

**MANAGERIAL AND SOCIO-ECONOMIC
IMPLICATIONS OF THE IMPLEMENTATION OF
TELEWORK IN GAUTENG**

by

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ABSTRACT

Telework can be defined as a flexible work arrangement, where selected employees work at home one or more days per week or at a site near home, instead of physically travelling to a central workplace. Telework has progressed globally, especially during the past decade to a work option that has an impact on commerce and industry in a most beneficial manner. This flexible work arrangement emerged in organisations because of the development of information and communication technology (ICT) that forms the key component of the teleworkers equipage.

This investigation focussed on telework aspects, such as the effects on the environment, quality of life and economic effects. It is evident that telework generates significant benefits to the corporate environments, improves work and personal life experiences for human resources, improves environmental and social circumstances and has resulted in a significant paradigm shift in the corporate arena. The investigation also identified barriers that constrain managers from implementing telework. The investigation furthermore determined how South Africa, in particular, might benefit socio economically.

Inferential conclusions indicate that telework could counteract many of South Africa's transport and related socio-economic problems that pose detrimental consequences for the environment and other resources, as is the case in many other countries.

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LIST OF FORMULAE AND ACRONYMS

3G	THIRD GENERATION
ABSA	AMALGAMATED BANKS OF SOUTH AFRICA
ADSL.....	ASYMMETRIC DIGITAL SUBSCRIBER LINE
BBS.....	BULLETIN BOARD SYSTEM
BRT	BUS RAPID TRANSFER
CBD	CENTRAL BUSINESS DISTRICT
CH ₄	METHANE
CO.....	CARBON MONOXIDE
CO ₂	CARBON DIOXIDE
CPU	CENTRAL PROCESSING UNIT
CSTA.....	COMPUTER SUPPORTED TELEPHONY APPLICATIONS
CTI.....	COMMUTER TELEPHONY INTEGRATION
DA	DEMOCRATIC ALLIANCE
DoT.....	DEPARTMENT OF TRANSPORT
EIT	ECONOMIES IN TRANSITION
E-MAIL	ELECTRONIC MAIL
GDP	GROSS DOMESTIC PRODUCT
GHG	GREEN HOUSE GASSES
GM.....	GENERAL MANAGER
HC.....	HYDROCARBONS
HFCs.....	HYDROFLUOROCARBONS
HOV	HIGH OCCUPANCY VEHICLE
HSDPA	HIGH SPEED DOWNLINK PORTABLE ACCESS
I GENERATION	INFORMATION GENERATION
ICT.....	INFORMATION AND COMMUNICATION TECHNOLOGY
IP.....	INTERNET PROTOCOL
IPCC	INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE
ISDN.....	INTEGRATED SYSTEMS DIGITAL NETWORKS
IT	INFORMATION TECHNOLOGY
ITAC.....	INTERNATIONAL TELEWORK ASSOCIATION AND COUNCIL
ITS	INTELLIGENT TRANSPORT SYSTEM
JAMA	JAPAN AUTOMOBILE MANUFACTURERS ASSOCIATION

LAN.....	LOCAL AREA NETWORK
MAN.....	METROPOLITAN AREA NETWORK
N ₂ O.....	NITROUS OXIDE
NAAMSA.....	NATIONAL ASSOCIATION OF AUTOMOBILE MANUFACTURERS OF SOUTH AFRICA
NO _x	NITROGEN OXIDE
OECD.....	ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT
PC.....	PERSONAL COMPUTER
PFCs.....	PERFLUOROCARBONS
SAA.....	SOUTH AFRICAN AIRWAYS
SANRAL.....	SOUTH AFRICAN NATIONAL ROAD AGENCY
SF ₆	SULPHUR HEXAFLUORIDE
SOHO.....	SMALL OFFICE HOME OFFICE
TELCOA.....	THE TELEWORK COALITION
UNFCC.....	UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE
USA.....	UNITED STATES OF AMERICA
VMT.....	VEHICLE MILES TRAVELLED
VO.....	VIRTUAL OFFICE
VoIP.....	VOICE OVER INTERNET PROTOCOL
VPN.....	VIRTUAL PRIVATE NETWORK
VUT.....	VAAL UNIVERSITY OF TECHNOLOGY
WAN.....	WIDE AREA NETWORK
WIFI.....	WIRELESS FIDELITY
WIMAX.....	WORLDWIDE INTEROPERABILITY FOR MICROWAVE
WWW.....	WORLD WIDE WEB

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION AND MOTIVATION

Previous research done in the United States of America (USA) (Hoffmann, 1999) served as an inspiration to investigate the feasibility of telework and related information and communication technologies (ICT) on the socio-economic environment. This research includes, as a point of departure, an investigation on management and employee perceptions of telework in order to determine if any barriers exist that might hinder the implementation of telework.

Typically, telework refers to the use of ICT to conduct business from a distance. It can include videoconferencing, online database searches, facsimile transmissions, cellular and standard telephone calls, voicemails and electronic mails (e-mails). Technically, telecommuting is a subset of telework. Telecommuting eliminates or reduces the length of commute trips in that employees can work at home, in other places or in designated telecentres. The terms telework and virtual office (VO) are interchangeable. Telework refers to full- or part-time employees, in selective occupational groups, for whom travel to work is eliminated, shifted out of peak travel times, or curtailed through the performance of work at home or alternative work centres, and who communicate using ICT instead of travelling to corporate offices (Stough & Button, 2006:5).

Corporate use of ICT developments during the last few decades is largely responsible for making it possible for work to be conducted from home. Sophisticated telephone and wireless services, personal computers connected to central networks and data systems, facsimile, e-mail and voice mail systems have all dramatically widened the choice of geographic location for information and knowledge workers. In effect, ICT services are substituting, partially or completely, travel to the traditional office (National Transport Library, 2006:11).

The locus of control for work and career paths has shifted from the company to the individual. Similarly, telework options increase the levels of autonomy and responsibility

for employees. Technological advances and globalisation, both of which create the need to use flexible scheduling and work options to meet global service and personal needs, enhance the practicality of telework alternatives for businesses and individuals alike (Stough & Button, 2006:9).

According to the Canadian Telework Association (2006), some of the beneficial socio-economic outcomes of telework in the USA include the following:

- it enhances economic development and sustainability;
- it promotes energy conservation;
- it reduces stress and subsequent health care costs;
- it stimulates recruitment and retention capabilities and aids in economic development, global competitiveness and the prevention of the corporate “brain drain”; and
- it is advantageous for disaster management and business continuity strategies by allowing work to continue during emergencies.

Recent newspaper reports in South Africa consistently highlight a variety of problems that further enhance the feasibility of conducting this investigation. Hoffmann (2006:12, 13) and other sources, as indicated, cite some of the examples of these problems according to various news reports, as follows:

- rapidly increasing traffic congestion and worsening driving standards leading to more accidents make it difficult for insurance brokers to operate on a profit basis. Currently, the number of claims being submitted tallies to one out of every four vehicles on the road. The reasons given for this increase in road accidents include traffic congestion in all metropolitan areas, together with the aggressive and impatient behaviour of drivers;
- reduced levels of sunlight are causing certain industries, such as soft fruit and fisheries, to suffer increasingly because of earth warming resulting from air pollution;
- if the government promulgates legislation regarding air pollution control in the Vaal Triangle region, it will be possible to save R289 million in terms of medical expenses for the country and the Vaal region *per se*; and
- owing to earth warming, 34 percent of South Africa’s ecosystems are in danger, 82 percent of rivers and 12 percent of marine bio zones.

In South Africa, no surveys have been conducted towards establishing the extent to which telework is practised.

1.2 PROBLEM STATEMENT

This study focuses on investigating telework as a flexible work option for counteracting many of the South African transport and related socio-economic problems that pose detrimental consequences to the environment and other resources. The investigation includes whether possible barriers may exist that could result in management/employers being reluctant to implement telework.

1.3 OBJECTIVES AND PURPOSE OF THE STUDY

1.3.1 Primary objective

The investigation primarily focuses on employee and employer attitudes with regard to the implementation of telework as a flexible work option concurrent with the related beneficial implications to the environment and socio economy.

1.3.2 Specific objectives

The following specific objectives are important to support the fulfilment of the primary objective:

- establish the degree of cognisance and willingness to accept the phenomenon of telework in trade and industry, in both the private and public sectors;
- establish and identify possible barriers that may constrain management from implementing telework;
- investigate the extent to which individuals desire to regain control over stress and time in order to balance work and family life within a flexible work option concept;
- establish the extent of corporate desire to improve productivity and labour economics within a flexible work option concept; and
- investigate the possibilities of preserving the environment by reducing land-use requirements for highway expansion, traffic congestion and air pollution within a flexible work option concept.

1.4 METHOD OF INVESTIGATION AND RESEARCH DESIGN

Figure 1 provides a holistic model of a generic research framework. The areas in white indicate those areas that are not applicable to this investigation. Those areas with a coloured background, therefore, indicate the research process followed.

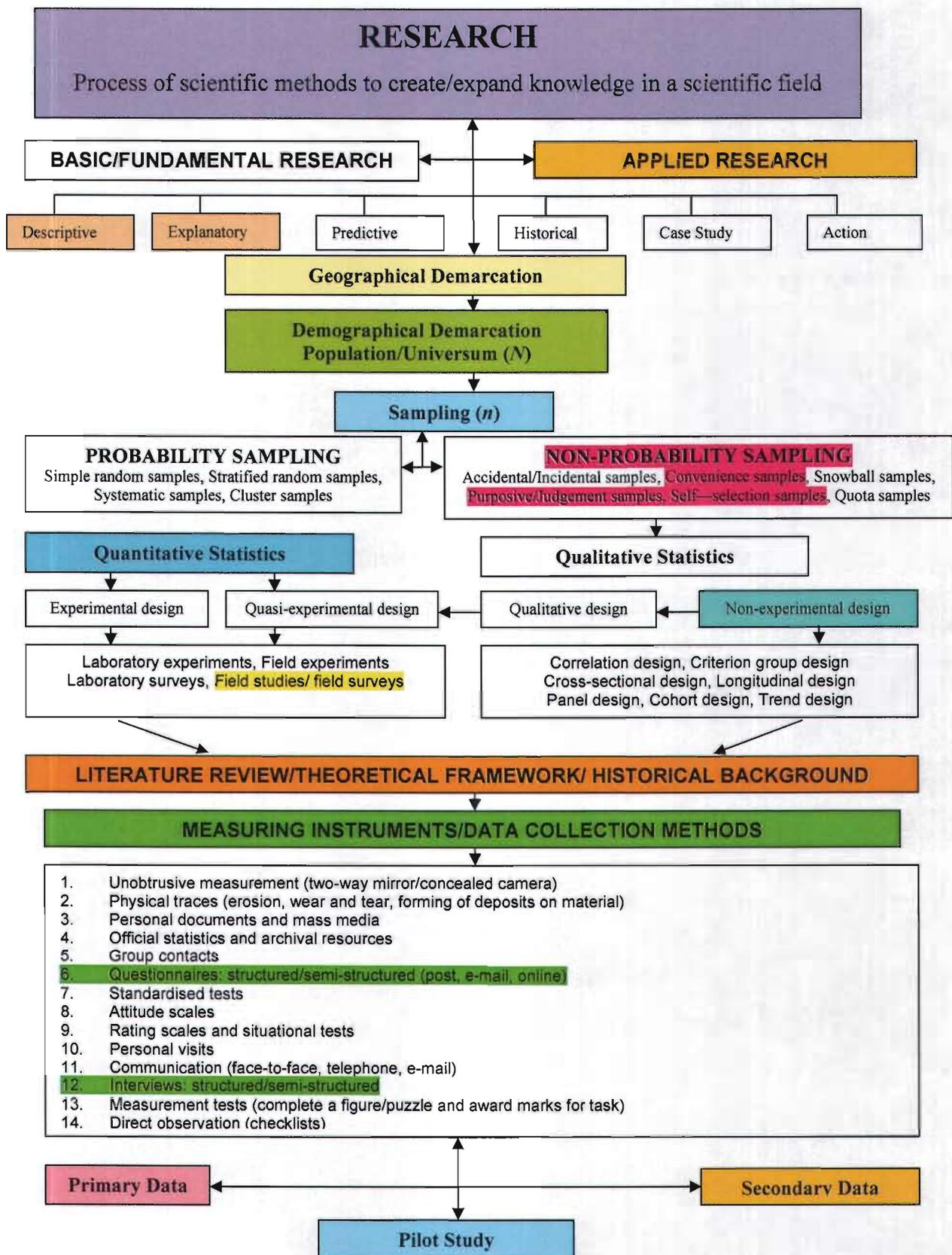


Figure 1: A holistic research framework (Hoffmann, 2008, adapted from Welman & Kruger, 2001)

Table 1 depicts the systematic research process followed, as indicated in Figure 1.

Table 1: The systematic research process

STEPS	APPROACH/DESIGN
Step 1	Applied research
Step 2	Exploratory research involving descriptive statistics
Step 3	Geographical demarcation
Step 4	Demographical demarcation/ Population (<i>N</i>)
Step 5	Sampling (<i>n</i>)
Step 5.1	Non-probability sampling
Step 6	Quantitative statistics
Step 7	Non-experimental design
Step 8	Field surveys
Step 9	Literature review
Step 10	Measuring instrument and data collection
Step 10.1	Structured questionnaires
Step 10.2	Structured interview
Step 11	Primary and secondary data
Step 12	Pilot study

Chapter 3 provides a detailed description of the abovementioned research process.

1.5 DATA CAPTURING, PROCESSING AND STATISTICAL ANALYSIS

The MS Excel software package was used for data capturing and processing purposes. The services of a statistician at the North-West University have been invaluable in this regard.

1.6 CONTINGENCY ANALYSIS

Limited literature on the topic of telework is available in South Africa. This necessitated the extensive use of online and other sources of information. The Internet sources studied for the purposes of the study originated from reliable sources, such as international telework professional bodies and established organisations worldwide that promote the implementation of telework.

1.7 STRUCTURE OF STUDY

Chapter 2 provides a literature review covering a historical perspective and theoretical framework of telework and its socio-economic implications. It is evident that telework is essentially a management style, whereby telework represents a particular approach to management. The literature also provides a 'South African scenario' that indicates how a variety of socio-economic problems in South Africa could, if not to a large extent at least partially, be addressed by the implementation of telework as a flexible work option.

Chapter 3 outlines the research methodology, target population, sampling, geographical demarcation, statistical analysis, data collection, design, pre-testing and distribution of the questionnaire and, finally, the empirical response rates.

Chapter 4 focuses on the empirical findings of the investigation. Analysis and interpretation of processed data obtained from the measuring instrument are contained within this chapter.

Chapter 5 deals with the conclusions and recommendations emanating from the findings of the study. Possible areas and concepts for future research are also identified in this chapter.

1.8 DEFINING THE TITLE OF THE PROJECT

1.8.1 Managerial

'Management' (from Latin *manu agere* "to lead by hand") characterises the process of leading and directing all or part of an organisation, often a business, through the deployment and manipulation of resources (human, financial, material, intellectual or intangible) (ManagementUpdate.Info, 2007:1). The term 'managerial' is derived from the word 'management'. Managerial means 'relating to, or a characteristic of a manager or management'. It is the act, manner or practice of managing, handling, supervising, or controlling.

1.8.2 Socio economic

Socio economic is a term relating to or concerned with the interaction of social and economic factors (COD, 2002:1114); that is, relating to, or involving both economic and social factors (CED, 2003:1532).

1.8.3 Implications

The term implication refers to an implicit conclusion that can be drawn from something, or a likely consequence (COD, 2002:579).

1.8.4 Implementation

The term 'implementation' is defined as carrying out or fulfilling something or putting something into action. It is also described as "application, putting into practice, operation, employment, execution, enactment" (The free dictionary, 2008).

1.8.5 Telework

Telework implies bringing work to the worker and not the worker to work - meaning working at home or at an off-site location for a part of the workweek. 'Tele' means distance, combined with 'work', implying that work is executed from a distance or away from the traditional workplace. Therefore, telework can be defined as a flexible work arrangement, where selected employees work one or more days a week from their home or at a site near the home instead of physically travelling to a central workplace. Teleworkers may be based in corporate offices but work at home part of the week. Alternatively, they may spend most of their time with clients and rarely work in corporate offices. Hoffmann (2001:1) defines a teleworker as a person who works at home or at an alternative workplace during normal business hours one or more days each week or month whilst still maintaining the role of a full-time corporate employee. Teleworkers are normally required to be available during a core time, for example 08:00-17:00, and should be reachable by telephone, computer or facsimile.

1.8.6 Gauteng

Gauteng is the most densely populated province in South Africa. It is geographically the smallest province but accommodates more than seven million of the country's 47 million citizens. Johannesburg is the capital of the province. Pretoria (Tshwane) lies 50 kilometres north of Johannesburg. Other important Gauteng towns include the West Rand towns of Krugersdorp and Roodepoort, and the East Rand towns of Germiston, Springs, Boksburg, Benoni, Brakpan and Kemptonpark. North of Tshwane is the industrial areas of Rosslyn, Soshanguve and Cullinan (known for its diamonds). In the south of the province are Vanderbijlpark and Vereeniging, with Heidelberg, Nigel and Bronkhorstspuit to the east

(South African Consulate General: Gauteng, 2007:1). Figure 2 provides an illustration of the Gauteng province, as described above.



Figure 2: Gauteng Province (SafariNow.com, 2005:1)

1.9 SUMMARY

Chapter 1 served as an introduction to the investigation in order to clarify the basic scientific approach, which will be expounded upon further in Chapter 3. The following chapter, Chapter 2, describes the historical background and theoretical framework upon which the investigation is based.

CHAPTER 2

HISTORICAL BACKGROUND

2.1 INTRODUCTION

Chapter 1 served as the introductory preamble, briefly explaining the purpose, problem statement and objectives of the study. In addition, the chapter provided a synopsis of the research methodology used in the investigation. Chapter 2 covers the historical background or theoretical framework upon which the investigation is based.

The workplace of today bears little resemblance to the workplace and administrative procedures of yesteryear. Traditionally, the place of work consisted of a designated physical space with distinct and basic furniture, and technical, stand-alone, single-function pieces of equipment. Later, equipment was mechanised, which subsequently led to the automation of processes and procedures. This process was the first sign of the ability of office equipment to take over the more mundane and routine tasks of managers and administrative assistants. The processes of mechanisation and automation evolved into a process of electronic linkages and, a number of years down the line, networks became a reality. Networks are one of the main contributors to what is today known as the 'virtual workplace'. Networks enable people to download information electronically from one site or workstation to another. This means that employees no longer need to be office-bound in order to do their administrative work. In addition, work does not have to be delayed or rescheduled when employees are out of the office.

2.2 FROM THE TRADITIONAL OFFICE TO THE ELECTRONIC OFFICE

In the traditional office, work was done according to a set routine. The activities were geographically centred and administrative staff would normally have a space designated to them with their own furniture and equipment. Staff had to deal with a variety of equipment and job demands, such as typewriters, files, filing cabinets, phone calls, typing and the reprography of documents (Ferreira, Erasmus &

Groenewald, 2003:258). The traditional office functions were limited to basic clerical services.

A number of factors have been identified that contributed to the transformation of the traditional office. These are discussed below.

The most important factor that contributed to the emergence of the electronic office is ICT. ICT has changed the manner in which administrative duties are performed, and terminologies such as PCAnywhere (customised, contemporary telework software, TMSymantec) and World@Work (global telework forum, USA) clearly depict the meaning and importance of telework. Consequently, a paradigm shift to virtual time and space took place because of the possibilities created by the use of ICT. This concept of virtual time and space expanded and later contributed to the emergence of the VO.

The administration done in the electronic office is inherently more interactive than the previous manual administrative routines. As a result, people have more control over their time, the content of their jobs, the tools at their disposal and the place from where they do their work. This means that employees now have more freedom to decide on when to do a particular piece of work.

Employees can now fit work in with their own schedules and personal preferences, whereas in the past they had to go to a specific geographical place of work at a specific time in the morning, remain there for the required number of hours, and then go home at a prescribed time. They also had to be physically at the office and had to perform their work using the labour-intensive equipment that was available. This included manual procedures on typewriters, filing of hard copies in cabinet drawers, communicating by general post services and telephone, and many other routine tasks.

However, because of the variety of options that computer software and hardware offer, administrative employees now have more tools at their disposal from which to choose. This means that they can adapt and adjust the content and nature of their jobs so that it fits in with their own personal work and life styles. Therefore, the emerging VO is one of the most important features of virtual reality because electronic

networks result in work arrangements where employees do not have to be office-bound in order to get their work done.

The following are the features inherent to the electronic office:

- automation;
- computer networks;
- user-friendly hardware and other equipment;
- multi-functional technology and equipment;
- software applications; and
- the human resource supply.

2.3 FROM THE ELECTRONIC OFFICE TO A VIRTUAL WORKPLACE

The previous section described the traditional office and the electronic office, together with the emergence of a new administrative scenario, referred to as the VO. VOs are typically equipped with a combination of technologies that enable information workers to recreate the support services of the traditional office. This is especially salient, since it represents the core of the changes and possibilities brought about by being able to work anywhere and anytime, whilst recreating administrative support services off-site. The concept 'virtual' implies the use of technology that is mainly based on the influence of ICT developments (Ferreira *et al.*, 2003:261).

The impact and extent of this new administrative scenario is significant. Firstly, the invention, and later proliferation of the computer, has been a cause of concern for human beings because it influences the way in which they organise themselves socially and technically. The computer has brought about the information age. The computer has changed the way work and work groups are organised, as well as the nature of the workplace. Furthermore, the rapid development of new communication technologies, such as multimedia, the Internet and the information highway, has led to a new way of doing business.

Typically, this new way of doing business consists of a chain of operations involving several people in a network that leads to a higher degree of flexibility and the redesign of the traditional office. Quite often, only one person will occupy an office in

such networks. There is a strong relationship and resemblance between the features of mobility and virtual reality.

Features of the virtual workplace are:

- fewer boundaries;
- changed administrative processes;
- specialised support services;
- a fundamental shift in work patterns;
- a paperless environment;
- a worksite away from the traditional office;
- distributed intelligence;
- a new conception of space, time and distance; and
- telecommuting.

2.4 TELECOMMUTING AND TELEWORK

The word 'commute' means 'to travel' and telecommuting is viewed as a form of teleworking. All telecommuters are teleworkers, but not all teleworkers are telecommuters (Jala International Inc., 2006:1). Figure 3 depicts the integrated relationship between teleworking and telecommuting.



Figure 3: Relationship between telecommuting and telework (Nilles, 1998:17)

Telework implies bringing work to the worker and not the worker to work, meaning working at home or at an off-site location for a part of the workweek. 'Tele' meaning distance, combined with 'work', implies that work is executed from a distance or away from the traditional workplace. Therefore, telework can be defined as a flexible work arrangement where selected employees work one or more days a week from their home or from a site near their home, instead of physically travelling to a central workplace each

day. Teleworkers may be based in corporate offices, but work at home part of the week. Hoffmann (2001:1) defines a teleworker as a person who works at home or at an alternative workplace during normal business hours one or more days each week or month whilst still maintaining the role of a full-time corporate employee. Teleworkers are normally required to be available during a core time, for example 08:00 - 17:00, and to be reachable by telephone, computer or facsimile.

The VO is described as a work site that is situated outside of the traditional office, where people still do the work associated with a traditional office. In the VO, human resources consist of people who work for an employer, but from outside of a corporate office. The VO is described by means of a variety of other flexible work option terminologies such as:

- a home office;
- small Office, home office (SOHO);
- work-at-home;
- a mobile office;
- an unassigned office;
- a telecentre, telebusiness centre;
- hot-desking;
- hotelling;
- cocooning; and
- just-in-time (Farrell, 2003:1).

One of the first individuals to foresee the arrival of telework (as it was termed in Europe) was Norbert Wiener in his landmark book, *The Human Use of Human Beings: Cybernetics and Society*, published in 1950. Wiener discussed a hypothetical example of an architect living in Europe but supervising the construction of a building in the USA. Using the recently introduced facsimile transmission service "Ultrafax," he said, "... even without transmitting or receiving any material commodities, the architect may take an active part in the construction of the building In short, the bodily transmission of the architect and his document may be replaced very effectively by the message-transmission of communications which do not entail the moving of a particle of matter from one end of the line to the other" (National Transport Library, 2006:12).

Interest in telework did not increase significantly until the early 1970s, when terminal-based use of corporate and time-share mainframe computers became widespread. Portable terminals, using voice-quality telephone lines, permitted system access from any location that had telephone service. Gradually, it became understood that telecommunications and data processing could be meshed into integrated systems. In the late 1970s, the French neologism term *telematique* (telematics) was coined by Simon Nora and Alain Minc as a way of describing this growing interconnection of telecommunication and computers into one integrated national and international system.

The early 1970s also saw an international oil crisis, which focused critical attention on the waste of energy in private and public transport systems. The combination of technical potential and social need served as a strong stimulus for innovation. The dominant view of telework in this initial phase was the potential to save energy by substituting electronic communication for physical transportation.

In 1973, Jack Nilles introduced the term 'telecommuting' as the USA equivalent of 'telework', which was later adapted back to 'telework' by USA academics (National Transportation Library, 2006:13).

In 1980, Alvin Toffler incorporated the idea of telework into his three-phase world history, making it one of the basic elements of the emerging "Third Wave". In this book, he predicted that the new information-based production system would move millions of workplaces from factories and offices back to where the workers had come from - the home.

During the 1984 Summer Olympics in Los Angeles, businesses reduced traffic congestion by allowing employees to work from home using company-supplied computers. Employees liked working from home so much that the project became a permanent arrangement and spread to other Californian companies (Klayton, 1994:5).

At the organisational level, many studies have forecast radical changes to existing hierarchical institutions. In his 1979 paper, Daniel Bell refers to the change in libraries, indicating that these buildings which house the world's recorded knowledge may become only a monument of the printed past. Wilfrid Lancaster, of the University of Illinois,

suggested the imminent disappearance of the book, to be replaced by the year 2000 with a computer network.

A number of writers have speculated about the impact of telecommuting on the working community. In the early 1980s, Starr Roxanne Hiltz put forward the concept of the 'online community', which would gradually replace the physical office. According to Hiltz, these office networks can best be thought of as a new kind of social system: one in which the familiar social processes of the workplace and the organisation are replaced by electronic online communities (National Transport Library, 2006:13).

The terms 'telework' *versus* 'telecommuting' and 'telecommuters' *versus* 'teleworkers' have been used interchangeably. For the sake of consistency and better understanding of the topic, only the terms 'telework' and 'teleworkers' will be used in the remainder of this dissertation.

2.5 DRIVING FORCES BEHIND TELEWORK

Driving forces are factors that provide the incentive, motive or reason for a phenomenon. In the case of telework, these driving forces include the following five:

2.5.1 Work related factors

These refer to aspects of the work environment that are uncomfortable or undesirable for the individual, and/or the desire to work independently.

2.5.2 Family related factors

These factors include the role, responsibilities and/or the desire for more family time.

2.5.3 Leisure related factors

These factors refer to an individual's pursuit of interests, education and personal improvement.

2.5.4 Ideological factors

These factors focus prominently on the promotion of environmentalism, including the reduction of air pollution.

2.5.5 Transportation factors

These factors relate to avoiding travelling to corporate offices, accommodating the disabled and a variety of others (Stough & Button, 2006:3).

2.6 GEOGRAPHICAL LOCATIONS AND FORMS OF TELEWORK

According to the National Transport Library (2006:7), telework does not always imply working at home. Often, telework is only practised for one or two days per week, although it may also be practised on a full-time basis. While today's teleworkers are predominantly managers or professionals, many observers see this practice as potentially relevant to most information workers, as well as to certain other types of employees. There are two main variants: home-based and telecentre telework. In addition, there are variants of those variants to suit personal needs, as described under the following headings indicated in different preferential 'palatial flavours'.

2.6.1 Chocolate – Home-based telework

Most people love chocolate, and home-based telework is an equally captivating departure from 'work-as-we-know-it'. It immediately captures the imagination, such as working in idyllic surroundings at home, instead of some noisy office; working at one's own pace, neither being pushed nor impeded by one's fellow workers; fitting one's work life into family life, instead of *vice versa*; design one's own job; and dramatically increasing productivity and job opportunities (Nilles, 1998:11).

In home-based telework, the employee works at home, keeping in touch with the main office by telephone or some other ICT. It is anticipated that most home-based teleworkers will work at home part-time (one to three days per week), spending the rest of their work time in the main office or at other company facilities. However, some teleworkers could be at home full-time. The original sole telework-site was Alvin Toffler's electronic cottage or, under the opposing paradigm, the 'electronic sweatshop' (the home, pure and simple, and full-time or close to it). This option is heavily dependent on remote supervision. It does not provide the social interaction that a work centre offers. On the other hand, work at home can give employees extreme flexibility in schedule and life style. Childcare may be accommodated more easily and for many people with primary childcare responsibility, working at home may be the only employment option. It also offers employment opportunities to the elderly and the handicapped. The work-at-home option can be done on

an individual basis to accommodate a particular situation or need, either temporarily or permanently. Individuals tend to prefer home-based telework, as opposed to telecentre-based options (Stough & Button, 2006:4).

2.6.2 Telecentre concept

An important alternative form of telework involves performing the work task at a special-purpose telework centre (generally referred to as telecentres), located relatively close to the employee's home. The centres are usually equipped with sufficient office automation and communications facilities to serve as true extensions of the normal workplace. This approach is particularly attractive for those workers who have to travel long distances to get into work. While telecentres do not eliminate travel, they can substantially reduce the required distance and time of travel. Centres are best located in less congested areas or near public transit. These centres can take a variety of forms, such as a satellite centre, regional or local centre and neighbourhood centre.

The financial feasibility of telecentres in various circumstances has yet to be determined. In addition, there is the possibility that regional centre teleworkers may move even further away from their place of work when they are no longer commuting to the central business district, thereby negating many of the quantifiable benefits of telework. Furthermore, if such centres are not conveniently located near public transit, they could increase vehicle trips. For all of these variants, the common criterion is that such centres be located close to where the teleworkers live so that the teleworkers can perform their duties there instead of, or in addition to, working at home.

2.6.3 Vanilla – Satellite telecentre

A satellite telecentre may seem much less glamorous than home-based telework. A satellite telecentre is an office building (or part of a building), owned or leased by an organisation, where employees regularly report for work. It looks much like any other set of offices, with individual cubicles of various sizes, desks, computers, telephones, conference rooms, and so on – although the mixture of these may be different from a more conventional office. However, one important difference between a satellite office and a traditional office lies in the fact that all of the centre's employees use it because they live closer to the centre than to their regular or main office, regardless of what their jobs entail.

2.6.4 Chocolate chip – Local telework centres and neighbourhood centres

Local telecentre facilities house any number of teleworkers from different organisations. Employees share space and equipment in a centre closest to their homes. Therefore, densely populated areas could have centres that are financially supported by all of those organisations whose employees use them. Such an option is complicated to implement on a large scale because it requires a great deal of cooperation amongst different organisations.

Some local centres serve a neighbourhood. These are called neighbourhood telecentres. Neighbourhood centres tend to support only a few teleworkers, generally fewer than 20. The emphasis in neighbourhood centres is on eliminating the need for any vehicle use in getting to and from the centre. Teleworkers should be able to walk, commute by bicycle or make use of public transport to reach the centre.

2.6.5 Tutti-frutti combinations

The previous four ‘flavours’ of telecentres can be combined and mixed in such a way as to create appropriate hybrids for any given organisation. For example, home-based teleworkers may work part of the time from home and the rest of the time from their principal office, a satellite, or a local telecentre. A few home teleworkers may still go to the office most days, but telecommute at both ends of the workday, going to and from the office during off-peak traffic hours. While this option does reduce travel time, it does not have much impact on reducing air pollution.

Satellite and local centres in well-designed operations are likely to have both permanent office space for their full-time employees and temporary office space for their home or occasional teleworkers, as well as for employees from other cities who need temporary space during a trip. The central criterion for telework is the same for all of these hybrids - if a job or major portions of a job not intrinsically depend on the location of the worker, it is tele-workable.

In South Africa, an investigation on telecentres in rural areas established their uses, benefits, shortcomings, viability and sustainability (Jacobs, 2003). The investigation was then extended to focus on “a quality management system for rural community centres”, during which course a telecentre management system model was designed (Jacobs, 2005).

Several telecentres have been established in South Africa as part of a government-driven community development project (Universal Service and Access Agency of South Africa, 2007:1). However, since the telecentre concept is beyond the scope of this study, no further detail is discussed here.

2.7 JOBS WITH TELEWORK POTENTIAL

The consensus among leading advocates of telework is that it is not appropriate for all employees. The most visible classes of work performed by full-time teleworkers are knowledge functions, sales and marketing. The 'knowledge function' or 'information worker' category includes reading, writing, customer service and research (in books, databases or by telephone), along with analytic functions of many kinds. The sales functions would comprise calling, planning and record keeping. Large-scale telemarketing (as opposed to order taking) is most often performed from 'boiler rooms', in order to make the most intensive use of voice over data lines and to maximise motivation. Parts of many jobs, the totality of which cannot be removed from their normal setting, can be isolated successfully in space and time and performed elsewhere. Typically, information- or knowledge-based jobs are more suitable for telework. That is, jobs where the worker's primary activity involves the creation, processing, manipulation or distribution of information (National Transport Library, 2006:19).

2.8 CHARACTERISTICS OF AN IDEAL TELEWORKER

The characteristics suitable for telework include being self-motivated, self-disciplined, having specialised skills and experience, being able to work independently, and being innovative and flexible in one's attitudes. Typically, employees who are extroverts are not likely to make good frequent teleworkers since they crave social interactions within their work environments. Many successful teleworkers have reached the stage in their lives where working from home has positive trade-offs, providing that they be able to come to a satisfactory working relationship with their families at home. Some teleworkers are affected by certain compulsions when working in isolated environments such as the home. These could include overeating, drug abuse and workaholism. An important requirement is that the teleworker should have a permanent workstation that does not require daily set-up and take down. It should be noted that characteristics of the successful teleworker and job characteristics are relatively independent of the technology involved (Nilles, 1998:34).

2.9 PERSONALITY TYPES BETTER SUITED TO IN-OFFICE WORK

It is clear from the above discussion that some employees are better suited to the formal/traditional office environment. Even so, given that telework can often be located in a satellite or local centre, this does not necessarily preclude employees from teleworking. However, those who need direct physical supervision for reasons of motivation or discipline should not be assigned to home-based teleworking jobs. Although, one could argue that they should not have been hired in the first place. Highly social people, who need face-to-face interaction with others to function well, should be allowed to remain in the office. Employees who are inflexible in their work habits and the stereotypical bureaucrats may have difficulty working at home. Similarly, single people who use the office or its environment as a meeting opportunity may prefer to work in an office rather than from home. Substance abusers, assuming their sources of supply are equally available at home, may become worse if they are home-based teleworkers. Food was once thought to be one of the substances most abused by home-based teleworkers. However, new evidence shows that few teleworkers experience any significant weight gain or loss (Nilles, 1998:38).

2.10 TELEWORK INDUSTRIES

Administrative business services, retailing/wholesaling and banking/finance stand out as the leading industries in the telework arena. Manufacturing, telecommunications and healthcare also rank high. Jobs or tasks that are not location-dependent and/or do not require significant levels of face-to-face interaction are likely to be good candidates for telework. The following tasks, duties or responsibilities are suitable for telework:

- data capturing;
- programming or other specialist computing;
- administrative work;
- translation;
- financial services, book-keeping or accountancy;
- ordering, information or booking services;
- sales, marketing;
- editing;
- research, consultancy;
- design, architectural work;
- training, education;

- management;
- repair; and
- maintenance (Stough & Button, 2006:15).

2.11 TELEWORK ARRANGEMENTS

Employers are increasingly accepting telework, often on an informal ‘off-the-record’ basis, in order to enable continued workforce contributions in a range of personal circumstances that necessitate temporary, part- or full-time absence from work. These temporary and transitional applications include maternity leave, temporary care of children or elderly parents, injury and illness, temporary relocation and phased retirement. While increasingly accepted, these are seen as concessions given to valued and privileged professional staff.

Programmes that are more permanent are centred on sales, telemarketing, customer service and data-/forms-entry staff. For employers, telework arrangements are also helpful in making at least partial use of personnel who are away attending special training or education activities, as well as in fulfilling the need for peak part-time and seasonal work. In addition, many companies are encouraging telework as one aspect of the adoption by senior staff and executives of a high-technology/high-performance work style (National Transport Library, 2006:22).

2.12 RELEVANT TELE-SUBSTITUTIONS

2.12.1 Incarcerated workers

Prison populations are becoming a regular element of certain telework schemes. Inmates at Arizona correctional facilities in the USA are employed as reservation agents for Best Western. They receive the same wages and benefits as non-prison workers and part of their pay goes to victim restitution and part to the state to pay for room and board (National Transport Library, 2006:22).

2.12.2 Tele-transactions

Tele-transactions include the many instances where orders are placed within and between businesses (or between individuals and companies, as in computerised stock trading) via computers over private networks or public telephone lines or, as in tele-banking, by means of touch tone lines.

As money and stocks are 'moved' electronically, consumer transactions are also transformed. Tele-investing combines access via personal computer to stock-quotation services with computerised order placement. The faxed transaction, whether used to settle insurance claims, provide documents or buy lunch, is an increasingly common replacement for mail, phone calls or personal delivery of documents, depending on the time and space constraints of the particular transaction (National Transport Library, 2006:22).

2.12.3 Other tele-substitutions

In addition to telework, there are a growing number of situations in which telecommunications are substituted for in-person acquisitions or performance of services. In the near future, they are not likely to have a strong impact on transportation, but the cumulative effect could eventually be significant if it could affect transportation directly and also indirectly through its impact on land use, which, in turn, affects public transportation. Moreover, increasing public acceptance of services that generate a broader market for sophisticated telecommunications services will contribute to the availability of these services for telework. These other tele-substitutions include tele-education, tele-shopping, tele-banking, tele-medicine, tele-justice, tele-taxes and tele-voting (National Transport Library, 2006:23).

2.13 INFORMATION AND COMMUNICATION TECHNOLOGY AS FACILITATOR TO TELEWORK

A substantial amount of telework can be accomplished effectively even with only a telephone, paper and pencil as the relevant technologies. Yet, application of more sophisticated technology generally makes life easier, increases the amount of telework one can do and makes telework available to more people (Nilles, 2001:3). Figure 4 provides a broad perspective of the involved telework technologies.

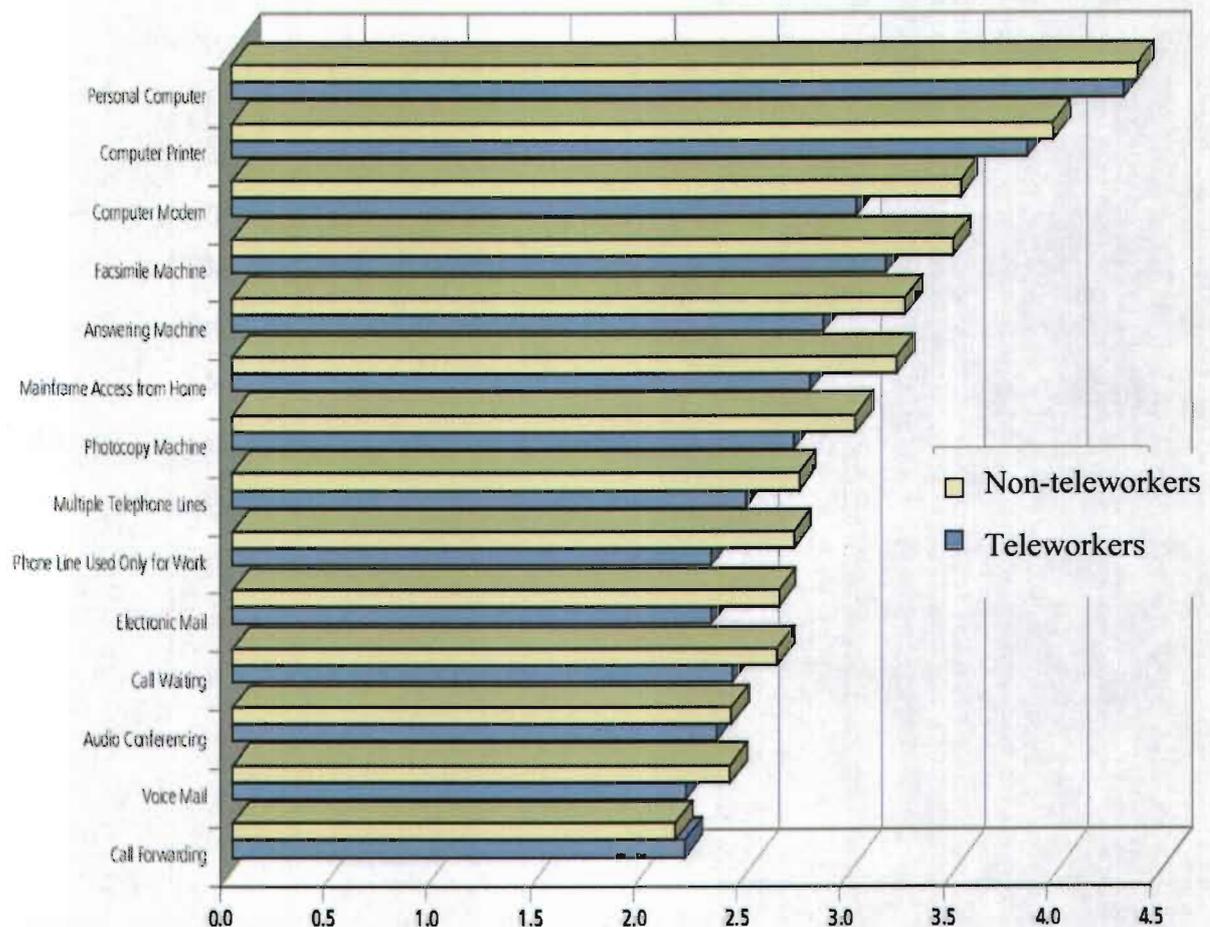


Figure 4: Telework technologies (Nilles, 2001:3)

The scale used by Nilles (2001:3) ranges from one (it has no effect on the job) to five (it makes the job significantly easier). The clear conclusion from Figure 4 is that ICT is the key component of the teleworkers' equipage, with the personal computer being the most important requirement and printers the second most important item. Teleworkers only indicated call forwarding as more widely used than by non-teleworkers.

The following section briefly explains telecommunication accoutrements in order to enhance understanding of the electronic needs for a successful VO.

2.13.1 Electronic communication

O'Connell (1996:52), states that communication is the binding factor that integrates the VO. Powerful networks and sophisticated telecommunications systems provide the technology logistics that every employee should have easy access to – whether in the SOHO, at the corporate office, at a telecentre or at any other place where the job has to be performed. Face-to-face scheduled corporate meetings should not be neglected as an important tool to maintain corporate and social relationships.

The biggest advantage of electronic communication is that a person from South Africa can connect to an e-mail address in New York and receive four responses in less than twelve minutes. That equals a communication speed of around 100 000 miles an hour. According to Ferreira *et al.* (2003:131), electronic communication has become the new mode of organisational communication, not just among employees within one building, but also with employees in other regions, other countries and even customers all over the world.

2.13.2 Software

Software houses and suppliers of hardware and office ergonomics were quick to recognise the promising market created by the telework concept. Customised telework-software packages facilitate global telework interconnection, with more advanced ones continually appearing that compress the data into much more reasonable lengths (Nilles, 2001:10).

2.13.3 Voice mail

For every teleworker who is often unable to answer the telephone immediately, voice mail is one of the necessary tools.

2.13.4 Customised telework software/groupware

The goal of groupware is to interconnect work groups effectively, regardless of the location of the individual group members. It is now possible for employees working in offices on different floors of the same building or even thousands of miles apart to be assigned to a project team and to communicate easily with other members of their work group. Groupware packages are available to teleworkers that enable them to download files from the corporate office to the VO or *vice versa*. It also allows the teleworker to monitor work and create daily status reports for the manager.

Ferreira *et al.* (2003:146) indicates that work-group computing is a catch phrase for ICT that helps employees working on a common job. Work-group computing is made possible by groupware packages, which are Web-based software packages designed for use on computer networks that allow people to share information, coordinate activities and centralise all information about a project.

Groupware software packages typically include the following capabilities:

- group writing and connecting;
- electronic mail;
- meeting and appointment scheduling;
- shared time lines;
- electronic meetings;
- shared files and databases.

2.13.5 Electronic bulletin board system

An electronic bulletin board system (BBS) provides the means to manage teleworkers. This facility is offered by Unibase, which sells data-entry services to organisations that collect information on hand-written forms but need to store the data on computers. Completed forms are scanned using a scanning device and forwarded to Unibase, where software programs organise these documents into bundles, which are then distributed over the company's BBSs to teleworkers – many of whom work at night. Teleworkers download the files and key in the data into a typed format, which is then ready for the customers' computer databases. When this routine is completed, the teleworkers log back into the BBSs and return the files. The BBSs can be used by managers to monitor the progress of assignments (Hoffmann, 2001:12).

2.13.6 Telecommunication networks

Telecommunication networks are the freeways of teleworking (Nilles, 2001:14). Computer networks represent a tool to facilitate the utilisation of telephone companies' telephone lines and switches. It transfers voice and data five-to-ten times faster than traditional telephone lines. These networks are known as Integrated Systems Digital Networks (ISDN). Integrated with telecommunications and various other information technologies, they represent the teleworker's lifeline to the corporate office. The following network systems are briefly discussed:

2.13.6.1 Local area network

A local area network (LAN) is a network that connects computers and devices in a limited geographical area such as a home, school computer laboratory, office building or closely positioned group of buildings. Each computer or device on the network, called a node, often shares resources such as printers, large hard disks and programs. Managers are

having such networks installed within the office for business purposes. Once they are in place, telework becomes a natural extension.

2.13.6.2 Wide area network

A wide area network (WAN) is a network that covers a large geographical area (such as a city, country or the world) using a communications channel that combines many types of media such as telephone lines, cables and radio waves. A WAN can be one large network or can consist of two or more LANs connected together. The Internet is the world's largest WAN.

2.13.6.3 Metropolitan area network

A metropolitan area network (MAN) is a high-speed network that connects local area networks in a metropolitan area such as a city and handles the bulk of communication activity across that region. A MAN typically includes one or more LANs, but covers a smaller geographical area than a WAN (Shelly, Cashman & Vermaat, 2008:471).

2.13.6.4 Internet and intranet

The Internet is an extension of a 1960s USA government project that was used solely for computer science and engineering projects. It was used as a vital communications link between far-flung project collaborators, but was virtually unknown to outsiders. In 1989, the USA government decided to stop funding the project and this led to its commercial successor, the 'Internet'. In just a few years, the Internet has changed the course of the computer industry and materially altered the possibilities for teleworking (Shelly *et al.*, 2008:69).

The World Wide Web, an Internet service, provides a graphics-rich, easily navigated publishing medium, which, when integrated with e-mail, can be used to build a powerful information system. It is asserted that the Internet is the single most important development in the world of computing since the personal computer was introduced in 1981. The Internet is considered to be faster, more effective and more cost efficient than any other traditional marketing instrument. The growth rate in Internet connections sends a fundamental message to trade and industry: if one does not have a Web address, one does not exist. The ability to interact on the Internet will be an absolute requirement for commerce in the 21st century. By making telecommunications contact with vendors and

clients a matter of daily experience in many offices, the psychological barrier to accepting telework is greatly diminished (Nilles, 2001:11).

Du Plooy, (1999:8) investigated why enterprises in South Africa still doubt the possibilities of the Internet. He ascribes it to the fact that organisations are uninformed and afraid and, therefore, still cling to the *status quo* concerning ICT. Organisations acquire Web sites because they perceive it as a business norm and it is clear that the South African Web domain consists of merely an 'Internet presence', where the Internet's marketing and communication possibilities are not nearly used to their full potential.

In addition to the Internet, the intranet supplies an important communication channel between employees and an organisation's database in order for employees to be efficient in finding required information. The primary features offered by intranet include corporate document management, e-mail and information publishing. The intranet improves productivity, collaboration and the uninterrupted flow of information between departments within an organisation. It is fast becoming the most important method of knowledge distribution across companies and the cost of an intranet investment can often be recouped within the first couple of months after installation (Hoffmann, 2001:14).

2.13.6.5 Electronic mail

This facility does not only reduce the use of paper, but it also increases the speed and immediacy of messages. This concept alters the way in which teams of employees operate together and enables colleagues to stay globally connected. The Internet and e-mail provide a powerful information system. E-mail is economically viable in terms of cost. However, because of a lack of regular in-house training, employees do not always make optimal use of e-mail facility features, such as meeting requests, voting, interactive electronic diaries, calendars, archiving and many other features (Bothma, 2007:137).

2.13.6.6 Video conferencing

As an alternative to holding face-to-face conferences among an organisation's employees, a growing number of firms use videoconferencing and teleconferencing. This can be especially helpful when organisations have employees in different locations, such as teleworkers. This technology transmits images of individuals as well as their voice communication. Some organisations, rather than installing videoconferencing facilities, use

public meeting rooms equipped with videoconferencing capability as well as video conferencing service providers. Organisations that make frequent use of videoconferencing will likely find greater economy in installing their own equipment rather than paying to use others' facilities (Quible, 2005:433).

2.13.6.7 Teleconferencing

Teleconferencing involves electronic communication between two or more people at two or more locations (Ferreira *et al.*, 2003:147). Teleconferencing uses telephones to connect any number of remotely located individuals, which enables them to communicate by voice only (Quible, 2005:344). A teleconference is easy to arrange as it requires no special equipment except for telephones and may be used anywhere a person has access to a telephone connection. It is very cost effective compared to the cost of business travel.

2.13.6.8 Data conferencing

Teleconferencing, which includes the ability of two or more people to communicate simultaneously, is called data conferencing. With data conferencing, users at distant locations are able to edit and modify data files (Ferreira *et al.*, 2003:147).

2.13.6.9 Commuter telephony integration

Computer supported telephony applications (CSTA), telephone switches and commuter telephony integration (CTI) allow an organisation to integrate its telephone system with the corporate computer and network systems. The number of incoming calls can be detected and verified in the corporate database. The system can then forward the call to the appropriate employee, even if that employee is a teleworker. When the employee picks up the telephone, a soft copy (computer monitor version) of a client's record is displayed. Outgoing calls can also be controlled and audited with call accounting software that provides the company with detailed reports of calls made, duration and the account holders to whom it should be charged. This will obviously reduce the abuse of telephone facilities so often reported by companies in general (Harbison & Dunham, 1996:88).

2.14 HARDWARE

Challenging new technologies promise to change the administrative scenario progressively and drastic increases in bandwidth capacity are anticipated. The Internet creates a need for the continuous improvement in bandwidth, but currently the perceived and experienced

sluggishness of modems is a frustrating factor that users have to bear with. Connectivity to the corporate office has become a richer experience with new software applications, fast action speeds and compatible hardware to complement the interrelated information system (Hoffmann, 2001:15).

2.14.1 Computers, central processing units, monitors and keyboards

Teleworkers normally choose to use a laptop or notebook computer as their primary computer. This appliance can be connected to a large monitor, as well as to the corporate network at the office. Laptop computers are currently supplied with a comprehensive system consisting of a printer, facsimile facility and even a modem to connect to telephone lines. Desktop personal computers (PCs) are not expected to become obsolete, but may be cut down in size (Hoffmann, 2001:15).

2.14.2 Cellular telephony

According to Guest (2006:2), the cellular telephone (cell phone), alternatively known as a mobile telephone, is often the first port of call for workforce mobility today. Cell phones allow a receiver to be reachable at all times, regardless of location. Apart from their time saving benefits and usefulness as a valuable emergency tool, they also provide a mechanism for managers to keep track of teleworkers. The Nokia Vice President of Enterprise Solutions visited South Africa to show how far the cell phone has come and where it is going. A new range of cell phones, developed specifically to meet business requirements, was recently released. These not only provide essential business applications like e-mail but also Internet browsing, all whilst being in transit.

These devices are able to access corporate applications and data, receive remote ICT management and support, swap calls to Voice over Internet Protocol (VoIP), support session initiated protocol-based rich call services, and enable the effective management of security settings. Despite greater functionality built into cell phones, most knowledge workers still need the back-up of a desktop or laptop computer for more information-intensive work. With the growth in connectivity options, from asymmetric digital subscriber line (ADSL) and wireless, to high-speed downlink portable access (HSDPA) and third generation (3G), companies are now able to empower their employees with access to business applications and corporate data. Citrix Systems South African country manager Chris Norton agrees: "The technology to support a mobile workforce is extremely

mature. The only thing that is needed is some form of connectivity. Quite frankly, if you have the connection you can work at home the same way you work at the office" (Guest, 2006:2).

Historically, remote access to the business was achieved by dialling into a specific server. Today, however, is a different story and there are various ways of enabling access to business applications and data. The most common methods of client server applications are where an application on the employee's computer speaks to the business' server. Applications are accessible through portals, intranets and the Internet, or application streaming, which enables work to be done even if the systems are offline. The choice of solution will depend largely on the devices being used, the communication channels available and on which applications will be required. Regardless of the method used, Norton says that the focus must be placed on delivering the best possible access experience for users, administrators and management. "Each type of user wants a different type of user experience. A general employee wants to access whatever is required to fulfil their job requirements with the systems completely invisible. The administrator, on the other hand, wants complete visibility of the systems so that he or she can identify and address any problems that may be occurring. And management wants transparency, with information technology (IT) enabling the business rather than providing an obstacle" (Guest, 2006:2).

The future will not simply be determined by ICT and its potential for transforming the nature and location of information processing work. The technology is a tool with many possible applications and these applications will, in turn, only be adopted and implemented by individuals and organisations that can see how to facilitate the achievement of their current aims. Telework will be adopted only by those managers who see it as a solution to their problems, and workers who see it as a solution to their needs. The role of technology is not to replace or to minimise human involvement, but to provide more flexibility and efficiency. Therefore, the major benefit of the ICT revolution is the way in which it empowers people towards technology-oriented human resources. As more computers are connected to the information highway, and software applications provide better solutions, the more the corporate world will have access to global information.

2.15 TELEWORK AROUND THE GLOBE

2.15.1 Telework in the United States of America

According to Jala International Inc. (2006:2), preliminary forecasts of the global growth of telework are based on the assumption that other countries will evolve telework along the same lines as what happened in the USA. That is, they will follow certain historical, technological and economic patterns similar to those of the USA. Figure 5 shows a 2000 to 2010 forecast of the expected total number of teleworkers in the USA.

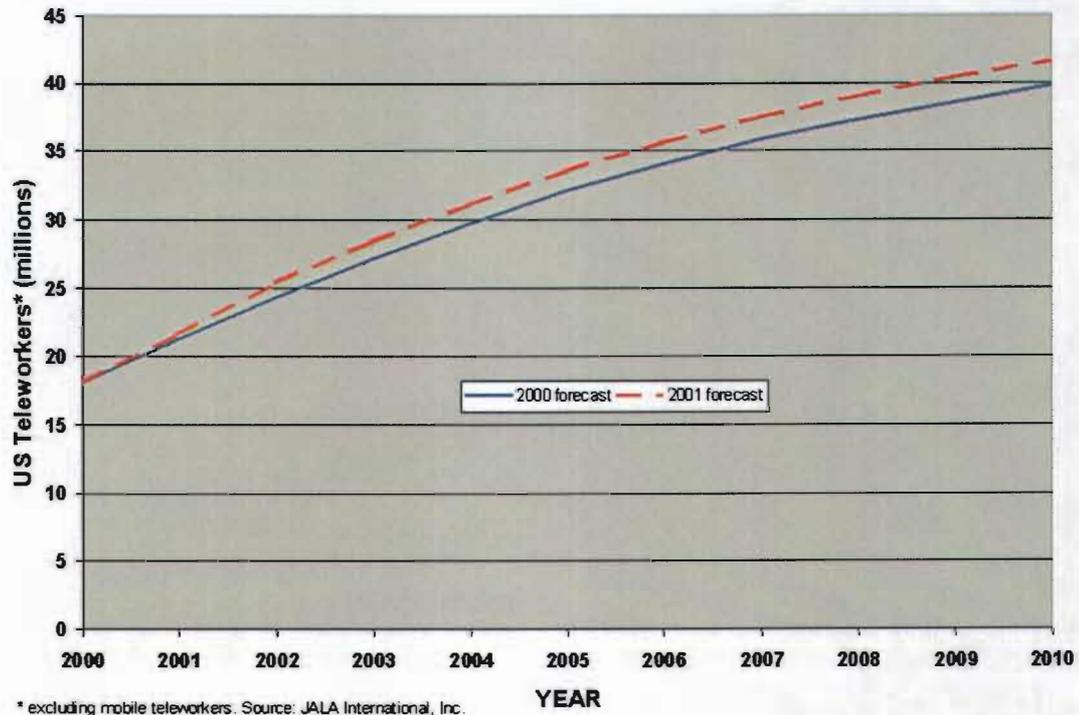


Figure 5: Projected growth of telework in the USA (Jala International Inc., 2006:2)

In Figure 5, the blue curve modifies the revision, resulting from estimated reactions to the 11 September 2001 terrorist attacks on the USA. These curves depict regular teleworkers who telework at least one day per month, although the USA average is half of the normal work time. This clearly indicates an imminent move away from corporate offices. This move is not only in terms of safety and emergency situations, but also with regard to business continuity strategies, which ensure that organisations maintain a productive momentum, even during unforeseen down times because of natural occurrences such as heavy snowfalls, hurricanes or floods.

2.15.2 Possibilities for telework around the globe

As one might expect, developing countries present the most challenges with regard to telework. Therefore, impact studies, together with gap analyses, should form an important baseline strategy to test the viability and sustainability before pilot implementation can be considered. All of the forecasts in the rest of this chapter are nominal forecasts. That is, they represent the most likely future, given what is known today about the underlying factors.

2.15.3 The Organisation for Economic Cooperation and Development

The member countries of the Organisation for Economic Cooperation and Development (OECD) are generally considered to represent the so-called developed world. The list includes Australia, Canada, most of the countries of Western Europe, Japan, and the USA. There are some interesting differences among the OECD countries. For example, Australia and the Western European countries are ahead of the USA as far as the extent of ISDN availability is concerned. Sweden and Finland have the world's highest penetration of digital cell phone services, thereby allowing them to deliver quality telecommunication services to sparsely populated areas. Yet, European companies and governments tend to be far more conservative in their rates of acceptance of teleworking, even though the European Commission has been seriously promoting telework since the early 1990s. Clearly, the USA has by far the largest number of teleworkers at present, but it may be overtaken in numbers by the rest of the OECD countries around the year 2008, provided that these countries live up to their potential (Nilles, 1998:288).

2.15.4 Latin America and the Caribbean

This group includes most of the non-European, Spanish- and Portuguese-speaking countries. Long saddled with the stereotype of 'banana' dictatorships and general backwardness, the trend toward market-oriented democracy has been strong in all but one of these countries in recent years. Aided by capital inflows from the OECD countries, this group is beginning to develop the level of infrastructure necessary for widespread availability of telework. However, serious economic problems and deficiencies in the educational systems of several of these countries, exacerbated by high population growth rates, may be significant deterrents. Still, even a small, well-educated fraction of a very large population, such as Brazil's, can constitute a major force in the global labour market (Nilles, 1998:289).

2.15.5 Eastern Europe

This group includes all of the countries within the former Soviet Union, as well as the so-called middle-European countries. The dominant country in the future of telework in this region is Russia, where, as one might expect, extreme winter weather may be the main reason. A conventional way of looking at the prospects might point out that the Eastern European group actually includes most of northern Asia, with its huge expanses of sparsely settled land. Yet, with the implementation of global satellite data networks in the next few years, low population densities (and, therefore, low likelihood of wired interconnection) in these areas may, after all, not be a strong deterrent to telework. Furthermore, the former Soviet bloc countries generally have well-educated populations. This fact will allow them to be major competitors in the telework markets of the future, assuming that the economic and political systems of the region support such activities (Nilles, 1998:289).

2.15.6 Asia Pacific region

This set includes South Korea, Thailand and most of the non-continental Pacific countries, except Japan. It also includes Hong Kong, although now a part of the People's Republic of China, Hong Kong is a major economic power in its own right. These countries, for the most part, are rapidly making the transition from less developed to developed economies, even though in 1998 some experienced serious economic setbacks. The Philippines, for example, is already a source of programming and data entry services for the rest of the world. Singapore is already a major telecommunication hub in South East Asia and, together with Malaysia and Indonesia, forms a major economic force in that part of the world. Indonesia, with a projected population of nearly 240 million by 2010, is rapidly urbanising. While all of these countries have major traffic congestion problems, it is only now that most are developing the telecommunication infrastructures and organisational attitudes necessary for adopting telework, with Singapore, Johore Bahru and Kuala Lumpur leading the way. Even though many of these countries have authoritarian political systems, this has not appeared to impede economic progress significantly. Furthermore, each of these countries has a growing middle class. By 2030, Indonesia, the Philippines, South Korea and Taiwan should be the primary players, with just over 30 million teleworkers for the entire region (Nilles, 1998:290).

2.15.7 South Asia

This region comprises the Indian subcontinent, plus Afghanistan. Just from a population consideration alone, India is likely to be the leader in the growth of telework in this region. Furthermore, since English is a first or second language for most educated people in the region and English is by far the most common language of Internet commerce, the inclusion of India in global information trade should be relatively painless. Indian software developers are already routinely teleworking for firms. As with the other countries with large populations, it is not necessary for all of the population to be literate and numerate. If even 10 percent of the population of a country of one billion inhabitants are information workers at an educational level that approximates to that of developed countries, then there is also the potential for at least 50 million teleworkers to be added to the world's supply (Nilles, 1998:291).

2.15.8 Asian planned economies

The socialist, central-government-ruled economies form this group. This group consists out of Asian countries entirely. These countries historically have been low achievers in a technological development sense, and are among the poorest in the world on a *per capita* basis. Nevertheless, at least some of these countries, particularly China, are beginning to modernise at a rapid pace. China is also exerting considerable pressure on reducing population growth as a means of ensuring that an expanding population does not negate the effects of economic development. Even so, China, with its largely agricultural workforce, may face a crisis in food supply as industrialisation swallows up farmland. If *per capita* grain consumption rises along with the standard of living, as is most likely, then China's shortfall in grain production could reach the equivalent of the world's entire 1994 grain exports.

What does this have to do with teleworking? Extrapolation of historical trends does not work if there are great intervening discrepancies such as famines, earthquakes and other such disasters, natural or otherwise (Nilles, 1998:293).

2.15.9 Africa and the Middle East

This final sector includes all of Africa and the Middle Eastern countries. The region is characterised by very low economic situations in much of central and northern Africa and a great variety of types and levels of stability of governments. On the African continent, the

anticipated leaders in technological growth and number of teleworkers are Algeria, Egypt, Israel, Nigeria, Syria, and South Africa. A possible exception is Angola, which, because of its oil and mineral wealth, may experience faster growth than is anticipated (Nilles, 1998:294).

2.16 GROWTH TRENDS

All the results from the available information and projections indicate one conclusion: telework will steadily increase as a mode of work over the next few decades, possibly to the point where it will become invisible; meaning it will not even be distinguishable from the more traditional forms of work. The rates of growth will vary considerably in different parts of the world. A composite picture of telework over a period of 50 years (1980-2030) is shown in Figure 6.

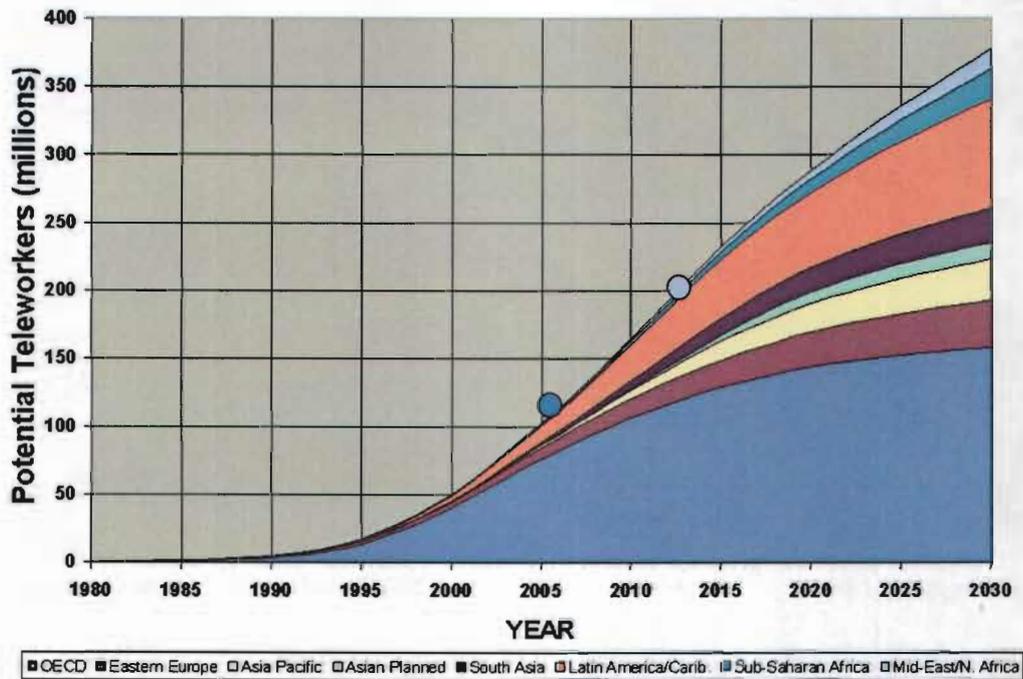


Figure 6: Projected worldwide growth of telework (Jala International Inc., 2006:3)

Figure 6 provides a current forecast of the number of teleworkers around the globe. The forecast is separated into the major world economic sectors, with the group of OECD countries occupying the bottom section of the chart and the Middle East and North African group at the top. The forecast is for those who telework at least one day per month.

It is interesting to note that Sub-Saharan Africa (including South Africa), as marked in Figure 6, is expected to start joining world ranks in teleworking between 2005 and 2010, which means that its required infrastructure is presently viewed as being sufficient to sustain the forecast trends. However, the Middle East and North Africa (as marked in Figure 6) are only expected to start joining global telework trends by the year 2010.

Figure 6 presents significant information regarding the expected 350 million teleworkers worldwide by 2030. Africa's contribution is expected to be around 50 million, with Sub-Saharan Africa contributing about two-thirds to this figure (approximately 32 million). While no teleworker figures are available for South Africa, it is nonetheless imperative that corporate leaders and government officials wake up to the reality of global telework trends and realise the benefits to be gained of having 32 million less vehicles on South Africa's roads.

According to Johnson (1994:1), telework has captured increasing attention across the USA in the last several years, as well as growing acceptance. However, the actual necessity to change location physically in order to accomplish tasks has recently been challenged, based on the statistics discussed in the following section.

2.17 ENVIRONMENTAL IMPACT

The most important environmental impacts of telework stem from the fact that most home-based teleworkers do not drive during their telework days. These teleworkers are reducing their daily air pollution production and energy use. At the individual level, this may not seem like much, but magnified by thousands or millions of teleworkers it can become a major means of improving environmental quality and counteracting global warming.

2.17.1 Conserving energy

Although energy utilisation will continue to grow as industry expands and standards of living are improved, the efficient use of energy will always be of prime importance. Through teleworking, instead of more conventional methods of working, there is a great potential to save energy. The three major areas where energy can be conserved are:

- vehicle-related materials and resources;
- highway-related materials and resources; and
- office-related materials and resources.

A tremendous amount of energy is required to produce transportation equipment such as motorcars, buses, trains and jet aircraft. If telework is promoted, there will be less use of such equipment and less energy will be required for the production, maintenance and repair thereof. Consequently, the fuel resources needed to operate such equipment will be largely reduced (Johnson, 1994:1).

By means of teleworking once a week, the average American worker saves money, conserves gasoline and makes a positive impact on the environment. As an example, if one employee teleworks four days per month, he/she could:

- save \$25 on petrol (or gasoline as it is known in the USA);
- gain four more hours of family time or sleep; and
- prevent 186 pounds of carbon dioxide from entering the atmosphere.

To expound further on these statistics, if 1 000 employees could telework four days per month, they could:

- save \$25,000 on petrol;
- gain 4 000 hours of family time or sleep;
- prevent 191 000 pounds of carbon dioxide from entering the atmosphere; and
- conserve 352 barrels of crude oil.

In addition, if just one commuter commits to telework once per week for one year, they could:

- save \$300+ on petrol;
- gain 52 more hours of family time or sleep;
- prevent 2 500 pounds of carbon dioxide from entering the atmosphere; and
- conserve approximately five barrels of crude oil (Phasha, 2006a:1).

According to the Energy Information Administration, a typical USA employee pays \$688 annually in gasoline. Nearly 100 million adults travel to work each day in the USA, of which the vast majority travel alone. Therefore, increased telework is one potential solution for a wide range of interrelated problems (Phasha, 2006b:1).

In the USA, the building, repair and maintenance of highways involve a large consumption of energy, not only in the operation of the highway construction and the required repair equipment but also in the manufacture and transportation of the needed materials. An

increase in the percentage of teleworkers will decrease the need for expanded highways and the associated road maintenance. Johnson (1994: 3) proposes that a "road paving moratorium" be invoked to limit the expansion and extension of highways throughout the USA. If a paving moratorium was limited to stopping the expansion of existing roadways, that would make sense. If it was interpreted as stopping the creation of new highways that allow people to access a new home in the country or explore remote parts of the world, this would be unreasonable. The real problem with highway use lies in the fact that a large number of people travel back and forth to work unnecessarily. As stated before, energy is wasted by the unnecessary use of materials for the manufacturing of unnecessary motorcars and the construction of unnecessary highways. Can one really believe that people can be stopped from enlarging or paving highways and, thereby, make a significant positive impact on the environment? It is necessary to examine the root causes for the massive expansion of highway systems and widening of freeways. One of the reasons often given for highway expansion is that people need to travel to work - but do they really have to?

It is necessary to examine the argument that people need to travel to work. What percentage of people could actually stay at home and use telework in order to accomplish their work effectively? Travelling to work seems to be a major element of the transportation needs and a root cause for the push to expand highways. Perhaps efforts should be expended to encourage more people to telework using computers and modems rather than cars, petrol and highway space. That effort would improve the environment and, simultaneously, help many people who suffer the frustration caused by rush hour traffic. Rush hour traffic also increases the incidents of accidents, some of which are fatal. To address this concern, it is prudent to consider telework carefully as a viable element of any plan to preserve and protect the environment from the encroachment and pollution caused by expansion of highways.

Motorcars should be used primarily for activities that cannot be undertaken easily by telework, for example driving to the mountains to backpack with family and friends, travelling to a river or lake to fish and swim, taking a family on a sightseeing tour, or going out for family fun and entertainment. Motorcars, buses or trains may not be necessary in the future to move workers back and forth to an office where they routinely sit down in

front of a computer and perform simulations, word processing, data entry, reporting and numerous similar tasks.

Once a person arrives at work in a central office location, he or she represents yet another energy consumer, often magnifying many times over the energy that he or she would require at home. An office building has heating, cooling and lighting needs. In addition, the materials needed to build and maintain an office building require energy in their production and transportation. Working from home requires only modest incremental demands on energy for heating, cooling and lighting, and makes effective use of existing building space and facilities. In Figure 7, Nilles (1998:149) provides a global forecast of the energy conservation impacts of telework as from 1980 until 2030, based on previous statistics obtained from 1980 to date.

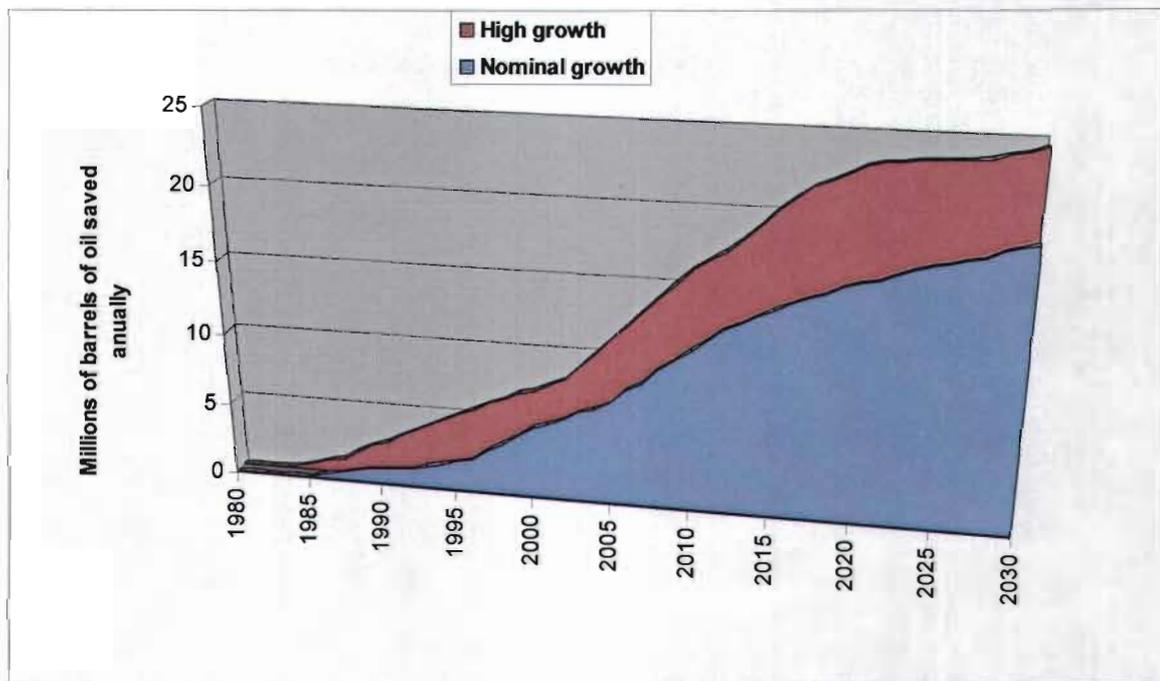


Figure 7: Estimated area wide energy conservation impacts of telework (Nilles, 1998:149)

The forecast model in Figure 7 calculates the net effect of telework on energy conservation. The net effect is derived from the reduction in vehicle fuel use by teleworkers, partially offset by the possible increased use of ICT (Nilles, 1998a:149). A total of 25 million barrels of oil saved annually through teleworking presents an annual saving of approximately \$2 250 million (estimated at \$90 (\pm R630) per barrel, according to

an approximation of the most recent exchange rates and oil prices). One can only imagine the global impact over a period of 50 years or more.

2.17.2 Preserves the environment

Whilst reducing land use requirements for highway expansion and reducing slow-moving vehicle emissions, highways and parking lots are continuing to consume large quantities of land surface areas. If a larger percentage of people could telework, existing highways could be reduced in size and parking lots could be converted into parks. One of the largest sources of pollution is the vehicle. This is especially true of slow-moving traffic that often slows down heavy, congested rush hour traffic.

2.17.3 Reduces air pollution

Telework is already widely seen as an important travel-demand management measure to reduce congestion and meet existing ambitious air quality goals. The air pollution reduction is directly proportional to the overall decrease in vehicle use (Nilles, 1998:158). Telework reduces vehicle miles travelled (VMT) and the accompanying emissions. The Clean Air Corporation estimates that the average vehicle emits one gram of volatile organic compounds, two grams of nitrous oxides and five grams of carbon monoxide per mile. Therefore, fewer motorcars on the road generally translate into lower levels of air pollution (Stough & Button, 2006:22). The transport system is responsible for direct and indirect environmental impacts – directly by producing emissions from motorcars, and indirectly through emissions associated with fuel extraction, refining and distribution, infrastructure construction and vehicle manufacturing (National Transportation Library, 2006:53).

“In addition to being the leading source of air pollution in the USA, motorcars and trucks (as the source of several greenhouse gas (GHG) emissions, including carbon dioxide, chlorofluorocarbons, and ozone) are major contributors to global climate change. Specifically, each gallon of gasoline [petrol] burned releases 20 grams of carbon dioxide (the principle GHG) into the atmosphere. Overall emissions of pollutants are projected to increase by almost 40 percent by 2010 because we are driving more and under more congested conditions” (National Transportation Library, 2006:53). Table 2 shows the estimated amount of reduction of pollutants due to telework. ‘Upper bound’ and ‘lower bound’ refer to the fact that if these figures should be presented in a graph, ‘upper bound’

would represent the top half of the graph and 'lower bound' would represent the lower half of the graph.

Table 2: Reduction of pollutants due to telework (National Transport Library, 2006:53)

		1992		1997 5 Years		2002 10 Years	
	Emissions	Tons saved	% of total	Tons saved	% of total	Tons saved	% of total
Upper bound	*NO _x	11,852	0.23%	41,061	0.81%	111,479	2.19%
	*HC	14,571	0.31%	50,468	1.09%	137,047	2.70%
	*CO	98,753	0.36%	342,118	1.25%	928,836	3.38%
Lower bound	NO _x	11,852	0.23%	31,593	0.62%	55,739	1.10%
	HC	14,571	0.31%	38,839	0.84%	68,524	1.35%
	CO	98,753	0.36%	263,229	0.95%	464,418	1.69%
*NO _x : Nitrogen Oxide; HC: Hydrocarbons; CO: Carbon Monoxide							

The pollution created by highway vehicles in 1990 was 5.085 million tons of nitro oxides, 4.63 million tons of hydrocarbons, and 27.48 million tons of carbon monoxide. With a higher number of teleworkers and reduced congestion for all vehicles, the total reduction in emissions could conceivably be several times the figures suggested in Table 2 (National Transportation Library, 2006:54).

Therefore, for an organisation with about 16 000 teleworkers working from home an average of 1.4 days per week, the annual pollution **reduction** would be in the order of:

- >6 150 000 pounds of carbon monoxide;
- >380 000 pounds of nitrogen oxides;
- >1 150 000 pounds of unburned hydrocarbons; and
- >26 000 pounds of particulate matter (mostly from brakes).

Figure 8 outlines a forecast of the annual levels of reduced motorcar mileage due to telework.

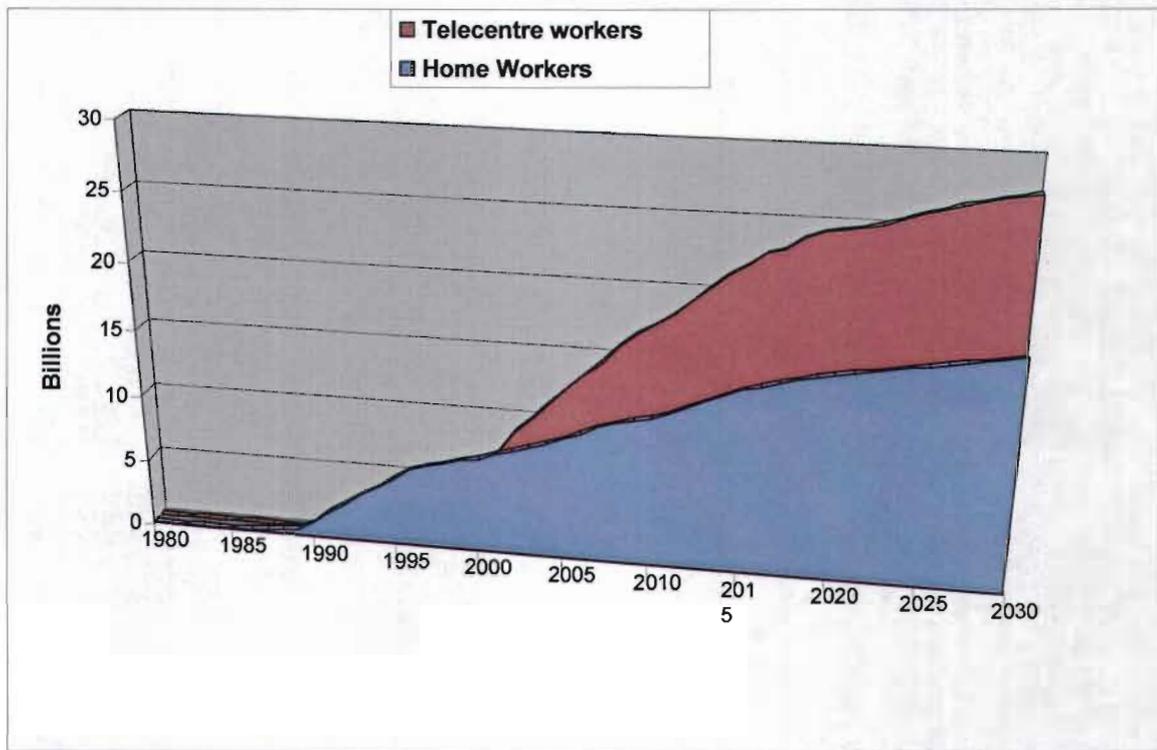


Figure 8: Annual mileage reduction due to telework (Nilles, 1998:147)

As a further example, Figure 8 shows an approximate annual total of 27 billion in reduced VMT. At least a half of this mileage reduction involves vehicle cold starts, which is the most polluting phase of motorcar use. It is therefore evident that telework promises to be a significant reducer of air pollution in the coming years or at least until zero-polluting motorcars dominate the market.

2.17.4 Reduces the effect of global warming

Global warming is the accelerated warming of the earth's surface due to human-related activity. The fact that GHG are mostly released through economic activities largely explains why global warming is so complicated and controversial. Carbon dioxide (CO₂) is emitted from the burning of fossil fuels so that most electricity production and industrial activity contribute to global warming. Since petrol, kerosene and diesel are fossil fuels, these too contribute, which means that the entire transport sector is implicated. Telework can play a major role in reducing GHG from these three major contributors to global warming. Methane (CH₄) is not only emitted from fossil fuel burning, but also from gas pipeline leaks and from decomposing vegetation. Therefore, CH₄ emissions are associated with livestock and with rice growing. Nitrous oxide (N₂O) comes from fossil burning and

fertilisers. The burning of forests also contributes to CO₂ emissions significantly (Kyoto Protocol, 2007).

2.17.4.1 International response to global warming: the Kyoto Protocol

The Kyoto Protocol shares the ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC) to stabilise atmospheric concentrations of GHG at a level that will prevent dangerous interference with the climate system (Kyoto Protocol, 2007). The Kyoto Protocol is an amendment to the UNFCCC and was adopted in Kyoto, Japan, in December 1997 and entered into force on 16 February 2005. The rules and requirements for the implementation of the Kyoto Protocol were further elaborated on in a package of decisions called the Marrakesh Accords.

The Convention divides countries into three main groups according to differing commitments:

Annex I Parties include the industrialised countries that were members of the OECD in 1992, plus countries with economies in transition (EIT) Parties, including the Russian Federation, the Baltic States, and several Central and Eastern European States.

Annex II Parties consist of the OECD members of Annex I, but not the EIT Parties. They are required to provide financial recourse to enable developing countries to undertake emissions reduction activities under the Convention and help them adapt to adverse effects of climate change. In addition, they have to “take all practicable steps” to promote the development and transfer of environmentally friendly technologies to EIT Parties and developing countries. Funding provided by Annex II Parties is channelled mostly through the Convention’s financial mechanisms.

Non-Annex I Parties are mostly developing countries. Certain groups of developing countries are recognised by the Convention as being especially vulnerable to the adverse impacts of climate change, including countries with low-lying coastal areas and those prone to desertification and drought. Others (such as countries that rely heavily on income from fossil-fuel production and commerce) are more vulnerable to the potential economic impacts of climate-change response measures. The Convention emphasises activities that promise to answer the special needs and concerns of these vulnerable countries, such as investment, insurance and technology transfer. South Africa falls within this category.

The Intergovernmental Panel on Climate Change (IPCC) (2005) indicates that climate change may have a greater effect on Africa than on any other continent. It predicts a minimum 2.5°C increase in temperature in Africa by 2030. Dry lands bordering the desert may become drier and wetlands bordering the rainforests may become wetter. The panel warns that the supply of food in Africa could be “severely compromised” by climate change, with crop yields in danger of collapsing in some countries (2007a:41).

The core commitment under the Kyoto Protocol requires each Annex I Party to ensure that its total emissions from GHG sources over the commitment period do not exceed its allowable level of emissions. Table 3 shows the emission targets of the Annex I Parties. The Commission requires that Annex I countries reduce their emissions to 5,2 percent below their 1990 baseline over the 2008-2012 period.

Table 3: Emission targets for Annex I Parties (Kyoto Protocol, 2007)

Annex 1 Parties	Annex 1 Parties Emission Target (expressed in relation to emission in the base year or period which is 1990) (%)
Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, European Community, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom of Great Britain and North Ireland	-8
United States of America	-7
Canada, Hungary, Japan, Poland	-6
Croatia	-5
New Zealand, Russian Federation, Ukraine	0
Norway	+1
Australia	+8
Iceland	+10

Each Annex I Party is required to implement domestic policies and measures to reduce its GHG emissions and help meet its commitments. The targets cover emissions of the six main GHGs as previously mentioned, namely:

- carbon dioxide (CO₂);
- methane (CH₄);
- nitrous oxide (N₂O);
- hydrofluorocarbons (HFCs);
- perfluorocarbons (PFCs); and
- sulphur hexafluoride (SF₆).

2.17.4.2 Eco-friendly vehicle manufacturing

The following are examples of how international motorcar manufacturers try to reduce harmful emissions and subsequent environmental damage by trying to manufacture eco-friendly vehicles (Reuters, 2007:24).

- At the motor show in Detroit, Michigan, USA, all eyes were on the hybrid gas-electric motorcars and the electric engine motorcar. It looks as if the traditional gas-burning engine will slowly disappear due to its contribution to global warming and due to rapidly increasing oil prices. The Japanese motor giant, Toyota, is the leader in these hybrid environmental-friendly vehicles and expects to sell the first 300 000 in the USA in 2007. This depicts a one-third increase as opposed to 191 000 vehicles sold during the previous year. Toyota is a threat to the Chrysler, Ford and General Motors car manufacturing groups. General Motors has been the world leader in motorcar sales for the last 80 years and has introduced the electrical car of the future, the Volt. It generates its power using an engine with batteries that can be recharged. It is expected that this technology will be on the market in the next two to three years.
- Eco-friendly vehicles shared the limelight at the Tokyo motor show where Nissan Diesel announced the commercialisation of its Final Low Emission New Diesel System. This system is a new diesel model that is based on an advanced technology known as selective catalytic reduction that combines ultra- high-pressure fuel injection with chemical urea-based catalyst. This technology is particularly effective in reducing harmful emissions from diesel engines. Nissan diesel is using this technology in the all-new Quon, which it produced in late November 2007, making it the first production

model to meet the rules. Hino Motors displayed six hybrid commercial vehicles, including buses, aerial platform vehicles and trucks.

- Isuzu showed both a new engine equipped with a ceramic filter to reduce emissions and next generation concept vehicles powered by compressed natural gas and dim ethyl ether that is a chemical synthesised from natural gas or biomass. Vehicles powered by this are environmentally friendly because it emits no black smoke and extremely small amounts of particulate matter and nitrogen oxide. According to the Japan Automobile Manufacturers Association (JAMA), sponsor of the show, about 20 percent of the 206 models on display were specifically designed to meet environmental needs.

- Executives of the world's leading manufacturers of heavy-duty vehicles and engines are urging government authorities worldwide to harmonise environmental standards and test procedures to promote the rapid development and deployment of environmentally friendly technologies. At the Second Global Commercial Vehicle Meeting, held on the opening day of the Tokyo Motor Show, the executives recognised that their companies had made significant progress towards reducing emissions from heavy-duty vehicles. They agreed that more work remained, particularly in light of the more stringent emissions requirements in Europe, Japan and the USA. The joint statement further indicated that they supported:
 - the global use of ultra-low sulphur diesel fuel, which will lead to significant lower diesel emissions;
 - ongoing efforts by the United Nations Economic Commission of Europe to develop standardised emissions-testing methods and regulations; and
 - efforts to enhance global road safety (JAMA, 2005:1).

- Hino Motors, which has long positioned itself as a champion of environmental conservation, displayed its new Hino Drive master technology at the 11th World Congress on Intelligent Transportation Systems (ITS) in Nagoya, Japan, in mid-October 2007. This new technology will contribute to the saving of fuel and reduce environmental damage from exhaust fumes. It will also raise environmental awareness among drivers. The Hino Drive master technology is now being offered to fleet owners and drivers. The stand-alone onboard terminal warns a driver when he or she is wasting fuel because of poor driving. The system then generates a driving profile and

recommends ways to alter driving habits to improve petrol mileage. Toyoda, the president of ITS Japan and honorary Chairman of Toyota, indicated that a new era in ITS technology is approaching and asserts that “we will enter a second stage in which ITS is deeply embedded in our lives” (JAMA, 2005:1).

2.18 QUALITY OF LIFE IMPACT

Table 4 indicates the socio-psychological effects of telework. In Table 4, the work or social impacts of telework are broken down into eleven categories. In these categories, the emphasis is on change. Participants were asked what changed since telework began. They were asked to indicate on a Likert scale how much, if any, change there was and how important they rated each factor. Composite values (amount of change multiplied by importance to the participant) for these factors are shown in Table 3. The scales for amounts of change ranged from -2 to +2, with -2 signifying much worse, 0 signifying no change, and +2 signifying much better. Importance ranged from 0 (not important at all) to 4 (extremely important). The composite factor ranged from -8 (-2 x 4) to +8 (2 x 4).

Table 4: Work or social factor change (Nilles, 1998:141)

Factor	Teleworkers (T)	Non-teleworkers (Non-t)	Difference (T – Non-t)
Liberation	4.9	1.6	3.2
Continuity	3.1	1.3	1.7
Creativity	3.2	1.3	1.9
Personal life	2.5	1.0	1.5
Environmental influences	2.2	0.6	1.6
General work life	2.2	1.0	1.1
Stress avoidance	1.2	0.3	0.9
Interdependence	1.0	0.5	0.5
Belonging	0.6	0.3	0.3
Apprehension	0.7	0.6	0.1
Visibility	0.9	0.4	0.5

The factors in Table 4 are explained as follows:

- **Liberation:** This factor, showing 4.9 (extremely important), includes changes in ability to concentrate on crucial tasks, the need to cope with traffic and the ability to achieve more by being a teleworker as opposed to the 1.6 by being a non-teleworker. The comparative analysis infers a significant difference of 3.2.

- **Continuity:** This factor calibrates changes in freedom from interruptions, again showing as being an important factor for teleworkers at 3.1, as opposed to 1.3 of non-teleworkers.
- **Creativity:** Changes in creativity on one's work, the amount of flexibility in job performance and feelings of self-empowerment are represented by this factor, again depicting a similar response as to the previous two factors.
- **Personal life:** This factor includes changes in quality of family relationships, discretionary time, feelings of being in control of one's life, ability to separate work from home life, success in self-discipline, coordination of family and work time and knowing when to quit. The fact that this result depicts a 2.5 rating for teleworkers, indicates that teleworkers are not experiencing this factor as would be expected. However, non-teleworkers depict an even worse rating, which indicates that telework is still the preferred mode of work.
- **Environmental influences:** This includes changes in home-office space, stress from environmental noise, ability to match work and biorhythms and feelings of self-empowerment. Although this result provides similar evidence as in the previous factor, the non-teleworker rating of 0.6 is self-explanatory.
- **General work life:** This relates to changes in the individual's relationship with his or her supervisor, self-assessment of job skills, feelings of job responsibility, influence, versatility and scope. This result is also similar to the previous factors, showing a comparative difference of only 1.1.
- **Stress avoidance:** Changes in work-related costs, ability to bypass physical handicaps and avoidance of office politics are grouped here. The score of 1.2 for teleworkers, as opposed to 0.3 for non-teleworkers, goes against expectations that telework should reduce stress significantly.
- **Interdependence:** This factor relates to changes in the quality of meetings with colleagues and dependence on others to help perform one's job. Both teleworkers and non-teleworkers have a need for collegial interaction in the workplace.
- **Visibility:** Do teleworkers feel out of their supervisors' and co-workers' minds when they are out of sight? This factor includes changes in one's organisational strategy, understanding of what others are doing, how well one's suggestions are received and self-assessment of visibility in the organisation. Both groups scored low on this factor. This indicates that visibility is an equal concern for both teleworkers and non-teleworkers.

- **Belonging:** Do teleworkers consider themselves loners? This factor relates to changes in involvement in office social activities, amount of job-related feedback, career advancement, job stability and relationships with fellow workers. The low scores in both groups are again a matter of concern.
- **Apprehension:** Changes in uneasiness about equipment failure and feelings of guilt about 'not really working' represent this category, which again depicts low scores in both groups.

Table 4 shows clear differences between the teleworker and non-teleworker. The teleworkers, on average, showed net positive changes for all categories, although there were three areas in which negative scores were indicated, namely visibility, apprehension and belonging (Nilles, 1998:141). In terms of ranking, both teleworkers and non-teleworkers indicated liberation as being the most important factor, although non-teleworkers showed a significant difference. Teleworkers indicated belonging as being the least important factor, as opposed to non-teleworkers who rated belonging and stress avoidance as the least satisfactory factors.

2.18.1 Promotes safety

Safety is promoted by reducing highway use by people rushing to get to work. There are thousands of traffic-related deaths every year and thousands more people are severely injured while trying to get to and from work. In addition, substantial property loss stemming from traffic accidents occurs as people take chances in order to make the 'mad dash' from home to the office or back. Quite often, people have made the trip so frequently that they are not alert, may fall asleep and easily become impatient with traffic congestion and slower travellers.

More and more people are becoming frustrated by the insistence that they come into the office everyday when in fact, most, if not all of their work, could be accomplished from their homes or from sites much closer to their homes.

In the USA, highway accidents resulted in the loss of 43 500 lives in 1993. Teleworkers reduce their risk of injury and death by reducing the amount of time they spend in rush-hour traffic. Table 5 contains estimates of annual fatalities and accidents avoided due to a decrease in the VMT resulting from telework (National Transport Library, 2006:54).

Table 5: Motor vehicle deaths/death rates (National Transport Library, 2006:55)

		1992 Number	Percentage of total (%)	1997 5 years number	Percentage of total (%)	2002 10 years number	Percentage of total (%)
Upper bound	Lives saved	87	0.19	300	0.69	815	1.97
	Accidents avoided	28,520	0.23	65,770	0.63	117,700	1.43
Lower bound	Lives saved	87	0.19	231	0.54	408	0.99
	Accidents avoided	28,520	0.23	50,355	0.49	58,850	0.72

Table 5 shows a downward trend of both the annual motor vehicle deaths and accident rates for 1980-1990 over a ten-year period. The savings due to telework were calculated against total motor-vehicle deaths and accidents. These would have been substantially higher if they were calculated against only passenger-vehicle deaths and accidents. Future accident rates and death totals were based on future VMT totals; this rate was then applied to VMT savings accrued because of telework, to arrive at projected death and accident totals (National Transportation Library, 2006:55).

Closely related to safety on highways, is road rage. Road rage is increasingly making headlines across the globe. Traffic congestion is usually the primary reason cited for acts of road rage. As the number of the USA driving population increases each year, only a one percent increase in the number of roads has occurred in the last ten years. Road rage consists of a wide variety of aggressive driver acts against other road users. Some include speeding, tail gating, flashing headlights, yelling at other drivers, running stop signs or traffic lights, passing on the wrong side and weaving in and out of traffic. Studies indicate that traffic congestion is just one factor that contributes to road rage. Longer distances to and from work, and an overall increase in the daily stresses and intricacies of living in today's fast track societies, all serve as reasons for the increase in road rage (Bodak, 2007:1).

A survey conducted amongst motorists in the South African province of Gauteng indicates that 54 percent have been on the receiving end of road rage. Snyders (2007:6) reports that 35 percent of Gauteng motorists daily endure one to two hours of traffic congestion, which

leads to higher stress levels. Some respondents in the survey said that road rage mostly occurs when they travel to and from work. This survey was done after a motorist was attacked with a 'panga' (instrument used to harvest sugar cane) because of road rage.

Yet another factor linked to safety on highways is car hijacking. This factor is especially relevant in South Africa. Motorists are targeted by heavily armed, well-organised, high technology gangs or crime syndicates. Insurance firms and tracking companies have indicated that motorcar hijackings have increased from 12 434 in 2004/05 to over 15 864 in 2006, exceeding highs that were last recorded in 2001/02 (King, 2006:1).

2.18.2 Improves health

Health is improved by reducing stress related to compromises made between family and work. The stress associated with commuting back and forth to work away from the home is real, and telework offers a renewed opportunity for workers to rediscover the joys of working within the familiar surroundings of their homes. This is a rediscovery because centuries ago it was commonplace for 'cottage industries' to exist, where work was produced in the home, quite often incorporating the talents of the entire family in producing a product. With advanced ICT, a large segment of workers can return to this mode of 'work-at-home' productivity, without compromising either their family living or their productivity (Johnson, 1994:2).

Telework may improve the overall health of the worker and result in reduced medical costs. Studies of motorcar drivers have shown significant relationships between exposure to traffic congestion and a variety of adverse physiological reactions. For example, researchers have reported a significant and positive correlation between high traffic volumes and increased heart rates, blood pressure and electrocardiogram irregularities. Studies also show that chronic exposure to traffic congestion, especially over long distances, long waits and frequent trips, increases negative moods, lowers tolerance to frustration and can even lead to more impatient driving habits. The State of California Telecommuting Pilot Project survey data and interviews revealed that teleworkers experienced reduced levels of stress. Other related factors that would improve worker health and, therefore, reduce medical costs are reduced exposure to individuals with contagious conditions and health benefits associated with walking instead of travelling by motorcar (National Transport Library, 2006:56).

2.18.3 New work opportunities for the disabled (see the 'ability', not the 'disability')

Working from home enables some disabled employees to tailor their work environment to suit their needs and affords them flexibility in the scheduling of their medical sessions. For some disabled people, simply making the morning commute is an ordeal. Transportation presents another difficulty of the eight-hour workday. Routine tasks most people take for granted, leave some disabled workers exhausted by the time they get to the office. Telework eliminates the commute so that disabled workers can focus on their jobs. Employers who hire a disabled teleworker gain a highly motivated and often highly educated employee. Any stigma or misinterpretation is removed when working on the Internet. Unfortunately, just as employers have been slow to accept telework as an alternative for able-bodied employees, they have been equally reluctant to make special exceptions for the disabled (Mook, 2003:1).

2.18.4 Closer proximity to and involvement with family

Working in the home offers people a greater opportunity to share quality time with family members, to promote family values and to develop stronger family ties and unity. In addition, time saved through telework could be spent with family members constructively, in ways that promote and foster resolutions to family problems. The strength of a society is derived from the strength of its individuals and the strength of its individuals quite often is derived from the strength of their families (Johnson, 1994:2).

2.18.5 Proximity to extended family (location where employee has 'roots')

There is a wide range of scenarios that constitute what is best for any individual or family. However, quite often people are forced to leave the community where they grew up and where they have a large extended family of parents, grandparents, brothers and sisters, aunts and uncles and family relations. Many people long for the opportunity to return 'home' where they can spend their lives with old friends and family. While this is not true for everyone, there are a large number of people who stand to enhance the quality of life through the flexibility that telework offers. Through telework, a person can work for a company in one part of the world, whilst living in another part (Johnson, 1994:2).

2.18.6 Remote worksite that is mutually acceptable to all family members

Telework enables the spouse of the teleworker to pursue his/her career. A situation may arise where a husband or wife has a job opportunity in another town but must turn it down because the spouse may not want to or may not be able to change employment. If either person could telework, the decision is much easier allowing for a more congenial relationship and reducing the potential stress and possible break-up of a relationship (Johnson, 1994:2).

2.18.7 Employee freedom

Telework employees have greater freedom in choosing an environment that is more suitable from a social and economic point of view. Teleworkers, whether they are part of a couple or single, do not have to quit their jobs and move when they find they are not compatible with the town they are living in. This situation may arise following a divorce. It may also occur when a single person finds that he or she does not enjoy living in the area surrounding his or her employer's business. Telework affords an employee the freedom to look for another place to live, where he or she can feel more comfortable from both a social and an economic point of view and live near people that have common interests with themselves. All of this, whilst remaining loyal to and productive for the sake of an employer (Johnson, 1994:3).

2.19 ECONOMIC IMPACT

Although many of the cost elements are easily established, many of the benefits of telework are less easily defined in quantitative terms. The following benefits are generally non-quantitative.

2.19.1 Improves productivity

Time saved can be used to improve productivity. People who travel back and forth to work in the conventional manner spend a great deal of time on unnecessary activities. Time is wasted from the minute one gets up to go to work until the minute one goes to bed after returning from work. Teleworkers do not have to waste time being 'presentable' and preparing for the commute on such a continuous basis. They can start working at their work terminal simply by putting on a robe and slippers and grabbing a cup of coffee. The employee no longer worries if the motorcar will start, if one's clothes are neat, or if one's grooming is perfect. This may still be important, but it no longer has to be. Employees are

also no longer interrupted by the idle chatter that inevitably takes place at the central work place – some of it useful for purposes of work, but a lot of it just a waste of time and a perpetual interruption. Through telework, one can keep track of the latest rumours at one's own convenience using e-mail. For persons with health problems or handicapped persons, working from home may offer some comforting and productive opportunities as well (Johnson, 1994:4). Some scholars believe that teleworkers generally work longer hours than their non-teleworking counterparts due to a 'gratitude effect', referring to shorter travel times, less time spent on socialising and easy accessibility to work (Kossek, 2003:1). This rescinds the myth that teleworkers will be idling their time away because they are out of sight.

2.19.2 Other non-quantitative benefits

The other non-quantitative benefits of telework include the following:

- decreased sick leave;
- decreased medical costs;
- increased organisational effectiveness;
- decreased turnover;
- increased employee effectiveness; and
- increased self-estimate of effectiveness (EPA, 2006:2).

2.19.3 Reduction in number of people job-hopping

'Job-hopping' refers to employees who regularly change jobs. 'Job-hopping' can lead to an increase in training requirements. Many people 'job-hop' each year, and much of this is because they want to move to a new location. They enjoy their work and they would continue working for their present employer, but they do not like their present location. If people could move without losing their jobs, as with telework, the amount of retraining would be reduced substantially. This would increase overall employee productivity while keeping loyal and productive employees on board (National Transport Library, 2006:56).

2.19.4 Job creation

The establishment of telecentres in economically disadvantaged areas may revitalise commercial districts and, potentially, create new employment opportunities. Increased employment would come from new jobs created at the centre, as well as from the other jobs that the development and support services would create. Aside from these aspects, the

existence of such centres would lure other employers, both public and private, to the region (National Transport Library, 2006:56).

2.19.5 Economic development

The development of an extensive telecommunications infrastructure may provide economic growth opportunities in both urban and rural areas. Many authors have argued that advanced telecommunication systems make all locations attractive and, therefore, reduce existing inter-regional economic and social inequalities.

Growth and redevelopment of cities and towns in rural areas are considered a viable alternative to urban sprawl. If telecommunications reinforce the trend to move away from major cities to rural areas, then urban sprawl may be reduced in favour of rural city/town growth (National Transport Library, 2006:56).

2.19.6 Rural area development

The National Transport Library (2006:56) asserts that 20 years ago 'access', in economic development terms, meant roads and highways, and air and rail transportation. Today, 'access' refers to information, data and fibre optics. Telecommunications may mitigate the factor of geography from the economic development equation and make rural areas very accessible and attractive to expanding businesses. Unique applications of telecommunications may ensure that jobs are available in all areas, even rural areas, and stop tendencies towards urban migration. Telework is being viewed as a means to provide a new way of establishing an economic base in rural areas by providing a mechanism to funnel work into areas of high unemployment. It may help reduce the social tensions of poverty and unemployment to the extent that telework makes more jobs more accessible to economically depressed regions.

2.20 BARRIERS TO THE ADOPTION OF TELEWORK

2.20.1 Organisational culture

In recent years, the notion of organisational culture has become a popular explanation for why some firms are more successful than others are. In today's highly competitive business environment, the way in which culture aids or constrains organisational innovation is particularly important. Managers contemplating telework would be wise to consider culture. Although the concept of culture has proven difficult to define, it generally refers to

the set of shared beliefs, values, norms or assumptions that arise when a group of people has a shared history (Daniels, Lamond and Standen, 2000:31). Organisational cultures are passed on to new members, eventually becoming habitual guides to perceiving, thinking and feeling. Culture provides meaning, stability and comfort to individuals. As well as reflecting the organisation's past, cultures are influenced by values in the wider community, through regulations imposed by government, norms embedded in the industry, or the explicit copying of other organisations.

2.20.1.1 Different cultures in organisations

Daniels *et al.* (2000:37), defines the theories of culture types based on two sets of competing values: control *versus* flexibility, and internal *versus* external focus. From these, four proto-typical cultures are identified:

- **A human-relations culture characterised by flexibility and an internal focus**

The human relations culture is broadly oriented towards human commitment and, typically, values human resources, training, cohesion and staff morale.

- **An open-systems culture characterised by flexibility and an external focus**

This culture is oriented towards expansion and adaptation to the external environment and values adaptability, readiness, growth, resource acquisition and external support.

- **An internal-process culture having an internal focus and a control orientation**

This culture is oriented towards consolidation and continuity and values information management, communication and stability.

- **The rational-goal model with an external focus and control orientation**

This culture aims to maximise output and values productivity, efficiency, planning and goal setting.

The abovementioned typology helps to explain the relationship between telework and organisational culture. A human-relations focus may favour telework as a flexible work option that will increase morale, commitment and, ultimately, productivity. There may be relatively few problems with giving professional or clerical employees the autonomy to work remotely, provided certain checks on past performance and self-discipline are met. The human-relations focus lies behind the family-friendly and, to a lesser extent, the high-technology telework users.

An open-systems orientation characterises a growth-oriented firm in a dynamic, high-risk environment, where innovation of the work process improves competitiveness. Key professionals who require sustained periods of concentration for high-quality work or high creativity may be allowed to work away from the office. Virtual teams may be seen as a way to leverage skills from widely dispersed individuals. Telework may also reduce the risk of losing key skills by making work more attractive to women with family-care obligations or individuals with certain lifestyle preferences. However, non-core staff, such as clerical workers, may not be offered the same privileges. High-technology firms are the best examples of open system cultures that use telework.

Daniels *et al.* (2000:37) are also of the opinion that telework is less likely to be used widely by rational-goal or internal-process cultures. Rational-goal cultures use it to cover short-term staff absence, reduce the costs of clerical labour, increase flexibility or, where business needs dictate, after-hours work or fieldwork. Telework is not likely to be offered widely as a strategy for increasing the value of human resources. It may be seen as more appropriate for non-professional workers who can be assessed on objective work criteria and amongst whom it can be more readily controlled.

Finally, internal-process cultures favour telework the least because of the high value they place on rules, regulations, coordination, stability and control. Episodic telework arrangements in very bureaucratic organisations are a good example of how this common culture type promotes or limits the use of telework.

The model of Daniels *et al.* (2000: 37) illuminates the role of culture in telework adoption. A typical profile involves a hybrid of all four, even though one may have a greater role than others may. When real organisations, rather than archetypes, were examined in a recent study, some broad relationships between culture and telework emerged. The most important feature was the lack of emphasis on internal processes, including rules, regulations, coordination, stability and control. Second in importance was a focus on productivity and accomplishment.

Three other characteristics were somewhat less common but still differentiated teleworking organisations from non-teleworking ones: a favourable attitude towards innovation via technology; making people feel part of the organisation; creativity and innovation.

Managers seeking to implement telework will find it useful to determine the extent to which their culture has the required attributes, as shown in Table 6.

Table 6: Features of organisational cultures favouring telework (Daniels *et al.*, 2000:38)

Primary characteristics	<ul style="list-style-type: none"> • Less emphasis on control, coordination, rules, formality, stability and predictability • Greater focus on productivity and achievement
Secondary characteristics	<ul style="list-style-type: none"> • Early adoption of technology • Making employees feel part of the organisation • Creativity and innovation

2.20.1.2 Cultures that inhibit telework

Strong assumptions about management and work make some organisations less amenable to telework than other organisations, and managers considering telework need to assess the type of culture they inhabit, the types of telework that fit the culture and what cultural barriers need to be overcome.

According to Daniels *et al.* (2000:32), a major organisational impediment to telework is managerial concern about losing control of workers when they are out of sight. This attitude can be traced to particular factors in the historical evolution of work. Recent decades have seen a reaction against the bureaucratic and technical style of management, with the human relations and socio-technical schools turning attention to the social side of the organisation and, in particular, to the value of a flexible and committed workforce in turbulent business environments.

An approach to management that gives workers greater discretion over the work process focuses on outcomes and offers more holistic jobs that is clearly better suited to telework than one based on hierarchy and fragmentation. Family-friendly work practices, such as permanent part-time work, flexitime or job sharing, are often said to be 'win-win' strategies that help businesses maintain productivity and retain experienced and committed workers by giving them greater discretion over work hours. Lewis, a psychologist and employee productivity expert, believes that managers must understand that every individual has a different style of working. By allowing staff to work according to personal preferences in order to achieve the best results, can only benefit their well-being and, most importantly, it

will increase productivity and, ultimately, raise levels of customer service. Mutual trust is necessary, whereby employees will do their best, regardless of where they perform their jobs. Business should keep up with and accept evolving work practices if they want to continue recruiting and retaining the cream of the talent pool (Williams, 2007b:3).

However, these options are still available only to a small proportion of the workforce largely due to managers' concerns about losing control over work time and coordination. Telework challenges managerial control more than most of these practices and it remains one of the least used options. Control remains a fundamental value in many corporate cultures today. The question arises: is flexibility the new Holy Grail; is flexibility a friend or fashionable foe?

Another illustration of the influence of managerial values is the way in which technology has been used to increase control over teleworkers, even though freeing them from control might have improved productivity. ICT now provides the opportunity for very precise monitoring of activity in some jobs. Call - or contact centres for example, openly display real-time statistics on operator calls, thereby discouraging employees from taking breaks - even brief ones for socialising or rest. These systems create such a strong competitive pressure that most employees only last a few months. In other firms, the same technology has been used to allow operators to work from home giving them discretion over the moment-to-moment work processes, with monitoring only being done on overall productivity. The central value of control can therefore be seen in managers' styles, administrative systems and the way technology is used.

Daniels *et al.* (2003:33) state that organisational culture dictates a commitment to the organisation as a place. Companies incur tremendous expenses providing facilities in which an employee can feel a sense of belonging and safety, with health and childcare facilities, libraries, laundry facilities, natural surroundings, as well as cafeterias and parking lots. Such 'trappings' are designed to keep employees 'in', motivated and committed.

There are also numerous ways that telework challenges assumptions about work. Working in casual clothes at odd hours in a home office or lounge does not convey a professional image. If employers think management requires direct supervision, managers whose

subordinates cannot be seen may be deemed as ineffective. Empty desks might suggest inefficient resource use, rather than greater productivity or better customer service. Employees who do not participate in office networks may be considered less than serious about their work or careers. Such issues cause managers concern about the messages telework sends to other employees, to clients and to the wider community.

These cultural factors present significant barriers to the use of telework in many organisations. Despite the advantages of increased productivity, commitment, recruitment, retention and savings on administration costs, telework is still only a formal part of human resources policy in a relatively small percentage of firms.

2.21 MANAGEMENT AND MANAGEMENT STYLES

The purpose of this section is to examine managerial styles in relation to telework and to determine the extent to which the management of teleworkers requires a different approach to the management of other workers. Therefore, it is necessary to establish a framework of management functions and roles within which to examine what managers need to do. One can then move on to consider how, why and what managers do, might be different for workers whom they may not see regularly, or may never even meet.

Cronje, Du Toit, Motlatla and Marais (2003:122) define management in terms of the well-known four fundamental functions: planning, organising, leading and control. Figure 9 graphically depicts these four functions: management decides what has to be done and how it should be done; management gives the orders of what has to be done and checks that these orders have been carried out.

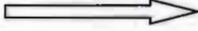
ACTIVITIES		TERMINOLOGY
Management decides what should be done		Planning
Management decides how it should be done		Organising
Management says how and when it should be done		Leading
Management ascertains whether the tasks have been carried out satisfactorily		Control

Figure 9: Basic tasks of management (Cronje *et al.*, 2003:123)

These are the basic tasks of a manager, linked in a sequence, as shown in Figure 10. The fundamental management activities and the resources of a business, as well as the goals of the business should be viewed as an integrated process, rather than as separate entities. Such an integrated process has to do with the following: planning the goals, together with the resources to accomplish them; organising resources, including human resources; leading the people involved; and controlling the resources and activities of the people involved.

In considering these functions in relation to teleworkers, it is clear that managers still need to plan teleworkers' work, ensure that the necessary resources (financial, material and human) are available to them, lead and motivate them, evaluate the outcomes of their efforts, and modify their activities accordingly.

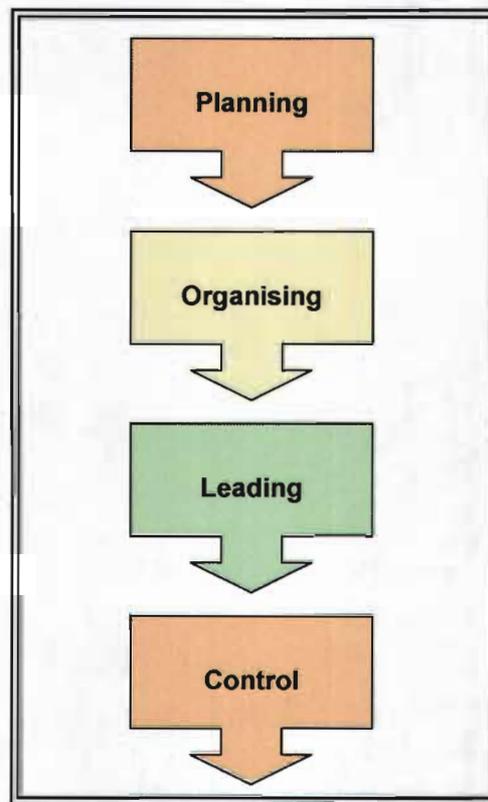


Figure 10: Four fundamental management tasks represented as a process (Cronje *et al.*, 2003:123)

What do managers do as they carry out these functions? Daniels *et al.* (2003:104) identifies a series of interpersonal, informational and decisional roles that managers enact. These are summarised in Table 7.

Table 7: The managers' working roles (Daniels *et al.*, 2003:105)

Role	Descriptions	Examples of activities
Interpersonal		
Figurehead	Symbolic head, obliged to perform a number of routine duties of legal or social nature	Ceremony, status requests, solicitation
Leader	Motivation and activation of subordinates, responsible for staffing, training and associated duties	Virtually all managerial activities involving subordinates
Liaison	Maintains self-developed network of outside contacts and informers who provide favours and information	Acknowledgement of mail, external board work, other activities involving outsiders
Informational		
Monitor	Seeks and receives wide variety of special information to develop thorough understanding of organisation and environment; emerges as nerve centre of internal and external information of the organisation	Handling all mail and contacts categorised as concerned primarily with receiving information (e.g. periodical news, observation tours)
Disseminator	Transmits information received from outsiders or from other subordinates to members of the organisation, some information factual, some involving interpretation and integration of diverse value positions of organisational influences	Forwarding mail to organisations for informational purposes, verbal contracts involving information flow to subordinates (e.g. review sessions, instant communication flows)
Spokesperson	Dissemination of the organisation's information to its environment	Inform 'key influencers' (e.g. CEO, Board) and 'the organisation's public' (suppliers, trade, organisation's, peers, government agencies, customers and press)
Decisional		
Entrepreneur	Searches organisations and its environment for opportunities and initiates 'improvement projects' to bring about change, supervises design of certain projects as well	Strategy and review sessions involving initiation or design of improvement projects
Disturbance handler	Responsible for corrective action when organisation faces important, unexpected disturbances	Strategy and review sessions involving disturbances and crises
Resource allocator	Responsible for the allocation of organisational resources of all kinds- in effect the making or approval of all significant organisational decisions	Scheduling, requests for authorisation, any activity involving budgeting and the programming of subordinates' work
Negotiator	Responsible for representing the organisation at major negotiations	Contract negotiation, labour negotiations

In considering these manager roles in relation to teleworkers and teleworking, managers will still need to:

- carry out ceremonial activities (welcomes, farewells);
- carry out managerial activities involving subordinates;
- engage in activities involving outsiders;
- handle the mail and other contacts concerned primarily with receiving information;
- forward mail to the organisation for informational purposes, and have contacts involving information flow to subordinates;
- inform key influencers and the organisation's public;
- engage in strategy and review sessions involving initiation or design of improvement projects and/or disturbances and crises;
- carry out activities involving budgeting and the programming of subordinates' work; and
- carry out contract and labour negotiations.

These two approaches show that it is not the roles and responsibilities of management that will change as traditional work transfers to telework, rather it is the way in which these roles and responsibilities are enacted that may change. Modern-day managers may now engage in participative decision making to make provision for the future and to coordinate their subordinates in teams, rather than as individuals. However, they still have to plan and coordinate. In the same way, the managers of teleworkers still have to carry out their managerial functions, albeit in different ways. One can therefore assume that to manage teleworkers would require a new style, where mutual trust also plays a vital role.

2.22 THE SOUTH AFRICAN SCENARIO

In recent newspaper articles in South Africa, a variety of problems have been continuously emphasised that could, at least partially, be addressed by the implementation of telework. Some examples of these articles are as follows:

- **No new roads** have been added to the country's road infrastructure, despite the fact that, according to the National Association of Automobile Manufacturers of South Africa (NAAMSA), 56 952 new vehicles were sold in June 2006 alone. The number of minibus taxis also increased from 729 in 2000 to 128 668 in 2005 (Azzakani, 2006:16).

The country's road infrastructure has been unable to keep up with growth and demand. These new vehicles are clogging up the roads and making travel to and from work much longer.

- De Villiers (2005:15) paints a bleak picture of the above situation comparing it to a "carnageddon", referring to a "bloody war between man and motor". The report states that in 2000, approximately 300 000 people worldwide died in armed conflict, whilst 1.2 million people died in motor accidents during the same period, of which 70 percent were younger than 45. This situation does not only have detrimental repercussions on roads, but is also affecting three other areas, namely bloody disputes over the world's oil reserves, 'environmental murder' and destruction of the social environment. In the process, marginalising of non-motorists results, unity in suburbs dies, urban development explodes and rural areas are destroyed.
- Figure 11 displays the caption of a newspaper article named "*SA wurg dood in verkeer*", (2004:12). Figure 11 emphasises the fact that no money or space is available for the development of new roads to alleviate the congestion and related destructive circumstances. The photograph shows one of the busiest intersections in South Africa, namely the Gillooly's Interchange near Johannesburg.



Figure 11: Traffic congestion at Gillooly's Interchange (*SA wurg dood in verkeer*, 2004:12)

The following statistics give the average number of vehicles per day and the average speed in the fast lane during peak traffic (fast lanes have 120 kilometre per hour speed limits) on six different main roads in three cities in South Africa, namely Johannesburg, Cape Town and Durban. These are described in Figure 12 as a “road hell”:

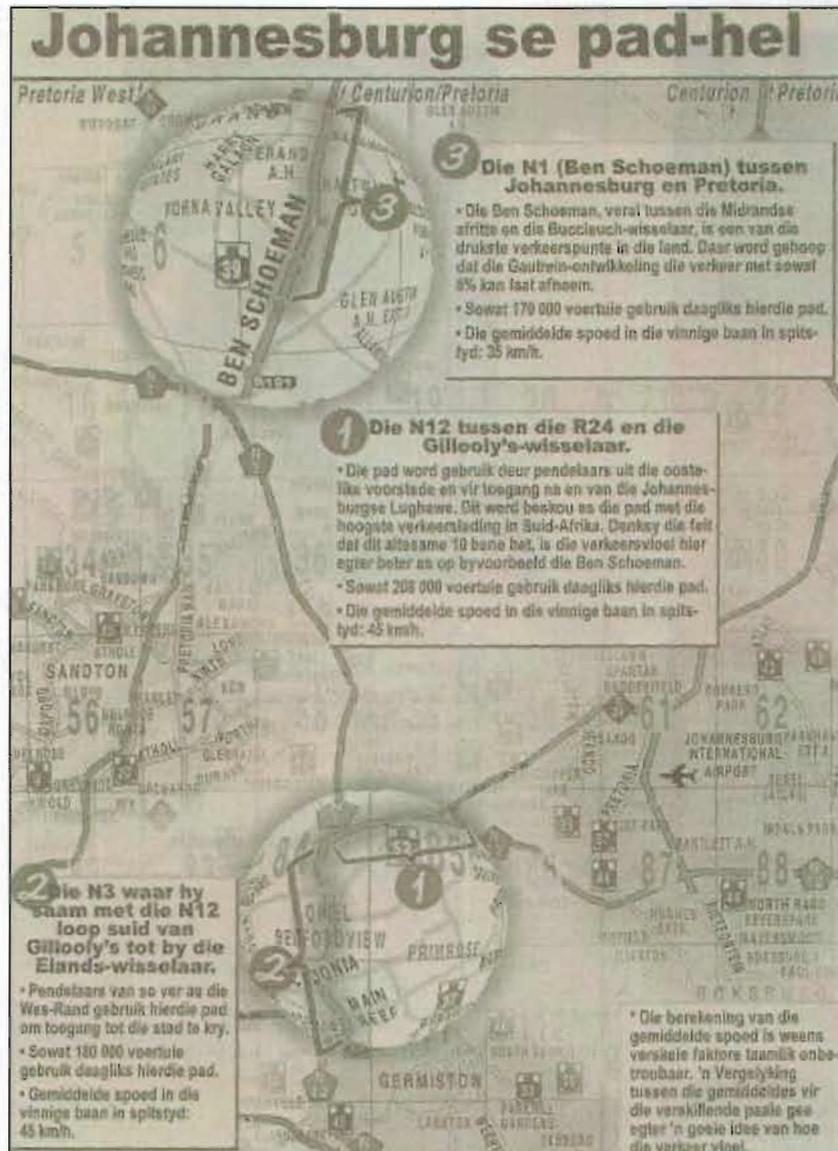


Figure 12: Six South African main roads and traffic (SA wurg dood in verkeer, 2004:13)

The N12 between R24 and Gillooly’s Interchange carries 208 000 vehicles per day, with an average speed in the fast lane during peak time of 45 kilometres per hour.

The N3, merging with the N12 south of Gillooly's Interchange carries 180 000 vehicles per day, with an average speed in the fast lane during peak time of 45 kilometres per hour.

The NI between Johannesburg and Tshwane is the busiest road in South Africa, with an average of 170 000 vehicles per day, with an average speed in the fast lane during peak time estimated at 35 kilometres per hour. The second busiest is the Soweto highway, with 85 000 vehicles per day.

The NI between Bellville and Cape Town Central Business District (CBD) carries 70 000 vehicles per day, with an average speed in the fast lane during peak time of 70 kilometres per hour.

The "Cape knots" displayed in Figure 13, shows the N2 between the Airport and Cape Town CBD, that carries 98 000 vehicles per day, with an average speed in the fast lane during peak time of 55 kilometres per hour.



Figure 13: The Cape Knots (SA wurg dood in verkeer, 2004:13)

Figure 14 shows the traffic pressure in Durban on the N3 south of the EB Cloete intersection to the CBD, with an average of 116 000 vehicles per day and an average speed in the fast lane during peak time of 90 kilometres per hour.



Figure 14: Traffic pressure on Durban main route (SA wurg dood in verkeer, 2004:13)

The number of vehicles totals 842 000 per day on the six main routes in South Africa. This clearly indicates the seriousness of the country's transport dilemma regarding the detrimental and interrelated state of affairs involving accidents, death, disabilities, insurance claims, stress, time wastage, money wastage, air pollution, road rage, counter-productivity, fuel consumption, and many more. Added to this, an average speed of 56.6 kilometres per hour during peak time per day clearly emphasises the impact on productivity levels.

- The dilemma on South Africa's roads is increased by the unreliability of the **public transport** system that consists of busses, trains and taxis. This was discovered through interviews with various people using public transport. They have to rise very early in the morning to be at work on time. The location of stations for buses, taxis and trains are also sometimes inconveniently positioned for their users. People in South Africa using public transport are known for being late due to the unreliability and inconvenience of the public transport system.
- Another newspaper article reports that costs related to a **loss in productivity** in South Africa could be as much as R102 milliard per year or 10 percent of the country's gross domestic product (GDP). In the 2005 Proudfoot Productivity Study of 12 countries, it was discovered that an average of 22 percent of time is wasted at work. The study discovered that the economic costs of loss of productivity in South Africa are estimated to be between R51 milliard and R102 milliard per year (Ueckermann, 2005:2). In many cases, telework is seen as a strategy to counteract losses in productivity, not only for employees, but also for employers. For the employer, it could save office space, reduce parking requirements, decrease sick leave and increase organisational effectiveness, amongst others, but management will have to have a serious mind shift. Productivity is not necessarily linked to performance (work harder) it is also linked to work smarter.
- Van der Westhuizen (2006:1) states that more than 100 000 motorists live in Tshwane, but work in Johannesburg. They spend three hours in traffic on a daily basis. That amounts to 300 000 hours lost, which could have been spent much more productively. Peak traffic time in Johannesburg 25 years ago was between 07:00 and 09:00, but today

ranges between 06:15 and 09:30. Coetzee (2007:7) confirms the above, stating, “Gauteng motorists currently loose three hours per day in traffic”.

- Closely linked to productivity is the taking of too much **leave**. According to the results of a survey done in South Africa, women take more sick leave than that taken by their male counterparts. Women who suffer from depression take an average of 8.64 days at a time, in relation to 2.5 days at a time for any other condition. Absence from work cost the economy R19 milliard in 2005 and 2006. It has been stated that employers must take employee depression more seriously. Females are traditionally responsible for the care of children. Flexible work options should be implemented so that female employees can take care of their children and in order to prevent them from abusing sick leave (De Lange, 2007:2).
- **Oil** is a limited resource that soon can be depleted, due to the speed with which it is used throughout the world. Oil is going to become so expensive that the world economy is fast heading for a recession. Mc Clelland, retired CEO of the South African Petrol Society, states that the world at present uses 86 million barrels of oil per day. At a growth rate of only 1,5 percent per year, the world will need 90 million barrels of oil per day by 2010. The question then arises as to where the additional four million barrels will be obtained. He also refers to the waste of petrol that takes place when people drive to work alone in a vehicle (Williams, 2007b:12). The political tensions in Pakistan and the increasing violence in Nigeria, Africa’s biggest oil-producing country, together with a decrease in America’s oil supplies are some of the reasons for the high price of oil.
- In April 2007, the oil price was \$60 per barrel; in April 2008, the oil price was \$115 per barrel and a 12-month forecast from April 2008 is \$149 per barrel (Oil dashboard, 2008:1).
- As a consequence of the high price of oil and increasing indications that fuel operators simply cannot supply the ever-increasing demand for petrol and diesel, the following was a message from fuel operators to South African motorists: “Prepare for a constant shortage of **fuel**”. The petrol price has increased to scary heights in the last few years (DME, 2008:1).

- **Diesel** sales in South Africa increased during the past five years by 30 percent (Williams, 2007a:19).
- According to Van Zyl (2006:4), increased traffic congestion and poor driving standards lead to more accidents and make it difficult for insurance brokers to operate on a profit basis. Claims are being submitted by one out of every four vehicles on the road. The increase in accidents is ascribed to traffic congestion experienced in all the metropolitan areas and aggressive and impatient driving manners.
- **Global warming** can have detrimental effects on Africa. A study done by the University of Pretoria estimates that Africa might lose \$25 billion in crop failures and another \$4 billion from less rain, due to global warming. In the dry lands, water may become a critical scarcity. Soaring temperatures and erratic rainfall may dry up surface water, soil may hold less moisture, boreholes may become contaminated and vegetative cover may recede. Warming may also damage animal habitats and biodiversity (Global warming in Africa: Drying up and flooding out, 2007:41). Telework could at least reduce, postpone or even eliminate these detrimental effects that awaits South Africa.

2.23 SUMMARY

This chapter outlined how the information revolution is reshaping corporate and personal lives, thereby moving people closer to a global eco-friendly society. Telework represents a major step towards working successfully anywhere, anytime, with ICT as one of the key workplace transformers of a new millennium. In Chapter 3, the research framework and methodology followed in this investigation will be explained in detail.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

Chapter 2 provided the historical background and theoretical framework on which this investigation is based, whilst Chapter 3 explains the research approach and methodology followed.

Research is a process that involves obtaining scientific knowledge by means of various objective methods and procedures. The term 'objective' indicates that these methods and procedures do not rely on personal feelings or opinions, and that specific methods are used at each stage of the research process. These methods include procedures for drawing a sample, measuring variables, collecting and processing data, analysing and, finally, interpreting the results. There are various methods and techniques available and, in general, the aim of a specific research project will determine those that are the most appropriate (Welman *et al.*, 2005:2).

3.2 METHOD OF INVESTIGATION AND RESEARCH DESIGN

The primary reference material used for designing the research methodology is Welman *et al.* (2001, 2005), since the authors specifically focussed in their first edition on the field of business and administrative sciences. However, the revised 2005 edition is more generic to a wide variety of disciplines.

3.2.1 Applied research

Applied research in industry has several features that distinguish it from basic research. Firstly, the need for research in industry develops because of organisational problems. Secondly, the goal of research in industry is to improve the effectiveness of an organisation. Thirdly, the participants in research in industry are typically employees or job applicants. Fourthly, if the results of research in industry are positive and usable and if the conclusions of the study are accepted it can be implemented (Welman *et al.*, 2005:25).

3.2.2 Exploratory research involving descriptive statistics

The approach of exploratory research is not to start with a specific problem - the approach of such a study is to find a problem or hypothesis to be tested, which is typical of qualitative research (Welman *et al.*, 2005:14). In the case of exploratory research in a relatively new area which lacks established theories or research findings, specific research hypotheses may not be feasible. In such instances, a question about the relationship between variables may be posed (Welman *et al.*, 2001:23). Descriptive statistics involve the description and/or summary of the data obtained for a group of individual units of analysis (Welman *et al.*, 2005:231). Descriptive research has two goals: explaining phenomena and predicting behaviour (Welman *et al.*, 2005:23).

3.2.3 Geographical demarcation

The reason why the study focuses on companies in Gauteng is that Gauteng is the province with the highest per capita income and more than 60 percent of South Africa's research and development takes place in Gauteng. Gauteng has a greater proportion of its labour force in professional, technical, managerial and executive positions than any other province (South African Consulate General: Gauteng, 2007:1).

3.2.4 Demographical demarcation/population

The demarcated target population (*N*) focuses on information and knowledge employees and employers in the private and public sectors. The research method was designed to investigate employee and employer attitudes with regard to the implementation of telework as a flexible work option, focussing on the related beneficial implications on the environment and socio economy. No distinction is made between the public and private sectors since it is not relevant to this investigation. It needs to be emphasised that international surveys provided evidence of equally successful applications of telework in both sectors.

Public sector (*N* = 45)

Private sector (*N* = 46)

3.2.4.1 Empirical response rate

Table 8 indicates the number of questionnaires distributed and the subsequent response rates. Table 8 also indicates which companies have already implemented telework and have teleworkers, together with which companies have not yet implemented telework and,

therefore, have no teleworkers. It was decided to include both teleworking and non-teleworking companies in Gauteng, to prevent focusing only on one point of view. It is important to note that in the companies who have implemented telework, not all employees are teleworkers. Only a few selected employees are teleworkers and the remainder are employed on a traditional full-time basis.

Table 8: Questionnaire distribution and response rates

<i>N</i>	Number of questionnaires distributed	Number of questionnaires returned	A teleworking company (YES)	Not a teleworking company (NO)
Company A	15	15		NO
Company B	20	13	YES	
Company C	6	2	YES	
Company D	20	19	YES	
Company E	15	11		NO
Company F	15	9		NO
TOTAL	91	70	3	3

The fact that teleworking companies and non-teleworking companies are equally represented is also expected to add significant statistical value to the findings of this investigation.

3.2.5 Sampling

Non-probability sampling was conducted in this study. Purposive, self-selection and convenience sampling (*n*) were applied, focussing on the following units of analysis:

Employers (*n* = 31)

Administrative employees (*n* = 39)

3.2.5.1 Purposive sampling

Purposive sampling is the most important kind of non-probability sampling. Researchers rely on their experience, ingenuity and/or previous research findings to deliberately obtain units of analysis in such a manner that the sample they obtain may be regarded as being representative of the relevant population (Welman *et al.*, 2005:69).

3.2.5.2 Self-selection sampling

Self-selection sampling occurs when a case is allowed, usually an individual, to identify a desire to participate in research. This can be done by:

- publicising a need for cases, either by advertising through appropriate media or by asking them to participate; and
- collecting data from those who respond.

Cases that self-select often do so due to their interest or opinions about research questions or stated objectives. In some instances, that is exactly what the researcher may want (Welman *et al.*, 2005:69).

3.2.5.3 Convenience sampling

Convenience sampling, also referred to as haphazard sampling, involves selecting haphazardly those cases that are easiest to obtain for the sample. The sample selection process is continued until the required sample size is reached.

Table 9 provides information on the sample groups and sample sizes.

Table 9: Sample groups and sample sizes

N	MANAGERS	EMPLOYEES
Company A	5	10
Company B	4	9
Company C	1	1
Company D	7	12
Company E	7	4
Company F	6	3
TOTAL	31	39

It is significant to note that there is a relatively even correlation between managers and employees, which is expected to add value to the validation of the inferential analysis in the statistical findings.

Figure 15 provides information on the response percentages of the different sample groups, as outlined in Table 9.

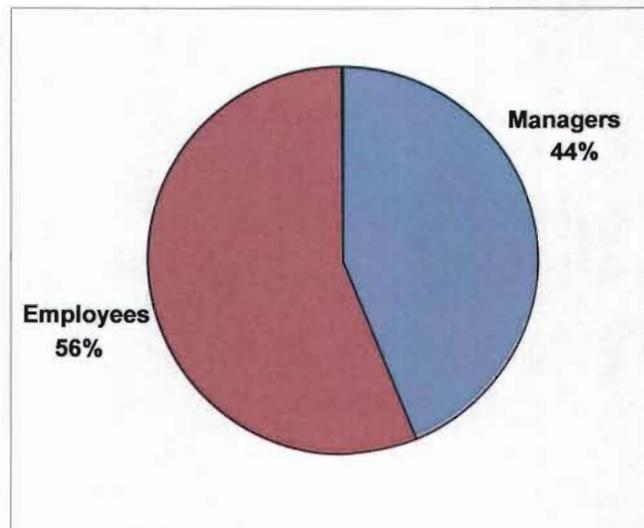


Figure 15: Response percentages of the different sample groups

Respondents in managerial positions accounted for 44 percent of the responses, employees accounted for 56 percent. This clearly signifies representative samples.

Figure 16 provides information on the gender distribution of the different sample groups.

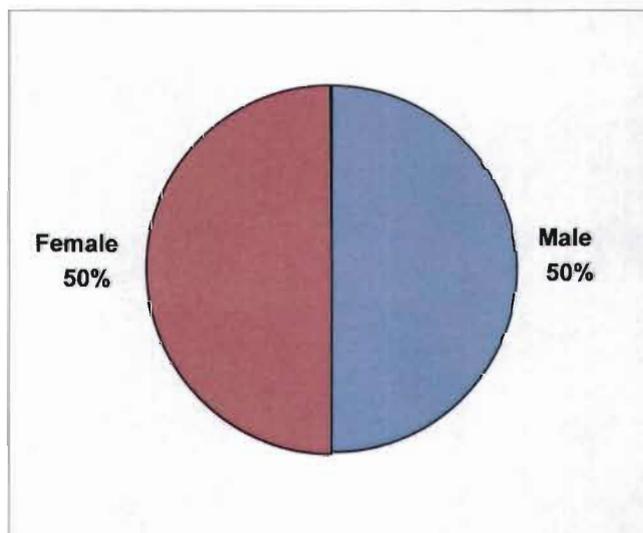


Figure 16: Gender distribution

The representation of the two genders in equal proportions is also expected to add value to comparative correlations in analysing of the statistics.

Figure 17 provides information on the gender distribution within the different sample groups.



Figure 17: Gender distributions within the different sample groups

It is clear that male managers outnumber female managers and that female employees outnumber male employees, a fact that may prove to be significant in applicable parts of this study (refer to Paragraph 4.6.5).

3.2.6 Quantitative statistics

Research must be limited to what can be observed and measured objectively, that is, that which exists independently of the feelings and opinions of individuals. These statistics strive to formulate laws that apply to populations that are universally valid and that explain the causes of objectively observable and measurable behaviour. The term objective implies that people other than the researcher should agree on what is being observed, such as the score that the observation should register on a measuring instrument (Welman *et al.*, 2005:6).

3.2.7 Non-experimental design

Neither random nor any planned intervention occurs in non-experimental research. In this type of research, one or more variables, apart from the independent variable in question,

could be the actual source of observed variation in the dependant variable(s) (Welman *et al.*, 2005:92).

3.2.8 Field studies/field survey

It appears that there is no satisfactory umbrella term for non-experimental hypothesis-testing research at present. The most satisfactory candidate for this purpose appears to be survey research, although this term tends to be associated mainly with opinion surveys. However, non-experimental, hypothesis-testing research covers a wider spectrum than opinion polls. In non-experimental, hypothesis-testing research, there is no planned intervention and no random assignment of research participants to groups consisting of different levels of the independent variable(s). This type of research examines the relationship that occurs between two or more variables, without any planned intervention (Welman *et al.*, 2005:93).

3.2.9 Literature review

The investigation relied mostly on international literature (Chapter 2) in providing a theoretical framework on management perceptions and the socio-economic implications of telework, since local sources are minimal. Newspaper reports, journal articles, books, personal and electronic communication, databases and the Internet were used.

3.2.10 Measuring instrument and data collection method

Structured questionnaires were used, whereby alternatives are provided to each question, and the respondent simply needs to select and mark the applicable answer. The questionnaire also included a few open questions where respondents had to provide responses in their own words. It was decided to compile one questionnaire for both sample groups. The same information from both groups shed light on the experiences or responses of the different sample groups to the same statements. A comparative analysis will be performed on sections E and F and the completion of similar questionnaires will facilitate such an operation.

3.2.10.1 Demographic variables

In Section A of the questionnaire, the respondents were asked to provide their demographic particulars. The purpose of this was to commence with simple questions. The information was also important for cross tabulating different variables for analysing relevant data.

3.2.10.2 Design of structured questionnaire sections

The design of the structured questionnaire was based on the content of data sets previously used by other international researchers (Wendell, 2007:1-11). Since these data sets originate from international sources, they have been delineated, adapted and refined in order to conform to the industrial environment in South Africa.

The questions consisted mainly of closed questions because such questions are usually self-explanatory and can be answered with ease and within a short time period.

Table 10 provides the structural layout and content of the questionnaire (refer to Appendix B).

Table 10: Questionnaire layout and content

LAYOUT	CONTENT
SECTION A:	General information and environmental impacts
SECTION B AND C:	Quality of life impacts
SECTION D:	Economic impacts
SECTION E:	Cognisance and willingness to accept the phenomenon of telework
SECTION F:	Managerial implications

Section A consisted mostly of closed questions where the respondent had to select and mark the applicable answer. Two open questions were included in this section. Questions in this section covered the following aspects:

- job title;
- gender;
- number of dependant children and their ages;
- dependant care responsibilities;
- main form of transport to and from work;
- reasons for travelling alone in own vehicle;
- number of days that traffic congestion is experienced;
- reason for travelling with public transport;
- distance travelled per day;
- time taken up by travel to and from work;
- road rage and hijacking experiences; and
- use of company vehicles.

Section B and C consisted of personal opinions rated on a four-point Likert scale.

Questions in this section covered the following aspects:

- physical health;
- time available for family and personal business;
- time available for social and recreational activities;
- convenience and flexibility of child care or other dependant care;
- mental health;
- amount of stress experienced while working;
- degree to which subject feels rested when arriving at work;
- impact of distance between worksite and residence on overall quality of life;
- degree of safety in and around the worksite; and
- degree of road rage and hijackings in and around the area where subject works.

Section D consisted of qualitative questions. Questions in this section covered the following aspects:

- work-related expenses during a typical month, such as fuel, parking fees, public transport, car pool, meals and child or other dependant care;
- hours of annual leave taken for purposes of family responsibilities and personal business; and
- time used for sick leave as a result of minor ailments such as colds, headaches and stress-related symptoms.

Section E consisted of closed questions where respondents had to select a 'yes' or 'no' response. Questions in this section covered the following aspects:

- respondent's familiarity with the term telework;
- whether respondent is presently teleworking;
- if respondent would consider telework;
- if respondent would allow others to telework ;
- if respondent believed telework could improve productivity; and
- if respondent regarded teleworkers as being less serious about their jobs.

Section F consisted of personal opinions rated on a four-point Likert scale. Respondents had to indicate to what extent they agreed or disagreed with the statement provided and

select and mark the applicable answer. This section related to the managerial implications of telework, whereby employees had to rate management on the following aspects:

- management and supervising styles;
- communication skills;
- levels of trust that exist between manager and employee; and
- varying degrees of control that management has over employees.

3.2.10.3 Scaling of questions

As closed questions which require a 'yes' or 'no' answer do not always provide satisfactory information, it was decided to make use of Likert scales. Scaling is a process of creating a continuum on which possible answers to a question are located. This continuum represents a negative factor/dimension on the one side, and a positive factor/dimension on the other. This study made use of three differentiations of four-point scales in sections B, C and F respectively. The type of question determined the scale that was used. Figure 18 provides an outline of the three scales used in this study.

A	B	C	D
Very Good	Good	Fair	Poor
AND			
A	B	C	D
A Lot	Some	Very Little	None
AND			
Strongly agree	Agree	Disagree	Strongly Disagree

Figure 18: Likert scale differentiations

3.2.10.4 Questionnaire content

The first page of the questionnaire consisted of a covering letter in which respondents were requested to complete the questionnaire and were notified that the completed questionnaire would be collected manually. An assurance of anonymity was provided.

Sections E and F of the questionnaire were used in a comparative study, meaning that Sections E and F completed by managers were compared with Sections E and F completed

by employees. This was done in order to determine whether managers and employees have the same experiences about aspects that are important to both.

3.2.10.5 Distribution and collection of questionnaire

Unfortunately, the distribution and collection did not go as planned because of reluctance on the part of the selected industry samples and it was a battle to find sufficient respondents from both sampling groups. A few organisations did not respond to e-mail requests and those who did respond replied that the request was raised at senior management who then refused assistance. The reason given was that concerns were raised about making employee information available to an external party, despite the assurance of guaranteed anonymity. Some of the employers distributed the questionnaires to staff in their departments and then collected it themselves, after which they forwarded it via e-mail or personally. Since these employees knew that their employers would have access to the data that they supplied, this could pose as a nuisance variable influencing honesty in the completion of sections E and F. The nuisance variable was closely monitored when analysing and interpreting the results in these two sections, and corrective measures were taken when it proved to have had an influence on the results.

3.2.10.6 Structured interview

A structured interview was conducted with Farrell (2007) from Absa Bank regarding a company bus-transport system that they exclusively use for Absa employees. The interview covered the following:

- Question 1: How does the company transport system operate?
- Question 2: What were the reasons for implementing such a system?
- Question 3: What benefits are derived from this system?

The results are explained in Chapter 4.

3.2.11 Primary and secondary data

Primary data are original data collected by a researcher for the purpose of the study at hand. Secondary data are information collected by individuals or agencies and institutions other than the researcher (Welman *et al.*, 2005:149).

3.2.12 Pilot study (pre-testing of questionnaire)

When a new instrument is developed, it is useful to 'test it before administering it to the actual sample. This process of testing is done by means of a pilot study, which entails administering the instrument to a limited number of subjects from the same population as that for which the eventual project is intended (Welman *et al.*, 2005:148). Therefore, a pilot study was conducted whereby four respondents at managerial level and four respondents at employee level completed the questionnaires. After all the deficiencies had been corrected, the questionnaire was refined and distributed.

3.3 SUMMARY

This chapter dealt with the research design applied in this study. The information provided clearly outlines a well-designed research framework applicable to the field of study and a quantitative measuring instrument from which inferential analyses are expected to generate reliable statistics. The next chapter focuses on the statistical findings, analysis and interpretation of the processed data.

CHAPTER 4

DISSEMINATION OF FINDINGS

4.1 INTRODUCTION

Chapter 3 outlined the research framework as a baseline for conducting the empirical research in this study. Chapter 4 provides the findings, analysis and interpretations of the processed data.

Presentation of the actual findings, analysis and interpretation are made sequentially, according to the sections and aspects included in the structured questionnaire (refer to Appendix B).

4.2 SECTION A: GENERAL INFORMATION AND ENVIRONMENTAL IMPACT OF TELEWORK

Section A deals with the demographic data of the respondents and the environmental impact of telework.

4.2.1 Job title (Question 1)

In this question, the respondents had to indicate their job titles by selecting and marking the applicable answer. Distribution of respondents with regard to their job titles is set out in Figure 19.

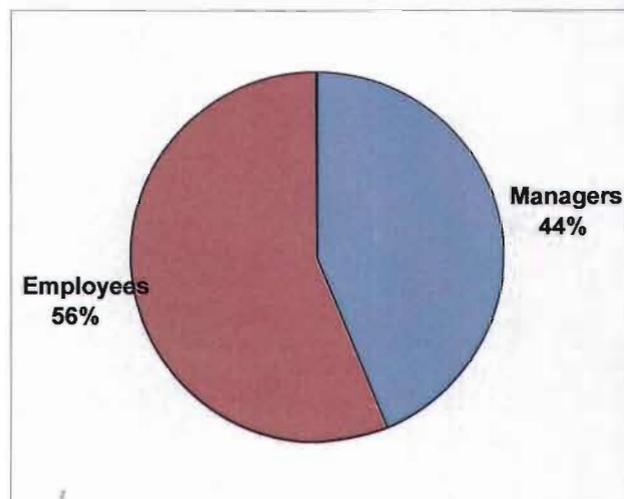


Figure 19: Response percentages of managers and employees

Respondents in managerial positions accounted for 44 percent and employees for 56 percent. These figures provide a similar *pro rata* distribution, which will allow significant comparisons where applicable.

4.2.2 Gender (Question 2)

In this question, the respondents had to indicate to which gender group they belong by selecting and marking the applicable answer. The distribution of respondents according to their gender is outlined in Figure 20.

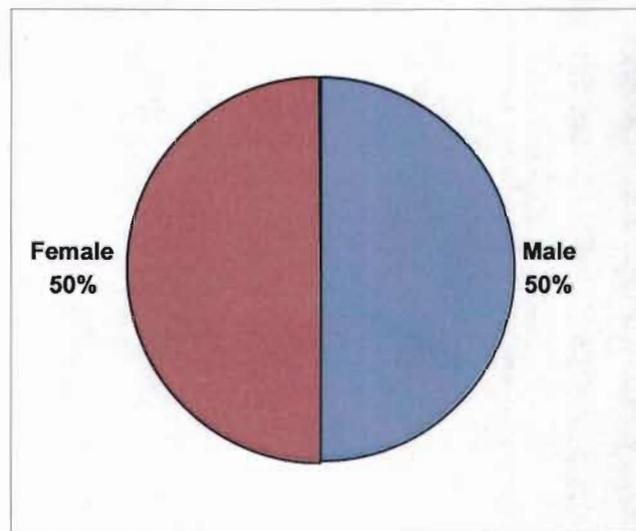


Figure 20: Gender distributions of respondents

The equal distribution according to gender of 50 percent male and 50 percent female respondents could add significant value to making comparative deductions between the two genders.

4.2.3 Dependant children (Question 3, 4 and 5)

In questions 3, 4 and 5, the respondents had to indicate how many children they have between the specified age groups provided in each question. Questions 3, 4 and 5 were interpreted and analysed together, which produced a mean of 1,14 children per household. It seems as if families are having fewer children, which could have many reasons, such as the high expenses involved and women may be more career-oriented than a few years ago. Without a flexible work option such as telework, it is often difficult to balance work with family life.

4.2.4 Adults dependent on care, such as elderly or disabled persons (Question 6)

Figure 21 depicts the results to the question asking whether respondents take care of elderly or disabled persons within their households, whereby respondents had to select a ‘yes’ or ‘no’ answer.

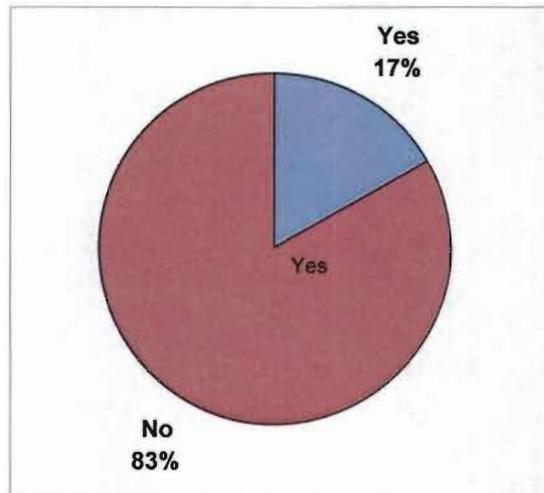


Figure 21: Response rate for elderly or dependant care responsibilities

Of the respondents, 17 percent reported that they have elderly or disabled persons to care for in their households. This response corresponds well with the statement that our “society is ageing. Twenty-five percent of all workers have elder care responsibilities” (University of Chicago Compensation, 2007:1). The difference of 8 percent in this international comparison could well be related to disabled persons who were not included in the Chicago study cited above.

4.2.5 Main form of transport (Question 7)

Respondents had to indicate what their primary means of transport to and from work is by selecting and marking the applicable answer, as depicted in Table 11.

Table 11: Means of transport to and from work

Forms of transport	Frequency	%
Public transport	2	2,86
Lift club	2	2,86
Travelling alone in own car	66	94,29
Total	70	100,00

The significant majority of 94,29 percent reported that they travel alone in their own cars to and from work. Supporting this result, nearly 100 million adults in the USA travel to work each day, of which the vast majority travel alone (refer to Paragraph 2.17.1).

This clearly indicates an unacceptably high occurrence of vehicle use by employees. This contributes to environmental and socio-economic hazards, such as air pollution, road congestion and other previously mentioned problems. This high incidence in South Africa could be ascribed to the fact that a well-developed public transport infrastructure is seriously lacking in comparison to those in developed countries. This unacceptable high occurrence of vehicle use by employees can also be ascribed to the high sales figures in the automotive industry (refer to Paragraph 2.22).

4.2.6 Reasons for travelling alone (Question 8)

For question 8, respondents had to indicate the reasons why they travel alone using their own cars to and from work. Table 12 provides a summary of the results.

Table 12: Reasons for travelling alone

Reasons for travelling alone	Frequency	%
It is convenient	18	25,71
My job requires it of me	33	47,14
I cannot make use of a lift club	2	2,86
Family responsibilities	11	15,71
Other	2	2,86
No response	4	5,71
Total	70	100,00

A significant number of respondents (47,14 percent) reported that the reason for them travelling alone using their own cars to and from work is because their jobs require it of them. Only 15,71 percent reported that they travel with their own cars due to family responsibilities. This corresponds with Questions 3, 4 and 5 in Section A, where respondents reported on the number of dependants per household. These dependents may account for why respondents make use of their own transport. The number of respondents who reported that it were convenient for them to travel with their own cars (25,71 percent), could be indicative of the fact that South Africa's employees enjoy the luxury of travelling with their own transport rather than having to endure the small discomforts of other modes

of transport available. The 15,71 percent of respondents who reported that they travel with their own cars because of family responsibilities could also indicate that, should flexible work options be available, they would have been able to avoid travelling to corporate offices.

4.2.7 Traffic congestion on the road (Question 9)

Here, the respondents had to indicate how many days per week they experience traffic congestion on the road by selecting and marking the appropriate answer as indicated in Table 13.

Table 13: The frequency of traffic congestion on the road

Traffic congestion	Frequency	%
Never to 1 day per week	19	27,54
2 Days per week	7	10,14
3 Days per week	8	11,59
4 Days per week	1	1,45
Everyday	34	49,28
Total	70	100,00

A significant number of respondents (49,28 percent) reported that they experience traffic congestion on the road everyday. This has previously been indicated as one of the main reasons for road rage, an increase in accidents, higher levels of stress and other related problems. Since respondents were not questioned about the time they leave home to travel to work, this figure could be higher given that some may only leave for the office after peak-hour traffic has slowed down. In Chapter 2 it was mentioned that peak-hour traffic in the mornings was generally thought to be from about 07:00 to 09:00, but that more recently traffic congestion on the N1 highway had lasted between 06:15 and 09:30 in the mornings and between 15:00 and 20:00 in the afternoons (refer to Paragraph 2.22). The response of the remaining half of respondents, who only experience traffic congestion one to four days per week, could be because they do not have to travel to work everyday or because they are teleworking already, as explained in the methodology (refer to Paragraph 3.2.4.1). As such, an inferential deduction could be made that a much higher incidence of traffic congestion occurs than the above statistics depicted in Table 13 suggest. Supporting this result, overall emissions of pollutants are projected to increase by almost 40 percent by 2010 because

individuals are driving more and under more congested conditions (refer to Paragraph 2.17.3).

4.2.8 Travelling with public transport (Question 10)

In this question, the respondents had to indicate why they travel by public transport by selecting and marking the appropriate answer as outlined in Table 14.

Table 14: Reasons for using public transport

Reason for travelling with public transport	Frequency	%
Do not have own car	2	2,86
Traffic congestion is too much	0	0
It is cheaper	1	1,43
It is convenient	0	0
Do not make use of public transport	67	95,71
Total	70	100,00

A significant majority of respondents indicated that they do not make use of public transport (95,71 percent). The explanation clearly lies in the fact that, in addition to the situation regarding the public transport infrastructure in South Africa as previously mentioned, a mere 2,86 percent indicated that they do not own a car. This result is concomitant with the fact that vehicle sales are booming because of the favourable economic climate in the country and this could be one of the reasons why so little use is made of public transport (refer to Paragraph 2.22). It could also be because, in South Africa, public transport is not always reliable or safe. The public transport system in South Africa consists of taxis, trains and busses, and none of these three can be counted on in terms of reliability. This was discovered through interviews with various people using public transport. Many people have to rise very early to reach work on time, and the often-inconvenient location of the buss-, taxi- and train-stations adds to their travel time. People using public transport in South Africa are known for being late due to the unreliability and inconvenience of the public transport system (refer to Paragraph 2.22).

4.2.9 Distance travelled per day (Question 11)

Here, the respondents had to indicate the distance travelled per day to and from work by writing down a response in the space provided. The average round-trip distance reported was 48,56 kilometres per day. This amounts to a mean of 243 kilometres travelled per

week and a mean of 936 kilometres per month. If fuel consumption is taken into consideration at an estimated average of 10 litres for an average motor vehicle, this could amount to 93,6 litres per month. Further calculations could estimate its related environmental hazards in terms of fuel emissions and air pollution continuing its vicious cycle of destruction that is adding to earth warming (refer to Paragraph 2.17.4). A disconcerting consequence of travelling these vast distances per month is the constant fuel shortages as indicated by fuel operators in South Africa (refer to Paragraph 2.22).

4.2.10 Time spent per day to travel (Question 12)

In this question, the respondent had to indicate the time spent per day on travel to and from work by writing down his/her response in the space provided. The average time reported per round trip was 69.43 minutes per day. This amounts to a mean of approximately six hours and ten minutes per week and 30 hours and 50 minutes per month that could have been spent more productively if the option of telework was available. Clearly, this indicates a very high incidence of lost time in terms of productivity that, unavoidably, leads to monetary losses for industry as well. Supporting this result, Gauteng motorists daily endure one or more hours caught up in traffic congestion (refer to Paragraph 2.18.1). No new roads have been added to the road network, despite the fact that high new-vehicle sales contribute to the congesting of roads, making travel to and from work that much longer (refer to Paragraph 2.22). To add to this bleak picture, no money or space is available for the further development of new roads to alleviate the congestion and related destructive environmental circumstances (refer to Paragraph 2.22).

4.2.11 Victims of road rage or car hijackings (Question 13)

Here, the respondents had to indicate whether they had ever been a victim of road rage or vehicle hijacking. The responses are indicated in Figure 22.

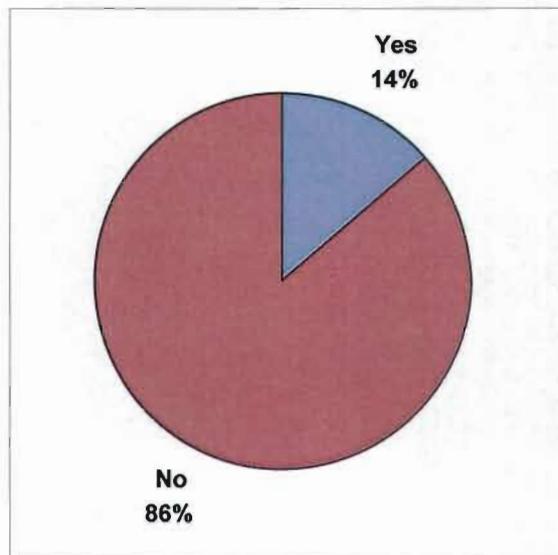


Figure 22: Road rage or vehicle hijackings

Although 14 percent of respondents who were victims of road rage or car hijackings may seem low, it nevertheless presents a significant and alarming rate of these criminal transgressions. The more vehicles on the road, the more these crimes are expected to escalate. Commuters are in a hurry to reach their places of work on time. Therefore, even a small indiscretion on the part of another road user could just be the spark that leads to an unfortunate and avoidable incident, which may result in death, serious injury, court cases and all kinds of claims and trauma. Hijackings even take place in broad daylight and may also involve casualties such as murder, disability and trauma, as previously mentioned (refer to Paragraph 2.18.1).

4.2.12 Company transport (Question 14)

For Question 14, respondents had to indicate whether they made use of company transport. This question was designed to determine whether industry is aware of its responsibility to contribute to minimising the escalation of traffic on the roads. The results to this question are indicated in Figure 23.

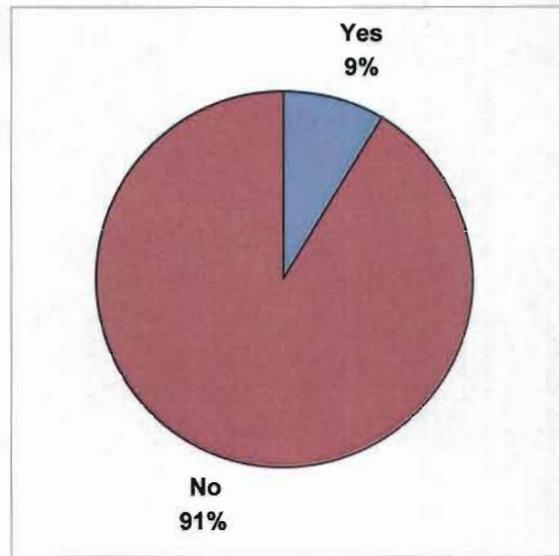


Figure 23: Use of company transport

Figure 23 shows that only 9 percent of respondents reported driving in a company car.

The following are the responses received from a structured interview conducted with Farrell (2007), regarding the company bus-transport system available to Absa Bank employees (refer to Paragraph 3.2.10.6).

Question 1: How does the company transport system operate?

Response: Absa Bank in Johannesburg has implemented a mobile office using a bus system for its employees. Employees who are interested, can travel by bus to and from work. This is an ordinary tour bus without any telecommunications services on board, but employees can work on laptops while travelling. The Absa system includes four busses that depart from different areas and at different times in the morning. Not all employees can make use of these busses due to the different responsibilities involved in their jobs and because some employees at Absa Bank are teleworkers. This is presently a pilot project which is expected to end soon and the results of this project will then determine whether Absa Bank will continue with the system.

Question 2: What were the reasons for implementing such a system?

Response: The reason for implementing this company transport system is due to the heavy traffic congestion on the roads to and from work everyday.

Question 3: What benefits are derived from this system?

Response: The benefits of this system are that employees can improve their productivity and that they do not have to be trapped behind the wheel of a car on the congested roads.

With company transport, Absa Bank can contribute to reducing stress levels, which results in employees feeling more relaxed when they arrive at work (Farrell, 2007).

4.3 SECTION B: QUALITY OF LIFE IMPACT

Section B and C deal with the impact that telework has on quality of life. In Section B, the respondents had to rate statements according to their personal opinions using a four-point Likert scale, as indicated in Figure 24. In order to ascertain scientific accuracy, some figures and tables also provide feedback where subjects did not respond.

A	B	C	D
Very Good	Good	Fair	Poor
Statement 1: Physical health.			
Statement 2: Quantity of time available for family/personal life.			
Statement 3: Quantity of time available for social/recreational activity.			
Statement 4: Convenience and flexibility of childcare or other dependant care (elderly, disabled or other).			
Statement 5: Mental health (general levels of stress, tension, anxiety and/or depression).			

Figure 24: Personal lifestyles

The ranked responses to Section B are depicted graphically in Figure 25.

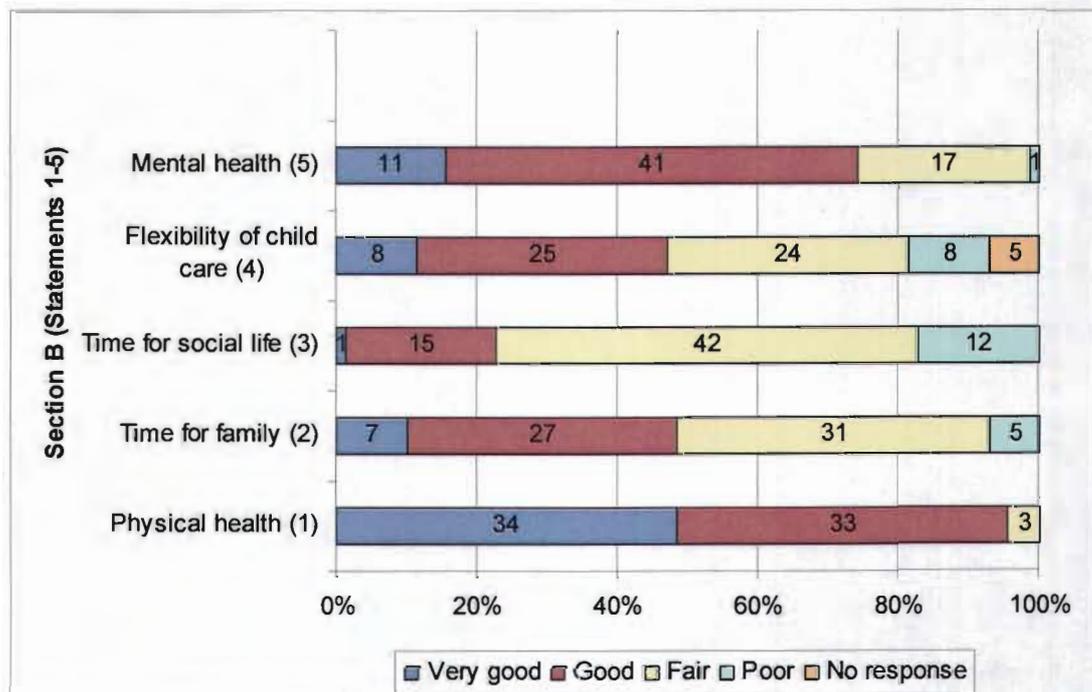


Figure 25: Continuum of rankings in Section B (1-5)

4.3.1 Statement 1: Physical health

The majority of respondents (97 percent) indicated that they are physically healthy ('very good' and 'good'). Looking at a break down of this figure, close to half of the respondents (48,57 percent) indicated that their physical health is very good, whilst 47,14 percent reported that their physical health is good. A very small percentage reported their health as merely being 'fair', and none of the respondents reported poor health. These statistics indicate a generally healthy workforce, considering life in the fast lane as experienced by many corporate employees in a high technology and frequently changing society. Health levels are improved by reducing stress related to compromises made between family and work. The stress associated with commuting back and forth to work, together with making compromises between family and work is real, and telework offers a renewed opportunity for workers to rediscover the joys of working within the familiar surroundings of their homes (refer to Paragraph 2.18.2).

4.3.2 Statement 2: Time for family

Half of the respondents rate the time that they have available for their families as 'good' and 'very good', whilst the other half assert that it is fair and poor. This high figure reflects negatively on the time that parents are available to attend to their families because of job demands that deprive them of this valuable contribution to family life. This high incidence could be indicative of the deterioration of the quality of family life in terms of disciplining minors and being available to attend to their many needs and problems. Children are growing up in environments where an alarming number of juvenile crimes are being reported on in the local and international media. Many parents have acknowledged that they lost control over their children who then were subjected to negative influences. The importance of time spent with family is supported by the fact that the strength of a society is derived from the strength of its individuals, and the strength of its individuals quite often is derived from the strength of their families (refer to Paragraph 2.18.4). With advanced ICT, a large segment of workers can return to this mode of 'work-at-home' productivity without compromising either their family living or their productivity (refer to Paragraph 2.18.2). If just one commuter commits to telework once per week for one year, they could gain 52 more hours of family time or sleep (refer to Paragraph 2.17.1).

4.3.3 Statement 3: Time for social life

A disquieting majority of 77,14 percent of respondents rated the time available for social and recreational activities as 'fair' and 'poor'. Only 22,86 percent of respondents reported to have 'good' or 'very good' time available for social and recreational activities. Health specialists recommend exercise to revive mind, body and soul. This is necessary for a person to be in good shape and to perform optimally in the work environment. The absence of social activity also has a negative influence on family life. Parents do not have the time to set a good example and children do not have the required exposure to positive examples of living a balanced life.

4.3.4 Statement 4: Flexibility of childcare

The statement on the flexibility of dependant care options (child or elderly care) is rated by 11,71 percent as being 'very good' and by 35,71 percent as being 'good'. About half of the respondents (45,71 percent) indicated that flexibility of childcare is 'fair' and 'poor'. The high number of respondents indicating flexibility of childcare as 'good' to 'very good' may be because some respondents reported having no children in their households and those who reported having children have, on average, one child per household. The limited time available for dependant care is clearly not a concern for the majority.

4.3.5 Statement 5: Mental health

A significant majority of 74,28 percent of the respondents rated themselves as being mentally healthy ('very good' and 'good'). However, the incidence of the remaining 25,72 percent is much too high and indicative of unfavourable circumstances related to their work and lifestyle environments. Poor mental health could include factors such as stress levels, tension, anxiety and depression. Respondents' mental health could also suffer if they do not have sufficient time available for their families and for social and recreational activities, and if their flexibility of child or elderly care is not sufficient. This will inevitably have a negative impact on employees' productivity and performance in their jobs.

Studies of motorcar drivers have shown significant relationships between exposure to traffic congestion and a variety of adverse physiological reactions. For example, researchers have reported a significant and positive correlation between high traffic volumes and increased heart rates, blood pressure and electrocardiogram irregularities.

Studies also show that chronic exposure to traffic congestion, especially over long distances, long waits and frequent trips, increases negative moods, lowers tolerance of frustration and can even lead to more impatient driving habits (refer to Paragraph 2.18.2).

Figure 26 indicates that the more time respondents spend travelling on round trips for work purposes, the less time they have for their family and personal life (refer to Section B, Statement 2).

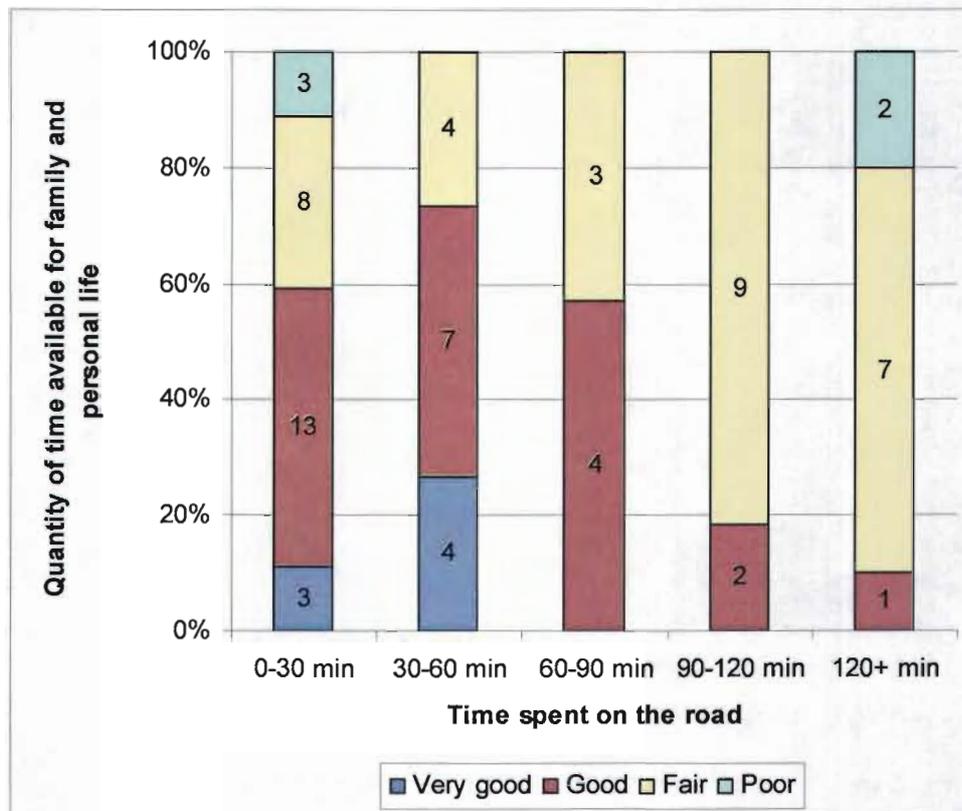


Figure 26: Amount of time spent on the road

- Figure 26 indicates that, of those respondents who travel between 0-30 minutes, 59,25 percent reported time for family and personal life as ‘very good’ and ‘good’. Respondents who reported time for family as ‘fair’ and ‘poor’ were 40,74 percent.
- Of those who travel between 30-60 minutes, 73,33 percent reported to have ‘very good’ and ‘good’ time available for family and personal life. Respondents who rated their time as ‘fair’ for family and personal life were 26,66 percent. No respondents reported their time as ‘poor’ for family and personal life.
- Respondents travelling 60-90 minutes who rated their time for family and personal life as ‘good’ were 57,14 percent. No respondents reported their time available for

family and personal life as 'very good'. Respondents rating their time as 'fair' amounted to 42,85 percent. No respondents rated their time available for family and personal life as 'poor'.

- For respondents who travel between 90 and 120 minutes, 18,18 percent reported time for family and personal life as 'good', no respondent reported a 'very good'. Respondents who reported time available for social and family life as 'fair' were 81,81 percent and no respondents reported 'poor' time available.
- Only 10 percent of respondents who travel more than 120 minutes reported time available for family and personal life as being 'good'. No respondents reported a 'very good'. Respondents, who reported time as 'fair' and 'poor' for family and personal life, amounted to 90 percent.

From this figure, a negative tendency is clearly visible. The further the respondents travel the less time they have for family and personal life - a problem that could be solved by telework. Working in the home offers people a greater opportunity to share quality time with family members, to promote family values and to develop stronger family ties and unity. In addition, time saved through telework could be spent with family members constructively in ways that promote and foster resolutions to family problems (refer to Paragraph 2.18.4).

Figure 27 disseminates the finding related to the time respondents spend on the road for purposes of work and its impact on the time they have for social and recreational activities (refer to Section B – Statement 3).

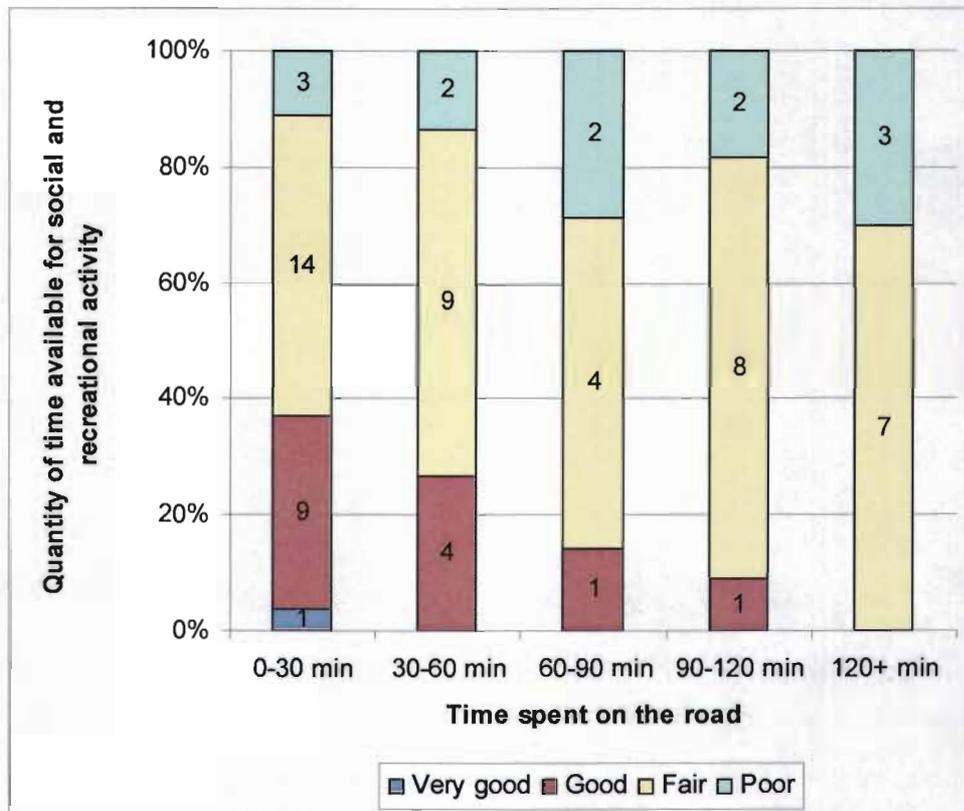


Figure 27: Amount of time available for social and recreational activities

- Figure 27 indicates that, of those respondents who travel between 0-30 minutes, 37,03 percent reported time for social and recreational activity as ‘very good’ and ‘good’. Respondents who reported time for social activity as ‘fair’ and ‘poor’, accounted for 62,96 percent.
- Of those respondents who travel between 30-60 minutes, 26,66 percent reported time available for social and recreational activity as ‘good’. No respondents reported time for social and recreational activity as ‘very good’. Respondents who reported time for social and recreational activity as ‘fair’ and ‘poor’ accounted for 73,33 percent.
- Of those respondents who travel between 60-90 minutes, only 14,28 percent reported time for social and recreational activity as ‘good’. No respondents reported time for social and recreational activity as ‘very good’. Respondents who reported time for social and recreational activity as ‘fair’ and ‘poor’, accounted for 85,71 percent.
- Of those respondents who travel between 90-120 minutes, only 9,09 percent reported time for social and recreational activity as ‘good’. No respondents reported time for social and recreational activity as ‘very good’. Respondents who reported

time for social and recreational activity as ‘fair’ and ‘poor’, accounted for a significant majority of 90,90 percent.

- Of those respondents who travel more than 120 minutes, no one reported time for social and recreational activity as ‘very good’ or ‘good’. All respondents (100 percent) who travel this distance reported time for social and recreational activity as being only ‘fair’ and ‘poor’.

This figure clearly shows a negative tendency. This proves that the further the respondents travel, the less time they have for social and recreational activities.

4.4 SECTION C: QUALITY OF LIFE IMPACT

In Section C, respondents had to rate the statements according to their personal opinion on a four-point Likert scale, as indicated in Figure 28.

A	B	C	D
A lot	Some	Very little	None

Statement 6: Amount of stress you experience while working.

Statement 7: Degree to which you feel rested and relaxed when you arrive at work.

Statement 8: How much of an impact does the distance between your main worksite and your residence have on your overall quality of life?

Statement 9: Degree of safety from crime in and around your worksite.

Statement 10: Degree of road rage and car hijackings in the area where you work.

Figure 28: Work and quality of life

The ranked responses to Section C, Figure 28 are depicted graphically in Figure 29.

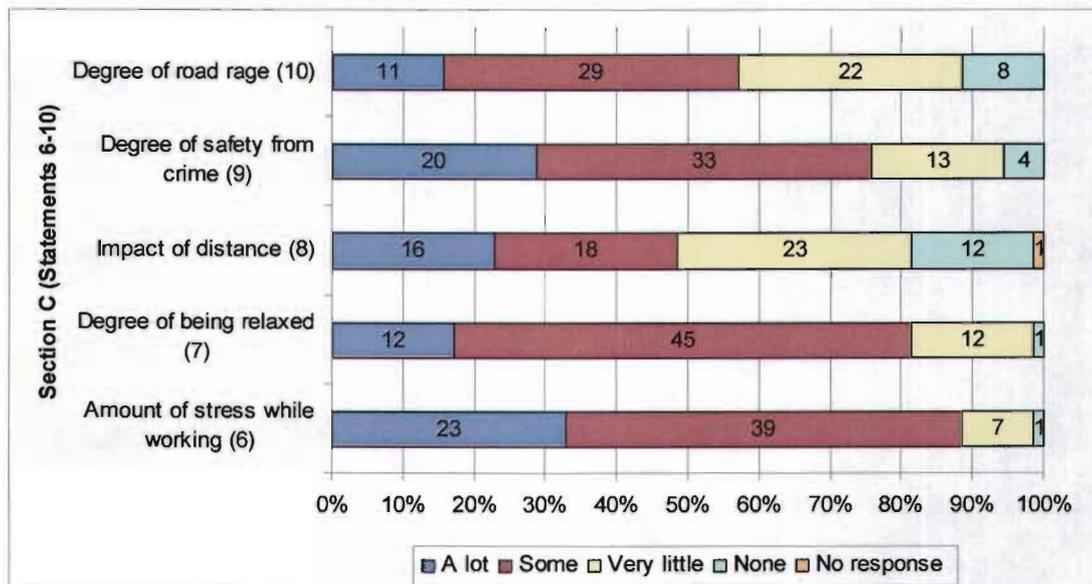


Figure 29: Continuum of rankings in Section C (6-10)

4.4.1 Statement 6: Amount of stress

The majority of respondents experience stress at work. Respondents who reported a lot of stress were 32,86 percent. Respondents who reported some stress were 55,71 percent. This can also be because the respondents have little time available for family, social and recreational activity, as reported in Figure 25. Respondents who experience ‘very little’ or ‘no’ stress at work were 11,43 percent.

4.4.2 Statement 7: Relaxed and rested when arriving at work

For the statement ‘The degree to which you feel rested and relaxed when you arrive at work’, only 17,14 percent of the respondents indicated ‘a lot’, while 64,29 percent reported ‘some’. Respondents who reported ‘very little’ or ‘none’ for this statement accounted for 18,57 percent.

4.4.3 Statement 8: Distance travelled

In the light of the above, it is interesting to note that only 48,57 percent of respondents reported that the distance between their worksite and their residence has an impact on their overall quality of life. Respondents who reported ‘a lot’ were 22,86 percent and 25,71 percent reported ‘some’ impact on their overall quality of life. The respondents who reported that the distance between their worksite and their residence has ‘very little’ impact on their overall quality of life accounted for 50 percent, while 32,86 percent reported ‘very little’ impact and 17,14 percent reported ‘none’.

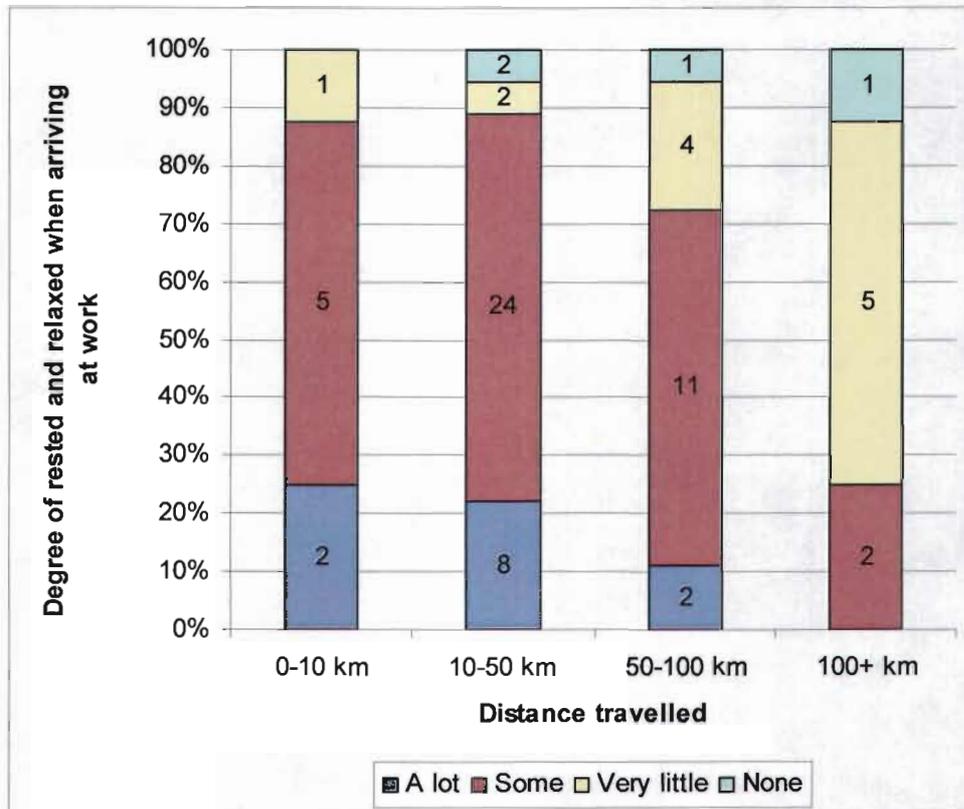


Figure 30: Distance travelled as opposed to feeling rested and relaxed

- From Figure 30, it is clear that, of the respondents who travel between 0-10 kilometres per day, 87,50 reported that they feel ‘a lot’ and ‘some’ degree of being rested and relaxed when they arrive at work. Only 12,50 percent of respondents reported ‘very little and ‘no’ feeling of being rested and relaxed when they arrive at work.
- Of the respondents who travel 10-50 kilometres per day, 88,88 percent reported that they feel ‘a lot and ‘some’ degree of being rested and relaxed when they arrive at work. Only 11,11 percent of respondents reported ‘very little’ and ‘no’ feeling of being rested and relaxed when they arrive at work.
- From those respondents who travel 50-100 kilometres per day, 72,22 percent reported that they feel ‘a lot’ and ‘some’ degree of being rested and relaxed when they arrive at work. Only 27,77 percent of respondents reported ‘very little’ and ‘no’ feeling of being rested and relaxed when they arrive at work.
- Of respondents who travel more than 100 kilometres per day, only 25 percent reported that they feel ‘a lot’ and ‘some’ feeling of being rested and relaxed when they arrive at work. A significant majority of 75 percent reported ‘very little’ or ‘no’ feeling of being rested and relaxed when they arrive at work.

Figure 30 clearly indicates a negative tendency. The greater the distance that respondents must travel per day to and from work, the less they feel rested and relaxed when they arrive at work. When telework is practised, the commute to and from work is eliminated, therefore, the problem of not being rested and relaxed when starting the workday is eliminated too. It also provides evidence that the distance between worksite and residence does have an impact on the degree of feeling rested and relaxed and will have an influence on the employee's holistic quality of life and productivity levels.

4.4.4 Statement 9: Safety from crime

It is reassuring to note that 28,57 percent of respondents reported that they experience 'a lot' of safety from crime in and around their worksite and 47,14 percent reported 'some' degree of safety from crime in and around their worksite. Respondents who reported 'very little' and 'no' feeling of safety were only 24,28 percent. The feeling of being unsafe also can have a negative impact on one's stress levels, tension and anxiety. This may be a contributing reason why respondents' mental health is reported as being good (refer to Figure 25).

4.4.5 Statement 10: Road rage and car hijackings

Road rage and car hijackings are disturbingly high in the areas where the respondents work. Respondents who reported 'some' degree of road rage and car hijackings amounted to 41,43 percent and respondents who reported 'a lot' of road rage and car hijackings in the area where they work amounted to 15,71 percent. Respondents who reported 'very little' and 'no' experience of road rage amounted to 42,86 percent. It is important to note that road rage and car hijackings could be two major contributors to not feeling rested and relaxed when arriving at work, as reported on in statement 7.

Supporting this result, 35 percent of Gauteng motorists endure one to two hours caught up in traffic congestion daily, which leads to high stress levels. Some respondents indicated that road rage mostly occurs when they travel to and from work. Traffic congestion is usually the primary reason cited for acts of road rage (refer to Paragraph 2.18.1).

4.5 SECTION D: ECONOMIC IMPACT

Section D deals with the economic impact of telework on employers and employees.

4.5.1 Work related expenses (Question 1)

In this question, the respondent had to indicate work-related expenses incurred during a typical month according to the items listed in Table 15.

Table 15: Work related expenses per month

Work related expenses during a typical month	R
Fuel for vehicle	1 128,79
Parking fees and toll fees	148,33
Public transport	157,00
Car pool / lift club	0
Meals, snack, food	314,22
Child or dependant care fees	1 661,67
Total	3 410,00

A significant cumulative amount of R3 410,00 is spent every month on work-related expenses, of which about one-third (R1 128,79) is spent on fuel, and a minimum of R314,22 on meals and snacks. A major portion of these expenses could have been saved if the employee had been a teleworker. On an annual basis, it means that the employee sacrifices an average of R40 920,00 of his/her gross earnings on expenses that could have been avoided. A fact that adds to this bleak picture is that oil is becoming so expensive that the world economy is fast heading into a recession (refer to Paragraph 2.22). Adding to this problem, more fuel is wasted when people travel to work whilst being the only person per vehicle (refer to Table 11).

4.5.2 Family and personal responsibilities (Question 2)

Here, the respondent had to indicate how many hours leave are used for family and personal responsibilities during a typical year by writing down responses in the space provided. An average of 44 hours annually was reported, which amounts to an average of one week and four hours' leave annually. This confirms that respondents' flexibility and convenience of childcare is 'fair', as they reported in Paragraph 4.3.4. This also confirms the statement in Paragraph 4.3.2, where respondents reported that they experience 'very good' and 'good' time available for family and personal life. Respondents assert that they

have enough time for family and personal life and that they have sufficient flexibility for childcare. This could be the reason why respondents do not indicate a need to take more leave for family and personal responsibilities. This is a positive inference if one considers that absence from work cost the economy R19 milliard in 2005 and 2006. Telework could allow employees to take better care of their children and prevent the abuse of sick leave (refer to Paragraph 2.22).

4.5.3 Sick leave (Question 3)

In this question, the respondent had to indicate how many hours' leave were used for minor ailments such as influenza, headaches and stress-related symptoms during a typical year. The average response reported 19,7 hours annually, which amounts to an average of two and a half days annually. This is clearly a concern in terms of loss in productivity, since this leave is taken annually for **minor ailments**. This is also concurrent with the fact that respondents' health is excellent, as reported in Paragraph 4.3.1, indicating that, typically, no long-term serious health hazards are experienced by subjects.

4.6 SECTION E: COGNISANCE OF AND WILLINGNESS TO ACCEPT THE PHENOMENON OF TELEWORK

Section E dealt with cognisance of and willingness to accept the phenomenon of telework. In this section, the respondents had to indicate their answer by selecting either a 'yes' or a 'no' reply.

4.6.1 Familiarity with the term telework (Question 1)

This question was included in order to establish how familiar respondents are with the term 'telework' and its meaning, given that telework is perceived to be a contemporary concept that is not widely known in South Africa. Figure 31 depicts the findings to this query.

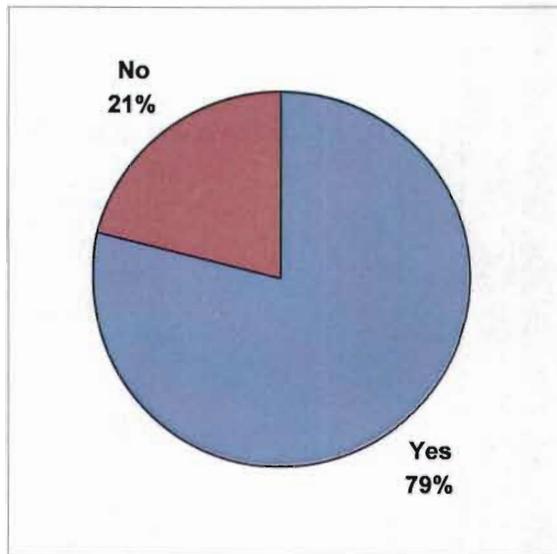


Figure 31: Cognisance with the concept of telework

A majority of 79 percent assert that they are familiar with the concept of telework. Telework is only one of a variety of different flexible work options (University of Chicago Compensation, 2007:1) and it is significant to note that so many managers and employees are familiar with the concept - contrary to what was expected.

4.6.2 Number of employers that have teleworkers (Question 2)

The reason for including this question was to establish how many organisations in Gauteng are making use of the telework concept. The results are depicted in Figure 32.

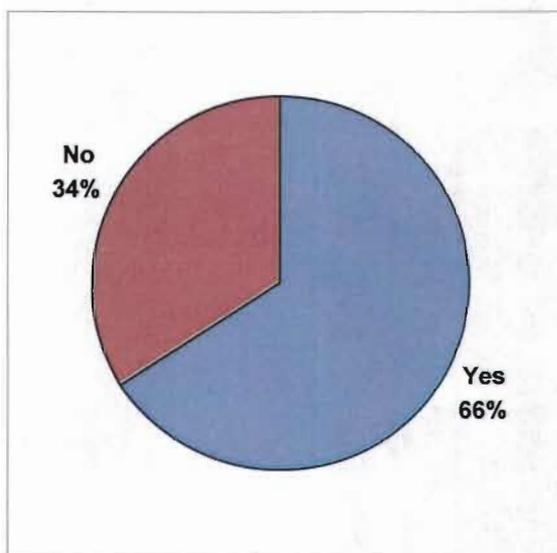


Figure 32: Response rate on telework in respondents' organisations

Although a significant majority of respondents were familiar with the concept, only 66 percent of the organisations that took part in this study had teleworkers. Figure 33 indicates that only 30 percent of employees are teleworkers.

4.6.3 Number of employees that are presently teleworking (Question 3)

This question aimed to establish how many respondents are actually employed as teleworkers. The results are depicted in Figure 33.

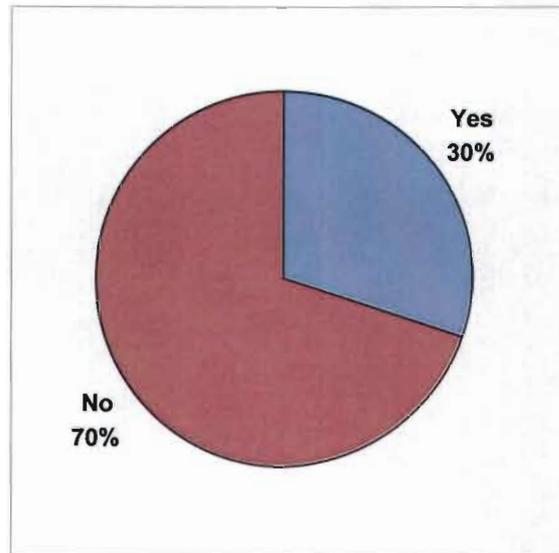


Figure 33: Number of teleworkers

The above result infers that from an organisation's total workforce, only 30 percent are teleworking. This raises the question as to why telework is not implemented on a larger scale.

4.6.4 Choice to be a teleworker (Question 4)

This question aimed to determine the respondents' opinions regarding the phenomenon of telework and to determine whether they would consider experimenting with it. The results are outlined in Figure 34.

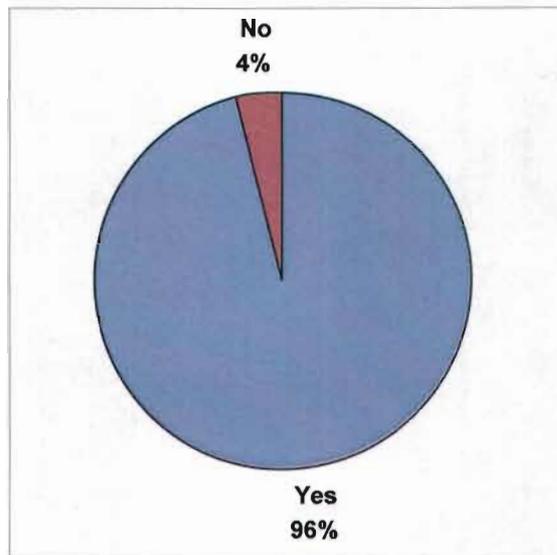


Figure 34: Employee interest in telework

A significant majority of 96 percent indicated that they would be interested to experiment with telework. Supporting this result, previous international studies also emphasise that telework allows employees to work according to individual styles. This, in turn, could benefit them in terms of their mental and physical wellbeing. In addition, it significantly increases productivity and reduces absenteeism because of minor illnesses. Figure 31 provides evidence of significant cognisance of telework in Gauteng (79 percent). Figure 32 reports that only 66 percent of organisations have implemented telework. Figure 33 indicates that only 30 percent of employees are in fact teleworkers. The significance of these results infers that nearly the entire workforce (Figure 34) would consider experimenting with telework.

4.6.5 Employer or supervisor consideration to allow telework (Question 5)

This question was aimed at establishing whether employers/supervisors would indeed consider allowing employees to telework. The results are outlined in Figure 35.

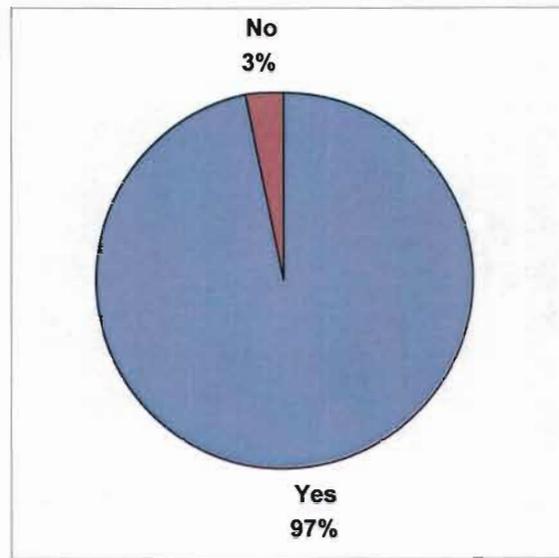


Figure 35: Employer/supervisor willingness to allow telework

A significant majority of 97 percent reported that they would allow employees to telework. Supporting this result, telework is increasingly accepted by employers (refer to Paragraph 2.11). This response represents a very positive inferential deduction regarding managers' acceptance of telework as a flexible friend and not a fashionable foe! In support of this result, the theoretical framework also emphasises the responsibility of supervisors in maximising resources and staff talents because they are best positioned to understand the demands of the work and the capacity of individual staff members to succeed in flexible work arrangements. Therefore, supervisors have to be prepared to manage the work under the conditions of a flexible work arrangement. This result, compared to the inferential deductions made from Figures 31-34, supports results obtained from an international survey, which were interpreted as follows: if so many employees and employers are aware of telework and its benefits, why do only a small percentage actually embrace it? One can only agree with the conclusion that the problem lies with "traditional, controlling, fearful managers" (Actoras Consulting Group, as cited by Hoffmann, 2001: 69).

4.6.6 Gender distribution of sample

It is important to consider the gender distribution of the previous question. Figure 36 depicts the gender distribution of managers and employees in support of telework.

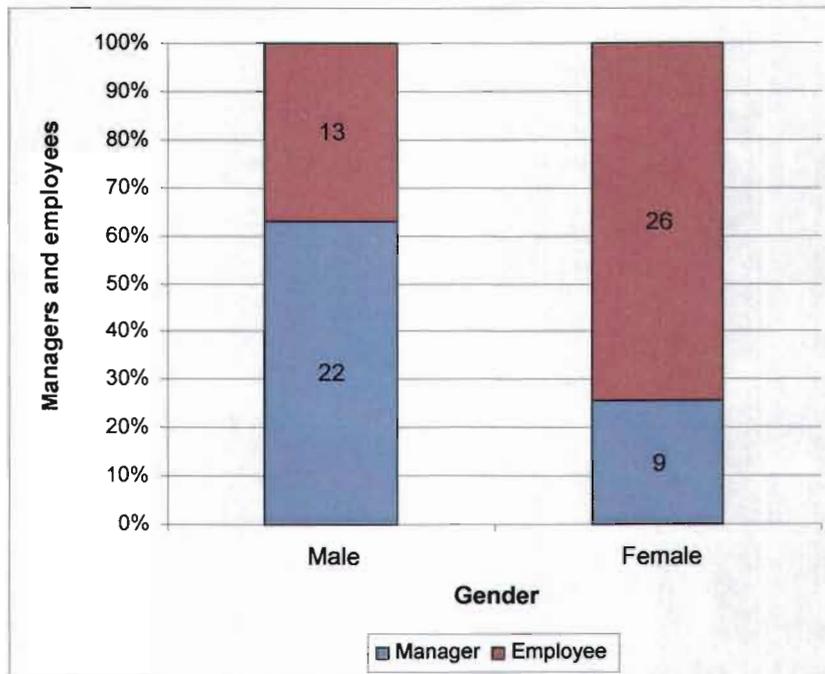


Figure 36: Gender distribution of managers and employees in support of telework

It is significant to note that 63 percent of male managers are supportive of telework. Traditionally, males have been regarded as the breadwinners responsible for earning incomes by working outside the home environment. However, Figure 36 presents a different picture. Male managers are supporting telework for their employees' sake as well as their own. The male managers probably recognise the advantages that it can generate in general. Males appear to accept the idea of working from home and earning a salary without necessarily going 'out to work' to do so.

While one could argue that females are traditionally the ones who take care of children and, therefore, female managers would be expected to be more agreeable to the telework concept. However, female manager respondents who indicated that they support telework accounted for only 25,71 percent.

4.6.7 Advantages, disadvantages and the implementation of telework (Question 6)

This question focussed on establishing the opinion of respondents on whether they would be interested to find out more about the concept of telework, its advantages and disadvantages. The responses to this question are indicated in Figure 37.

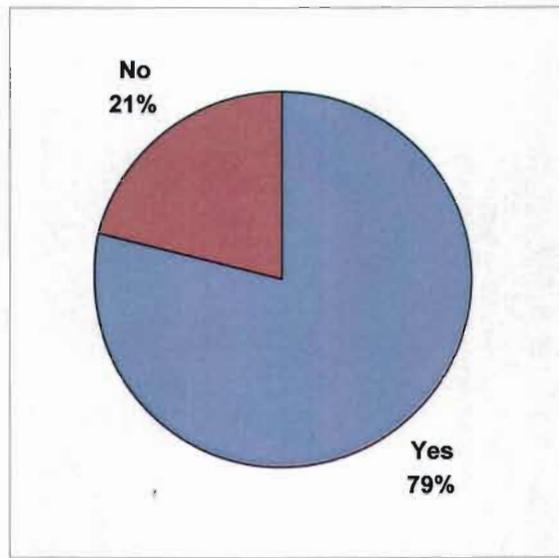


Figure 37: Interest in more information on telework

A significant majority of 79 percent indicated that they would like to know more about telework and its operational strategies. This response is supported by previous studies, providing evidence that managers are more open to new, creative ways of completing work, thereby promoting a healthy balance between work and personal commitments (University of Chicago Compensation, 2007:1).

4.6.8 Maintaining and improving productivity through telework (Question 7)

Since it was previously established that many supervisors find it a major concern as to whether employees will be productive when teleworking, the next question aimed to establish the degree to which respondents are cognisant of an increase in productivity while teleworking. Figure 38 depicts the response to this query.

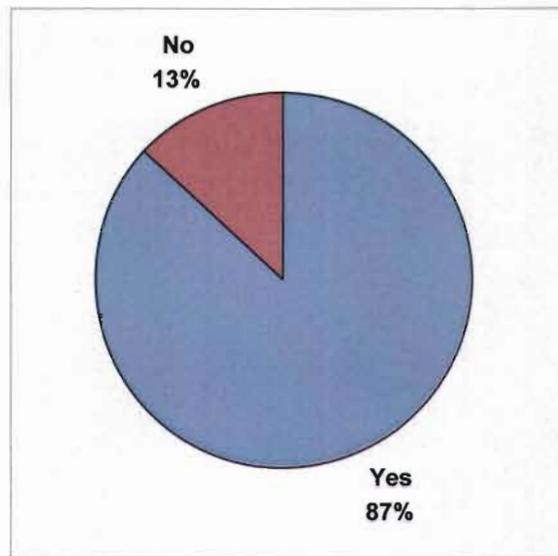


Figure 38: Expected increase in productivity while teleworking

A significant majority of 87 percent believe that they will be able to improve productivity while teleworking. This result is concomitant with previous findings that telework could have a significant impact on increased productivity. In addition, it also relates to time saved by not having to travel and not being interrupted by idle chatter in the central workplace (refer to Paragraph 2.19.1). Added to this inferential deduction, another dimension is emphasised by Johnson (1994:3), whereby teleworkers no longer need to be perfectly groomed in their personal appearance. Supporting the above, telework is seen as a strategy to counteract losses in productivity, not only for employees but also for employers. For the employer, it could save office space, reduce parking requirements, decrease sick leave and increase organisational effectiveness, amongst other benefits (refer to Paragraph 2.19.2).

4.6.9 Teleworkers are committed employees (Question 8)

This question aimed to determine if employees believed that teleworking would negatively influence the degree of commitment they have towards their job. The responses are indicated in Figure 39.

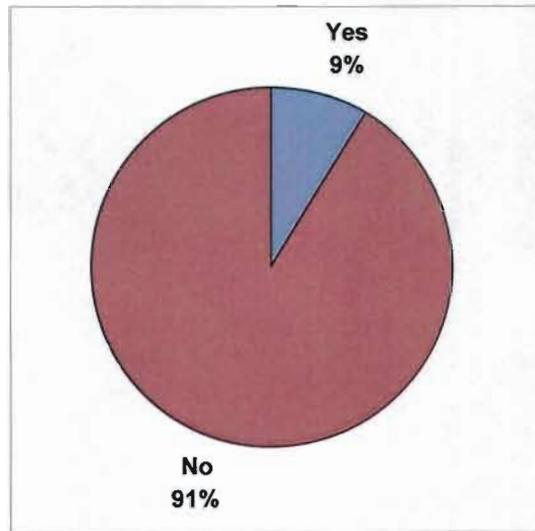


Figure 39: Teleworkers' commitment to their jobs

A significant majority of 91 percent reported that telework would not influence their commitment to their jobs even if they worked from home. This result emphasises the *modus operandi*, whereby telework does not make work easier or minimises less enjoyable parts of the job. It is merely a creative approach for completing work; it does not reduce the work, hours or output. As explained by the University of Chicago Compensation (2007:1), an “unmanageable assignment or difficult work relationship cannot be overcome by telework”.

4.7 SECTION F: MANAGERIAL IMPLICATIONS

Section F focuses on the managerial implications of telework. In this section, respondents had to indicate, on a four-point Likert scale, the extent to which they agreed or disagreed with the statements provided.

4.7.1 Management's focus (Question 1)

This statement was aimed at establishing what management's focus is where specific tasks are concerned. Would they rather focus on outcomes and results than on the time and the process involved in completing the task? The responses to this query are indicated in Table 16.

Table 16: Management’s focus on outcomes and results, as opposed to the task itself

Scaling	Frequency	%
Strongly agree	28	40
Agree	28	40
Disagree	11	15,71
Strongly disagree	3	4,29
Total	70	100,00

A significant cumulative majority of 80 percent (40 percent ‘strongly agree’ and 40 percent ‘agree’) indicated that management in their organisations focuses on the outcomes and results of a task, and not on how the task was accomplished. This supports the statement that managers need to move from procedure-based to result-based management and employees should be judged by their performance rather than their demeanour in the office. Supporting this result, an approach to management that gives workers greater discretion over the work process focuses on outcomes and offers more holistic jobs and is clearly better suited to telework than an approach based on hierarchy and fragmentation (refer to Paragraph 2.20.1.2)

4.7.2 Managerial style (Question 2)

Table 17 depicts the results to the statement that a flexible managerial style is mostly used in the respondent’s organisation.

Table 17: Management style in the organisation

Scaling	Frequency	%
Strongly agree	9	12,86
Agree	38	54,29
Disagree	22	31,43
Strongly disagree	1	1,43
Total	70	100,00

A majority of 67 percent of respondents (12,86 percent ‘strongly agree’ and 54,29 percent ‘agree’) responded that the managerial style used in their organisations is a flexible style. This is a clear indication that trendsetting companies are working towards more flexible work practices that challenge the traditional employer-employee relationship. These

practices refer to the strategies that benefit businesses through maintaining productivity and retaining committed workers by giving them greater discretion over work hours (refer to Paragraph 2.20.1.2).

4.7.3 Supervisory style (Question 3)

This statement was included to test respondents' opinion on whether they experience a policing and surveillance supervisory style in their organisations. The feedback to this question is indicated in Table 18.

Table 18: Supervisory style in the organisation: policing/surveillance

Scaling	Frequency	%
Strongly agree	2	2,86
Agree	22	31,43
Disagree	36	51,43
Strongly disagree	10	14,29
Total	70	100,00

A cumulative majority of 65,72 percent of respondents are of the opinion (51,43 percent 'disagree' and 14,29 percent 'strongly disagree') that management does not use a policing or surveillance type of supervisory style. Daniels *et al.* (2003:103) indicates that supervisors who physically need to observe their employees working would have to re-orient their management style if they were to contribute properly to the success of telework projects. Supervisors who supervise by 'coaching' rather than 'policing' their staff would be more suitable for supervising 'off-site' employees.

4.7.4 Two-way communication channels (Question 4)

Table 19 depicts the results to the statement on whether effective two-way communication channels exist in the respondents' organisations.

Table 19: Effective two-way communication

Scaling	Frequency	%
Strongly agree	12	17,14
Agree	44	62,86
Disagree	11	15,71
Strongly disagree	3	4,29
Total	70	100,00

Of the respondents, only 17,14 percent ‘strongly agreed’ that effective two-way communication exists and 62,86 percent of respondents ‘agreed’, totalling a significant cumulative response of 80 percent. This is positive given that trust depends on the quality of communication. It is therefore reassuring to note that quality communication has clearly been established and that effective two-way communication exists. ICT supports the concept of effective two-way communication. With e-mail, effective two-way communication is even more possible. E-mail does not only reduce the use of paper, but it also increases the speed and immediacy of messages. This concept alters the way in which teams of employees operate together and it enables colleagues to stay globally connected (refer to Paragraph 2.13.6.5).

4.7.5 Supervision of teleworkers (Question 5)

This statement was included to establish the opinion of respondents regarding the possibility of effectively supervising employees if they are teleworkers. Responses to this statement are indicated in Table 20.

Table 20: Possibility to supervise teleworkers effectively

Scaling	Frequency	%
Strongly agree	8	11,43
Agree	52	74,29
Disagree	9	12,86
Strongly disagree	1	1,43
Total	70	100,00

A significant cumulative 86 percent of respondents are of the opinion that it is possible to supervise teleworkers effectively (11,43 percent indicated ‘strongly agree’ and 74,29 percent indicated ‘agree’). Telework represents a particular approach (Lamond, 2000:106). That is, while it is possible to supervise teleworkers effectively, a more adaptive style is

required. Supporting this result, a major benefit of the ICT revolution is the way it empowers people toward technology-oriented human resources (refer to Paragraph 2.14.2).

4.7.6 Visual control (Question 6)

This statement focussed on the opinions of respondents on whether ‘visual control’ is necessary to supervise effectively. The results are displayed in Table 21.

Table 21: Visual control is necessary to supervise effectively

Scaling	Frequency	%
Strongly agree	0	0,00
Agree	8	11,43
Disagree	49	70,00
Strongly disagree	13	18,57
Total	70	100,00

The majority who responded are of the opinion that visual control is no longer necessary to be able to supervise effectively. Respondents who ‘strongly agreed’ accounted for 18,57 percent and those who ‘agreed’ for 70 percent, totalling a cumulative and significant 89 percent. Supporting this result, some scholars believe that teleworkers generally work longer hours than their non-teleworking counterparts due to a ‘gratitude effect’, referring to shorter travel times, less time spent on socialising and easy accessibility to work, which rescinds the myth that teleworkers will be idling their time away because they are out of sight (refer to Paragraph 2.19.1).

Previous studies (Wells, 2001:2), support the fact that a surveillance-type of management style has not changed much over time and that altering this remains one of the biggest telework challenges because it runs so deep in some organisations. Management will have to be willing to change their style. The “fishbowl principle”, where employees need to be seen working at their desks, will no longer apply.

4.7.7 Trust (Question 7)

This statement was included to determine if employees are trusted enough by management to allow them to qualify as teleworkers. The responses to this statement are indicated in Table 22.

Table 22: Management may trust selected employees to allow them to telework

Scaling	Frequency	%
Strongly agree	25	35,71
Agree	37	52,86
Disagree	8	11,43
Strongly disagree	0	0,00
Total	70	100,00

Respondents who ‘strongly agree’ on this matter amounted to 35,71 percent and respondents who indicated that they ‘agree’ amounted to 52,86 percent. Therefore, a cumulative majority of 88,57 percent of respondents in this investigation are of the opinion that trust has already been established. Respondents who reported that they ‘disagree’ amounted to only 11,43 percent. According to Pritchard, as stated by Wells (2001:12), the core virtue of quality distance management is trust. If employers trust their employees to do their jobs, much of the supervisory job is under control. If a supervisor does not achieve that level of trust with everyone, then telework is not recommended. This is why it is generally easier to have experienced and above average performers as teleworkers rather than new workers - the trust factor has already been embedded.

4.7.8 Management control (Question 8)

Table 23 depicts the results to the statement whether management fear that they will lose control over employees if they are teleworkers.

Table 23: Management fear of losing control over teleworkers

Scaling	Frequency	%
Strongly agree	0	0,00
Agree	9	12,86
Disagree	46	65,71
Strongly disagree	15	21,43
Total	70	100,00

It is reassuring to note that, in this study, a significant majority of the respondents (88 percent, with 21,43 percent indicating ‘strongly disagree’ and 65,71 percent indicating

‘disagree’) indicate that management did not fear losing control over employees who are teleworkers. Only 12,86 percent of respondents reported that they believe that control will be lost if employees telework. This is a significant positive response from a South African point of view, since previous international research by Daniels *et al.* (2000:32), provides evidence that a major organisational impediment to telework is managerial concern about losing control over workers when they are out of sight. Therefore, telework does challenge managerial control.

4.7.9 Methods of supervising teleworkers (Question 9)

This statement was included to establish whether respondents are knowledgeable about the methods for supervising teleworkers. The results are indicated in Table 24.

Table 24: Methods of supervising teleworkers are available

Scaling	Frequency	%
Strongly agree	12	17,14
Agree	51	72,86
Disagree	6	8,57
Strongly disagree	1	1,43
Total	70	100,00

A significant majority of respondents (90 percent, with 17,14 percent indicating ‘strongly agree’ and 72,86 percent indicating ‘agree’) indicate cognisance of available methods of supervising teleworkers. Only 10 percent of respondents ‘disagreed’ and 1.43 percent ‘strongly disagreed’. In addition to available refined strategies and processes, the supervision of teleworkers can also be streamlined using ICT. Supporting the above result, previous international research also infers that ICT now provides the opportunity for very precise monitoring of activities in some jobs (refer to Paragraph, 2.20.1.2). These allow the teleworker to monitor work and create daily status reports for the manager. Electronic BBSs provide another of the means to assist in the management of teleworkers (refer to Paragraph 2.13.5).

4.8 COMPARATIVE INFERENCES

As reported in Chapter 3, a comparative study was done between Sections E and F. Sections E and F completed by managers were compared with the Sections E and F completed by employees. In the comparison, only one significant difference between the

two sample groups was noted. This occurred in Section E, question 7 (refer to Paragraph 3.2.10.4). The response of employees as a sample group differs significantly from the managers' responses with regard to the improvement in productivity while teleworking, as indicated in Figure 40. One can only speculate on the reason why managers do not feel that productivity can be improved by telework. Is it due to a lack of trust, is it the fishbowl concept in action or are they simply hesitant because of the fear of failure?



Figure 40: Increase in productivity as rated by employees and managers

A significant 94,87 percent of employees are of the opinion that teleworkers' productivity can be maintained and even improved. A significant majority of 77,41 percent of managers are of the same opinion. Clearly, employees are more confident in expressing this opinion, whilst managers may have some reservations regarding their management style, control and productivity measurement of teleworkers who are 'out of sight'.

4.9 VALIDITY AND RELIABILITY

Validity is the extent to which the research findings accurately represent what is really happening in a specific situation. Reliability involves the credibility of the findings (Welman *et al.*, 2005: 142,145). In this case, the findings appear to be valid and credible because many of the findings correlate with secondary statistics collected in the USA by reputable researchers. The correlations are indicated in the theoretical framework of the investigation and cross-referenced accordingly.

Internal validity has not been impeded by any third variable and external validity correlates meaningfully with secondary statistics obtained through similar USA data sheets refined and replicated in this investigation.

4.10 SUMMARY

The results of the investigation were presented, analysed and interpreted in this chapter. The insufficient and heavily congested roads and transport infrastructures pose a major concern. The distance travelled to and from work decreases time spent for family life and for social and recreational activities and also has a negative influence on the degree to which employees feel rested and relaxed on arrival at work. It is also evident that work-related expenses, such as fuel, represent a substantial amount spent out of employee salaries. The steadily increasing oil price adds to the effect that this detrimental situation will escalate to unacceptable proportions. Adding to these serious socio-economic hazards is the proven excessive vehicle fuel emissions, which poisons the air we breathe and, even more seriously, escalates global warming. Many of these situations could at least be partially addressed or avoided with the implementation of telework. It was evident that managers and employees are aware of telework, its meaning and advantages. However, it is important that awareness campaigns, training and guidance on how to implement telework successfully be addressed urgently to counteract possible reservations that managers may have.

In Chapter 5, conclusions and recommendations, based on the above, will be made in order to conclude this investigation.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

Chapter 5 covers a synopsis of the holistic investigation, the conclusions and recommendations of the study, based on the results depicted in the previous chapter. Possible areas for future research relating to this study are also identified in order to establish a holistic knowledge base regarding the phenomenon of telework – not only relating to the province of Gauteng, but also to the advantage of the South African socio economy in general.

5.2 SYNOPSIS

This study was designed to investigate employee and employer attitudes with regard to the implementation of telework as a flexible work option. The study also focused on the related beneficial implications of telework on the environment and socio economy. In order to establish this, it was necessary to collect information on employee and employer attitudes towards telework. The literature sources in Chapter 2 provided evidence that employer attitudes towards telework have to be supportive in nature in order to implement telework successfully.

In order to establish the beneficial implications of telework on the environment and socio economy, it was necessary to collect information on how telework affects the environment, quality of life and economy. The literature sources in Chapter 2 provide evidence that telework has a positive impact on the environment, quality of life and economy.

5.3 CONCLUSIONS

The following are the conclusions drawn about employee and employer attitudes concerning the implementation of telework as a flexible work option.

5.3.1 Employee and employer attitudes/possible barriers

5.3.1.1 A new approach

It has been established that telework is essentially a management style. Telework is one of a number of flexible work practices (for example, part-time, temporary or casual employment; overtime and shift working; contracting), which has developed substantially in recent times as a means of ensuring that the necessary human resources are matched to the operations of an organisation. The introduction to this style of managing employees may be driven by, for example, business needs to increase organisational efficiency and productivity, or by an effort to provide employees with opportunities to balance their work-lives with family needs. Either way, telework represents a unique approach.

5.3.1.2 Trust as a critical success factor

The core requirement of quality tele-management is trust. If managers trust employees to do their jobs, whether or not the employees are physically within their vicinity, and if employees trust their supervisors to provide competent direction and guidance and reward for work well done, then much of the supervisory task is under control. If a manager does not achieve that level of trust, telework is not recommended. A significant amount of 66 percent of respondents reported that their organisations have employees that are teleworkers, although only 30 percent of the same respondents reported that they are in fact teleworkers. From this result, it may be concluded that the trust factor does not exist for all employees. Alternatively, organisations may be conducting pilot telework programmes. Other reasons, which have not been established, may also account for only 30 percent of respondents reporting that they are teleworkers.

5.3.1.3 Communication

The best managers of teleworkers are those with good communication skills, who trust employees and value their suggestions. An individual supervising a telework arrangement should ideally have better than average supervisory and communication skills, and should be able to define specific tasks and expectations clearly. High quality communication helps to develop trust, in that clarity of communication enables each party to assess the meaning and intent of the other parties involved accurately. Therefore, effective two-way communication is necessary - not only when communicating face-to-face but also when communicating using ICTs.

5.3.1.4 Visual control

Supervisors who physically need to observe their employees working would have to be re-oriented in their management style if they are to contribute optimally to the success of telework projects (Daniels *et al.*, 2000:103).

5.3.1.5 Procedure-based to result-based management

Most constituents do not care how a service or product was developed. However, they do care about its quality in terms of their own needs, its promptness and cost. How it was done and what processes were involved are not important to them. In telework management, the situation is similar. A manager should be able to give his or her employees a set of requirements as to what they are to produce, establish the level of quality required, delineate the cost in terms of time and resources, and set a deadline for the delivery of the results and, then, leave it at that. They should therefore define outputs, hold stakeholders accountable for the results and measure only the quality of the results.

5.3.1.6 Information and communication technologies

ICT is well established. As such, ICT makes telework and other flexible work practices a reality. The advent of the Internet, coupled with the growing global economy, has had a considerable impact on the way in which individuals, businesses and governments conduct their affairs. While the last decade has brought considerable opportunities to all, it has also required significant changes to operations. The so-called 'iGeneration' has been a pivotal driver for the adoption of mobile working. Born into a world enabled by the Internet, the 'iGeneration' already apply their ICT skills to perform their work differently. The 'iGeneration' may become frustrated by the restrictions placed on them by managers with tunnel vision who attempt to maintain traditional administrative environments. With appropriate and responsible planning, a virtual workforce could save money on a large scale and, simultaneously, improve performance. Leaving it too late may cost the economy dearly in the long term and allow public infrastructures and the environment to suffer unnecessarily.

5.3.2 The environment and socio economy

The following are the conclusions drawn regarding the related beneficial implications of the implementation of telework as a flexible work option.

Travel is part of peoples' lives; however, the actual necessity to physically change location in order to accomplish work tasks has been challenged on the basis of concerns for the environment, quality of life and economic implications. The flexibility of locality-independence provides many potential benefits.

5.3.2.1 Environmental impact

The most important benefit of telework for the environment is the reduced VMT and accompanying vehicle emissions that contribute detrimentally to the environment and global warming. Fewer cars on the road translate into lower levels of air pollution. Many pollutants are emitted during travel, which adds to an already serious situation in global warming.

5.3.2.2 Quality of life impact

In most cases, both parents in a family work, which places heavy demands on balancing work and family. Women with children are the fastest growing segment of the workforce. Men are also becoming more involved in family and home care responsibilities. If one or both parents are able to adopt teleworking, it would improve the work-family balance in their lives significantly. Telework may be an important factor in allowing individuals to create the lives that they really want for themselves and their families. It also improves the quantity and quality of time available for social and recreational activities and provides employees with more flexibility in child- and other dependant-care options. Given that overall quality of life is improved by telework, it is reasonable to assume that telework also improves mental health, which includes significant reductions in stress, tension, anxiety and depression levels. The possibility of being a victim of crime, hijacking or road rage is also reduced.

5.3.2.3 Economic impact

From an economic point of view, both the employer and the employee benefit from telework. There are more significant benefits than just the savings in office rent, furniture and additional overhead costs. Non-quantitative ways in which the employer benefits include decreased sick leave, improved productivity, decreased medical costs, increased organisational effectiveness, decreased labour turnover and increased employee effectiveness. In addition, teleworkers' self-estimate of effectiveness also increases. Employees benefit by not incurring operation and maintenance costs associated with

operating a motor vehicle. They also lessen their risk of traffic-related transgressions and fatalities. Telework employees save on fuel, parking fees, toll fees, public transport, car pool, lift club, meals and child- or dependant-care fees.

5.4 RECOMMENDATIONS

The following recommendations are expected to contribute to the acceptance and support of telework implementation by employers and employees.

5.4.1 Employer and employee attitudes/possible barriers

5.4.1.1 A new approach

Managers may need to learn how to manage virtually. Not having every employee visible is a major adjustment for supervisors and managers. Many employers and managers are not aware of the technological and organisational innovations that could streamline telework in their companies. Managing teleworkers is not unlike managing employees on-site. It requires management skills, such as goal setting, progress assessment, regular feedback provision and management based on outcomes. Other approaches should include planning carefully, communicating often, selecting the appropriate human resources and providing them with the required tools and assistance when they need it.

5.4.1.2 Trust as a critical success factor

Trust is the reason why it is generally easier to have experienced employees, rather than new employees, as teleworkers. Surveys of successful teleworkers generally show that they have been with their organisations for at least five years and have above-average performance records. These employees are value-adding entities who are familiar with the operations and culture of the companies where they are employed and mutual trust has already been established. International experts on telework, such as EPA (2006:3), recommend that, as a new concept, telework should first be developed as a pilot programme. Telework should only be expanded to a larger section of the work force once the pilot programme, involving a small number of employees, proves successful.

5.4.1.3 Communication

A manager should make sure that the frequency of communication is such that remote employees still feel part of the team at the office. 'Out of sight, out of mind' can be a concern for both the employer and the employee. This is why most home-based

teleworkers go to the office on average two-to-three days per week. In addition to making information available, it is also important that the manager is available. Personal contact is as important for teleworkers as it is for on-site employees. Open two-way channels of communication contribute to identifying and discussing problem areas as soon as possible. Developing plans of action helps to avoid bigger problems down the road. Regularly scheduled meetings should be arranged to monitor work progress and to discuss any problem areas with teleworkers. Such meetings will also help in setting short-term goals, and brief meetings are usually more effective than protracted ones.

5.4.1.4 Visual control

It is often difficult for managers to let go of the visual control of employees. However, as time goes by the results will speak for it selves. Guest (2006:3) agrees that this mind shift is not easily achieved and that supervisors and managers of teleworkers should exert conscious efforts in order to supervise teleworkers successfully. One way of ensuring that managers feel they are still in control is to have written programme guidelines or policies, which include aspects such as:

- **A plan:** Construct a team charter and set long- and short-term goals. Since teleworkers often need to make independent decisions, it is particularly important that they understand the goals of the company, the goals of their group within the company and their own role in achieving these goals.
- **A written agreement:** Many employers remain suspicious of telework because they are fearful of reduced worker accountability and its effects on productivity. A written agreement between the teleworker and the employer can help alleviate these fears. This agreement should serve the purpose of making people understand the company's goals, priorities and objectives. It should cover aspects such as ownership of remote equipment, compensation for worker expenses, worker performance evaluations and frequency of required office attendance. It should also include a plan for compensation in case of injury on the job and legal considerations, such as grounds for termination of the telework agreement.
- **A forum:** An electronic BBS for teleworkers on the company intranet provides easy access to information that employees need in order to do their jobs. It also allows them to communicate efficiently with managers and co-workers.
- **The appropriate human capital:** Managers should select teleworkers carefully. Ideally, teleworkers should be employees with proven performance records and self-

starters who work well independently and get quality work done within prescribed timeframes.

- **National support infrastructures:** A South African professional telework forum, regular newsletters or other publications and interaction between teleworkers could provide a stable support infrastructure that could represent a communication channel for negotiations at regional, provincial and government levels in liaison with reputable international expertise.

5.4.1.5 Procedure-based to result-based management

Managers need to move from procedure-based to result-based management. Employees should be judged by their performance rather than their demeanour or time spent in the office. Trade and industry officials in the private and public sectors understand that work can be performed in many ways, not necessarily by being restricted to offices, geographic locations or specific time schedules. Results-based performance management or outcomes-based performance should actively remodel the traditional concept of nine-to-five work patterns.

5.4.1.6 Information and communication technologies

It should be ascertained that teleworkers have the required ICTs and that these technologies are reliable. The teleworker will also require a fast, reliable Internet connection. Enabling teleworkers to perform optimally will ease the responsibilities of the manager. Managers should make sure that teleworkers have access to network navigation tools, such as search engines, site maps and written instructions on where to find files or other resources. Such tools will empower teleworkers to find their way around the network independently and according to their own schedules. With regard to this, virtual private network (VPN) connections and wireless fidelity (WiFi) are valuable in that they allow teleworkers access to the company network from wherever they perform their jobs.

5.4.2 The environment and socio economy

The following are the recommendations for accepting and recognising the related beneficial implications of the implementation of telework as a flexible work option.

5.4.2.1 Environmental impact

The following recommendations are directed at the Government. The Government needs to accept and recognise the related beneficial implications of the implementation of telework as a flexible work option in South Africa:

- The government should officially acknowledge telework as part of a transport and environmental solution, especially with regard to the rapidly increasing oil price, as reported on in Chapter 2. Corporate leaders and government officials should recognise the reality of global telework trends and take cognisance of the phenomenal benefits of 32 million fewer vehicles on South Africa's roads (refer to Paragraph 2.16).
- Urgent and serious consideration should be given to the incorporation of telework into the South African Climate Change strategy. As reported in Chapter 2, South Africa falls under the non-annex 1 parties of the Kyoto Protocol, which mostly includes developing countries. It is essential that the South African government takes serious steps to apply every possible measure in order to reduce climate changes because of the detrimental effects of global warming on Africa in particular. In support of this, an agreement was reached recently between the USA and 180 other countries that a new protocol, to replace the 1997 Kyoto protocol, will be drawn up in 2009 in Copenhagen, Denmark. The USA did not support or sign the 1997 Kyoto protocol and, therefore, did not commit themselves to reductions of GHG by 2012. However, the USA undertook to support the new protocol, which is a positive reaction in the right direction since the USA is viewed as a serious culprit in emitting highly excessive amounts of GHG into the atmosphere (Van Rooyen, 2007:2).
- Managers should lead by example and encourage greater use of telework within their own departments. South Africa's government departments could set the example by introducing telework internally in order to serve as motivation for the private sector. If the government can initiate the implementation of telework, then the battle is won halfway. Consultants could provide valuable guidance in order to streamline the implementation of telework, to monitor the process and to guide the application of corrective measures where necessary.
- Tax incentives should be considered for companies implementing telework in order to encourage other organisations to follow suit.

5.4.2.2 Quality of life impact

Employers should recognise the quality of life benefits of telework in order to make the most of these advantages themselves (refer to Paragraph 2.18). The healthier and happier the employee is, the more productive he/she will be, with resulting benefits for the employer, the company and, ultimately, the economy. Companies that resist the idea of telework should consider following the example set by Absa Bank (refer to Paragraph 4.2.12) in order to contribute, at least in some manner, to the transport problems, counter productivity and employee health problems caused by travelling alone.

5.4.2.3 Economic impact

- Employers should recognise the economic benefits of telework as being a win-win concept for all involved. Many expenses can be saved by telework (refer to Paragraph 4.5.1).
- Human resource executives should take a leadership role in their companies by recruiting managers who are already predisposed to being open to alternative work options.
- Mobility is increasingly an option chosen by employees, but it is not an option that suits all personality types or work functions. Therefore, it is advisable to first embark on pilot telework projects. Companies should start by identifying suitable employees as participants in pilot telework projects. Potential participants would include those employees already adopting a mobile work style, as well as workgroups and job functions - such as sales and service teams - that lend themselves to a virtual workplace. Such pilot projects help senior and middle management identify aspects that need to be considered before extending the roll out to the company. In addition, those employees within the pilot team are given the opportunity to ascertain whether or not telework suites them.
- Training institutions should proactively include training material in their curricula in order to prepare prospective employees with the required knowledge pertaining to a mobile workforce.

5.5 FURTHER RESEARCH OPPORTUNITIES

The government should recognise and incorporate telework as part of the South African Climate Change strategy. Serious consideration should be given to telework as a partial solution to the transport and earth warming hazards associated with travel, similar to

international examples in developed countries. In order to accomplish this, higher education institutions could add much value by investigating the impact of telework on other sub-disciplines, such as the monetary implications, legal implications, management implications, ergonomic implications, ICT implications, and the like. These could all be comprehensively combined as one project, monitored and funded under the auspices of entities such as the National Research Foundation (NRF) or the Council of Scientific and Industrial Research (CSIR). National support structures could be established concomitant with the mentioned research bodies, such as professional bodies, newsletters, conferences and other infrastructural initiatives.

5.6 SUMMARY

Public and private sectors need to realise that they have pivotal roles to play in facilitating South Africa's global competitiveness and that effective implementation of the necessary strategies should not be delayed. In Africa, ICTs have a major role to play in alleviating poverty and in creating new ways of conducting business. The phasing out of excessive office space also gives rise to a magnitude of global communications opportunities for ICT service providers. At the user end of the ITC spectrum, successful implementation lies in the output of the model in terms of its usefulness, timeliness and relevance, and responsible planning and facilitation.

Whilst most authors are optimistic, constraints are likely to result from the lack of suitable skills in remote areas and the lack of appropriate support services, many of which require a critical mass of customers to be viable. It is unlikely that telework will lead to regional development without active intervention by national or local government to make up for such deficiencies and provide fiscal resources.

The world is on the verge of a new era of telecommunications that will influence how people live, how work is done and how productivity will improve in the new millennium. Telework may prove to be an effective means of enhancing lives and improving productivity on this new frontier.

Two of the primary causes in the wavering acceptance of telework are management reluctance and a lack of trust, which often results from factors such as a reliance on line-of-sight management styles, a lack of applicable training, ignorance of and discomfort with

flexible workplace programmes, and a dearth of misinformation regarding the effect of telework.

This study concludes that a positive and supportive attitude from employers and employees alike is salient to the successful implementation of telework as a flexible work option. The related beneficial implications of telework should not be underestimated since it has been proven that it holds the key to a healthier, happier society in a cleaner, healthier global socio-economic environment.

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APPENDIX A

September 2007

FACULTY OF APPLIED AND COMPUTER SCIENCES

DEPARTMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY

Dear Respondent

TITLE OF MASTERS DEGREE DISSERTATION
Managerial and socio economic implications of telework in Gauteng

I am presently doing research for a Masters Degree in order to establish the managerial and socio economic implications of **telework** in Gauteng. This phenomenon has already been successfully implemented and refined in the USA and many other developed countries but in South Africa it is relatively unknown. Your participation in this survey will be highly valued in order to establish the attitude of managers in SA towards telework and the benefits it could generate for employers, employees, families, communities and the socio economy.

Telework can be defined as a flexible work arrangement whereby selected employees (**teleworkers**) are allowed to work one or more days per week **from their home** or an alternative site **instead of physically travelling** to a central workplace.

I am aware that you have busy schedules and sometimes have to work under difficult circumstances. However, I am convinced that you will make a constructive contribution to the success of my research project. Should you prefer that your identity be kept confidential, I can assure you that your anonymity will be guaranteed.

Please complete the attached questionnaire by answering all the questions. It will not take up more than ten minutes of your time. There is no right or wrong answers.

Please use the enclosed envelope. I will collect the questionnaires personally from your office before the end of this workday.

Thank you very much for your participation. I do value your insight and opinions, and appreciate your time.

Regards

MS ELSA VAN WYK
LECTURER
(016 930 5047)

APPENDIX B

TELEWORK QUESTIONNAIRE

SECTION A: PLEASE INDICATE YOUR CHOICE BY MARKING THE APPROPRIATE BLOCK WITH X – DO NOT MARK MORE THAN ONE BLOCK

General information and environmental impacts

1. Job title:

Managerial post	Employee
-----------------	----------

2. Gender:

Male	Female
------	--------

3. Number of dependant children, age 4 and under, living with you?

0	1	2	3	4 or more
---	---	---	---	-----------

4. Number of dependant children; age 5 to 12, living with you?

0	1	2	3	4 or more
---	---	---	---	-----------

5. Number of dependant children; age 13 to 18, living with you?

0	1	2	3	4 or more
---	---	---	---	-----------

6. Do you have any adults living with you who are dependant on you for their care (elderly, disabled or other?)

YES	NO
-----	----

7. What is the main form of transport you use to travel to and from work?

Public transport	Lift club	Travelling alone in own car
------------------	-----------	--------------------------------

8. If you travel alone with your own car what is the main reason for doing so?

It is convenient for me	My job requires it of me that I have my own car	I live far from work and cannot make use of a lift club	Family responsibilities require that I use my own car	Other
-------------------------------	---	---	---	-------

9. How many days per week do you experience traffic congestion on the road?

Never to 1 day per week	2 days per week	3 days per week	4 days per week	Everyday
-------------------------	-----------------	-----------------	-----------------	----------

10. If you travel with public transport, what is the reason?

I do not have my own car	The traffic congestion on the road is too much	It is cheaper	It is convenient	I do not make use of public transport
--------------------------	--	---------------	------------------	---------------------------------------

11. State your travel distance per day to and from work: _____

12. How much time is taken up to travel to and from your work per day?

13. Have you ever been a victim of road rage or hijacking?

YES	NO
-----	----

14. Do you drive a company car?

YES	NO
-----	----

SECTION B: BASED ON YOUR PERSONAL OPINION, PLEASE RATE THE FACTORS IN ITEMS 1 TO 5. USE THE FOLLOWING SCALE FOR YOUR RESPONSES:

A	B	C	D
Very Good	Good	Fair	Poor

Quality of life impacts

1. Your physical health
2. Quantity of time available for family / personal life
3. Quantity of time available for social / recreational activity
4. Convenience and flexibility of child care or other dependant care (elderly, disabled or other) options
5. Your mental health (general levels of stress, tension, anxiety and / or depression)

SECTION C: BASED ON YOUR PERSONAL OPINION, PLEASE RATE THE FACTORS IN ITEMS 6 TO 10. USE THE FOLLOWING SCALE FOR YOUR RESPONSES:

A	B	C	D
A Lot	Some	Very Little	None

- | | |
|--|--------------------------|
| 6. Rate the amount of stress you experience while working | <input type="checkbox"/> |
| 7. Rate the degree to which you feel rested and relaxed when you arrive at work. | <input type="checkbox"/> |
| 8. Generally speaking, how much of an impact does the distance between your main worksite and your residence have on your overall quality of life? | <input type="checkbox"/> |
| 9. Rate the degree of safety from crime in and around your worksite. | <input type="checkbox"/> |
| 10. Rate the degree of road rage and car hijackings in the area where you work. | <input type="checkbox"/> |

SECTION D: PLEASE WRITE YOUR RESPONSES IN THE SPACES PROVIDED.

Economic impacts

1. During a typical month, approximately how much work related expenses do you have in the following areas?
 - Fuel for a vehicle(s) you drive R_____
 - Parking fees and toll fees R_____
 - Public transportation R_____
 - Car pool / Lift club R_____
 - Meals, snacks, food R_____
 - Child or other dependant care fees R_____

2. During a typical year, approximately how many hours of annual leave do you use for taking care of family responsibilities and personal business?

3. During a typical year, approximately how many hours of sick leave do you use as a result of minor ailments such as influenza (flu), colds, head aches and stress related symptoms?

Please read through the following paragraph:

Telework can be defined as a flexible work arrangement where selected employees (**teleworkers**) work one or more days a week **from their home** or at an alternative site **instead of physically travelling** to a central workplace / office.

SECTION E: PLEASE INDICATE YOUR CHOICE BY MARKING THE APPROPRIATE BLOCK WITH X.

Cognisance of and willingness to accept the phenomenon of telework

1. Were you previously familiar with the term telework and its meaning?

YES	NO
-----	----

2. Does your organisation presently have any employees who are teleworkers?

YES	NO
-----	----

3. Are **you** presently working according to this work arrangement?

YES	NO
-----	----

4. Would **you** consider working according to this work arrangement if it was possible?

YES	NO
-----	----

5. Would you consider allowing **other** selected employees to work according to this work arrangement?

YES	NO
-----	----

6. Would you like to know more about telework, its advantages and disadvantages and the organisational implementation process?

YES	NO
-----	----

7. Do you believe that employees can maintain and even improve their productivity when teleworking?

YES	NO
-----	----

8. Would you regard teleworkers to be less serious about their jobs?

YES	NO
-----	----

SECTION F: PLEASE INDICATE YOUR CHOICE BY MARKING THE APPROPRIATE BLOCK WITH X.

Managerial implications

1. Management's main focus is on outcomes and results rather than the time and processes involved in order to complete a task.

Strongly Agree	Agree	Disagree	Strongly Disagree
----------------	-------	----------	-------------------

2. The managerial style mostly used in my organisation is a flexible style.

Strongly Agree	Agree	Disagree	Strongly Disagree
----------------	-------	----------	-------------------

3. The supervising style **that** managers use mostly in my organisation is a policing style or a surveillance type **of** style.

Strongly Agree	Agree	Disagree	Strongly Disagree
----------------	-------	----------	-------------------

4. The management of my organisation has effective two-way communication channels (communicating with employees).

Strongly Agree	Agree	Disagree	Strongly Disagree
----------------	-------	----------	-------------------

5. It is possible to effectively supervise employees if they are teleworkers.

Strongly Agree	Agree	Disagree	Strongly Disagree
----------------	-------	----------	-------------------

6. "Visual control" over employees is necessary in order to supervise effectively.

Strongly Agree	Agree	Disagree	Strongly Disagree
----------------	-------	----------	-------------------

7. Management may trust selected employees enough to allow them to be teleworkers.

Strongly Agree	Agree	Disagree	Strongly Disagree
----------------	-------	----------	-------------------

8. Management will lose control over employees if they are teleworkers.

Strongly Agree	Agree	Disagree	Strongly Disagree
----------------	-------	----------	-------------------

9. Methods of supervising teleworkers are available.

Strongly Agree	Agree	Disagree	Strongly Disagree
----------------	-------	----------	-------------------

Thank you for your time and kind assistance!