

**INFORMATION ENVIRONMENT
OF THE TELEWORKER**

by

HELENA J NORTJE

DISSERTATION

Submitted in fulfilment of the requirements for the degree

MAGISTER ARTIUM



INFORMATION SCIENCE
of
JOHANNESBURG

in the

FACULTY OF ARTS

at the

RAND AFRIKAANS UNIVERSITY

SUPERVISOR: PROF PA VAN BRAKEL

AUGUST 2003

SUMMARY

The information economy, brought about by the advances in information and communications technology, has led to significant changes in the work environment. Organisations and workers must be flexible and are required to adjust quickly to demands from external and internal market forces. Employees are expected to be knowledge workers who are not only computer literate, but information literate as well. The high demand for flexibility has led to a trend that allows workers to perform their duties in locations outside of their traditional workspace. This trend has been named teleworking or telecommuting.

A literature study revealed similarities and differences between the work environment of the knowledge worker and that of the teleworker. Both the teleworker and the knowledge worker are interacting in an environment that consists of individual, group and organisational processes. These processes are interrelated and none of them can be viewed in isolation. The factors that influence the knowledge worker also affect the teleworker, but the extent and focus of the influence vary. The features of the work environment of the knowledge worker and the teleworker provided the context for investigating the information environment of both.

The information environment of the knowledge worker revealed certain distinct features, such as the manner in which documents and information were managed and the systems that were used. These features were compared with the information environment of the teleworker through an investigation of teleworkers in South Africa. Although very few, if any, South African organisations were involved in formal teleworking programmes, it was possible to establish certain trends through employees who had an *ad hoc* arrangement with their organisations. In conclusion, it was found that the information environment of the teleworker was somewhat similar to that of the knowledge worker, but certain distinctions also came to the fore. Further areas for research were also identified.

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INFORMATION ENVIRONMENT OF THE TELEWORKER

1. INTRODUCTION

1.1 BACKGROUND TO THE RESEARCH PROBLEM

In the industrial age, there was a clear delineation between work and home. Jobs and job roles were clearly defined, and management held the key to the information in an organisation. Information and knowledge were disseminated when needed, and workers had to follow instructions and concentrate on their assigned tasks. The physical location of machinery and supplies was necessarily also the place where the work was performed. Workers put in the required time, performed the required tasks and rarely, if ever, felt responsible for the organisation's end product. The advances in information technology brought about significant changes in the work environment and led to the creation of the information age or information economy.

Mochella (as cited by Ruetters, 2000) illustrates the pattern of change in the information and technology field by referring to four overlapping waves. The first wave centred on systems and defined the computer industry of the 1970s. It was a time of centralised information management where only specialists worked directly with computers. The second wave centred on personal computers and began around 1980. It was defined by desktop computing and the growth of local area networks, and the information management in an organisation became distributed. In the early 1990s, the network wave started rolling; its driving force being the Internet. During this era, there was a fusion of computing and communications technologies, and electronic commerce became a reality. We are currently in the thrust of the most significant wave of all, namely the digital information wave.

The significance of this wave is huge because it focuses on content which is anything that people want to see and hear that can be produced digitally. Information, unlike traditional resources, does not deplete with use, but increases in value when consumption increases. This means that the more information is digitally stored and used the more it will lead to the creation of new information. This wave is a direct manifestation of the information economy.

According to Djoen and Uijttenbroek (1997) the information economy has the following characteristics:

- Accelerated technological developments
- Enhanced information and knowledge intensive activities
- Reduced time-to-market and life cycles of products and services
- Globalisation of the market place.

The spiralling supply and demand for information technology drives technological development, which, in turn, enhances information and knowledge intensive activities. The increase in knowledge intensive activities reduces the life cycle of products and services. Technological advances help organisations to produce and market products and services across geographical boundaries, and an increasing number of organisations view the world as one enormous market. Organisations develop products and services in places where the know-how is available, buy materials and components where they are the cheapest, produce in countries with the lowest labour and distribution costs and sell their products internationally. Organisations must be large enough to compete globally, but small enough to respond quickly to local market needs.

All of the changes in the external market of the organisation are leading to noteworthy internal changes. The trend is towards a flattening of the hierarchical structure in the organisation, where management is more centrally located and the responsibility with regard to decisions is spread throughout the organisation to every employee. Olmsted and Smith (1997:12) summarises the changes as follows:

‘The global economy is a driving force today. It has led to extensive restructuring in most organisations as companies have worked to reconfigure themselves and refocus their competencies in order to remain viable in the marketplace. Seeking to become more competitive on a global scale, organisations have looked for ways to become more flexible in order to respond better to fluctuations in demand for products and services.’

The information economy has therefore also influenced the work environment, specifically the duties of workers in an organisation. Just as organisations are expected

to adapt to the demands of a new global economy, so are the workers expected to adapt to the demands of the organisations. In the 1970s and 1980s a typical workday meant going to the office at 8:00 or 8:30 and leaving again at 16:30 or 17:00. Only a select few of the middle or top management stayed at the office later or took work home. Few employees had direct access to personal computers and only the specialists were involved in making decisions and using information as a strategic resource. The growing developments in the field of information and communications has changed the worker's primary tools required to perform duties from pens, paper, calculators and typewriters to personal computers, telephones and a connection to the Internet via a modem or a network server.

Apart from being expected to be computer literate, workers are increasingly expected to be information literate. All employees are expected to know the 'where' and 'how' of finding information, using and modifying information, storing information and allowing the relevant people in the organisation access to information. In a sense, workers are all expected to be information workers, and even knowledge workers, on top of their required job skills. The fact that a customer has so many options when purchasing a product or requiring a service means that the relationship between the organisation and its customers is central to success. Customers tend not to care where, when or how their needs are met as long as the resolution is swift, responsive and predictable.

Organisations and workers must be flexible and are required to adjust quickly to new demands. In line with this required flexibility, there is a growing need to spend time more productively. This has led to a trend that allows workers to perform their duties in locations outside of their traditional workspace, namely teleworking. Teleworking necessitates a transition from in-person supervision to remote managing, from face-to-face communication to technology-assisted communication and from on-site working to offsite working.

Nilles (1998:1) coined the term 'telecommuting' or 'teleworking' approximately 25 years ago while stuck in traffic in Los Angeles. The initial interest in teleworking was therefore driven by concerns about traffic congestion and pollution. In the 1980s, as companies focused increasingly on cutting costs, they pointed to teleworking as a means to reduce the expense of maintaining office space. More recently, organisations have

begun to view teleworking as a tool to attract and retain top personnel in fields with short labour supplies. Over the years, the number of alternative work forms has increased to include satellite centres, neighbourhood work centres and mobile working. The focus of this study is teleworking as manifested in a 'work from home' situation. The concept of 'teleworking' developed parallel with the developments in information and communications technology. It is therefore necessary to briefly discuss these developments.

In the 1980s the cost of computers decreased so drastically that workers were no longer forced to access remote, shared host computers and printers, but could use microcomputers or the so-called personal computer that was placed on their desktops. New software emerged, allowing the computerisation of for example, spreadsheets and graphic designs. Communication software tools enabled personal computers to imitate terminals and access central applications that were installed on host computers. These software tools also enabled the linking of personal computers in local area networks, thus enabling workers to create and share information. Towards the end of the decade, the development of smaller, portable laptop computers made it easier for workers to link to the host computer at work while staying at home. However, the limited bandwidth of telephone lines was a problem that directly influenced the growth of teleworking in this decade.

In the 1990s computers became more powerful and data communication links within and between workplaces had enough bandwidth to enable the development of multimedia-bound architecture. Access to multimedia content was now possible through the Internet and the World-Wide Web. Information technology infrastructures became more cost effective and the sharing of information became as easy as sending an e-mail. According to Fitzer (1997:67), the popularity of teleworking grew due to several factors, the most important of which was the technological advances as discussed. Other factors included:

- Cost saving
- Productivity
- Valuable skills

- Fostering diversity
- Employee needs
- Productivity concerns.

A study of the literature indicated that although there were numerous advantages relating to teleworking, there were also some concerns, especially relating to the accessibility of information for teleworkers. Piskin (1997:170) says that despite all the dramatic advancement of information technology in recent years, the virtual proximity of information resources has been short-ended. Even when top performing desktop computers and state-of-the-art modems are used at home or on the road, accessing an organisation's intranet is not always permitted for security reasons. Also, teleworkers are still very limited in their ability to manipulate multimedia content and to download large multimedia files via normal telephone lines.

1.2 RESEARCH PROBLEM

From the information contained in the previous section, it seems that the infrastructure for teleworkers lacks adequate access to information and information sources. The information environment of the teleworker may therefore be different to that of the knowledge worker. This research provided clarity regarding the features of the information environment of the knowledge worker and that of the teleworker. The literature study presented almost no information that related to teleworking in the South African context and the hypothesis was that there would be very few organisations in the country that were involved in formal teleworking programmes. The empirical component of this study is therefore a superficial exploration of the South African teleworking environment. The following research problem was identified:

What are the features of the information environment of an employee in an alternative work environment with specific focus on teleworking, and how do these features vary from that of a knowledge worker in a traditional office environment?

This research problem was then divided into the following sub-problems:

- What are the features of the work environment of the traditional office worker?
(The features of the work environment of the knowledge worker would provide the background for understanding the work environment of the teleworker.)
- What are the features of the general environment of the teleworker?
(Drawing parallels between the work environment of the knowledge worker and that of the teleworker would provide an indication of possible parallels within these information environments.)
- What are the features of the information environment of the traditional worker?
(The features of the information environment of the knowledge worker would identify any similarities to and/or differences from that of the teleworker.)
- What are the unique features of the information environment of the teleworker?
(The empirical research would determine the validity of the hypothesis that there were very few organisations in South Africa involved in teleworking. It would also establish correlations and distinctions between the information environment of the teleworker and that of the knowledge worker.)

1.3 TERMINOLOGY

- **Communications and communications technology:** ‘Communications’ is defined as the transfer of information from one location to another. ‘Data communications’ refers to digital transmission and ‘telecommunications’ refers to a mixture of voice and data, including both analog and digital modes of transfer (TechWeb, 2003). In this study, the terms ‘communications’ and ‘communications technology’ are used and include both telecommunications and data communications.
- **Networks:** A system that transmits any combination of voice, video and/or data between different users constitutes a network. It includes the operating system or

software and all the supporting hardware such as bridges, routers and switches. The antennas and towers used in wireless systems are also part of a network.

- **Teleworking:** Broadly defined, ‘teleworking’ means ‘working at a distance’. There is no generally accepted definition of teleworking – different people use it with slightly different meanings. There are also a variety of other words with a similar meaning, including ‘home working’, ‘flexible working’, ‘remote working’, ‘mobile office’, and ‘virtual office’. In the USA, the term that is commonly used is ‘telecommuting’. The definition most acceptable for use in this study is supplied by British Telecom (as cited in Mersham, 1996:73):

‘Teleworking covers a wide range of work activities, all of which entail working remotely from an employer, or from a traditional place of work, for a significant proportion of work time. Teleworking may be on either a full-time or part-time basis, but usually involves the worker to be at the remote location for at least two days of the week. The work often involves electronic processing of information, and always involves using communications technology to keep the remote employer and employee in contact with each other.’

- **Teleworker:** In accordance with the definition supplied above, a teleworker is an employee who performs his or her normal office duties from home for at least two days of the working week.
- **Knowledge worker:** Turban, Rainer and Potter (2001:48) define a ‘knowledge worker’ as an employee who creates information and knowledge, and integrates it into the business. Typical knowledge workers are professionals such as lawyers, market analysts, accountants, research analysts and production planners. This research will use the term ‘knowledge worker’ to describe employees who were working in a professional capacity in the traditional office environment of an organisation.
- **Information environment:** For the purpose of this research, ‘information environment’ meant any part of any system involved in finding, processing, storing

and retrieving information. This includes aspects such as information and communications technology, the human resource component, and procedures relating to information systems, such as data, information and knowledge.

1.4 RESEARCH METHODOLOGY

The research took the form of a literature study and included an analysis of the results acquired via interviews with a number of teleworkers in South Africa. Reports, articles and other publications relevant to the nature of teleworking were researched, examined and evaluated. Contact was established with certain authors that have been researching this field and their experiences were incorporated into this study. The literature study culminated in research that provided theoretical and, where possible, practical information on teleworking. The research approached the concepts from an information professionals' point of view, with the focus on the information environment that is necessary for successful teleworking.

1.5 CHAPTER OUTLINE

In the second chapter of this dissertation, the features of the work environment of the knowledge worker are established, while in Chapter 3 the features of the work environment of the teleworker are described. The specific features of the information environment of the knowledge worker are discussed in Chapter 4 and the dissertation concludes in Chapter 5 with the identification of the features that influence the information environment of teleworkers in South Africa.

2. GENERAL ENVIRONMENT OF THE KNOWLEDGE WORKER

2.1 INTRODUCTION

The knowledge worker can be defined as a professional employee who performs a job in the office of the organisation during set working hours for a set amount of working days. This knowledge worker functions in a dynamic environment where external and internal forces are unpredictable. In this environment, there are many factors that influence the individual's needs, behaviour and functioning. The features of the environment of the knowledge worker can only be explored by examining the forces that influence the nature of organisations. Newstrom and Davis (1997:7) believe that issues, trends and features can be classified into four areas that affect the nature of organisations today, namely people, structure, technology and the environment. These forces are constantly interacting. When individuals work together in an organisation, it normally results in the creation of a structure or formal relationship. Individuals working towards a common goal need technology to accomplish that goal, so there is an interaction of individuals, structure and technology. These three forces are in turn influenced by factors in the external and internal organisational environment. To understand the general features, needs and behaviour of individuals in an organisation, it is necessary to borrow from the field of organisational behaviour.

Organisational behaviour is the study and application of knowledge about how people act within organisations. It attempts to identify ways in which people can act more effectively. Organisational behaviour is a scientific discipline in which large numbers of research studies and developments are constantly adding to the knowledgebase (Newstrom and Davis, 1997:5). Robbins (1997:2) defines organisational behaviour as the study of the actions and attitudes that people exhibit within organisations. Carrell, Jennings and Heavrin (1997:29) state that the field of organisational behaviour includes investigating the management of people at work within an organisation.

These definitions indicate that the knowledge worker does not operate and function in isolation. What then are the features of the general environment of the knowledge worker? This could only be determined through the exploration of the employees' relationship with the organisation. In this chapter, attempts are made to identify the

features of the environment of the knowledge worker through the exploration of the three basic aspects that constitute an employee's relationship with an organisation, namely, individual, interpersonal, and organisational processes. In Figure 1, these processes are illustrated as part of the larger field of organisational behaviour.

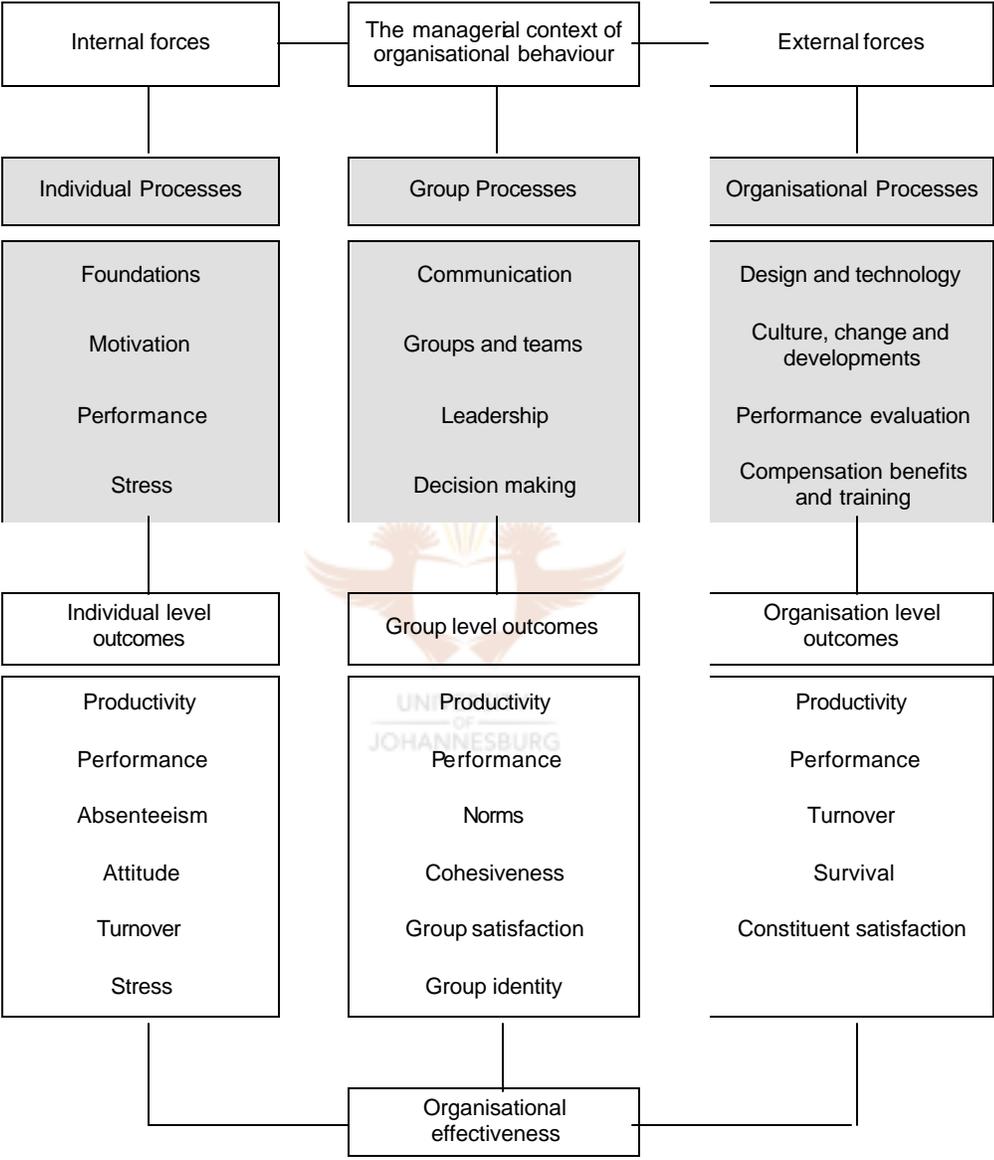


Figure 1 Field of organisational behaviour (Moorehead and Griffin, 1998:17)

2.2 INDIVIDUAL PROCESSES

2.2.1 Foundations of individual processes

To understand the needs and requirements of an individual in an organisation one must examine the basic nature of the employee–organisations relationship. Understanding this relationship clarifies the nature of individual differences which, in turn, play a critical role in determining the various behaviours and needs of individuals in the workplace. The individual makes a variety of contributions to an organisation and expects the organisation to provide incentives. This is known as a psychological contract (Moorehead and Griffin, 1998:88). All organisations face the challenge of managing the basics of this psychological contract because they want value from their employees. They must therefore give employees the required incentives.

Individuals with their own unique qualities and features are the basic building blocks from which an organisation is created. Therefore, the key to the successful management of the psychological contract is to understand that every individual is different. Carrell, Jennings and Heavrin (1997:98) confirm this by stating that every person is different from everyone else and individuals are unique in terms of their skills, abilities, personalities, perceptions, attitudes, values and ethics. Individual differences can be categorised into three areas, namely attitudes, personality and perception. These three areas are key indicators of the way in which an individual views a working environment and acts within it.

2.2.1.1 Attitudes

Attitudes are the feelings and beliefs that determine how an employee behaves and perceives an environment; they direct the actions of an employee (Newstrom and Davis, 1997:255). Hellriegel, Slocum and Woodman (1998:50) define attitudes in more detail by breaking them down into the following components:

- Affective component, or the feelings, sentiments, moods and emotions about some person, idea, event or object

- Cognitive component, or the beliefs, opinion, knowledge or information held by an individual
- Behavioural component, or the predisposition to act on a favourable or unfavourable evaluation of something.

Attitudes are formed by a variety of forces, including personal values, experiences and personalities. Key job-related attitudes are job satisfaction and organisational commitment or involvement. Job satisfaction reflects the extent to which an individual finds gratification and fulfilment in a job. According to Robbins (1997:31) evidence indicates the important factors conducive to job satisfaction are mentally challenging work, equitable rewards, supportive working conditions and supportive colleagues.

Employees tend to prefer jobs that give them opportunities to use their skills and abilities, and that offer a variety of tasks, freedom and feedback on how well they are doing. They want reward systems and promotion policies that they believe are just and in line with their expectations. For many individuals, a job also fills the need for social interaction and, therefore, having supportive and friendly co-workers leads to increased job satisfaction. Moorehead and Griffin (1998:99) summarise it by saying that a satisfied employee tends to be absent less often, make more positive contributions and stay with the organisation for longer. In contrast, a dissatisfied employee may be absent more often, may experience stress that disrupts co-workers and may be continually looking for another job.

Job satisfaction or the lack thereof can therefore be highlighted as a feature of the employee's relationship with an organisation. Job satisfaction depends on the employee's attitude, which consists of feelings, beliefs, knowledge and actions taken accordingly. The organisation should strive to provide challenging work, fair rewards, decent working conditions and team spirit and support. The mix of all these ingredients determines job satisfaction for the knowledge worker.

Organisational commitment reflects an individual's attachment to the organisation and refers to the strength of an employee's involvement in and identification with the organisation.

Strong organisational commitment is characterised by a:

- Belief in and acceptance of the organisation's goals and values
- Willingness to exert considerable effort on behalf of the organisation
- Desire to maintain membership in the organisation (Hellriegel, Slocum and Woodman, 1998:99).

Organisational commitment is therefore a broader work attitude than job satisfaction because it applies to the entire organisation rather than just the job itself. Commitment is typically also more stable than satisfaction because day-to-day events are less likely to influence it. A highly committed individual probably overlooks minor sources of dissatisfaction and plans a long-term career at the organisation. According to Moorehead and Griffin (1998:100), there are few definite things an organisation can do to promote satisfaction and commitment. Research suggests the following:

- Extrinsic rewards
- Role clarity
- Participative management.

Organisational commitment is a feature of the knowledge worker's relationship with the organisation. As is the case with job satisfaction, the individual's attitude influences organisational commitment.

In this section, job satisfaction and organisational commitment have been identified as two features of the knowledge worker-organisation relationship and it has been determined that both these features are influenced by the individual's attitude. In the next section, the features that are influenced by an individual's personality are examined.

2.2.1.2 Personality

Personality is defined by Moorehead and Griffin (1998:92) as the relatively stable set of psychological attributes that distinguishes one person from another. Robbins (1997:34) defines personality as the combination of psychological traits used to classify an individual. Organisational behaviour is concerned with how an individual's personality affects the employee–organisation relationship and, therefore, the general work environment. Various sources in this field suggest that there are only five key dimensions to consider. The same five dimensions have emerged in so many studies that have been conducted in so many different ways that they are often referred to as the 'big five' dimensions of personality (Greenberg and Baron, 1997:111). These dimensions are:

- Conscientiousness
- Extroversion–Introversion
- Agreeableness
- Emotional stability
- Openness to experience.



Greenberg and Baron (1997:134) state that work-related outcomes are most positive when there is a close match between an individual's personality and the requirements of the job. This is known as the person–job fit. Theories suggest that satisfaction is highest and turnover lowest where personality and jobs are in agreement. According to Robbins (1997:37), the most researched theory is the Six Personality Types model. The six personality types are realistic, investigative, social, conventional, enterprising and artistic. The key points of the model indicate that there:

- Are intrinsic personality differences among individuals
- Are different types of jobs
- Individuals in job environments congruent with their personality type should be more satisfied and less likely to resign voluntarily than people in incongruent jobs.

An individual's personality type will go a long way in determining his or her suitability for a specific job. Research indicates that the better the person– job fit, the higher the job satisfaction. This suggests close interplay between these two features.

2.2.1.3 Perception

Perception is the selection and organisation of stimuli to provide significant experiences for the perceiver (Hellriegel, Slocum and Woodman, 1998:72). Carrell, Jennings and Heavrin (1997:112) define perception as the process that individuals undergo to organise their sensory impressions to give meaning to their environment. It is clear from the definitions that individuals may look at the same thing, yet perceive it differently. Different perceptions often result in distortions with regard to the workplace. Carrell, Jennings and Heavrin (1997:113) suggest the following to be some of the main perception distortions:

- Selective perception: Individuals cannot assimilate everything they observe; therefore, they select pieces of information on the basis of their own interest, background, experience and attitudes.
- Projection: Individuals often assume that others are similar to themselves, thus projecting their own feelings or features onto others.
- Stereotyping: Individuals categorise or label people on the basis of a single attribute.
- Halo effect: This occurs when one feature of an individual, either favourable or unfavourable, is used to develop an overall impression of that individual.

The impact of perceptual distortion can be minimised by the individual. The following actions are identified by Greenberg and Baron (1997:81):

- Do not overlook the external causes of others' behaviour
- Identify and confront stereotypes
- Evaluate people based on objective factors

- Avoid making rash judgements.

The employee–organisation relationship is influenced by an individual’s perception of factors in the working environment. In contrast to the other three features that have been identified thus far (job satisfaction, organisational commitment and person–job fit), perceptual distortion is mostly influenced by actions on the individual’s side of the relationship. There are not many actions that an organisation can take that will drastically alter the effects of this feature.

The employee–organisation relationship, which constitutes the general work environment, is founded in aspects such as the attitude, personality and perception of the knowledge worker. Examining these aspects has led to the identification of four features of the knowledge worker’s environment, namely job satisfaction, organisational commitment, person–job fit and perceptual distortions. In the next section, the concept of motivation is explored and the features of the employee–organisation relationship that arises from this concept are identified.

2.2.2 Motivation

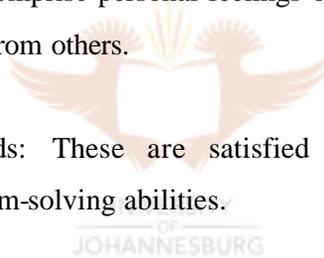
Motivation is defined by Moorehead and Griffin (1998:118) as the set of forces that causes people to engage in certain behaviour. It represents the forces acting within a person that cause the person to behave in a specific, goal-directed manner. An individual’s behaviour with regard to the employee–organisation relationship centres around motivation or the basic needs of that individual. It is therefore necessary to understand the theories underlying the concept of motivation before any specific influences and features can be identified.

According to Greenberg and Baron (1997:144), the theories of motivation focus on the specific factors that engage, direct and end a person’s behaviour. These theories attempt to explain motivation in terms of the satisfaction of basic human needs. The most widely reported theories are Maslow’s hierarchy of needs and Alderfer’s ERG theory.

2.2.2.1 Hierarchy of needs

Hellriegel, Slocum and Woodman (1998:141) explain Maslow's hierarchy of needs theory as follows:

- Physiological needs: The needs for food, water, air and shelter are the lowest level of needs.
- Security needs: The needs for safety and stability, and the absence of pain, threat or illness are all security needs.
- Affiliation needs: The needs for friendship, love and a feeling of belonging fall under affiliation needs.
- Esteem needs: These comprise personal feelings of achievement and self-worth and recognition or respect from others.
- Self-actualisation needs: These are satisfied through self-fulfilment and a strengthening of problem-solving abilities.



Hellriegel, Slocum and Woodman (1998:140) state that the theory is based on the following four assumptions:

- Once a need has been satisfied, its motivational role decreases and another need gradually emerges.
- The needs network of most people is very complex, with several needs affecting behaviour at any one time.
- In general, lower level needs must be satisfied before higher level needs are sufficiently activated to drive behaviour.
- There are more ways of satisfying higher level needs than lower needs.

2.2.2.2 ERG theory

In many respects, Alderfer's ERG theory agrees and refines Maslow's hierarchy model, but it suggests that the individual has three basic sets of needs (Greenberg and Baron, 1997:147), namely:

- Existence needs: These are material needs such as food, air, water, fringe benefits and working conditions.
- Relatedness needs: Establishing and maintaining interpersonal relationships with co-workers, superiors, subordinates, friends and family meet these needs.
- Growth needs: These needs are satisfied by an individual's attempts to find opportunities for unique personal development by making creative or productive contributions at work.

The existence needs generally correspond to Maslow's physiological and safety needs; relatedness needs generally correspond to Maslow's affiliation needs and growth needs generally correspond to Maslow's esteem and self-actualisation needs. The difference between the two theories is that the ERG theory suggests that the satisfaction of more than one level of needs may motivate an individual at any one time.

2.2.2.3 Application of the hierarchy of needs and ERG theory

The similarities between the two content-based theories permit for a single evaluation regarding an organisation's role in satisfying the needs of employees. Greenberg and Baron (1997:147) suggest four key points that will enable an organisation to meet the needs of its employees, namely:

- Promoting a healthy workforce: Some organisations help satisfy their employees' physiological needs by providing incentives to keep them healthy. These incentives serve to promote a healthier lifestyle and therefore increase the chance of satisfying physiological needs.

- Providing financial security: This is an important type of safety need and some organisations pay special attention to satisfying it by, for example, offering low interest loans.
- Providing opportunities to socialise: Some organisations incorporate social activities as part of the workday to help satisfy the social needs of employees.
- Recognising employees' accomplishments: This is an important way to satisfy the individuals' esteem needs. There are many different ways to incorporate this into an organisation, for example giving small gifts or monetary awards for special and outstanding performance.

The underlying assumption of these theories is that the satisfaction of an individual's needs would motivate him or her to become a more productive worker. The satisfaction of an individual's needs could therefore be identified as another feature of the knowledge worker–organisation relationship. At the same time, the nature of the individual's needs, as explained above, suggests that this feature is also intrinsically part of two other features that have been identified in 2.2.1 of this section. Job satisfaction and organisational commitment to a certain extent also depend on an individual's level of motivation (or the level of need satisfaction). It is clear from the above discussions that organisations play a distinct role in need satisfaction of knowledge workers, which influences the employee–organisation relationship.

2.2.3 Stress in the workplace

The goal of many organisations today is to do things better and faster, but with fewer employees. An unfortunate effect of this trend is to put too much pressure on individuals, creating a stressful job environment. Many people think that stress is a simple problem, but in reality it is complex and its effects on the employee are often misunderstood. In this section, stress is examined as a possible feature that influences the knowledge worker–organisation relationship. To be able to understand this concept, it is necessary to define it and examine its causes and explain its consequences.

Stress can be defined as a person's adaptive response to a stimulus that places excessive psychological and physical demands on him or her (Moorehead and Griffin, 1998:226). Stress, therefore, involves the interaction of an individual and an environment. An individual's interpretation of circumstances influences extent to which stress occurs in a given situation.

2.2.3.1 Causes of stress

Conditions that tend to cause stress are called stressors. Although even a single stressor may cause major stress, usually stressors combine to place pressure on an employee in a variety of ways until stress develops (Newstrom and Davis, 1997:434). Carrell, Jennings and Heavrin (1997:142) summarise the most common sets of work-related stressors as follows:

- Task demands: These stressors are related to a specific job and individual performance.
- Physical demands: These involve the physical strain and exertion that a particular job demands.
- Role demands: This happens when two or more sets of demands are placed on an employee, resulting in conflict of roles.
- Interpersonal demands: These include for example group pressures, leadership style and interpersonal conflict.

Moorehead and Griffin (1998:234) state that stress in an organisational setting can also be influenced by events that take place outside of the organisation. Life stressors are mainly categorised into life change and life trauma. Life change is any meaningful change in an individual's personal or work situation, such as retirement, retrenchment, or change in residence. Life trauma is any upheaval in an individual's life that alters attitudes, emotions or behaviours, for example marital problems, family difficulties and

health problems. Many of these events relate directly or indirectly to the work environment.

2.2.3.2 Consequences of stress

Carrell, Jennings and Heavrin (1997:146) say that not all stress is bad and that some stress could be beneficial to performance; that an extremely high stress level contributes to a decline in performance and a moderate amount of stress has a positive effect on performance. They identify the following major consequences of stress:

a) Individual consequences

- Behavioural: These consequences may harm the individual under stress or others.
- Psychological: This relates to an individual's mental health or well-being and includes depression and sleeplessness.
- Medical: This affects an individual's physical well-being and can include heart disease, stroke, headaches, backaches and ulcers.

b) Organisational consequences

- Performance: A clear consequence of stress in the organisation is a decline in performance.
- Withdrawal: In an organisation this would relate to absenteeism and quitting.
- Attitudes: Job satisfaction, morale and organisational commitment suffer, causing employees to be negative towards their jobs and the organisation.

Clearly, stress is definitely one of the features that influence the general environment of the knowledge worker. Again, there is a clear connection between stress and some of the other features that have been identified so far, namely job satisfaction, organisational commitment, person-job fit and the satisfaction of individual needs. It would be in the interest of the organisation and the individual to install measures that will manage this important aspect of the employee-organisation relationship.

In Section 2.2, the focus has fallen on the individual processes that form part of the knowledge worker–organisation relationship. Six features that form part of this relationship have been identified, namely job satisfaction, organisational commitment, person–job fit, perceptual distortion, motivation and individual need satisfaction, and stress. These features are therefore key aspects of the general environment of the knowledge worker. There is a definite connection between most of these features and changes in one almost certainly also affects the other features of this relationship. In the next section the role of interpersonal processes in the employee–organisation relationship is explored and attempts are made to identify the features that influence the general work environment of the knowledge worker.

2.3 INTERPERSONAL PROCESSES

2.3.1 Communication

The most frequently cited source of interpersonal conflict is probably poor communication (Robbins, 1997:123). We spend most of our waking hours communicating by writing, reading, speaking and listening, and it seems reasonable to conclude that one of the most inhibiting forces of successful group performance is a lack of effective communication. No organisation can function without proper communication between employees; an idea, no matter how excellent it is, is useless unless it is transmitted and understood by others. Moorehead and Griffin (1998:256) state that the purpose of communication is firstly to achieve coordinated actions among employees; secondly to allow the sharing of information; and finally to express feelings and emotions.

Without communication work coordination is impossible, because employees cannot communicate their needs and feelings to one another. In this section, the theoretical aspects of communication, such as a definition, the process and direction of communication and the barriers to good communication are examined. Electronic communication is also briefly described

Communication can be defined as the process by which a person, group or organisation transmits some type of information to another person, group or organisation (Greenberg and Baron, 1997:290).

2.3.1.1 Process of communication

Before communication can take place, a purpose, expressed as a message, is needed. This message is encoded and passes between a source and a receiver by means of a medium. The receiver then decodes the message, resulting in transference of meaning between people. According to Newstrom and Davis (1997:51), the communication model is made up of eight steps: develop an idea, encode, transmit, receive, decode, accept, use and feedback.

2.3.1.2 Direction of communication

In Section 2.2, the interplay between features of the employee–organisation relationship has been identified. This interplay is also evident with regard to communication, and it is therefore useful to briefly describe the difference between formal and informal communication in an organisation.



a) Formal communication

Every organisation has a formal communication system through which official messages move from senders to receivers. These channels may be downward, upward or horizontal (Carrell, Jennings and Heavrin, 1997:441):

- **Downward communication:** Communication from a superior to a subordinate is crucial to an organisation. Plans, policies and procedures that originated at upper management levels must be communicated to lower levels of the organisation to ensure effective performance.
- **Upward communication:** Upward communication flows to a higher level or group in the organisation and is used to provide feedback, to inform on progress towards attaining goals and to relay current problems. Without these forms of information,

upper-level management cannot accurately monitor organisational performance and make decisions about future programmes and activities.

- **Horizontal communication:** Horizontal or lateral communication occurs when employees of the same workgroup or at the same level in the organisation communicate with one another. Communication between peers tends to be more casual and occurs more quickly because fewer social barriers exist between the parties.

b) Informal communication

A large amount of the communication in an organisation is transmitted through an informal communication channel known as the grapevine. The grapevine is a person-to-person communication network based on a normal rather than an abnormal set of relationships (Carrell, Jennings and Heavrin, 1997:445). Employees at all levels of the organisation are linked to the grapevine, and informal communication occurs naturally wherever individuals come together in either work or social settings. The grapevine is often more informative than formal communication, because it reports the 'inside details' of something that has been vaguely communicated via the formal channels.

2.3.1.3 Electronic communication

Communication technologies such as e-mail, voice mail, teleconferencing and video conferencing are used at an astonishing rate in today's organisations. These technologies create new symbols and message transmission methods that increase the speed of organisational communication, and user attitudes have generally been favourable (Carrell, Jennings and Heavrin, 1997:441). The sheer volume of information that is available creates the potential problem of information overload, an aspect that is examined in Section 4.2.3. The impact of technological development offers both great promise and problems (Newstrom and Davis, 1997:74). This aspect of communication is dealt with in Chapter 4.

2.3.1.4 Barriers to communication

Perfect communication accurately transmits a message from a sender to a receiver.

Moorehead and Griffin (1998:276) explain the organisation barriers to communication as follows:

- Noise: A common form of noise is the rumour grapevine
- Status differences: These are expressed by titles, office location and privileges
- Time pressures and information overload.

Communication is necessary to perpetuate the well-being of the organisation and therefore plays a key role in the knowledge worker's environment. In the technology-driven society of today there is particular emphasis on electronic communication. The importance of this aspect with regard to the general environment of the teleworker is touched on in the next chapter and explored in detail in Chapter 4.

2.3.2 Groups

Much of the activity in an organisation occurs within groups—from informal groups of employees whose friendship influences their relationship with each other to formal autonomous work groups. Group activities can be critical to the success of an organisation and the utilisation of groups in organisations is a common occurrence. According to Moorehead and Griffin (1998:290), the definitions of groups are as abundant as the studies on them. Groups have been defined in terms of perceptions, motivations, organisation, interdependencies and interactions.

Greenberg and Baron (1997:249) provide the following comprehensive definition:

“A group is a collection of two or more interacting individuals with a stable pattern of relationships between them who share common goals and who perceive themselves as being a group”.

The group dynamics of an organisation are related to the general environment of the knowledge worker. A brief theoretical examination of the structure and types of groups is therefore necessary.

2.3.2.1 Group types

There are many ways of classifying groups. A key difference exists between formal groups, which are established by the organisation and have a public identity and goal to achieve, and informal groups, which emerge on the basis of common interest, proximity and friendships (Newstrom and Davis, 1997:341). It is safe to assume that the formal group type would have a more direct bearing on the employee–organisation relationship that exists in the traditional office.

2.3.2.2 Group structure

As explained in the definition of Greenberg and Baron, one of the key features of a group is its stable structure. According to Greenberg and Baron (1997:254), group structure refers to the interrelationship between individuals constituting a group and the features that make a group function orderly and predictable. They continue by saying that there are four important aspects relating to a group's structure. These are:

- Roles: Each individual is required to play a number of different roles, depending on the social context and the group that they find themselves in at the time.
- Norms: These are a group's unspoken rules that will define and shape its behaviour in specific situations.
- Status: This refers to a member's perceived grading, position or rank in a group.
- Cohesiveness: It is the degree to which members are attracted to each other and are motivated to stay in the group.

The dynamics of groups can be identified as another interpersonal feature of the employee–organisation relationship. Understanding the roles that knowledge workers play in the different groups can help clarify their behaviour and assist the organisation in dealing with their needs. This is in line with the pattern that emerged in previous sections; again there is interplay between the satisfaction of need feature identified earlier and the structure and functioning of groups.

2.3.3 Teams

A team functions through coordinated effort (Robbins, 1997:110). There are certain similarities between groups and teams and the influence of team dynamics on the knowledge worker’s relationship with the organisation would presumably also be significant. The differences between groups and teams is summarised in Table 1.

	GROUPS	TEAMS
Performance depends on	Individual contributions	Individual contributions and collective work products
Accountability for outcomes rest on	Individual outcomes	Mutual outcomes
Members are interested in	Common goals	Common goals and commitment to purpose
Responsive to	Demands of management	Self-imposed demands

Table 1 Differences between groups and teams (Greenberg and Baron, 1997: 271)

2.3.3.1 Types of teams

Robbins (1997:111) states that teams can be identified on the basis of their objectives. The three most common forms or types of teams likely to be present in an organisation are:

- **Problem-solving teams:** These teams are typically composed of permanent employees from the same department who share ideas and offer suggestions on how work processes and methods can be improved
- **Self-managed teams:** These teams generally consist of a group of people who take on the responsibilities of their former supervisors.

- Cross-functional teams: They are made up of employees from the same hierarchical level, but from different work areas, who come together to accomplish a task.

2.3.3.2 Features of effective teams

Based on their research and analysis of successful teams, Greenberg and Baron (1997:281) identify the following steps to success:

- Diversify team membership
- Keep teams small in size
- Select the right team members
- Train members with all the technical skills that they require
- Clarify all goals
- Link individual rewards to team performance
- Use appropriate performance measures
- Encourage participation
- Cultivate team spirit and social support
- Foster communication and cooperation
- Emphasise the urgency to the team's tasks
- Clarify the rules of behaviour
- Regularly confront teams with new facts
- Acknowledge and reward vital contributions to the team.

The dynamics of teams are very similar to that of groups in the organisation, but with more emphasis on the organisation's influence on key success factors. Certain aspects of features that have previously been identified as the basis on which successful teams are built include communication, goal and role clarification, rewards and needs satisfaction, team spirit and social support. The frequent occurrence of teams in organisations today is an indication of their importance with regard to the work environment of the knowledge worker.

Communication, group- and team dynamics are central features in the relationship between the organisation and the knowledge worker. There is a strong link between these three aspects and features that have been identified earlier, namely job satisfaction, organisational commitment, person– job fit and need satisfaction.

2.4 ORGANISATIONAL PROCESSES

In Section 2.2, the features of the individual processes relating to the employee–organisation relationship have been identified. In Section 2.3, an exploration of the features relating to the interpersonal processes has been continued and in this section the features that influence the knowledge worker’s environment are explored from the organisational processes viewpoint.

2.4.1 Organisational structure and design

Organisations have different structures and these structures have a bearing on employee attitudes and behaviour (Robbins, 1997:185). For this reason, it is important to define organisational structure and to briefly examine the key components that make up the structure. This section continues with an exploration of a few structural design options and discusses whether these structures have an impact on the environment of the knowledge worker.

Organisational structure comprises task, reporting and authority relationships within which the work of an organisation is done. It defines how the parts of an organisation fit together. Carrell, Jennings and Heavrin (1997:535) define organisational structure as:

- The formal tasks that are assigned to individuals and departments
- Formal reporting relationships, including the number of hierarchical levels, manager’s span of control, decision responsibilities and lines of authority
- Systems to effectively coordinate employees both within and across departments.

In essence, an organisation’s structure is the manner in which it divides its labour into specific tasks and achieve coordination among these tasks. The purpose of the structure is to coordinate employees’ behaviour to achieve the organisation’s goals.

2.4.1.1 Key elements of organisational structure

Most of the sources, including Robbins (1997:185), identify the following six elements as important when designing an organisation's structure:

a) Work specialisation

Work specialisation is the degree to which organisational tasks are subdivided into separate jobs. This means that rather than an entire job being done by one individual, it is broken down into steps, each step being completed by a separate individual. There is value in specialisation in certain areas, but the potential for problems exists if it is carried too far.

b) Departmentalisation

Departmentalisation focuses on grouping tasks in a meaningful manner, creating groups of manageable size and establishing a system of reporting relationships among supervisors and managers. The traditional departmentalisation is based on business functions, such as marketing, manufacturing, human resources or finance. According to Moorehead and Griffin (1998:453), there is a trend towards departmentalisation on the basis of customers, which allows organisations to better monitor and respond to the needs of the customers.

c) Chain of command

This is an unbroken line of authority that extends from the top of an organisation to the lowest levels; it clarifies who reports to whom. This concept has far less relevance today because of the advancements in information technology and the trend towards empowering employees to make decisions that were previously reserved for management.

d) Span of control

Span of control refers to the number of people reporting to a manager; it defines the size of an organisation's work groups. A manager who has a small span of control can maintain close control over employees and stay in touch with daily operations.

e) Centralisation and decentralisation

The term centralisation refers to the degree to which decision making is concentrated at a single point. Typically, it is said that if the top management makes all the organisation's decisions with little or no input from lower-level employees, then the organisation is centralised. In a decentralised organisation, action can be taken more quickly to solve problems, more people provide input into decision making and employees are less likely to feel alienated.

f) Formalisation

Formalisation is the degree to which rules and procedures shape employees' jobs and activities. A highly formalised position means that the employee has minimum discretion over what is done, when it is done and how it should be done. There are explicit job descriptions, lots of organisational rules and clearly defined procedure-covering work processes. Where formalisation is low, job behaviours are relatively non-programmed and employees have a great deal of freedom to exercise discretion in their work. The degree of formalisation can vary between organisations and within an organisation.

Work specialisation, departmentalisation, chain of command, span of control and centralisation combine to constitute the first feature with regard to organisational processes, namely organisational structure. It is clear that, together with the other features that have been identified, organisational structure influences the employee-organisation relationship. Organisational structure is closely integrated with the concept of organisational design. In the following section, the basic types of organisational designs are identified to establish the impact they have on the environment of the knowledge worker.

2.4.1.2 Organisational designs

A review of the sources found uniformity with regards to the most common organisational design structures. The clearest explanation can be found in Moorehead and Griffin (1998:490), who describe organisations as traditionally designed according to three basic structures, namely the simple structure, the bureaucracy and the matrix structure.

- **The simple structure :** This structure characterises relatively small, usually young organisations in a simple, dynamic environment. The organisation has little specialisation and formalisation; its power of decision making is concentrated with the chief executive, who is often the owner–manager, and the flow of authority is from the top down.
- **The bureaucracy:** Standardisation is the key concept that underlies all bureaucracies. It is characterised by highly routine operating tasks and achieved through specialisation, centralised authority, narrow spans of control and decision making that follows the chain of command.
- **The matrix structure :** Essentially this structure combines two forms of departmentalisation, namely functional and product, to achieve the benefits of each. The most obvious feature of this structure is that it breaks the chain of command concept. There are two managers, department heads and product heads. The strength of the structure lies in its ability to facilitate coordination when the organisation has multiple complex activities. Its major disadvantage lies in the confusion that it can create and its propensity to create power struggles and stress in employees.

Since the early 1990s senior managers in a number of organisations have been working to develop new structural options that can better help their organisations compete effectively (Robbins, 1997:195). Robbins singles out three ‘new’ structural designs:

- **Team structure :** An organisation that uses teams as its central coordination device has a team structure. The primary features of this structure are that it breaks down

departmental barriers and decentralises decision making to the level of the team. More often, in larger organisations the team structure complements an existing bureaucracy. The organisation is then able to achieve the efficiency of standardisation and the flexibility gained from teams.

- **Virtual organisation:** The essence of this structure is a small, core organisation that outsources its major business functions. In structural terms, the virtual organisation is highly centralised, with little or no departmentalisation. The major advantage of this organisational structure is its flexibility and the key disadvantage is that it reduces management's control over primary aspects of its business.
- **Boundary-less organisation:** This organisational structure seeks to eliminate the chain of command, has limitless spans of control and replaces departments with empowered teams. By removing vertical boundaries, management flattens the hierarchy, thus minimising status and rank. Cross-functional teams that are organised around process activities will replace functional departments, thus effectively removing the horizontal boundaries. When fully operational, this structure also allows for the external boundaries, such as geographical location, to be broken down. Technology, and specifically communications technology, enables employees from different geographic locations to work together on a specific project.

Coupled with structure, the design of an organisation has also been identified as part of the organisational processes that influence the environment of the knowledge worker. In Section 2.4.1.3, the existence of a link between features such as job satisfaction employee behaviour, and organisational structure and design is probed

2.4.1.3 Employee behaviour and organisational structure and design

Evidence linking organisational structures to employee behaviour leads suggests that it is impossible to generalise (Robbins, 1997:201). Not everyone prefers the freedom and flexibility of a boundary-less organisation. Some employees are most productive when tasks are standardised and there is virtually no discretion for decision making at lower

levels. It is, however, possible to draw certain conclusions with regard to individual difference and work specialisation, span of control and centralisation.

According to Carrell, Jennings and Heavrin (1997:542) evidence suggests that work specialisation contributes to higher productivity, but at the price of reduced job satisfaction. It is clear that individuals today are less tolerable of over-specialised jobs than in the past, but it would be unwise to ignore the segment of the workforce that still prefers repetitive tasks and routine. According to Robbins (1997:201), evidence suggests that there is no clear relationship between span of control and employee performance. It is therefore impossible to state that any particular span of control has direct benefits for employee productivity. There is fairly strong evidence to suggest that centralisation and job satisfaction can be linked. In general, organisations that are less centralised have a greater amount of participation in decision making, and participative decision making is positively related to job satisfaction. Individual differences, such as experience, personality and attitudes influence an employee's behaviour regarding a specific organisational structure.

The research provided conclusive proof of a link between job satisfaction, employee behaviour and organisational structure and design. Whether this link is regarded as positive or negative depends on a number of factors, one of which is a feature identified earlier, namely person-job fit.

2.4.2 Organisational culture

The culture of an organisation is unique; even organisations in the same industry or field may have totally different cultures. The effectiveness and success of an organisation are not determined solely by the abilities and motivations of employees and managers, or solely by how well groups and teams work together, although both individual and team processes are crucial for organisational success. According to Hellriegel, Slocum and Woodman (1998:544), the organisation itself has an invisible quality that may be more powerful than the dictates of any one person or any formal system. This quality or feature is organisational culture. This section is dedicated to defining different types of organisational cultures and determining their effect on certain aspects of the knowledge worker's relationship with the organisation.

Carrell, Jennings and Heavrin (1997:569) define organisational culture as the underlying beliefs, values and principles that serve as a foundation for an organisation's management system, as well as the set of management practices and behaviours that both exemplify and reinforce those basic principles. Robbins (1997:237) describes seven primary features that capture the essence of an organisation's culture. These are:

- Innovation and risk taking
- Attention to detail
- Outcome orientation
- People orientation
- Team orientation
- Aggressiveness
- Stability.

These features indicate the prevailing culture in an organisation. This aspect is further explored in Chapter 3 with reference to the effect an organisation's culture has on the teleworker.

2.4.2.1 Types of organisational culture

Although organisations tend to have their own unique culture, Greenberg and Baron (1997:473) identify four categories that organisational culture commonly fall into:

- **Academy:** This is an organisation that provides opportunities for employees to master many different jobs and to move from one to the next. This type of organisation typically hires many new graduates and give them special training in a wide variety of jobs.
- **Club:** Some organisations are very concerned with getting people to fit in and be loyal. In this type of organisation, one's age and experience is highly valued.
- **Baseball team:** This type of organisational culture is characterised by people who are entrepreneurs, are willing to take risks and are generously rewarded for it. This

is typically an organisation in the professional field, such as law, investment banking and technology.

- **Fortress:** This organisation's main aim is survival and not inventiveness. It is typical of organisations that are facing hard times and where employees do not have job security.

As mentioned, not all organisations fit perfectly into these different types; an organisation could have a blend of cultures operating at the same time. The culture of an organisation could change over time with changes in its structure or management.

2.4.2.2 Effects of organisational culture

The effect of an organisation's culture on its employees and the processes in the organisation can be profound. Culture can generate strong pressure on individuals to go along and to act in ways consistent with it. Greenberg and Baron (1997:479) identified three areas where organisational culture can play a major role:

- **Organisational performance:** Evidence suggests that in order to influence performance an organisation's culture must be strong. This means that approval or disapproval must be expressed to those who act in ways consistent or inconsistent with the culture, and there must be widespread agreement on values among employees. Organisational culture is only one factor that would influence the profitability or financial stability of an organisation. Therefore, there is no definite positive or negative link between a specific organisational culture type and performance.
- **Length of employment:** Organisational culture can have a considerable effect on the behaviours and attitudes of employees. Research indicates that employees tend to 'survive' longer in organisations that stress the importance of interpersonal relationships as opposed to organisations that place more focus on hard work only.

- **Person–organisation fit:** Person–organisation fit would reflect the extent to which employees' values match that of the organisation. Greenberg and Baron (1997:480) state that the closer the person–organisation fit, the more satisfied people are in their jobs, and the less interested they are in quitting. This suggests that an organisation should focus on attracting individuals whose values match those of the organisation.

The culture of an organisation is a feature of the general environment of the knowledge worker that influences and in turn is influenced by other features, such as employee motivation, communication, group and/or team dynamics and the structure of the organisation. The integration between these features is clear, but many other variables must be taken into account when deciding on the effects of a specific culture on knowledge workers.

2.4.3 Goals and rewards

To survive in today's global competitive market, setting challenging goals that take into account both time and quality is crucial. Goal setting and rewards could play an important role in the organisation and in this section a general goal-setting model, performance management and reward systems are discussed in the context of their relevance to the environment of the knowledge worker.

2.4.3.1 Goal setting

Moorehead and Griffin (1998:198) state that the theory of the use of goal setting for motivation assumes that behaviour is the result of conscious goals and intentions. The theory suggests that two specific goal features are expected to shape performance. They are goal difficulty and goal specificity. Goal difficulty is the extent to which a goal is challenging and requires effort. Goal specificity is the clarity and precision of a goal. Some goals, such as those involving costs, output, profitability and growth, are readily specified, but others, such as improving employees' job satisfaction and morale, company image and reputation, ethics and socially responsible behaviour, are much harder to state in specific terms.

Goal setting can also be approached from a somewhat broader perspective, namely by management by objectives (MBO). MBO is essentially a collaborative goal-setting process through which organisational goals systematically cascade down through the organisation (Moorehead and Griffin, 1998:200). A successful MBO programme begins with top management establishing overall goals for the organisation. After these goals are set, managers and employees throughout the organisation collaborate to set subsidiary goals. Each subordinate, together with the manager, then sets goals and the manager periodically meets with the employee to verify progress. MBO is often an effective and useful system for managing goal setting and enhancing performance in an organisation.

The manner in which an organisation approaches the aspect of goal setting influences the performance and job satisfaction of employees. Goal setting, as a feature of the knowledge worker's environment, depends on interpersonal processes, such as communication and organisational processes (including design and culture), and individual aspects such as need satisfaction, organisational commitment and the level of stress that is being experienced.

2.4.3.2 Performance management

The core of performance management is the actual measurement of the performance of an individual or group. It is the process by which someone evaluates an employee's work behaviour through measurement and comparison with previously established standards. The results of performance management are documented and communicated to employees (Moorehead and Griffin, 1998:202). Performance management is closely linked to goal setting because it is the tool that measures the success of reaching goals. According to Robbins (1997:219), performance management serves many purposes in an organisation; it assists management in general human resource decisions and provides information on aspects such as promotions, transfers and identifying training and development needs.

A performance management system exists in almost every organisation, but how it is used may vary. Moorehead and Griffin (1997:203) say that in most performance management systems, an employee's primary evaluator is the supervisor. This stems

from the fact that the supervisor is presumably in the best position to be aware of an employee's day-to-day performance.

The frequency of appraisal is typically the same for all positions in an organisation. Annual performance appraisals are popular because of convenient administration. There are, however, organisations that prefer performance appraisals to be done twice a year. The culture of the organisation and the environment that it functions in should also be considered when determining the frequency of appraisals.

According to Robbins (1997:226), the following steps will ensure that an organisation overcomes problems with its performance management system:

- Use multiple criteria for the appraisal
- De-emphasise traits and emphasise behaviour
- Document performance behaviour in a diary
- Train the appraisers
- Appraise selectively
- Give performance feedback.



The link between performance management and goal setting, perceptual distortion and organisational culture indicates the relevance of performance management to the environment of the knowledge worker. Performance management is also the feature that forms the basis for the reward system in an organisation and this aspect is discussed in the next section.

2.4.3.3 Reward system

Individuals act in certain ways to satisfy their needs and to get rewards. An organisation's reward system can therefore have an effect on employees' behaviour. Robbins (1997:231) suggests that organisations typically base rewards on performance, effort, seniority, skills held and job difficulty – facets that are typically be clarified through the use of the organisation's performance management system. He continues to

explain that rewards can be divided into two categories, namely intrinsic rewards and extrinsic rewards.

Intrinsic rewards, such as more responsibility, participative decision making, diversity of activities, greater freedom and discretion, and opportunities for personal growth are largely a result of an individual's satisfaction with a job. Extrinsic rewards include direct and indirect financial compensation and non-financial rewards. Direct compensation is a salary, bonuses, profit sharing or opportunities to receive stock options. The organisation also provides employees with indirect compensation such as insurance, paid vacation time, pension and medical aid contributions. Indirect compensation is generally made available to all employees in an organisation, regardless of performance. It is therefore the direct compensation, controlled by management, that is perceived as a motivational reward. It can be concluded that if workers perceive that their efforts are not recognised or rewarded, and if they view their alternatives as limited, they may continue working but perform at a level considerably below their capabilities.

An organisation's reward system can be singled out as an important feature of the general work environment, because of its integration with almost all of the other features that have been identified so far. The reward system assists in satisfying employees' needs and therefore affects behaviour and performance. Intrinsic rewards stem from an employee's level of job satisfaction and extrinsic rewards provide employees with the necessary motivation to change behaviour. The culture, design and structure of an organisation help to determine the performance management system used by the organisation, which in turn assists in shaping the reward system.

2.4.4 Technology

The last feature relating to organisational processes that can influence the knowledge worker's environment is technology. Technology is the knowledge, techniques and equipment that an organisation uses to transform unprocessed resources into finished goods or services. Technological changes are important to an organisation because changes in technology affect the nature of work (Carrell, Jennings and Heavrin, 1997:615). Nowadays, technology is used in organisations to gain a competitive

advantage over another by finding more effective ways of producing products and delivering services – all at lower costs. It is impossible to function today without technology and very often organisations must keep abreast of technological developments, not necessarily for competitive advantage, but just to be able to compete at all.

Computerised information processing systems, new types of communications systems, the Internet, intranets and various combinations of these technologies allow employees to send and receive information to and from one person or groups of people around the world. Moorehead and Griffin (1998:266) state that the ‘office of the future’ is here, with the computer-integrated organisation becoming commonplace. The real increase in productivity due to information technology comes from the ability to communicate in new and different ways rather than from simply improving the speed of existing communications. Organisations must generate, disseminate and implement new ideas with increasing speed and effectiveness. Organisations are ‘knowledge based’ and continually generate new ideas to improve themselves (Moorehead and Griffin, 1998:267).

Technology is therefore not the only feature that would influence organisational processes; central to it is the concept of information, with all its manifestations, such as data, knowledge and resources. Chapter 4 and 5 of this research study are dedicated solely to exploring aspects of the information environment of the knowledge worker and teleworker respectively.

2.5 CONCLUSION

The environment of the knowledge worker is constantly influenced by certain internal and external factors. Organisational behaviour explains how employees are influenced by these factors and how they act as individuals and as groups within organisations. The three basic categories that constitute organisational behaviour are individual processes, interpersonal processes and organisational processes. The features of the knowledge worker’s relationship with the organisation have been identified according to these processes and are summarised in Figure 2.

An employee's attitude can help determine the level of job satisfaction and organisational commitment. Research suggests that the better the person-job fit, the higher the job satisfaction. Every individual perceives the world differently and these perceptions can lead to distortions that in turn have an influence on employees' behaviour in an organisation. Tasks, physical and role demands, together with life change and trauma can combine to cause stress. The consequences of stress are far reaching and influence job satisfaction, organisational commitment, person-job fit and need satisfaction.

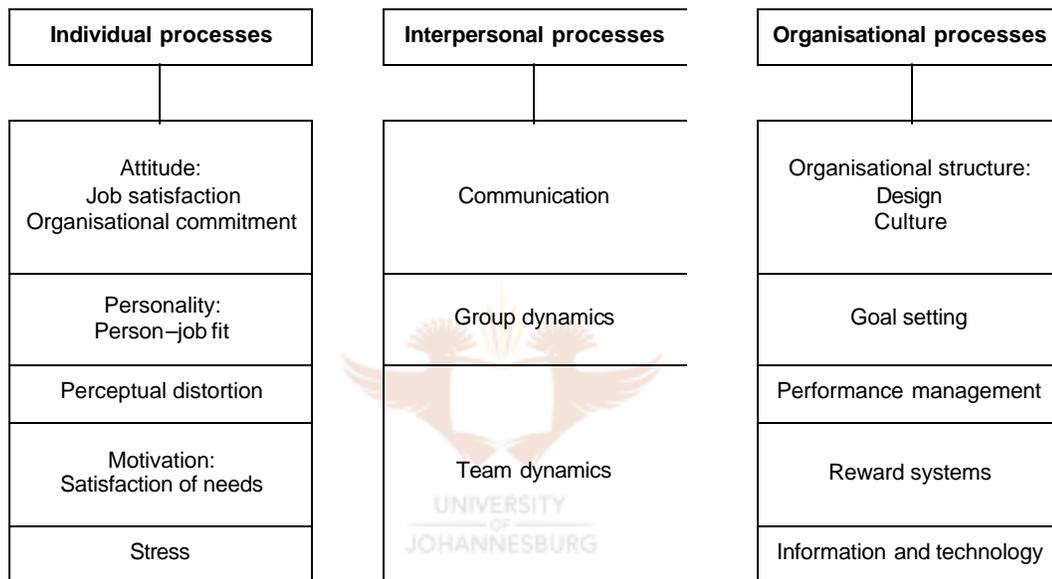


Figure 2 Features of the knowledge worker's environment

Proper communication facilitates the functioning of employees at all levels in the organisation and an understanding of the grapevine can assist an organisation to create an open communication environment. A team's primary focus is to collectively provide solutions, whereas a group exists primarily to assist each other with certain tasks. The dynamics of groups and teams are features based to a large extent on aspects such as communication, role clarification, rewards and need satisfaction.

Organisational design is the practical manifestation of organisational structure. Research indicates a link between organisational structure and design, and the behaviour of employees, revealing integration between the different features identified. The culture

of an organisation is a feature of the knowledge worker's environment that influences and is influenced by motivation, communication, group and team dynamics, and the structure and design of the organisation. The manner in which an organisation uses goal setting affects the performance management system, which again affects the manner in which rewards are managed.

Goal setting depends on features, such as communication, organisational design and culture, need satisfaction and organisational commitment. The performance management system is closely linked to perceptual distortion, communication and the organisational culture. An organisation's reward system is integrated with almost all the features that have been recognised, including job satisfaction, motivation, organisational culture and design, and communication. Technology, together with information, is recognised as two important aspects of the knowledge worker's environment.

In this chapter, the different features of the general environment of the knowledge worker in the organisation have been identified. A pattern of strong integration and even interdependence between features from all three the process areas (individual, interpersonal and organisational) emerged. It could therefore be concluded that if a concept demonstrates interdependence with other concepts, it is more likely to be a feature of the general work environment. In the next chapter an attempt is made to identify the features that form part of the teleworker's work environment. The extent to which these features are interdependent is also explained.

3. GENERAL ENVIRONMENT OF THE TELEWORKER

3.1 INTRODUCTION

Teleworking has been defined in Section 1.5.1 as a wide range of work activities, all of which entail working remotely from an employer or from a traditional place of work for two or more days a week. The teleworker can therefore be defined as the person who performs the activities as stated in the above-mentioned definition. In the previous chapter, the knowledge worker has been defined as a professional employee who performs work activities in the office of the organisation during set working hours for a set amount of working days. There are significant differences between these two definitions, the most obvious being that the knowledge worker performs work activities in the office, while the teleworker performs work activities away from the office.

The similarities, however, must also be pointed out: both definitions refer to ‘a worker’; both refer to ‘an organisation’ (or employer) and both refer to ‘work activities’. As explained in the introduction of the previous chapter, the knowledge worker does not function in isolation, but is constantly influenced by other individuals and certain organisational forces. Because of these similarities it is possible to assume that the teleworker is also influenced by other individual and organisational forces. In this research the features of the knowledge worker’s environment in the organisation have been examined through the exploration of three basic aspects, namely individual, interpersonal and organisational processes. This research has been reported in Chapter 2.

In this chapter, the field of organisational behaviour is used again in an attempt to determine the general features of the teleworker’s environment. The aspects of individual, interpersonal and organisational processes are therefore again examined. In this chapter, it is also discussed whether the same basic features that applied to the knowledge worker apply to the teleworker. The features of the environment of the knowledge worker, as identified in the previous chapter, are therefore used to determine whether their influences on the teleworkers’ environment are the same and whether any additional features influence this environment.

3.2 INDIVIDUAL PROCESSES

3.2.1 Introduction

Individuals with their own unique characteristics and differences are the foundation of any organisation and these differences would probably influence the teleworker's work environment. It has been established in Section 2.2 that the key indicators of individual differences can be categorised into five areas: attitudes, personality, perception, motivation and stress. In this section the influences of these individual differences on the general work environment of the teleworker are discussed.

3.2.2 Attitudes

Attitudes are the feelings and beliefs that determine how an employee perceives the environment and how he or she will react to this environment. Work-related attitudes are job satisfaction and organisational commitment. Job satisfaction reflects the extent to which an employee finds fulfilment in the duties that constitute work. An employee that has become a teleworker still performs the same core processes of work, albeit in a different location. This implies that job satisfaction influences the teleworker's environment in the same manner that it influences the knowledge worker's environment in the organisation.

Organisational commitment reflects an individual's attachment to the organisation. This attachment is reflected in the strength of an employee's involvement in, and identification with, the organisation. The teleworker's commitment and involvement in the organisation may change as soon as a job is performed from a remote location. Depending on the circumstances, the teleworker may become more or less committed. The level of the teleworker's commitment may change, but the actual commitment as a feature still influences the teleworker's environment just as it influences the knowledge worker's environment.

3.2.3 Personality

The Six Personality Types Model (Robbins, 1997:37) indicates that:

- There are intrinsic differences in personality
- There are different types of jobs
- Individuals in job environments that match their personality type would be more satisfied and less likely to resign voluntarily than people in jobs that do not match their personality

This person–job fit feature is likely to influence the teleworker’s environment, although the basic distinction of working outside the office as opposed to inside the office could indicate that different factors would play a role. These factors relate directly to the personality type of the teleworker.

In the teleworking environment, certain kinds of people are more likely to succeed. The ideal teleworker is a person who is strongly self-motivated and self-disciplined (Nilles, 1998:34). Simmons (1996:66) agrees when he lists self-discipline and the ability to self-start as personality traits of the teleworker. The teleworker does not have the visual and audio clues of the traditional office to be kept motivated and therefore needs a strong internal drive to get the job done. The remoteness of a teleworker’s work environment suggests that he or she must be self-disciplined (Davies, 1996:33). The home environment is not monitored continuously and the organisation must, to a large extent, rely on an employee’s own sense of responsibility.

Flexibility and innovativeness are also characteristics of the ‘ideal’ teleworker personality type (Nilles, 1998:35). Employees who generally have difficulty adjusting to new situations may have difficulty adjusting to the teleworking situation. Employees who are flexible and innovative by nature should be able to adjust easily. The work environment of the teleworker places restrictions on the amount of face-to-face socialising that takes place on the job. It seems therefore fair to suggest that teleworking favours an employee who is more introvert by nature, but at the same time has good communication skills (Simmons, 1996:67). The influence of communication on the teleworker’s environment is explored later on in this chapter.

Person–job fit is a feature of the environment of the teleworker and it is influenced by the teleworker’s specific personality traits. These traits have been identified as self-motivation, self-discipline, flexibility, innovativeness, a relatively low need for social interaction and good communication skills. In Section 2.2.1.2, it has been established that there is a relationship between person–job fit and job satisfaction, indicating that the traits identified above also influence the job satisfaction of the teleworker.

3.2.4 Perception

In Section 2.2.1.3, perceptual distortion has been identified as another feature of the knowledge worker’s environment. Individuals give meaning to their environments in different ways, which sometimes results in a distortion of reality. It is therefore the individuality of the employee that determines a perception of the working environment. The working environment of the teleworker is physically different from that of the knowledge worker, but the teleworker is still an individual with certain perceptions. These perceptions therefore also influence the environment of the teleworker.

3.2.5 Motivation

In Section 2.2.2 two motivational theories, namely the Hierarchy Of Needs and the ERG Theory have been discussed. It is clear from this discussion that an employee’s level of motivation depends on the extent to which his or her needs are met by the organisation. As with the knowledge worker, the satisfaction of the needs of the teleworker is an important feature. Four key areas that assist the organisation in satisfying the needs of employees have emerged from Section 2.2.2. These are:

- A healthy workforce
- Financial security
- Opportunities to socialise
- Recognition of the employee’s accomplishments.

The provision of financial security and the recognition of an employee’s accomplishments relate directly to goals and rewards and this is discussed in more detail

later on in this chapter. The provision of opportunities to socialise can be linked to the aspect of communication. This link is also discussed in Section 3.3.2.

3.2.6 Stress

An individual's interpretation of circumstances influences the extent to which stress occurs in any given situation. Conditions that tend to cause stress, called stressors, usually combine to pressure an individual in a variety of ways until stress develops (Newstrom and Davis, 1997:434). In Section 2.2.3.2, the consequences of stress have been discussed and it has been found that stress can influence an individual on a behavioural, psychological and medical level. Stress can also influence the organisation with regards to employee performance and attitude. Statistics from the United States lists stress among the top five reasons for absenteeism over the period 1995 to 1998 (Stone and Joseph, 1999). The causes of stress, as identified in Section 2.2.3.1, are task demands, physical demands and role demands.

The teleworker's unique working environment implies a unique set of stressors. One of the most mentioned stressors is social isolation (Davies, 1996:33; Hobbs and Armstrong, 1998; Gantenbein, 1999). Chevron and Primeau (1996:42) conducted extensive research regarding teleworkers and they determined that social isolation was the most frequently mentioned reason why teleworkers said they would prefer not to work remotely. Many of the respondents in the study regretted the loss of the office co-worker interaction and expressed frustration with the absence of body language. Hobbs and Armstrong (1998) suggest that the teleworker should keep in regular contact with others on a social level and not just through their work environment. Some teleworkers may thrive in an environment with very little social interaction while others may become depressed, resulting in job dissatisfaction and decreased productivity. Because of the overlap with communication, social isolation is analysed further in the next section of this chapter.

Kugelmass (1995:77) suggests workaholism as another significant stressor. The fact that professional employees routinely work 'overtime' at home could mean that teleworking increases the risk of overwork. The teleworker probably has a more efficient and productive work environment, making it easier to work more intensively and for longer

periods (Kugelmass, 1995:78). Piskurich (1998:25) agrees when he states that many teleworkers work longer days than their traditional office worker counterparts. Although there are some personality types that flourish as workaholics, the majority of people become highly stressed when working too hard, resulting in illness and unhappiness. A stressor related to workaholism is the ever-present office (Piskurich, 1998:26). Teleworkers can never get away from their home office and having all the undone work right there can cause stress. Nilles (1998:180) suggests that some practical aspects of the teleworker's environment could result in distractions that can cause stress. He lists them as:

- **Noise:** Background household noise, like vacuum cleaners, washing machines etc. could make it difficult for a teleworker to concentrate or even have a telephone discussion.
- **Children:** Child responsibilities and activities in and around the home can lead to distractions that may cause unnecessary stress.
- **Homemaker:** Although this is generally more of a problem for women, it could also be a cause of stress for men. Spouses cannot understand why the teleworker, who is home all day, cannot do the laundry, make dinner and look after the household chores. These expectations can create stress.
- **Drop-in traffic:** Neighbours who suddenly realise that the teleworker is home during the day may be tempted to drop-in at any time. Again, this can cause serious distractions, leading to unnecessary stress.

Stress is a feature of the teleworker's environment; the causes of stress are unique to this environment, but the consequences can be detrimental for both the teleworker and the organisation. Most of these practical causes of stress can be avoided if the teleworker, his or her family and the organisation are aware of the potential pitfalls.

In this section, the focus falls on the individual processes that form part of the work environment of the teleworker. This is done through the exploration of the features as

identified in Section 2.2. Job satisfaction, organisational commitment, person–job fit, perceptual distortion, individual needs satisfaction and stress are all features of the teleworker’s environment. Differences pertaining to certain aspects relating to personality, motivation and stress were identified; these differences are mostly the result of the difference in working environment between the teleworker and the knowledge worker.

3.3 INTERPERSONAL PROCESSES

3.3.1 Groups and teams

Group activities occur often in an organisation, whether in a formal or an informal manner. Formal groups are formed by the organisation while the employees create informal groups. Informal groups are typically are friendship groups or interest groups (Greenberg and Baron, 1997:251). The remoteness of the teleworker’s environment influences his or her availability to become part of an informal group and it could also have an influence on whether he or she is selected to form part of a formal group. The overlap between social isolation and communication therefore also ties in with the dynamics of groups.



Teams generate results through a coordinated effort, meaning that their collective efforts result in a higher level of performance than their individual efforts put together would have. The major differences between teams and groups are summarised in Table 1. Of significance to the teleworker’s environment is the fact that teams rely on individual contributions and collective work products, necessitating constant and intense communication between team members. Communication and cooperation have been identified in Section 2.3.3.2 as two of the critical success factors pertaining to teams. Fitzer (1997:69) suggests that involving teleworkers in brainstorming, teambuilding and problem solving may be more difficult, but it is not impossible.

Nilles (1998:100) agrees when he says that the interaction cycle of a team dictates when face-to-face communication is necessary. The cycle begins with the inception of the team, where it is usually necessary for team members to physically get together to define goals, allocate responsibility and assign individual tasks. Once the tasks have

been allocated, the key productivity enhancer is usually individual work, which the teleworker can do in a remote location. Further team meetings may be necessary to review progress or to revise goals, but these meetings can be done electronically, eliminating the need for physical proximity of team members.

The teleworker's remote environment does therefore not mean that he or she cannot participate in group or team activities. Changes to the method of communication may be necessary, but the dynamics of teams and groups will stay the same. These dynamics can therefore also be identified as features of the environment of the teleworker.

3.3.2 Communication

The purpose of communication is to achieve coordinated actions among employees and to allow the sharing of information and the expressing of emotions and feelings (Moorehead and Griffin, 1998:26). In Section 2.3.1.2, the direction of communication in an organisation has been discussed, concluding that formal communication occurs downward, upward and horizontal. Much of the communication in an organisation occurs through an informal channel or the so-called grapevine. Informal communication occurs naturally wherever individuals come together in a work situation and employees at all levels of the organisation are linked to the grapevine.

Teleworkers may be less distracted by workplace bureaucracies and social activities, but they also sacrifice the personal interaction and informal communication of the workplace (Putnam, 2001). The teleworker can experience a lack of formal and informal communication, resulting in feelings of isolation. In teleworking a lack of proper communication is potentially damaging to teleworkers and organisations (Fitzer, 1997:69). Successful organisations will establish good communication systems and processes both on a formal and informal level. Hale and Whitlam (1997:152) suggest that successful communication in the teleworker environment should have the following features:

- Formal and informal mechanisms
- Be continuous and in profusion
- Communication-related technology that is utilised to the full

- The right culture and climate for a free flow of communication.

Crandall and Wallace (1998:52) suggest that informal communication should be replaced to some degree by scheduled telephone conversations, e-mail communication and face-to-face meetings. Most research indicates that regular, scheduled face-to-face meetings are a necessity for successful communication in the teleworker's environment. Nilles (1998:108) says that most teleworkers must be in the office part of the time and scheduling regular meetings at these times should not be difficult. It may, however, be more problematic to arrange impromptu meetings to discuss pressing issues. Electronic means of communication can go a long way in solving this problem.

There is a definite need for both the teleworker and the organisation to improve their ability to communicate effectively by means of electronic media (Kurland and Bailey, 1999:65). Using technology such as e-mail, videoconferencing and/or teleconferencing can ensure that the teleworker and fellow employees stay informed of issues and tasks. Bouvet (1996) suggests that organisations should talk to teleworkers and other employees in a department via conference calls in the morning. This way the entire workforce can review the day's work and be informed of appointments and activities.

Meetings, whether face-to-face or via electronic means, can take care of the specific job-related objectives, but it is more difficult to solve the problem of successful informal communication. Nilles (1998:112) suggests the following with regard to successful informal communication:

- Managers in the organisation should take care to inform teleworkers of changes in the organisation, for example individuals who have resigned.
- Teleworkers should be included in social events as far as possible. This may mean rescheduling a 'group lunch' for the day on which the teleworker is at the office or organising a social get-together when it is convenient for the teleworker to join.
- The teleworker's manager should act as a problem solver, providing the teleworker with the resources that are needed to do the job, for example supplies and manuals.

- Memos and other information documents should be routinely forwarded to the teleworker, either at home or to a post box at work.

The teleworker's circumstances necessitate a stronger reliance on electronic communication, such as e-mail, faxes and teleconferencing. It is also clear that special attention should be paid to aspects of informal communication, ensuring that the teleworker does not become isolated from office socialisation. Communication is vital to the health and success of an organisation and therefore plays a key role in the environment of the teleworker.

In this section, the dynamics of groups and teams, and communication as a feature of the teleworker's environment have been identified. The strong link between these three features and the possibility of isolation of the teleworker have been pointed out. The mechanism of communication must be adapted to suit the teleworker's remote working environment. In the next section, the organisational processes that feature in the environment of the teleworker are explored.

3.4 ORGANISATIONAL PROCESSES

3.4.1 Organisational structure and design

An organisation's structure refers to the manner in which labour is divided into specific tasks, and how coordination is achieved among these tasks. In Section 2.4.1.1, six vital elements in the design of an organisation's structure, namely work specialisation, departmentalisation, chain of command, span of control, centralisation and decentralisation, and formalisation have been identified. Organisational structure is closely linked to organisational design. Organisations have traditionally been designed according to three basic structures, namely the simple structure, the bureaucracy and the matrix structure (Moorehead and Griffin, 1998:490).

Structural options that have recently started to emerge include the team structure, the virtual structure and the boundary-less structure. In Section 2.4.1.3, it has been pointed out that when probing the link between employee behaviour and organisational structures, it becomes clear that it is not possible to generalise. Research, however,

indicates that there can be a link between job satisfaction, employee behaviour and organisational structure. Other features such as person–job fit, personality and the satisfaction of needs also influence the effect of organisational structure on the teleworker’s environment.

Just as there are certain personality types that are better suited to teleworking, so there are certain organisations that are better suited to teleworking. Organisations with little work autonomy that use time-based methods of work supervision, and whose decision-making processes are centralised, find it virtually impossible to supervise teleworkers without changing these aspects of their organisational structure (Jacobs and Van Sell, 1996). The organisation should have a flexible, results-orientated structure that allows for managing employees through quality of results, rather than through time spent on tasks. Mitchell (1996) has found in his research that formal telework programmes are more likely to be found in organisations that are progressive and expectations based in their approach than in organisations that are conservative and agreements based.

Nilles (1998:228) suggests ‘diffusion’ as an organisational design structure that accommodates the needs of a teleworking programme. The central characteristic of diffusion is that an organisation can have components that are geographically scattered, while still maintaining a logical connectivity among these components. Nilles continues by stating that information technology is a key component of the diffused structure, because it provides the means of maintaining connectivity among employees. The management style of a diffused organisation is based on the principle that if an employee produces results according to the corporate objectives and goals, the employee is deemed effective, no matter where he or she is performing a job.

Organisational structure and design are features of the teleworker’s environment that influence the very existence of a formal teleworking programme in an organisation. It is also evident that certain organisational structures are more suitable for teleworking than others. Organisational culture is closely linked to structure and design, and is discussed in the next section.

3.4.2 Organisational culture

The culture of an organisation is unique and can contribute to its effectiveness and success, or its downfall. Organisational culture is the underlying beliefs, values and principles that serve as the foundation for an organisation's management system, as well as the set of management practices and behaviours that underpin these basic principles. Seven features that portray the essence of an organisation's culture have been identified in Section 2.4.2.1. These are innovation and risk taking, attention to detail, outcome orientation, people orientation, team orientation, aggressiveness and stability. An organisation's culture may change when changes in the structure or management occur. It is also possible that a blend of cultures can operate in one organisation at the same time. The effect of an organisation's culture on its employees can be profound – forcing them to act in ways consistent with the existing culture.

Teleworking is not suitable for every organisation and, as Apicella (2001) suggests, an organisation should adjust its culture to accommodate teleworking if necessary. Organisational culture sometimes manifests itself as a list of written or unwritten rules, and these rules should be underscored by sound business reasons. The same goes for a culture that is created around teleworking. Crandall and Wallace (1998:56) say that teleworking can necessitate a major culture change for organisations. They suggest changes to occur in the following areas:

- Management style
- Work focus
- Traditional communication processes
- Corporate focus.

As Piskurich (1998:29) suggests, there are no hard and fast rules regarding the 'correct' culture for teleworking and organisations must adapt and find solutions that are suitable for them. The culture of an organisation is a feature of the teleworker's environment and it influences and in turn is influenced by other features, such as communication, and the structure and the design of the organisation.

3.4.3 Goals and rewards

It is accepted practice today for organisations to implement proper goal setting and reward programmes in order to compete in the competitive market of the global village. In this section, the general aspects relating to goal setting and training, performance management and reward systems within the context of the environment of the teleworker are discussed.

3.4.3.1 Goal setting and training

The general theory of goal setting as discussed in Section 2.4.3.1 assumes that behaviour is the result of conscious goals and intentions. The theory differentiates between goal difficulty and goal specificity: goal difficulty being the extent to which a goal is challenging and goal specificity being the clarity and precision of a goal. Hale and Whitlam (1997:98) emphasise the importance of defining organisational goals and communicating the goals to employees at all levels in the organisation. It is therefore also important that the organisation defines its goals with regard to teleworking, and that these goals are clearly relayed to all teleworkers and their managers (Crandall and Wallace, 1998:59). Goals should have definite outcomes aimed at achieving the overall objectives of the organisation, the department and/or the team. One method of ensuring that teleworkers and managers are on top of things with regards to goals and objectives is to implement proper training programmes. Central to these programmes should be the identification of the differences between traditional work environments and the teleworking environment.

Research indicates that training is a key aspect of a successful teleworking programme. Nilles (1998:192), for example, summarises results by saying that training is crucial to the success of telework and that proper task-oriented technology training and training in the aspects of managing telework is needed. Malhotra (1997) agrees when he states that training employees in technology use and concepts of managing 'remotely' is essential for a successful telework programmes. Kugelmass (1995:186) states that the training of managers and supervisors, teleworkers and non-teleworkers are all equally important. Omitting any of these groups results in a lack of information and creates unnecessary conflict and complications. Training establishes common ground between the

organisation, managers and teleworkers and provides a forum where initial and administrative issues can be discussed and completed.

The training of teleworkers and managers can be approached in numerous different ways and should be seen as a tool for anticipating and resolving issues before they become problems. Piskurich (1998:109) suggests that training of the teleworker should include discussions on aspects such as vision and definition of telework, advantages and disadvantages, features of successful teleworkers, policies and procedures, obtaining and using equipment to set up the home office, and personal skills necessary for teleworking. Simmons (1996:120) suggests dividing the training programme into competency-based and technology-based skills. He groups the various competency skills as follows:

- **Task competencies:** The teleworker probably already has the skills to complete the tasks at hand, but it may be necessary to update some of these skills, particularly because he or she now must perform some of the tasks using technology.
- **Personal competencies:** These skills are concerned with the fundamentals of teleworking. One key area is concerned with personal development, such as presentation and communication skills, coping with isolation and self-motivation. The other key area is concerned with the status of the teleworker as an autonomous business unit and includes time management, financial planning and budgeting, internal accounting, and reporting and invoicing.

Simmons (1996:120) continues by identifying the following technology-based skills:

- **Operational competencies:** These competencies go beyond tasks skills and are generally associated with the use of information and communications technologies, such as a personal computer, dedicated fax machines, video-conferencing, sophisticated telephone systems and voice mail systems.
- **Hardware and software user competencies:** Although some of the teleworkers may already have the necessary competencies to use technology, it may be

necessary for them to become more skilled in the use of hardware. This could also be true for the use of software programs, especially with regards to time management software and communications software.

The importance of training in the teleworker environment is clear and it can therefore, together with goal setting, be identified as an important feature. In the next section performance management is discussed as part of the organisational processes influencing the teleworker's environment.

3.4.3.2 Performance management

Performance management is closely linked to goal setting as it is the vehicle for determining the success of goal achievement. Performance management is used to make general human resource decisions, to provide information on aspects such as promotions, and transfers, and to identify training and development needs (Robbins, 1997:219). In Section 2.4.3.2, steps to assist an organisation in creating a fair performance management system have been identified. They are:

- Using multiple criteria for appraisal
- De-emphasising traits and emphasising behaviour
- Documenting performance behaviour
- Training the appraisers
- Providing performance feedback.

There seems to be consensus in the literature that the key to performance management for teleworkers lies in the ability to compare expected work with actual work. A teleworker's performance must be monitored by outputs rather than inputs and, if the output is not easily quantifiable, it should be supplemented by frequent communication (Kurland and Bailey, 1999:64). Fitzer (1997:69) suggests that an accomplished manager will already use an overall management model that is equally applicable to the teleworker. Such a model spells out the required outputs and performance standards and will involve frequent monitoring.

Mersham (1996:82) explains the concept of performance management by providing an example. He says that for many years organisations have gone through the process of identifying and analysing tasks performed by employees and whether these tasks produced outcomes in line with the organisation's goals. Key performance indicators (KPIs) became a popular way of identifying the expected output of an employee in a specific position. The KPI method requires the identification of location dependence for specific positions. This suggests that if an organisation uses the KPI method (or a similar one) for performance management of knowledge workers, it could also use this method for performance management of teleworkers, because the variable, in this case the environment, is already included in the system.

The performance management system used for teleworkers can be the same as that used for traditional office workers, but it may be necessary to adjust certain aspects. Performance management is a feature of the teleworker's environment that is clearly linked to goal setting, training and the rewards system.

3.4.3.3 Reward system

In Section 2.4.3.3, it has been pointed out that rewards normally manifest in one of two areas, namely as intrinsic or extrinsic rewards. Intrinsic rewards, such as more responsibility, participative decision making, greater freedom and opportunities for personal growth, are a result of an individual's satisfaction with a job. Extrinsic rewards are financial compensation, including salaries, bonuses and profit sharing.

Existing reward systems regarding types of employment, pay levels and benefits coverage should be carefully examined to ensure that teleworkers are treated equitably and fairly (Olmstead and Smith, 1997:71). Olmstead and Smith suggest that an organisation should find creative ways of applying the pay-for-performance approach and should be flexible in its approach when rewarding teleworkers.

Fitzer (1997:72) says that although teleworkers may perceive the opportunity to work remotely as a reward in itself, organisations should compensate them in ways such as the following:

- Pay for performance
- Pay for competencies
- Fostering accountability
- Competitive positioning
- Bonus and/or incentive eligibility
- Financial and non-financial recognition programmes.

The interconnectivity of rewards, communication, goal setting and performance is also demonstrated by Crandall and Wallace (1998:181) when they suggest that rewards will play a key role in:

- Communicating change and defining what is expected of employees
- Teaching new business processes and defining telework
- Reinforcing and rewarding changes in individual behaviour and performance.

The reward system, as a feature of the teleworker's environment, is integrated with almost all other features that have been identified so far and has a particular strong link with goal setting, training and performance management. The structure and culture of an organisation help to determine the performance management system, which in turn assists in shaping the reward system.

3.4.4 Home office infrastructure

The infrastructure of a teleworker's home office incorporates the physical space and design, as well as the technology design and utilisation. In Section 2.4.4, technology has been identified as a feature of the knowledge worker's environment in the organisation. It is safe to assume that it can also be identified as a feature of the teleworker's environment. The work environment of the teleworker, however, differs vastly from that

of the traditional office worker and it is therefore necessary to explore workspace design and technology infrastructure as they fit into this environment.

3.4.4.1 Workspace design

When an organisation decides to allow employees to work from home, it has a responsibility to help these teleworkers organise their physical space. Nilles (1998:46) says that teleworkers and their managers should ensure that the home office has the following minimum features:

- Adequate work space
- Access to telephone and electrical outlets
- Security and safety of work materials
- Sound control
- Separation from ongoing domestic activities
- Temperature and light control
- Insurance
- Hazard control.



He continues by specifying that the organisation should pay attention to the following details:

- Business visitors: The teleworker must consider how much contact he or she is going to have with business visitors and should ensure that they are able to reach the home office easily.
- Furniture: The teleworker should have a physical set-up that is safe and comfortable. In all likelihood the teleworker spends a large amount of time on a personal computer and furniture should therefore be selected to provide maximum convenience and minimum fatigue. There should also be enough space to arrange furniture within convenient reach of telephone lines and electrical outlets.

- Noise: The teleworker must be protected from household noise and vice versa. Noise should never be so disturbing that it influences the teleworker's productivity.

Piskurich (1998:51) stresses the importance of a proper policy that deals with setting-up the teleworker's office. This policy should include:

- The minimum size needed for workspace
- Privacy requirements
- Furniture that the teleworker provides and furniture that the organisation provides
- Responsibility for upkeep of company furniture
- Responsibility for utilities and other ongoing costs
- Responsibility for necessary repairs and maintenance
- Insurance requirements.

It is important for the organisation to remember that the home office is really an extension of the traditional office and should be designed and equipped as such. The teleworker's physical workspace influences his or her performance and ability to communicate effectively. The workspace is also linked to other features, such as stress and motivation. The infrastructure or workspace of the teleworker can therefore be identified as a feature of the environment he or she operates in.

3.4.4.2 Technology infrastructure

The last feature relating to organisational processes that can influence the teleworker's environment is technology. Technology is used to gain competitive advantage by finding more effective ways of producing goods and delivering services. Technology and teleworking are so closely linked that it is impossible to separate (Kugelmass, 1995:117). Some authors argue that teleworking came into being because of technology. The types and quantity of technology available to the teleworker is infinite but can, according to Simmons (1996:97), be split into a few key areas:

- Computer hardware
- Computer software

- Communication services
- Network services.

Nilles (1998:217) says that there is no specific list of required technologies for successful teleworking, but the primary rule regarding hardware is that teleworkers need what they would need in their traditional offices, as well as communications capabilities. The communications capacity required by individual teleworkers may differ, but should generally not be more than a standard data or fax modem and communications software with a dial-back facility. In addition to the equipment mentioned above, Jacobs and Van Sell (1996) suggest:

- Remote access to the company's LAN and intranet
- Sophisticated phone systems
- Tele and videoconferencing equipment
- Other equipment, such as fax machines, printers, personal digital assistants, cellular phones and scanners.

Technology and the concept of information resources are central to the teleworker's environment. Chapter 4 and 5 are dedicated to examining the features of the information environment of both the knowledge worker and the teleworker.

3.5 CONCLUSION

The similarities between the forces involved in the knowledge worker's environment and the teleworker's environment make it possible to draw certain parallels between the features. The basic features are the same, with the exception of the home office infrastructure, which has been identified as an additional feature in the teleworker's environment. Certain aspects of these features will differ, because of the significant differences between the knowledge worker and the teleworker's work environments. The shaded features in Figure 3 indicate where differences have been identified.

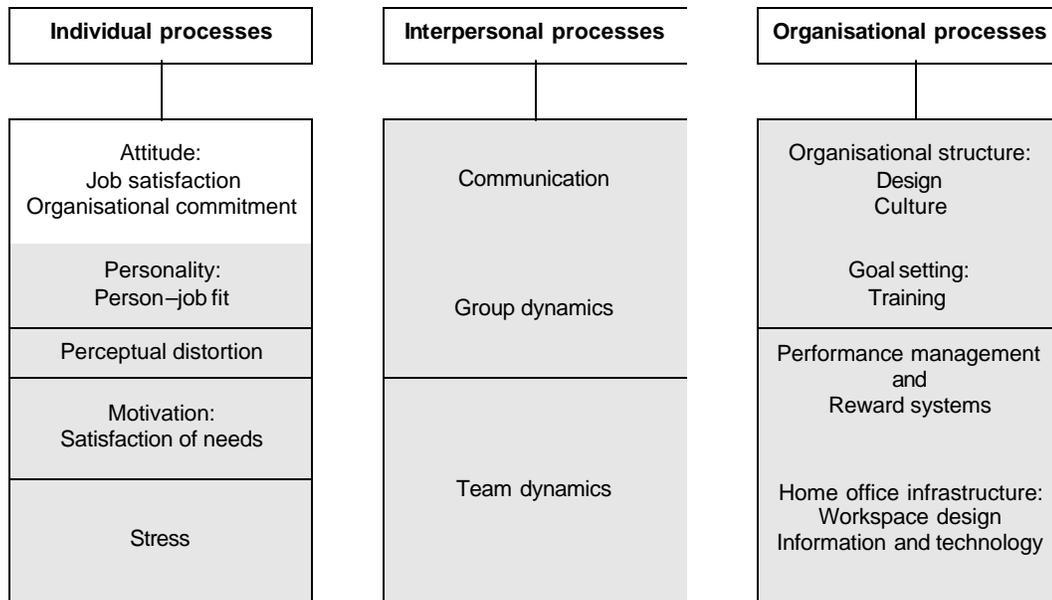


Figure 3 Features of the teleworker's environment

Job satisfaction, organisational commitment and perceptual distortion are all features of the teleworker's environment. Person-job fit is a feature that is influenced strongly by an employee's personality. The teleworker should be self-motivated, self-disciplined, flexible, innovative and have relatively low need for social interaction. The satisfaction of the teleworker's needs plays an important role in his or her environment and is closely related to other features, such as communication, performance management and reward systems. The teleworker's unique working environment can cause distractions, which may lead to stress. Both the organisation and the teleworker should be aware of these potential stressors.

The remoteness of the teleworker's environment can influence his or her ability to become part of informal groups in the organisation. Through the use of communication technology, it is, however, still possible for the teleworker to be part of formal groups and teams. One of the most significant features of the teleworker's environment is communication and special attention must be paid to this aspect to ensure that the teleworker stays informed with regards to work and social issues.

There are certain organisations that are better suited to teleworking. These are typically organisations with a flexible, results-orientated structure. It may be necessary for an

organisation to change its culture to accommodate teleworking programmes. The training of teleworkers and managers is a feature of the teleworker's environment that is influenced by goal setting and reward systems. The home office environment of the teleworker adds a new feature, namely workspace design. The teleworker's performance and ability to communicate effectively will be influenced by workspace design. Technology and information are also vital features of the environment of the teleworker.

In this chapter, the features of the teleworker's general work environment have been discussed by applying the conclusions drawn in Chapter 2. In the next chapter, the focus falls on the information environment of the knowledge worker and the features that play a role in this environment.



4. INFORMATION ENVIRONMENT OF THE KNOWLEDGE WORKER

4.1 INTRODUCTION

The information economy influences the way organisations conduct business and the way knowledge workers perform their duties. Increasingly, organisations are approaching information as a strategic resource that should be managed. Therefore, knowledge workers are expected to be both computer literate and information literate. This implies that they must know where to find information, and how to use, modify, store and allow access to it. Knowledge workers are therefore expected to be information specialists as well as competent in their chosen professions. The ability of any knowledge worker or organisation to accomplish any given task or reach any desired goal is directly related to the ability to find the right information at the right time.

The information in an organisation exists within the realm of the organisational environment, as well as the external environment. Davenport (1997:33) says that the external environment dictates business trends and determines the availability of technologies to support these trends. This environment influences the organisation's business goals and willingness to invest in technologies, which in turn influences the information strategy, behaviour and culture in an organisation. The knowledge worker's interpretation and use of information in the organisational environment is influenced by diverse factors (Lucas, 2000:27). In Figure 4, some of these factors are illustrated and it is indicated which of them have been discussed in Chapter 2 of this study.

In this chapter, the features of the information environment of the knowledge worker are discussed. These features were used in the empirical study to compare the information environment of the teleworker with that of the knowledge worker. In the chapter, there is a brief discussion of the information environment and then general factors that influence this environment. The tasks performed by the knowledge worker are examined and the specification of different information systems involved in the different tasks follows.

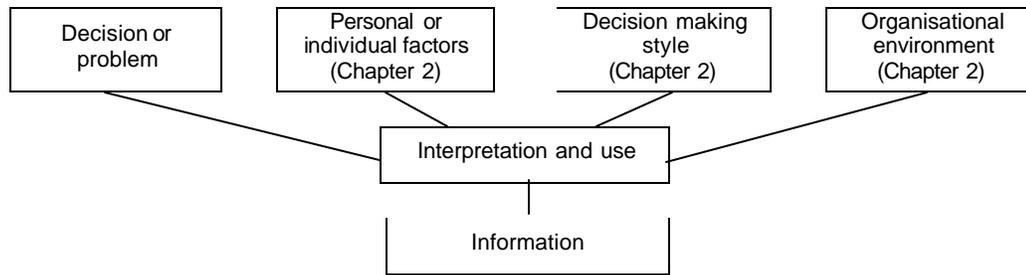


Figure 4 Influences on the interpretation and use of information (Lucas 2000:27).

4.2 INFORMATION ENVIRONMENT

The information environment of the knowledge worker comprises different features and it is influenced by a number of diverse factors. In this section, some of the aspects that have a direct bearing on the way a knowledge worker will manage information are briefly referred to. In Section 4.2.1, a distinction is made between the concepts of data, information and knowledge while, in Section 4.2.2, the differences between information systems and information technology are examined. The concept of information overload is discussed in Section 4.2.3, while security within the context of the information environment is explored in Section 4.2.4.

4.2.1 Data, information and knowledge

To fully understand the information environment, it is necessary to distinguish between data, information and knowledge. Sandoe, Corbitt and Boykin (2001:90) describe data as something that generally refers to facts that can be stored in a computer system and that can be used to create information. Data have no inherent use or action of their own but require some processing such as sorting, selecting and formatting to create information. Sandoe, Corbitt and Boykin define knowledge as information, that is transformed data, with either know-how, know-why, or care-why dimensions. Watson (1996:28) provides a similar definition when he says that data are raw, unsummarised and unanalysed facts. He describes information as data that have been processed into a meaningful form, and knowledge as the capacity to use information. Data are raw facts and information is an organised body of facts ready for a range of uses such as decision making or planning. Knowledge is information experiences that can be communicated

and shared (Lloyd-Walker, 1999:521). It is clear from the definitions that although the terms *data*, *information* and *knowledge* refer to different aspects of the information environment, they are connected through their similarity within the information environment. Information is invariably seen as an umbrella term for all three terms because it provides the means for raw data to be turned into knowledge. For the remainder of this chapter, the term information is used as the umbrella term except where a distinction between the terms is necessary to clarify a concept.

4.2.2 Information systems and information technology

Information systems and information technology are two important aspects of the information environment, and both are closely linked to data, information and knowledge. Information technology is defined as the physical equipment used for processing, storing and transmitting information in electronic form and includes computers and communications devices (Lucas, 2000:11). Watson (1996:546) provides a simpler definition for information technology: 'A collective term for computer and communications hardware and system and application software.' Information technology can therefore be defined as any aspect of technology that aids in the management of information.

Information system is a term that is used in many different ways within many different environments. Information systems are commonly associated with information technology, but they are more than just computers. According to Sandoe, Corbitt and Boykin (2001:5), an information system is a unique configuration of information technology resources and organisational processes whereby information technology resources and the information they provide are applied to support specific organisational processes. Turban, Rainer and Potter (2001:17) define information systems as interrelated components working together to collect, process, store and distribute information.

Information systems therefore encompass information technology, as well as any other process or aspect that relates to information management in an organisation. Information technology is, however, the main tool used in the management of information in organisations today.

4.2.3 Information overload

More new information has been published in the last 30 years than in the last 5000 years (Hazelwood, 2000:2). One of the key aspects of the information environment in organisations today is information overload. Knowledge workers around the world are inundated with information, which has a definite impact on the environment in which they function. Kennedy (2001:1) provides some statistics:

- The Electronic Messaging Association estimates that 108 million e-mail users received more than 7 trillion e-mail messages in 2002.
- According to a software company, BrightPlanet, the World-Wide Web is 500 times larger than what is indexed by popular search engines such as AltaVista, Google and Yahoo.
- In the United States, every worker receives an average of 190 messages per day, including fax, voice mail, e-mail and standard mail, and in the UK the average is 160 messages per day.

The advances in information technology and particularly communications technology have increased the availability of information for the knowledge worker. Enormous amounts of data are being stored in organisations, thus increasing the amount of knowledge, but at the same time contributing to the problem of information overload (Lloyd-Walker, 1999:522). The extent to which information and knowledge can be used to an organisation's advantage depends on the methods available for knowledge workers to store, convert, access and disseminate specific information.

A timely exchange of information, where workers are able to utilise information as it is received, is more efficient than merely inundating them with a constant stream of data (Kust, 1999). Hazelwood (2000:3) has the following suggestions to avoid information overload with regard to digitally available information:

- Set up filters for incoming e-mail messages

- Unsubscribe to electronic newsletters that are not critical to the job at hand
- Bookmark a Web site only if it is really of value for the job
- Have specific guidelines when searching for information.

4.2.4 Information security

Information security is a vital part of the information environment in every organisation today. The importance of good information security is highlighted by Long and Long (2002:343) when they state that four out of every five business information systems have been violated in some way, resulting in the loss of critical information, property or data integrity. Information security can be defined as measures designed to protect a system from deliberate or accidental damage or access by unauthorised persons (Capron and Johnson, 2002:590). It includes the policies, procedures and all technical measures used to prevent theft or alteration of any part of the information system.

Information security threats come in many different forms – from the physical theft of equipment to the dishonest and/or negligent behaviour of employees that can damage data and information. Some of the common security threats with regard to hardware are theft and power failures. Software security threats include viruses and the unlawful modification of the software. A major security threat with regard to information is hacking, where people attempt to gain access to information systems illegally.

The increased access to networks, brought about by communications technology, has impacted dramatically on security in the organisation. Statistics from the USA indicates that the most frequently reported security issues fall into the following categories (Capron and Johnson, 2002:325):

- **Credit card fraud:** Customers' credit card numbers are captured and used fraudulently.
- **Data communications fraud:** This involves threats such as the use of an office network for personal purposes, computer-directed diversion of funds and using another organisation's network illegally.

- **Unauthorised access to computer files:** This covers aspects such as accessing confidential employee records and theft of trade secrets and product pricing structures. A large amount of unauthorised access incidents are related to corporate espionage.

Internet technology has given rise to new security concerns, especially with regard to an organisation's intranet and/or extranet. The intranet is a private, in-house network that uses Internet software and TCP/IP protocols. It can be accessed by employees of the organisation. An extranet is an extended intranet, allowing access to employees, as well as to an organisation's customers and suppliers. According to Turban, Rainer and Potter (2001:235), organisations can restrict access to their intranet in a number of different ways. Public key security, consisting of encryption and digital certificates, is used to authenticate any user who wants to access the intranet.

Organisations can also protect their networks through the use of firewalls. A firewall is a device located between an organisation's internal and external networks to regulate network access. It examines the header information of a packet and allows or denies access accordingly. For more sophisticated security, an organisation can implement assured pipelines. The assured pipeline examines the entire packet to determine whether access should be allowed or denied. Whether an organisation chooses to use public key encryption, firewalls or an assured pipeline, someone is responsible for writing and maintaining the internal rules that identify the people, applications and addresses that are allowed or rejected.

These aspects play an important role in the information environment of an organisation. In the next section, the general tasks of the knowledge worker in an organisation are discussed. The tasks of the knowledge worker have a direct impact on the information and knowledge that he or she requires and therefore also impact directly on the information environment of the knowledge worker.

4.3 FUNCTIONS OF THE KNOWLEDGE WORKER

In Section 2.4, the differences in organisations have been discussed by referring to the different structures and designs, cultures, reward systems and technology usage. There

are, however, some features of an organisation that are common to all organisations. Laudon and Laudon (2001:74) list the following similar features:

- All organisations have a clear division of labour and specialisation. Workers are employed because they possess particular talents or skills.
- Employees are arranged in a hierarchy of authority where everyone is accountable to someone, and authority is limited to specific actions.
- Authority and actions are guided by explicit rules and procedures which are interpreted and applied to specific cases.
- Organisations strive to hire and promote employees on the basis of their technical skill and ability, and not on personal connections.
- All organisations are devoted to the principle of maximum efficiency.

Furthermore, all organisations stabilise over time to produce a particular number of products and services. Organisations that survive become efficient in the production of these products and services by following standard routines. Employees develop standard rules, procedures and practices that enable them to cope with virtually all expected situations. These rules, procedures and practices are sometimes called standard operating procedures and can be formal and in writing or informal and developed over time (Laudon and Laudon, 2001:74). The standard operating procedures are closely linked to the business processes in an organisation.

Business processes are defined as a specific order of work activities across time and place, with a beginning, an end, and clearly identified inputs and outputs (Sandoe, Corbitt and Boykin, 2001:55). These processes are a sequence of activities that have a purpose and require some measure of interaction. Business processes are generally cross-functional and require information to be shared, sometimes across functional boundaries and hierarchical levels in an organisation. Business processes allow

employees to manage and coordinate work, and connects the organisation to the external environment, such as suppliers and customers.

Any employee who is part of the business processes of an organisation is required to carry out certain tasks. Although knowledge workers span a very broad range, their major activities can be grouped into five main functions, namely managing documents, scheduling and/or coordinating, communicating, managing data and decision making (Laudon and Laudon, 2001:437). All knowledge workers, operating in teams or alone, are involved in carrying out these functions. Each function is now discussed in more detail.

4.3.1 Managing documents

Documents, of which reports, manuals, brochures and memos are examples, are a common medium for storing and packaging organisational data and information. Documents have structure and context, and they include and exclude enough information to be usable (Davenport, 1997:146). Managing documents in an office environment include document creation, storage, retrieval and dissemination or sharing. Documents in an organisation are created electronically through the use of information technology, which includes software such as word processing, desktop publishing, Web publishing and work-flow managers.

There is a growing trend in creating and storing documents electronically instead of printing and storing them in paper format. The problem is, however, that a large amount of an organisation's current information is still stored in paper format, and to locate and update information in that format lead to organisational inefficiency. It has been estimated that up to 85% of corporate information is stored on paper (Hemphill, 2001). Document imaging systems are systems that convert paper documents and images into digital format so that they can be stored and accessed via computer (Laudon and Laudon, 2001:438). These systems store, retrieve and manipulate a digitised image of the document, permitting the document itself to be discarded. In Section 4.4.3.1, these and other document managing systems are discussed in more detail.

4.3.2 Scheduling and/or coordinating

As has been mentioned in Section 2.3.2 and 2.3.3, the majority of organisations today organise their workforce in groups or teams. Members of these teams rely on each other to execute tasks efficiently. In Section 2.3.3.2, proper coordination has been identified as a key success factor for teams operating in organisations. Scheduling and coordinating tasks and meetings between team members are therefore important aspects of a knowledge worker's day-to-day functions. The efficient collaboration of teams and groups depends on the correct information being disseminated.

Group collaboration systems that support the functioning of groups play a key role in organisations today (Lucas, 2000:570). These systems, called groupware, have powerful capabilities that allow employees to schedule, communicate and share resources, using information and communication technology. One aspect of group collaboration systems that pertain to scheduling is networked digital calendars. These calendars enable team members to view each other's daily schedules, as well as project schedules. Groupware is discussed more extensively in Section 4.4.3.2.

4.3.3 Communicating

In Section 2.3.1, the importance of communication between employees in organisations has been established. No organisation can function without proper communication between employees. Communication is necessary, firstly, to achieve coordinated actions, and secondly, to allow for the sharing of information. There is a close link between communication and coordination – the one is not possible without the other. The communication functions of knowledge workers include initiating, receiving and managing voice, digital and document-based communication, either individually or in groups.

In addition to the groupware mentioned above, there is a massive amount of communications technology available today, including voice mail, fax machines, e-mail, digital answering services, intranets, videoconferencing and more. These systems are called communications systems and are defined as the communication of

information by electronic means, usually over some distance (Beekman, 2001:492). Communications technology, together with groupware, is dealt with in Section 4.4.3.2.

4.3.4 Managing information

In the information economy, information is the lifeblood of every organisation and it must be properly managed to retain its value for the organisation. At some point almost every knowledge worker is involved in the process of managing information, because information is constantly generated in every action and aspect of the organisation. Some of this information is formal and structured, such as invoices, personnel records and bank records, while a certain amount of it is unstructured or informal, such as customer feedback (Watson, 1996:505). It is only recently that organisations began to focus on capturing unstructured information, leading to the development of new technologies, such as customer relationship management software.

In many of the large organisations, there is a formal data administration function, that is responsible for managing corporate information. The fundamental principle of data administration is that all information is the property of the organisation as a whole and cannot belong to any one business unit or function in the organisation (Laudon and Laudon, 2001:250). Organisational information should be available to any employee who may need it to perform a task. This has led to the development of systems that control all the information in an organisation. Most of the organisational information is contained in database systems. Typical data management technology includes database management systems and spreadsheets. In Section 4.4.3.3, these data management systems are addressed.

4.3.5 Decision making

Another important function that knowledge workers are involved in is that of decision making. Decision making happens when an employee becomes aware of a problem. Differences in decision making types can, for the most part, be classified along organisational levels.

Lucas (2000:35) suggests the following types of decisions:

- **Strategic decision making :** This type of decision making determines the objectives, resources and policies of the organisation. One of the major problems at this level is predicting the future of both the organisation and its environment, and then matching the organisation's expectations to that of the environment. This type of decision making normally involves a small group of high-level managers who deal with these complex, non-routine problems.
- **Managerial control decision making:** Decision making at this level is principally concerned with how effectively and efficiently resources in the organisation are being utilised. It is also concerned with how well operational and functional business units are performing. Managerial control decisions take place within the context of policies and objectives that are set out at the strategic decision making level.
- **Knowledge -level decision making:** Decisions of this type deal with evaluating new ideas for products and services, and ways to communicate new knowledge. It is also concerned with ways to distribute information throughout the organisation.
- **Operational control decisions :** An operational control decision covers the day-to-day problems that affect the organisation. It determines how to carry out specific tasks as set out by strategic and middle management decision makers. Decisions at this level determine which units in an organisation complete which tasks. They also establish criteria for task completion, resource utilisation and output evaluation.

Within each of these levels of decision making, Turban, Rainer and Potter (2001:324) classify decisions as structured or unstructured. Structured decisions are repetitive and routine, and involve definite procedures so that they do not have to be treated as new each time. Unstructured decisions, by contrast, are those in which the decision maker must provide judgment, evaluation and insight into the problem. These types of decision are novel, important and non-routine. In general, operational decisions are fairly

structured, whereas strategic decisions are more unstructured. However, it is possible to encounter both structured and unstructured decisions at any level of decision making.

Systems for decision support are used at different levels in the organisation. In Section 4.4.4, decision support systems are examined, but to be able to fully understand the workings of decision support systems, it is necessary to describe the stages in the decision making process. Lucas (2000:35) sets out the decision making stages as follows:

- **Intelligence :** This stage determines that a problem exists. It indicates why, where and with what effect a problem occurs. An employee must become aware of a problem and gather information about it.
- **Design:** During the design stage an employee designs possible solutions for the problem. He or she asks what approaches are available to solve the problem and evaluates each one.
- **Choice :** At this stage the employee selects one of the alternatives identified as a possible solution.
- **Implementation:** This stage is to ensure that the solution is carried out and that the problem is thereby solved.



In general, the stages in the decision making process do not necessarily follow a linear path, and it may at any stage be necessary to revert back to a previous stage. In this section, the five major functions of a knowledge worker have been described. In the next section, these functions are used as guidelines to determine what information systems are available to assist employees in the completion of tasks.

4.4 BUSINESS INFORMATION SYSTEMS

4.4.1 Introduction

The different interests, specialities and levels in an organisation necessitate different information systems. No single system can provide all the information that employees in the organisation need. Information systems are constructed to serve the different functional and operational needs in an organisation. A major challenge for organisations today is to ensure that information systems deliver effective services and provide access to resources in a distributed computing environment.

Connectivity, availability and performance are key aspects of an organisation's information systems (Sandoe, Corbitt and Boykin, 2001:71). Connectivity refers to the ability of a system to connect to networks and exchange information with other devices on those networks. Connectivity is a major challenge today, because of the diversity of networks and computing platforms available in most organisations. Availability means that employees should be able to access services and resources at any required time. The performance of the information system is to a large extent dependent on the expectations of the employees. Knowledge workers require organisational information to be available within seconds. This, coupled with the volume of users, can have a significant effect on the information system.

As has been mentioned in Section 4.2.2, information systems are a vital part of any information environment. A discussion regarding the different systems available should therefore be included when identifying the features of the information environment of the knowledge worker. In this section, some of the many information systems that are available to support employees in the management of information are discussed. The systems are divided into broad categories, namely transaction processing systems, office automation systems and decision support systems. Emphasis is placed on office automation systems, as these are the type of information systems that knowledge workers use most to complete the functions of managing documents, scheduling, communicating and managing information.

4.4.2 Transaction processing systems

Organisations must process the routine day-to-day tasks of business. Transaction processing is a real-time action taking place at random, that is, in any order that they occur (Turban, Rainer and Potter, 2001:42). Typical transactions include invoicing a customer, the receipt of an order from a client, a change of address or capturing of new client information. Transaction processing systems (TPSs) are the basic business systems that serve this operational level of an organisation.

Transaction processing systems can typically be divided into five functional categories that broadly relates to the functional areas of an organisation. These categories are: sales and/or marketing, manufacturing and/or production, finance and/or accounting, human resources and other types of systems that are specific to an industry, for example the admissions and/or registration system of a university (Laudon and Laudon, 2001:41). Within each of these categories there are sub-categories, such as sales management and payroll, and for each of these sub-categories there is a transaction processing system. TPSs are used mostly by operational workers to perform routine tasks, such as sorting, listing, merging and updating (Lucas, 2000:52). TPSs are central to an organisation's functioning and they often provide information that is used by other types of systems, such as office automation systems, which are discussed in the next section.

4.4.3 Office automation systems

Office automation systems are designed to improve the productivity of knowledge workers by supporting the coordinating and communicating activities of a typical office. Office automation systems typically handle and manage documents, scheduling, communicating and data (Watson, 1996:52). In this section, some of the tools and systems available for managing each of these functions are discussed.

4.4.3.1 Managing documents

As documents contain information, producing and managing them are two of the most important activities in the office today. The most widely used system to manage documents is word processing. Word processing, referring to hardware and software, is

the single most common application of information technology found in today's offices (Long and Long, 2002:52). According to Capron and Johnson (2002:356), word processing allows employees to manage documents in the following ways:

- Creating them by keying in information
- Editing them by changing their content and correcting mistakes
- Formatting them by changing their appearance
- Storing and retrieving them on disk
- Printing them to be stored on paper.

Most word processing software has advanced features, such as spelling, grammar, style and thesaurus checkers that enable the users to automate writing tasks and merge functions that link letters or other documents with names and addresses in a mailing list. The more recent word processing software, such as Microsoft Word 2000 and WordPerfect 8, enables users to create and access Web pages (Georgia, 1999). An employee creates a document in the word processing programs, and then saves it as a Web page that can be accessed by others. Password protection allows the originator to protect the document in such a way that other employees can add comments, but not change the original content.



Another tool frequently used for the management of documents is desktop publishing. Desktop publishing uses the basic features of word processing and combines it with design elements, such as graphics and special layout features, to create a publishing quality document (Long and Long, 2002:53). Employees can save the organisation time and money by producing documents in-house instead of sending them to professional publishers.

Document imaging systems allow organisations to convert new documents and images into digital formats, making them accessible through the use of a computer. Document imaging systems generally include scanners for converting paper pages to digital documents, high-capacity disk drives for storing the document images and fax machines for sending images to remote locations (Beekman, 2001:401). Document imaging

systems can also be used to convert archived paper documents to the more durable digital formats.

4.4.3.2 Communication and scheduling

a) Networks

A network is a computer system that uses communications equipment to connect two or more computers and their resources (Capron and Johnson, 2002:196). Computer networks come in all shapes and sizes but can broadly be categorised as either local area networks (LANs) or wide area networks (WANs). A LAN is a type of network in which the computers are physically close to each other. Each device connected to the network is called a node.

A WAN is the type of network that extends over a long distance and each network site is a node. Connections to a WAN can be through a switched line, where an employee accesses telephone lines to transmit or receive information, or through a dedicated line that is continuously available for information transmission (Beekman, 2001:243). Value added networks (VANs) are private networks managed by a third party and used by multiple organisations. A VAN is set up by an organisation that is in charge of managing it and other organisations can subscribe to use it (Turban, Rainer and Potter, 2001:188).

The network of networks, the Internet, is based on client–server technology, which enables the user to control all functions. All the information on the Internet, including e-mail messages, Web sites and databases, is stored on servers. An Internet service provider (ISP) is a commercial organisation, with a permanent connection to the Internet, that sells temporary connections to other organisations. This enables organisations to make use of services, such as e-mail, newsgroups, the World-Wide Web and LISTSERVs to retrieve information (Turban, Rainer and Potter 2001:218).

With the creation of the Internet came the TCP/IP protocol, now used on all public networks. TCP/IP is a standard that allows cross-communication for almost any type of computer and network system (Beekman, 2001:492). Organisations have extended this

standard both internally and inter-organisationally, resulting in the creation of intranets and extranets. An intranet allows employees within an organisation to access information through the same browser software used for the Internet. As has been described in Section 4.2.4, an intranet is a private network contained within a specific organisation.

Intranets contain valuable information for knowledge workers, such as internal job openings, corporate policy information, training courses, marketing information and so on. Some organisations provide selected customers and suppliers access to their intranets, thus creating an extranet. An extranet allows organisations to manage their relationship with customers and suppliers more easily and less costly. Like the intranet, the extranet can be a valuable tool for providing information to employees in an organisation. Networks permit employees to communicate over a physical distance, thus utilising various powerful communications technologies and devices. These are now discussed.

b) Communications



In the past, communications meant voice transmission over a telephone line, but today most transmissions are digital, using computers to transmit data from one place to another. The communications revolution has led to the development of thousands of communications products and services, such as local and long-distance telephone services, cellular phones, wireless communication services, data networks, satellite communication and Internet services (Turban, Rainer and Potter, 2001:197).

Communications technology is compatible hardware and software that are positioned to communicate information from one location to another. Capron and Johnson (2002:205) describe typical components of a communications system as follows:

- Computers to process technology
- Input–output devices that send or receive information
- Communication channels, such as telephone lines, fibre optic cables or wireless transmission

- Communication processors, such as modems and front-end processors
- Communication software that controls input and output activities.

To send and receive information from one place to another, communications systems must perform a number of separate functions. These functions are described in Laudon and Laudon (2001:262) as:

- Transmitting information
- Establishing an interface between the sender and receiver
- Routing messages along the most efficient paths
- Performing elementary processing to ensure that the right messages reach the right receiver
- Editing the information
- Converting messages from one speed into the speed of the communication line or from one format to another
- Controlling the flow of information.

The oldest communication channel is the twisted wire, which is still useful in local and wide area networks. Coaxial cables are a faster and more interference-free communication channel, and fibre optic cables are a communication medium that is well suited to the transmission of large volumes of information. An important alternative to these communication channels is wireless transmission. Wireless transmission sends signals through air or space without any physical connection. A large number of communications devices are to organisations today. Some of these devices are briefly discussed below.

- **Faxes:** Facsimile technology uses computer technology and communication links to send graphics, charts, text and signed documents anywhere in the world. The document is placed in the fax machine where a built-in modem converts it to analog signals. The document is sent through the telephone line and received at the other end where it is reassembled in the same manner to create a nearly identical version of the original document.

- **Modems:** Using the same basic technology as a fax machine, a modem translates digital signals into analog signals and vice versa. Connected to a telephone line and a computer, it facilitates information travel between users by converting the digital signals of the computer into the analog signals of a telephone line. The modem at the receiving end then converts the signals back from analog into digital. Fax modems enable employees to generate and send faxes directly from personal computers, while at the same time allowing all other functions normally performed by a modem (Capron and Johnson, 2002:212).
- **Voice mail:** A voice mail system digitises the spoken message of a sender, transmits it over a network and stores it for later retrieval. When the receiver is ready to listen, the message is converted back into audio form. Voice mail systems typically allow users to save, delete or route messages to other users (Laudon and Laudon, 2001:278).
- **E-mail:** With electronic mail systems users to send messages from one computer to another. There are different user interfaces, but the basic concepts are the same for all e-mail systems. Each user has a mailbox, a storage area for messages, and any user can send messages to another user regardless of whether that user is logged in. E-mail systems enable users to send, receive, edit, display, save or delete messages. E-mail user groups enable one user to send the same message to different people at the same time.
- **Teleconferencing:** Teleconferencing is a technology whereby employees communicate information and ideas, despite geographical barriers. Two or more employees are each connected to a computer terminal and read messages typed by other participants as they appear on the screen. Each participant then comment or respond to the messages that have been typed (Beekman, 2001:247).
- **Videoconferencing:** A newer form of teleconferencing is the videoconferencing system that has components such as video cameras and a large screen added to the online computer system to send live pictures (Capron and Johnson, 2002:212). Videoconferencing equipment is expensive to own, but the costs are trivial

compared to that of travelling expenses for employees in different geographical locations.

- **Pager systems:** These systems have been in use for a number of decades. Originally, they beeped when the user received a message, requiring him or her to use a telephone to retrieve the message. Today pagers can send short messages that the user can read on the screen.
- **Cellular phones:** Cellular phones are part of our everyday life today. They use radio waves and radio antennas placed in certain adjoining geographical areas. The cellular telephone infrastructure was originally developed for voice communication, but is increasingly used to transmit two-way digital communications such as SMSs.
- **Mobile data networks:** These networks are designed for two-way transmission of data files. Mobile data networks are radio based and use handheld computers to transmit information. These networks are often used by organisations that have to deploy workers in different geographical locations at different times. The network enables workers to transmit information to the central office for processing.
- **Personal communication services (PCSs):** Personal communication services (PCSs) are cellular technology that uses low power, high frequency radio waves for voice and data transmission. PCS telephones operate at higher, less-crowded frequencies than cellular telephones, thus transmitting multimedia communication messages. The higher frequency also facilitates the use of PCS telephones in places such as tunnels, where normal cellular phones are not operational.
- **Personal digital assistants (PDAs):** Personal digital assistants are small handheld, pen-operated computers that are capable of all digital transmission communications. They have built-in wireless communications capabilities, as well as work organisation software. PDAs can compose and display e-mail messages, provide Internet access, keep an address book and have an electronic scheduler.

- **Smart phones:** This communications technology combines the capabilities of a cellular telephone, pager and personal digital organiser into a single small device. It is a wireless phone with text and Internet capabilities and can handle wireless telephone calls, voice mail, e-mail and faxes.
- **Groupware :** Capron and Johnson (2002:212) define groupware as any kind of software that enables a group of people to share ideas or track information together, creating a collaborative work environment. Groupware is built on three principles: communication, collaboration and coordination. It uses communications technology to enable employees in different locations to work together on the same documents, schedule meetings, route electronic forms, access shared folders, develop shared databases and send e-mail (Turban, Rainer and Potter 2001:111).

Although groupware is based on communications technology, it is more than just a communication system. It allows an employee to perform all of the five major functions that have been described in Section 4.3, namely managing documents, scheduling, communicating, managing data and decision making. In Table 2 the capabilities of commercially developed groupware products are summarised

Capability	Description
Publishing	Posting documents as well as simultaneously work on the document and allowing to track changes
Replication	Maintaining and updating identical data on multiple PC's
Discussion tracking	Organising discussion by different users on varied topics
Work-flow management	Moving and tracking documents created by groups
Security	Preventing unauthorised data access
Portability	Data availability for mobile use, allowing access to corporate data
Document management	Storing information from various types of software in a database

Table 2 Capabilities of groupware systems (Laudon and Laudon, 2001:443).

All these different systems are used to make the act of communicating information between employees simpler and less expensive. They offer an electronic alternative to the traditional, formal forms of communication as have been described in Section 2.3.1.

4.4.3.3 Managing information

a) Spreadsheets

Electronic spreadsheets enable the user to manipulate numeric and quantitative information and perform tasks, such as repetitive calculations, budgeting, investment management, business projections and scientific simulations (Beekman, 2001:152). If one value is changed, a spreadsheet system automatically updates related values. Most spreadsheet packages include graphic functions that can present information in the form of charts or graphs to facilitate comparisons and forecasts.

The latest spreadsheet packages are capable of reading and writing Web pages (Long and Long, 2002:101). Spreadsheet programs are useful for the manipulation of quantitative data, but database management software is more suitable for managing lists of related data and for combining information from different fields.

b) Database management systems

One of the key technologies that enable employees in an organisation to manage information is a database management system (DBMS). A database management system consists of hardware and software that are used to define, create, retrieve, manage and protect information within the database (Watson, 1996:506). The DBMS acts as an interface between the application programs and the physical information files. This means that when an application program calls for an information item, the DBMS retrieves it from the database and presents it to the application programs (Turban, Rainer and Potter, 2001:145).

According to Capron and Johnson (2002:416), employees are mostly involved in using the databases for data maintenance and data retrieval. Data maintenance involves adding, modifying and deleting data. Data retrieval involves extracting the desired data from the database, mostly using queries and reports. A query presents a set of criteria that the DBMS uses to select data from the database. A report provides for a specific formatted presentation of data from the database (Beekman, 2001:215).

Most large database management systems allow concurrent access by many users and use a record locking system to ensure that only one user can update a record at any given time. Data in a DBMS are stored in a central place, which implies that the security risk is much greater than when data are stored among different applications and locations. To eliminate some of the risk the DBMS normally requires users to enter user identification information and a password. The DBMS can also assign specific privileges, such as read-only privileges or updating privileges (Capron and Johnson, 2002:418).

4.4.4 Decision support systems

In Section 4.3.5 the level and process of decision making in an organisation have been described and reference has been made to structured and unstructured decisions. Through simulation, decision support systems (DSSs) assist with the process of making semi-structured and unstructured decisions. Lucas (2000:560) defines DSSs as computer-based systems that use information, models and simulation to help the decision maker solve unstructured problems. Turban, Rainer and Potter (2001:45) agree when they say that DSSs are computer systems that support managers in non-routine decision making tasks. At the most basic level, a spreadsheet can also be classified as a DSS, because it enables the user to build models and look at the impact of changing certain variables, thereby equipping him or her with information to make decisions.

Laudon and Laudon (2001:469) distinguish between two types of DSS, namely, model driven and data driven. Model-driven DSS are the oldest type and are primarily stand-alone systems isolated from all other major organisational information systems. These systems use a model to perform 'what-if' and other kinds of analyses. Data-driven DSSs analyse large quantities of data found in other organisational information systems. They support decision making by enabling employees to extract information that was previously unobtainable because of information overload DSSs are interactive; employees enter certain variables and rely on the system to produce certain outputs. Changing the input variables will results in a different set of outputs.

4.4.4.1 Executive support systems

The most senior of managers in an organisation are faced with unique decision making demands. Executive support systems (ESSs) are designed to supply managers with the information they require to make these decisions. ESS provides information with regard to the internal environment of an organisation, including organisational structure, employee and labour relations, strategic control and crisis management. At the same time, an ESS is required to provide information that pertains to the external environment, including competitor activities and government legislation.

ESSs use the same basic principle of modelling as other DSSs, but are primarily focused to provide information on the broad organisational performance. ESSs are most valuable because of their flexibility. They are not primarily decision making systems, but tools that act as an extension of a manager's own thinking processes, enabling him or her to make decisions. In recent years, ESSs have been enhanced with features such as multidimensional analysis, user-friendly graphical interfaces, imaging capabilities, hypertext and Internet access (Turban, Rainer and Potter, 2001:332). These features facilitate the use of ESSs across an organisation, even if its offices are located in different countries.



In Section 4.4, an overview of some of the information systems that are being used in organisations today has been provided. These systems are designed to aid the knowledge workers in completing their day-to-day tasks, and they form an integral part of the information environment of the office.

4.5 CONCLUSION

Information is a strategic resource in organisations today and all employees are expected to be computer and information literate. Both the organisational environment and the external environment influence employees' ability to manage information. Data, information and knowledge have different meanings, but are closely connected in the information environment. In this chapter, 'information' has been used as an umbrella term for all three, and has also been the connection between data and knowledge. Information system is a broad term that includes information technology and any other

process or aspects related to the management of information in organisations. Information overload is a major problem in organisations and has a definite influence on the information environment of the knowledge worker.

All employees are involved in the business processes of an organisation and are therefore required to manage information. The functions of knowledge workers are broadly divided into five main categories: managing documents, scheduling, coordinating, communicating, managing information and decision making. Every employee, no matter at what level he or she operates, is involved in these five functions.

Different information systems are used for different tasks in an organisation. Transaction processing systems are information systems that process the day-to-day routine tasks in an organisation. Office automation systems are used to improve the productivity of knowledge workers and can be classified according to the four of the five functions of the knowledge worker. Word processing, desktop publishing and document imaging systems are used to manage documents.

Employees schedule, coordinate and communicate information using various communications systems and devices, such as videoconferencing, personal digital assistants, cellular phones, smart phones and groupware. Information is managed with various spreadsheet packages and database management systems. Decision making processes in organisations are being assisted by decision support systems that enable an employee to model or simulate a situation and view the outcome. This chapter has identified the features and aspects that influence the information environment of the knowledge worker, as illustrated by Figure 5. The next chapter compares the features of the information environment of the teleworker with those of the knowledge worker.

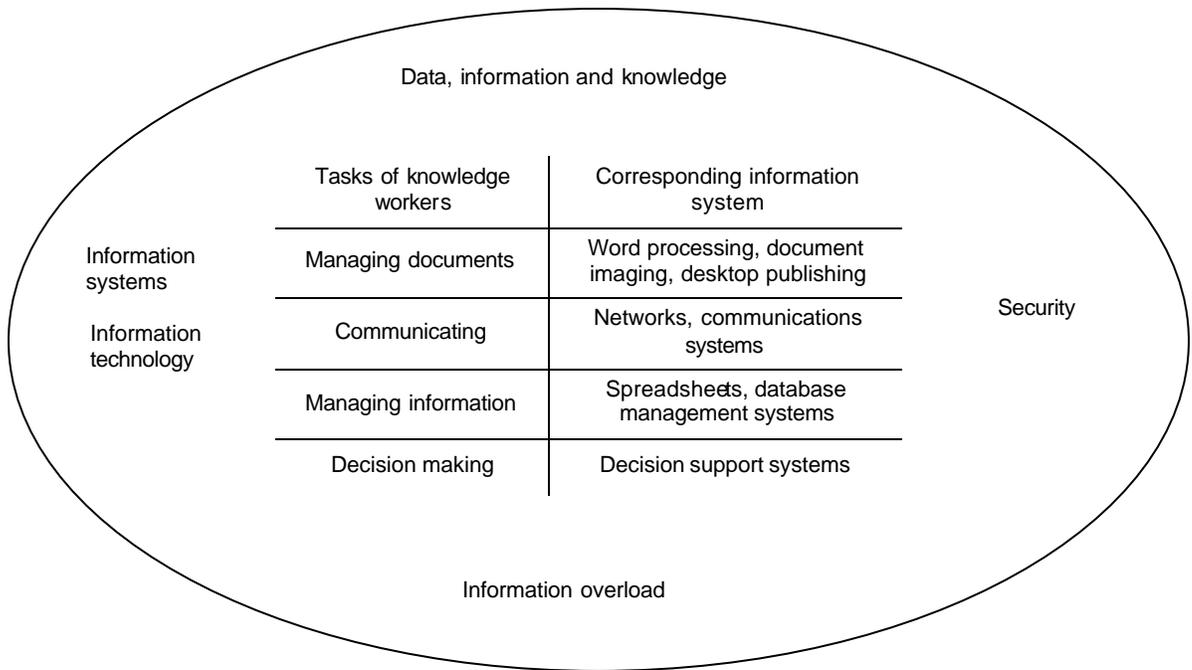


Figure 5 Factors that influence the information environment of the knowledge worker



5. FEATURES OF THE INFORMATION ENVIRONMENT OF THE TELEWORKER

5.1 INTRODUCTION

It has been stated in the previous chapter that the ability of an organisation to accomplish any given tasks or reach any desired goal is directly related to employees' ability to find the right information at the right time. The teleworker, as an employee of the organisation, is therefore expected to gain access to and manage information just like the knowledge worker. Although teleworkers may be performing their duties in a location physically removed from the office, they still function within the organisational environment. It is therefore assumed that their use of information is influenced by factors similar to that of the knowledge worker. In Section 4.1, the factors that influence the knowledge worker's use of information have been identified as personal or individual factors, decision making style, the organisational environment and the nature of a decision or problem.

In Chapters 2 and 3, certain features of the general environment of the knowledge worker and teleworker have been discussed. In Chapter 4, the features that constitute the information environment of the knowledge worker have been identified. In this chapter, the information of previous chapters is summarised and used to classify the features of the information environment of the teleworker. During the research, a comparison was made between the information environment of the knowledge worker and that of the teleworker. These conclusions were consequently correlated with empirical data that were collected by means of structured interviews. The interview findings were used to construct the features of the information environment of the teleworker as in Section 5.3.4.

5.2 INFORMATION ENVIRONMENT

Using the framework from Chapter 4, a literature study was undertaken to identify the features of the information environment of the teleworker. An extensive evaluation of the literature, however, revealed insufficient information, because only some of the features mentioned in Chapter 4 were discussed. Features that were discussed included

information systems, communications and security. No references were found with regard to managing documents, decision making, utilising information or information overload. Therefore in Section 5.2.1, information systems are examined. In Section 5.2.2, factors relating to communications technology are reviewed and in Section 5.2.3, discussed security is discussed as a feature of the information environment of the teleworker.

5.2.1 Information systems

In Section 4.2.2, information systems have been identified as a vital part of the information environment of the knowledge worker. In the same section, it has also been established that the information needs of an organisation are as varied as the positions. Information systems are designed to meet the operational and functional needs of an organisation and no single system can provide all the information that an employee requires. In Chapter 4, it has been found that access to appropriate systems is crucial for the knowledge worker to perform his or her job successfully. It is apparent from the literature that there is no hard and fast rules with regard to the types of information systems a teleworker should use. Some teleworkers may need only a single telephone connection, while others may need high-speed connections with state of the art computers (Nilles, 1997:12). In the rest of this section, the hardware, software and communication needs of the teleworker, as reflected in the literature are considered.

5.2.1.1 Hardware and software

According to Simmons (1996:100) the same hardware that is used in the office is required by the teleworker at his or her home office. This includes a desktop or portable computer with the standard specifications and peripherals, such as a keyboard, monitor, network card, modem and printer. Hoffmann (2002) says that most teleworkers typically choose portable computers, such as laptops and notebooks, because of their convenience. The teleworker is able to store his or her information on the portable computer, take it to the office and have instant access to the stored information. The portable computers currently on sale include all the necessary peripherals, such as printers, fax or data modems and network cards. The specifications of the computer,

printer, scanner and other peripherals depend on the teleworker's requirements, and differ from person to person.

When selecting software, the same rule of thumb applies as with hardware: the software used at home by the teleworker should be the same as the software used in the office (Simmons, 1996:102). Software is broadly categorised as operating systems, applications and groupware. Groupware, as has been explained in Section 4.4.3.2, is based on three principles, namely communication, collaboration and coordination. Its goal is to effectively interconnect work groups, regardless of their physical location. In Table 2, the capabilities of groupware system have been summarised as publishing, replication, discussion tracking, workflow management, security, portability and document management.

5.2.1.2 Networks and communications

Nilles (1998:74) describes networks as the 'arteries' of teleworking. Networks are enabled by communications equipment and are therefore a vital part of the information environment of the teleworker. Different types of networks exist, namely wide area networks (WANs); local area networks (LANs) and virtual area networks (VANs). Communications, discussed extensively in Section 4.4.3.2, consist of compatible hardware and software arranged to communicate information from one location to another. Of the vast array of communications media available, the following are specifically mentioned in relation to teleworking (Hoffmann, 2002):

- Electronic mail (e-mail)
- Videoconferencing
- Teleconferencing
- Cellular telephones
- Voice mail.

These communication media have been discussed in Section 4.4.3.2.

5.2.2 Information security

From the reviewed literature it is apparent that information security is one of the major issues facing organisations with regard to teleworking (York, 1999:4). It is relatively easy to safeguard organisational and private information when it is kept in the organisation's servers with no access from outsiders. However, protecting organisational information in today's networked environment is not always easy. Nilles (1998:83) warns against restricting teleworkers' access to non-sensitive information, as this restriction may impact negatively on their ability to do their work. For teleworking, Wolk (2000) recommends at least three levels of personal security, namely anti-virus software, a personal firewall system for the teleworker and encryption of valuable data. Firewalls, as has been defined in section 4.2.4, are located between the external and internal network of an organisation and are designed to protect corporate information.

Organisations can also consider the implementation and enforcement of security policies for teleworking. A security policy provides clear guidelines with regard to the legitimate use of equipment and its physical protection (Chen, 2000:69). Chen continues by specifying the following guidelines for the development of a teleworking security policy:

- It must be reviewed to reflect technology changes
- It must provide guidelines for technologies that control access
- It must address physical protection of equipment
- It must clarify the functions, applications and data needed by teleworkers to determine the levels of security needed
- It must describe how teleworkers should obtain access to proprietary information from home
- It should outline the organisation and teleworker's responsibility in case of theft
- It must include a formal disaster recovery plan for the teleworker's home office.

Wolk (2000) concludes by saying that there is no absolute safeguard against security breaches and that there should always be a balance between legitimate needs on the one hand and security measures on the other.

5.3 EMPIRICAL FINDINGS

5.3.1 Purpose

The purpose of the empirical research was to investigate the information environment of teleworkers in South Africa. The empirical component was aimed at confirming the theory that there were very few organisations in this country that were involved in teleworking. The empirical findings could also validate the features of the information environment of the teleworker as found in the literature. A framework was followed that led to the identification of the features of the general environment of the knowledge worker and teleworker, as have been described in Chapter 2 and 3 respectively. The features of the information environment of the knowledge worker have been discussed in Chapter 4 and are summarised in Table 3. Information from previous chapters and the summary in Table 3 was used as the basis for the empirical component.

Tasks	Information systems	Additional features
Managing documents (Creation, storage, retrieval, dissemination)	Word processing Desktop publishing Document imaging systems	Security (Physical, network)
Communication (Individual, group, team)	Networks (Internet, Intranet/ extranet, types) Communications (Faxes, modems, voice mail, e-mail, videoconferencing, cellular phones, personal digital assistants, groupware)	Information overload
Managing information (Formal information, informal information)	Spreadsheets Database management systems	
Decision making (Strategic, managerial, knowledge, operational)	Decision support systems	

Table 3 Summary of the information environment of the knowledge worker

5.3.2 Respondents

After extensive investigation, it was determined that very few organisations in South Africa had formal policies and strategies with regard to teleworking. People in the human resource departments of organisations were contacted via telephone calls and e-mails. Where relevant, people from other sections in the organisation were approached

as well. None of the organisations that were contacted had teleworking sections or departments. The teleworkers that were identified were engaged in teleworking on an *ad hoc* basis and had no written agreement with their organisations.

Large organisations in Gauteng were contacted, because Gauteng is widely regarded as the economical hub of South Africa and most of the major organisations' head offices are located in Johannesburg, Midrand or Pretoria. The banking sector was targeted first, because previous research conducted within the South African context indicated that some of the major banks may be implementing teleworking programmes (Hoffman, 2002). Several senior people from the human resource departments of major banks, such as Standard Bank, ABSA and Nedcor, were contacted, but no information with regard to any teleworking activities was found. ABSA mentioned that it was in the investigating phase with regard to teleworking, but had not done any real planning or implementation. ABSA was therefore unable and not prepared to assist with the research.

It was then decided to target organisations that were known to be on the forefront of innovative ideas and activities. One such sector was the consulting industry, consisting of organisations such as Accenture, Price Waterhouse Coopers, and Ernst and Young. These organisations were generally very unhelpful and it was impossible to establish whether any of them had teleworking programmes. Accenture indicated that they did have teleworkers, but said that they had a policy not to assist in any research outside of the organisation.

The information and communications technology industry was consequently targeted and almost identical responses were received. None had any formal teleworking programmes, but it was discovered that IBM did have a number of employees involved in *ad hoc* teleworking. At this point, it became clear that teleworking was a very new and unknown concept in South Africa. It was therefore impossible to target a specific industry or even a specific organisation and it was decided to target individuals. These individuals were found by sending out email messages and making telephone calls. Interviews were eventually conducted with eight people who were all full-time, professional employees at different organisations.

Although the respondents originated from different organisations and different industries within South Africa, most of them were found to be linked to the information and communications technology industry. A possible reason for this is the fact that information and communications technology is the enabler of the teleworking concept, as has been mentioned in earlier chapters. Another reason could be the changing and innovative nature of this industry, which enables organisations to adopt and accept new ideas more easily and quickly. The respondents were therefore selected only because they were full-time employees and were working from a remote location or home office.

5.3.3 Structured interview

The interviews were aimed at determining the similarities between the information environment of the knowledge worker and that of the teleworker. The information in Table 3 was used as the foundation for the structure of the interview questions (Appendix A). Section 1 of the interview related to the task column, Section 2 to the information systems column and Section 3 to the additional features column.

5.3.4 Results

The interview was structured using the information in Table 3. The research findings are therefore discussed as they relate to the table. In this chapter, there is a simultaneous discussion of Section 1 and 2. The additional features, as they reflect in Section 3, are then examined. Beginning with question 1, all the respondents indicated that they were to a large extent involved in managing documents. They were creating, storing, retrieving and distributing documents on a daily basis. The type of documents varied slightly from respondent to respondent, and was mostly related to the specific respondent's type of job. The majority of the group worked in the information and communication technology industry was involved in the creation of technical documents for perusal by team members, co-workers and clients.

All the teleworkers said that they mainly used word processing software for the creation of documents and two said that they used desktop publishing software. Desktop publishing software was used to create certain graphics and images that were sometimes

needed for distribution to clients or co-workers. Only one respondent indicated that she used document imaging systems on a daily basis. This respondent was involved in Web site design projects and often needed to scan images for clients or fellow project team members. Although some of the other respondents also used document imaging systems, it was less frequent.

When questioned about the manner in which they distributed documents, all the respondents specified that they preferred e-mail. Documents that were created specifically for the use of co-workers and clients were distributed mainly through e-mail and to a lesser extent by fax. Documents created for general use by other employees in the organisation were stored on servers at the organisation's office, where they could then be accessed. All eight respondents pointed out that they stored documents on the hard drive of their personal computers. In addition, some also stored it on the organisation's file servers and one indicated that he used the organisation's document management system. No specific mention was made regarding back-ups. Very few mentioned the need for paper-based storage. Documents were retrieved from the various places of storage and all the teleworkers indicated that they exclusively made use of electronic methods for accessing documents.

The respondents said that they used data management systems such as spreadsheets and databases, on a daily basis. In most cases, the respondents used the organisational databases to manage all their formal information, including updating project information, storing and retrieving information and distributing pertinent organisational information to co-workers or team members. The teleworkers mentioned that they used electronic spreadsheets mainly to prepare quotations for clients and to update financial accounts and other financial information.

In response to the question of which communication systems they use, all respondents selected e-mail, telephone, cell phone and fax machines as the major communication mediums. They used e-mail, cell phones and telephones for all day-to-day communication with co-workers and clients. Most indicated that they only used faxes when the client did not have access to e-mail or when there was a problem with an organisation's e-mail system. Only two of the respondents specified that they made use of videoconferencing and teleconferencing. Both of them used videoconferencing only

when they were in the office and had to communicate with clients or co-workers overseas. They made use of teleconferencing from their home office only when they urgently needed to communicate with colleagues, both locally and overseas. Respondents indicated that they viewed video and teleconferencing as a luxury and not as a necessity for successful communication. One of the respondents said that he used a personal digital assistant for personal and work-related matters but that it was his own property.

Some of the teleworkers pointed out that they used electronic team rooms as a medium for communication. An electronic team room is a type of groupware or advance collaboration application that enables team members to coordinate, communicate and collaborate, as explained in Section 4.4.3.2. One respondent said that the team room was a Web site that gave team members access to all project documents, project plans and e-mail correspondence. The team leader opened, managed and controlled the team room and invited members to join in all or certain parts of the information. All members could access the team room through their browser software. Very few of the respondents used paper-based communication media.

All the teleworkers were involved in teamwork and spent their time collaborating on projects. The majority of them indicated that their preferred method of communication with team members was face-to-face team meetings. Respondents said that they preferred face-to-face communication because it clarified issues instantly. These face-to-face team meetings were preferred especially at the beginning of a project and at certain crucial stages in the project cycle. Day-to-day communication with regard to the project was mainly done using e-mail and electronic team rooms.

Question 5 referred to the type and frequency of decisions made by respondents. All the teleworkers were involved in making decisions at an operational and knowledge level. Some of them were frequently involved in decisions of a managerial nature, while only two were somewhat involved in strategic decisions. The type of information that was needed to make decisions mainly related to the level of the decision. The teleworkers indicated that they needed information with regards to projects, customers, products, competitors and technical aspects. In addition, the respondents who were involved in

managerial and strategic decision making said that they needed general organisational information, such as policies, procedures, strategies and financial information.

When questioned on the use of information sources, most respondents pointed out that they almost entirely used electronic sources. All respondents had access to the organisation's intranet and it was by far the most widely used source of information. They said that in most cases the information on the organisation's intranet encompassed almost all the information that they needed. Some of the respondents said that all organisational research, technical reports and project information were available in online databases that they accessed through the organisation's intranet. Every one of the respondents indicated that their organisation was using a wide area network as the basis for connecting employees. Only two knew for certain that their organisations were also making use of a value added network (VAN).

The majority of respondents were using Web sites to access information about the organisation, its competitors and the specific industry that they work in. Search engines and the Web were also used to obtain information from electronic journals, white papers and articles. Teleworkers were connected to the Internet and the organisation's network using either a dial-up line connection or a permanent line connection. Line speeds and types varied between standard 56K lines and ISDN 128K lines, but most of the respondents used a dial-up connection at the standard 56K speed. When connecting to the organisation's network, respondents said that they were required to log on with a secure log-in name and password.

CD-ROMs were sometimes used as a source of information if they contained presentations, software and reference manuals. Some respondents made use of the organisation's extranet to obtain information about their business partners. Almost none of the respondents used online newsgroups, but one said that he subscribed to online user forums. These forums provided a variety of information with regard to a specific topic, field or industry. Although the use of paper-based information sources seemed to be limited, some of the respondents did indicate that they made use of reference manuals that contained information regarding technical specifications and procedures. These manuals were generally available at the respondents' home office, which allowed them easy access.

A few of the teleworkers used newspapers, magazines and trade journals. These sources were used for industry and market-related information. One of the respondents said that he sometimes required updates on new products and technologies and that he did not always have access to this information. In his case, it seemed that the information was circulated in paper-based form at the office and it was not always readily available electronically.

The questions in Section 3 of the interview were aimed at establishing any additional features that influenced the information environment of the teleworker. All the respondents said that the minimum equipment that they required to do their work at home was a portable computer, such as a notebook or laptop, a modem and a telephone line. All of them also concurred that they had all the required equipment. Generally all the respondents' equipment belonged to the organisation and in most cases, the organisation was also responsible for upgrading and replacing the equipment. None of the respondents was in any way restricted with regard to the use of this equipment.

In terms of the security of the equipment, all of the teleworkers said that they were not required to add any special security features to their home office. It was suggested that the crime situation in the country required a person to ensure that his or her house was secure and, because of this, organisations trusted that the teleworker's home office was as secure as possible. Only two respondents mentioned that they were aware of special security features built into the information systems that they used. These security features mainly comprised special firewalls that, according to the two respondents, did not hamper their ability to manage information. When questioned, the remaining respondents said that they had anti-virus software on their personal computers and were expected to keep this software up to date with downloads from the organisational server. Apart from that, they were not aware of any other security features.

Quite a number of respondents pointed out that they had a major problem with information overload. They indicated that it was very time consuming to search through the mountain of available information and that it influenced their job performance negatively. It seems that this was especially a problem because of the vast quantities of available electronic information. Some of the teleworkers suggested that it was, at times, more difficult to determine the value of information when working in isolation.

In the office, there were always co-workers at hand who could quickly provide necessary guidelines when determining the worth of a particular section of information.

5.4 CONCLUSION

A study of the literature revealed limited information with regard to the features of the information environment of the teleworker. Features that have been discussed include information systems, communications technology and security. Information systems comprise hardware, software, networks and communications structures that form a vital part of the information environment of the teleworker. Information security relates to both the physical security and the security found in the information systems of an organisation. As has been explained in Section 5.3.2, there are very few, if any, organisations in South Africa that are currently running formal teleworking programmes. The respondents of the structured interview were therefore not selected from a specific industry or organisation, but were chosen solely because they were involved in *ad hoc* teleworking arrangements. It did appear that most of them were connected to the information and communications technology industry.

5.4.1 Differences between the features of the information environment of the knowledge worker and the teleworker

At first glance the research results seemed to reveal very little difference between the features of the information environment of the knowledge worker and that of the teleworker, but a further analysis indicated that there were certain distinctions. The following areas produced a number of differences:

5.4.1.1 Storing, retrieving and sharing of documents

Teleworkers were involved in the tasks of managing documents, managing information, decision making and communicating. When it came to creating documents, teleworkers used the same information systems as knowledge workers. A distinction could, however, be made with regard to the storage, retrieval and sharing of documents. The respondents indicated that they stored documents on the hard drives of their computers and on the servers of the organisation. Almost none of them was making use of paper-

based storage methods. As have been mentioned in Section 4.3.1, this was contrary to the environment of the knowledge worker, where large amounts of information are stored in paper-based form. The difference in storing documents also related to a difference in retrieving and sharing documents. When retrieving documents, teleworkers exclusively used electronic means. The same applied to the dissemination of documents, which were mostly done using e-mail and other electronic methods.

5.4.1.2 Communication media

Managing information entailed the same processes for the teleworker as for the knowledge worker. Data management systems were used on a daily basis and the organisational databases seemed to be the preferred method for maintaining, updating and retrieving information. Teleworkers relied heavily on e-mail, cell phones and telephones for their communication needs and occasionally also made use of fax machines. It is important to note that the use of video- and teleconferencing was not as widespread as it was in the information environment of the knowledge worker. The teleworkers indicated that they did not view these communication mediums as crucial to their functioning as employees. The cost of videoconferencing meant that it was not a viable option for the home office and the two teleworkers who were using it, did so from the organisation's offices.

In Section 4.3.2, the trend for organisations to arrange their employees in work groups or teams has been discussed. The teleworkers that were interviewed followed this trend, because all of them were involved in team or group work. They said that they preferred face-to-face meetings as a means of communication with team members, especially at the commencement of a project. Communicating with team members was generally not a problem, but some of them indicated that from time to time they did need to gather information from team members and, therefore, it would be easier if they were in the same location.

Most of the teleworkers also relied on groupware or electronic team rooms as a medium for communication. All project information, communications and updates were stored in the electronic team room and were accessible to team members. When the communication methods of teleworkers were compared to that of knowledge workers, it

was clear that a distinction could be made with regard to electronic and paper-based communication. Almost none of the teleworkers was using paper-based communications, such as letters and memorandums. They were generally much more reliant on electronic means for communication.

5.4.1.3 Decision making

When it came to decision making, teleworkers were mainly involved in operational and knowledge-level decisions. In Section 4.3.5, it has been explained that operational decisions involve solving day-to-day problems and knowledge-level decisions concern the evaluation and creation of new ideas, products and services. Only some of the respondents participated in decisions on a managerial and strategic level. As has been discussed in Section 4.3.5, middle and senior management were mostly involved in managerial and strategic decisions. It therefore appeared that very few senior managers were involved in teleworking and that it was mostly supervisory and middle management employees who made up this staff component.

As has been described in Section 2.3.4, most traditional organisations require their managers to be visible and manage hands on. It could therefore be that organisations are not comfortable with senior management working away from the office and away from their subordinates. Another possible reason could be that the senior managers in an organisation require certain information that is not as easily accessible from a remote location. In certain instances, senior managers are often required to travel and it might simply not be viable for them to spend their remaining working time away from the office as well. The exact reasons for this trend, however, must be further researched. None of the teleworkers used decision support systems, thus distinguishing them from knowledge workers who do.

5.4.1.4 Information sources

Most of the teleworkers were linked to their organisation's network via a standard 56K, dial-up connection. Very few used an ISDN, 128K line with a permanent connection. These connections formed the basis for the teleworkers' access to their organisation's information resources. All the teleworkers pointed out that their organisation's intranet

was their major source of information; it seemed that their organisational intranets contained almost all the information that the teleworkers needed. Technical reports, information on procedures and policies, organisational research and project information were available via the intranet or in online databases that were accessed via the intranet. Teleworkers also used the communications technology to access Web sites on the Internet, where they gathered information concerning the organisation, competitors, clients and the industry that they functioned in. Electronic journals, white papers and articles were also accessed via the Internet. Not many of the organisations had an extranet, but a few of the teleworkers did say that they were connected to the extranet and used it to obtain information relating to their business partners.

Respondents also used online user forums as information sources, because these were easily accessible and provided pertinent information on their specific field or industry. The use of paper-based information sources was very limited among teleworkers. Trade journals and reference manuals were sometimes used, but the use of magazines and newspapers was almost non-existent. It is evident that the earlier trend continues, because teleworkers were much more reliant on electronic information sources than paper-based sources. They also said that they were fairly satisfied with the availability of these sources and overall they seemed to have adequate access to these information sources.

5.4.1.5 Equipment

Generally the teleworkers needed a portable computer, modem and a telephone line to do their work. All of them indicated that they did have the needed equipment and that it was the property of their organisation. The organisations were mostly responsible for replacing stolen equipment and for upgrading outdated equipment. Although not formally written down, teleworkers generally understood that they were governed by the same policies and procedures as the rest of the organisation when it came to the use of equipment. They all agreed, however, that their organisations did not actively control this issue.

5.4.1.6 Security

Interestingly enough, security, both physical and within information systems, did not seem to be a major concern for the organisation or the teleworkers. Very few of the teleworkers were aware of any special security features and the ones who were said that it did not influence their work in any way. Standard measures of security included anti-virus software, and normal log-in names and passwords were required on most networks.

5.4.1.7 Information overload

Information overload appeared to be a much greater problem for teleworkers than it was for the knowledge workers. The majority of teleworkers indicated that they were suffering from information overload and that the remoteness or isolation of their working environment magnified this problem.

Generally, teleworking in South Africa seemed much less formal and much less frequent than was assumed earlier. A possible reason could be that the structure and culture of organisations in South Africa are still traditional and rigid and are therefore not well suited to teleworking. In Section 3.4.2, it has been determined that organisations that accommodate teleworkers should be innovative, creative and flexible. It has also been assumed from the literature study that teleworkers may be experiencing problems with regard to accessing appropriate information systems and sources. It seems, however, that teleworkers in South Africa did not experience these anticipated problems. A possible explanation could be that problems were addressed as they occurred, because of the *ad hoc* nature of the teleworking agreements. Another possible reason could be that, locally, there were very few teleworkers. This means that the drain on organisations' information resources was limited and the impact was therefore not causing any severe problems.

5.4.2 Summary

One trend that featured throughout this research was the fact that teleworkers were extremely reliant on connectivity to the organisation's network. Almost all of their

information tasks were done via the electronic medium, whether it was accessing, retrieving, updating, storing or sharing of information. This was possibly the single most unique feature that distinguished the information environment of the teleworker from that of the knowledge worker. The findings of the research can therefore be summarised as follows:

- Teleworking was an extremely new concept in South Africa and there were very few organisations currently embracing this concept. Policies and procedures for formal teleworking were non-existent and teleworking was therefore an *ad hoc* arrangement between some employees and their organisations.
- Teleworking was largely restricted to professional employees at supervisory and middle management level.
- Teleworkers were part of formal project teams and did derive from the segment of employees that worked on their own.
- Teleworking was not possible without the use of communications technology. Teleworkers operated within the electronic environment and had to be connected to the organisation's network to function successfully.
- Teleworkers indicated that they were able to easily access the required information.
- Security appeared not to be a major concern for organisations or teleworkers.
- The information environment of the knowledge worker and that of the teleworker was very similar and it should therefore be fairly easy for organisations and employees to make the transition and adopt the concept of teleworking.

6. CONCLUSION

6.1 INTRODUCTION

The digital information age has brought a change in the way organisations conduct their day-to-day business activities. Information is being viewed as an important resource and there is a spiralling demand for information technology that can assist in the management of this resource. This demand is the driving force behind technological developments in the fields of information and communications technology. It is also central to the creation and expansion of the global economy. Organisations are expected to adjust and adapt, and flexibility has become a key factor for economic survival. The changes in the external environment of organisations have filtered through to the internal environment and the information economy of today has certain prevailing influences on the way in which workers conduct their duties. Workers are expected to be information literate and has to become knowledge workers.

Employees are no longer just required to be computer literate, but are also obliged to know how to find, use, store and distribute information. In a way, workers are all required to be knowledge workers in addition to being skilled for a specific job. The pressure to adjust quickly to customer demands means that workers must use their time more productively. This aspect, coupled with the advances in information and communications technology, has led to the development of teleworking. In essence, teleworking means to ‘work from a distance’. Terms such as ‘flexible working’, ‘remote working’, ‘mobile office’ and ‘telecommuting’ are used as synonyms for teleworking. In this report, the term ‘teleworker’ is used for employees that are working from a location distant from that of their organisation’s offices. The term ‘knowledge worker’ is used for employees that are performing their day-to-day activities within the physical space of their organisation’s offices.

The research focused on identifying the features of the information environment of the teleworker within the South African context. The information environment is a part of the greater organisational environment for both the teleworker and the knowledge worker. It was therefore necessary firstly to determine the features that made up the general work environment of the knowledge worker. The features of the general

environment of the teleworker were then explored. The research continued by concentrating specifically on the features of the information environment of the knowledge worker and that of the teleworker respectively.

As mentioned before, certain internal and external forces are constantly influencing the environment of the knowledge worker. The field of organisational behaviour explains how employees are influenced by these forces and how they act and 'behave' within the organisational environment. Organisational behaviour is concerned with the three basic aspects that represent the employee's relationship with the organisation, namely individual processes, interpersonal processes and organisational processes. In relation to the above, the features of the environment of the knowledge worker comprise the following:

- Individual processes: The knowledge worker's attitude influences his or her job satisfaction and organisational commitment. Job satisfaction reflects the extent to which an individual finds fulfilment in a job, and organisational commitment refers to the knowledge worker's level of dedication towards an organisation. Personality, which determines the knowledge workers suitability for a job, is another feature that has been identified. Perceptual distortion, which relates to how an employee perceives his or her environment, and motivation, which manifests in the satisfaction of needs, play a role in the knowledge worker's environment. Stress, experienced on a personal or professional level, can affect the job performance of the knowledge worker.
- Interpersonal processes: Formal and informal communication is necessary for a healthy organisation and is therefore an important feature of the knowledge worker's environment. Particular emphasis is placed on electronic communication, and communications technologies such as e-mail and voice mail are burgeoning. Group dynamics and team dynamics have also been discussed as features that influence the environment of the knowledge worker. Whereas group structures are generally informal and closely related to the social needs of employees, team structures are more formal and are created to address the task-orientated needs in an organisation.

- Organisational processes: Features that have been identified under organisational processes include organisational structure, which comprises the design and culture of an organisation. Organisational design is defined by the how the different components of an organisation, such as tasks, relationships and authority, fit together. The culture of an organisation is the underlying values and beliefs that govern the functioning of that organisation. Goal setting, performance management and the reward systems being used in an organisation will influence the environment of the knowledge worker. Performance is closely linked to goals, and rewards are closely linked to performance.

The similarities between the forces involved in the environment of the knowledge worker and that of the teleworker have made it possible to draw certain parallels between the two environments. Some of the basic features of the teleworker's and knowledge worker's environments are the same, such as attitude and perceptual distortions. As with the knowledge worker, these features influence the teleworker's job satisfaction and organisational commitment. Although personality is a feature of the teleworker's environment, it has been concluded that the teleworker typically is a person with specific traits such as self-motivation, self-discipline, a high level of flexibility and innovative thought processes. The teleworker's unique environment can have distractions, such as high noise levels, drop-in traffic and family activities and these can lead to an increase in stress levels. Social isolation and workaholism have also been identified as possible causes of stress for the teleworker.

Communication, group and team dynamics have been identified as features of the teleworker's environment and again their influence on the teleworker is different from that of the knowledge worker. The teleworker's remote location plays a role in his or her ability to become part of informal groups at the office. It is, however, still possible for teleworkers to be part of formal groups and teams. To counter the effect of social isolation, special attention should be given to include teleworkers and to ensure that they are familiar with all work and social issues that may arise in the office. When the feature of organisational structure was examined, it became apparent that there are certain organisations that are more accommodating towards teleworkers. These typically are organisations that are innovative and flexible with a results-orientated approach and structure.

In Section 3.4.3, the need for teleworkers and their managers to undergo specialised training with regard to goal setting, performance management and reward systems has been determined. The remote environment of the teleworker gives rise to a new feature, namely workspace design. The teleworker's workspace significantly influences his or her ability to perform and communicate successfully.

The knowledge worker's information environment is part of the larger work environment and has its own identifiable features. Information, incorporating data and knowledge, is the first logical feature of this environment. Another feature that has been identified is information systems, which comprise information technology and all other processes linked to the management of information in the organisation. The advances in information and communications technology have led to an increase in the availability of information. Knowledge workers' duties are influenced by the vast amounts of available information, and information overload has therefore been identified as another feature of their information environment.

Although organisations differ dramatically with regard to culture, structure and design, they are all governed by standard operating procedures. Standard operating procedures are closely linked to an organisation's business processes, and the business processes are the tasks that enable employees to manage and coordinate their work. The typical tasks that knowledge workers are involved in can be categorised as managing documents, managing information, scheduling, coordinating, communicating and decision making. These tasks have been identified as features of the information environment of the knowledge worker. Managing documents involves creating, storing, retrieving and sharing documentation, such as reports, manuals and brochures. The effectiveness of teams relies on the correct dissemination of information, and knowledge workers are typically involved in scheduling, coordinating and communicating when they are functioning as part of a team. Decisions can be classified along organisational levels: there are strategic decisions, managerial decisions, knowledge decisions and operational decisions.

Connectivity, availability and performance are three important aspects of an organisation's information systems. Various information systems are used for different business processes and tasks. These include transaction processing systems, office

automation systems, communications systems and decision support systems. Transaction processing systems are the basic systems in an organisation that are used for all day-to-day operations. Office automation systems are designed specifically to improve productivity and include diverse tools, such as word processing software, spreadsheets, databases, groupware and other communications and network devices. Decision support systems assist the process of decision making through simulation and are used by knowledge workers for non-routine decision-making tasks. Collectively, these systems form part of the information environment of the knowledge worker. The increased access to information has an impact on the levels of security in organisational systems and typical problems include data communications fraud and unauthorised access to computer files. Information security is an integral part of every information system in the organisation and is therefore included as a feature of the knowledge worker's information environment.

6.2 SUMMARY

The features of the information environment of the knowledge worker were used as a basis to determine the features of the teleworker's information environment. An extensive investigation of the literature revealed limited information with regard to the teleworker's information environment. Partial information was found regarding information systems, communications technology and security. It is recommended in the literature that the teleworker use the same hardware and software at his or her home office as in the organisation's offices. The literature mentioned e-mail, videoconferencing, teleconferencing, cell phones and voice mail as communications devices that are useful for the teleworker.

The empirical study revealed that very few, if any, local organisations are involved in formal teleworking programmes. It was therefore not possible to identify teleworkers from a specific organisation or industry. The respondents were selected because they complied with the definition of teleworking as given in Section 1.3.1. Structured interviews were conducted and it was identified that most of the teleworkers were linked to the information and communications technology industry.

The results revealed more similarities than differences between the information environment of the knowledge worker and that of the teleworker. Teleworkers were generally involved in the same tasks as the knowledge workers and used the same information systems for these tasks. There was, however, a difference in the way they used these systems. Teleworkers were almost solely relying on electronic means for managing information, managing documents and communicating. Information systems that were used a great deal included telephones, cell phones, e-mail, groupware or electronic team rooms, intranets and the Internet.

Although security was a feature of the information environment of teleworkers it did not seem to play a key role in their ability to access information. It was discovered that information overload had a far greater effect on their environment than it had on the knowledge worker's environment. It was anticipated that teleworkers' information environment would reveal certain problems with regard to the accessibility of information. These problems did not materialise, as the teleworkers indicated that they were generally satisfied with these aspects.

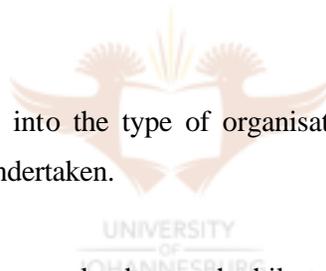
The empirical findings revealed that teleworking was restricted to professional employees at supervisory and middle management level, because the respondents were mostly involved in decisions on operational and knowledge levels. Teleworkers were part of formal project teams and it was not possible for them to continue working from a remote location without the use of communications technology. The research concluded with the findings that the information environment of the knowledge worker and that of the teleworker were very alike and it should therefore not be impossible for organisations to adopt this form of work.

6.3 FURTHER RESEARCH

Most of the research conducted in the field of teleworking was done in Europe and the USA. Therefore, many possibilities for further research exist within the South African context.

The following are some of the options for further research:

- In-depth research with regard to the infrastructure of the teleworker's home office. Research of this nature could include discussions on aspects such as mobility and workspace ergonomics.
- Specific research can be undertaken to determine the productivity levels of teleworkers. Social matters such as isolation, stress and creativity levels may play a role with regards to the teleworker's productivity.
- A study regarding the cost implications of teleworking could be done and specific aspects, such as the return on investment, could be calculated.
- There is also scope for research that focuses specifically on the security aspects relating to telework.
- A further investigation into the type of organisation that would be best suited to teleworking could be undertaken.
- At this point in time, it may also be worthwhile to conduct research that establishes the reasons for the limited number of teleworkers in South Africa.



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APPENDIX A

Section 1

1. To what extent are you daily involved in the following?

Creating documents	1 Not at all	2	3	4 To a large extent
Storing documents	1 Not at all	2	3	4 To a large extent
Retrieving documents	1 Not at all	2	3	4 To a large extent
Disseminating documents	1 Not at all	2	3	4 To a large extent

2. What does the following involve?

Creating documents	
Storing documents	
Retrieving documents	
Disseminating documents	

3. Which of the following communication systems do you use and what do you use it for?

	Use	Reason
Telephone		
Cell phone		
Teleconferencing		
Fax		
E-mail		
Videoconferencing		
Memos		
Letters		
Other		

4. Are you involved in team or group work? If so, what is your preferred type of communication with team or group members? Please provide reasons.

5. Please rank the frequency of the type of decisions that you must make from 1 to 4, with 1 being the least and 4 being the most frequent.

Strategic decisions (determining organisation objectives and policies)	
Managerial decisions (effective and efficient use of resources)	
Knowledge level (evaluation of new ideas, products etc)	
Operational level (day -to-day problems)	

6. What type of information do you need to make decisions?

7. How do you access this information?

8. Do you use decision support systems?

9. What other tasks do you perform?
10. What information do you require to complete these tasks?
11. How do you access this information?
12. Which of the following information sources do you use, how do you use it and what do you use it for?

Paper based	Use	How	Reasons
Books			
Reference material (dictionaries, encyclopaedias)			
Periodicals (journals)			
Company research and technical reports			
Magazines and newspapers			
Other			
Electronic sources	Use	How	Reasons
CD-ROM			
Company databases			
Own databases			
Online databases			
Web sites			
Newsgroups			
Listservs			
Intranet			
Extranet			

13. What other information do you require that you do not currently have access to?

Section 2



14. Do you use word processing software, such as Microsoft Word?

1 Not at all	2	3	4 To a large extent
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15. What do you use it for?

16. Do you use desktop publishing software, such as Quark Express?

1 Not at all	2	3	4 To a large extent
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17. What do you use it for?

18. Do you use document imaging systems such as scanners?

1 Not at all	2	3	4 To a large extent
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19. What do you use it for?

20. Do you use data management systems such as spreadsheets or databases?

1 Not at all	2	3	4 To a large extent
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21. What do you use it for?

22. Does your organisation make use of a wide area network (WAN) or a value added network (VAN)?
23. Do you have access to the Internet? If so, how are you connected (line type, speed, etc.)?
24. Do you have access to the organisation's intranet and/or extranet? If so, is it a permanent connection?

Section3

25. What is the minimum equipment (hardware) that you require to perform your job at home? Do you have all the necessary equipment?
26. Does the equipment in your home office belong to you or to the organisation?
27. Who is responsible for replacing equipment in the case of theft and for upgrading it?
28. Did the organisation specify any special physical security features for your home office?
29. Are you aware of any special security features built into the information systems that you are using, such as firewalls and special encryption? If so, do these features impact on your ability to manage information?
30. Are you restricted by your organisation with regards to how and for what purpose you use the information technology equipment?
31. Does information overload influence the performance of your job?
32. What additional aspects do you think influences the way you manage information and perform your job? How do they influence it?