

CHAPTER 2

2 RESEARCH APPROACH AND DESIGN

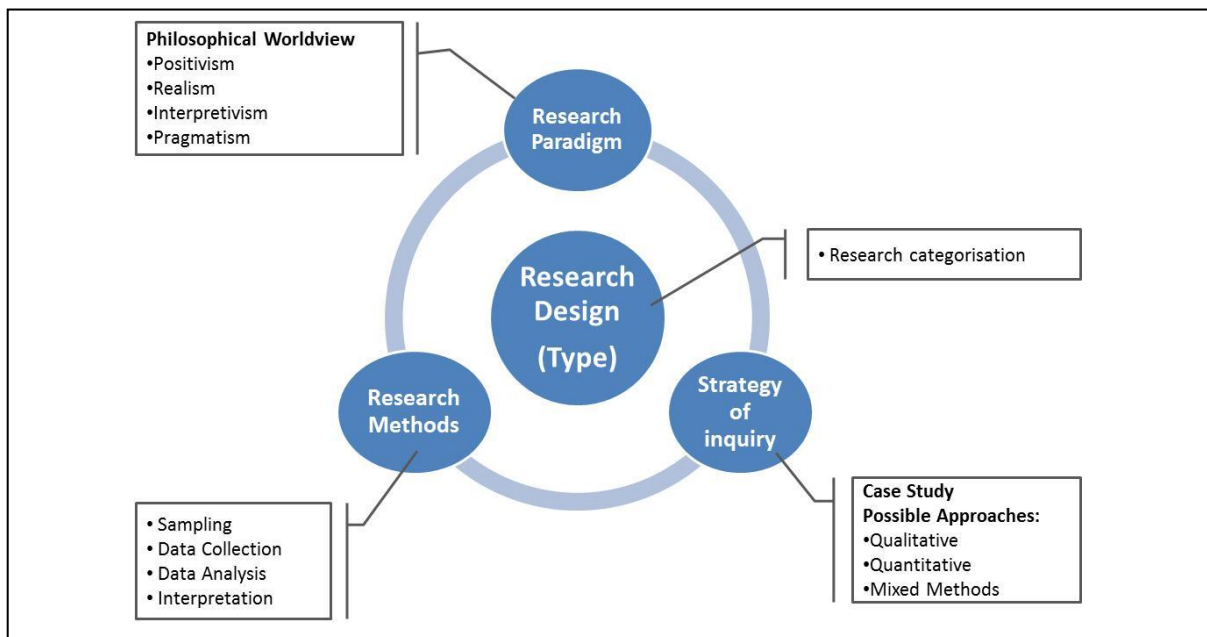
2.1 INTRODUCTION

The purpose of this chapter is to describe the research design selected for the study. The chapter not only gives the actual research design, but also explains the rationale or approach that guided the decisions that were made in order to arrive at the specific design. The aim of the research decisions has been to ensure alignment between the purpose of the study, the research objectives, the research paradigm, and the research design. The research design has driven the structure of the thesis document as well as the sequence in the research process.

One of the underlying factors in selecting a specific research design is the concept of the research philosophy. The term research philosophy, or philosophy of science, is used to encompass the concepts of how knowledge is developed and the nature of that knowledge within a particular research setting (Saunders, Lewis & Thornhill, 2009:107). Creswell (2009:5) also refers to the term "philosophical worldview". This chapter gives a background to the types of research philosophies, and how these link to the researcher's preferred research paradigm, in turn affecting the design decisions made.

In addition to the research paradigm, a research design encompasses a *design type*, the *strategy of enquiry* and the *research methods* (Cresswell, 2009:5; Kotzé, 2010b:4). These elements are shown in Figure 2-1. Each of these elements will be described in more detail in the sections of the chapter below.

Figure 2-1: Research design elements



Source: Cresswell (2009:5) (Adapted)

The research setting and selection of cases, and the entrée and establishing of researcher roles are described next, since these are important for a case study approach. This chapter will also explain the elements of the embedded, multiple-case study design, with focus on the embedded units of analysis, and summarise the sample sizes and data collection and analysis methods applied. Even though data analysis is closely linked with the execution of the study, the strategies for textual and numeric data analysis will also be addressed as part of the research methods in this chapter. The interrelationship between the research type, the strategy of enquiry and the research methods will be highlighted, and the reasons for the specific choices will be substantiated.

Two additional components that relate to design are considered in this chapter, namely quality and ethics. *Quality* is especially important in the context of qualitative designs, which have traditionally been seen as lacking in rigour (Golafshani, 2003:597; Guba & Lincoln in Guba & Lincoln, 1982:246; Morse, Barrett, Mayan, Olson & Spiers, 2002:2). Secondly, *research ethics* is about being responsible in how we do research, and always taking the moral high ground. Even though the research falls under the ethical guidelines of the University of Pretoria, the ethical issues of the particular design are considered in more detail in the last section of this chapter.

2.2 RESEARCH PARADIGM AND PHILOSOPHY

In deciding on the research philosophy and paradigm used for this research, it was important to start by considering the different types of research philosophies. The types of research philosophy include positivism, pragmatism, realism and interpretivism (Saunders *et al.*, 2009:108). Each research philosophy has a certain *ontology* (what assumptions are being made about reality), an *epistemology* (how knowledge is created, and what truths can be established), and an *axiology* (how values influence the perception and interpretation of realities) (Saunders *et al.*, 2009:119). Ponterotto (2005:126) also includes rhetorical structure (formulation of the report) and methodology as part of the philosophy.

A research philosophy is important since it helps the researcher understand how he or she is approaching their own research study, and it also assists in understanding the studies of other researchers. Positivism is mainly associated with being able to extract an absolute truth from quantitative data (Saunders *et al.*, 2009:113). Realism is still closely associated with the philosophy of natural science, in that "what we experience through our senses portrays the world accurately" (Saunders *et al.*, 2009:114). Interpretivism brings in the social component of the human being, namely that there is a level of interaction between the researcher and participant that can shape the findings (Saunders *et al.*, 2009:115). Finally, pragmatism is a combination of philosophies, which holds the view that it is possible to work with potentially conflicting assumptions regarding the nature of reality (ontology) as well as variations in how knowledge can best be reproduced (epistemology) (Saunders *et al.*, 2009:109). This implies that the situation will dictate which philosophy is most relevant to follow, much as a chameleon would take on the colour of its environment.

Certain research methodologies and designs are more compatible with particular philosophies than others. Therefore, the research methodology is often selected on the basis of the particular philosophy that is favoured by the individual researcher on the one hand, or the methodology that is more often used within the specific area of science on the other hand. It is, however, important that the research philosophy selected, as well as the research methodology, ultimately supports the achievement of the purpose of the research. The basic tenets of each philosophy are given in

Table 2-1. Positivism and Realism are often used in the so-called hard sciences, where laboratory settings or controlled experiments are possible. Interpretivism and Pragmatism are often associated with the social sciences, where real-life situations need to be analysed.

Table 2-1: Research philosophy summary

	Positivism	Realism	Interpretivism	Pragmatism
Ontology	Objective, independent of social actors	Objective, independent of human thoughts	Subjective, socially constructed	Multiple views, choose best representative view.
Epistemology	Facts and observable data	Facts and observable data, But sensations also play a role	Social phenomena, situational	Integrate perspectives to interpret the data
Axiology	Value free Researcher independence	Value laden Researcher bias	Value bound Researcher part of research	Values play large role
Methods	Quantitative	Quantitative	Qualitative	Mixed
Metaphor	Natural Scientist	Realist	Social Actor	Chameleon ^(a)

Source: Saunders *et al.* (2009:119) (Adapted)

Note: (a) The word “chameleon” is not a word used by this source, this is an interpreted metaphor associated with the description given.

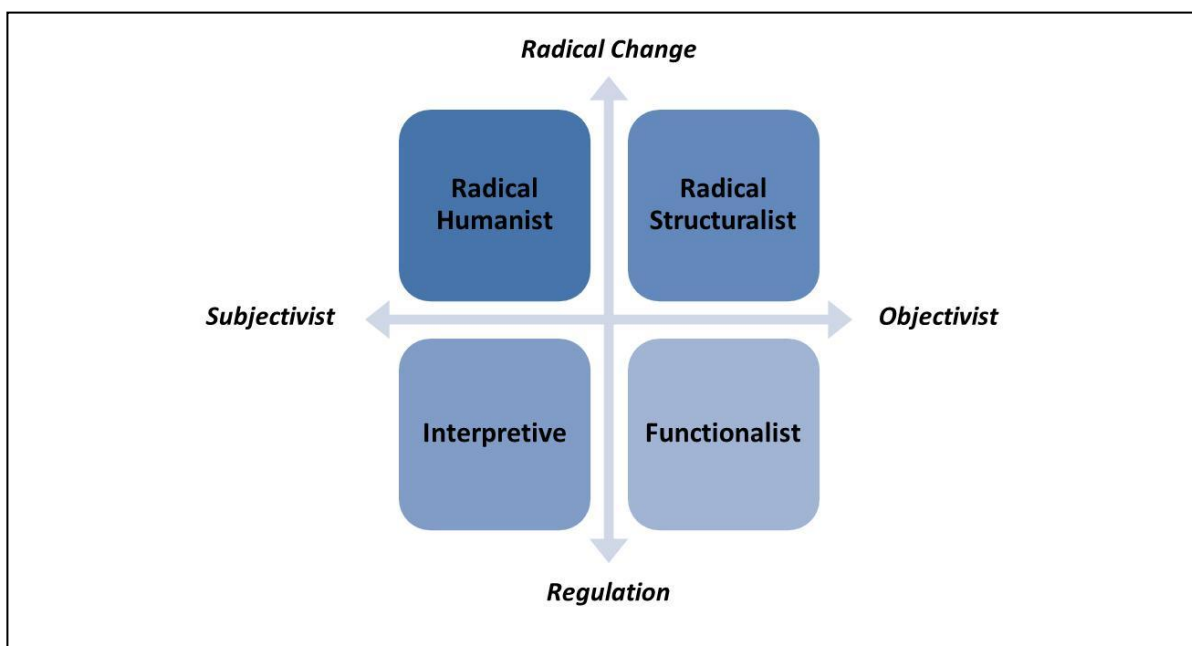
The research philosophy which resonates most closely with this researcher is that of pragmatism. This is based on the underlying belief that in some cases an absolute truth can be extracted based on facts and figures (which is why a quantitative component was included in the study in the form of questionnaires), while on the other hand the social context needs to be taken into consideration (which is why a qualitative component was included in the form of semi-structured interviews). Since the problem manifested itself in real life, namely in the organisational context, the strategy of inquiry selected was a case study with mixed methods as the approach to data collection and analysis.

The researcher was also very involved with the particular topic in her own management environment at the time, and therefore brought with her a set of values that was also applied to the research. This relates to the axiology associated with an interpretivist philosophy, in that the researcher, in being part of the research process,

consciously needs to evaluate what the participant is saying without contaminating it with own values and experiences, to ensure trustworthiness of the data.

As a further progression from research philosophies, research paradigms have been described in the literature. A research paradigm is "a way of examining social phenomena" (Saunders *et al.*, 2009:118) or a set "of interrelated assumptions about the social world" (Filstead in Ponterotto, 2005:127). In this context, the research paradigm can be seen as a combination of the research philosophies that can be applied to a specific research problem. Burrell and Morgan (in Saunders *et al.*, 2009:120) define four paradigms based on two axes. The first axis is regulation *versus* radical change, and the second axis relates to the subjectivist *versus* objectivist ontological perspective. This is shown in Figure 2-2. In this model, both the radical humanist and radical structuralist paradigms imply changes to the status quo. However, the first does so from a subjectivist ontology, while the latter does so from an objectivist ontological perspective. In addition, the radical structuralist paradigm also correlates with the Critical-Ideological paradigm described by Guba and Lincoln (in Ponterotto, 2005:129), which is normally used in cases where the current situation is challenged by introducing change and measuring success.

Figure 2-2: Research paradigms for analysis of social theories



Source: Burrell and Morgan (in Saunders *et al.*, 2009:120)

On the regulatory side of the model, where the current status quo is retained, the interpretive and functional paradigms exist. In the objective-functionalism paradigm, the organisation would be treated as a laboratory in which an experiment was being executed. The paradigm adopted for this research, however, has been subjective-interpretivism. This was done, firstly, because the aim of the study was to determine the current way in which the performance of virtual knowledge workers was managed and measured, and not to change or improve the performance or the management thereof. Secondly, the subjectivist approach implied that the context was important, and needed to be interpreted in relation to both the researcher and the participants' approaches and backgrounds.

The overall philosophy of pragmatism was still relevant in that the mixed-methods approach was used to uncover the status quo of the situation.

2.3 INQUIRY STRATEGY AND BROAD RESEARCH DESIGN

2.3.1 The Research Type

The research type is a way of categorising the research (see Table 2-2). It firstly consists of the nature or purpose of the research, secondly the type of research, and then there are five dimensions or elements which assist in further categorising the design (Kotzé, 2010a:3; Leedy & Ormrod, 2010:223; Mouton, 2001:149).

Table 2-2: Research type options and selections summary

Type of Category	Options	Chosen for study
Type of research	Basic (pure/fundamental) or Applied research	Applied
Nature of research - Relationship to theory building / Purpose	Exploratory (Theory building); Descriptive (Describe relationships); Explanatory (Theory testing); Evaluative (Action Research).	Descriptive with an exploratory element
Design Type: - Data collection or not	Empirical; Non-empirical	Empirical
Design Type: - Origin of data	Primary data; Secondary data	Primary
Design Type: - Type of data	Numeric (quantitative) data; Textual (qualitative) data	Both numeric and textual data

Table 2-2: Research type options and selections summary (Continued)

Type of Category	Options	Chosen for study
Design Type: - Context / Environment / Degree of control	Non-experimental, quasi-experimental, experimental	Non-experimental
Design Type: - Time frame / horizon	Cross-sectional or longitudinal research	Cross-sectional

Source: Kotzé (2010a:3); Leedy and Ormrod (2010:223); Mouton (2001:149)

The *type of research* chosen is applied research, since the results can be applied in a practical, management situation (Saunders *et al.*, 2009:8), which is the problem experienced in managing the performance of virtual knowledge workers. The *nature of the research* (or purpose) is a combination of descriptive and prescriptive, with an element of the exploratory, since the extent of the problems and associated theory in managing the performance of virtual knowledge workers needs to be established. According to Kotzé (2010a:5), the exploratory purpose is used "[in] applied research, to gain a preliminary understanding of the nature, context, potential impact and possible causes of, as well as the possible factors contributing to an organisational problem". The research objectives were also framed to support the nature of the research, namely to *critically review* the management of virtual performance, and to *describe the characteristics* of managers, individuals and their performance where the performance of virtual knowledge workers was being managed. The study further *explored* how the organisational context, as well as the approach of line managers, affected the performance of virtual knowledge workers. Lastly, the objective of *creating a conceptual framework* links to the prescriptive component of the research. The combination of an exploratory and prescriptive purpose of research is supported when using a case study strategy of inquiry (Mouton, 2001:149).

The *design type* of the research is further categorised by five additional elements or dimensions. Since *data collection* did take place, the study can be categorised as being empirical. Secondly, the *origin* of the data is primary data, since new data were collected for analysis. Documents relating to policies and examples of performance appraisals were also used to a lesser extent, and even though they were not in the form of a dataset, they can be defined as secondary, or previously collected data. Thirdly, the *type of data* collected was both numerical and textual. The numerical data relate to the coded answers of questionnaires, including certain numeric

answers such as number of hours, age, and number of times an item was completed. Textual data were derived from interviews, documents, and open-ended questions in the questionnaires. Since the collection of data happened as part of a real-life situation, where the *context* was not manipulated, the study is further categorised as being non-experimental. Finally, in terms of the *time frame*, the study is classified as cross-sectional and not longitudinal, implying that the data were collected in one single time horizon per case, with no full re-collection of data done in a subsequent period (Saunders *et al.*, 2009:256).

2.3.2 Strategy of Inquiry

To direct the research process, the case study strategy of inquiry was selected for this study from a list of more than 20 different strategies of enquiry available (Mouton, 2001:143), including surveys, action research and experiments. The definitions of the case study strategy of inquiry range from simple definitions of it as an in-depth analysis of a specific real-life situation (Dul & Hak, 2008:4; Eisenhardt, 1989:534), to the much more complicated and complete definition that Yin (2009:18) has distilled from 30 decades of research, given in Table 2-3.

This detailed definition refers to the complexities created by the large variety of variables that were present in the analysis and the need for comparing findings through a form of triangulation, and brings in the concept of theoretical sampling for collection of data. Theoretical sampling applies to cases where the theoretical hypotheses have been stated up front. Table 2-3 now gives the full definition of Yin (2009:18) in columns 1 and 2, and shows in column 3 how this research complies with the definition.

Table 2-3: Case study definition and application to study

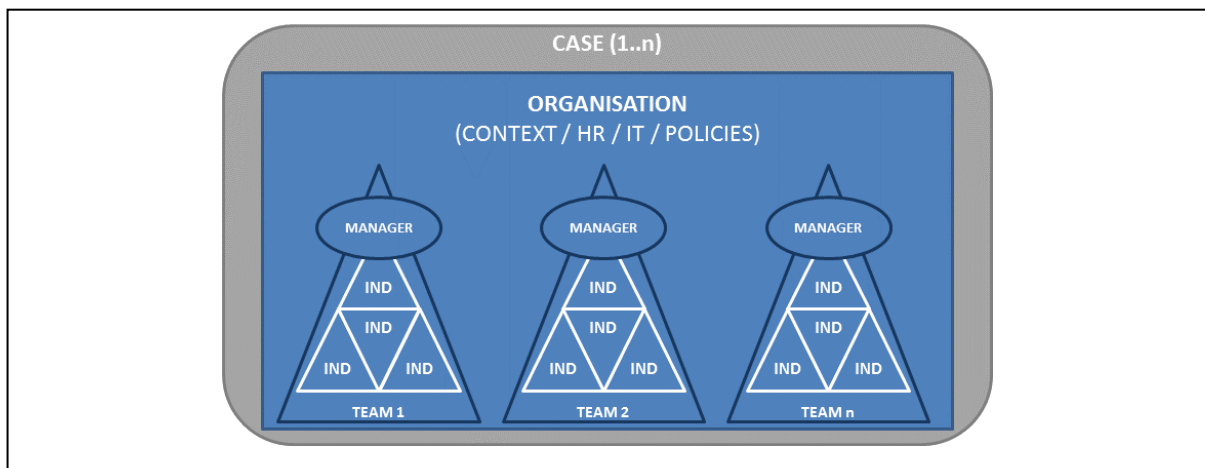
Component of the definition	Definition	Application to this study
Scope: "A Case study is an empirical enquiry that..."	"...investigates a contemporary phenomenon in depth and within its real-life context, especially when..."	Phenomenon is "managing the performance of virtual knowledge workers". Real-Life context: Within the organisations that they work.
	"...the boundaries between phenomenon and context are not clearly evident."	Relationships between the organisation, the organisation type and the type of work individuals perform, could all have an impact on the findings.
Technical: "The case study inquiry..."	"...copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result..."	As shown in the Impact Parameter Model, many parameters impacting the performance of the individual were found.
	"...relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result..."	Interviews, surveys, and secondary documents were used for data collection.
	"...benefits from the prior development of theoretical propositions to guide data collection and analysis."	Constructivist grounded theory; Research not framed by hypotheses or propositions; Data drove the themes and theory proposed.

Source: Yin (2009:18)

Where the research of Jackson *et al.* (2006:219), which reviewed virtual workers and their performance, only used a single case, this research employed five cases in a multiple-case design strategy of inquiry. Each case was represented by a preselected Information and Communication Technology (ICT) or related company, in which an in-depth study of the management of performance of virtual knowledge workers was conducted. Within each individual case, the approach to the problem was analysed from different perspectives, namely from a team level, which included the manager and the individual team members; from the management and individual team members level as separate units of analysis; and also from the organisational level. This ensured that a holistic picture (or 360 degree view) of the "real-life" situation was obtained. Since multiple units of analysis were included within the case, it is classified as an embedded case study. The details of the units of analysis are given in the section 2.4.3 "Elements of the Embedded, Multiple-Case Study Design".

More than one case was included. Dul and Hak (2008:4) refer to this approach as a comparative case study, while Yin (2009) refers to this typology as multiple-case design. The preceding definitions have been used to classify this study as an *embedded, multiple-case study design*. The inclusion of multiple cases was used, among other reasons, to allow for comparison between the cases, and assist with offering theoretical insights about the phenomenon. At the same time, three main levels of analysis were included to allow for triangulation of the data. In Figure 2-3, the *case* is the company as a whole; the *team* is a combination of the manager (first level) and the individual team members (second level); and the *organisational level* (third level) is represented by HR and IT representatives, and the company policies.

Figure 2-3: Case study components

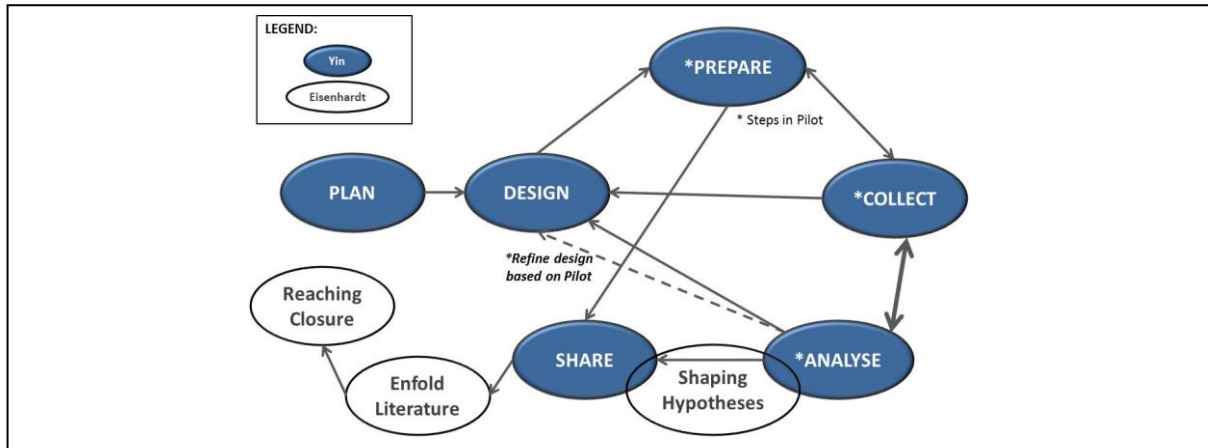


Note: IND = individual

Building new theory through case methodology has not always been acceptable in research circles. In the preface to his book on case study research, Yin (2009:ix) states that case studies have traditionally been seen as having a low scientific value, since they normally take place in non-laboratory settings. Yin therefore calls for rigour in case study research. He proposes a methodological process that should be followed in a rigorous way which will enable scientific acceptance of the findings. The process is seen to be linear, yet iterative. The call for rigour in case study research was also made by Eisenhardt (1989; 1991), who used Yin's original works of 1981 and 1984 to develop her concept of building theory from cases through a theory-building framework. The process of Yin (2009:1) is given in Figure 2-4, and enhanced

with some of the additional elements of Eisenhardt (1989:533). This was the process followed in this research undertaken in this study.

Figure 2-4: Case study process



Source: Eisenhardt (1989:533); Yin (2009:1)

As shown in Figure 2-4, the need for the research was established during the *plan* and *design* phases, at which time the research approach and design were completed. The next step was to *prepare*. In this step the questionnaires and the protocol for approaching each case were created, using the initial literature review as inputs. The protocol contains the instruments, processes and procedures for approaching a case and aids with reliability of the study (Yin, 2009:79). The protocol was refined by executing a pilot study in which the first iteration of *collect*, *analyse* and *share* took place. The execution of *collecting and analysing* of the data took place iteratively for each case. *Sharing*, or member checking, was done through reviewing the individual case descriptions on organisational level.

The *shaping of hypotheses* occurred only after selective coding, as part of the grounded theory process, had been started. This could only be done effectively once all interviews for all the cases had been completed. At this stage additional literature was reviewed, and the *enfolding of the literature* was also done as part of the interpretation of data. The last step of the process was *reaching closure*, where the final framework, findings and recommendations were documented. As described in Chapter 1, this process was used as a basis to sequence the chapters for this thesis.

2.3.3 Research Approach

The strategies of inquiry used in research design are divided into three categories, namely qualitative, quantitative and mixed methods approaches, depending on the overall approach to data collection and analysis (Creswell, 2009:12; Mouton, 2001:143). Teddlie and Tashakkori (2009:4) also refer to this classification as "communities of researchers", since there has been a definite split of researchers into the two camps of qualitative and quantitative research. The strategy of enquiry used in this study was mixed methods. Mixed Methods can be defined as combining both qualitative and quantitative methods. The aim of this approach is to strengthen the findings by either combining, connecting or embedding the different data sets and findings at various stages of the research process (Creswell, 2009:4; Denscombe, 2010:135; Leedy & Ormrod, 2010:144; Teddlie & Tashakkori, 2009:339).

Even though case study research was traditionally seen as a qualitative approach only (Cresswell, 2009:12; Dul & Hak, 2008:4; Mouton, 2001:143), Eisenhardt (1989:533,538) and Yin (2009:19) both promote the use of mixed methods in case study research. This means that a richer data analysis and better framework for theory building can be established. This study used the case study as the strategy of inquiry. Data collection and data analysis were done using both qualitative and quantitative approaches, meaning that the research can be classified under a mixed methods approach.

Denscombe (2010:135) states that mixed-method research is normally associated with the research philosophy of pragmatism. The paradox in mixed methods is that qualitative and quantitative research approaches are often seen to be at two opposite poles, the first being used in exploratory studies, while the second is mainly used in explanatory studies, thereby following very different processes in research design and methodology (Creswell, 2009:208). It is therefore not surprising to find that Mixed Methods as a formally accepted approach is only a very recent addition to the research arsenal (Creswell, 2009:204; Teddlie & Tashakkori, 2009:62).

Three of the issues that should be considered in a mixed methods approach are the *timing*, *weighting*, and *mixing* of the qualitative and quantitative methods (Creswell,

2009:206; Denscombe, 2010:135, Teddlie & Tashakkori, 2009:31). From a *timing* perspective, in the current study the pilot for the multiple-case study strategy was sequential, and used the outputs of the qualitative data to refine the questionnaires, being the quantitative component. The sequential timing was continued for the rest of the multiple-case study, since qualitative and quantitative data were collected and analysed in sequence. From a *weighting* perspective, the qualitative data received a higher priority than the quantitative data. The focus was on the interviews, which resulted in more textual than numeric data being collected, thus the weighting of the qualitative analysis was higher than that of the quantitative analysis.

Finally, the literature also refers to how and when the *mixing* takes place. In other words, how the two methods relate to each other in terms of data collection and analysis. According to the guidance of Creswell (2009:207), the qualitative and quantitative methods were used simultaneously, but not necessarily by combining the two sets of data in the same dataset. Secondly, triangulation occurred by comparing the results of the quantitative analysis with the results of the qualitative analysis. So the mixing only happened during the analysis and enfolding of literature phases, both on the case and the inter-case level, where findings were being analysed and interpreted. Creswell (2009:213) refers to this as a concurrent triangulation design. The detail of exactly how the timing, weighting and mixing of methods was implemented for data collection and analysis can be found in Chapter 4.

2.4 DESIGN: RESEARCH METHODS

2.4.1 Research Setting and Selection of Cases

The target population for companies selected as "cases" was from the Information and Communication Technology (ICT) and related sectors. In other words companies either delivering IT or ICT-type services, or using these ICT services or providing consulting regarding these services. The sampling of the companies was judgemental or selective. This is a non-probability type of sampling where the selection of who or what to include is done by the researcher. This technique was used with the aim of including companies where the phenomenon of virtual work was

present, thereby negating the limitation of this technique of being seen as unrepresentative (Saunders *et al.*, 2009:236).

In terms of the selection process, there were firstly two companies who had volunteered to participate because of their interest in the topic, as well as the challenges they were facing with managing their current virtual knowledge workers. The company in which the researcher was employed at the time was also included, as well as another ICT company that afforded its employees flexibility based on the type of services being delivered. Two other companies that were contacted declined to participate. The one company felt that the information that would be requested was too confidential, and the other company felt that it did not support virtual work sufficiently.

The final representivity of the sample group regarding the topic under consideration was high. A total of 86% of the individuals surveyed across all of the cases were classified as virtual knowledge workers (working away from their manager for more than one day per week). Therefore the sample was found to be representative of the virtual worker phenomenon.

The qualitative strategy of enquiry also allows for the extension of the sample if data saturation has not been achieved, or if the sample is found to be non-representative in any of the other parameters such as company size and/or existence of virtual work policies. Data saturation occurs when no new concepts or categories emerge from new data. Saturation shows that data collection is complete (Goulding, 2002:69; Smith, 2004:28). In this regard, after collection and initial data analysis, one additional company was added to determine whether a larger company which had a more established virtual-work guideline would prove any different. However, after the first two interviews in this company it was already found that data saturation in terms of the themes identified in the first four companies (*i.e.* cases) had been achieved.

All five companies signed letters of agreement to participate in the study (refer to the example letter in Appendix D – Case Study Protocol, Figure 13-1 for page 1 and Figure 13-2 for page 2). Pseudonyms were used for the names of the companies to protect their identities and keep them anonymous. The first company entered was

used as the pilot study, and has been called Alpha. The additional company that was added at the end, where differences were tested in relation to the rest of the findings, was named Delta. The other companies were called Echo, Foxtrot and Tango respectively.

2.4.2 Entrée and Establishing Researcher Roles

An individual, or company representative, was identified in each of the companies which had volunteered or which were selected for participation. These individuals were the initial point of contact, and the protocol to be followed in their company was discussed with them. In this regard, initial meetings were held with all five of the companies, and they agreed to the methodology proposed for the research. The company representative was also used to assist in identifying the divisions and teams that were included in the research, as well as identifying the organisational representatives for HR and IT. The company representative was required to do the initial introduction of the research to all of these parties, and explain to the individuals the commitment of the organisation to being involved in this study. An example letter was provided to the company representative. It was found that when the companies had volunteered from an operational perspective, it was easier to identify and gain access to the managers and their teams, while with those companies that were approached through the organisational hierarchy, and that used HR to identify the teams, the entry was much slower and there was more difficulty in getting the right teams identified.

2.4.3 Elements of the Embedded, Multiple-Case Study Design

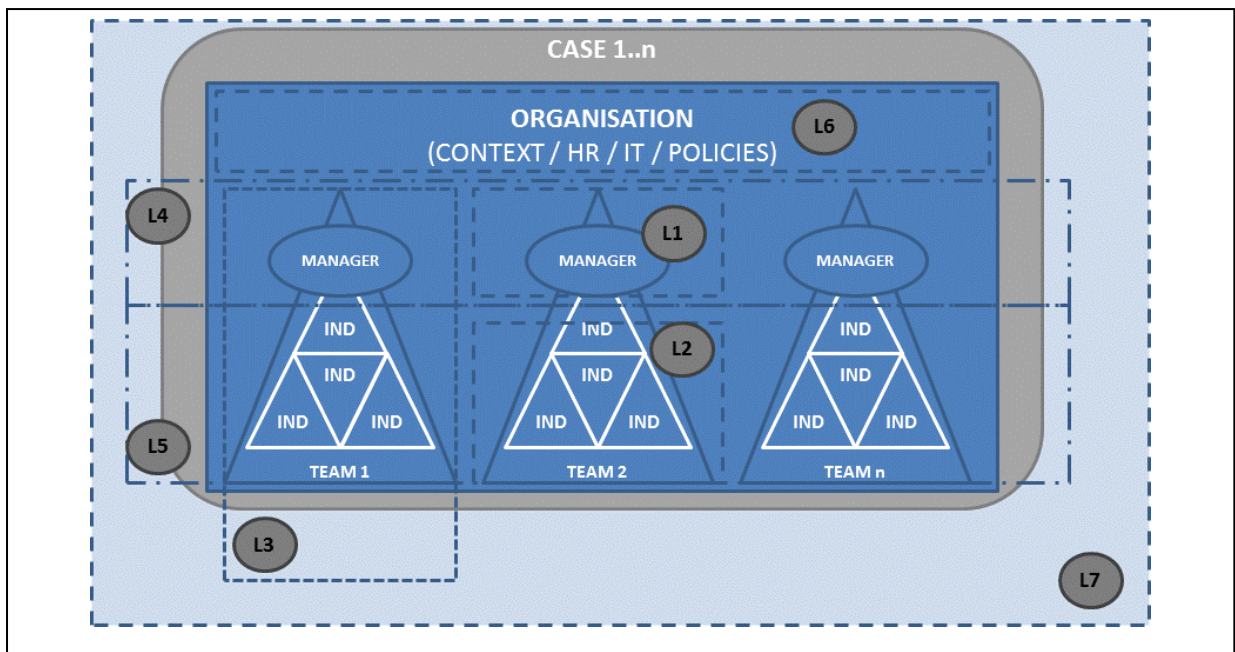
As described under the strategy of inquiry, an embedded, multiple-case study design was used. The word *embedded* implies that there was more than one unit of analysis within a single case, while *multiple* indicates that more than one case study (or company) was included, so that comparisons could be made between cases. From a terminology point of view, each case was related to a specific ICT company, which is identified by "L7" on the diagram, and the word "company" relates to the case as a whole. The word "team" is seen as the combination of the manager and the individual

team members. The term "organisation" is used to describe the unit of analysis representing the organisational level within the company or case.

The units of analysis are listed and described below, and are represented in Figure 2-5 as L1 to L7.

- L1 – **Manager of team:** Views and opinions of a manager regarding the management of the performance of virtual knowledge workers.
- L2 – **Individual team member:** The perception of an individual team member regarding virtual work performance and their perception of how the managers are managing their performance.
- L3 –**The Team:** The combined perceptions of the individual team members of how they are managed, compared with how the manager thinks he or she is managing the individual team members.
- L4 –**Managers combined:** Line management's approach to and support for managing the performance of virtual knowledge workers within the organisation.
- L5 – **Combination of all individual team members surveyed into one dataset:** Individual employees' (virtual knowledge workers') way of working in the organisation by combining all the teams' surveys of that organisation together in one dataset.
- L6 – **The organisation:** The context or supporting environment that the company (or case) provides in terms of managing the performance of virtual knowledge workers, obtained through the views of an HR representative, an IT representative and content analysis of documents and policies on organisational level.
- L7 – **The case:** This unit of analysis represents the company as a whole, which was important for initial sampling and also for final write-up of the case.

Figure 2-5: Embedded units of analysis in a single case study



Note: IND = individual

Data collection was only performed on three levels, namely organisation level, manager level and individual team member level, represented by L6, L1 and L2 in Figure 2-5. A summary of the sampling and data collection methods for these three levels is given in Table 2-4. Each level of sampling is described in more detail after the table. The interrelationship of the three data collection units is given in Figure 2-6. The assumption was that all three components would have an effect on the ultimate performance of virtual knowledge workers. The semi-structured interviews and the individual questionnaires included questions linking to these components.

Figure 2-6: Interrelationship of units of data collection

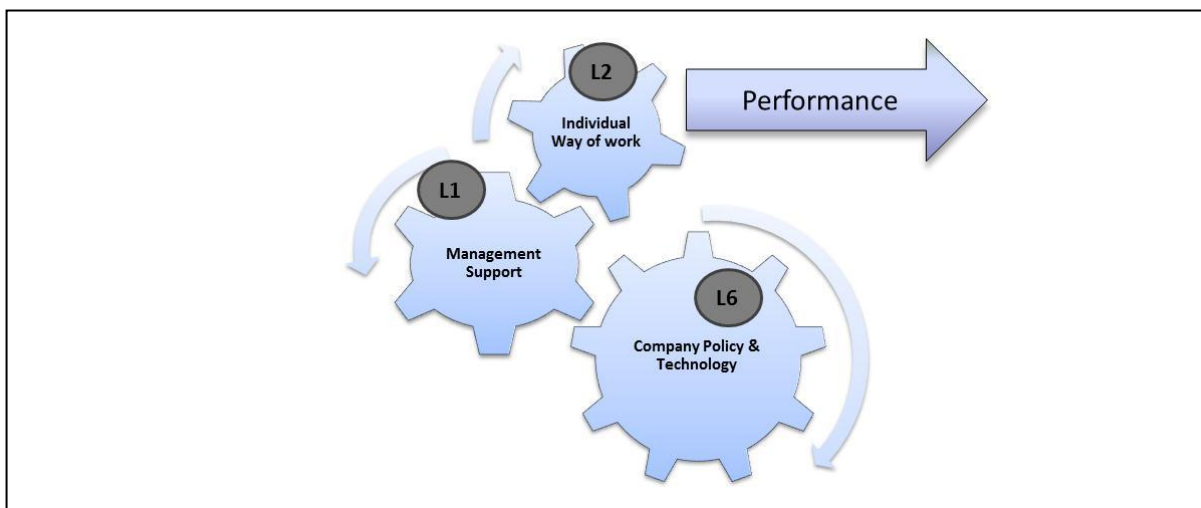


Table 2-4: Summary of sampling, data collection and data analysis

Level of sampling	Sampling	Data Collection	Data Analysis
Company (Case)	Selective and self-select. (Total of 5 companies)	Primary data, except where indicated.	As per other levels
Team	Selective. (Total of 29 teams)	Online / paper questionnaire with comparable questions for both manager and individual team member.	Descriptive statistical analysis
Manager	The manager of the selected team (one-to-one relationship with the team) (Total of 29 Managers)	Semi-structured interviews on site at the company Secondary data: Previous performance appraisals of individual team members	Content analysis
Individual Team Member	Census: All individuals in the selected team. (Total of 163 responses)	Online Questionnaire	Descriptive statistical analysis
Organisation	Selective: HR Representative (1 per company) IT Representative (1 per company) (Total of 10 company representatives)	Semi-structured interviews with representatives on site at the company Secondary data: Policies Lists of systems Performance appraisal examples	Content analysis Document content analysis

In the company, the *teams were selected based on selective sampling* with the help of the company representative. Since it was important that the teams should include virtual knowledge workers, the definition of this term in the context of the study was explained to the company representative to assist with the selection process. The preferred number of teams and the team sizes were also communicated to the company representative. The manager of the team could be either the line manager or the project manager, as long as he or she was directly responsible for the team members in terms of the achievement of their goals. The individual team members could work as part of a team (collaboration required) or as individuals (no specific collaboration required) in the team.

A *census approach* was used for all individual team members in the selected team, meaning that all individuals in that particular unit or team would be included in the research (Zikmund, 2003:369). The perceptions of the individual team member formed part of the unit of analysis on this level, and *online questionnaires were used for primary data collection*. The decision to use online questionnaires in favour of doing focus groups was twofold. *Firstly*, the survey questions were created based on the initial literature review, as some information did exist regarding managing the performance and virtual workers in general. The literature was therefore used to construct some of the questions, and code answers for easy and quick analysis afterwards (Zikmund, 2003:175). The literature used to this end and the initial question framework are presented in Chapter 3. *Secondly*, because questionnaires have pre-coded answers, they are quick and easy for respondents to complete. This was important, as the individual knowledge workers were normally under considerable work-delivery pressure, and had limited time to spend on the questionnaires, as was mentioned in pre-interviews with the respective company representatives.

The disadvantages of questionnaires are that the options are often pre-determined and could therefore preclude novel answers that might be of interest to the study. To counteract these disadvantages, some of the questions made provision for an “other” option, especially where lists of options were provided. Three open-ended questions were also added at the end of the questionnaire, which were used extensively by the individuals, and which were included as part of the content analysis process.

On *organisational level*, *selective selection of a representative of both an HR and IT representative* was done for each company (or case). This is in line with the overall sampling strategy for qualitative research. It was not deemed necessary to include the Group HR Manager or Chief Information Officer (CIO), as their time is normally limited, and the information to be obtained was not necessarily of a strategic nature, but rather of an operational nature. Once again semi-structured interviews were held with the representatives chosen.

The execution of the data collection and analysis is described in Chapter 4.

2.4.4 Textual and Qualitative Data Analysis

A core analysis technique used for the text-type data of transcribed interviews is content analysis, which starts by grouping together answers to the different questions, and continues by systematically reading through them to identify patterns and themes which can be categorised into what are known as “coherent categories” (Taylor-Powell & Renner, 2003:2). This can be done from a predefined category list determined from the literature review, which would match a deductive approach to analysis, which ensures that a new situation matches the existing theory (Leedy & Ormrod, 2010:32; Taylor-Powell & Renner, 2003:3).

Alternatively, one can use the categories that emerge to build a new model, through an inductive approach to theory building (Leedy & Ormrod, 2010:33; Potter in Burden & Roodt, 2007:11). Glaser and Strauss (1967:28) developed an inductive approach to qualitative analysis which they called grounded theory. The principle of this approach was to start with no codes, and as the text was read and reread, codes would emerge. In this way theory could be created from data. Since the data was obtained from a real-life situation, it can be said that the theory was grounded in real-life experiences: therefore the term “grounded theory” was used (Shurinck in Burden & Roodt, 2007:11).

Grounded theory has undergone iterative development, which is important since each iteration is linked with a specific research philosophy (Mills, Bonner & Francis, 2006:2). The original form of grounded theory, as developed by Glaser and Strauss (1967), was pure in two aspects. Firstly, there was the *clean slate* approach to literature and codes, to ensure that the researcher was not contaminated by existing theory. Secondly there was the principle that *the truth* would emerge from the data, meaning that there was only one real “pre-existing” truth hidden in the data. These two principles are linked to a positivist philosophy.

In the evolved theory which was proposed in the 1990s, the concept that a pre-existing truth did not exist, and that a truth would emerge from the context and the specific participants, became more accepted (Corbin & Strauss, 2008:50; Mills *et al.*, 2006:3). This started leaning towards a more constructivist approach, which was

formalised by Charmaz (in Mills *et al.*, 2006:7) into what is known today as constructivist grounded theory. A key principle of this approach is that the researcher becomes a co-author who assists in reconstructing meaning from the information provided by the participants. In addition, it is seen as acceptable to have some literature review inputs as a starting point or to "stimulate thinking" (Mills *et al.*, 2006:4). From an ontological point of view, constructivism is based on the relativist approach, which states that truth exists only relative to a context. From an epistemological point of view, constructivism supports the subjective relationship between the researcher and the participant (Mills *et al.*, 2006:2). This fits in with the overall subjectivist-interpretivist paradigm of this researcher, as described earlier in this chapter. This implies that the truth of the current situation needs to be found relative to the context. For the purpose of this study, the constructivist grounded theory approach was therefore used for data analysis.

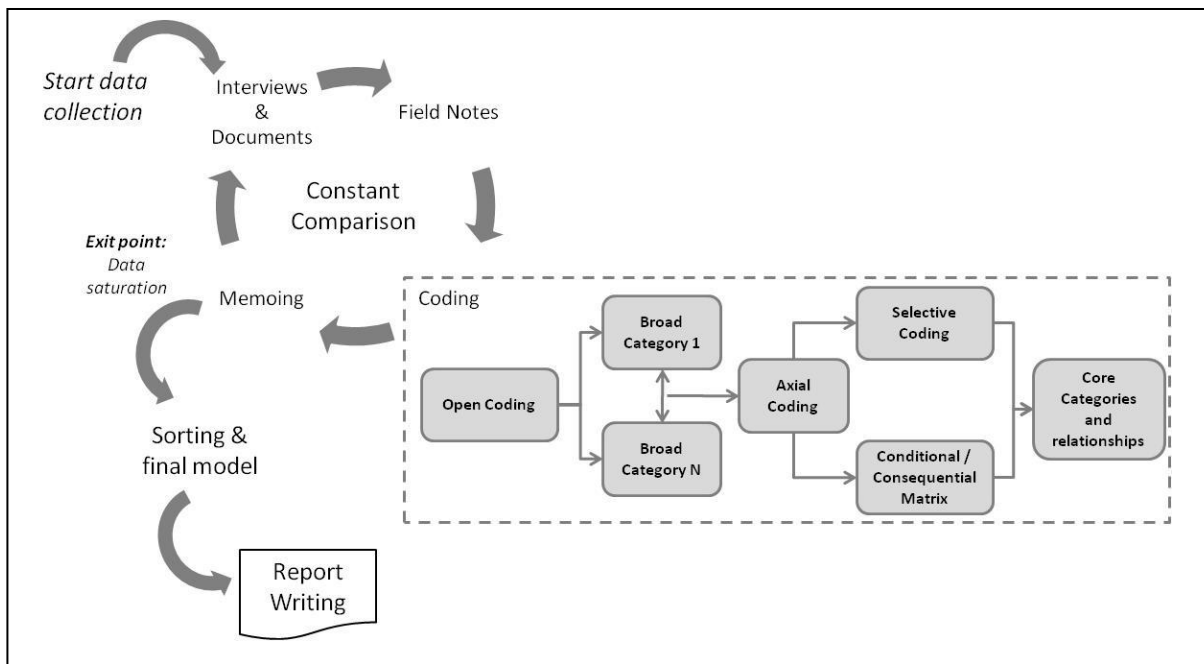
As a further level of detail as part of the case study process, Burden and Roodt (2007:13) propose the creation of a roadmap for the constructivist grounded theory approach. The general roadmap starts with data collection in the form of interviews and collection of relevant documents ("*Collect*" phase in the case study process). During the interview, additional field notes or memos need to be made, to ensure that any relevant contextual data is also captured (Burden & Roodt, 2007:15; Goulding, 2002:65). In this study, for the sake of clarity, the notes made during or just after the interviews are referred to as *field notes*, while the additional notes made during the coding process are referred to as memos (or *memoing*). In this way, memos were used to document additional properties of the emerging categories, and helped to keep a link with the original context of the text, so as to ensure that the intent of the participant was accurately represented, in line with recommendations by other researchers (Charmaz in Mills *et al.*, 2006:7; Goulding, 2002:65; Smith, 2004:29).

Coding, as described by Goulding (2002:77), is "the conceptualisation of data by the constant comparison of incident with incident, and incident with concept, in order to develop categories and their properties". A process is normally followed whereby the coding moves through different and ever greater levels of abstraction to arrive at the underlying theoretical framework. The different steps of coding in a grounded theory

approach are described as part of the execution of the study in Chapter 4 and forms part of the “Analyse” phase of the case study process.

The cycle of data collection, field notes, coding and memoing is normally repeated as part of the constant comparative method in which similarities and differences are compared across the different interviews and cases (Glaser & Strauss, 1967:106; Goulding, 2002:169; Smith, 2004:25), until such time as data saturation is achieved (Goulding, 2002:69; Smith, 2004:28). This is represented by the iteration between “Collect”, “Analyse” and “Share” of the case study process. Data saturation is the exit point at which sorting of information can take place and the final theoretical model can be fully documented (Smith, 2004:29). This links to the “Shaping Hypotheses” and “Enfolding Literature” stages and finally the “Reaching of Closure”. The grounded theory roadmap is represented diagrammatically in Figure 2-7.

Figure 2-7: Grounded theory roadmap



Source: Burden & Roodt (2007); Mills *et al.* (2006); Smith (2004)

The coding of the text can be done in a manual way, by making notes on printed documents and transferring these to post-it notes on walls to give a more visual effect. Coding can also be done programmatically through a tool such as ATLAS.ti. Burden and Roodt (2007:15) suggest a combination of the two methods. For the

purpose of this study, only ATLAS.ti was used. The detail of how the process was executed is described in Chapter 4.

2.4.5 Numerical and Quantitative Data Analysis

Statistical analysis is normally used for quantitative data, such as that collected in a questionnaire. Statistical analysis can range from simple descriptive statistics which are used to describe the different variables that are being analysed (Saunders *et al.*, 2009:591; Zikmund, 2003:736), to the more sophisticated statistical significance testing, which is used to show that differences between sub-groups in the data are not appearing through chance alone, by using correlation coefficients obtained through linear regression (Saunders *et al.*, 2009:601; Zikmund, 2003:402,551). To do this, a hypothesis is normally formulated relating to the differences between two groups in relation to a pre-determined variable (Zikmund, 2003:520). These tests could also be used to correlate answers in the different question components with one another, or used to draw inferences regarding the population.

Since the responses of each team constituted a very small sample size, which rendered sub-groups such as those of virtual vs. non-virtual, age-group and employment status even smaller, it was difficult to ensure that the data was sufficiently complete for the statistical testing to be accurate. Therefore it was decided not to include the statistical significance testing. In addition, from a mixed methods perspective, the presentation of the descriptive statistics is closer to the qualitative descriptions of the textual data, and gives a better coherence in terms of the description of the study results as a whole.

The online survey tool, Lime, was used to create the online questionnaires, and Excel was used for the descriptive analysis component. The detail of how the questionnaires were constructed, as well as the data collection and analysis, is provided in Chapter 4.

2.5 ASSESSING THE RIGOUR OF THE RESEARCH DESIGN

2.5.1 Trustworthiness in Qualitative Research

Qualitative researchers have often been accused of insufficient rigour in terms of their data analysis (Golafshani, 2003:597; Guba & Lincoln in Guba & Lincoln, 1982:246; Morse *et al.*, 2002:2). As Morse *et al.* (2002:2) state, "Without rigor, research is worthless, becomes fiction, and loses its utility". Kidder and Judd (in Yin, 2009:40) state that the four measures of quality used in most social research are *construct validity*, relating to appropriateness of measurement instruments; *internal validity*, relating to causal relationship, which is only applicable to explanatory or causal studies; *external validity*, or generalisation of the findings; and *reliability*, meaning repeatability. While the terms *reliability*, which implies consistently getting the same results (Zikmund, 2003:740), and *validity*, which implies that the correct object is measured (Zikmund, 2003:743), are used in the quantitative research realm, rigour in qualitative research seems to centre around the term of trustworthiness (Golafshani, 2003:602; Morse *et al.*, 2002:5). Guba and Lincoln, (1982:246-247) expand this to *credibility*, *transferability*, *dependability*, and *confirmability*. The research design described for this study is now evaluated according to these concepts.

Credibility or truth value relates to whether the findings of the study actually represent reality (Guba & Lincoln, 1982:246), also known in quantitative studies as internal validity (Kotzé, 2010c:8). From a credibility approach, the advantage of the case study inquiry is that a detailed analysis of each situation (or company) is conducted. The case study and mixed-method approaches allow the collection and analysis of similar data from different perspectives, which allows for the triangulation of data. Triangulation ensures the credibility of the data of any particular case, meaning that the results of each analysis level are cross-checked with another level in the same organisation, making sure that the results correlate (Yin in Dul & Hak, 2008:4). This was applied extensively in the research, by collecting data on organisational, team and individual level. In addition, the individual case descriptions were confirmed with the respective company representative, as part of the member checking approach.

The term *transferability* refers to how generalisable the results are (Guba & Lincoln, 1982:246; Kidder & Judd in Yin, 2009:40), and is known as the external validity of the data. The fact that multiple cases are included allows for the comparison of the different cases (i.e. a comparative case study), to show similarity of results across the different cases. This also links to the concept of data saturation, where each new case does not bring new concepts. Similarity of results across these cases implies that results are potentially transferable (or generalisable) and could be applied to non-evaluated cases as well. In this regard, the definition relating to the virtual knowledge worker is important, so that the virtual knowledge workers across companies (cases) are comparable. This has been a drawback in previous studies, since various terms have been used for virtual workers, including teleworkers, remote workers and mobile workers, as well as the term non-standard worker, which includes many different scenarios of remote work (Broschak *et al.*, 2008:6; Davenport, 2005:27). Eisenhardt (1989:533) promotes the use of a theory-building framework, which includes analysing data within the case to determine initial theories, and then performing pattern matching between cases (referred to as "cross-case pattern matching") to test the generalisability of the theory. The framework also includes the step in which the literature needs to be enfolded ("enfolding literature" as indicated in Figure 2-4) to ensure that similarities to and differences from existing literature and theory can be clarified. Including multiple cases means that the results can be verified across cases, making the results more generalisable, and facilitating the building of theory.

Thirdly, the *dependability* (or reliability) of the study needs to be reviewed. This would imply that the study can be reproduced or replicated under similar circumstances and in a similar context but at a different time (Guba & Lincoln, 1982:247; Kotzé, 2010c:8). To make the study dependable, all procedures, techniques and processes that are followed need to be documented in sufficient detail. Yin (2009:79) promotes the use of a case study protocol, which contains the instruments, processes and procedures for approaching a case, and ensures that each case is approached and executed in the same way. This has been included for this study. In addition, on the data analysis level, the tool ATLAS.ti was used to ensure transparency in terms of coding and analysis.

Confirmability is the last term to contribute to the concept of trustworthiness in qualitative studies. This relates to how objective the research is (Guba & Lincoln, 1982:248; Kotzé, 2010c:8). This can be difficult in qualitative research, especially in the subjectivist-interpretivist philosophy, where objectivity may not always be possible, as the researcher is inherently involved with the research subject, and the values of the researcher play an important role in the data collection and interpretation (Ponterotto, 2005:131). Ponterotto (2005:131) adds that it is important for the researcher to review his or her values up front, and clearly document them, and in so doing acknowledge them, since this type of research can never be totally value-free. Field notes, memos and a research diary were used to this end.

Table 2-5: Trustworthiness (rigour) in research design

Qualitative term	Quantitative term	Application in the research design
Credibility	Internal validity	Within-case triangulation Member checking
Transferability	Generalisability (External validity)	Definition of virtuality Cross-case pattern matching (Selective coding)
Dependability	Reliability	Case study protocol ATLAS.ti for data analysis
Confirmability	Objectivity	Researcher reflections, field notes and memos.

2.5.2 Sources of Bias

A further element that needs to be reviewed and understood in terms of the quality or trustworthiness of the research design is the concept of bias. Bias or inaccuracies in the data can affect the dependability and transferability of the results (Saunders *et al.*, 2009:326). There are many sources of potential bias which are inherent in the design elements chosen for this study, such as selection or sampling, data collection mechanisms, which include interviews and questionnaires, as well as the overall strategy of enquiry, which is the case study.

Firstly, the case selection used judgemental or selective sampling, which is a non-probability sampling mechanism. It is possible that companies with more diverse examples of virtual knowledge workers and their management could have been excluded. Especially in the companies that volunteered, a self-selection bias could

have applied. This type of bias occurs when individuals who feel strongly about a matter volunteer to take part in a research study, giving an inaccurate representation of the actual occurrence of the phenomenon (Zikmund, 2003:178). In this case, it was an advantage to the research, since these companies who participated did include workers who were allowed to work remotely from their managers, and this allowed an important insight into the challenges experienced, and methods used for managing these virtual knowledge workers.

Secondly, in terms of data collection, it is known that the semi-structured interview can create interviewer and response bias. As described by Saunders *et al.* (2009:236), interviewer bias is caused by the way that the interviewer asks the questions, or by own beliefs that the interviewer consciously or subconsciously brings into the interview. This may cause interviewees to answer the questions in a certain way, or give answers that they believe the interviewer wants to hear. Further to interviewer bias, response bias is where the interviewee only declares a part of the total picture. This could be due to many reasons, including confidentiality of certain facts, fear of additional probing questions or time constraints. Morse *et al.* (2002:10) refer to the concept of "investigator responsiveness" and state that "Research is only as good as the investigator. It is the researcher's creativity, sensitivity, flexibility and skill in using the verification strategies that determines the reliability and validity of the evolving study." Since the investigator or researcher is normally the interviewer of the subject, variation in questioning may occur depending on how the questions are answered by the interviewee.

In the current study, to counter interviewer bias and response bias, questions were designed to be as open-ended as possible by asking "Why" and "How" questions, to ensure that the interviewer was not leading the interviewee into a pre-determined response. In addition, an interview guide with core questions was designed for use in all the interviews, to ensure that the core questions were all asked in a consistent manner. The aim was, as a minimum, to cover the questions on the interview guide. If additional questions needed to be asked, they were added during the interview. Where answers needed additional clarification or if all questions were not covered during the interview, the interviewee was re-approached at a later stage via email or additional meeting.

Response bias could also have been experienced during data collection on the individual level, namely with the online questionnaires. The individual answering the questionnaire might not have spent enough time reading the questions, which would lead to inaccurate answers. The individual might also try to complete the questionnaire as quickly as possible, rather than truthfully answering the questions. Individuals could also simply ignore the link as “just another questionnaire” that would take up their already pressured working time. The assistance of the manager was used to introduce the questionnaire, and the questionnaires were available for the individuals for up to three months to allow sufficient time for the individual to answer the questions at a time convenient for them. The highest response rates were normally achieved in the first two days after introducing the questionnaire. Some individuals also answered during the night, which attests to the “always online” mind-set that applies to these types of worker.

2.6 RESEARCH ETHICS

Research ethics is being responsible about how we do research, and always taking the moral high ground. It is about ensuring that we do not seek to obtain answers at all costs, by respecting the rights of those that we include in the study. In this regard it is always important to follow the deontological view, which purports that the end will never justify the means (Saunders *et al.*, 2009:183). Although there are many ethical elements to take into consideration for empirical studies, the three most important ethical elements applicable to the current study and the collection of primary data are initial permission and voluntary participation; confidentiality and anonymity; and the researcher's objectivity and integrity (Saunders *et al.*, 2009:188). These three elements were important because the case study strategy of inquiry was followed, requiring in-depth analysis of each case, as well as direct interaction of the researcher with the subjects of study through interviews and questionnaires. The three selected elements will be discussed in more detail, while the other elements are tabulated in summarised form in Table 2-6.

Table 2-6: Additional ethical elements for primary data

Term	Applicability to Primary Data
Copyright	Permission obtained when previous questionnaires used. References provided when questions from previous research used.
Plagiarism	Relevant citations given of any direct quotes and concepts to be used from previous research. All quotations used from interview data clearly marked. Individuals not mentioned to retain anonymity.
Financial incentives	No incentives, financial or other, used to solicit participation.
Physical or psychological harm	No physical harm possible. No psychological stress, unless filling in a questionnaire or interview participation was stressful to an individual.
Informed consent	The questionnaires requested the consent of the individual participating and disclosed the purpose of the study. An informed consent form was also signed for each interview.
Data storage	The fact that research data would be stored and archived for 10 years was disclosed to the organisation.
Data Fabrication	Once data of the interviews had been coded and consolidated on organisational level, this was disclosed to the organisational representatives, to ensure that they agreed with the organisational representation.
False reporting	Every effort was made to ensure that reporting was correct, and representative of the actual situation. This links closely to the concept of trustworthiness of data, already discussed.

Source: Kotzé (2010d:14) (Adapted)

In looking at the three key elements identified from an ethical perspective in more detail, the first element of *permission and voluntary participation* had already been considered during the study's design phase. This was done through identifying an individual in the company who could be approached for an in-principle agreement on behalf of the company. These individuals were kept up to date as the research methodology was refined. The final permission by the company to conduct the study in that organisation was obtained in writing. (Refer to Appendix D – Case Study Protocol, for the Organisational Permission letter template.)

The fact that the organisation had given permission for the study to take place did not, however, necessarily indicate voluntary participation of all individuals within the company. Any individual had the right to decline participation, even if the company had given permission for the study. The individual could decide on participation at the point when an interview was requested, or when a questionnaire was distributed. Refer to Appendix D – Case Study Protocol, for the informed consent for interviews, and Appendix C – Online Questionnaires, for the consent related to the electronic

questionnaires. Both the organisation as well as the individual could withdraw at any stage of the research process.

During the data collection and analysis, consideration needs to be given to *confidentiality and anonymity* (Saunders *et al.*, 2009:188). Confidentiality refers to the fact that certain information should not be disclosed, such as trade secrets, information relating to competitive advantage and information that could place the individual at a disadvantage by sharing it. Keeping information anonymous implies that it should not be possible to identify the source of the data. From an anonymity perspective, the names of interviewees were not included in quotes used from the interview, and they were represented in such a way that a specific individual could not be identified. On the questionnaire level, no names were requested, but the answers of each team would be stored together, so that these could be triangulated with responses from the manager's interview and shortened questionnaire.

From the aspect of *confidentiality of data*, information was never discussed across levels in the same company, such as discussing team answers with the manager, and was only reported as a final consolidated result for the company to the company representative. The answers of each individual (manager and team member) were in that sense confidential. On the organisational level, the name of the company was not linked to the case, but a pseudonym was rather used, although the context of the organisation was given (e.g. industry, local or international, size) to be able to position the companies in relation to each other. (Refer to Appendix D – Case Study Protocol, for how anonymity and confidentiality were applied during the coding process.)

In addition, the *researcher's objectivity, integrity and honesty* were of importance throughout all the phases of the research study. The aspects of integrity and honesty were even more important for the case study research strategy, since in this type of study the researcher is directly involved in interviews as well as collecting secondary data. The objective of the case study was to do a detailed review of the phenomenon in each organisation, potentially sensitive information was revealed to the researcher. The sensitivity of the information was also based on the fact that the companies taking part in the study were in some cases competitors of each other. The

researcher was fully aware of this, and actively managed the potential conflict of interest. The researcher was and remains bound by ethical standards of the research process, which includes non-disclosure of any information obtained if it could compromise the anonymity or confidentiality requirements, as well as the agreement not to use any information obtained for other than for academic purposes.

Where the companies, however, required it, the researcher also signed additional non-disclosure agreements specific to those organisations. In accordance with the element of objectivity, the researcher used field notes and reflections to ensure that the analysis represented the findings of the case study, and not the researcher's own working situation, which also included the management of virtual knowledge workers.

From a secondary data perspective, there were some elements that needed to be considered (Kotzé, 2010d:14). Secondary data included previous performance appraisals and policy documents. In this regard, there were certain companies that required the signing of an additional non-disclosure agreement (as mentioned above), since this was deemed to be confidential corporate information. It was also decided not to include the policies and any other secondary documents as part of the ATLAS.ti document dataset, to ensure that confidentiality in this regard was maintained. Only relevant portions of the documents were quoted.

2.7 SUMMARY

Chapter 2 has described the research paradigm, research type, strategy of inquiry and research approach. The study used a constructivist grounded theory framework for the overall approach. Within this framework, the research design consisted of the mixed methods research approach, in which numerical data was collected through questionnaires, and analysed using quantitative methods such as descriptive statistics. Textual data was collected via interviews and document review, and analysed using the qualitative methods of content analysis and the constant comparative coding method. The mixing of these methods was important in the context of the case study strategy of inquiry, since it provided a more complete picture of the total case, and was used as part of triangulating the findings within

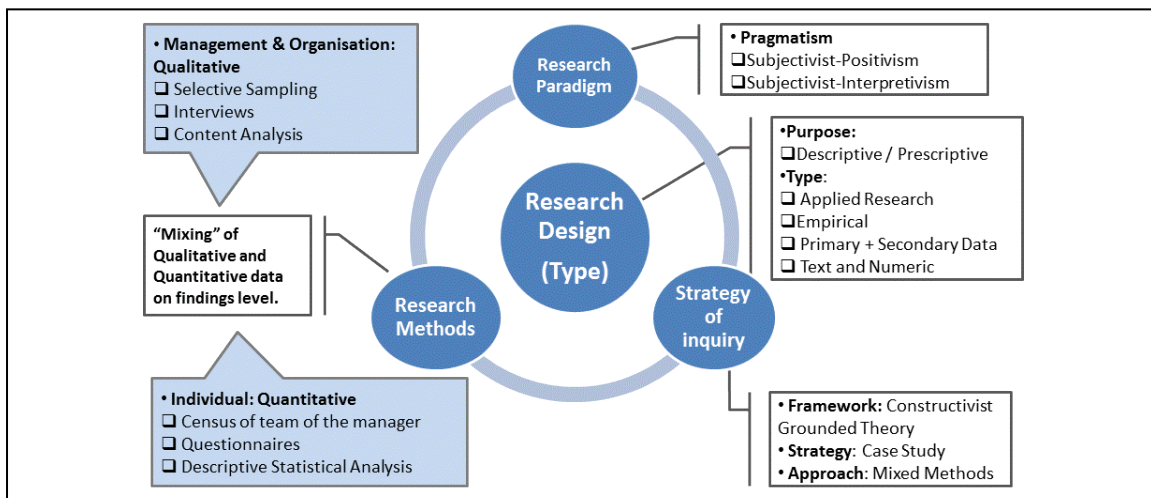
each case. The multiple-case study strategy of inquiry also allowed the identification of both similarities and differences between cases, which aided in the building of theory.

Furthermore, the case study strategy of inquiry supported the in-depth analysis of these real-life situations, which in turn supported the overall nature of the research (exploratory and descriptive), as indicated in the objectives set for the research. This was a good fit with the subjective-interpretivist paradigm adopted for the research. This paradigm supports descriptive research and a subjectivist ontological approach, implying that the context in which the research takes place is important.

Finally, pragmatism, as the selected research philosophy, is a combination of philosophies which holds the view that it is possible to work with variations in assumptions regarding the nature of reality (ontology), as well as variations in how knowledge can best be reproduced (epistemology) (Saunders *et al.*, 2009:109), and therefore advocates the mixing of methods in order to support this worldview (Denscombe, 2010; Mouton, 2009).

The elements of research design used for this study, in terms of the selection of the research paradigm, the strategy of enquiry, research methods and design type, are shown in a combined view in Figure 2-8.

Figure 2-8: Research design elements: summary



Source: Cresswell (2009:5) (Adapted)

For the design, the quality or rigour aspects related to qualitative research have been defined as credibility, transferability, dependability and confirmability. The three most important ethical elements applicable to the current study and the collection of primary data were identified as the initial permission and voluntary participation, confidentiality and anonymity and the researcher's objectivity and integrity.

This chapter has answered the questions “what?” and “why?” for the research design. The “how?” or execution of the design will be discussed in more detail in Chapter 4, while a summary of quality and ethical issues encountered during execution will be discussed in Chapter 8 as part of the closure. The initial literature review will, however, be presented next in Chapter 3, to set the context and describe the guiding framework that was used in the data collection instruments.