Chapter 3 Research methodology

3.1 Introduction

This chapter discusses the research philosophy and strategy of the study. A number of contexts need to be taken into account when considering the research methodology: the IS and ICT4D research landscapes, the study's overall research aims, the practicalities presented by a case study context and the conceptual fit of the theoretical framework. Guidance needs to be provided for executing the study, not only concerning the way of thinking but also to guide data collection and analysis.

The chapter commences with a discussion of the general assumptions underlying research philosophy. Burrell and Morgan's (1979) research paradigms are introduced and critically reviewed before a position is taken on the research philosophy and paradigm for this study. The IS and ICT4D research landscapes are briefly assessed to consider this study's research position within the landscape. The research planning for conducting a case study is presented, including aspects such as the type of study, time frame, the use of theory as well as data collection, analysis and dissemination. The case setting is subsequently presented. The chapter concludes by stating ethical concerns, the limitations of the study and its contribution to knowledge.

3.2 Research philosophy

In this section, the different possible assumptions concerning ontology, epistemology, human nature and regulation vs. change are discussed. These assumptions are used to distinguish between research paradigms. The different paradigms for studying social systems, as presented by Burrell and Morgan (1979), are discussed. After taking into account some of the problems encountered with the paradigmatic division, a research philosophy for this study is suggested.

3.2.1 The subjective-objective dimension

Burrell and Morgan (1979: 1) present three sets of assumptions which they associate with the *nature* of social science. According to them, the extremes of each assumption belong with either a subjective or objective research orientation. The assumptions relate to ontology, epistemology and human nature.

3.2.1.1 Ontology

Ontology concerns the *nature of the world* that is investigated, in this case the social world (Burrell and Morgan, 1979: 1). Does the social world have an existence independent of the observer, or is it the mental product of the observer? Burrell and Morgan (1979: 4) distinguish between two ontological positions, namely realism and nominalism. The *realist* position assumes that the social world has a reality of its own. Social structures have an independent existence, no matter how we refer to them or whether we even know about them. According to the contrasting view of *nominalism*, the social world only exists in the names and labels we attach to it. We use these names and concepts as part of our sense-making and to help us interact with the social world.

3.2.1.2 Epistemology

Epistemology is concerned with *what constitutes valid knowledge about the world*. It is how we come to understand the world and in what way this understanding is communicated (Burrell and Morgan, 1979: 1). Is knowledge something that can be externalised and communicated as facts, or does it need to be personally experienced? Burrell and Morgan (1979: 5) present two epistemological positions, namely positivism and anti-positivism. The *positivist* approach advocates a search for regularities within the social world, as well as causal relationships between its components. Hypotheses are used to help prove or falsify claims about regularities. Positivists are interested in growing the knowledge base of accepted regularities. *Anti-positivist* epistemology is against the notion of any laws or regularities to describe the social world. Anti-positivists do not believe knowledge is gained by being an external observer of social activities. They argue that one needs to get personally involved in such activities; "one has to understand from the inside rather than the outside" (Burrell and Morgan, 1979: 5). Knowledge is subjective and cannot be generated objectively.

3.2.1.3 Human nature

Human nature is Burrell and Morgan's way of referring to *the relationship between people and their environment* (1979: 2). Which determines what happens to people: the people or their environment? *Determinism* refers to the extreme belief that people's situation or environment is in control, whereas *voluntarism* assumes free-willed actors, in total control of their destiny. The human nature assumption is the only one where Burrell and Morgan (ibid.) do not feel strongly that a choice needs to be made; according to them, many social science researchers assume an intermediate position.

3.2.1.4 Associated methodology

Burrell and Morgan (1979: 6) conclude their discussion of the subjective-objective dimension by suggesting *methodological approaches* that go along with each orientation. According to them, an objective stance to social science assumes a realist ontology, a positivist epistemology and determinism. Such a stance, which they term *nomothetic*, requires a rigorous scientific method, similar to what is used in the natural sciences. On the other hand, a subjective stance assumes a nominalist ontology, an anti-positivistic epistemology and voluntarism. Such a stance lends itself to an *ideographic* research approach, the researchers trying to place themselves inside the world of the subject by trying to understand its background, history, life world and characteristics.

3.2.2 The regulation or change dimension

When it comes to the *nature of society itself*, Burrell and Morgan (1979: 12-19) identify two fundamentally different sets of assumptions. The first set of assumptions is concerned with the way the status quo is maintained in society, with a striving towards orderliness. According to Burrell and Morgan (ibid.), this kind of thinking can be seen in e.g. Durkheim's work on social cohesion. It refers to the functionalist kind of thinking where systems theory from biology is applied to social systems. How does a system maintain its stability, how is it functionally integrated, and how are users' needs satisfied? Burrell and Morgan refer to this set of assumptions as the *sociology of regulation*. It is more than just a description and assumption of orderliness, it also implies a normative position, namely that the status quo should be maintained and society is best regulated.

The second set of assumptions is concerned with *radical change*. It does more than just point out existing conflict and disintegration, which could be viewed as the normal state of affairs. It refers to the Marxist kind of thinking, that tries to surface structures of domination, the need for change and emancipation. It sees inherent problems and structural contradictions in the status quo and advocates radical change. It is future-oriented and possibly Utopian in its striving towards a better life for the deprived.

According to Burrell and Morgan (1979: 16-19), the assumptions on regulation and radical change move beyond the traditional order-conflict debate, where order and conflict could be viewed as both present in society as part of normal cycles of social systems. Their normative stance implies that the researcher has to take a position, either believing in regulation or promoting radical change.

3.2.3 Burrell and Morgan's paradigms

Based on the joint assumptions relating to the two dimensions discussed above, namely the subjective-objective dimension and the regulation vs. change dimension, Burrell and Morgan (1979) developed *four sociological paradigms*. They called these respectively the functionalist, interpretive, radical humanist and radical structuralist paradigms. In particular, the realist position in ontology, the positivist position in epistemology, the determinist position in human nature and the sociology of regulation characterise the *functionalist* paradigm. Thus, the functionalist paradigm assumes a social world that exists independent of the researcher and about which knowledge can be gained in an objective fashion. The nominalist position in ontology, the anti-positivist position in epistemology, the voluntarist position in human nature and the sociology of regulation contribute to the *interpretive* paradigm. The interpretive paradigm assumes free will and a cognitively constructed world, about which knowledge is gained subjectively, by personal involvement of the researcher. Both the functionalist and interpretive paradigms assume that the existing social order should be maintained. The functionalists deliberately study the mechanisms they believe contribute to order, whereas the interpretivists attempt to understand the current situation from the inside. The *radical humanist* paradigm is similar to the interpretive in terms of ontology, epistemology and human nature, but it promotes radical change or emancipation. The *radical structuralist* paradigm, advocating change from a positivist and deterministic perspective, is used in Marxist approaches (Burrell and Morgan, 1979: 34) and less widely elsewhere. In terms of the general social science research approaches, the functionalist paradigm is associated with the positivist approach, the interpretive paradigm to the interpretivist approach and the radical humanist to the critical approach.

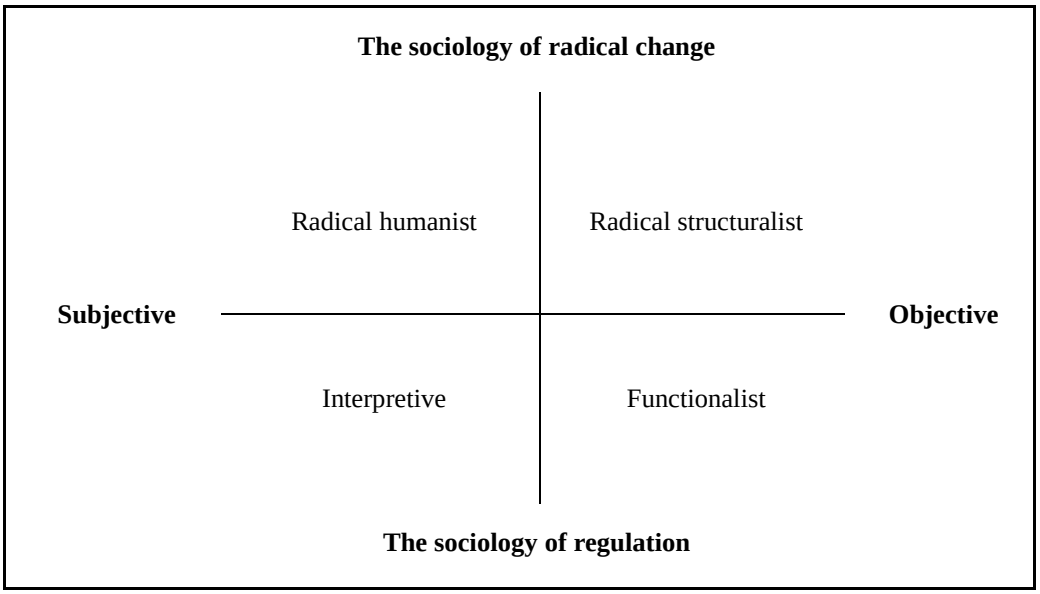

Figure 3.1: The four sociological paradigms
(Burrell and Morgan, 1979: 22)

The four sociological paradigms are summarised in Figure 3.1 above. Before proceeding to motivate the research paradigm of this study, the use of the paradigms within IS and ICT4D will be investigated.

3.2.4 Use of the research paradigms in Information Systems

Oates (2006) as well as Myers (2009) refer to three dominant philosophical paradigms in IS research, namely positivism, interpretivism and critical research. In both authors' cases, the distinction between positivism and interpretivism is only epistemologically based; in other words, Burrell and Morgan's other aspects of ontology and human nature are not discussed. The way critical research is described can be related to Burrell and Morgan's radical humanist paradigm: the epistemological assumptions hold as for interpretivism, but the radical change view is advocated for society as opposed to the regulation or status quo view.

In a seminal article by Hirschheim and Klein (1989), they apply Burrell and Morgan's four paradigms to information systems development. They refer to the distinction in the objective-subjective axis as epistemological only, and to the regulation vs. change axis as ontological. Whereas there is admittedly an ontological aspect to the regulation vs. change views of the social world, Hirschheim and Klein's (ibid.) distinction is confusing as it does not account for the normative aspect. Also, the use of the word 'ontology' on this axis results in the

ontological dimension of Burrell and Morgan's objective-subjective axis being overlooked; Burrell and Morgan's use of 'ontology' being in a more fundamental sense.

3.2.5 Critique of the paradigms

Burrell and Morgan's use of nominalism vs. realism in ontology to distinguish between the interpretive and functionalist paradigms is uncomfortable. Maybe, this is the reason IS research authors such as Oates and Myers only focus on epistemology. Even researchers advocating an interpretivist philosophy may not necessarily want to deny the existence of any degree of independent reality of the social world. Some attempts have been made to deal with this matter, as well as with the problems emanating from the distinction between the interpretive and functionalist/positivist paradigms, in particular those relating to epistemology and human nature. Examples of such attempts, and of research areas that span across Burrell and Morgan's paradigms, are discussed below.

3.2.5.1 Structuration theory

Giddens' (1984) structuration theory is an attempt to bridge the dualism between objectivism and subjectivism in social theory (Mendelsohn and Gelderblom, 2004: 8). Of Burrell and Morgan's three sets of assumptions associated with the objective-subjective dimension, the one Giddens attacks most is the human nature assumption of determinism vs. voluntarism. Giddens does not believe that individual behaviour is merely determined by an externally existing social structure, as do the structuralists whose work would reside under Burrell and Morgan's functionalist paradigm. Neither does he believe that individual agents are totally free and unconstrained by social structures, as does the subjectivist camp whose work would reside under the interpretive paradigm. Giddens replaces the dualism between the camps with the duality of structure, where social action produces social structure, and social structure influences social action.

3.2.5.2 Critical realism

The research philosophy of critical realism appears to specifically deal with the ontology dilemma. Critical realism claims the ontology of realism, namely the existence of a world independent of humans, with structures that have causal powers (Roode, 2003: 1-2; Mingers, 2006: 21). This also holds for social structures. At the same time, it is recognised that the nature of the social world is different from the natural world (Mingers, 2006: 25). Social structures do not exist independent of the social actors involved, and knowledge about these

structures cannot be accessed objectively or in a controlled manner. Despite this so-called epistemic relativity, critical realism advocates that the same, abduction-based critical realist method suggested for the natural sciences is used in social science (Mingers, 2006).

3.2.5.3 Complexity thinking

Notions from complexity thinking have presented challenges to the functionalist/interpretivist divide (Leleur, 2006). When presented with a self-aware, self-reflective and self-referencing system that also observes its environment, what is classified as subject and what as object? Does one assume the ontology of realism or nominalism? Leleur suggests that our perceptions of systems be expanded rather than trying to fit new theories into existing paradigms. He suggests complexity research as an additional paradigm, based on its own set of assumptions. Within this paradigm, he promotes a multimethod approach that uses both hard and soft systems methodologies (Leleur, 2006: 151).

3.2.5.4 Pluralism

Pluralism in methodologies is mentioned by some theorists as a possible way to overcome the limitations in thinking of one paradigm or set of assumptions. Jackson (2003: 282) provides a motivation for combining the philosophical paradigms, using Habermas' work to counter existing arguments of paradigm incommensurability. Jackson's (2003) Total Systems Intervention and Mingers' (2006) call for multimethodology in research and intervention methods both provide guidance as to the systematic combination of approaches; see also Rosenhead and Mingers (2001: 290). Mingers' appropriation of critical realism specifically promotes pluralism (Mingers, 2006: 31), while pluralism is not limited to critical realist research.

3.2.5.5 Systems research

Alter (2004) points to the problematic nature of systems research, not fitting comfortably in either positivist or interpretive paradigm. The complexity that it captures cannot necessarily be reduced to the linear relationships that would make it fit well into positivist research, and the systems nature of a situation does not always lend itself to an interpretive approach. According to Alter (ibid.), research using systems approaches often leads to criticism related to its relevance, rigour and research approach. In this study, which can be classified as systems research, an attempt is made to thoroughly deal with research methodology. At the

same time, it can be seen in the subsequent sections of this chapter that the methodological classification of the work remains problematic in a number of respects.

3.2.6 Research philosophy of this study

The research philosophy for this study is a careful or qualified interpretivism. It is indicated below how a philosophy of interpretivism is broadly rather than closely followed.

The basic assumptions of interpretivism have been discussed in previous sections. From the writings of Myers (2009: 38), Oates (2006: 292), Lee (1999) and Walsham (1995: 378), interpretivism appears to be a better home for a study of the social environment (in IS) than positivism. The research approaches of the natural sciences are not regarded as appropriate for social studies, because they do not have a way to deal with "the human phenomenon of subjective understanding" (Myers 2009: 38). According to Myers, social researchers study subjects and not objects. Social researchers have to deal with a double hermeneutical challenge, of subjects (researchers) interpreting subjects' interpretation of the world. To try and understand a subject's interpretation, one has to move as close as possible to the subject.

Thus, the *epistemology* of subjectivism will be assumed, and the social systems under investigation will be studied from the inside, taking into account the multiple subjective perspectives of the people involved. The interpretive systems view, namely that a system is a subjective mental construct, will be followed (see Chapter 4, on systems thinking). However, much of the useful systems concepts were developed in the positivist domain. These will not be altogether discarded, and when an objective viewpoint needs to be assumed during some stages of analysis, it will be done. Awareness of the point of view of the researcher will be shown as far as possible. Rather than creating a dilemma by not being consistently subjective while doing a systems description, an attempt will be made to strengthen or enrich the subjective knowledge base by adding the assumed view "from the outside" as an additional perspective.

Ontologically, a claim of pure nominalism, as per Burrell and Morgan's interpretivism, will not be made. The possibility of an independent social reality is not ruled out, although subjectivity in the perception of the observer and research participants makes a clear view of such a reality inaccessible. In this study, people's perceptions of social reality and the meaning they construct around it are deemed to be at least as important as the actual underlying social structures.

As regards to *human nature*, an intermediate view will be taken, allowing for both structural influences from the environment and choices exercised by human actors; something akin to Giddens' structuration theory (the latter which is indeed included in the study's theoretical framework, which is discussed in Chapter 7).

In the choice between social *regulation and change*, the order/regulation/status quo position will be assumed. This does not mean that change is not acknowledged or advocated, since change is part of any social setting and any system's life cycle. Rather, it means that the focus will be on *understanding* the *existing social systems* in their current situation, and looking for inherent patterns and organisation. Although an ICT4D initiative involves bringing about change, this study does not advocate disruptive transformation but rather wants to see how existing social practices can be accommodated when technology is introduced in a culturally defined environment.

The theoretical framework for analysis is that of social autopoiesis, incorporating Giddens' structuration theory (Turpin, 2009; Turpin and Alexander, 2010; Chapter 7 of this study). This social systems theory, which use is motivated for later in the study, is placed loosely in the interpretive paradigm, which appears to be an appropriate home for both autopoiesis and structuration theory, at least to the extent that both these theories are non-functionalist and non-teleological (Mingers, 2004: 406; 2006: 19,88). In Section 3.2.5 above, structuration theory is given as an example to critique the interpretive/functionalist divide. While structuration theory presents an attempt to bridge the divide between objectivism and subjectivism in social thinking (as discussed in more detail in Chapter 5), Giddens appears to be interpretive in his approach overall. Autopoiesis theory is not totally interpretive: Bailey describes Maturana and Varela's autopoietic approach as "in many ways just traditional science" while he simultaneously describes it as emphasising "the hermeneutic, the interpretive, the role of the observer in the system" (Bailey, 1994: 286). In Section 6.2.6, the influence of interpretive scholars on Maturana and Varela's thinking is discussed, while some contradictions in the latter's stance are simultaneously indicated.

3.3 The IS and ICT4D research contexts

A concise overview of the IS and ICT4D research landscape is presented below, as context for positioning this research project. Some of the material discussed overlaps with the ICT4D background information in Chapter 2. However, it is reviewed here with a different emphasis, namely the research methodologies that accompany ICT4D thinking.

3.3.1 Research strategies in Information Systems

How does the choice of interpretivism compare to the research paradigms historically and currently applied in IS? As mentioned earlier in this chapter, the dominant research paradigms in IS research are positivism, interpretivism and critical research. IS research, also called MIS research in the United States, started from an almost purely positivist approach, as an extension of computer science (Landry and Banville, 1992; Lee, 1999). However, the significance as well as messiness of the organisational context became more apparent with time, so that other approaches to deal with the social environment became not only accepted but also necessary. Neither Lee (1999) nor Landry and Banville (1992) are convinced of the scientific or practical justifiability of positivism, the latter which has remained dominant in their respective environments during the 1990s. Lee suggests more critical research for the future, such as by using critical social theory, while Landry and Banville advocate methodological pluralism.

Walsham (1995) discusses the slow move towards interpretivism in IS that he has noticed up to 1995. By 2006, he claims and substantiates that "interpretive research in IS is now a well-established part of the field" (Walsham, 2006: 320). Two of the IS journals that are A-rated by the Association of Information Systems (Dwivedi and Kuljis, 2008: 678), namely the *European Journal of Information Systems (EJIS)* and the *Information Systems Journal*, recently published surveys of research approaches used in their journals (Dwivedi and Kuljis, 2008; Avison et al., 2008). Both of these show that the interpretive paradigm has become dominant in their journals, closely followed or matched by positivist studies. Published critical studies are far less frequent, and have only made an appearance relatively recently.

From the above, one can see that interpretivism has become a mainstream research philosophy in IS although it has not been the case initially. Qualitative, interpretive case study research, as is proposed for this study, is the most prominent research approach in *EJIS* publications from 1997 to 2007 (Dwivedi and Kuljis, ibid.).

3.3.2 The ICT4D research context

In the discussion below, the landscape of ICT4D research approaches and discourses is concisely sketched, in order to position this study within the ICT4D research landscape.

3.3.2.1 Addressing the social context of ICT4D research

Where the social context is recognised by IS studies, it is usually that of the business organisation (Lee, 1999: 9). In ICT4D research, the immediate social context is likely to be a community that bears little resemblance to a business. Along with 'community' often come factors such as a different culture, language, power structures and economic activity. Thus, the social context in an ICT4D study cannot be studied in the same manner as the social context of a traditional IS project; it requires additional care. In Avgerou's (2008; 2009) ICT4D research discourses, it is indicated how the added challenges of studying a community in a developing country context are addressed differently by researchers with differing sets of assumptions about innovation and development. After having introduced them in Chapter 2, Avgerou's discourses are revisited below to see what their associated research methodology implications are.

3.3.2.2 Research approaches associated with the ICT4D discourses

In Chapter 2, three prevailing discourses in ICT4D research are discussed, namely "transfer and diffusion", "social embeddedness" and "transformation" Avgerou (2008); the latter is subsequently divided into "progressive transformation" and "disruptive transformation" (Avgerou, 2009).

What are the research approaches associated with each? From Avgerou's (2009) discussion of the transfer and diffusion discourse, this discourse appears to go along with the studying of technology acceptance factors in developing countries. From Avgerou's discussion, the researcher infers that the transfer and diffusion research could be associated with a positivist research philosophy.

The social embeddedness discourse with its focus on understanding local social dynamics and local processes of IS innovation (Avgerou, 2009) is inferred to go along with an interpretivist research philosophy. This would be consistent with researchers in the social embeddedness stream's extensive use of social theory, such as structuration theory, Actor Network Theory, contextualist theory and activity theory (Avgerou, ibid.).

The discourses concerned with "transformation" (Avgerou, 2008), in particular "disruptive transformation" (Avgerou, 2009) has a critical stance, often drawing from critical social theory. Since it questions agendas for development and attempts to uncover power struggles

and exploitation within the local environment, it can be associated with a critical research philosophy.

3.3.2.3 An ICT4D research survey

In Walsham and Sahay's (2006) survey of the ICT4D research landscape between 2000 and 2004, they investigated ICT4D articles in 13 major IS journals as well as ICT4D conference proceedings. In terms of methodology, they found the majority of papers to be interpretive, according to them a natural fit with the nature of questions and issues addressed in these papers. Walsham and Sahay (ibid.) believe that when comparing this set of research with work done prior to 2000, the research methodologies of the recent papers were more solid and of a better quality. They mention in particular that there are more in-depth case studies in the recent work.

3.3.2.4 The ICT4D discourse associated with this study

Within Avgerou's discourses, this study is closest aligned to the "social embeddedness" view of IS innovation. It specifically aims to understand and describe the social context where an ICT4D intervention takes place. In terms of the transformation view, it does not take a stance that unquestioningly assumes ICT's positive role in economic development, nor does it take a stance that is explicitly critical. It is neutral in the sense that it wants to assess the influence of an ICT4D project on its system served. The ICT4D project hopes to make a contribution by assisting local initiatives that have a track record of successfully providing education, health care and social care within the community, to expand and improve their reach by means of ICT. There is an awareness of inequalities and tensions within the community, and the researchers on the project are not uncritical of the assumptions made by foreign donor agencies involved. Overall, the view is that careful introduction of ICT into existing institutions that contribute towards socio-economic development, will assist those institutions to better achieve their developmental objectives. Thus, the transformation view of the study is perhaps closer to "progressive" than "disruptive" transformation, without taking a strong "progressive transformation" view. The ICT4D research paradigm most closely associated with the mentioned assumptions is described by Avgerou as "ICT and development as socio-economic improvements though locally situated action" (Avgerou, 2009: 21). Since "social embeddedness" is its strongest feature, it will be referred to in this manner, rather than using the full name of the research paradigm.

As indicated in a previous paragraph, the "social embeddedness" view is associated with interpretive research, which according to Walsham and Sahay (2006) is also the dominant research methodology in ICT4D. Thus, the choice of an interpretive research methodology for this study is consistent with the research stream it aligns with as well as with ICT4D research in general. This study's aim of explicitly dealing with the social context in an ICT4D study is well represented by the "social embeddedness" view.

3.4 Research strategy

In this section, the research strategy of this study, namely case study research, is motivated and discussed. The research strategy is revisited in a reflective manner in Chapter 9, as a prelude to the data analysis.

According to Flyvberg (2006), all knowledge about the social world is context dependent. People learn more effectively from cases than from rules, because of the presence of context. As such, case studies are not only useful but necessary as a means to convey knowledge. Flyvberg also refers to Kuhn, who stated that in order to be effective, a discipline requires a large number of thoroughly executed case studies as exemplars (Flyvberg, 2006: 242).

3.4.1 Case setting

The case study presented in this research is a longitudinal single case study. Researchers from the University of Pretoria have carried out IT training in the deeply rural community of Tugela Ferry in KwaZulu Natal. Tugela Ferry is a geographically remote settlement in a designated Zulu tribal area, which means it is part of South Africa but the land is controlled and managed by the Zulu kingdom, by means of a traditional leadership structure. Centrally located in Tugela Ferry is a Christian mission. IT literacy training took place at the mission school on their invitation. The two interdependent communities most closely involved and affected by the IT project was the traditional Zulu community with its centuries old set of cultural practices, including an ancestral belief system, and the Christian mission community, with its Western and Zulu staff as well as predominantly Zulu congregation members. These two communities represent the 'systems served' by the ICT4D project, using the language of Checkland and Holwell (1998), and have accordingly been selected to describe and analyse as the social systems of concern.

The above case has been chosen because of its strong set of social system characteristics, which proved promising in terms of a systems modelling exercise. In terms of Oates' possible reasons for selecting a case (Oates, 2006: 144), this case was chosen while it provided a unique opportunity, and to be a test-bed for a social systems theory. The researcher decided to immerse herself in the case as a single case study, since the particular social environment proved a challenge to understand culturally, and contained enough internal variety and complexity to justify expending all her efforts on it.

3.4.2 Case study format

The case study takes the form of a descriptive as well as an explanatory study. In a descriptive study, a "rich, detailed analysis of a particular phenomenon and its context" (Oates, 2006: 143) is provided. An explanatory study attempts to add to this description an explanation of why certain outcomes occurred. According to Gregor, a theory for explaining could also be called a theory for understanding: it attempts to show "how the world may be viewed in a certain way, with the aim of bringing about an altered understanding of how things are or why they are as they are" (Gregor, 2006: 624). In the Tugela Ferry case, a rich description of the two social systems that were identified, is used with the eventual aim of assessing the ICT4D project's developmental impact on these social systems.

3.4.3 Time frame

The time frame of the case is the duration of the IT project, from its inception in 2009 until its effects could be observed in the community. The time period for observing effects is around two calendar years from when the first formal IT training took place, up to August 2011. Within this period, a number of site visits by combinations of members from the implementation and research project team have taken place, including five visits by this researcher. An iterative sense-making process oscillating between on-site fact-finding and back-office study and reflection has taken place during this period, with data collection and interpretation influencing each other.

3.4.4 Generalising from the case

Will it be possible to generalise from this case study? An interpretive case study focuses on understanding "from the inside" and attempts to generate in-depth knowledge about a particular situation. As such, its relevance may be in basic knowledge accumulation, which is not necessarily less valuable without generalisation (Flyvberg, 2006: 227).

According to Oates (2006: 145) it is possible to generalise from a single case, to the extent that it has characteristics typical of other cases. Flyvberg (2006) discusses the trade-off between the generalisability that is possible on a typical case and the value gained from studying an unusual case. He argues that one might learn more from studying a less typical case, which has been carefully selected because of the relationship of the unusual attributes to the theory or proposition investigated. The Tugela Ferry case held promise for applying the selected social systems theory, as discussed in more detail in Chapter 5. Since this case represents the first time that the particular theory is applied, it is important to aim for success: only after a first-time success will the wider applicability of the theory become relevant. It can be viewed as a critical case in the sense that if the theory cannot add value to this case, it is unlikely to add value in other cases (Flyvberg, 2006: 230).

3.4.5 Principles for conducting interpretive case study research

Klein and Myers' (1999) principles for interpretive field studies are used to guide empirical work on the case study. These principles take a hermeneutic approach to interpretive research, and attempt to make practical suggestions based on interpretivism's philosophical foundations. The seven principles, as summarised below, have been used to guide the study's research process, and data collection in particular:

The fundamental principle is that of the *hermeneutic circle*. The understanding of the whole is influenced by an understanding of the parts and vice versa. This process continues over time, so that every time new meaning is gained in one area, the interpretation of the entire rest of the system under investigation needs to be reassessed. This researcher's understanding is that the research planning/theoretical lens and collected information also inform each other continually over time, as part of the hermeneutic circle.

The principle of *contextualisation* states that the background and history of a case setting needs to be taken into account when interpreting the current situation, also for the benefit of the reader of the researcher's work. However, an interpretive approach recognises that context cannot be used to predict, is dynamic and can be influenced by the researcher.

According to the principle of *interaction* between researcher and subjects, the information that is collected is not "out there" but constructed in the interaction between the researcher and subjects. Not only does the researcher subjectively interpret, but the way participants

present information is influenced by how they view the researcher, how they interpret and are influenced by the research process.

The principle of *abstraction and generalisation* requires the ability to conceptualise the information collected in the ways described above. Theory is often used as part of the abstraction, providing a way to package concepts, provide insights and draw conclusions.

The principle of *dialogical reasoning* asks the researcher to critically revisit the assumptions that have been made at the start of the research process, which led the researcher to use a particular theory or design the research in a certain way. What were the propositions and what story did the data really tell? The aim is not to eliminate prejudices but to surface them and to indicate whether or where they have changed. In line with this reasoning, Flyvberg (2006) advises that the researcher is on the constant lookout for information that could be used towards verification (confirmation of assumptions or propositions) as well as falsification (finding evidence contrary to assumptions or propositions).

The *multiple interpretations* principle requires that the researcher actively seeks for multiple viewpoints in a situation, records them and also tries to make sense of possible reasons for the differing views. Having to find a conceptual means to accommodate differing views may lead to a new interpretation of the situation.

The principle of *suspicion* requires the researcher to be on the lookout for inconsistencies in the data, and to question the surface meaning of what people say. It might happen that people provide false or distorted information because of their own agendas. Since interpretive research needs not be critical, Klein and Myers (ibid.) regard this principle as optional.

In the Conclusion of the study, these principles are revisited as part of an assessment of the way the empirical research has been conducted (Section 10.3.2).

3.5 Using a theory

As mentioned in section 3.2.6, a systems theory of social autopoiesis is used on the case study, of which the principles are discussed in Chapter 6 and the application framework in Chapter 7. Walsham (2006: 324) suggests that in interpretive IS research, theory could be used in three ways, namely “as an initial guide to design and data collection, as part of an iterative process of data collection and analysis, or as a final product of the research.” In this

case, theory is used iteratively for data collection and analysis while the theory is refined in the process. As such, the theory not only deductively informs the data collection and analysis but is also a product of the research process.

Walsham (2006: 324) admits that the choice of a particular theory is always subjective. In his analysis of a few literature cases where a theory was used, the only consistent rationale he could find for the choice of theory was that it "spoke" to the authors. He suggests that researchers choose a theory firstly because they feel personally comfortable with it and it appears insightful to them. If they are themselves convinced of its use, it will be easier to convince the research audience. However, there should be some basis to motivate for its use, after having read widely on different theories and listened to others' advice on what works for them. If the potential value of using a theory needs to be confirmed, a preliminary analysis can be done and presented as a working paper or at a conference, with the author requesting feedback.

Truex et al. (2006) propose that the following aspects are considered when adapting a theory from another domain into IS research: the fit between the theory and phenomenon of interest, the theory's historical context, the fit between the theory and research method, and lastly the contribution of the theorising process to cumulative theory, meaning that the new theory should be compared to existing theories when arguing for its value addition.

Walsham's (ibid.) as well as Truex et al.'s (ibid.) criteria are revisited in Chapter 5, when criteria for selecting a social systems theory are presented.

3.6 Information collection

The selected research strategy is a case study. The centrality of cultural aspects in the study calls for the supplementation of 'typical' case study information collection methods, namely interviews and documents (Myers, 2009: 79) with ethnographic methods such as field notes. As such, the researcher does not subscribe to the strong distinction made, almost a mutual exclusivity, between the case study and ethnographic research methods, as found in Myers (2009).

Empirical information has been collected by means of observation, interviews (semi-structured and unstructured) and relevant documentation. Information is predominantly qualitative. Observation has been performed with two aims. Firstly, general contextual

knowledge was seen to be important because of the central role of cultural practices in the study, in particular the lifestyle of the deeply rural Zulu people and the mission culture. To some extent, the researcher will always remain an outsider when visiting the community. However, some participant observation was done where opportunities arose (Myers, 2009: 138). This did not take the form of living like the people, but rather participating in selected social and work activities as makes sense. The ethnographic method of making field notes (Oates, 2006: 176) has been used extensively while visiting the site. Secondly, during observations the researcher was on the constant lookout for specific information to populate the theoretical framework. Interviews were also conducted with the theoretical framework in mind. It was found that the highly abstract theoretical concepts of the framework required careful 'translation' in order to be suited as interview questions and topics, given the local context that was very different from the researcher's life world. The research also made use of a third information source mentioned above, namely documents, in the form of census data and community-specific reports.

3.6.1 Ethical aspects

The ethical clearance procedure of the university required gaining informed consent from respondents interviewed. However, in the Tugela Ferry case, the extreme vulnerability of the community asked for additional care with ethical matters. The project team on the ICT4D project set some practical ethical guidelines to themselves, including constant awareness by the researchers of ethical dilemmas. Some such possible dilemmas are discussed by Walsham (2006: 327). He mentions commonly accepted ethical criteria of harm to participants, informed consent, privacy and deception. In addition, he discusses criteria originating from dilemmas that he has personally experienced, around non-disclosure of identity, keeping the interests of the organisation (community) at heart and critical reporting in the literature. In Chapter 9 of this study, some ethical matters that were practically encountered in Tugela Ferry are discussed, along with the results of the data collection exercise.

3.7 Information analysis

Information has been analysed and reported on using the concepts of the theoretical framework, the results of which are presented in Chapters 8 and 9. As a guideline for data analysis, Walsham (2006: 325) warns that whatever the analysis method chosen, the researcher's common sense must take precedence. In other words, one should not get so locked in to an analysis process or theory that something else emerging from the data might

get lost. In this study, the iterative process of revisiting the theoretical framework while doing data collection gave the researcher the opportunity to deal with some mismatches between what the data indicated and what the theory assumed.

3.8 Research audience

The audience at which this research is aimed, is the ICT4D research community as well as the systems thinking research community. Even though the traditional IS research community is not a primary audience, the treatment of the social context of an information system from a social systems angle is believed to also have value to the IS research community.

3.9 Contribution to knowledge

How will the study's contribution to knowledge be assessed? Myers states that a case study's contribution to knowledge is found in the generalising from the findings, as shown conceptually or by means of a theory (Myers, 2009: 84). The ability to generalise has been discussed in section 3.4.4. Further, according to Gregor, the contribution to knowledge that is expected when using a theory for explaining or understanding is "whether new or interesting insights are provided". It is also judged on the "plausibility, credibility, consistency, and transferability of the arguments made" (Gregor, 2006: 625). Thus, one needs to show credibility in the research process, information collection and argumentation throughout the process. The provision of new or interesting insights is understood to be the ability of the research to let the reader see the situation in a new or different light.

In this study, systems thinking is used to describe the multiple social systems involved in an ICT4D project as well as their mutual interaction. The systems described are the systems served as well as the serving system. From this description, the impact on socio-economic development of the ICT4D project on the systems served is assessed. In Chapter 2, the assessment of ICT4D's contribution to development has been noted as a prevailing problem, and that systems thinking can assist with this problem but is seldom used in ICT4D. The development of a social systems framework to describe and assess the impact of an ICT4D project on its systems served is accordingly regarded as a contribution in the field of ICT4D. In particular, the use of social autopoiesis to assess the sustainability of a social system, as well as the impact of ICT4D on the sustainability of its systems served, is a new or different way to assess sustainability in ICT4D. The theoretical contribution of the study is evaluated in Chapter 10, using the criteria suggested by Whetten (1989).

3.10 Limitations of the study

The study limits itself to the application of systems thinking in ICT4D. However, a large portion of the work involves traversing the general systems thinking and social theory literature, as preparation for developing a social systems framework. As such, a large portion of the work presented in this study is not traditional IS research and also goes beyond the ICT4D domain. In line with the thesis' use of systems thinking to describe the social context in ICT4D, Checkland and Holwell's (1998) systems-based definition of an information system, discussed in section 2.2.2, is used throughout.

A theoretical feature of the study is its use of a combination of social and systems theories in an unconventional way, as compared to mainstream IS and even ICT4D literature. Even the manner in which Giddens' (1984) structuration theory is applied deviates somewhat from its usual application in IS. This study does not limit itself to incrementally building on similar previous work in the field, although relevant work is acknowledged where possible. The results of this study could not have been achieved through incremental work only. While the nature of the study required such an unconventional and multidisciplinary approach, it may limit the acceptability of the work by the mainstream IS research community.

Empirically, the research is limited to a single case study. The case setting is the Msinga municipal district in KwaZulu Natal, South Africa, and in particular the deeply rural village of Tugela Ferry that is situated in Msinga.

While doing data collection in the case setting, the researcher remained an outsider to the community, not being a native Zulu nor being able to speak Zulu. While making extensive use of cultural interpreters, and gaining the perspectives of multiple interviewees as far as possible, the research remains the interpretations of an outsider.

The literature reviewed, in particular the literature relating to ICT4D, systems theory, social theory and autopoiesis, does not include work published after August 2011.

3.11 Conclusion

In this chapter, the research philosophy of this study has been presented with reference to the research assumptions discussed in e.g. Burrell and Morgan (1979). This philosophy has been compared to the prevailing research methodologies and research thinking in IS as well as

ICT4D. Following this, the planning and execution of a case study research project has been discussed. Research planning and execution has been frequently compared with criteria suggested in the literature, such as Walsham (2006) and Klein and Myers (1999). The researcher indicates how the project could make a contribution to knowledge, and what the study's limitations are. Having gone through this process, the research methodology and planning for the study has been thoroughly set out and motivated.

Having presented the research methodology, the study now proceeds to its theoretical component, the aim of which is to develop a social systems framework. The first theoretical chapter deals with systems thinking and systems approaches.