Chapter 3

Research methodology

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Research methodology

3.1. Introduction

The purpose of this chapter is to present the philosophical assumptions underpinning this research, as well as to introduce the research strategy and the empirical techniques applied. The chapter defines the scope and limitations of the research design, and situates the research amongst existing research traditions in information systems.

The philosophical assumptions underlying this research come from the interpretive tradition. This implies a subjective epistemology and the ontological belief that reality is socially constructed. The research strategy adopted was to conduct multiple case studies in two organisations and in a community. The fieldwork was conducted at the sites during the period from February 2000 to April 2001 and a steady correspondence has been maintained with the different informants at the sites. The main data collection techniques used in this research study were semi-structured interviews, participant observation, group discussion, documentation analysis and questionnaires.

This chapter is divided into three sections. In the first, the interpretive stance in the field of information systems is examined. The next section is about the research strategy. It describes the research approach followed in case study research. Finally, section three deals with the research design and covers the reasons for selecting organisations, data sources, research analysis sub-units, data collection and analysis, and a brief summary of the expectations from the theoretical framework adopted.

3.2. The interpretive research approach

Based on the philosophical assumptions adopted, research can be classified as positivist, interpretive and critical (Myers et. *al*., 1998). Different research methods such as case study, and action research, can be positivist, or interpretive or critical, though often this distribution is extremely contentious (Walsham, 1995a).

An IS research project can be considered positivist if there is evidence of formal propositions, quantifiable measures of variables, hypothesis testing, deducing the inferences concerning the phenomena from the representative sample to a stated population (Orlikowski and Baroudi, 1991). Positivist approaches assume that the relationship between social reality and humans is independent, objective of the cause-and-effect type. This approach has, however, been criticised in the literature on IS for its treatment of organisational reality, which is regarded as complex and not easily amenable to statistical deduction. It is also regarded as being too deeply rooted in functionalism and too concerned with causal analysis at the expense of getting close to the phenomenon being studied (Galliers, 1991). Examples of case studies done from the positivist philosophical viewpoint are to be found in Benbasat *et al.*, (1987) and Yin (1994).

IS research may be categorised as critical if its main task is seen as being one of social critique, whereby the restrictive and alienating conditions of the status quo are brought to light (Klein and Myers, 1999). In critical research, the investigation is classified as emancipative if it aims to help eliminate the causes of unwarranted alienation and domination, and thereby enhance the opportunities for the realisation of human potential (Alvesson and Wilmott, 1992; Hirschheim and Klein, 1994). Critical theorists assume that people can consciously act to change their social and economic conditions. They also assume that social reality is historically constituted and that it is produced and reproduced by people. Examples of critical research can be found in Forster (1992), Ngwenyama (1991), Ngwenyama and Lee (1997).

The epistemological stance on interpretive approaches is that knowledge of reality is gained only through social constructions such as language, shared meanings, tools, documents, etc. (Walsham, 1993). In an interpretive research project there are no predefined dependent and independent variables, but a focus on the complexity of human sense-making as the situation emerges (Kaplan and Maxwell, 1994). Those who espouse the interpretive approach, claim that social phenomena must be understood in the social contexts in which they are constructed and reproduced through their activities. In other words, the understanding of social action must

include the meaning that social actors give to their deeds (performance/actions). Furthermore, the advocates of the interpretive stance consider that social reality is constructed as a result of intentional actions (Burrell and Morgan, 1979). Interpretive approaches to research in IS are 'aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context' (Walsham 1993, pp 4-5). Examples of interpretive research include the work of Orlikowski (1991), Walsham (1993) and Myers (1994).

From the philosophical basis of interpretive research, four categories of interpretive approaches can be identified: phenomenology, ethno-methodology, philosophy of language and hermeneutics (Myers, 1997). An example of research based on phenomenology can be found in the research work of Zuboff (1988). Zuboff (1988), in her research work, discussed how the role of IT has not only been to automate procedures and approaches but also at the same time to produce new information. An example of ethno-methodology is found in the research work of Suchman (1987) and an example of hermeneutics can be found in the research work of Boland (1991) and of Lee (1994).

Using the interpretive perspective will enable us to increase our understanding of the critical, social and organisational issues related to the adaptation and adoption of ICT/IS in organisations or communities. The interpretive approach operates under the assumption that access to reality is only possible through social constructions such as language and shared meanings. It has its philosophical base in hermeneutics and phenomenology. Walsham (1993) asserts that the purpose of the interpretive approach in IS is to produce an understanding of the context of IS and the process whereby IS influences and is influenced by the context. Interpretive approaches give the research greater scope to address issues of influence and impact, and to ask questions such as 'why' and 'how' particular technological trajectories are created (Boland, 1985, 1991; Orlikowski and Baroudi, 1991; Deetz, 1996).

As a way of improving the quality of research conducted from the interpretive perspective, Klein and Myers (1999) proposed a set of principles based on the

hermeneutic orientation. The set of principles is as follows: (i) the hermeneutic circle, (ii) contextualisation, (iii) interaction between the researcher and the subject, (iv) abstraction and generalisation, (v) dialogical reasoning, (vi) multiple interpretations and (vii) suspicion.

Klein and Myers (ibid.) show us how these principles are interrelated - they consider that a researcher decides what relevant context(s) should explored - Principle 2 is in use in this case. When it comes to how the data are going to be created in relation to the subjects, Principle 3 plays its role. In deciding which theories or concepts and which research will be abstracted and generalised, it is Principle 4 that is being used. When the researcher's own intellectual history is at issue, Principle 5 is in use. Different versions of interpretations may come into play and if they require the researcher to examine the influences of the social context and document the multiple views of 'stories', the use of Principle 6 is advisable. Finally, when the aspects of reality are presented in order to formulate research questions critically, Principle 7 is in use. It is clear that it is not possible to describe all aspects of the context. The researcher has to decide what to say depending on the audience and story that he or she wants to tell.

Klein and Myers (1999) recommend that researchers must work out for themselves 'how' and 'which' principle may be applied in any particular situation. They also believe that this set of principles may not be used mechanically, since the importance and relevance of each principle is partly derived from the manner in which the others are applied to the collection and interpretation of the field material.

If this set of seven principles is used, the research work can become more plausible and convincing to its target audience. Hence the main aim of this set of principles is to improve the plausibility and cogency of the research.

3.3 The case study strategy

It is recognised that not all case studies are interpretive. Case studies are normally associated with qualitative research, but can also be used as a method of inquiry employing a positivist epistemology and ontology.

Yin (1994) warns against confusing case studies with qualitative methods using the ethnographic method. Ethnographic methods are derived from cultural anthropology. In studying organisations these methods might help the researchers to extract cultural knowledge, and identify actions and instruments that participants utilise in their everyday life (Schwartman, 1993; Prasad, 1997). Yin (1994) distinguishes ethnographies from case studies in that the former take a long period of time to conduct and require very detailed observational evidence. Case studies, by contrast, are conducted within a defined time frame and do not necessarily imply the use of ethnographic techniques. Researchers conducting case studies may not even need to visit the organisation under study; they could collect their data by consulting secondary sources or interviewing respondents telephonically or by e-mail (ibid.). Yin (1994) defines a case study as an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly defined. Yin (1994:13) argues that 'The case study allows an investigation to retain the holistic and meaningful characteristics of real-life events such as individual life cycles, organisational and managerial processes, neighbourhood change, international relations and the maturation of industries.' Therefore, the case study approach is especially useful in situations where contextual conditions of the events being studied are critical and where the researcher has no control over the events as they unfold. The case study, as a research strategy, should encompass specific techniques for collecting and analysing data, directed by clearly stated theoretical assumptions. Furthermore, data should be collected from different sources and its integrity should be ensured. A classification of the different types of case study is shown in Table 3.1.

Stake (1993) distinguishes three types of case studies: intrinsic, instrumental and collective. An intrinsic case study is done when the case is unique and is therefore not representative of others. The purpose of conducting this type of case study is not mainly to build a theory, but because of its intrinsic interest. An instrumental case study is selected to provide insights or to develop an existing theory: 'The case is often looked at in depth, its contexts scrutinised, its ordinary activities detailed because it helps us pursue the external interest' (Stake, 1993:237). Finally, the collective case study is instrumental and extends to more than one instance.

Yin (1993) also distinguishes three types of case studies: exploratory, causal and descriptive case studies. In an exploratory case study, the collection of data occurs before theories or specific research questions are formulated: it is followed up by analysis of data and leads to more systemic case studies. The first stage in this type of case study is to define the issues to be researched. The causal case study will look for cause-and-effect relationships, and search for explanatory theories of the phenomena. For Yin (ibid.) this situation offers the most suitable conditions for adopting the case study as the research strategy of choice. The descriptive case study will require a theory to guide the collection of data and 'this theory should be openly stated in advance and be the subject of review and debate and later serve as the 'design' for the descriptive case study. The more thoughtful the theory, the better the descriptive case study will be.' (Yin, 1993:22). Case studies can also be single or multiple according to their numbers. Case studies can be embedded as well as holistic. An embedded case study is one in which there is more than one sub-unit, whilst in a holistic case study a global programme of organisation is contemplated (Yin, 1994).

Table 3.1: Types of case studies

Criteria	Type of case study
Nature of the case	Intrinsic: unique and extraordinary
	Instrumental: developing theories and insights
	Collective: more than one instrumental case
Theoretical aims	Descriptive: requires theory to guide data collection
	Causal: search for causal and explanatory theories
	Explanatory: data collected before theory
Number	Single
	Multiple
Units	Embedded: more than one sub-unit
	Holistic: global

The case study as a research approach in IS

The case study is a widely accepted research strategy in the field of IS. A study conducted by Scott and Ives (1992) reveals that the case study approach was the most common research strategy from 1970 to1979 from a universe of 532 journal papers. In a similar research study, Farhoomand (1992) shows how from 1977 to 1985 the case study was one of the most popular research methods (25.4%) from 636 papers surveyed from journals focused on or related to information systems. According to Walsham, (1993:14), 'case studies provide the main vehicle for research in the interpretive tradition.' The case study strategy has been argued to be particularly useful for practice-based problems where the experience of the actors is important and the context of action is critical (Lee, 1989; Galliers, 1991).

In information systems, case studies might be classified as positivist, critical or interpretive according to the epistemological and ontological assumptions adopted. Yin (1993) provides a positivist definition when he argues that evidence should link up research questions arising from rival theories. The design should include clearly stated objectives linked to the research questions and basic sub-units of analysis. This research should identify the critical evidence, interviews and documents that support the hypotheses, (including rival hypotheses) and analysis of techniques. Following this stream of thought, Benbasat *et al.* (1987) emphasises the importance of testing hypotheses when conducting case studies. This might be the reason why Walsham

(1993, 1995b) classifies the views on case studies of Benbasat and his colleagues (ibid.) along with those of Yin as positivist. In this thesis it is assumed that the difference between an interpretive and a positivist case study resides in epistemological and ontological positions. The positivist position maintains that scientific knowledge consists of facts while its ontology considers the reality as independent of social construction (Walsham, 1995b). This contrasts with the inter-subjective and socially constructed epistemology and ontology of the interpretive position. However, in this research, it is considered that using case study strategy from an interpretive point of view can benefit from incorporating the rigours in designing and collecting data discussed by Benbasat *et al*. (1987) and Yin (1994).

This approach is not radically opposed to positivist research. Nevertheless, it is recognised that the research is strongly influenced by the epistemological and ontological stance of the researcher. In this case, it is recognised that the researcher believes that reality is socially constructed and that (we) can learn about it through the interplay between the subject and object of this study. This is also recognised by Galliers (1987) and by Zuboff (1988:423) in clarifying the rationale of her epistemological and ontological stances:

> Behind every method lies a belief. Researchers must have a theory of reality and how reality must surrender itself to their knowledge-seeking efforts. These epistemological fundamentals are subject to debate but not to ultimate proof. Each epistemology implies a set of methods uniquely suited to it…My own commitment to understand social phenomena has been fundamentally shaped by the study of phenomenology and, in particular, its application to sociology and psychology.

Paré and Elam (1997) argue that case study research strategy makes the capture and understanding of context possible and can be used to achieve a variety of research aims using diverse data collection and analysis methods. Montealegre (1995) says that case studies (in particular, in-depth case studies) permit a comprehensive approach to the historical and social analysis of complex phenomena. The interpretive researcher attempts to derive his or her constructs from the field by an in-depth examination of exposure to the phenomenon of interest. Through this approach, categories and

themes emerge that hopefully are closely linked to the experiences of the relevant study's participants (Orlikowski and Baroudi, 1991).

Case study research has been subject to criticism on the grounds of non-representativeness and a lack of statistical generalisability. Moreover, the richness and complexity of the data collected means that the data is often open to different interpretations, and potential 'researcher bias' (Conford and Smithson, 1996). Despite the lack of a detailed step-by-step data analysis of case study data (Miles and Huberman, 1994), and especially the problem of not being able to provide generalisability in a statistical sense, Pettigrew (1985) still believes that case studies are useful in developing and refining generalisable concepts and that multiple case studies can lead to generalisations in terms of propositions. Walsham (1993:15) argues that the validity of the case study approach derived from an interpretive epistemological stance is based on the 'plausibility and cogency of the logical reasoning applied in describing and presenting the results from the cases and in drawing conclusions from them.' Similarly, Yin (1994) argues that case studies are used for analytical generalisations, where the researcher's aim is to generalise a particular set of results to some broader theoretical propositions.

In addition, the case study approach allows for 'thick descriptions' of the phenomena under study (Yin, 1994). Such 'thick descriptions' give the researcher access to the subtleties of changing and multiple interpretations (Walsham, 1995b), which would have been lost in quantitative or experimental strategies (Yin, 1994). The case study approach has also been suggested for projects of a procedural nature extending over a long period of time (Benbast et. al 1987; Yin, 1994; Walsham, 1993; Mitev, 2000b). In studying events in their natural setting, the case study makes use of multiple methods of data collection such as interviews, documentary reviews, archival records, and direct and participant observations (Yin, 1994).

Given the interpretive stance adopted in this research and the nature of the research question of understanding how Mozambican organisations are adopting ICT initiatives, it is believed that the case study approach is the appropriate research

strategy for this topic. The same research questions could have been approached using surveys designed to examine changing patterns in organisations and communities, showing, for instance, the rate of adopting a particular ICT or technique over others implementing some other type of technology. However, this might not reveal in detail the unique experiences of individual organisations and the layers of factors influencing the change. The case study method was chosen because of its advantages in creating novel and profound insights and its focus on examining the rich social and cultural influences of local adaptations to the adoption of ICT initiatives in the context of Mozambique as a developing country.

3.4. Research design

3.4.1. The selection of the case study sites

As stated, the purpose of this thesis is to create a better understanding of the interplay between development and ICT dynamics at the organisational and community level in the social context of Mozambique. This entails a detailed study of the wider and local context factors influencing such ICT/IS, the processes of implementation at the local level and ensuing change resulting from the implementation process. Such a focus led to the adoption of an interpretive stance, which seeks to uncover truth by understanding the phenomena in their real-life context (Walsham, 1995b). A case study approach is, therefore, used to describe the implementation of ICT-related initiatives in two organisations (an electricity company and the Central Bank) and a community ICT-based project (Telecentre). Over a 14-month period beginning in February 2000, three case studies were conducted. The first was in the Electricity Company of Mozambique (EDM) which was in the process of adopting (implementing) an invoicing system (*Galatee*). The second was in the Central Bank of Mozambique (BM), which was implementing a BPR initiative. The third case study concerned the implementation of an ICT-based project (Telecentre) in two districts in the southern part of Mozambique.

The selection of these cases was based on two issues. The first is that the two organisations are part of the organisations that were established just after the country gained independence in 1975 or formed during the period of transitional government. In addition, they are unique in the country in terms of their duties. The Telecentre is the first experience in the country of implementing an ICT-based project in a rural community environment. The second reason for the selection of these three case studies was a matter of access.

Research access was not easy to obtain. Flowers (1996) stresses the difficulties in obtaining access to private companies, particularly banks, when investigating organisational and internal issues, as this could undermine 'the interests of the powerful' (Lee 1993:129). For instance, in the course of this research, seven organisations were approached, but only the above-mentioned two (EDM and BM) responded positively. Another organisation made its involvement in this study conditional upon the completion of a consulting project, which was planned to commence in March 2000 and to last approximately six months. However, up to the time of the completion of the fieldwork for this research, the consulting company was still working in the organisation. The fourth organisation asked for the fieldwork plan and after a response to this request, never replied. The last three organisations never replied to the initial letter asking for permission to conduct this study.

Buchanan *et al*. (1988:55) recommend a pragmatic, almost opportunistic approach to fieldwork in organisations.

> This pragmatic approach is supported by wider trends. Research access has become more difficult to obtain, for at least two reasons. First, further education has widely recognised the value of project work across a range of courses and many organisations have been deluged with requests for research access. We have been denied in some cases only because someone else got there first, second, as the economic climate has become harsher, in the private and public sectors, managers increasingly feel that they and their staff have little time to devote to non-productive academic research activities. These trends encourage the organisational researcher to become more innovative, devious and opportunistic in the research for sites and data.

When the researcher was offered an opportunity to conduct case studies at these three sites, she accepted without hesitation.

3.4.2. The sub-units of analysis

This research study adopts a multiple–case design containing several units of analysis. The units of analysis consist of ICT-related initiatives from a national (Mozambican) perspective, followed by banking and electricity industries in the country, and then the use of ICT in rural communities (Telecentre) with the emphasis on the adoption and use of ICT/IS. It is expected that the analysis of these units will provide a context for describing and analysing the case studies, and reconstructing the initiatives of the three case studies. At EDM, the sub-unit of analysis is the implementation of an invoicing system as part of a project, expected to modernise the management of EDM. For the BM case study, the sub-unit of analysis is related to a BPR initiative aimed at developing a new organisational structure and an IT Master Plan. The case study of the Telecentres is concerned with the implementation of ICT-related projects in rural areas.

3.4.3. Data sources

Data collection was done through both secondary and primary sources. Primary data sources included key informants for each case study. Secondary data sources mainly covered government publications, technical document, and annual reports of the companies. Valuable insight was also gained from the analysis of research studies conducted by the National ICT Policy Commission (CPI) on ICT projects in the country. Secondary data covered different sources and provided an essential preparation for the interviews. Secondary data helped to cross-check official information, learn about major events, technical details, historical decisions and main organisational players and roles. They also supported the exploring of particular responses during interviews.

Mitev (2000a, 2000b), and Silva and Backhouse (1997) have illustrated through the *Socrate* and London Ambulance Services case studies the benefit of examining written secondary sources as research material, which provides a multitude of interpretations. For this study it was possible to conduct the data collection and analysis in an iterative manner.

3.4.4. Data collection and analysis

The main data techniques used in this research study were semi-structured interviews, participant observation, group discussion, secondary source analysis and questionnaires. Personal interviews constituted one of the most important and valuable sources of information

The social nature of information systems has led many IS researchers to adopt research approaches that focus primarily on human interpretations and meaning (Walsham, 1995b). Interpretive studies advocate a relativistic understanding of the phenomena being studied (Orlikowski and Baroudi, 1991). Interpretive researchers see the pursuit of meaning and understanding as subjective and knowledge as a social construction (Walsham, 1993). They examine the social reality and subjective meanings held by people by eliciting and observing what is significant and important to them. They are not reporting facts, but their interpretations of other people's interpretations (Walsham, 1995b). There is no rigid separation between data collection and analysis, and the process is an iterative cycle of data collection and analysis, with the intention that the results of the analysis will help guide the subsequent collection of data. The cycle is repeated and theory is elaborated and checked as the process continues. When conducting interpretive research it is generally accepted that researchers should interact directly and intensively with the subjects of their research over a period of time.

The interviewees were chosen for their relevance to the conceptual questions rather than their representativeness. Initial participants (at the first group interview) were asked to suggest names of other actors involved in the topic of the case study (for

example, in the case of EDM the *Galatee* project) or people who are using it, and general networking through personal contacts expanded the sample. The total number of respondents to interview was reached heuristically, i.e., the decision to stop adding respondents was taken when nothing new was being learnt from the interviews and a state of theoretical saturation was achieved. The interviewees were selected on the basis of their closeness to the topics of the study project and their levels of experience in management and organisational issues. It was deemed essential not to limit interviewees to IS/IT staff. The way in which the data collection was organised is described in detail in Chapter 4.

All the interviews were conducted in Portuguese and for the purpose of this thesis were translated into English by the researcher herself. All interviews were transcribed in '*word*' format (in Portuguese) and extensive notes were also taken during the fieldwork. The information gathered from these interviews was subjective, although an attempt was made to present an account from various perspectives and levels within the organisation. Interview transcripts and written notes were analysed systematically through iterative and repeated re-reading of them. This made it possible to gain an increasingly profound understanding of each interviewee's viewpoint and perspective, of links and contradictions within and across interviews, of complex contextual factors emerging from the aforesaid interviews and of the many relationships between the relevant concepts.

In the three case studies, a total of 121 interviews (38 - EDM; 26 - Telecentre and 57 - BM (4 individual and 53 groups)) were conducted with directors, senior managers, managers, users and IT staff. The data about the companies and their ICT-related projects were gathered from company reports, books and Internet web pages.

There is a multitude of different data collection techniques and these vary according to the extent of interaction (the 'distance') between the researcher and the phenomena under scrutiny. Until quite recently, much of the reported interpretive IS research (Walsham, 1995a) only involved relatively distant data collection methods such as analysis of published data, textual analysis or surveys. Document analysis was used in

the fieldwork conducted for this study, together with less distant methods such as interviews, meetings and participation observation, which provided face-to-face contact with the social actors in order to explore and probe responses. The case study method necessitates the collection of a large amount of rich, 'thick' qualitative information from a number of sources in order to address the complexity of the organisational processes and of the context studied.

During the fieldwork, the cross-checking mechanisms for the data pertaining to each case study were of an evolutionary nature, i.e., the questions were clarified and also refined during the process of gathering data. The key informants have checked the results of the analysis by reviewing transcriptions of the interviews, and meetings were also held with some key participants in order to give them a chance to reflect on the case in a big and rich picture.

A presentable formal documentation of the field material for each case study was created, which consists of all the data or pieces of evidence, data collection instruments, interviews transcriptions and field notes. This will enable other investigators to review the evidence directly and not be limited to the written reports.

The analysis of data was done by following the trends in the patterns that emerged in the course of the research that explain past data. One fundamental tenet of the sociology of technology is that there is no one inevitable way of developing technological artefacts. Therefore, when interviewing respondents, one is listening for narratives about why things happened in the way they did *or not*, in the case of adoption. Hence one is collecting multiple interpretations with all their contradictions, rather than finding the 'correct' interpretation (Yin, 1994).

The analysis of data firstly dealt with the description of each case based on the data collected via the different instruments. Secondly, an analysis was done of similar and different patterns in each case study. It is the author's contention that the descriptions of the case studies allow one to gain insights into the specific context. Finally, considering that this research study is composed of three different case sites, it was

necessary to search for patterns in all the cases. This enabled the researcher to develop a strong body of evidence from the cases.

3.4.5. Theoretical Framework

The conceptual framework contains the key factors, the variables and presumed relationships amongst them (Miles and Huberman, 1994). Walsham (1993) maintains that in the interpretive tradition there are no 'correct' or 'incorrect' theories. Instead, they should be judged according to how 'interesting' they are. Thus interpretive researchers can only claim that the theories presented are interesting to them and expect them to be interesting to those involved in the same areas. Interpretive theories will be made public and people will judge, evaluate and alter the theories. The result is not the generation of a new theory, but the generation of an inter-subjective one, that is, a theory built on by people working in the field. Walsham (1995b) presents three different uses of theory in interpretive case studies: theory guiding the design and collection of data; theory as an iterative process of data collection and analysis; and theory as an outcome of a case study. The use of theory as an iterative process between data collection and analysis has been applied in this research study. Yin (1993) emphasises that the theoretical propositions before the case study should be formulated very carefully because they contribute to the design of the case. The formulation of the theoretical propositions will also, according to Yin, indicate what analytical generalisations are expected as an outcome of the case study.

The main aim of this research is to understand the interplay between development and ICT dynamics at the organisational and community levels in the context of Mozambique under the globalisation trend; and to demonstrate that this can be achieved through understanding the particular ICT-related initiatives in organisations and communities within the social contexts in which the process of adoption and use of ICT-related initiatives is taking place. Moreover, it is argued that all of the ICT dynamics implemented in organisations or communities are part of the national network for development. To support this argument, an initial framework based on the human environment model (HEM) and actor-network theory (ANT) perspective was

drawn up in the previous chapter. This framework is used to interpret the three sub-units of analysis. In doing so, three questions are raised, which are to be the subject of research:

- How do we understand the dynamics of the ICT-related innovations (Applications) within organisations and rural communities?

- What can be done in order to make the use of ICT more effective?

- To what extent is ICT contributing to the development in Developing Countries in general and in Mozambique in particular?

The rest of the thesis is aimed at answering these questions. This study will consist of an interaction between theoretical foundations and empirical evidence. On the one hand, the results of the empirical investigation contribute to the refinement of the research questions, methodology and theory. On the other hand, the empirical study is shaped by the theoretical basis of the study.

3.5. Summary

In this chapter the theoretical and philosophical assumptions underlying the research methodology in the IS field were reviewed. In addition, a discussion of the research design for this study was made. A summary of this chapter is presented in Table 3.2 through highlighting the major decisions made in order to conduct this research work.

Table 3.2: Summary of the research design

Level of decision	Choice
Epistemological and ontological assumptions	Interpretive
Research strategy	Multiple case studies
Research Techniques	Participant observation, semi-structured interviews (individuals and groups), group discussion, documentation analysis, questionnaires.
Organisations	BM, EDM, Telecentre
Sub-units of Analysis	BM: BPR initiative EDM: Invoice system *(Galatee)* Telecentre: ICT project in rural areas
Timeline	BM: February - May 2000 EDM: June 2000 - April 2001 Telecentre: August 2000
Subject	Adoption and use of ICT in organisations and communities
Theoretical Framework	ANT (translation: problematisation, '*interessement*', enrolment and mobilization) for micro-level analysis, social context (human environment model) for meso-level analysis and ST for the macro-level analysis