

Chapter 1

Introduction

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Introduction

1.1. Introduction

This chapter of the thesis introduces the research problem and the analytical approach. The key aim of this thesis is to examine the interplay between information and communication technology (ICT) innovations in different micro-level settings within the broader development context in Mozambique - a country currently experiencing various attempts at global integration through infrastructure development, education initiatives and various socio-economic development programmes.

This chapter contains six sections. The first section presents the justification and motivation behind the main aims of the thesis. In section two, the problem is discussed from four different points of view: globalisation, development, transfer of ICT innovation and organisational change. This discussion leads to the formulation of the purpose and research questions for the thesis in section three. The fourth section discusses the significance of this research and its key contributions. The empirical setting is described in section 5, followed by the final section which provides a road map of the thesis.

1.2. Justification of the topic and motivation for studying the problem

The key theme of this thesis is the analysis of the increasing interconnections between ICT innovation in micro-level settings of organisations and communities with broader development processes within the emerging global economy of Mozambique. This analysis helps to draw implications for developing countries in general. Castells (1996) argues that the global economy would lead to increased productivity and efficiencies if organisations were to invest in a comprehensive reform programme of institutional and organisational change driven by technology and information. Recent advances in ICTs are becoming central to the process of socio-economic change and

development in different contexts, especially that of developing countries (Avgerou, 1998; Avgerou and Walsham, 2000; Walsham, 2001). While ICT-enabled development initiatives in the government sector (for example education and health) have been ongoing since the eighties, in recent years there have been signs of government organisations in developing countries investing in various projects that were previously the domain of the private sector. These initiatives involve the application of new management techniques such as Business Process Re-engineering (BPR), Enterprise Resources Planning (ERP) and Total Quality Management (TQM).

The use of ICTs and the adoption of new management techniques provide organisations in developing countries like Mozambique with the promise of actively participating in globalisation processes which could contribute to national development efforts (Kiggundu, 1991; Saxena, 1996; Bada, 2000; Avgerou, 2001b). For example, recently in Mozambique, within the government development framework of poverty alleviation, various ICT-related projects have been initiated in the public and private sectors, as well as in rural communities and organisations (Governo de Moçambique, 2001a). A number of examples can be seen in Mozambique. For instance, the Institute for Prevention of Natural Disasters is engaged in the development and implementation of the information system for the prevision and control of natural disasters; the Central Bank together with the Ministry of Planning and Finance are in the process of developing a national payment system; researchers from the Eduardo Mondlane University and Ministry of Health are implementing a health information system to strengthen the district management of health facilities.

This research has two key motivations. Firstly, Mozambique, a developing country, is now at peace after several years of civil war and is attempting to implement a broad recovery programme founded on an ICT-based vision. This research seeks to contribute to the attainment of this vision. Secondly, while many organisations are in the process of implementing different ICT-related projects in order to improve their efficiency, little is known about their impacts and the efficiencies that are achieved on the ground. There is currently a dearth of studies that analyse such organisational

experiences with new ICTs and associated management techniques, and how these lead to practical improvements in organisational functioning. A systematic analysis of these experiences can help to guide future efforts in the country, and this research seeks to contribute to this body of knowledge. This study reinforces the efforts of groups like the International Federation for Information Processing (IFIP) Working Group 9.4 on ICT in developing countries by systematically analysing experiences of Mozambique. The next section presents some key defining aspects of the research problem.

1.3. Defining aspects of the research problem

The research problem is perceived as being shaped by four key issues. The first concerns globalisation and the nature of the interaction between global processes of technology and management with the local realities of organisations and infrastructures. The second concerns the debate on development and the role that ICT can play in shaping socio-economic growth processes. The third concerns ICT innovations and how these are shaped by social aspects. The fourth issue concerns processes of ICT-enabled organisational change, and the associated difficulties in attaining them.

1.3.1. From the perspective of globalisation

In recent years, the role of globalisation processes in shaping ICT use has been argued by many authors (Avgerou, 2000; Avgerou, 2001b; Walsham, 2001). Indeed, ICT-related initiatives in many parts of the world reflect and also shaped these globalisation trends. Giddens (1990:64) gives a useful definition of globalisation as ‘the intensification of the world-wide social relations which link distant localities in such a way that local happenings are shaped by events occurring many miles away and vice versa’. This means that this is a dialectical process because these local developments may become a function of events occurring in different locations many miles away and *vice versa*. Globalisation is related to the way in which we live and it

is a dynamic process (Giddens, 1999). Similarly, Castells (1996) describes the trend of an increasing interconnection of economic activities and social relations, which he refers to as a 'networked, deeply interdependent global economy'. Thus globalisation refers to a world in which societies (and cultures) in contemporary times, have in one way or another come closer together (Kiely, 1998). Beck (2000: 11) asserts:

Globalisation denotes the processes through which sovereign national states are criss-crossed and undermined by transitional actors with varying prospects of power, orientations, identities and networks.

Kiely (1998) emphasises the importance of explicitly including globalisation as an issue for empirical investigation. IS researchers have in recent years started to address issues arising from globalisation, including how organisations, especially in developing countries, can utilise and adapt IT to the needs of their social and cultural context (Walsham, 1998; Avgerou and Walsham, 2000). New technologies cannot be mechanically applied whilst excluding the local context, and need to be actively adapted. Global techniques and ICTs invented in the developed world need to be modified and adapted to developing country situations. Such processes of adaptation are very evident in settings like Mozambique where there are significant differences in context as compared to countries in the developed world. This research seeks to examine this complex interplay between processes of globalisation and how they shape and are shaped by ICT initiatives in different micro-level settings of organisations and communities in Mozambique.

One approach to the study of globalisation is that of analysing processes of integration of national economies, politics, ideas, culture and people into one seamless whole spread over territorial borders, ideological divides, civilizations, classes and races (Held, *et al.*, 1999). In the economic sphere (which is the primary starting point for many scholars), the process is observed mostly in the expansion and mobility of the factors of production, especially capital, across geographical boundaries. However, processes of integration are not 'naturally' achieved, and increasingly authors have conceptualised globalisation as a dialectical process, which simultaneously integrates and disintegrates (Castells, 1996). We adopt a similar perspective on globalisation. While ICTs provide a developing country like Mozambique with the potential to

address some of its socio-economic problems, this potential is not ‘naturally’ achieved. This potential is shaped by what actors do in micro-level situations. It is these micro-level dynamics that this research seeks to understand and analyse.

1.3.2. From the perspective of development

The main objective of this subsection is to analyse some aspects of the evolution of developmental thought, especially as regards the interaction between ICT and key dimensions of development.

Development is a multifaceted concept and encompasses various inter-connected social, economic and cultural aspects (Reddy, 1987; Max-Neef *et al.*, 1989; Sen, 1993; Escobar, 1995; Yeung and Mathieson, 1998). The quotation below illustrated the multifaceted dimension of development.

Development must, therefore, be conceived of as a multidimensional process involving major changes in social structures, popular attitudes, and national institutions, as well as the acceleration of economic growth, the reduction of inequality, and the eradication of absolute poverty. Development, in its essence, must represent the whole gamut of change by which an entire social system, tuned to the diverse basic needs and desires of individuals and social groups within that system, moves away from a condition of life widely perceived as unsatisfactory and toward a situation or condition of life regarded as materially and spiritually “better”. (Todaro quoted by Roode (forthcoming):14)

In traditional development theory, capital accumulation has been the central point of development, and how it could be enhanced through deliberate industrialisation, centralised development planning and external aid. The underdeveloped economies, however, were thought to be characterised by a number of features that set them apart from the economies studied by orthodox economics, which called for modification of the existing theory (Escobar, 1995).

The early modernisation approach saw different countries of the world occupying different stages of growth, and countries were compared on the basis of their GDP

(Gross Domestic Product). Development was conceptualised as a universal process consisting of various stages abstracted from the experiences of countries in Europe and North America. In such a model it is assumed that the final stage will be characterised by migration from rural to urban areas, and infrastructure creation within the large cities would serve as essential engines of development (Hettne, 1990). Developing countries were expected to take the benefits of scientific and technological achievements and achieve 'higher' levels of development.

The focus on development based primarily on the economic criteria of GDP following stages has been criticised by many authors (Max-Neef *et al.*, 1989; Hettne, 1990; Sen, 1993; Escobar, 1995; Yeung and Mathieson, 1998). These criticisms have led to development being redefined in order to include the social well-being and political structures, as well as the physical environment as reflected in the UNDP on Human Development publications (UNDP, 1999, 2000a, 2001a). These reports take into consideration non-economic dimensions of development such as welfare, social equity, gender balance, democracy, empowerment and sustainable development.

Max-Neef *et al.* (1989) proposed the human scale development model, which focused on the satisfaction of the fundamental human needs. As Max-Neef and his colleagues (1989:30) stated:

The fundamental human needs are essential attributes related to human evolution; satisfiers are forms of being, having, doing and interacting, related to structures; and economic goods are objects related to particular historical moments.

This perspective emphasises the role of human beings in development processes and disputes the traditional linear notions of development that do not account for variations in the socio-economic contexts of development (Hettne, 1996). The Human Scale Development Model (HSDM) is based on human needs, self-reliance and organic articulations. These components of the HSDM point out that development

... must be sustained on a solid foundation which is the creation of those conditions where people are the protagonists of their future. If people are to be the main actors in Human Scale Development both the diversity as well as the autonomy of the spaces in which they act must be respected. Attaining the transformation of an object-person into a subject-person in the process of

development is, among other things, a problem of scale. There is no possibility for the active participation of people in gigantic systems which are hierarchically organized and where decisions flow from the top down to the bottom. (Max-Neef *et al.*:13).

They also argue that

...fundamental human needs cannot, by definition, be structured from the top downwards. It cannot be imposed either by law or by decree. It can only emanate directly from the actions, expectations and creative and critical awareness of the protagonists themselves. Instead of being the traditional objects of development, people must take the leading role in development. (Max-Neef *et al.*: 39).

The Max-Neef model thus emphasises a bottom-up approach to creating social well-being, as a basis for eradicating poverty, rather than just being concerned with raising the GDP. The development process is characterised by dependency relations. These relationships should flow from low to high levels, i.e., from the local level and through the national to the international. The concept of self-reliance at all levels has been argued by Max-Neef *et al.* as part of the understanding of the sustainable development notion. Self-reliance is understood “in terms of a horizontal interdependence and, in no way, as an isolationist tendency on the part of nations, regions, local communities or cultures.” Max-Neef *et al.* (1989: 49). Based on the notion of self-reliant Human Scale Development, Roode (forthcoming) derives a working definition for sustainable development. The definition below is also assumed in this research work.

In this notion of self-reliant human scale development, we found a satisfactory definition of sustainable development. To formalize this: sustainable development is achieved through self-reliant human scale development which flows from the individual level to the local, regional and national levels, and which is horizontally interdependent and vertically complementary (Roode, forthcoming: 19).

It is under this new paradigm of development that benchmarks of progress were developed in order to include other aspects such as economic performance, competitiveness foundations, health, education, environment, democracy and freedom (Yeung and Mathieson, 1998). These benchmarks are seen to be crucial for achieving

balanced development in terms of human well-being. Currently, a new paradigm accounting for development is emerging based around “knowledge” and information. This paradigm is built around the role of ICT to stimulate socio-economic growth in developing countries. ICTs offer new ways to exchange information and conduct business which have the potential to change the nature of services provided by the financial and other sectors in both the public and private domains (World Bank, 1998, 1999; Madon, 2000; PNUD, 2001; UNDP, 2001b). The African Development Bank Report (1998), like an earlier World Bank annual report (1997), indicates an increase in the provision of information services in Africa, which can potentially help to address the deep-rooted problems of poverty and poor infrastructure. But the extent to which this potential is realised depends directly on the ability of people to adapt, adopt and use ICT to address local and regional development challenges.

Alleviation of poverty thus depends on creating a social environment that is conducive to providing universal access to basic welfare systems. This relational perspective of development differs from the traditional models that focused on the analysis of the stages of economic growth. This signifies that the impact of the usage of ICT-related technologies should not be measured in terms of the number of electronically connected individuals, but also in terms of its accessibility and contribution to social progress (Uimonen, 1997).

ICTs can support methods to perform more effective trade promotion functions, which in turn can help to address Africa’s historical lack of international competitiveness. For example, in the current times of interconnectivity, promoting trade requires efficient financial and payment systems to settle transactions. Efficacy in performing these transactions can potentially be achieved through the use of ICTs that can help to enhance the scope of tradable services. Such enhancements can have broader impacts on other sectors of electronic commerce, banking, insurance, advertising, consulting and other professional services. Press (1997) has established a positive correlation between the number of Internet hosts in a country and the Human Development Index (HDI) (Press, 1997), which emphasises the central role of ICTs in natural development processes.

Information and knowledge can help to build stronger networks through the facilitation of dialogue and information exchange (Mansell and When, 1998). Such networks built around technology and information have been argued by Castells (1996) to provide the basis of the contemporary 'network society'. Networks potentially provide individuals with the opportunity to make a difference by sharing their knowledge with others for the larger good (Talero and Gaudette, 1995). Development in ICTs outruns society's ability to use it 'appropriately', raising the challenge to the network to put ICTs to work to improve the quality of the life of human beings (Drucker, 1993; Sen, 1993). This research is motivated by the ideology that ICTs should be used in developing countries to address the problems of poverty alleviation and to create a social environment that is conducive to providing citizens with universal access in order to satisfy their fundamental human needs.

Yamakage (1990) argues that ICTs can contribute to social development in developing countries, if these countries have the autonomy to define their own priorities and requirements. It is important that ICT implementation is focused on addressing these basic priorities to support services such as health and education. Consequently, the success of ICTs should not be solely measured in terms of efficiencies but rather in terms of accessibility and contribution to social progress (Uimonen, 1997). ICT should not only be used to enhance industrial ability to manufacture goods and services, but also to create informed societies and communities with access to basic services. For individual actors and organisations to be innovative and make free and informed decisions, they need to process information freely and use it properly. ICT itself does not determine the change, but facilitates it, shaped by the social context of its application (Uimonen, 1997). Puiatti and Accascina (2001) in their work are reporting good experiences of applying ICT for development in Egypt.

The importance of expanding the access of developing countries to ICT and related technology has been recognised by governments and international agencies with increasing consensus that ICT-related technology should be regarded as a strategic national infrastructure (Kenney, 1995; Nidumolu, *et al.* 1996; IDRC, 1999, 2000;

Conselho de Ministros, 2000; Madon, 2000; Yahaya, 2000; PNUD, 2001). Development, conceptualised as a discourse (Escobar, 1995) can in contemporary times be characterised by various dimensions of new ICTs. These range from the need to create more ICT infrastructure, develop different applications, and develop ‘knowledge workers’ who can form the basis of new “information societies”. While creating infrastructure is a starting point, although expensive, it is perhaps the easiest part. It is more complex to stimulate processes through which individuals, organisations, communities and countries create capacities to use information effectively in their local contexts and for their needs (Madon, 2000). It is this perspective that encouraged the Government of Mozambique to approve a national ICT policy and designed its implementation strategy with the notion of integrating the solution of developmental problems within the ICT vision. In this way each ICT project defined within the implementation strategy framework should be linked to the development priorities of a specific community. In this manner each of the projects at the local level should be horizontally interdependent with, and vertically complementary to, other projects at higher levels.

Driven by the belief that in current times ICT is one of the key motors for development, governments are taking wide-ranging initiatives to rapidly create knowledge-based economic structures and information societies comprising networks of individuals, firms and countries interlinked electronically through webs of informational relationships. ICTs present government with opportunities to create and support strategies to address basic development needs and create new infrastructure. Developing countries face a complex mix of developmental challenges, including the need to recoup a fair share in international trade, the development of human capital through better health and education, to promote effective macroeconomic management and good governance, and to address questions of agricultural development, food security and environmental conservation (Oshikoya and Hussain, 1998).

Technology, development and culture can be considered as a large system dependent upon and linked together by different relationships (Escobar, 1995). Technology can be seen as an agent of development, which generates mechanisms of feedback and

learning that can further influence broader development processes. Such a development cycle supported by technology provides the potential to reconfigure the global context of information and knowledge in which the local entity operates. Understanding the critical micro-level dynamics of the ICT innovation within the broader context of development in Mozambique, is a key aim of the thesis.

1.3.3. From the perspective of transfer of ICT innovation

At least two different meanings of innovation are found in the literature. The first refers to something totally new in society, an ‘invention’ (Bijker, 1987, 1997; Bijker and Law, 1997). The second meaning of innovation refers to something within a particular setting, but not new *per se* (Vidgen and McMaster, 1996; McMaster *et al.*, 1997). This research is concerned primarily with the second kind of innovation that is typically designed in the developed world and introduced to developing countries like Mozambique through a ‘technology transfer’ process. This process involves not only the transfer of technology but also with it various organisational and management practices, which are often found to contribute to the tension within socio-organisational contexts of developing countries (Avgerou, 1996, 1998, 2001b; Bada, 2000). The potential value and effectiveness of the transfer process is dependent on the local socio-organisational conditions and the ability of the organisation to adapt the ICTs in order to address local priorities (Odedra, 1991; Bhatnagar and Odedra, 1992; Odedra-Straub, 1996, Avgerou and Walsham, 2000; Bhatnagar, 2000).

An approach to studying the process of technology transfer is provided by Rogers’ (1983, 1995) theory of diffusion of innovations. This theory, which has emerged over several decades, has influenced several disciplines, including IS. Diffusion is defined as a process by which an innovation is communicated through certain channels over time among the members of social systems. Research within this tradition has typically focused on identifying factors that influence the rate of diffusion, especially related to beneficial innovations. The rate is ‘measured’ by seeing how an organisation passes through different sequential stages of the diffusion process. Diffusion theory researchers have tried to understand the factors that influence the

ICT/IS innovation adoption decisions (Attwell, 1992; Fuller and Swanson, 1992; Cool *et al.*, 1997, Straub *et al.*, 2000), typically at the organisational and intra-organisational level, rather than with an inter-organisational focus (Prescott and Conger, 1995). Another assumption of the traditional diffusion theory perspective has been the homogeneity of the institutional environment across the adopting units, which tends to obscure variations across the units arising from geographic distance from the source of the innovation, local norms and regulations, and the availability or not of factors to support the diffusion system.

The focus of diffusion studies on the organisational level tends to obscure the influence of external factors on the innovation process, such as the deregulation of an industry, or the infrastructure conditions that are unique to a country or society. Such a 'context-free' view of innovation is limited as it treats IS primarily as a technological innovation, and does not adequately consider the embedded nature of technology in products, services, and organisational practices. It has now been well established by IS researchers that contextual factors play an important role in influencing the ability of an organisation to adopt and effectively apply technological innovations (Williams and Edge, 1996; Du Plooy, 1998; Barrett, 1999; Allen, 2000; Avgerou, 2000; Walsham, 2001). The traditional perspective of diffusion theory carries the implicit assumption that innovations remain invariable over time, which is especially problematic in the current period of globalisation that is characterised by processes of rapid technological change.

Some of the limitations of the diffusion model can be summarised as follows:

- There is relative neglect of the inter-organisational level of analysis and 'external factors' that shape innovation processes.
- The institutional environment across adopting units is assumed to be homogeneous.
- There is an implicit assumption that innovation remains invariable over time and passes through sequential stages.

In this research, we attempt to address these limitations, drawing upon an alternative theoretical approach that is provided by Actor-Network Theory (ANT) (McMaster *et al.* 1997; Büscher and Mogensen, 1997, Knights and Noble, 1997; McMaster *et al.*, 1998).

ANT proposes the concept of ‘translation’ to replace ‘diffusion’ and sees innovation spreading as a result of how actors ‘translate’ the interest of others so that they become aligned with their own interests. Successful ‘translation’ of the interests of both human and non-human entities so as to create effective alliances, contributes to effective ‘transfer of technology’. While we discuss ANT in depth in Chapter 2, it is important to point out how the ANT approach helps to address some of the limitations of diffusion theory. ANT does not see technology as an independent artefact that ‘diffuses’ out from one central point, but views technology as part of a complex heterogeneous network of human actors and non-human artefacts. The effectiveness of the transfer process is then dependent on how these networks are created, stabilised and strengthened over time. Such a conceptualisation has heterogeneity and not homogeneity at the heart of its analysis. The difference between the ANT and diffusion approach is effectively captured in the following quote by McMaster *et al.* (1998).

ANT is concerned with creation of facts (black boxes, technologies, innovations), unlike other classical theories of innovation, such as the deterministic Rogerian *diffusion theory* (Rogers, 1995), which purport to discover pre-existing but otherwise hidden facts (usually by lone heroic discoverers or inventors). In traditional theories, once a fact has been uncovered, it mysteriously then begins to diffuse throughout society, largely intact and unchanging and propelled by power of its own self-evident factuality - like a bolt from Mjollnir (The hammer of Thor, Norse god of thunder) flying straight from the halls of Asgard right into the world of an unsuspecting and hitherto ignorant humanity.

ANT sees the creation of facts as black boxes that come into being when the interests of human and non-human actants in a single collective are aligned, thereby creating a (relatively) stable network. Facts are not diffused in the classical sense; instead, claims are translated and strengthened (or weakened) through the enrolment and inscription of additional human and non-human

actants. They are thereby constantly transformed as the network lengthens across time and space (McMaster *et.al.*, 1998:345-46).

1.3.4. From the perspective of ICT/IS and organisational change

Information systems are widely acknowledged to be of central importance to contemporary organisations. The relation between IS and organisation has been of central concern in IS research, with an increased focus currently on understanding the nature of mutual interconnections of IS and organisations (Orlikowski, 1992, 1993a; DeSanctis and Poole, 1994; Monteiro and Hanseth, 1996; Avgerou, 2001a). Such an approach emphasises that contemporary organisations are entangled with technology, and one cannot be analysed without understanding the other. This relationship between technology and organisation is constantly being negotiated over time. This entangled view of technology emphasises the role of context and also of processes and challenges. The ‘goal-based’ view of change advocates the role of factors internal to the organisation in influencing change (Kirton, 1980; Child, 1992), and the ‘adaptation’ model focuses on the role of external factors (Goodman, 1982; Levy and Merry, 1986; Hall, 1991). The view of technology adaptation is compatible with the ‘interactive’ view (Pettigrew, 1985, 1987; Slappendel, 1996) that regards organisational change as an emerging process based on the interaction of both internal and external forces, structural properties and managerial actions.

The planned view of change has been the dominant model in organisation and IS researches and assumes that individuals are rational in their actions and guided by goals of the organisations (Wilson and Rosenfeld, 1990; Wilson, 1992). Such a view is based on a deliberate, purposeful and explicit decision to engage in a program of change (Levy and Merry, 1986) to improve organisational performance. Top management is seen responsible as for creating and communicating a vision of the change initiative and the agenda of implementation to help attain this vision (Levy and Merry, 1986; Plant, 1987; Wilson, 1992). Top managers are seen as the primary source of the organisational change, and their actions as being crucial to improve the organisation’s “fit” with the environment. Planned change often treats culture in a functional way as a variable that can be managed, along with other variables like size,

structure and technologies, (Allaire and Firsirotu, 1984; Meek, 1988). In planned organisational change there is room for the use of external agents of change such as management consultants to initiate and/or support the change initiative. Different approaches have been suggested in order to help management plan for and implement ICT-related organisational change. Models such as those of Benjamin and Morton, (1988); Davenport *et al.*, (1989); Benjamin and Levinson, (1993) focused on the importance of having a strong management team to champion the change effort. Others have argued for a need to have a structural fit or appropriate technical fit with ICT innovation and organisation (Davenport and Short, 1990; Venkatraman, 1994).

In recent years, information system researchers have criticised the planned approach to change on the grounds of its ignoring the context and the process and its emphasis on control and technology determinism (Smirch, 1983; Suchman, 1987; Ciborra, 1999; Ciborra and Hanseth, 2000). Ciborra (1999), in his research work suggested that development and implementation of ICT initiatives should support micro-practices for the improvement of the use of the ICT in organisations. In this regard the improvisation approach plays an important role.

However, there are an increasing number of voices that argue that structure and people are not readily amenable to change. Oliver (1997) argues that many organisational practices are simulated within a strong and prevailing culture that is difficult to change. These institutionalised activities are generally upheld because of their longevity, which in itself is considered a sufficient condition for usefulness because of inertia and costs of change (DiMaggio and Powell, 1991). Planned change is typically a 'technological determinant' and sees technology as a primary and autonomous driver of organisational change (Blau *et al.* 1976; Carter 1984; Huber, 1990).

The increasing emphasis on the organisational context of IS has been accompanied by a change in focus from the use of computers within a specific organisation to a broader perspective analysing inter-organisational factors that influence ICT use (Reekers and Smithson, 1996). More recently the focus has been on national and

international factors that influence the use of ICT in organisations (Barrett, *et al.*, 1997; Walsham, 1998; Chriysochos, 1999; Bada, 2000; Madon and Sahay, 2001). These developments reflect an increased understanding of the diverse factors that influence the use of ICT and the appropriate approach required for studying them. Some such approaches that are increasingly being adopted are the contextualist approach, improvisation, drift and situated analysis.

A contextualist approach to studying ICT and organisational change focuses on the interaction of multi-level structures and systems within which ICT is implanted and the process of change that takes place over time (Walsham, 1993; Braa, 1997). The literature on the contextualist approach will be considered in more detail in Chapter 2. However, the contextualist model has been criticised for lacking an adequate theoretical underpinning and a conceptual model for linking the external context and the internal organisational context (Pettigrew and Whipp, 1992). For Pettigrew *et al.* (1992) it is important to complement rational models with others, which are able to identify the possible causes of change such as political, cultural and economic. In this way these models would be socially rich and able to capture the dynamic relationship between technology innovation and social changes in the organisational context.

Orlikowski (1996) described situated analysis or the situated change perspective, which sees change as endemic to the practice of organising and hence as enacted through the situated practices of organisational actors, as they improvise, innovate and adjust their work routines over time. Within this perspective, change has been seen as emergent from everyday practice and inseparable from the ongoing actions of the members of the organisation.

After the presentation of the four viewpoints of the research problem, the purpose and research questions of this study are highlighted in the next section.

1.4. Purpose and research questions

A key aim of this thesis is to develop and apply a conceptual framework for analysing ICT implementation in organisational and community settings but situated in the broader context of developing countries, where ICT implementation with development objectives is emphasised. While ANT provides the conceptual lens to scrutinize the translations occurring in micro-level settings, these dynamics are related to broader processes arising from globalisation and development. New discourses arising from these macro-processes are helping to create ‘new structures’ that both enable and constrain the micro-level dynamics. We draw upon structuration theory to understand these linkages between the micro and macro-levels, and how the potential for change exists, even in previously marginalized contexts like Mozambique.

In the previous section, four different perspectives of the research problem were discussed which emphasise the complexity of the relationship between ICT and organisations in the context of a developing country. The purpose of this thesis is to create a better understanding of the interplay between ICT and organisations in Mozambique. Understanding gained at the organisational and community levels has implications, such as how ICTs can be leveraged to effectively support broader development processes in Mozambique.

With this in mind, the study seeks to address the following research questions:

- 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 development processes in Mozambique?

These questions are analysed at two interconnected levels. The macro-level addresses issues around development and globalisation, specifically the question of: ‘How do various actors in Mozambique (mainly Government, business and community leaders) leverage to support the country’s quest for global integration?’ At the micro-level, the implementation of ICT innovation is analysed in three different case settings. The

important question here is this: ‘How does an ICT innovation become institutionalised within a particular setting?’ These two levels, and their interconnections, are analysed during the course of this thesis.

Two of the case studies presented in the thesis are at the organisational level (Central Bank and electricity company of Mozambique) and the third in the community (Telecentre). The case analysis is conducted and sensitised to the social transformations currently occurring in Mozambican society, and the conflicts, tensions and expectations that emanate from these processes of change.

For several reasons, it is important to create a better understanding of the implementation of ICT-based initiatives in the Mozambican context. Firstly, an understanding of these processes will help organisations and government to apply ICT/IS more effectively in specific settings. Considering the large amount of resources demanded for the implementation of such initiatives, it is important that these resources be used effectively. Effective micro-level experiences can help to develop confidence in people and policy makers, who can then more broadly support the quest to be ‘included’ in the global process.

Secondly, an understanding of these processes may be of interest to members of society in general and, in particular, to those directly involved. An ICT innovation often affects the organisation or community as a whole and also those who are in contact with these organisations. This is especially important for the public organisations in their activities and for the quality of the product and /or services produced.

Thirdly, an understanding of these processes may address the linkage of development and globalisation discourse and ICT innovation in the context of Mozambique. Clearly, a better understanding of ICT dynamics in organisations might help us in directing the ICT applications for the priorities of the development of the country.

1.5. Significance of the research

It is generally assumed that ICT enables organisational change to take place and contributes to the socio-economic growth of developing countries (Madon, 2000; UNDP, 2001b). However, we need to gain a better understanding of the conditions within which such enabling potential is realised.

The first contribution of this thesis comes from the description and analysis of three case studies. This contextualist and situated analysis contributes to an increased understanding of the variety of organisational trajectories that are associated with the introduction of new ICTs. The nature of these trajectories is essentially not understood in the context of a developing country like Mozambique.

The second contribution arises from implications for policy makers, responsible for promoting ICT and developmental strategies. Policy makers need to understand the function, dynamics and causes of why and how ICT projects fail at the micro-level, and how these reasons can be addressed through policy interventions. For example, a number of projects in developing countries fail because of managers not having an appropriate blend of both technical and social skills (Bada, 2000; Yahaya, 2000). These differences require interventions in educational policy such as curriculum changes.

By explicitly considering the interaction between ICT innovation, organisational and development in local (specific) contexts, policy makers can develop approaches to break the vicious circle of organisational under-development and poor ICT infrastructure, and help to initiate a virtuous circle of organisational development made possible by ICT innovation.

In summary, this study aims to be of significance to policy makers, IS researchers and professionals, and to managers and users. In this study, it is expected that the key contributions will arise from the application of the theoretical framework to empirically analyse the interplay between development and ICT dynamics at the

organisational and community level. This interplay is shaped by the processes of globalisation. This implies that a better understanding of the contribution of ICT to socio-economic national development will be gained.

1.6. Setting the scene: the three case studies

In Mozambique, the government has launched a recovery development programme, which aims to alleviate conditions of dire poverty within the country. The recovery programmes manifest themselves across the economy and society as part of a general package of reform, known as the Poverty Alleviation Programme (PARPA), (Governo de Moçambique, 2001a). The PARPA is a comprehensive programme of reform aimed at restructuring the economy by introducing changes in the country's public and private institutions as well as in rural communities with a view to improving the basic living conditions of Mozambican citizens. The rural community is targeted as the first priority with a view to reducing the imbalance between different parts of the country.

Recently, the Government of Mozambique launched a national strategy of reform of the public sector (Governo de Moçambique, 2001b) as part of the overall PARPA framework. It involves, among other issues, reduction in government spending for the public sector and increased modernisation of the public sector.

It is within this context of reform that the following three case studies are empirically investigated: (a) implementation of a computer-based information system in a public company – an electricity company (b) business process re-engineering in a bank and (c) an ICT-based project (Telecentres) at the community level. A brief overview of the three cases is follows.

Within the electricity industry the government established the objective of extending the electricity infrastructure across the whole country, and reducing the cost of production and distribution. The electricity industry is experiencing various

transformations with a view to improving its public services and becoming more 'customer-oriented'.

Since 1993, there has been an increase in the number of licensed banks, from 2, in 1993, to 12 commercial banks in 2000, and more than 30 different exchange houses. Moreover, the role of the central bank in the financial sector has been growing (BM, 2000). Based on this situation the BM decided to embark on a modernisation programme in order to face the new challenges of the times. Business process Re-engineering (BPR) should be seen as a component of the modernisation initiative within the BM.

The Telecentre project is the first experience in Mozambique of introducing an ICT project in rural communities. Considering that the rural community is one of the government priority areas for the PARPA, this case is essentially an interesting and relevant one to analyse. Conclusions drawn from this case analysis can have larger implications for national development policy.

In general, there is a proliferation of ICT solutions in the country, which have implications for a range of different services. In Mozambique at present, banks, public and private institutions and government spend a considerable amount of resources on ICT in order to improve their services. In general, the public and private institutions, and financial institutions in particular, are increasingly automating their processing with a view to providing faster and better quality services to customers. However, little is known of the actual gain of these projects on the ground.

Simultaneously, there is also an increase in the level of activities of international aid agencies, multinational enterprises and ICT management consultants who advise local organisations and government institutions to become global players through introducing strategic planning and major restructuring programmes (Price and Johri, 1992). Despite this increase in ICT-related projects in organisations and communities, the precise nature of these changes has not been studied. Some studies have only focused on conducting cross-sectional examination factors that influence ICT

diffusion (Kluzer, 1992, 1993), without a detailed study of the nature of associated organisational changes. Therefore, the Telecentre, banking and electricity industry can indeed be considered an appropriate setting for a study which aims to examine the interplay of the ICT dynamics and development under the globalisation trend. A more detailed discussion of each case study is undertaken in Chapter 4.

1.7. Structure of the thesis

The thesis is organised into six chapters. Chapter 1 has presented the justification and motivation of the study built around four different perspectives (a) Globalisation (b) Development (c) Transfer of ICT innovation and (d) Relationship between ICT/IS and organisational change.

Chapter 2 describes the natural context and some implications of globalisation. It is divided into three parts. The first part presents the background of Mozambique in terms of geography, socio-economic status and ICT infrastructure status. The second part covers the literature review. Finally, the third part presents a framework starting from Du Plooy's work on human environment for the adoption and use of IT (Du Plooy, 1998) and based on the contextualist approach and situated analysis to study ICT innovation in a specific context such as a developing country (Mozambique).

Chapter 3 is devoted to an overview of the relevant research approaches in information systems, research methodology and assumptions adopted for epistemology and ontology. In addition, it also outlines the case study strategy applied in this research work.

Chapter 4 and Chapter 5 describe the case studies and analysis respectively. Chapter 4 starts by outlining the fieldwork process and the organisational context and then describes each case study in terms of the implementation of the ICT-related initiative in each case. Chapter 5 commences with the examination of each case study through translation under the ANT perspective, and continues with an interpretation of the

field results through analysis of the social and local context (human environment) in which the process of adoption and use of ICT initiatives is taking place. The contribution of each case study to development is examined and the initial framework for the analysis of the case studies results presented in Chapter 2 is refined.

Finally, in Chapter 6, an overview is given of the research analysis presented by examining how the research questions have been addressed. The research contributions and their implications are discussed and evaluated against criteria formulated by researchers in the field. The limitations of the research and potential areas for further research are also discussed.