

**Understanding Dynamic Process of Emerging ICT Adoption in  
UK Service SMEs: An Actor-Network Approach**

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**Business and Management Research Institute  
University of Bedfordshire**

**PhD THESIS**

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**PhD THESIS**

**Academic year 2012/2013**

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UK Service SMEs**

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**April 2013**

**This thesis is submitted in partial fulfilment of the  
requirement for the degree of Doctor of Philosophy**

## **Dedication Note**

This thesis is dedicated to my family for their support and encouragement.

# Acknowledgement

There are a number of people that made the beginning and the completion of this research possible. I think it is time for me to thank them for their immense encouragement and motivation. First and foremost, my appreciation goes to the Almighty God, for his grace, guidance, protection, and most importantly for being faithful throughout this project.

Second, my thanks go to my family and most especially my mother whom despite the difficulties I encountered in embarking on this journey has always told me that “remember son, hard work does not kill but what it generates is satisfaction. Always go for what you think will help you achieve the heights you feel you would be contented in life, no matter the barriers you encounter in the process”. Throughout this journey, I have always resided in these words and sleep with them. It has been one of the sources of my motivation.

Third, someone that has been a very big part of this project is my Director of Studies (DOS) Professor Yanqing Duan who is also the Director of the Business and Information Systems Research Centre. Her encouragement, support and motivation were incredibly exceptional both as a researcher and as a person. Please permit me to explain why I considered her as an exceptional individual. Since I began this journey, mid July 2009, she has constantly organised seminar presentations which allowed her students to present their works and stimulate their thinking as well as training programmes on research methods. Apart from this, she has ensured that I was okay mentally and physically and provided advice as was necessary. This project would not have been successful without her immense contribution. Thank you so much!

Another thank you goes out to my other supervisors: Professor Phillip Burrell, Dr. Stephen Jackson and Dr. Hsin Chen for their constructive feedback. Their support contributed to ensuring that this research was one that would be successful in the end. With all my heart, I say thank you all!

Yet another thank you goes out to Dr. Vincent Ong for his help during a period I was struggling to get used to NVivo software for the data analysis. I will never forget at this point, to thank Professor Brian Matthew and Dr. Habte G. Selassie, whom I discussed my intention to enrol for a PhD after my MSc. Programme. These scholars constantly reminded me of the need to continue to strive even when the going gets tough. I have always reflected on their encouragement throughout this journey. Lastly, on this paragraph, I want to thank Professor J.C. Okoye, of the Nnamidi Azikiwe University, Akwa, Nigeria. You have been a mentor, a father and a role model right from my undergraduate degree to this time. Your incredible

care, advice and motivation in the last 7 years have always encouraged me. I know I don't have much to offer to you right now but sincerely, I have always remembered you in my prayers. Thank you so much!

Finally, I want to thank the University of Bedfordshire and in particular, the Research Graduate School for their support, and to my colleagues (fellow PhD students) for their assistance in one way or the other when the need arises. Thank you guys!

## **Abstract**

Although literature reveals that significant efforts have been made to study ICT adoption and diffusion, the diversity of research in terms of theory and methodology is very low. Most studies have relied on traditional adoption theories (e.g., TAM and DOI) and these theories are not capable of providing rich explanation on how the adoption and post-adoption develop over time. It is argued here that ICT adoption involves multi-dimensional and complex issues. These issues range from how various roles played by actors in emerging ICT are accounted for to ensuring successful adoption.

Therefore, this research aims to advance our understanding of emerging ICT adoptions in SMEs from a dynamic process perspective. The specific objectives of this research are to: establish the stages of the dynamic process, identify the key actors and their roles, explore the critical factors affecting the emerging ICT adoption process, identify the challenges and provide recommendations and implications for stakeholders in promoting future adoption and diffusion in UK SMEs. The research adopts a social-technical approach that challenges the ideas of the mainstream thinkers. More specifically, it adopts Actor Network Theory (ANT). The key ANT concepts that influenced the empirical investigation are inscription, translation, framing and stabilisation.

The research adopted a qualitative method using face to face interviews. Two rounds of data collection were undertaken. The first round started with a theoretical review, the analysis of relevant literature, and unstructured interviews mainly with small business managers. Eleven interviews were carried out. The second round of interviews was semi-structured with key human actors identified in the first round of interviews. A total of fifteen interviews were conducted. They included the small business manager; SMEs service sector customers, government agencies, SMEs consultants, and IT vendors. The aim was to further explore the dynamic adoption process, the roles and challenges of actors and to validate the outcomes of the findings. The analysis was guided by a hybrid approach of thematic analysis using NVivo software.

The study proposed and validated a conceptual framework that illustrates the dynamic process of emerging ICT adoption in SMEs from the Actor Network Theory perspective. This framework helps to understand the adoption process, actors involved, actors' roles and interactions, and the critical factors.

Using the key concepts of ANT as the basis of the investigation, the findings identify a number of key activities associated with the adoption process. These activities include: problem assessment and evaluation, concept generation and evaluation, concept specification, product outsourcing /role delegation, misalignment and alignment of interests,

product trial, product modification, adaptation, and impact and problem redefinition. These activities reveal that adoption of emerging ICT in a small business context is not constant, straightforward and certain; instead it is unpredictable, dynamic, and an on-going and reiterative process. ANT concepts were further used to analyse and categorise 20 roles that different actors play, 15 critical factors influencing emerging ICT adoption in SMEs, and the challenges facing actors. While all of these roles, factors, and challenges are critical, in this study, the findings reveal that *monitoring* and *legislation* are the most recurring roles at each stage. Furthermore, *ease of use*, *managerial time*, *shared support*, *customer focus* and *adoption costs* are the factors affecting the success of multiple stages (three stages). Finally, the thesis presents the contributions and implications for both research and practice in future adoption and diffusion.

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## Abbreviations

ANT.....	Actor network theory
BIS.....	Business, innovation and skills
CAQDAS.....	Computer Assisted Qualitative Data Analysis Software
ECF.....	Enterprise capital fund
GDP.....	Gross domestic product
ICT.....	Information communication technology
IDT.....	Innovation diffusion theory
IS.....	Information Systems
IT.....	Information Technology
RBV.....	Resource based view
SME.....	Small and medium enterprises
TAM.....	Technology acceptance model
TOE.....	Technology, organisation and environment framework
TPB.....	Theory of planned behaviour
TRA.....	Theory of reasoned action

# Chapter 1

## 1.0 Introduction

The implementation of new technology has been recognised as an important process for transforming a business (Yu and Tao, 2009). These transformations are not only enabled by Information and Communications Technologies (ICT), but also dependent on the ability of organisations to adopt and implement emerging ICT to streamline their business processes, and sustain business competitiveness and growth continually. Organisations that constantly keep up with the new ICT can take advantage of these technology applications. However, existing studies have shed limited light on how and why SMEs are adopting and implementing new ICT applications over time (Ramsey et al., 2008). This research aims to advance our understanding of emerging ICT adoption in SMEs from a *dynamic and evolutionary process perspective* in order to provide new insights on how SMEs continually adopt emerging ICT. More specifically, the research addresses the adoption process, the roles of actors, the factors influencing its adoption and the challenges facing actors.

### 1.1 Rationale for the research

The research focuses on SMEs. SMEs are drivers of diversified socio-economic development in the form of employment creation and innovation. Therefore, this section examines why the research is important followed by the current gaps in literature.

#### 1.1.1 *The importance of adoption research in SMEs*

Emerging ICTs are major drivers of innovation and business transformation that affect every firm and its operations. They have dramatically changed the way firms organise, innovate, and create values. Therefore, as new ICTs emerge, organisations devise new strategies and directions to utilize these applications to reach out to their customers and business partners and develop new and innovative ways of doing business. Consequently, they rely on ICT for their business success. This explains why the UK government has promulgated measures to encourage small businesses in keeping up with new ICT in this digital age.

Small businesses in general play pivotal roles in economic development. In Europe for example, small businesses represent 99 percent of all businesses (Lindermann et al., 2009).



SMEs provide employment for about 70 percent of the working population and yield gross added value of about 70% in Europe and in countries outside Europe (Castro et al., 2010). In the UK, SMEs are key to economic growth, job creation, regional and local development (Martin and Halstead, 2004; Lee, 2004). Tilley and Tonge (2003) note that since the Bolton Report was published in 1971, small businesses have continually contributed to the economy. Recently, Ritchie and Brindley (2005) found that 67 percent of jobs created in the European Union were as a result of 18 million SMEs. They have contributed to 55 percent of employment and 51 percent of GDP in the UK (Ritchies and Brindley, 2005). As countries go through the global economic crisis, SMEs have been the backbone of not only the UK's economy but the whole European region (Wymenga et al., 2011).

The UK service sector in particular has expanded rapidly in recent years and represents about 20% of the national output (BIS, 2010b). It is the second largest segment of businesses in the UK and accounts for 23% of UK business (Quader, 2007). This is one of the sectors relevant for the growth of the global economy (Parellada et al., 2011). According to Milla and Choi (2011) the main difference between the past and the future of service oriented businesses is the emergence of globalisation. This factor is pivotal in every business as well as the global changes such as the shift toward techno- economic paradigms such as ICT (Parellada et al., 2011). This has increased the role of service industries. The sector is now essential in developing the economy, sustaining business competitiveness and providing support to both the private and public sectors. The growing significance of service businesses suggests that the effort to improve all aspects of the economy focuses increasingly on the service sector (BIS, 2010b).

Despite small businesses' willingness to develop and adopt new ICT to improve business processes, they operate in a competitive business environment and face challenges. Yet much research attention has focused on large organisations. For example, Williams et al., (2009) analysed the different areas/sectors of ICT adoption and diffusion studies and found that SMEs adoption research accounts for only 8.6%. Even when SMEs attempt to adopt the new ICT, most of them accept it as a solution (Rantapuska and Ihanainen, 2008). They are unaware that a little change in their ICT adoption strategies can lead to improvement in business practices and performance. Sometimes, they only look at the short term solutions and ignore the long term benefits.

The UK government has often been at the forefront encouraging small businesses to adopt ICT through various programmes, which include information technology initiatives, business analysis initiatives and funding (Chapman et al., 2000). Simpson and Docherty

(2004) point out that such initiatives have not been successful because of the “missionary approach” taken by the UK government to support SMEs. ICT adoption and diffusion are far less encouraging in SMEs and the complexities associated with the adoption are still neglected when considerations are given to the professional service sector businesses (Ramsey et al., 2008).

### 1.1.2 *Current gaps in literature*

First, an extensive literature review reveals that a substantial number of theories have been used to examine ICT adoption research, but the majority of these theories have focused on a variance or factor approach. Parker and Castleman, (2009) for example, analysed adoption theories and stressed that those most commonly used to explain ICT adoption decisions in small business contexts are innovation models (Rogers, 1983; Rogers, 1995), intention based models (Ajzen and Fishbein, 1980; Davis, 1989), Resource Based View (RBV), and Porter’s model (Porter, 1985). In addition, several other meta-analysis (Premkumar, 2003) and extensions (Adams et al., 1992; Pavlou and Fygenson, 2006; Venkatesh et al., 2003) of these theories have been proposed. While these theories have contributed to adoption studies in the past, they have always focused on conceptualising the constructs as variables and predicting the levels of ICT adoption in organisations. This approach appears to have ignored the explanation of how these organisations develop and adopt ICT over time. This approach is not in any way proportionate to the variety of approaches used to investigate ICT adoption research or the amount of effort made to understand ICT adoption and development. It is argued that to understand the complex issues involved in ICT adoption, studies should not only rely on theories that predict levels of outcome but also explore other theories that can help explain the phenomenon in greater detail (Silva, 2007).

Second, the diversity in terms of the methods used in ICT adoption research is low. Previous and recent studies (Orlikowski and Baroudi, 1991; Galliers and Land, 1987; Choudrie and Dwivedi, 2005; Williams et al., 2009) have analysed methods used to study IT/ICT adoption. The quantitative approach is still the dominant approach (Williams et al., 2009). Questionnaires are the most widely used method of data collection. Other methods, such as interviews, multi-method, mathematical model, field study, laboratory experiment, secondary data analysis, action research are rarely used in ICT adoption research (Williams et al., 2009). Although the quantitative approach is well recognised and has its advantages, it considers ICT adoption as a one off event and focuses on factors affecting adoption at one decision point. The dominant use of quantitative methods will inevitably hamper the intellectual debate and most importantly, limit the future development of research in this

field. More research attempts are needed to study ICT adoption using alternative methods that offer richer insights and provide mechanisms as to how SMEs can adopt emerging ICT continually.

Third, few studies examine ICT adoption from multi-dimensional and dynamic process perspectives. When studying the adoption of ICT, various roles played by actors in the process need to be accounted for. While this has been highlighted in the literature, an extensive literature review suggests that there is still a dearth in research which has considered the roles/influences of various stakeholders and how they are being influenced by ICT. ICT adoption is often studied from two dominant streams—the social perspective, and the technology perspective. From the social perspective, Newman and Thomas (2008) note that new technology applications are more associated with diverse human actors and would eventually fail if these actors do not participate. Similarly, Costello et al.,(2007) contend that human actors are the most expensive resources of an organisation and any framework relating to SMEs would not be complete if human actors are excluded. In addition, Raza and Standing (2010) also note that organisational actors are an integral part of ICT adoption decision practices and cannot be detached from any organisation model.

The reasons for these assertions are obvious. If ICT for example is commercialised with few organisational actors, it may not be compatible with the current organisation arrangements and it can further result in unanticipated and declining effects. It may lack the required content which limits it from working properly (Fang et al., 2011). Employees on the other hand, may not be willing to switch from the old applications to new ones. Managers may also be afraid to adopt ICT, especially if the applications are not user friendly (Walker and Lees, 2002). Both internal organisation actors (managers) and external actors (customers and suppliers) who use the system may have concerns regarding the ICT standards and may constantly challenge its adoption (Fang et al., 2011). On the other hand, the influence or the roles of the potential ICT may also shape the decisions of the social actors who are an integral part of the adoption decisions. However, how these social actors exert or are being influenced by the ICT, which may improve the quality and usability of the new ICT, is less accounted for in the literature (Schwarz and Chin, 2007; Cavusoglu et al., 2010). Actors involved in ICT adoption are numerous and their roles and /or how they influence and are being influenced by ICT need to be examined. This requires a shift from the usual technocentric position to a dynamic interaction of people and ICT in which the absence of one may hinder the adoption success.

As a result of the gaps discussed above, the constant quest to keep up with new ICT has become an ongoing management challenge (Williams et al., 2009) and remains critical to most organisations (Beckinsale et al., 2010). Although most of the prior studies still regard ICT adoption as a one-off activity, they have always ignored the fact that as decisions are made, on proceeding to another stage, they can be challenged, altered or completely changed. This may lead to an entirely new decision. The failure on the part of most studies to understand this has always led them to consider ICT adoption as a one-off action. Most of these studies often fail to recognise the fact that ICT does not appear with a well-articulated and user enhancing advantage (McAfee, 2006). As a result, there are always limited guidelines on how organisations can improve, adopt, adapt and/or recreate and use the new technology applications over time (Venkatesh et al., 2007; Hirschheim, 2007).

The dominant approaches used to evaluate the strategic values of ICT are static in nature (Al-Natour and Benbasat, 2009; Williams et al., 2009) and are unable to capture the constant technology advancements and the dynamic and evolutionary nature of technology adoption, and should be considered from a dynamic and evolutionary process perspective. To address these issues, it is argued that a new framework should be developed to help researchers, policy makers and practitioners better understand how SMEs constantly keep up and benefit with emerging ICT.

## **1.2 Research objectives**

This research aims to advance our understanding of emerging ICT adoption from a dynamic process perspective. The objectives of this study are:

1. To understand issues relating to emerging ICT adoption by reviewing and analysing the existing literature, and exploring the current situations in UK small service businesses.
2. To propose and empirically validate a conceptual framework to depict the dynamic process of emerging ICT adoption in SMEs.
3. To explore the roles of actors in the emerging ICT adoption process and their associated challenges.
4. To identify the critical factors influencing the emerging ICT adoption process.
5. To provide implications and guidelines for stakeholders in promoting future adoption and

diffusion of new ICT in SMEs.

It is important to note that this research does not attempt to enrich existing prominent theories of adoption or combine two or more of them; instead, it aims at developing a more explanatory framework that lays a foundation for studying ICT adoption and development from a dynamic process perspective.

### **1.3 Key terms in the study**

There are a number of terms which are important in this research and need to be explained. These terms are expected to guide the readers. The terms are now briefly examined.

#### *1.3.1 Adoption and development*

Adoption and development are used interchangeably throughout this research. Raza and Standing (2010) note that technology in an organisation relates to new applications that use some methods to process information. It provides services/products that are capable of satisfying the needs of different actors in society; as a result, the adoption of technology also means the development of a successful technology using the new process systems. Earlier, Orlikowski (1992) argued that human interaction with the technology has two interactive modes (design mode and use mode), and these modes of interaction are tightly linked. Adoption in this research involves actions that lead to development, adaptation and implementation (Orlikowski, 1992). It is the continuous process actors go through in order to cope with the perceived consequences associated with technological events (Beaudry and Pinsonneault, 2005). The activities include designing, modifying and aligning relevant aspects of organisational operating procedures (Tyre and Orlikowski, 1994).

#### *1.3.2 Dynamic process*

A Dynamic process in this context is defined as an interactive system or process involving competing or conflicting forces characterised by continuous activities, change or process. This takes place over time.

### 1.3.3 *ICT and emerging ICT*

Observation during the field work shows that most SMEs used the term technology or IT more often than ICT; though a number of researchers published in this area as noted by Costello(2009) have made ICT another commonly used term. It is important to note that whether technology or IT is referred in this work, this research focuses on emerging ICT in small service businesses. Ongori and Migiro (2010) considered ICT as applications and devices that are deployed to create, produce, analyse, package, distribute, retrieve, store and transform information. Similarly, Ritchie and Brindley (2005) defined ICT as “different digital technologies that collect, organise, store, process, and disseminate both internal and external information to an organisation”. These definitions suggest that ICT is a term that embraces all technologies that are used for communication of information. Bearing in mind that adoption is an on-going action and due to constant environmental changes, managers do not have to rely on a single system; instead they should rely on a number of technological applications. Therefore, providing a single definition of ICT or emerging ICT in this research would be inherently problematic.

Emerging ICT in its broad context encompasses any new ICT development or improved ICT applications. Examples include applications, time tracking devices, customers and operations information, knowledge management systems and document management systems. This definition is adopted in this research given that advances in ICT have profound effects on the operations of organisations as a result of changes in the environment. Organisations face new challenges that require using ICT in different ways and sometimes they may require extending the already existing applications. New ICT may be in existence but may not be fully established, as such it can be modified and extended further or new ones can also emerge to allow organisations to meet their business needs.

### 1.3.4 *Actors*

Lindsey (2005) notes that actors represent numerous other imagined users involved in the constructions of ICT and do not exist in isolation. Actors in this study constitute both human and non-human such as people and technology. The constant turbulence of the business environment always triggers *managers* to rely on non-human actors (e.g., technology) to survive. Therefore the absence of technology in any business operation can have a dramatic effect on the business success. Human actors are various users or members of society who directly or indirectly form an integral part of establishing ICT. These actors may act as a dictator for emerging ICT needs through a series of activities resulting in new ICT

implementation. They constitute an integral part of the development process throughout the technology's life history (Lindsay, 2005). On the other hand, it is argued that *technology* does not need to be institutionalised for it to exist; instead, once it is conceived it is a force to be reckoned with, and it is an actor delegating roles and influencing human actors. Therefore, studying ICT adoption requires taking into account the interactions of both human (people) actors and non-human (technology).

### 1.3.5 SMEs

The term SMEs varies considerably across countries and most countries use different criteria to classify them. Although no commonly recognised definitions of SMEs exist in literature, the commonly used classifications include number of employees, sales and investment and total net assets (Costello, 2009). Tilley and Tonge, (2003) note that over the last 30 years, a number of debates have been held relating to the categorising of SMEs based on the number of employees, and this has been generally regarded as the most frequently cited in literature. The organization for Economic Co-operation and Development for example, defined SMEs as those businesses that employ less than 500 persons (OECD, 2004); others have used a maximum number of 100 or 200 employees. The European Commission have classified SMEs by a definition, which was expected to be appropriate for all member states (Tilley and Tonge, 2003). However, in the UK and most other European countries, SMEs are defined as companies with employees between 1 and 250 (Tilley and Tonge, 2003). Within this, most studies categorise it further to micro (1-10 employees), small (11-50 employees) and medium (51-250 employees) (Costello, 2009). SMEs are defined in this research as organisations with 1- 250 employees.

## 1.4 Research process and method

The aim of this research is to help UK service sector SMEs benefit from emerging ICT by examining the dynamic and the evolutionary process of technology adoption using ANT. More specifically, the research focuses on the adoption process, the role of the various actors in the process and the associated critical factors. These objectives were achieved through the research processes explained below.

#### 1.4.1 *Literature review*

This research starts with reviewing previous and recent ICT adoption literature to understand what is new and identify the research gaps. The initial literature review was to search for suitable research papers in the field of ICT which helps to identify the research problems. The second part of the literature review continues throughout the research. This further helps to collate evidence from reflective journals in order to confirm the findings. The early review helped to identify the rationale for the study and the formation of the research objectives.

#### 1.4.2 *Preliminary study*

The preliminary study involves the initial round of interviews (unstructured interviews). The purpose of the unstructured interview was to understand the current state of the emerging ICT adoption and to put the study into a large context; and secondly, to help ascertain the applicability of the theoretical codes generated from the literature using the sample of the initial empirical data. The aim is to ensure that a number of theoretical codes generated are credible or applicable to the subsequent empirical data. Finally, to help identify the actors involved and the initial set of factors. The preliminary study helps to test the theoretical codes identified from the literature to a sample of the raw data and ascertain their reliability. The reliability analysis helps to unveil the suitability of the theoretical codes. The preliminary study reveals the concepts of *inscription*, *translation*, *framing* and *stabilisation* are the most credible. These concepts formed the basis for further exploration.

#### 1.4.3 *Initial framework*

These outcomes of the preliminary framework helped to develop the initial framework. The purpose of the framework is to guide and stimulate the participants' thinking during the second round of the interviews. In addition, it allows the participants to access their experiences at each stage of the framework to assist them in the organisation of the conversion, while some degree of freedom is given to express their views during the semi-structured interviews.



#### **1.4.4 Validation**

This validation consists of three stages. The aim is to explore further the roles of actors and confirm the outcome of the findings.

##### **1.4.4.1. *Semi-structured interviews***

The second round of this research starts by conducting a semi-structured interview adopted to help gain valuable insight on the outcomes that emerged during the unstructured interviews, and gain a deeper understanding of the participants' social and personal matters in order to validate and confirm the findings. The framework helps participants to articulate and interpret their experiences (Schultze and Avital, 2011) within each stage of inscription, translation, framing and stabilisation. In addition, it adds a descriptions in a way that the established characteristics (key activities, roles of actors, the factors and the challenges facing actors) at each stage of the framework are revealed.

##### **1.4.4.2 *Data analysis***

Qualitative data analysis is associated with three concurrent flows of activities including data reduction, data display, conclusion drawing /verification (Miles and Huberman, 1994). The study adopts thematic data analysis to achieve this task. More specifically, a hybrid approach (integration of inductive data analysis and deductive data analysis) is the one featured in this research which incorporated NVivo to facilitate the analysis because of the huge data involved.

##### **1.4.4.3 *Confirmation and Conclusion***

Verification means a further reliability check and validity of the raw data coded. Inter-rater reliability checks which involve percentage agreement as proposed by (Boyatzis, 1998) were conducted while the validity was further ascertained and confirmed by experts in the field, who further checked the codes associated with the supporting evidence. The verification leads to the confirmation and conclusion of the study.

## 1.5 The structure of the thesis

This thesis comprises of seven chapters:

**Chapter one** contains an overview of the research. First, it presents the research rationale, research objective, key terms fundamental to the research, research process and methods and finally, the structure of the thesis.

**Chapter two** presents the literature review. This consists of three main parts. The first part reviews the emerging nature of ICT adoption and uses actors and the relevance in engaging them in such processes. The second part reviews theories of information systems and organisational change and considers how previous researchers differentiated them. The third part looks at small businesses and their ICT adoption behaviour, government interventions and their understanding of emerging ICT so far.

**Chapter three** presents ANT as the theoretical lens for the research and guides the development of a conceptual framework that takes into account the dynamic and evolutionary process of technology adoption. Next, it presents ANT concepts used for the study, the application of ANT by previous studies and the rationale for using ANT.

**Chapter four** presents the research paradigm and methods, the research methods in information systems and ICT adoption in particular, and justifications for adopting interpretive research that addresses qualitative issues. It further reports the research process and data collection approaches and justifications for using unstructured and semi-structured interviews. Next, it highlights the sample selection technique and criteria, participants, unit of analysis and the stages of the interview process and finally, reflection on the methodology.

**Chapter five** presents the data analysis process. It presents a step by step review on how the codes and themes were derived using thematic analysis that incorporated NVivo in the process and presented the findings.

**Chapter six** presents the interpretation of the findings, the conceptual framework developed, discussions and recommendations.

**Chapter seven** summarises the key rationale for the research, objectives, methods adopted to achieve the objectives, the contribution to theory and knowledge, the implication for research and practice, limitations of the research and the future work.

# Chapter 2

## Literature Review

This research adopts a social-technical approach that challenges the underlying ideas and assumptions of the most prominent theories of IT/ICT adoption by providing a new lens to studying ICT adoption. Therefore, this chapter provides a comprehensive review of the relevant literature.

### 2.1 Approach to the review

The literature review is in three main parts. *The first part* examines the business environment; the nature of ICT adoption, actors involved and their relevance in establishing emerging ICT success. *The second part* examines three major schools of thought associated with information systems and organisational change in order to identify the option(s) suitable for this research and second, the theories associated with them. The theories reviewed include the traditional adoption theories and those that emphasise the recursive interactions between the social and the technical and focus on how researchers have made distinctions about them. These theories are considered in this research because adoption of IT can be interpreted as a process of organisational change (Garud and Rappa, 1994). *The last part* presents the theoretical review on SMEs, their ICT adoption behaviour, the degree with which UK government as a key influence has intervened so far in supporting SMEs as well as their approach to understanding ICT adoption in SMEs. Before proceeding further, Steen et al.,(2002) note that it is always necessary to understand the business environment in which businesses operate before paying attention to other issues.

### 2.2 The business environment and emerging ICT adoption

Business environment represents an array of relevant organisational factors and individuals which may be uncontrollable or controllable but influence an organisation's decisions and ultimate success (Benamati and Lederer, 2001). Such an environment according to Dixon et al.,(2002) is crucial for businesses to grow and benefit from ICT especially where there is transparency, openness and a competitive business framework, clear legislation, easy set up and stable legal treatment within and across countries (OECD, 2004). However, the business

environment has remained unstable; thus, managers need to understand its dynamics, and the roles of other actors involved in ICT adoption to make best decisions that constantly reposition the organisation.

Benamati and Lederer (2001) differentiate environmental *determinism* and *strategic choice* as two relationships that organisations have with their environment. Environmental determinism posits that the environment is a force that determines or constrains the organisations and organisations adjust based on the changes caused by it (Benamati and Lederer, 2001; Benamati and Lederer, 2008). The uncertainty caused by the environment can influence managers' decisions and encourages less bureaucratic and open structures (Benamati and Lederer, 2001). Therefore, the environment is a key influence that impacts on how organisations adopt and adapt to new ICT and other situations.

On the other hand, the strategic choice considers organisations as being more proactive than reactive in dealing with the environmental changes (Benamati and Lederer, 2001; Benamati and Lederer, 2008). Businesses try to minimize surprises by regularly interacting with their environment as well as predicting likely changes and possible strategic responses instead of simply reacting to the problem posed by the environment. As a result, firms can adopt more efficient measures and manage any change to their advantage (Benamati and Lederer, 2001; Cavusoglu et al., 2010).

The dynamic nature of the business environment necessitates change management. Organisations are constantly confronted with these changes which require adopting emerging ICTs to improve business processes and competitiveness. Although these emerging ICTs influence an organisation's decision making, they are not simple and predictable; instead, they are associated with some kind of organisation outcomes which are in most cases emergent and unanticipated (Orlikowski and Scott, 2008). Therefore, studies should focus their attention on understanding ICT adoption from a dynamic and evolutionary process perspective.

### *2.2.1 The nature of emerging ICT development, adoption and use*

According to Jacobsson and Linderoth, (2010), ICT adoption is a social process that involves diverse actors and also links to broader situations, emerging from organisations, economic, historical and socio-political structures, institutional properties, organisational, environmental, and socio-economic as well as the political agenda (Orlikowski, 1992). When a change for example triggers ICT adoption in an organisation, it affects or threatens the

existing power relations. It is through the interactions of various actors that meaning is attached to the technology (Jacobsson and Linderoth, 2010; Orlikowski, 1992). Technology may include objective functions accepted at one point but may be challenged from time to time due to different meanings actors assigned to it (Orlikowski, 1992). However, because diverse actors may exhibit different idiosyncrasies, difficulties and conflicts of interest often result (Orlikowski and Gash, 1994). Technology embodies negotiation, and its enabling or constraining effects depend on how diverse actors interpret it (McGrath, 2003) Therefore, understanding how a certain technology is developed, deployed, used, and evolves, requires a clear grasp of human actors (Orlikowski and Gash, 1994; Jacobsson and Linderoth, 2010) and the roles/influence of the technology.

### *2.2.2 Human actors as the key influence in ICT adoption process*

ICT adoption and implementation in SMEs is a complex process that occurs in a non-linear form (Xu et al., 2007). It ranges from identifying users' needs to developing and adopting it (Tyre and Orlikowski, 1994). The key to competitive advantage goes beyond education and training of developers; rather, it includes co-creation of values with users who are an integral part of the diffusion process (Prahalad and Ramaswamy, 2004; Kotler and Keller, 2009).

The developers' ability to innovate requires effective interaction with other actors in a way that is in line with the principles of value creations (Awa, 2010). In the knowledge economy, users are involved in value creation and developers usually avoid unaccompanied operations and foster innovations outside in an attempt to close up user-developer dichotomy (Awa et al., 2012), and value co-creation (Prahalad and Ramaswamy, 2004), making customers in charge (Zwick et al., 2008) or service-dominant (S-D) logic of marketing (Vargo and Lusch, 2004). Kotler and Keller (2009) suggest that this paradigmatic shift from family business to extended enterprise entails developers' using their skills to mobilize active customers' creativity in a collaborative network and to harmonise it with core competencies to build competitive advantage. Studies (Wyatt, 2003; Boellstorff, 2008; Kaulio, 1998; Zwick et al., 2008) showed empirical correlation between the success of value creation processes and the mobilization and expropriation of external but invisible affective, social and emotional relations of empowered entrepreneurs and consumers or users (Awa et al., 2011).

Empowering active users enhances socio-economic and socio-cultural benefits (Arvidsson, 2006; Awa et al., 2011). Often this is best achieved through dynamic platforms that encourage value creation in a manner that is desired by developers (Zwick et al., 2008). Kaulio (1998) suggests engaging users in all the stages of development, especially at

specification, conceptualisation, engineering design, and prototyping phases. In the apparel industry, for example, Arvidsson, (2006) identified copying clothing currently owned and co-designing with a trained person, and selecting from a set of opinions in which consumers show interest in participating in the design of clothing. Similarly, (Awa et al., 2011) found that users prefer to participate in mass customization of products (i.e. jeans, swim suits), and product features (i.e. fit and size) to a greater degree. Users here refer to actors who, though they do not exist in isolation, are involved in establishing ICT (Lindsay, 2005).

Effective development, adoption and implementation require collaborative efforts involving diverse actors that are closely involved in the process and contribute their expertise for a mutual beneficial goal. The more positive the interactions between those that provide these ideas and those that transform them into physical objects, the greater the perceived value (Rosenbaum and Massiah, 2007). The implication is that users through collective knowledge, learn and exchange ideas which relate to the core competences of building competitive advantage (Kotler and Keller, 2009). These diverse actors may exploit the creative knowledge of others; merge it with their firm's dynamic capabilities to co-create output.

ICT adoption involves multiple and perhaps diverse human actors. Studying the complex nature of internal and external actors (e.g., suppliers, customers, designers, developers, government, employees, competitors, socio-economic conditions, political, regulatory climate, demography, and technology) assists managers to understand the most significant actor(s) and the strategic impact on the organisation (Benamati and Lederer, 2001; Benamati and Lederer, 2008). Small business managers involve different internal and external actors in investigating emerging ICT since the tasks required in developing and adopting successful emerging ICT are vast and cannot be handled by a single actor (Benamati and Lederer, 2001). However, literature pays much attention to large organisations almost to the neglect of small businesses despite the fact that involving diverse actors may improve their ICT adoption strategically.

In most innovative organisations for example, the manager may not only be responsible for technological implementation but also involve members of the organisations and external actors. External actors include IT consultants who help to plan and implement new technology and provide on-going support as well as common problem solving; and IT vendors involved in the identification, resolution customization, creation of interface, and functional enhancement of the new ICT (Fang et al., 2011). Others may include designers and developers, government and its agencies. In addition, internal actors including IT staff may

attend conferences and seminars about emerging ICT and together with other external actors may determine the value of the emerging ICT and develop a procedure to assess and evaluate it. Organisations that accommodate internal and external actors are more likely to keep up with emerging technology (Benamati and Lederer, 2001). These actors are likely to provide sound results of how the organisations can adopt and implement emerging ICT rather than relying on internal resources only.

Despite the importance of human actors' participation in IT/ICT development and adoption, studies have found different results (Hawk and Santos, 1991; Woodroof, 1996). According to McKeen and Guimaraes (1997) there are a number of occasions where actor involvement may be unproductive. There are situations where users are dissatisfied and behave dysfunctionally during the development and implementation because they felt that their initiatives were not represented in the systems. Others may be as a result of poor communication between and among actors.

However, it has been argued that collaboration efforts among various human actors enhance managers' understanding of ICT adoption, reducing the high rate of ICT adoption failure witnessed by SMEs. While these suggest that various human actors play significant roles in ICT adoption success, it is also important to take into account technology in the analysis of the interaction between the technical and social systems (Jacobsson and Linderoth, 2010).

### *2.2.3 Technology as the shaper of the adoption process*

In today's turbulent business environment, for organisations to survive implies relying on non-humans. This dependence can be considered as a myriad of interactions between people and technology in which the absence of technology can have a dramatic effect on the entire organisation. The modern business environment is by far more technology driven. When studying technology adoption and implementation, technology should not be taken for granted (Orlikowski and Lacono, 2001). It is important to consider the influence of technology in order to wholly grasp the outcome of the interactions between technology and social systems (Jacobsson and Linderoth, 2010).

According to Orlikowski and Scott (2008), technology is indispensable for organisations and mediates work in different organisations. It has become virtually an integral part of the majority of business operations whether small or large. Today, it is hard to point out any present-day organisation that does not use any form of technology application at some level. Technology is critical to organisations in a modern day business as organisations go global,

and move into the web. As these organisations invest in technology applications, it allows them to perform their duties in different locations (Orlikowski and Scott, 2008) more effectively.

While a number of studies (Huber, 1990; Orlikowski and Lacono, 2001; Orlikowski and Scott, 2008) have called on researchers to pay adequate attention to technology, Doolin (1998), points out that technology is a condition as well as a consequence of power relations in organisations. In order to be critical in its analysis, there is a need to examine and analyse the practices surrounding adoption in the wider context. This implies not just understanding those that take decisions on what technology is to be invested, but how these technology applications are designed, who participates, uses and changes them, what influence it has on human actors or the likely consequences it may have on the entire organisation (Orlikowski and Scott, 2008). While these issues have been raised in literature, Orlikowski and Scott(2008) made it clear that little work has addressed these issues.

Among the recent studies that highlight some key influence of technology is Jacobsson and Linderoth(2010). Jacobsson and Linderoth (2010) note that to understand the influence of technology requires taking into account the programme of actions inscribed in the technology by different human actors, which provide roles to them. By imposing this inscribed programme of actions to human actors the technology itself is considered as an actor (Hanseth and Monteiro, 1997).When human actors for example impose assumptions, knowledge and interests to others, it is inscribed into a technology which may subsequently influence the roles of those that inscribed their beliefs and assumptions into it. However, this process, as Markus and Robey (1998) and Jacobsson and Linderoth (2010) posit, should not be considered as a one-off event since actors might accept or reject the inscribed assumptions, values and interests, which in turn lead to a complete inscription of new assumptions. In order to account for the roles played by technology, more research focus is needed if studies are to tackle the taking for granted notion of technology. A number of studies have pointed out the need for this.

Roberys and Grabowski (1996) note that because of the rapid advancement of technology, there is an urgent need for researchers to keep pace with technology change. They mentioned a number of problems with existing views of technology which have been highlighted above and argued that there is a need to reconsider technology, especially the ways it is investigated in the organisation. Similarly, Zammuto et al., (2007) note that despite the vital roles of technology, the interests given to technology by many management researchers for decades have reduced drastically. This appears to be problematic given the roles technology plays in



contemporary organisations. This calls for a reconsideration of the conventional views of adoption theories.

## **2.3 Theories of information systems and organisational change**

A number of studies have examined information systems and organisational change, using various theories. Cordella and Shaikh (2006) note that these theories can be grouped into the social construction theories, technology determinisms and those that address the problem of the interplay between the technology and users. On the other hand, Desanctis and Poole (1994) grouped the theories into three schools of thought namely; the decision making school, institutional school and social–technical school. These schools enable researchers to classify their research by the importance attached to either technology, society or both in shaping the other. These three schools are examined first before considering the theories associated with the features of these schools in order to select the option(s) suitable for this study.

### *2.3.1 Decision making school*

Decision making theorists (Keen and Morton, 1978; Jarvenpaa, 1989; Pinfield, 1986) are more rooted in psychology. This approach is linked to positivist research where the results of a given change in the initial set of technology can be predictable (Bostrom et al., 2009). The decision making school believes that technology is mainly the reason for any organisational change. They are of the view that belief for a certain outcome such as the benefit for adoption of technology enables an organisation to become aware of the benefits associated with a new technology (Xu et al., 2007; Desanctis and Poole, 1994; Bostrom et al., 2009). Theorists in this school argue that when technology is adopted, it enhances and/or restricts the behaviour of an individual, group, or organisation (Desanctis and Poole, 1994).

The decision making school considers technology as embedding features that help organisations solve problems. Its emphasis is on rational decision making (Desanctis and Poole, 1994; Bostrom et al., 2009) which is consistent with the technology imperative, where technology is an exogenous force that determines or strongly constrains the performance of individuals and organisations (Markus and Robey, 1998). The decision making school focuses on individual actors. They are independent, and associate with causal relationships and have a considerable determinant effect on each other (Orlikowski and Scott, 2008).

Although a number of studies within this school have made strong claims such as the failure to achieve a change implies a failure in technology implementation, mixed results besiege studies (Markus and Robey, 1998; Desanctics and Poole, 1994) on this. Studies (Moon, 2003; Johnson et al., 2008) have suggested different ways similar technologies are deployed and used across groups which generated different perceptions and behaviours that differ from the intended impacts. Markus and Robey (1998) for example, argue that regardless of the fact that technology helps in the day-to-day performances of tasks, it has accounted for a change where changes were not expected. The limitation of theories in this area is that they are deterministic and fairly static in nature (Desanctics and Poole, 1994).

### *2.3.2 Institutional school*

The institutional theorists (Giddens, 1979; Fulk et al., 1987; Salancik and Pfeffer, 1978) rest their assumptions on social development instead of technology and view technology as an opportunity for change rather than the main reason for change (Garud and Rappa, 1994; Desanctics and Poole, 1994). The school criticised the decision-making theorists for being “techno-centric,” where technology shapes human attitude, belief, and behaviour through over-emphasizing technology and taking for granted the social dimension of technology (Desanctics and Poole, 1994; Bostrom et al., 2009). The institutional school is similar to the organisation imperative where human actors construct technology to satisfy an organisation’s needs (Markus and Robey, 1998).

The idea behind the institutional school is that human interaction is what determines the social construction of technology. Although Markus and Robey (1998) note that designers can manage the impact associated with information technology by attending to both the technical and the social concerns, institutional theories have been designed for organisations and focus on the study of society. Theories within this school include process theories, which emphasise the social construction of meaning, social formation and the symbolic interaction theory which looked at the importance of communication in creating social order (Desanctics and Poole, 1994).

However, theories within the school went too far by taking the roles played by technology for granted (Orlikowski and Lacono, 2001) in organisational change. Most studies in this area failed to consider the intentions of the designers. Thus, it is argued that the theories associated with the institutional school cannot be viewed as an absolute test of the

organisation imperative (Markus and Robey, 1998). Theories in this area fall within social constructivism. They have been criticised for focusing mainly on social structure.

### *2.3.3 Social-technology school*

Socio-technical systems (STS) in organizational development is an approach to complex organizational work design that recognizes the interaction between people and technology in workplaces. The term also refers to the interaction between society's complex infrastructures and human behaviour. In this sense, society itself, and most of its substructures, are complex sociotechnical systems. The term 'sociotechnical systems' was coined in the 1960s by Eric Trist, Ken Bamforth and Fred Emery, who were working as consultants at the Tavistock Institute in London. The social-technology school (Saunders and Jones, 1990; Trevino et al., 1987; Callon, 1986) emerged from integrating practices of the decision school and the institutional school. The social–technology school views technology as made up of different features but it is the social systems that moderate their outcome on organisational behaviour (Desanctics and Poole, 1994; Bostrom et al., 2009). Theories relating to this school argue that adoption of IT depends on how well the technology and the social systems complement each other. Similarly, a number of studies (Markus and Robey, 1998; Pfeiffer, 1982 ) also point out that actors involved in decision making are often segmented and discontinuous in such a manner that decisions are made and changed continually. Also the perception of an action differs from one actor to another which is often problematic. Theories in this area correspond to emerging perspectives (Markus and Robey, 1998).

The basic premise of the emerging perspective is the interplay of conflicting views, preferences, and prejudices of different actors. Gasser (1986) investigates how people adapt and cope with technology and reveals how the nature of routine work involves the dynamic interplay of human and non-human actors. Theories associated with this social-technical school differ from the previous schools. The decision-making school tends to emphasise the development of technology with little emphasis on society; whereas the institutional school assumes that human actors have unlimited choice and have control over the consequences associated with the technology (Barrett et al., 2006).

Table 2.1 below further shows that the decision making school is deterministic, static and adopts a positivist approach. Theories that fall within the decision making schools, treat technology as a distinct entity and organisations use it to accomplish tasks. Most of the studies posit that technology is an independent variable while others simply consider it as a moderating variable that influences the organisation variables (Orlikowski and Scott, 2008).

On the other hand, the institutional school adopts process models, adopts the interpretive approach and focuses extensively on the roles of human agency (Barrett et al., 2006). Theories that fall within the decision making school and institutional schools may not be suitable for this research.

Table 2.1: Perspectives on technology and organisational change

<b>Perspectives on technology and organisational change</b>	<b>Characteristics</b>
Decision Making School	<ul style="list-style-type: none"> <li>• Technology determinism</li> <li>• Static models</li> <li>• Positive research approach</li> </ul>
Institutional School	<ul style="list-style-type: none"> <li>• Social constructivism</li> <li>• Pure process models</li> <li>• Interpretive approach to research</li> </ul>
Social Technology school	<ul style="list-style-type: none"> <li>• Centres on technology and society</li> <li>• Approaches are integrated</li> <li>• Uses both positivism and interpretive</li> </ul>

Adapted from Desanctis and Poole (1994)

Understanding emerging ICT adoption requires a thorough investigation of the dynamic organisation processes, knowledge about the intentions of diverse actors and features of the technology (Markus and Robey, 1998). Therefore, a social–technical approach that integrates and reveals the recursive interaction between technology and human agency (Orlikowski and Scott, 2008) may be more appropriate for this research.

The next section reviews theories associated in one way or the other to these schools. More specifically, the review focuses on traditional adoption theories and those that emphasise the interplay of social and technical.

## 2.4 ICT adoption theories

According to Parker and Castlemen (2009), there are five commonly used adoption theories that are relevant in explaining the influence of ICT adoption decisions in SMEs. They include the resource-based view of a firm, Porter’s models, Theory of Planned Behaviour, Technology Acceptance Model and Rogers’s Diffusion of Innovation Theory. The review is not restricted

to the above mentioned theories since there are other theories that have been used to study ICT adoption in SMEs. It is important to re-emphasise that this research does not intend to integrate two or more of these; rather, the focus is to review them, show how studies make distinctions about them and why they may not be suitable to underpin this study.

#### *2.4.1 Theory of reasoned action (TRA)*

TRA is one of the most influential theories of human behaviour (Venkatesh et al., 2003) that has been extensively used to study the adoption of ICT. It originates from social psychology (Venkatesh et al., 2003) in response to weak correlation between the measures of attitude and performance of simple and volitional behaviour (Hale et al., 2003). The theory is similar to the theory of hierarchy of effect of high involvement behaviour since it involves consciously selected courses of actions (awareness- attitude- behaviour) (Awa et al., 2010).

The theory takes the view that attitude and subjective norms shape intentions, and intentions in turn determine behaviour (Fishbein and Ajzen, 1975). Attitude here tends to represent positive or negative evaluative predispositions of an act while subjective norm represents the enhancement of one's image/social status (Venkatesh and Davis., 2000; Rogers, 1983; Rogers, 1995) as well as the perception of others about the behaviour(s) (Pavlou and Fygenson, 2006; Fishbein and Ajzen, 1975; Taylor and Todd, 1995).

Despite the contributions of TRA in the field of adoption research, it has been criticised by scholars. First, TRA deals with behaviours and not actions that result from behaviours. The model is concerned with that behaviour that is under a person's volitional control (Fishbein and Ajzen, 1975); thus, actions determined by factors beyond individual control are taken for granted. Sheppard et al (1988) observe that when actions require knowledge, skills, and resources, the conditions of the model are unlikely to be met. In such a situation, the person may not be able to perform the action even if the intention to do so is strong. For example, a person may not be able to adopt emerging ICT if he/she does not know how to use it. This implies that the ability for a person or organisation to achieve its intention is not certain regardless of the efforts.

Second, TRA focuses on the determinants and performance of a single action or behaviour (Sheppard et al., 1988; Benbasat and Barki, 2007). It fails to consider the possibility of choosing among alternative behaviours. Parker and Castleman (2009) have shown that in a small business context, family members, friends, and external parties often influence managers' decisions. TRA is deterministic in nature and actions chosen are rational and fall within the decision making school. TRA may not be appropriate for this research since

individual behaviours about the technology can be predicted if their beliefs, attitudes and intentions are well understood.

#### *2.4.2 Technological acceptance model (TAM)*

TAM is one of the traditional adoption theories specifically developed to help determine IT adoption behaviour (Davis, 1989). To date, the model is considered the most widely used theory in explaining and predicting ICT adoption (Silva, 2007; Benbasat and Barki, 2007; Schwarz and Chin, 2007; Venkatesh et al., 2003). The theory, as formulated by (Davis, 1989) originated from the Theory of Reason Action (TRA). The author adapted TRA into the context of information systems because (Ajzen and Fishbein, 1980) claimed that TRA essentially predicts any behaviour and therefore, should be appropriate to investigate what determines computer usage (Davis, 1989; Silva, 2007). TAM brought TRA into a simpler form and allowed many researchers to carry out ICT adoption studies that support a vast number of findings in different contexts and settings (Benbasat and Barki, 2007; Venkatesh et al., 2003; Lee, 2003).

TAM assumes two characteristic constructs— perceived usefulness (that is technology's values) and perceived ease of use (that is technology's simplicity and effortlessness). These constructs allow analysts to capture individual acceptance of information systems (Benbasat and Barki, 2007; Venkatesh et al., 2003); however, it has its limitations.

A number of studies (Bagozzi, 2007; Silva, 2007; Hirschheim, 2007) have evaluated the current states of TAM and highlight its challenges. TAM has created an "illusion of accumulative tradition" (Benbasat and Barki, 2007) which means that the majority of studies in this area have reinforced the researchers' knowledge on what the underlying TAM's relationships are. Such knowledge has not extended to wider areas such as technology development; thus, studies underpinned by the theory have not addressed how technology is shaped by diverse actors (Benbasat and Barki, 2007). This has hindered the development of the model particularly in areas relating to IT design and implementation and has failed to produce actionable advice for future researchers (Benbasat and Barki, 2007).

Orlikowski and Gash (1994) suggest that the development and implementation of a technology requires an effective coordination and integration of different beliefs and behaviours. Considering system use or design from a single actor has a number of shortcomings. TRA has been criticised for focusing on predicting or explaining just a single behaviour (Benbasat and Barki, 2007). Another problem with this theory is that it is static in

nature. TAM does not capture the dynamic and evolutionary nature of technology adoption in SMEs. As Benbasat and Barki (2007p. 215) put it: “many TAM studies typically focused on static models and assess all model construct concurrently; as such, they do not adequately represent or explain the dynamic interplay that usually occurs between different user behaviour that revolves around system use”. The major theoretical implication of TAM is that it is only important in explaining managers’ business attitude and decisions as regards technology adoption but has failed to predict business decisions continually (Yu and Tao, 2009). Lawrence (2010) notes that TAM is deterministic since it considers one aspect of interplay (technology aspect of ICT adoption) and neglects the interplay of human agency. It is a variance model and cannot adequately explain how diverse actors exert influence, which is fundamental in explaining the adoption of emerging ICT over time in SMEs.

#### *2.4.3 Theory of planned behaviour (TPB)*

Theory of Reasoned Action (TRA) was successfully developed to predict behaviours and intentions for volitional and controllable actions (Simth and Biddle, 1999). Ajzen (1985 ) however, argued that TRA was not adequate where volitional action is not complete. As a result, he proposed an extension of it and called it Theory of Planned Behaviour (TPB). TPB is an expansion of TRA with an additional variable, namely perceived behavioural control. Simth and Biddle (1999) note that both can share the same criticism except on issues relating to volition since perceived behaviour has taken account of this. Perceived behavioural control is defined as perceived ease of exhibiting the behaviour (Ajzen, 1991) and it is assumed to account for experience and anticipated internal and external resource constraints (Simth and Biddle, 1999).

The route to TPB is similar to TAM (Venkatesh et al., 2007; Bagozzi, 2007). TPB is a theory for studying ethical decision making in the same way TAM is a fundamental theory for studying behaviours (Venkatesh et al., 2007). However, there are still differences between TAM and TPB models in terms of the types of investigation and their applicability. For instance, TPB is specific for issues relating to information guiding decision making (Venkatesh et al., 2007). It draws both the subjective norms constructs and that of perceived behavioural control (as skills, opportunities, and resources for operating systems) to examine situations where individuals lack a sensible control over the intended behaviour (Awa et al., 2010).

Although information systems studies have assessed TPB across different behaviours in the same way TAM has been assessed in empirical studies, Ajzen and Fishbein (1980) note that

most studies that investigate variables relating to attitude are more likely to use the TPB framework. TPB studies have achieved a predictive validity greater than ordinary replication studies; and studies show consistency with the early studies in TAM research (Adams et al., 1992; Mathieson, 1991).

Despite the contributions of TPB to IT adoption studies, TPB has reached a point of maturity (Venkatesh et al., 2007), and research in these areas is now fine tuning the core constructs and identifying alternative constructs to predict behaviour. The majority of studies that have applied TPB ignore the complex interactions and interrelationships between small business CEO's, designers and developers, customers, government agencies in the adoption process (Ukoha et al., 2011). TRA, TPB, and TAM assume that the influence of external parties on IT adoption is distinct, instead of interwoven (Ukoha et al., 2011). Silver (2007) contends that researchers exploring SMEs' adoption of new technology require more explanatory theories instead of proposing individualist theories like TRA, TAM and TPB. These theories mainly have the features of the decision making school.

#### *2.4.4 Innovation diffusion theory (IDT)*

Diffusion of innovation offers a different theoretical lens. The theory seeks to explain when and how a new ICT is adopted and/or rejected (Rogers, 1995). Depending on the current evaluation practices, innovation is adopted or rejected and decisions are made provided the potential users are aware of the innovation and can assess its perceived usefulness. Innovation Diffusion Theory is a decision process that helps to measure the probability rates of adoption. This process happens through a channel within a period among the members of a social system (Rogers, 1983; Rogers, 1995).

Studies (Chuang et al., 2009 ; Shiau et al., 2009; Rogers, 1995; Attewell, 1992 ) argue that experts' knowledge acquired through learning significantly affects the adoption of technological innovations, and that such resource(s) are necessary for effective ICT uptakes. Rogers (1995) proposed the use of opinion leaders and change agents. Opinion leadership is defined as the extent to which a person is capable of influencing potential adopters' attitude in a way that is deemed acceptable, while a change agent is a person (a professional) that influences customer innovation decisions in a way he/she thinks is acceptable (Rogers, 1995).

Opinion leaders and change agents might help reduce the knowledge barriers of the potential adopters since most of their experience/knowledge can serve as useful information to build



expertise, and to reduce the perceived risk of potential adopters. However, studies show that businesses are better informed and may not necessarily depend only on specialist knowledge since they can also influence them negatively. Furthermore, SMEs often develop a set of interactions between families, business networks, and industries each with different norms, behaviour and value systems and government which can influence adoption. According to Stratopoulos and Lim (2010) such collaborative experience and knowledge can have impacts on the organisation. However, Benbasat and Barki (2007) opine that a complex social system is not only a requirement for IT adoption but it also helps in the design process.

The Diffusion of Innovation model also revealed five innovation characteristics—relative advantages, compatibility, complexity, trialability and observability which further reveal the similarities of TAM and IDT. TAM and IDT are related in some ways. Karahanna et al., (1999) integrated TAM and IDT to study pre-adoption and post-adoption belief and concluded that actual users and potential adopters of IT use different variables associated with attitude. However, TAM and Rogers's diffusion of innovation are variance models and cannot adequately explain the complexities and diversity associated with adoption of ICT in SMEs (Lawrence, 2010).

#### *2.4.5 Michael Porter's models*

Porter's models are mostly linked to the five forces framework which consists of the degree of competition, the threat of entry, the threat of substitutes, buyer power, and supplier power on business strategy (Smith and Rupp, 2002). Michael Porter recommended three generic strategies (low-cost leadership, differentiation, and focus) after putting the strategy of a firm in the context of economic forces to assist firms in manipulating the forces to gain competitive advantages (Gandhi et al., 2006). While competitive strategy associated with Porter's model relates to issues of an industry and competition, Smith and Rupp, (2002) point out that most internet companies as well as the traditional companies have engaged in an unhealthy competition in which most aspects of their strategies have been violated. They argued that bridging the gap between ICT strategy and its implementation is one major objective for developing the model.

According to Ukoha et al., (2011) the model considers the entrepreneurial nature which appears to be relevant in ICT adoption in a small business setting. Schubert (2007) applied this model in the SME context to study the adoption of Enterprise Resource Planning, while others have used it to determine how small businesses use it to deploy broad strategies to

achieve substantial competitive advantages. The model explains the risk taking approach of an entrepreneur in which a business strives to achieve adequate strategic positioning.

One of the limitations of Porter's model is that the model is generally applicable to large organisations because their risk taking behaviours to economic goals are high. This limitation hinders small businesses in obtaining the necessary resources for their own benefit since they often focus on the decisions generated from their family members and employees' knowledge (Butler et al., 2007; Beckinsale et al., 2006). Although Porter's generic strategies are effective in achieving competitive advantages, when combined with the resource based view (RBV) (Parker and Castleman, 2009), its theory failed to take into account the various roles played by actors on issues relating to IT adoption behaviour by SME managers. Instead the emphasis was on how organisations can manipulate the five forces to achieve competitive advantage.

#### *2.4.6 Resource -based theory (RBV)*

The resource-based theory explains how firms can use ICT to gain competitive advantage and high performance (Calderia and Ward, 2001; Ray et al., 2005; Parker and Castleman, 2009). The theory is of the view that competitive advantage and high performance can only be achieved if a firm owns unique operating competences/resources (human, physical, or organizational) or obtains customer-value and difficult-to-copy distinctiveness. Such resources must be valuable, earn returns, and require a comprehensive learning process (Ravichandran and Lertwongsatien, 2005; Calderia and Ward, 2001).

While Caldeira and Ward (2001) note that RBT may incorporate previous experience, organisational culture and competences and these are essential for an organisation's success, Parker and Casleman (2009) argued that firm resources can also be conceptualised into a number of factors including own managers and employee characteristics. These resources have been deployed by a number of small businesses, and hence, technology is considered as one and IT adoption occurs because firms use technology related resources.

One key advantage of the model is that it points out those capabilities (tangible and intangible resources) firms must possess to be able to adopt technology infrastructures. The theory is designed to assist managers to understand how competences can become one of the most valuable assets and allow businesses to understand how to improve their performance (Calderia and Ward, 2001; Parker and Castleman, 2009). However, this assumption may only be effective in large organisations since studies underpinned by RBT found that proactive organisations perform much better when they embrace technology to leverage

competencies and maintain their strategies as a result of technology capabilities developed internally (Parker and Castleman, 2009). This places SMEs in a difficult situation owing to flexibility, limited resources, owner-family's influence and lack of skills (Duan et al., 2002). Chapman et al (2000) report that these discourage SMEs from a number of strategic actions necessary to exploit resources in order to overcome the existing capability differences and meet the current gap (adopting new technologies).

Further, adoption studies in the past emphasised on how actors in the society (individual and groups whether government agencies or other non-profit organisations) affect IT adoption (Raza and Standing, 2010). Similarly, Garud and Rappa (1994) note that technology implementation involves a continuous and mutual interaction between technology and social context. As such, the society is a means through which new technologies are produced and reproduced. However, RBT did not sufficiently take into account external forces like customers, suppliers and even non-entrepreneurial firms (Parker and Castleman, 2009) including government agencies; though studies show that external forces play pivotal roles in influencing ICT adoption and internal technology capabilities.

An important concept that has also emerged from the resource based theory that may be relevant in research like this is the concept of dynamic capabilities.

#### ***2.4.6.1 The concept of dynamic capabilities***

The concept of dynamic capabilities is vital for small business competitiveness and success because of limited resources and their vulnerability to fierce competition (Wang and Shi, 2011). It is defined "as a firm's ability to change (e.g. improve, adapt, adjust, reconfigure, refresh, renew etc) a business process better than the competitors" (Kim et al., 2011P.488). Salunke et al., (2011) drew on Helfat et al., (2007) and Zollo and Winter's (2002), concept of dynamic capability which are among the most influential definitions (Helfat and Peteraf, 2009) and defined dynamic capability as "the capability of an organisation to purposefully create, extend or modify its knowledge-related resources, capabilities or routines" (Salunke et al., 2011p.1252).

This definition has common meaning with notable definitions in this area. Teece, et al., (1997) for example, defined the concept of dynamic capabilities as a capacity to build integrate and reconfigure. Eisenhardt and Martin (2000) consider it as the capacity to integrate configure, gain and respond to environmental changes. Similarly, Zollo and Winter

(2002) define the concept of dynamic capabilities as the capacity to generate and modify organisation routine and resources; while Helfat et al.,(2007) on the other hand, define it as the capacity to create, extend and modify an organisation's internal and external resources. The concept of dynamic capabilities is a co-coordinative management process that leads to inter-organisational learning and helps organisations to reveal dysfunctional routines (Teece and Pisano, 1994). The knowledge base of dynamic capability therefore, means that organisations often learn not just from their internal environment but also external environment to build their knowledge assets (Salunke et al., 2011).

Given the dynamic nature of the business environment, ICT needs to evolve in a bid to align with the dynamic constant turbulence of the global market. The key implication of these definitions centres on change (Lin et al., 2012). Kim et al.,(2011) note that change in business processes can be incremental adjustments, improvements, and radical configuration and constitute an important element in dynamic capability. Whether it is a minor or radical technology change, these changes, when diverse internal and external resources are integrated, can have a dramatic impact on the firm's activities (Kim et al., 2011). It is argued that the concepts of dynamic capabilities provide the strategic advantages that aid new innovations that respond to environmental changes. Early research identified integration, learning and reconfiguration (Teece and Pisano, 1994) as the three processes relevant to this.

### **Integration**

Lin et al., (2012) point out that although substantial effects of intangible resources influence an organisation, tangible capabilities such as the organisation structure, culture, processes and intergroup relationships can also have a substantial effect on the organisation (Lin et al., 2012). In addition to this, organisations that need to maintain high competitive advantages require the integration of external actors (Teece and Pisano, 1994). Salunke, et al.,(2011) for example, draw on the concept of dynamic capability and argued that organisations co-create values by engaging closely with their clients on a regular basis to develop effective solutions. Small businesses have external actors such as customers, suppliers and consultants. These actors provide ideas or information in order to capture, adjust and design appropriate ICT. The notion of capability therefore, is embedded in the unique way SMEs coordinate and combine resources to examine why a new technology application may be needed to support business operation (Teece and Pisano, 1994).

## **Learning**

Competitive advantages are created through exploitation of knowledge and technology. ICT adoption in small businesses has and will continue to grow. As a result, a number of organisations constantly learn how ICT has to be implemented to outperform the conventional work practices (Lopez-Nicolas and Soto-Acosta, 2010). Learning and unlearning remains essential not only for change but innovation in these organizations (Becker, 2008; Lopez-Nicolas and Soto-Acosta, 2010). Small service businesses can maximise profits and compete effectively by learning how best to adopt emerging ICT, especially those that are capable of impacting on their long-term strategy needs. Therefore, learning is one of the powerful concepts of dynamic capabilities which makes SMEs more innovative (Lin et al., 2012) and helps organisations to reveal dysfunctional routines (Teece and Pisano, 1994).

Organisational learning is concerned with knowledge creation; it constitutes knowledge acquisition, information distribution, and information interpretation intended to create competitive advantage (Lopez-Nicolas and Soto-Acosta, 2010). The more organisations devote time to learn how knowledge is created, the more they are aware of the knowledge that is more useful in developing a technology. Learning through acquisition of knowledge is critical in understanding when obsolete technology needs replacing (Lopez-Nicolas and Soto-Acosta, 2010). Though scholars (Templeton et al., 2002) show that organisational learning is more relevant to small businesses because of their nature and characteristics, most studies have focused more on large organisations. The ICT adoption process should be considered by SMEs as a learning process (Rantapuska and Ihanainen, 2008). As learning and information management improves SMEs strategic directions (Rantapuska and Ihanainen, 2008), small services businesses can maximise their competitive positions with emerging ICT by learning in order to make an optimal choice.

## **Reconfiguration**

Furthermore, studies within the field of dynamic capabilities have argued that dynamic capabilities may be studied in both high and moderate dynamic environments (Eisenhardt and Martin, 2000; Weerawardena and Mavondo, 2011). Because the business environment frequently changes, integration and coordination of resources without reconfiguring and transforming them when the need arises may not yield substantial competitive advantages (Lin et al., 2012). In today's unpredictable business environment, the environment and

competitive pressure affects SMEs, hence there is a benefit in the ability of organisations to observe the need to change their asserts and accomplish relevant internal and external transformation (Teece and Pisano, 1994). These require regular observations of the internal and external environment, in order to adjust effectively to adopting the right type of emerging ICT. Change without doubt is costly; organisations must develop and adopt new technologies to minimize their risk. The ability to understand the need for change and make the required adjustments would ultimately depend on how SMEs are able to scan the internal and external environment, reconfigure and/or transform ahead of rivals (Teece and Pisano, 1994).

Although a number of studies (Weerawardena and Mavondo, 2011; Salunke et al., 2011) suggest that the concept of dynamic capabilities may allow an organisation to differentiate their services from rivalries, provide a sound basis for examining the processes through which firms can create and adopt new products and processes that respond to environmental changes and are key to competitive advantage, the concept of dynamic capabilities was not considered in this research because it has been argued that there is no consensus yet on the nature of their relationships (Salunke et al., 2011). Cepeda and Vera, (2007) contend that the link between competitive advantage and dynamic capabilities in early definitions is tautological since studies have claimed that dynamic capabilities are linked to the profit and growth of the organisation.

On the contrary, Helfat and Peteraf., et al (2009) claimed that researchers have failed to understand that the concept of dynamic capabilities has different types and may be applied in different contexts and researchers should be specific on the particular type of capabilities they are studying. Yet the “definition has always been intentionally general in form” (Helfat and Peteraf, 2009p.94). There are still difficulties in the empirical scrutiny of the concept of dynamic capabilities (Weerawardena and Mavondo, 2011) and thus, it was not considered in this research.

#### *2.4.7 Technology-organisation-environment (TOE) framework*

The TOE framework was developed to examine the factors affecting technology adoption and its diffusion and/or the characteristics of technology adoption (Merono-Cerdan, 2008). The framework constitutes a more comprehensive set of factors that can help explain ICT adoption in organisations. TOE identified three contexts that influence a firm’s ICT adoption; Technological context; organizational context and environmental context (Tornatzky and Fleische, 1990; Ukoha et al., 2011). On the other hand, Rogers, (1983)

identified a group of adoption predictors or characteristics which include the leaders' characteristics, the internal and external business characteristics (Merono-Cerdan, 2008; Zhu et al., 2003). The leaders' characteristics include the person's (the leader) attitude toward change; the internal characteristics of an organisation relate to organisation design and the external organisation characteristics relate to the system's openness and the importance of the technological characteristics (Ukoha et al., 2011).

According to Zhu et al (2003), because decision makers can be viewed as distinct internal organisation properties, Rogers's model is similar to TOE in terms of adoption predictors, internal characteristics, top management characteristics and external characteristics (Ukoha et al., 2011). Diffusion of innovation and TOE emphasise on characteristics of a technology which are similar to the two constructs of TAM— perceived usefulness and perceived ease of use.

However, one major criticism associated with the TOE framework is that it is static in nature and focuses on barriers and drivers to adoption. TOE fails to reveal the complex and dynamic nature of ICT adoption activities in organisations. This framework appears to be unsuitable for SMEs because it neglected the flexible nature as well as the complexities associated with these small businesses. According to Xu et al.,(2007), SMEs are expected to follow a dynamic path because adoption may often base on trial and error in most cases. Although TOE is different from the previously discussed models, because it provides a large number of variables which make it a richer theoretical model, it is not primarily suitable for small businesses because of their peculiarities. As such, Rantapuska and Ihanaine (2008) strongly contend that many models designed in this area were originally designed for something else instead of studying ICT adoption in SMEs.

#### *2.4.8 Social-technical theories*

This section further reviews theories which stress the importance of interplay of society and technology. Although studies (Bijker and Law, 1992; McGrath, 2003) examine these theories differently, some social technical theories (e.g., social construction of technology) tend to neglect the way technology shapes the social relations; while others considered within it the role played by society (McGrath, 2003). The focus is to review previous scholarships on social-technical theories, to reveal how such contributions make further distinctions, and to demonstrate which school these theories belong to and their appropriateness for examining emerging perspectives. It is important to recall here that the aim is to aid in the selection of appropriate theory that underpins this research.

#### **2.4.8.1 Social shaping of technology**

The social shaping of technology draws heavily on the social influences as regards the use of technology. It focuses on issues of conflict and inequality in the economic and socio-political context (McGrath, 2003). Mackenzie and Wajcman (1999) drew on the work of Marx who looked at the world in a continuous state of conflict owing to differences in gender inequalities and considered the social shaping of technology more predominant in capitalist society. They also argued that the position of the theory has moved from a theory that considers generalisation to a theory that now accounts for certain ways technologies are socially shaped (McGrath, 2003). However, social shaping of technology does not account for the emerging and evolutionary nature of technology innovations and how technology is constructed and reconstructed in the society. Although Mackenzie and Wajcman (1999) looked at more diverse ways of understanding the social–technical relationship, researchers have also drawn on the social construction of technology to account for the interpretive flexibility which addresses the recursive interaction of the social and the technical systems.

Social shaping of technology provides wider perspectives of social-technical theory. For instance, Ceruzzi's (1999) work centred on information technology and studied the emergence of personal computing, which revealed that the interplay of social actors and technological forces are an integral part of the development process. The development of social shaping of technology according to McGrath (2003) has expanded to accommodate some of the views of social construction of technology and actor network theory. Social shaping of technology is now regarded as an umbrella that covers a range of other theories and may no longer be a theory of its own (McGrath, 2003). However, social shaping of technology has traditionally focused on gender relations and has been criticised for being deterministic (Mackenzie and Wajcman, 1999 ; McGrath, 2003)

#### **2.4.8.2 Social construction of technology**

Social construction of technology is one of the heterogeneous sets of approaches in social science, which emerged from sociology and was developed by scholars like Trevor Pinch and Wiebe Bijker (Bruun and Hukkinen, 2003). This approach examines how and why certain technologies emerge and are implemented at any given period (McGrath, 2003). Social construction of technology is of the assumption that technology change is determined by the social processes in which different technology emerged from and negotiated by the meaning different people attached to it within a social context.



According to Bruun and Hukkinen (2003) the best known social construction of technology study is that of Pinch and Bijker, which emphasises that the construction of high-wheeler machines to modern low-wheelers was not achieved through a natural trajectory of improving design; instead the construction, and the change was in the hands of a heterogeneous set of actors (Bruun and Hukkinen, 2003) that agrees and disagrees on the intentions of the designers. Hence, the theory assumes that technology can be interpreted in multiple ways and has the property of interpretive flexibility. Another concept that guides social construction of technology is closure. Closure is referred to as the streamlining of interpretations and consequently to the fading away (Bruun and Hukkinen, 2003), and in practice, it implies that those interpretations that are dominant are stabilized.

One of the key limitations of this theory is that the roles played by technology are still less accounted for (Markus and Robey, 1998; Bostrom et al., 2009). Social construction of technology to a large extent, accounts for the interplay of human agency (Cordella and Shaikh, 2006).

#### **2.4.8.3 Structuration theories**

The structuration theory (Giddens, 1979) has been applied in many studies. They revealed significant insights into the social process related to adoption and use of information technology as well as the importance of social structures. The core argument of the theory is that structures are only represented in the mind of human actors and/or as traces of human action (Bostrom et al., 2009). Structuration theory was developed to account for the interplay between human action and social structure, which are based on abstract notions with no material basis (Monteiro and Handset, 1996). It represents a situation governing the continuity or change in structure. The change in structure often leads to reproduction of social systems. The theory focuses on actors enacting structures in order to understand it and to use these structures (Giddens, 1979; Bostrom et al., 2009).

Monteiro and Handseth (1996) draw on the work of Walsham (1997) and note that the key element associated with structuration theories is the way both human actions and the structure are traced and these two levels are linked through duality of structure and modality. Duality of structure is emphasised here because structures inhibit actions, and at the same time human actions are considered as established structures. The interplay of these two are achieved through modalities (Monteiro and Handset, 1996). Modalities (interpretive

schemes, facility norm) here are what linked the structures and action and both have mutual relationships (Monteiro and Handset, 1996).

Studies have acknowledged the vital contributions of these theories though their use to understand social-technical organisation systems suffers limitations (Bostrom et al., 2009). Monteiro and Handset,(1996) note that structuration theory has not paid adequate attention to technology, rather it was developed to study social systems within the society. The theory mainly emphasises the importance of social structures or social constructions of technology and examines technology as a social structure that constrains and/or enables certain human activities (Monteiro and Handset, 1996). It failed to take into account the roles played by technologies and the associated characteristics in a social context.

Orlikowski (1992) extended the theory and considered the interplay between technology and the social system by further emphasising on duality: that is, “technology is physically constructed by actors working in a given social context and technology is socially constructed through the meaning they attached to it and the various features they emphasize and use”. Unfortunately, little is known about how technology shapes the social context because the majority of the contributions in this area have focused on “*user-centric positions*” where the role played by the technology is still not adequately examined if not completely ignored (Kallinikos, 2004).

Although Orlikowski’s structuration model of technology to a large extent associates with the emerging perspective and is appropriate in explaining the process involved in adapting a technology that subsequently leads to an introduction of new technology (Faraj et al., 2004), the theory has been criticised for paying substantial attention to one aspect of the interplay (the process involved in social construction of technology) (Cordella and Shaikh, 2006). According to Hanseth et al (2004) the theory is a poor conceptualization of technology given that it examines technology in a limited way and ignores the fact that structures are embedded by innovators during development (Bostrom et al., 2009). The roles played by diverse actors (innovators of the technology) and the features in understanding how these technologies are adopted in a social context are ignored (Cordella and Shaikh, 2006). Theories that explore in greater detail the interactions between the social and technical (Dewett and Jones, 2001; Orlikowski and Scott, 2008) integration are needed given that what makes the information system unique is the social- tech integration (Bostrom et al., 2009; Hanseth et al., 2004).

The extensive literature review suggests that Actor Network Theory (ANT) may be suitable for this research because it is associated with the emerging perspective –that is the process that shaped the outcome of the interaction between technology and people (Cordella and Shaikh, 2006). The theory does criticize both the philosophy of technology and social determinism (Latour, 1987; Faraj et al., 2004; Hanseth et al., 2004), for downplaying the ongoing interaction between social and technical and may be more appropriate in underpinning this research. This theory is examined in chapter three of this thesis.

## **2.5 SMEs and ICT adoption**

Bearing in mind that the focus of this research is small sector businesses we find their level of diversity and complexities are enormous and need examination. The subsequent section examines SMEs, their current ICT adoption state, the extent to which government has intervened and understands ICT adoption in this sector.

### *2.5.1 SMEs and the new e-economy*

The internet has changed the way organisations operate. Scholarly accounts from the UK highlight its importance for the entire economy and SMEs in particular (Simpson and Docherty, 2004). This has led to rapid access to a worldwide market, transformation of business processes and the change in balance of power between suppliers and customers as a result of available information (Simpson and Docherty, 2004) and the shift from a post-industrial era known for physical goods to a knowledge based economy where services, information, and intelligence are dominating.

The *new e- economy* is defined by Hamilton (2002) as dynamic systems of interactions between different actors (businesses, people, and government) that take advantage of information technologies to achieve socio-economic goals. Therefore, one of the factors that has forced businesses to invest in new e-economy is advances in ICT. Emerging ICT has been widely accepted in different organisations as tools for realising company business strategies. And most small businesses rely on them (Griffith and Northcraft, 1996), and spend a large amount of resources to invest in them on account that they save costs and improve organisational performance (Teo and Pan, 2008). However, most challenges witnessed by SMEs are often linked to their adoption behaviour.

### *2.5.2 SMEs ICT adoption behaviour*

ICT is crucial for most business strategies and organisations constantly rely on them and spend so much on them to save costs and generate information that improves organisational performance (Teo and Pan, 2008). Glancey et al., (1998) note that information is a corporate life-wire; it assists in shaping product/service design, client services, organisational structure, and corporate directions. One key characteristic of service-SMEs is that they are information intensive; communicating business information through ICT to their customers. SMEs are an integral part of social economic development and ICT is considered essential for SMEs especially in developing a local based economy. Although, some may have used ICT effectively to improve communication and customer relationship, most SMEs constantly look upon it to stimulate knowledge sharing and development of networks, yet only a few take a holistic view to understanding conditions that facilitate its continuous adoption, application and use (Mason et al., 2008)—perhaps because they lack human, organisation and technological capabilities (Khoumbati et al., 2006). The literature review suggests that many of them are yet to take full advantage of ICT because they are not open and do not sufficiently share business information (Rantapuska and Ihanainen, 2008).

Also, the way small firms utilise knowledge is also different. In most small businesses, the owner-manager is the key actor that manages the ICT investment. Most times decisions depend on tacit knowledge such as the experience, instinct, attitude and values of the manager (Rantapuska and Ihanainen, 2008). Although it has been recognised that tacit knowledge of the workforce is one of the greatest assets (McCall et al., 2008 ) which many corporate entities have ignored, using instinct by SMEs may not lead to effective decisions (Newman and Thomas, 2008). Rantapuska and Ihanainen (2008) found that poor collaboration reduces informal knowledge such as face-to-face interactions within and outside the firm. Contemporary managers believe that knowledge and ideas generated by the employees and external sources are far more innovative and rewarding especially in successful adoption of emerging ICT (Gagnon et al., 2000; Rantapuska and Ihanainen, 2008; Newman and Thomas, 2008). Although, SMEs are flexible in adapting to changes and can easily take advantage of low-cost and user-friendly features of ICT (Ray and Ray, 2006) in their attempt to overcome the ordeals of size and distance, still they face challenges.

Most small businesses are confronted with the ordeals of poor management, poor education, and inadequate awareness of ICT benefits owing to their size. Poor adoption plans may have a devastating impact on SMEs and limit subsequent adoption. Many SMEs fail in adopting and implementing emerging ICT because they prepare poorly. Unplanned preparations are

informed by short-term decisions and informal processes as well as leaving ICT matters in the hands of fewer persons, perhaps managers (Rantapuska and Ihanainen, 2008). Managers consider themselves too busy in their daily business routines (OECD, 2004), and this prevents them from having valuable information and decisions when the need for new ICT arises (Rantapuska and Ihanainen, 2008). Hence, progressive research in this area is necessary to enable small service businesses to understand the key issues that affect them, and how such issues can be gradually handled since many seem to be spending much on new technology applications without receiving any tangible benefits (Costello, 2009).

In addition many do not ordinarily invest in new ICT, rather automate existing ones because they are usually ill-equipped with resources and yet they need resources to support and respond to technology advances. Lin et al.,(2012) contend that the ability of SMEs to overcome the insufficient resources is the most critical issue confronting them. Furthermore, studies (Remenyi et al., 1991; Costello et al., 2007) also point out that when firms achieve a high level of sophistication in the use of ICT, the managers become more involved in evaluating ICT. However, most SMEs often look for a short-term improvement; that is, solutions that have tactical benefits. Costello et al., (2007) suggest that SMEs have continually lacked the knowledge necessary for maintaining a balance between long-term development and short-term operational demands of ICT. This always leads to failure. Although ICT failure is not new, several studies (Duan et al., 2002; Shiau et al., 2009) pointed out that the inability of ICT to deliver the desired value to the company (Fincham, 2002) and compatibility in integrating the complexities of new applications with existing ones are some of the reasons for such failures.

Another key issue is that SMEs are heterogeneous in terms of size, structure, culture, formation. SMEs differ in terms of how they utilize business information and knowledge or undertake a range of tasks down the value chain (OECD, 2004). For example, most small business managers have a desperate purpose; while some have a rational objective, others may also choose to remain small allowing owner-family members to play a significant role in shaping corporate directions (Parker and Castleman, 2009). Therefore, frameworks that take into account the diversity of actors and most importantly the complexities of small businesses are needed. Further, lack of time, resources, skills and misleading advice from external experts (OECD, 2004; Rantapuska and Ihanainen, 2008; Fincham, 2002; Duan et al., 2002) and lack of understanding of its benefits (Esteves, 2009) are barriers to ICT adoption and also make SMEs late in the adopters' category (Khoumbati et al., 2006). Adoption of emerging ICT in SMEs is associated with complex issues. Those that overcome the problems achieve competitiveness subject to effective learning and corporation.

Therefore, investing in them should not be considered another “purchasing event”; instead, it requires a continuous creation and adjustment of existing practice.

### *2.5.3 UK government and ICT adoption by SMEs*

One of the external forces that has been at the forefront, assisting SMEs on this, is the government. The UK government has been encouraging SMEs in adopting ICT through various programmes and initiatives; however the extent of these activities meeting the needs of SMEs is still less clear (Dixon et al., 2002) especially, now that the UK is witnessing a double dip recession. Previous studies assert that little is known about the exploration of government initiatives in influencing new ICT adoption strategies in SMEs (Beckinsale et al., 2006). While the integration of diverse actors, learning, experimenting and reconfiguration of internal and external resources may be beneficial to SMEs in achieving sustainable emerging ICT capabilities, there is also a need to trace the extent to which government initiatives have helped small businesses cope with new ICT since literature points out that government is one of the main actors that greatly influence ICT adoption in SMEs (Dixon et al., 2002).

#### ***2.5.3.1 Government intervention and ICT adoption by SMEs***

The European Union Heads of Governments summit held at Lisbon in March 2000 deliberated on the potentials of ICT in general and the internet for the economic wellbeing of all member countries in particular (Wyatt, 2003). The summit examined issues relating to employment creation, competition, cost reduction of internet access in three years, knowledge based flows, and ensuring all schools are connected to the internet by 2001 (Wyatt, 2003). Simpson and Docherty (2004) note that during this period the UK government was committed to improving SME adoption of the internet, to make UK's SMEs leaders in the G7 countries, to create a conducive atmosphere for businesses to use ICT applications, and to become early adopters by setting a deadline for adoption. Small businesses constitute a greater part of all enterprises in most economies. They are considered more important than their counterparts in terms of employment creations, output, innovation, and flexibility in adapting to changing market demands (Tilley and Tonge, 2003; Ongori and Migiro, 2010).

In 2002 the UK government provided grants ranging from £2,500 to £450,000 to assist small businesses to exploit ICT effectively (Costello, 2009). Approximately 1.9 million SMEs got connected to the internet, meeting the initial government estimate of 1.5 million but still

the UK small business sector adoption rates of the internet as a means of communication is low (Metaxiotis, 2009). Between 2001 and 2004, the UK government spent £67million on wide-ranging programmes to increase ICT readiness for small businesses by means of providing advice, information and training information and some financial incentives (Simpson and Docherty, 2004); however, small businesses were still confronted with complex and dynamic problems on a daily basis (Lindermann et al., 2009) especially those relating to the adoption and implementation of ICT.

The government of the UK over the years has realised that lack of business skills impede most SMEs from exploiting new ICT(OECD, 2004) and initiated many programmes to promote the adoption and diffusion of new ICT. These programmes aim to assist small business in diffusing ICT and to constantly transform most small businesses through support programmes and encourage them to adopt emerging ICT in order to remain competitive. One such programme is the creation of eleven regional development agencies in 2000; a government organisation intending to help SMEs and to represent their needs (Tilley and Tonge, 2003). The organisation encouraged SMEs by providing business service, support networks, and technology fund for ICT adoption. Today more and more independent organisations such as the network of Business Links are responsible for small business service (SBS).

In 2010, the UK government revealed a new scheme aimed at assisting small businesses to ensure they flourish in the prevailing economic crises. The aim of the scheme was to assist SMEs recover from the recent economic downturn (BIS, 2010a). The report further outlined six steps to help small businesses grow and achieve stability. These steps include: to help them have access to finance, allow them access to government procurements and support new businesses, ensure that competitive frameworks provide new businesses to have access to existing markets, support those businesses that have the potential to grow and to ensure that the government is educated towards their needs (BIS, 2010a). In addition, on January 4, 2011, another two new UK wide schemes were launched by the government: Enterprise Finance Guarantee Scheme (EFG) and Enterprise Capital Funds (ECFs) to support fast growing SMEs have access to loans or grants. The government under the EFG guaranteed 75% of a small business bank loan and ensured that the financial institutions lending the money cover 25% (BBC, 2011).

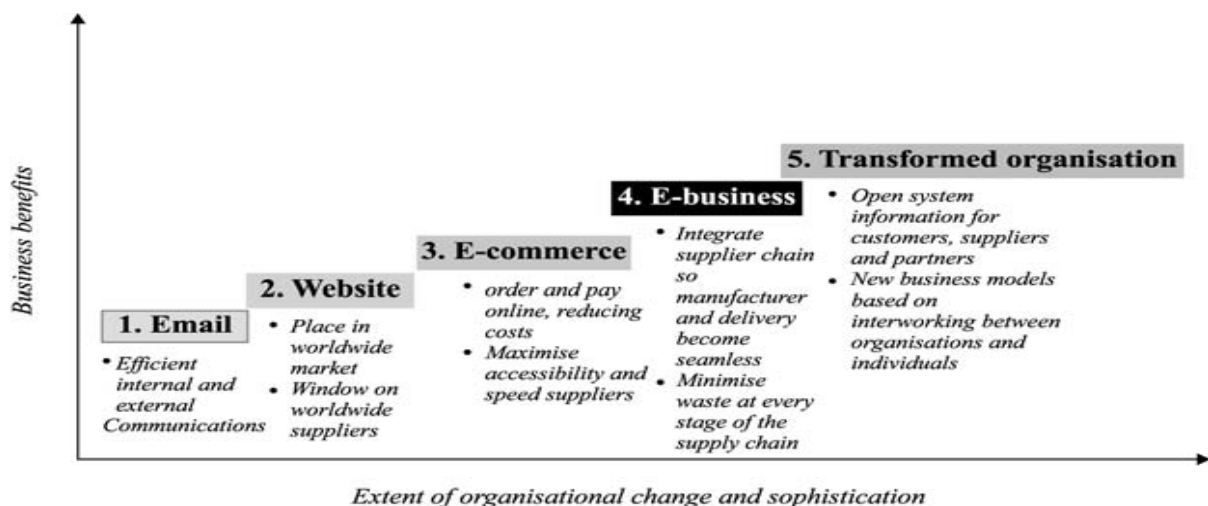
More recently, the government has established a programme called takeITon which involves a practical demonstration of how new ICT can be used to boost lead generation. The programme covers IT support which includes email marketing, internet marketing, social

networking marketing, and website optimization. Also realising the vital roles ICT plays in national competitiveness and to help UK business embrace them, they have also developed strategies for digital Britain around three themes: infrastructure, content and participation (BIS, 2010b).

Despite the various programmes undertaken by the government to SMEs, these initiatives remain unclear. Although Costello (2009) notes that to make adoption of technology applications successful, small businesses still need to invest time and resources, it is not clear what exactly accounts for this. One of the reasons may be the approach undertaken to understanding ICT adoption in SMEs.

### 2.5.3.2 Government approach to understanding ICT adoption in SMEs

A number of e-business growth models/adoption models have been used to study e-commerce and ICT adoption. Amongst these models are the British Library staircase for internet engagement model, IBM model for the stages of e-commerce, and the e-business adoption ladder. Costello (2009) points out that the e-business adoption ladder has underpinned government understanding of various areas of ICT adoption in most small businesses in the UK.



Source: Martin and Matlay (2001)

Figure 2. 1: Business adoption ladder



The e-business adoption ladder depicted in figure 2.1 has been used specifically to benchmark studies that show how SMEs progressed in terms of internet adoption. It represents incremental steps and explains how the adoption process happens in their exploration and development of ICT (Martin and Matlay, 2001). Though the e-business adoption ladder provides a practical understanding of how ICT advances, it was criticised for being linear (Xu et al., 2007). While the British Library Staircase takes into account SMEs own managers and links the technology evolution to their capabilities which enable them to manage new ICT knowledge, it was unable to address how small business managers obtain ICT information and what triggers them to do so (Xu et al., 2007).

Martin and Matley (2001) note that the development of linear models may not be adequate and any researcher that adopts this approach to explain SME economic activities may be oversimplifying complex issues associated with small businesses. Such studies have been challenged in terms of their effectiveness and generalization (Martin and Matley (2001). Similarly, a number of other studies have challenged the use of linear models on account of ignoring vital aspects or activities of SMEs. For example, Xu et al.,(2007) investigated the adoption of e-business by SMEs and argued that it is unlikely that SMEs will follow a sequential path.

Although linear models make a simpler explanation to describe ICT adoption and use, these models may not be adequate for SMEs because they are flexible and associated with complex activities (Martin and Matlay, 2001). It is argued that oversimplified models are primarily used for information seeking exercises and most SMEs have a low level requirement and their IT adoption behaviour is not predictable and thus may follow a dynamic path (Ramsey et al., 2003; Xu et al., 2007). While the adoption ladder has contributed to studies, the model may be difficult to apply in the context of SMEs bearing in mind their inherent diversity (Martin and Matlay, 2001). Adoption of emerging ICT may rely more on dynamic theories.

#### *2.5.4. Current gaps in ICT adoption research*

Several theories and models have been developed and used in adoption research. These theories and models have provided insights into adoption studies but they do not reflect the level of complexity and diversity involved in emerging ICT adoption. Studies (Vessey et al., 2002; Venkatesh et al., 2003; Brown et al., 2010) have continually emphasised that one of the most mature streams in information systems (IS) research is technology adoption. One of the reasons for this is the availability of theories developed unveiled in this study which

have been applied in different settings and contexts (Brown et al., 2010). As a result, studies have relied so much on these theories and ignored the fact that ICT follows an unpredictable path. Most studies in this area have ignored the fact that as the business environment changes, so do organisations constantly witness changes in technological applications, especially those of internet with new digital platforms for social, business networking and formation of communities (Vannoy and Palvia, 2010). The failure on the part of researchers to understand this has always led them to investigate ICT adoption from two dominant streams.

The first stream is those that believe that technology is distinct in nature with some stable characteristics (Benbasat and Zmud, 2003). The prominent theories of adoption reviewed in this section fall within this stream and share the same features with the decision making school because of the determinist conception embedded in the technology (Barrett et al., 2006). These theories have ignored the fact that as ICT evolves, it is also continuing and iterative in nature. Most of these theories are varied in nature and employ a positivist approach. These theories are unable to handle the growing complexities of organisational life characterised by a multiplicity of actors and rapid change in technology advancements. Studies point out some challenges for those who place more emphasis on the rationality of technologies directing change (Markus and Robey, 1998; Barrett et al., 2006; Jacobsson and Linderoth, 2010). Barrett et al.,(2006) for example, maintained that over two thirds of IT projects fail because of too much emphasis on the technology without corresponding attention on its impacts on people. The problem with studies that are associated with these streams is that despite their contributions, huge resources are still wasted through inadequate planning and management of ICT, leading to high failure rate (Hong and Kim, 2002).

The second stream is those that are focused on human /organisational perspectives. Markus and Robey (1998) have sought to highlight the limitations of focusing on the social/organisation perspectives where the position of technology is taken for granted (Orlikowski and Lacono, 2001). Most studies in this area tend to focus on people, issues of culture and the economic elements of the institutions (Orlikowski and Scott, 2008). Examples of theories that belong to this group are the social shaping of technology and social construction of technology. They are unable to account for the emerging and evolutionary nature of technology innovations. Although, structuration perspectives, to a large extent, may have been associated with emergent perspectives as it emphasises duality, it has only succeeded in emphasising one aspect of the interplay. Structuration theories focus on how technology is socially constructed and ignore the importance of technology and its associated

characteristics in understanding its adoption in a social setting (Cordella and Shaikh, 2006). Therefore, it may not be appropriate to inform this research.

These two streams have provided high theoretical explanation of adoption and implementation issues (Zhang and Fjermestad, 2008); however, they are unable to capture the constant technology advances and growing complexities associated with the adoption of new ICT. As a result, most small businesses are not responding to such changes quickly (Ritchies and Brindley, 2005; Chibelushi and Costello, 2009). Traditional adoption theories and some social-technical theories are unable to ascertain the multiple social systems or actors, each with possibly contradicting norms, behaviour and value systems (Parker and Castleman, 2009).

Furthermore, in the UK, the 'adoption ladder' was how the government used to understand ICT adoption in most small businesses. This model has seriously been critiqued for oversimplifying complex issues associated with SMEs. These issues call for a reconsideration of adoption research.

The literature review suggests that the emerging perspective (that is where users and consequences of technology emerge from unpredictable and complex social interaction) is able to unveil the issues (Markus and Robey, 1998). This perspective provides new opportunities for researchers but most importantly, challenges the underlying ideas and assumptions in which most prominent theories of ICT adoption were developed; however, this perspective is still absent in the literature (Markus and Robey, 1998). An attempt to understand the multiple, emergent and the social-technical entities involved in emerging ICT adoption which today stands as the contemporary organisation's norms (Orlikowski and Scott, 2008) remains fundamental for progressive research in this field.

Markus and Robey, (1998) note that this perspective considers technology as part of a complex process through which organisations accomplish tasks, and focuses on the dynamic interactions between people and technology over time (Orlikowski and Scott, 2008). Therefore, scholarly attempts should not be limited to either the technical or the social; instead, it is worthwhile to consider their recursive interactions when studying ICT adoption in organisations. Theories and models should treat ICTs adoption as a dynamic and evolving process, instead of a static and one-off action. A majority of ICT adoption research is based on the quantitative approach. For example, Williams et al (2009) revealed that the majority of studies (about 65%) employed a quantitative approach. There are less than 25% of studies employing a qualitative approach, and approximately 9% of papers employed a

conceptual/theoretical/meta-analysis. The questionnaire survey was the dominant research method. For example, among the papers reviewed by Williams et al (2009), about 58% employed survey methods, while 15% used case studies. Questionnaires are mainly employed to collect data on ICT adoption and diffusion. Other methods, such as interviews, multi-method, mathematical model, field study, laboratory experiment, secondary data analysis, action research were rarely used in ICT adoption research. ICT adoption studies mainly used a deductive approach involving theory confirmation and hypotheses testing. Although this research design has certain advantages, it does have limitations. It regards ICT adoption as a one-off action and focuses on factors affecting the decision making at one particular decision point. It has ignored the fact that ICT adoption is an on-going process.

In addition, bearing in mind that this research focuses on SMEs, small business managers often take ICT adoption decisions based on short-term and unplanned preparations due to lack of time to learn what will actually benefit the organisation in the long-run. Also most research in these sectors is sparse compared to that on large organisations, and research in the sector is often out-of date and requires further attention in research. Although government and other actors are playing substantial roles for SMEs to take on IT, in the current economic climate, their support and /or roles for SMEs are not clear and require further examination.

## **2.6 Summary**

Adoption of emerging ICT is a complex issue and involves a number of actors who play significant roles toward its success. Unfortunately, this review suggests that studies have largely ignored these actors when studying ICT adoption. The chapter reviewed a number of theories in information systems and organisational change. The review centred on the prominent/traditional theories of adoption and those within the social-technical school. First, although traditional theories of adoption are still dominant and have significantly contributed to adoption research, they still have limitations in capturing the dynamic and evolutionary process of technology adoption. In addition, theories like the social shaping of technology and constructions of technology fall within the social-technical theories; they have being criticised for being deterministic in nature. They dwell so much on the roles played by human agency. Although structuration theories appear to exhibit the characteristics of emerging perspectives, the roles played by diverse actors (innovators of the technology) and the features in understanding how these technologies are adopted in a social context are still less accounted for (Cordella and Shaikh, 2006). As a result of these, these theories are not considered in this research.

Secondly, evidence from the literature shows that most small businesses appear to be witnessing a problem in adopting new ICT because of the approach adopted by the government. In the UK, the adoption ladder has been the model used by the government to understand the various areas of ICT adoption in small businesses. While this model has contributed to the adoption studies, a substantial number of studies criticised this model because it is linear in nature and oversimplifies complex issues associated with SMEs because SMEs are unlikely to follow any one way of doing things. Therefore, these theories addressed in this chapter may not be suitable for this research. In the next chapter, the researcher reviews Actor Network Theory (ANT) as the theoretical underpinning of the research and the justification for using it.

## Chapter 3

### Theoretical Underpinning

This chapter presents Actor Network Theory (ANT) as the theoretical lens for this research. First it examines ANT and the key concepts used to guide the collection, analysis and interpretations of findings, the application of ANT by previous studies and the justification for selecting it as the theoretical framework for the study. Finally, the summary of the chapter is presented.

#### 3.1 Actor Network Theory

Studies (Bagozzi, 2007; Venkatesh et al., 2007; Orlikowski and Lacono, 2001) often call on a new theoretical perspective that will boost our understanding of the technology, as well as how the technology can be implemented taking into account the broader context (Silva, 2007; Schwarz and Chin, 2007). Actor Network Theory (ANT) is one of the results of such an inquiry. ANT was adopted for this study for the purpose of understanding both the dynamic and evolutionary nature of ICT. ANT attempts to address the role technology plays in a social setting and the process by which the technology bilaterally influences the social setting over time (Mahring et al., 2004; Latour, 1987; Callon, 1999). ANT rejects both the philosophy of technology and social determinism (Latour, 1987; Faraj et al., 2004; Hanseth et al., 2004) for neglecting the on-going and dynamic interaction between the society and technology (Hanseth et al., 2004).

The strength of ANT in understanding ICT adoption lies on studying both the human and non-human entities (Latour, 2005). ANT regards ICT and people and any other element as actors which are named “actants” (Hanseth et al., 2004) and defines an actor “*as any element which bends, shapes around itself, makes others elements depend upon itself and translates their wills into the language of its own*” (Callon and Latour, 1981P.286). These authors argue that the construction of a network will be taken for granted in the analysis if it is assumed that macro actors are bigger than micro actors. This is the position of ANT since it does not take for granted either the existence of technology or the social world. Also, Latour (2005) maintained that what is interesting in treating both human and non human actors the same, is not to claim that both the human and non human actors have intention, which is one of the attributes of human actors, instead ANT tries to recognise the attributes

of non human actors but not intention as both can modify a state of affair (Andrade and Urquhart, 2010P.355).

Hanseth et al (2004p.120) note:

*“Information and communication technology is becoming more complex, interlinked and more deeply interwoven into the fabric of society. This implies an unprecedented degree of complexities for system developments... Issues that previously could not be assigned to either micro or macro dimensions and handled separately turn out to be closely interrelated and connected in unexpected ways”.*

Similarly, Andrade and Urquhart, (2010P.353) pointed out that

*“We live in the world made of both social and technology artefacts; we cannot detach society from technology –neither can we isolate technical in the abstract”.*

ANT is not restricted to human beings, rather it is examined based on how strong the relationship between human and non human actors is and tracing such a relationship is what is regarded as the basic tenet of ANT. According to Vannoy and Palvia (2010), social influence often leads to technology adoption and technology adoption in turn comprises actors' embracement of the technology and its embedment in the society. The theory emphasises that social and technological systems should not be studied in isolation. Therefore, the theory recognises that human and non human actors are not independent but it is the ongoing actions of human with the non human that help to assess the advantages of any technology before adoption.

### **3.2 Actor network in Action**

Latour, (2011p. 800) notes that “to try to follow an actor network is a bit like defining a wave-corpuscule in the 1930s: any entity can be seized either as an actor (a corpuscule) or a network (a wave). It is this complete reversibility - an actor is nothing but a network, except that a network is nothing but actors”. It is the network that helps in the redistribution and relocation of action. Complete reversibility occurs because ICT constantly evolves and businesses persistently search for new technology that can help improve business processes. Actor networks constitute different actors (Latour, 2011) and these actors regularly create and recreate (Callon, 1986; Hanseth et al., 2004; Bruun and Hukkinen, 2003). The

complexity associated with the relationships in an actor-network is often enhanced because not all actors have the same level of flexibility (Cordella and Shaikh, 2006). Actors are rooted in their own characteristics and these characteristics are what leads to the relationships with heterogeneous elements which include the human and non human attached to one another in a given period (Cordella and Shaikh, 2006).

Faraj et al (2004) note that when actors come into a network, they come with their ideas, motives, and intentions which they try to impose on the technology being developed. When the key actor's interests are not in line with other actors' beliefs (Sarker et al., 2006), the opportunity for successful development and / or adoption becomes limited and thus results in the movement (back and forth) of an actor (Sarker et al., 2006). The network tends to be stronger where the interest of all actors is aligned in the network, and all actors have accepted the decisions of the key actor. On the contrary, the network becomes weaker where other actors challenge the decisions of others either because new ICT has evolved or the previous applications in use cannot meet the organisation's current needs, thereby causing closure by redefinition of a problem (Bijker et al., 1989). An actor that cannot meet the key actor's needs leaves the network, while others join the network (Faraj et al., 2004). Therefore, ANT recognises the unsteady and mutual influence of social and technical (Sarker et al., 2006) and represents an iterative process that depicts how users and other actors conform or reject the original design, which may subsequently result in new design and adoption interest (Faraj et al., 2004p. 189).

### **3.3 ANT concepts adopted for the study**

Van de Ven and Poole (1995) examined the process of organisation change and development process and argued that the process or series of activities that lead to such change have been difficult to describe or manage. They argued that: "It is the interplay between different perspectives that help one gain a more comprehensive understanding of organisational life because any one theory perspective consistently offers only a single account of a complex phenomenon"(VandeVen and PooleP510). Andrade and Urquhart (2010) also contend that technology cannot be predicted in exact terms and any theory that assumes that technology can be predictable in clear terms cannot allow the researcher to trace the negotiation process that takes place during technology implementation (Callon, 1991; Akrich et al., 2002a; Markus and Robey, 1998). Therefore, what makes *ANT unique in this study* is that it "*is based on no stable theory*" (Callon, 1999P.181). That is why scholars have often drawn from different theories and concepts and these have helped them discover new ways of analysing organisational change and development processes (VandeVen and Poole, 1995) and this



study is not an exception. ANT has a number of vocabularies and these vocabularies have been drawn by different scholars and provide a theoretical orientation for many studies. The concepts of inscription, translation, and framing and stabilisation formed the basis for this research. These concepts are now briefly reviewed.

### 3.3. 1 *Inscription*

According to Faraj et al (2004) new technologies do not start in a vacuum; rather they originate from an innovator's assumptions, knowledge, ideas and beliefs. According to Orlikowski and Gas (1994), in the sense making process, diverse actors adhere to their own knowledge and assumption of the technology which subsequently shape their actions. Inscription according to Callon,(1986) is a process where actors form values, and beliefs towards the technology or the extent the innovators determine what the functionalities of the technologies are or should be. It is a means through which actors engage in the process and try to create the technology (Callon, 1986; Faraj et al., 2004).

The interesting notion of inscription is simple. It ranges from an understanding of what ideas or anticipated beliefs are to be inscribed, what actors are involved in the process, how they are inscribed and finally, what amount of effort it takes for inscription to be opposed (Monteiro and Handset, 1996). The outcome of the concept of inscription is always the transformation of an innovator's interest and beliefs into a material form (Callon, 1991). Materials for inscription range from a diverse network of skills including practices, contracts and institutional arrangements involved in establishing a social order (Monteiro and Handset, 1996).

According to Faraj et al., (2004) if actors inscribe their ideas, interests and beliefs and relate them to different areas where they are suitable, these can lead to stability of the network (Mahring et al., 2004), which subsequently guide users in behaving in a way that defines the structures and functions performed by the technology. However, Jacobsson and Linderöth (2010) pointed out that the concept of inscription should not be considered as a one off event since what is to be inscribed can never be determined beforehand; rather, it is through learning that actors come to realise how and which inscription is needed (Monteiro and Handset, 1996). It is important to note that to achieve inscription, actors' interest must not be in alignment from the outset rather there must be a successful translation of other interests (Monteiro and Handset, 1996).

### 3.3.2 *Translation*

Inscription is strengthened in the translation process. This occurs where diverse actors who anticipated the change are enrolled by those responsible or involved in the change (Callon, 1991). Translation refers to how the key actors solicit the involvement of other actors to support their claims and have their interests represented (Callon, 1986; Sarker et al., 2006; Gao, 2005). “Key actor” is often considered as the competing actor that ensures that other actors support their claims in technology development and deployment (Sarker et al., 2006). Translation involves displacement, delegations or shifting, as such it is a process where key actors try to enrol, delegate, displace, persuade and convince other actors directly or indirectly in accepting their interest or in developing and deploying a technology based on their own interest (Callon, 1986; Faraj et al., 2004; Sarker et al., 2006). In the translation process, it is important to note that the movement of any innovation is always in the hands of diverse actors who behave differently to it (Tatnll and Jerzy, 2003). As such, it involves an ongoing transformation where getting a technology accepted requires the key actors to deploy a tactic that aims at convincing other actors to accept their claim or beliefs (Tatnll and Jerzy, 2003). However, Sarkker et al. (2006) note that there is no hard and fast rule about an effective translation; rather, it depends on the situations.

### 3.3.3 *Framing*

Orlikowski and Gash (1994) note that framing represents organisation reality including their assumptions, expectations and knowledge represented in visual images and organised as a web of meaning; as such, they are mental or cognitive models held by actors. They are considered as flexible in nature, with various dimensions that move silent and content (Orlikowski and Gash, 1994) and composite (a collection that ties individual frames together) formed by diverse actors constructing a common understanding, through negotiation and therefore, constitute different meaning. Orlikowski and Gas (1994) have argued that because technology comprises a key element in the organisation, as such, aspects of actors’ internal and external frame will concern technology. According to Faraj et al (2004) new ICT undergoes alteration or changes either because they may require advanced features, or improvement upon their existing features especially when adopted by lead users. This often allows new or different ways of using these ICT to emerge. Such ICT may not become successful if users do not believe the way it is designed and used. Therefore, framing means a bunch of features and functionalities of the ICT which constitute the core of the technology immediately when they become part of users’ expectations, standards and beliefs

of the actor (Faraj et al., 2004). It constitutes the emerging outcomes or physical object with functional and formal characteristics as a result of actors' inscribed interests and values (Faraj et al., 2004).

### 3.3.4 Stabilisation

Bijker et al.,(1989) defined stabilisation as the “disappearance of problems where the relevant actors consider the problem solved”. Similarly, Monterior and Henseth, (1996) note that the end results of stability involve the social process of aligning initially diverse interests of actors to one acceptance truth. The result achieved here is dependent on the aligned actor network. At the stabilisation stage, ICT is expected to be stable, and various actors are convinced about the value of the network or what Bijker et al., (1989) refers to as closure. *Closure* means the achievement of the actors and is more than just a short-term consensus but how new technologies are accepted and implemented (Misa, 1992). However, stabilisation of technology does not self-evidently mean that technology is not amendable. Indeed, ICT and business process can change or adjust from time to time, new ICT also evolves; thereby leading to complete reversibility or as Bijker et al (1989) puts it: closure by redefinition of the problem or what Latour (2011) referred to as reversibility. Definitions of these concepts are depicted in table 3.1

Table 3.1: ANT concepts and definitions

<b>Concept</b>	<b>Definition</b>
<b>Inscription</b>	Inscription is a process where actors form values towards the technology or the extent the innovators determine or formulate what the technology or its functionalities are or should be (Faraj et al., 2004). Inscription is often influenced by an organisation's beliefs, previous patterns of IT use and expectations over what the technology is about and can do (Callon, 1991).
<b>Transcription</b>	The process of aligning numerous interests and beliefs of different actors with that of the key actors within the network. “Key Actors” are the competing actors that ensure that other actors support their claims in technology development and deployment(Sarker et al., 2006). It involves understanding how actors seek the interest of other human actors or convince others, directly or indirectly, in adopting new technologies (Callon, 1986).
<b>Framing</b>	Framing recognises that actors not only inscribe beliefs, interests

	and values over technology, but such values may be dissimilar and detached from one another (Orlikowski and Gash, 1994).
<b>Stabilisation</b>	Stabilisation is where the relevant actors consider the problem as being solved (Bijker et al., 1989). Stabilisation of technology does not evidently mean that technology is not amendable. Indeed, technology and business processes might change or adjust over time or as Bijker et al (1989) put it “ <i>closure by redefinition of a problem</i> ” which leads to inscription again.

### 3.4 Applications of ANT

ANT has been applied in different contexts and settings and is recognised as an established theory in science and technology disciplines (Bruun and Hukkinen, 2003). A study conducted by Marres (2004) for example revealed how ANT served as a useful insight for studying the democratic process facilitated by Information and Communication Technology. ANT helped the researcher to develop a conceptual framework and a methodological direction that helped explore the nature of the problem. Lee and Oh (2006) adopted ANT to examine the processes involved in setting up mobile standards in an international environment where different actors like government agencies can collaborate. The authors strongly emphasised that ANT helped them “*to analyze the way in which actors form alliances and enrol other actors to support such alliances surrounding technology*” (Lee and Oh, 2006p.177). Pott (2009) adapted ANT to explore different methods that can be used to develop communication systems by exploring the use of social software after the London bombing in 2005, while Gao (2005) deployed ANT to study the social-technological construction of a chain’s strategy for telecommunication market transformation and concluded that ANT was a suitable theory for exploring the nature of the situation. Allen (2004) deployed ANT to study the evolution of the personal digital assistant.

ANT has also been used to study technology development and adoption. Faraj et al., (2004) used ANT to examine the evolution of Web browsers; while one of the early views of ANT (Walsham, 1997) demonstrated how ANT had been used in IT development and infrastructure standards. Tatnall and Jerzy,(2003) also adopt ANT to interpret what actually derives older people to adopt ICT. Recently, Andrade and Urquhart (2010) drew on ANT (the process of translation) to explore the different stages of information and communication technology aimed to help attract development in the rural areas of the Peruvian Andes. As such, Hanseth et al.,(2004) have argued that using ANT to examine the development and use

of communication and information technology may become more relevant in understanding the evolutionary process involved. The application of theories to different fields and contexts and the attention it had drawn to itself demonstrates how powerful and relevant it is as a theoretical lens.

### **3.5 Rationale for using ANT**

ANT was adopted for this research because traditional adoption theories have limitations in capturing the constant technology advancements and the dynamic and evolutionary nature of technology adoption (Eze et al., 2011). These theories do not challenge technology implementation. Although these theories have remained the theoretical foundation for many studies in ICT adoption, theories like Roger's diffusion of innovation accept the technologies the way they are and rely heavily on early adopters or opinion leaders for diffusion. Others (intentional based theories, behavioural based theories) focus on factors affecting the decision making at one particular decision point. Although one major consistency in these theories (Davis, 1989; Ajzen, 1985 ; Venkatesh et al., 2003) is that they look at the adoption as a one-off decision making event, these theories are unable to unveil the dynamic and the evolutionary process of technology adoption. Traditional adoption theories (intentional based theories, behavioural based theories and Rogers's diffusion of innovation) have permanent separation between the technology and the social world (Akrich et al., 2002a).

Monteiro and Handset (1996) contend that any theoretical framework that makes a *prior* distinction between the technical and the social is unlikely to keep its focus on the aims of social arrangements regardless of whether it is a means to achieving the technical or the social. ANT allows for an examination of actors involved in the ICT adoption process and the interplay of these actors including human and non human (Latour, 1987; Cordella and Shaikh, 2006). The theory "emphasizes on the existence of collection of a network which unites the innovation to all actors that make it happen"(Akrich et al., 2002ap. 205) and provides more insights into the dynamic process of ICT implementation. It allows researchers "to understand how an innovation is adopted, how it moves, how it progressively spreads to be transformed into a success" (Akrich et al., 2002bp.209). This explains the view that technology adoption and/or development is occurring throughout the lifecycle of an organisation where other forms of technology and acceptance may be dominant (Schwarz and Chin, 2007). The theory is regarded as highly significant as it examines broader ways for the management and implementation of ICT in organisations (Silva, 2007) and helps researchers to overcome the limited understanding of technology (Lee and Oh, 2006; Tatnall and Jerzy, 2003).

ANT is particularly relevant in a small business context because SMEs are flexible, unique, and associated with complex tasks and operate in a much more dynamic and unpredictable business environment. Using ANT as a theoretical lens, the theory may help to unveil how SMEs are likely to articulate their emerging ICT needs and align the relevant actors in order to create a unique technology capability. Therefore, looking at emerging ICT adoption from a perspective that “gives a better balance between the effect of social and technological participants will give a more accurate representation of the real world”(Wernick et al., 2008P.322).

Furthermore, Cordell and Shaikh (2006) note that science and technology should also be considered together in action and researchers should concentrate on the dynamics of the interaction instead of the stability of their relationships. The theory allows researchers to observe a complex network of players and their roles during the ICT adoption process and the disparate goals of actants since it does not *a priori* eliminate the social from the technical (Sarker et al., 2006). The interaction between the social and technical reveals the negotiation process that takes place during ICT adoption and development. It permits an explicit account of the inhibiting and enabling roles of technology during the process of design and helps to capture both social/organisational and technology factors (Sarker et al., 2006).

### **3.6 Summary**

ANT has been selected for this research for the reasons highlighted above. The theory is associated with the interplay between technology and society and has been considered more effective in examining the dynamic and evolutionary nature of the emerging ICT adoption as it reveals the negotiation process that takes place during technology adoption and implementation.

# Chapter 4

## Research Paradigms and Methodology

*“All science is based on paradigmatic thinking involving distinct assumptions on the nature of reality (ontology), how we can come to know that reality (epistemology) and how we can systematically access what can be known about the reality (methodology)” (Shah and Corley, 2006p.18822)*

The collection, analysis and interpretation of data is conducted within some broader understanding of what constitutes valid knowledge and the methodology adopted by the researcher has the greatest influence on the research process and findings (Doolin, 1998). Therefore, this chapter examines the paradigms and methods used in information system research, and why a particular paradigm(s) and method(s) are selected for this research. First, it presents the research paradigms, examines the research methods, and reviews the research methods in information systems and IT/ICT. Next, it presents the justification for adopting an interpretive approach that addresses qualitative issues. Finally, it examines the stages of the interview process.

### 4.1 Research paradigm

Information Systems (IS) studies use different underlying philosophical paradigms. A paradigm is “a set of shared assumptions or ways of thinking about some aspect of the world” (Oates, 2006p.282). These philosophical paradigms have different assumptions about the nature of the world (ontology) and the way researchers can acquire knowledge about the world (epistemology) (Oates, 2006). Therefore, any paradigm selected by the researcher, guides the researcher in both philosophical assumption of the research and in the selection of instruments, tools, and methods used in the study (Ponterotto, 2005). To understand these philosophical paradigms, their assumptions and different ways of assessing the quality of the research is an essential given that all research is based on some underlying assumptions and these assumptions help to determine what constitutes valid research and the appropriate methods to adopt (Myers, 1997).

Guba and Lincoln (1994) suggested four underlying paradigms for qualitative study: positivism, post –positivism, critical theory and constructivism. Orlikowski and Baroud

(1991) on the other hand, recommended three philosophical paradigms based on epistemology research (the way knowledge about the world is acquired): positivism, interpretive and critical. In line with Orlikowski and Baroud (1991), Oates (2006) strongly argued that positivism, interpretive and critical theory is the most “*broad –brush*” approach since these paradigms can be categorised further. For example, positivism can be sub-grouped into positivist and post-positivist and the goal of both paradigms is the explanation that eventually leads to prediction of the phenomenon, emphasises causes and effects of the phenomena, generalization, operates from both nomothetic and etic perspectives and is based on quantitative research (Ponterotto, 2005). On the contrary, interpretivism can also be subdivided into hermeneutics, phenomenology or constructivism and critical research into Marxism and feminism research (Oates, 2006).

Similarly, Sarantakos,(1993) argues that positivism, non positivism (interpretivism) and critical are the three dominant research paradigms. However, why these paradigms are philosophically distinct there is no clear reason and disagreement always arises as to whether these research paradigms can be combined within a study (Myers, 1997). This review focuses mainly on the paradigms in table 4.1 and Orlikowsk and Baroud’s (1991) work appears to be relevant in this research because they considered not just the research paradigms but also philosophical issues in IS research, and the IS researcher adopts one of these three paradigms.

Table 4.1: Philosophical assumptions and the research paradigms

<b>Philosophical Assumptions</b>	<b>Research Paradigms</b>		
	<b>Positivism</b>	<b>Constructivism</b>	<b>Critical theory</b>
<b>Ontology</b>	Reality exists by natural mechanisms. Discrete variables can be measured	Reality is constructed by people based on beliefs, feelings and experiment	Reality is shaped by social, ethnic, economic and political and other forces over time
<b>Epistemology</b>	Researcher is remote from reality	Researcher is a passionate participant	Researcher is involved with those being researched
<b>Methodology</b>	Experiment and surveys. Mainly quantitative methods	In-depth interviews. Individual beliefs, feelings and views sought	Action research. Researcher is transformative, changing the participants’ social world

Adapted from Hine and Carson (2007 p.4)



#### 4.1.1 *Positivist approach*

According to Orlikowsk and Baroud (1991) the positivist approach is considered in literature as the dominant approach (Morgan, 2007) but not necessarily in the IS world. It originated from physical science and is associated with the underlying assumptions of a scientific method instead of reforming politics, ethics, religion or even philosophy (Lincoln and Guba, 1985). It is considered as a form of philosophical realism closely linked with the hypthetico-deductive approach. This involves a systematic observation, description of phenomenon underpinned by a theory, presentation of propositions or hypothesis, and the use of inferential statistics and interpretation of result based on the theory (Ponterotto, 2005). The goal of the positivist researcher is to focus on explanations that eventually lead to predictions and control of the phenomena which the researcher is investigating.

From an ontology point of view, positivists believe that the world is well-organized and researchers can study it objectively (Oates, 2006). Ontology sees the interactions, actions and various ways people act as central (Mason, 1996). In other words, they believe that there is one reality that is not only apprehensible, but also identifiable and measurable which is independent of the investigator and the instruments used (Myers, 1997; Ponterotto, 2005). For instance, a researcher studying the adoption of ICT may randomly select a large number of samples of prospective participants in one sector. He may also conduct a controlled experiment, manipulating just single variables while other variables remain constant. According to Ponterotto (2005) this type of investigation is etic in the sense that the goal is to reveal a single set of results.

Epistemology looks at the relationship between the researcher and the participants (the knower). It is of the view that the evidence of the social world can be gathered through interactive situations, observation, and participation or by experiencing the natural setting (Manson, 1996). From an epistemology standpoint, positivists are concerned with objectivism and dualism. Objectivism means conducting research with adequate rigour without bias. While dualism on the other hand, means that the investigators, participants and the subject of discussion are independent of each other (Ponterotto, 2005). The researcher tends to study their participants without any influence, and in cases where the study has been influenced, the result is flawed. For instance, a researcher may set up an experimental study and use an entirely different set of people who might not be aware of some aspect of the study to conduct the study while he or she is neutral. In such a situation, Ponterotto (2005) argues that the relationship between the participants and the investigator

is both dual and objective. Positive paradigms attempt to rely on theory building, to test and validate in order to increase the predictive understanding of the phenomena studied and attain generalisation.

In terms of methodology, in IS research, research is positivist if it explains the formal proposition, values measured are quantifiable, and involves drawing the sample from a known population, hypothesizing, testing and verifying phenomenon (Orlikowski and Baroudi, 1991). These are in most cases stated in quantitative terms and transformed into mathematical formulas usually expressed in functional relationships (Lincoln and Guba, 1985).

Although studies have been guided by this paradigm, Lincoln and Guba, (1985) provide some of its challenges. First, they argued that efforts made by this family of philosophies that the belief system should be considered as science have yielded no results. In other words, it has been criticised for unsatisfactory conceptualisation of what a science is about. The paradigm has focused so much on operationalisation (a process in which abstract concepts are turned into measurable quantities) that it has been judged as inadequate since it does not deal with meanings or implications (Lincoln and Guba, 1985). Positivism is unable to deal with the emergent conceptual or empirical formations from a number of fields and the foundation in which these philosophical assumptions rest (ontological, epistemological, linear causality, axiological assumption of value freedom and an assumption of the temporal and contextual independence of observations) has been criticised for being difficult to maintain (Lincoln and Guba, 1985). These criticisms have been widely appreciated and have led to a number of researchers ignoring the paradigm to concentrate on others.

#### *4.1.2 Interpretive approach*

While interpretive and constructivism are often used interchangeably by some researchers, this research used the term interpretive throughout. According to Chen and Hirschheim (2004), there is a growing acceptance of interpretive research and it is considered as an alternative and in contrast to the positivism paradigm. It is concerned with the understanding of the social context and tries to identify, explore and describe how different factors in a social setting are related.

From an ontology standpoint, interpretive research looks at the multiple subjective realities, socially constructed and reconstructed of meaning through social interaction (Ponterotto, 2005). It is subjective and also influenced by the context of the situation. It considers the

person's experiences, and the conversations between the investigator and the participants. In other words, the interpretive paradigm holds that reality is constructed by the individual. In information systems, interpretive research is concerned with the understanding of the social context of information systems and is influenced by the social setting (Oates, 2006; Doolin, 1998). Interpretive research is subjective in the sense that an investigator for example, may interview few participants and in analysing the data, may ignore confirming its finding through cross validation or seek other experts in identifying similar patterns in the data where coding is involved. Also, in the interpretation of findings, different meanings may be attached; hence, it is difficult to unearth a single truth from the participants (Ponterotto, 2005).

From an epistemology point of view, interpretivists look at how both the individuals and groups in the society perceive the world and try to understand the phenomena through the values these people attach to them. In other words, the interaction between the investigator and the participant is paramount in capturing the real life experience of the participant (Ponterotto, 2005). For example, an information system researcher investigating the adoption and digital technologies may spend a bit of time interviewing participants. The assumption here, according to Ponterotto (2005) is that although both the researcher and the participants may slightly change as a result of the interaction, the depth of the insight of the research would be reached through extensive interaction between the researcher and the participants.

From a methodology point of view, interpretivists do not predefine dependent and independent variables; instead they try to understand people in their natural environment. Researchers using this approach do not arrive at the same result in a study; instead, there is often more than one result or explanation given. An example of an appropriate instrument for this approach is field studies (Chen and Hirschheim, 2004; Myers, 1997). The core features of the interpretive paradigm are interactions between the researcher and the object of the investigation in which a deeper meaning about the phenomena can be revealed. It is through the joint participation of the researcher and the participant that the findings of the interactive dialogue are interpreted (Ponterotto, 2005).

#### *4.1.3 Critical research approach*

Critical research originates from the institute of social research (Ponterotto, 2005) and focuses on conflict, oppositions, contradictions, and seeks to challenge the status quo in order to eliminate dominance (Myers, 1997). Oates (2006) has sought to highlight some of

the features and qualities of critical research as (a) *Emancipation*: which involves liberating people from power relations that shape the society and empower them. (b) *Non –per formative intent*: tends to be against research projects that aim at improving managerial efficiency and control where maximum productivity and profit are achieved through few resources and (c) *Critique of technology determinism* which challenges the idea that technology follows its own rules and people and societies must adapt to the technology instead of considering technology as being shaped by both the people and the society.

From an ontology standpoint, critical researchers assume that social reality is created and recreated by ethnic, cultural, gender social -political values, possessions, objective properties that dominate the way we see the world. Critical researchers try to explain *why* a certain way of seeing the world dominates and represents organisational reality (Oates, 2006). Researchers adopting a critical perspective focus on power oppositions, conflicts and contradictions in the modern society and help in the elimination of these issues raised above by challenging the conditions of domination. A critical researcher for example, may interview a small number of interviewees, and think that the less privileged in society are not getting adequate and effective broadband. In the study, the researcher presents the analysis in such a way that it forces the government to look at the situation and solve the problem.

Similar, to epistemology, the relationship between the researcher and the participants in critical research is also subjective. The goal is to encourage transformation that will lead to emancipation of oppressors (Ponterotto, 2005). For example, a researcher may conduct interviews with participants and use the data to empower the participants. Therefore, the goal of the research is to obtain deeper insights that lead to transformation. In terms of methodology, critical researchers look at the intense interaction between the participants and researcher and study the participant's world or experiences. This is linked to naturalist enquiry and ranges from face to face interviews to observations.

While philosophical assumptions are often linked with a particular research method and in some cases, interpretive is considered the same as qualitative research and positivist the same as quantitative research (Gable, 1994; Hine and Carson, 2007; Myers, 1997), it is important to note that based on the philosophical assumptions of the researcher, qualitative research is not necessarily synonymous with interpretative; instead, it can be positivist, interpretivist or critical (Myers and Newman, 2007). Hence, the interpretive paradigm may not necessarily be considered the same as qualitative research in all cases

In addition positivism and interpretivists have connotations that are useful in judging the quality of any research. Table 4.2 shows the relationship of positivism and interpretivism.

Table 4.2: Judging the quality of positive and interpretive research

<b>Positivism</b>	<b>Interpretivism</b>
Validity	Trustworthiness
Objectivity	Conformability
Reliability	Dependability
Internal validity	Credibility
External validity	Transferability

Source: Lincoln and Guba (1985)

Although some connotations (e.g., reliability and validity) in table 4.2 that help to judge the quality of positivist research may be applicable in qualitative research, positivism may not be suitable for this research because it does not interpret the social context within which people work. An interpretive paradigm that uses a qualitative approach may be suitable for this research because it is often used to understand people’s real life experiences.

## **4.2 Research methods**

Research methods are classified in different ways. While the most common classification in information systems is between qualitative and quantitative methods, these approaches are primarily different in both their methodological approach and philosophical foundations (Marshall, 1996). Quantitative research methods originated from natural sciences to study natural phenomena. This approach is used to quantify data collected and analysed which involves “careful control of empirical variables” (Ponterotto, 2005). It includes survey methods that use large samples and statistical techniques to examine group mean, variances, and correlation relationships between variables, experimentation, mathematical modelling and formal methods (Denzin and Lincoln, 2000; Golafshani, 2003).

On the other hand, qualitative methods originated from social science. This approach is used to investigate the social and cultural phenomena. It comprises a broad class of empirical procedures developed to interpret the opinions and experiences of the respondents in a given setting (Denzin and Lincoln, 2000; Ponterotto, 2005). The characteristics associated with qualitative research is often based on a particular research paradigm and include the participants’ own words to describe the phenomenon under investigation. Examples of qualitative research methods include case study research, ethnography, action research and

qualitative interviews. Qualitative research allows researchers to see and talk to the person or group of persons being interviewed, direct their attention to a specific case or cases in order to understand their social and cultural contexts within which they operate. “This means that qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meaning people bring to them” (Denzin and Lincoln, 2000p.3). This approach provides data from which theories and richer description of processes and outcome can be developed (Kaplan and Duchon, 1998).

While the attention of quantitative researchers is on data quantification, the qualitative method emphasises words in data collection and analysis. Both quantitative and qualitative methods are empirical in nature as both involve the collection, analysis and interpretations of the findings (Ponterotto, 2005). However, the driving force for doing qualitative research is that Information Systems (IS) research is shifting solely from technological to management and organisation issues (Myers, 1997). According to Manning (1992), paradigms that result in such shifts are emergent and research methods based on the emergent paradigms are mainly qualitative in nature.

Much has been revealed about the advantages and disadvantages for both qualitative and quantitative research methods. Quantitative research has been criticised for an inappropriate sample frame, the inter-relationships between constructs, inconsistency between the measures used and hypothesis (Denzin and Lincoln, 2000; Kaplan and Duchon, 1998; Oates, 2006; Bryman, 2008). Qualitative research on the other hand, has been criticised for providing very little insight into the research process, lacking theoretical development and failure on the part of researchers to develop studies that will enable theoretical questions to be addressed (Denzin and Lincoln, 2000; Oates, 2006).

The challenges associated with the qualitative approach is that it is rooted in many disciplines and originates from different paradigms, with each linked to its own criteria for carrying out the research (Ponterotto, 2005). Studies (Kaplan and Duchon, 1998; Lee, 2003; Elliot and Loebbecke, 2000) today are suggesting the use of mixed or multiple methods or the use of triangulation since there is no one approach in information systems research that provide the richness that information systems as a discipline offers and the need for its advancement in the future (Kaplan and Duchon, 1998).

While qualitative and quantitative methods are viewed differently, these two approaches are not necessarily two extreme “philosophical continuums” (Hine and Carson, 2007). Studies have juxtaposed the two approaches by using a quantitative hypothetico-deductive approach

to develop theories, test and confirm their findings (Hine and Carson, 2007). For example, Romano (1989) has combined these approaches and argued that if a research question is developed in a structured form and is used to collect qualitative data, these data can produce measures that can be tested using a quantitative approach. This reveals a better way to collect and analyse the data. Quantitative research is often implemented at the later stage of a field research and inductive research starts at the exploratory phase especially where the empirical literature is not enough to allow for a deductive approach (Hine and Carson, 2007). While these methodological classifications are important in research, within the context of this research, the focus is on qualitative approaches.

### **4.3 Research methods in IS and IT/ICT adoption studies**

#### *4.3.1 Research methods in information systems*

Many information system researchers have focused on the traditional empirical research approach (survey) more applicable to the natural sciences with less emphasis placed on the more conventional approaches (e.g., interviews) that also provide important contributions (Galliers and Land, 1987). Galliers and Land (1987) acknowledged that the traditional empirical research in IS in natural sciences is well documented and acceptable in academic literature. This approach has remained the dominant approach. For example, studies have examined the dominant research approaches in IS research. Chen and Hirschheim (2004) examined articles published in 8 major IS journals between 1991 to 2001 and revealed that positivist still dominates 81% of the published empirical research; while the survey method is most widely adopted (41%), with case study (36%) qualitative research (30%) and empirical study (61%); dominant approaches used in IS research are more based on quantitative research or positive paradigm than qualitative research or interpretive paradigm.

Similarly, Orlikowski and Baroudi (1991) report that positivism is the dominant paradigm and accounts for 96.8%, while interpretive accounts for 3.2%. Table 4.3 depicts the findings from Chin and Hirschheim's (2004) work. It illustrates that positivist and quantitative approaches were the dominant ones.

Table 4.3: Summary of journals in all categories

Years	Positivist	Interpretive	Empirical	Non-empirical	Quantitative	Qualitative	Mixed	Cross-sectional
1991	63	3	66	82	50	6	10	53
1992	60	4	64	72	49	7	8	45
1993	73	12	85	64	49	22	14	55
1994	92	10	102	79	73	23	6	70
1995	89	10	99	76	63	29	7	66
1996	97	20	117	70	65	36	16	65
1997	79	32	111	66	54	47	10	50
1998	89	31	120	48	59	52	9	63
1999	100	24	124	72	75	34	15	65
2000	92	42	134	60	70	54	10	69
2001	83	26	109	73	73	31	5	66
<b>Total</b>	<b>917</b>	<b>214</b>	<b>1131</b>	<b>762</b>	<b>680</b>	<b>341</b>	<b>110</b>	<b>667</b>

Source: Chen and Hirschheim (2004 p.208)

However, in recent times, academics and practitioners have realised that it is more suitable to include organisation and management issues in IS in order to assess the impact of both individuals and organisations. This is because IS is a Meta subject that cuts across so many disciplines. This broader view makes information systems more complex and allows different meanings and interpretation of the same phenomenon. Therefore, research methods in IS research must take account of the nature of the subject matter and the complexity of the real world (Galliers and Land, 1987).

Positivist research still dominates because the pragmatic progress associated with interpretivism is insignificant and may likely continue. The reason for this is that IS researchers may have become more interested in investigating phenomenon in their natural setting(Chen and Hirschheim, 2004). Therefore, in the long term, interpretive research is likely to continue though few research works have taken account of it; it is likely to be complex and difficult to pursue, and the results obtained in the process are likely to make original contributions (Chen and Hirschheim, 2004).

Galliers and Land (1987) further highlighted the taxonomy on IS research approaches relating to interpretive research. Table 4.4 provides researchers with the choices of a suitable research approach that can be deployed to examine a range of subjects (Choudrie and Dwivedi, 2005). The complex nature of this study entails that the taxonomy on the IS approach relating to interpretive research may be suitable for this research because it reveals several objects the researcher aims to relate in the study.



Table 4.4: The taxonomy on IS research approaches relating to interpretive research

<b>Object</b>	<b>Descriptive/Interpretive</b>
Society	Yes
Organisation Group	Yes <i>b</i>
Individual	Yes
Technology	Possibly
Methodology	Yes

a -Include future research, b- Include longitudinal research

Source: Galliers and Land, (1987)

#### 4.3.2 *Research methods in IT/ ICT adoption*

Technology adoption within information systems is either studied at individual level or organisational level. Considerable attempts have been made to review and classify the research approach, but studies (Orlikowski and Baroudi, 1991; Galliers and Land, 1987) in these areas note that methods such as survey, experimentation, case study are popularly used within the IS field. Choudrie and Dwivedi (2005) examined 633 articles drawn from top IS journals: *MIS Quarterly*, *ISR*, *EJIS* and *ISJ* between 1994 and 2003. The analysis suggests that studies in IT/ICT adoption used two main research methods: *survey and case study*. Survey method accounts for 74% and 26% employ case study method in a different context. Despite technology adoption being a common topic within the IS field, the research methods predominantly used are often the two methods (Choudrie and Dwivedi, 2005).

More recently, Williams et al., (2009) examined 345 papers on innovation, adoption and acceptance and diffusion in 19 peer reviewed journals between 1985 and 2007. The publications were analysed along the dimensions of unit of analysis, research paradigm, methodologies and methods and theories. The results of the analysis as well as the analysis from previous studies in technology adoption research depicted in tables 4.5, 4.6 and 4.7, below show that the qualitative research approach that involves interpretation is not predominantly used in ICT adoption studies.

Table 4.5: Adoption and diffusion studies according to research paradigm

Positivism	225(78.8%)
Interpretive	42(14%)
Descriptive	27(14%)

Source: Williams et al (2009)

Table 4.6: Research methodology

Empirical	273(90.7%)
Non-Empirical	23(7.6%)
Quantitative	195(64.8%)
Qualitative	68(22.6%)
Theoretical /meta –analysis	26(8.6%)
Mixed method	4(1.3%)

Source: Williams et al (2009)

Table 4.7: Research methods

Survey	173(57.5%)
Case Study	46(15.3%)
Multiple Method	11(3.7%)
Interview	7. (2.3%)
Multiple methods	6(2%)

Source: Williams et al (2009)

Tables 4.8 and 4.9 also show the analysis of articles on IT/ ICT adoption studies in various organisations and those specific to SMEs.

Table 4.8: Some previous studies on technology adoption (General)

<b>Authors/Year</b>	<b>Research Paradigms</b>	<b>Research Methods</b>	<b>Areas of study</b>	<b>Journals</b>
Chan and Tam (1997)	Interpretivism	Interviews	Factors affecting the adoption of open systems.	MIS Quarterly
Karahanna et al., (1999)	Positivism	Survey and interviews	Information technology adoption across time.	MIS Quarterly
Walker and Lees (2002)	Positivism	Survey	Technology –enabled service delivery: an investigation of reasons affecting	International Journal of service Industry Management

			customer adoption and rejection	
Venkatesh et al., (2003)	Positivism	Focus group and survey	Users' acceptance of Information Technology.	MIS Quarterly
Pavlou and Fygenson (2006)	Positivism	Survey	Understanding and predicting electronic commerce adoption.	MIS Quarterly
Ani et al., (2005)	Positivism	Survey	Adoption of ICT in academic Libraries	The Electronic Library
Kim S.S (2009)	Positivism	Survey	Technology use: An Extension and Test.	MIS Quarterly
Keller (2009)	interpretivism	Case study	User acceptance of virtual learning environment.	Communications of the Association for Information Systems
Chen et al., (2009)	Positivism	Survey	The acceptance and diffusion of the innovation.	Information and Management
Cavusoglu et al., (2010)	Positivism	Sensitivity analysis	Information technology diffusion with influential, imitators and opponents	Journal of Management Information Systems
Raza and Standing (2010)	Critical	-	Information systems adoption using critical systems thinking	Journal of systems and Information Technology
Jacobsson and Linderoth (2010)	Interpretivism	Case study	Adoption and use of ICT in construction projects: a Swedish case study	Construction Management and Economics

Table 4.9: Previous studies on technology adoption specific to SMEs

Author/Year	Research Paradigms	Research Methods	Area of study	Journal
Walker and Lees(2002)	Positivism	Survey	Technology –enabled service delivery in SMEs	International Journal of service Industry Management
Premkumar (2003)	Positivism	Survey	Information technology implementation in SMEs	Journal of Organisational Computing and Electronic Commerce
Simpson and Docherty (2004)	Interpretivism	Interviews	E-commerce adoption support and advice for UK SMEs	Journal of Small Business and Enterprise Development
Lee (2004)	Positivism	Survey	Internet technologies in SMEs	Journal of Computer Information Systems
Acar et al., (2005)	Positivism	Survey	ICT use by SMEs in Building construction	Construction Management and Economics
Ritchie and Brindley (2005)	Interpretive	Case study	Adoption of ICT in SMEs	New Technology ,Work and Employment
Owens (2007)	Interpretivism	Interviews	Implementation of new product development process in UK SMEs	Management Decision
Rantapuska and Ihanainen (2008)	Positivism	Survey	ICT investment decision making in SMEs	Journal of Enterprise Information Management
Ramsey and Ibbotson (2008)	Positivism	Survey	Factors influencing innovation adoption in professional service	International Journal of Innovation

			SMEs	Management
Merono-Cerdan (2008)	Positivism	Survey	Use of GroupWise and its influence on SME performance	Journal of Computer Information Systems
Harindranath et al(2008)	Positivism	Survey	ICT adoption and use in UK SMEs	Electronic Journal of Information Systems Evaluation
Wilson et al (2008)	Positivism	Survey	Diffusion of E-commerce in UK SMEs	Journal of Marketing Management
Wang and Costello (2009)	Interpretivism	Case study	Innovations in SMEs	The Journal of Entrepreneurship
Chibelushi and Costello (2009)	Interpretivism	Interviews	The challenges of ICT oriented SMEs	Journal of Small Business and Enterprise Development
Peltier et al (2009)	Positivism	Survey	The adoption of CRM technology by small retailers	International Small Business Journal
Tan et al., (2009)	Positivism	Survey	Internet based ICT adoption in Malaysian SMEs	Industrial Management and Data Systems
Chuang et al., (2009)	Positivism	Survey	Extent of IT adoption in SMEs using Upper Echelon Theory	Journal of Enterprise Information Management
Macredie and Mijinyawa (2010)	Interpretivism	Case Study	Open source software adoption in SMEs	European Journal of Information Systems

In addition, the analysis in tables 4.8 and 4.9 also shows that the qualitative approach has not been widely used in ICT adoption research. The paradigms and research methods used by most studies in IT/ICT adoption research show a resemblance in their approach. Positivist paradigm and survey methods were predominantly used in technology adoption research (Orlikowski and Baroudi, 1991; Galliers and Land, 1987; Choudrie and Dwivedi,

2005). This approach uses the methodological tradition of quantitative data collection and statistical analysis, and data collected are analysed in such a manner that a similar result will be obtained if another researcher collects and analyses similar data (Shah and Corley, 2006).

In support of this, Silva (2007) notes that technology adoption research has sought to deploy one of the multiple instruments available in quantitative data collection (survey). As such, most researchers use a confirmatory statistical technique despite the fact that researchers in normal science that focus on confirming the paradigm remain unquestioned and when there is an anomaly in the theory they tend to blame certain factors, such as the instruments, sample and sampling size (Silva, 2007). Such methods can ignore features from the subjects of the study so that results that are clear are reported (Galliers and Land, 1987) or eliminate factors which might be relevant but difficult to value. This might lead to a conclusion that could be misleading and using a statistical technique implies using precise measurement that is not considered sustainable (Galliers and Land, 1987).

#### **4.4 Why use interpretive paradigm that addresses qualitative issues?**

The positivist approach that addresses quantitative issues does not fit into the research problems because it has limitation in building theories desired by the researcher (Hine and Carson, 2007). The positivist approach accounts for a limited number of factors and deploying statistical and experimental hypotheses (Kaplan and Duchon, 1998) does not reproduce the real world experiences of the participants during the experimentation process. As a result, they reveal little information on the underlying meaning of the data (Gable, 1994).

According to Shah and Corley (2006P.1831)

*“...the researcher who...collects quantitative data from a distance without anecdote to support them, will always have difficulty explaining interesting relationships”*

Interpretive paradigm neither tests theories nor replicates research findings; instead results are representative of the interpretations of those experiencing the phenomenon being investigated (Shah and Corley, 2006). Through interpretive research, multiple social realities occur around the phenomenon because the phenomenon can be interpreted differently

(Shah and Corley, 2006). This approach produces a holistic understanding of the rich, contextual and detailed data (Mason, 1996).

Qualitative research is relevant in answering questions like *why* and *how*, and each of these questions can possibly be addressed with quantitative techniques; but adopting a quantitative technique can only address limited questions (Lacey and Luff, 2001). Therefore, the issues of how and why a phenomenon occurs are always difficult to address using the quantitative method (Srivastava and Thomson, 2009). The quantitative approach does not fit into the research problem in many areas of small business research (Hine and Carson, 2007) because it does not provide explanation and understanding of the complex issues associated with the social world (Marshall, 1996). The qualitative approach generates a huge amount of data that needs to be explored and summarised to have a clear picture of the research process. This may lead to seeking a relationship between different themes and the implication of the study may be derived from the data or the interpretation that is related back to the literature.

The qualitative approach to data analysis provides the basis for detailed interpretation because it is based on the natural environment of the phenomenon (Srivastava and Thomson, 2009). The iterative nature of data gathering and analysis often leads to a point where no new themes are emerging, meaning that the researcher requires no further data collection (DiCicco-Bloom and Crabtree, 2006). The approach allows the researcher to take a holistic view in which small business owner managers and other actors operate. According to Lincon and Guba (1985p.40) these approaches are more suitable for multiple realities and reveal more directly the nature of the investigation between the researcher and the respondent. This makes it easier to assess the extent that the phenomenon investigated is described from the researcher's own perspectives.

The literature review reveals that interpretive studies that use a qualitative research approach do not always generalise their findings and this approach is rarely used in ICT adoption studies, despite providing a useful alternative to determine richer information (Lee, 2003; Elliot and Loebbecke, 2000). There is still a dearth in studies that have applied these approaches in technology adoption (Williams et al., 2009). Therefore, an interpretive approach that addresses qualitative issues is likely to provide a clear opportunity to make original contributions. This approach was favoured in this research because it is an integral part of qualitative methodologies (Hine and Carson, 2007) which is sensitive to mutual shaping of influences that the researcher might come across. Most importantly, it has been argued that the interpretive approach is particularly suitable in the context of small

businesses because the researcher is closely involved in the process (Lacey and Luff, 2001), and it takes a subjective view of their meaning and understanding in a specific context (Hine and Carson, 2007). As a result, it provides a rich account of the participants' experiences.

## 4.5 Research process and methods

Before examining the data collection method used in this research, Figure 4.1 represents the research process which gradually developed during the course of the study. The stages are described below.

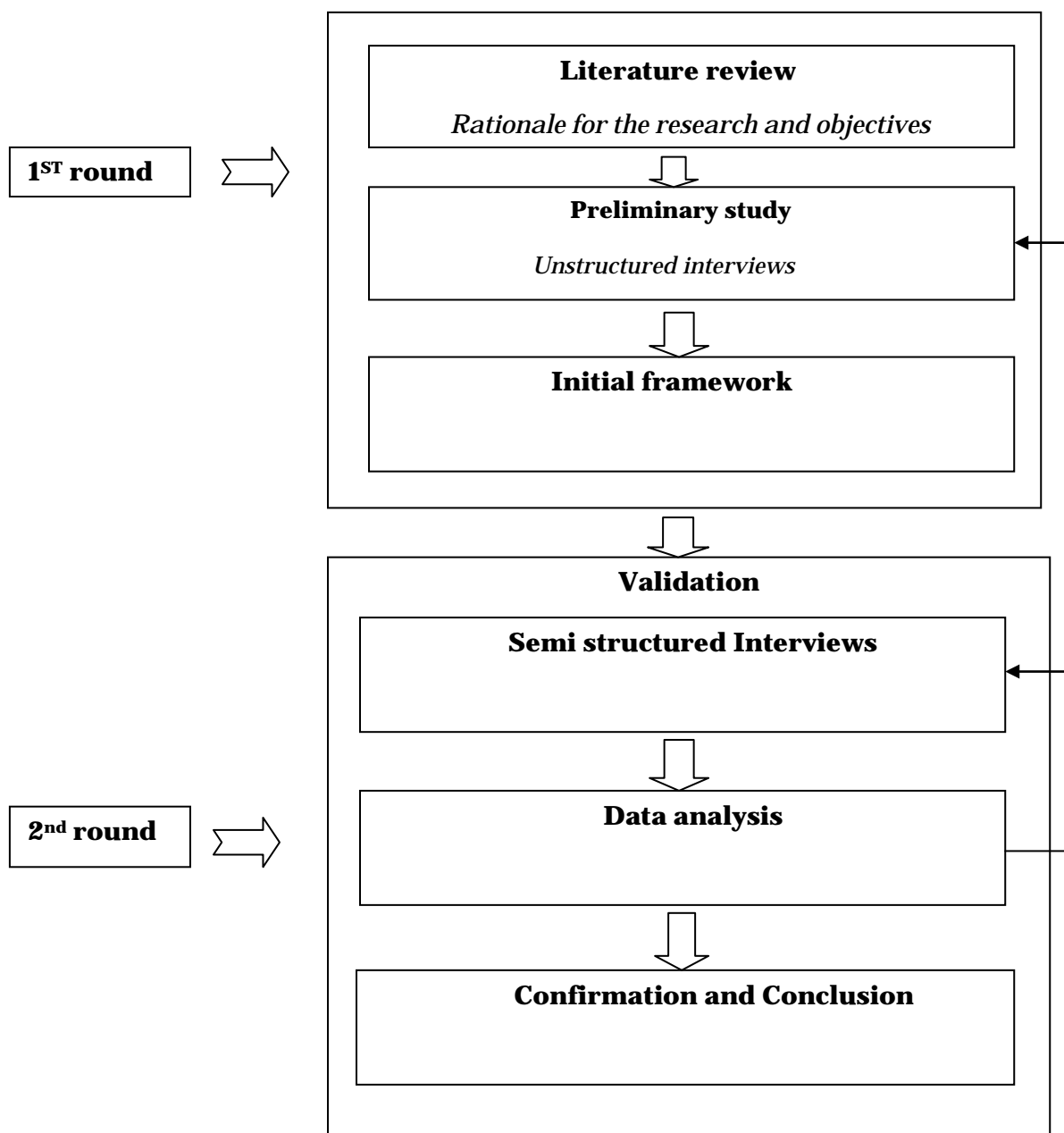


Figure 4.1: The research process



#### *4.5.1 Literature review*

The first round of the research consists of three main stages. It starts with reviewing the relevant literature. The research first reviews previous and recent ICT adoption literature to understand what is new and identify the research gaps. The review process was conducted in two stages. At the initial stage the review was carried out to look for suitable research papers and to focus on the area which helps to identify the research problem. The second part continues throughout the research which helps to collate evidence from reflective journals to support the claim of the new knowledge created in this work. These reviews were broad in order to put the study into a large context and to unveil various aspects that may impact on SMEs. The literature review helps in identifying the rationale for the study and the formation of the research objectives.

#### *4.5.2 Preliminary Study*

The preliminary study was conducted using the data gathered during the 1st round of the unstructured interviews. The research initially adopts unstructured interviews. Miles and Huberman (1994) note that issues can emerge from the field which the research aims to investigate and help put the research into a large context. In addition, since ANT was a theoretical lens for this study, Tatnall and Jerzy, (2003) suggest that the participants must be allowed to determine the right framework for the study. The unstructured interviews allowed participants to develop their ideas, by letting them talk freely without any interruption (Oates, 2006). The purpose was to have a broad and unconstrained view and to allow more issues to unfold.

As stated, the aim of the preliminary study was to unveil the current state of emerging ICT adoption in small service SMEs, help test the applicability of the key ANT concepts generated from the theory to the initial raw data. Third, identify key actors involved in the adoption and explore the initial set of factors (see stages one and two of the data analysis process in chapter 5). The initial inter-coder reliability analysis was conducted based on a guideline proffered by Bryman, (2008) at this stage. This analysis measures the extent to which independent coders tend to evaluate and assign exactly the same rating to each object or evaluate the characteristics of a text and reach the same conclusion (Tinsley and Weiss, 2000). Codes that form the bases for the study are driven deductively as well as inductively.

### 4.5.3 Initial framework

While many concepts were generated from ANT to guide the study and tested through the preliminary study, the inter-coder reliability analysis of the unstructured interviews unveiled the applicability of the four ANT concepts of *inscription*, *translation*, *framing* and *stabilisation* to the empirical data with a relatively high score (85%). These concepts were regarded as the coding frame. The preliminary analysis forms the basis for establishing the initial framework in figure 4.2 (see the analysis on how the conceptual framework for the study was established in section 6.5).

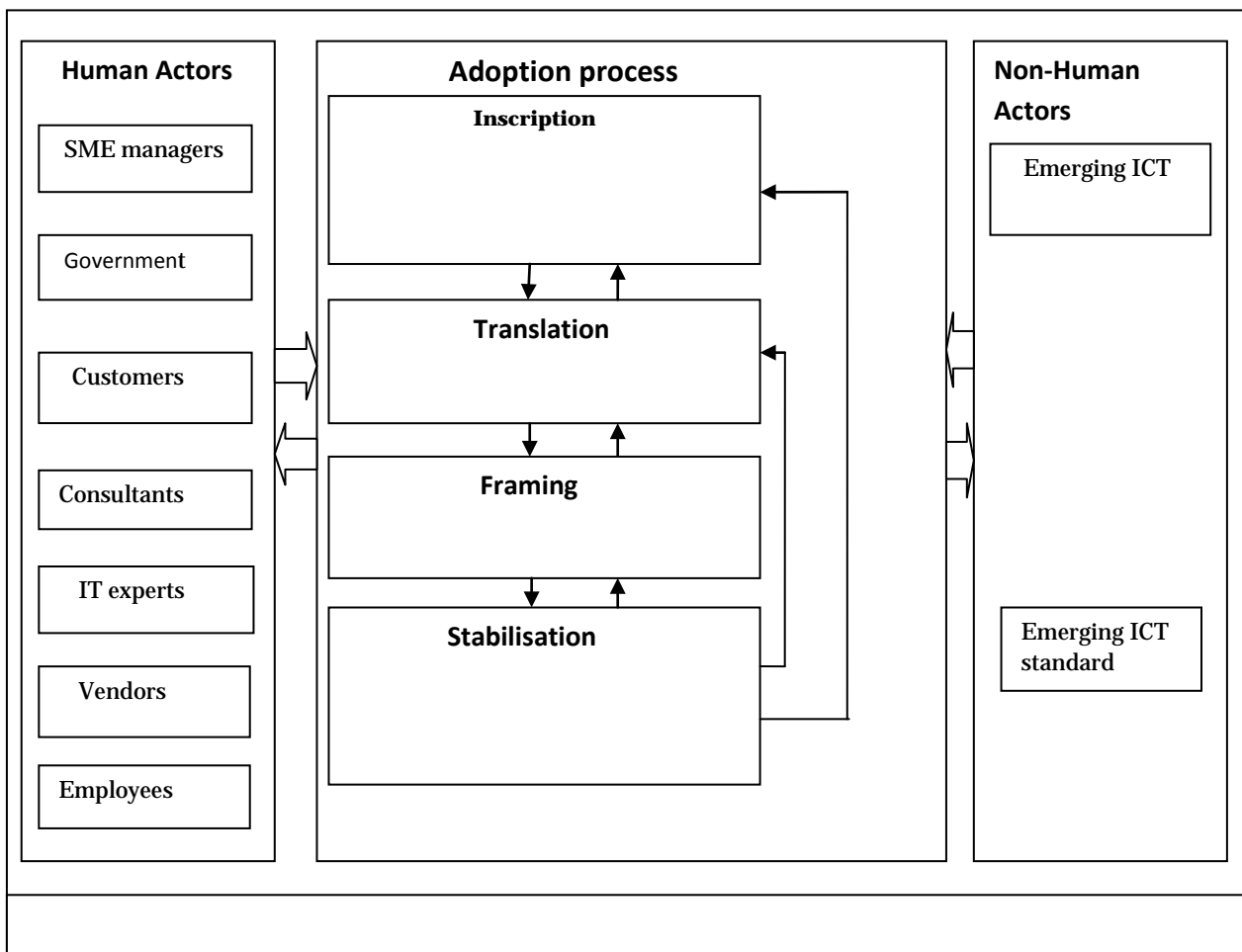


Figure 4.2: Initial framework

The framework helps guide the development of the semi-structured interview questions and data collection procedures and unveils the need to examine the roles of actors and validate the outcome of the findings.

#### 4.5.4 *Validation*

The purpose of the second round of the research is to validate and confirm the findings. This consists of three stages.

##### **4.5.4.1 *Semi-structured interview***

The second interview method used for the study was a semi-structured interview design. This is in order to gain a deeper understanding of the respondents' social and personal views in order to validate and confirm the dynamic and evolutionary process of emerging ICT, the actors involved and their roles in emerging ICT adoption; and to elicit the critical factors influencing the adoption of emerging ICT adoption. The interview approach was adopted in order to gain valuable insight and in-depth understanding on the outcomes that emerged during the unstructured interview. This method of interview involved individuals and participants and involves the development of a set of pre-set, open-ended, or probing questions which emerge during the interview process (DiCicco-Bloom and Crabtree, 2006).

##### **4.5.4.2 *Data analysis***

This research adopts thematic data analysis that incorporated NVivo which facilitated the analysis (see chapter 5 for more details). According to Miles and Huberman (1994p. 10) qualitative data analysis consists "of three concurrent flows of activity: data reduction, data display, conclusion drawing/verification". *Data reduction* is the process of searching, selecting, abstracting and transforming the pieces of data generated from field notes or the transcripts, and occurs continually throughout the research project (Miles and Huberman, 1994). Thematic data analysis (hybrid approach) used in this study involves all of these. The technique helped the researcher to decide which part of the data to code, and which part of the data reveals a number of related patterns. The approach used here allowed data to be displayed, organised and assembled, and helped further verification to be ascertained.

##### **4.5.4.3 *Confirmation and conclusion***

The verification that eventually led to the confirmation of the findings of the research was concluded. Verification means to ascertain the reliability and validity of the findings generated from the interview (Kvale, 1996). Following that preliminary verification, further verification was conducted at this stage to ascertain the reliability of the findings to ensure that the study investigated what it intended to investigate (see chapter 5 of the thesis).

Lastly, evidence from reflective journals were sought afterwards to support the claim of the new knowledge created in this work.

## **4.6 Data collection using qualitative interviews**

As philosophical paradigms inform qualitative research, so does qualitative research shift from these underlying assumptions to the research design which influences the way data are collected (Myers, 1997). A researcher that uses qualitative interview must consider in detail all the processes involved (Myers and Newman, 2007; Myers, 1997; Schultze and Avital, 2011). Therefore, this section examines and articulates the various data collection approaches used in this research.

### *4.6.1 Qualitative interviews*

Qualitative interview is one of the most important tools for data collection in qualitative research (Myers and Newman, 2007). It is important to bear in mind that the main reason for the qualitative approach is that it studies humans in their natural environment rather than in “artificial isolation” (Marshall, 1996p. 526). Therefore, it aims to elicit different types of information from participants including the participants’ behaviour, beliefs, attitudes, norms and values of others (Bryman, 2008). As an approach that involves the interaction between two or more people in order to understand their experiences, views and opinions about a particular issue, the method of data collection for qualitative interviews varies significantly.

Interview is one of the methods for data collection and ranges from one-on-one or face to face interview or one to group interviews, conversations, semi structured, structured and unstructured. The length of these interviews also varies considerably and may depend on the phenomenon being studied. Although interviews may be considered as social interaction or conversations (Kvale, 1996) the major concern is always to ensure that the validity and reliability of the empirical data collected are free from distortion.

Gilmore and Carson (2007) note that interviews are appropriate to study complex, dynamic interactive situations of a phenomenon. It contributes to a body of knowledge that is conceptual and theoretical (DiCicco-Bloom and Crabtree, 2006). The methods of data collection for this study are dependent on the life experiences of the participants because it reveals broader information on the underlying meaning of the phenomena investigated and aids new discovery. Drawing on Wengraf (2001), the data collection method for this study is

interview which aids in developing or constructing a model of some aspect of reality in accordance with the fact about the real life experiences of the participants.

#### 4.6.2 *Types of interviews*

##### **4.6.2.1 *Structured interview***

Structured interview which is also called scheduled standardized interview is one “in which the wording and order of all the questions are exactly the same for every respondent, the purpose being to develop an instrument that can be given in the same way to all respondents” (Denzin, 1989P. 104). All structured interview questions are similar in the way they allow the researcher to identify the differences in responses when variations between the respondents occur. Because structured interview assumes that each interviewee will respond to similar questions that elicit the same meaning for each respondent, the researcher often develops a uniform wording or complete script beforehand (Myers and Newman, 2007), for each interview question in the same context. It allows for pilot investigation that aids in the final questions eliciting the same meaning (Denzin, 1989).

A structured interview is not suitable for qualitative research because it does not allow discovery and understanding of the real world, rather it deals with confirmation and explanation. Structured interview is associated with survey research and lacks flexibility. It is normally used for deductive research that permits generalisation due to the large homogenous sample used.

##### **4.6.2.2 *Unstructured interview***

Unstructured interviews allow greater flexibility for both parties—the interviewer and the interviewees. Here, there is no fixed sequence of interview questions that suits all respondents; instead, data generated in this process are narratives of the participants instead of fact (Schultze and Avital, 2011). According to Denzin (1989) the readiness for this type of interview is dependent on how each respondent is willing to discuss a topic when asked. Unstructured interviews are similar to conversations (Bryman, 2008) or focus interviews (Denzin, 1989) in which certain types of answers are required from the respondents but allow the redefinition of questions to suit each interviewee because interviewees have their unique way of defining their words (Denzin, 1989).

Unstructured interview can identify other respondents as the interview progresses and makes a note while questions are asked to the respondents. Though no interview can be purely unstructured, some may be slightly unstructured to guide the respondents in conversation (DiCicco-Bloom and Crabtree, 2006). Though this type of interview is very time resource consuming (Mason, 1996), it is used to study complex, dynamic interactive situations of a phenomenon (Gilmore and Carson, 2007) as opposed to structured interviews. Unstructured interview was used initially for the study.

#### **4.6.2.3 *Semi-structured Interview***

Semi-structured interview involves a situation where the researcher (interviewer) asks a list of open questions on a fairly specific topic (Bryman, 2008). While this type of interview is considered as a major data source for a qualitative research project, others consider it as the most widely used interview approach in qualitative study (DiCicco-Bloom and Crabtree, 2006).

Semi-structured interview can involve individuals and groups and questions can be designed with a set of preset open ended questions with other emerging questions (DiCicco-Bloom and Crabtree, 2006). It is a method for reconstructing subjective theories because of the complex stock of knowledge the interviewee has about the topic (Flick, 2002). The knowledge may include explicit assumptions the respondents consider when answering open questions and may be supported further by implicit assumptions. The researcher supports the interviewee by asking a list of questions and uses these questions to restructure the respondents' subjective theory regarding the issue under investigation (Flick, 2002).

Semi-structured interview is the most appropriate when the questions are open ended, complex in nature and the interviewer has a great deal of flexibility on how the questions are being asked (Bryman, 2008; Oates, 2006). It allows the respondents to contribute their opinions and views freely in more detail, instead of responding to a list of predetermined questions. The use of open ended questions allows the respondents a greater flexibility and less restriction.

### 4.6.3 *Types of interviews adopted for the study*

#### **4.6.3.1 *Unstructured interview in the first round of interviews***

According to Gilmore and Carson (2007) small businesses do not have any formal way of doing things, and to understand small business activities, survey research may not give the required level of penetration. The authors further emphasise that an interview approach that follows a fairly unstructured pattern and provides an open, flexible, experimental and revealing pattern of studying complex, dynamic interactive situations is often considered as the best approach for research in small businesses.

*“ Studying a small business enterprise owner/manager is not about testing variables, not about testing techniques, but about determining key issues-- Recognising the holistic dimensions of entrepreneurial owner/manager decision-making practices qualitative approach that encourages holistic approach to data gathering has many advantages” (Gilmore and Carson, 2007p. 14).*

This approach may allow the researcher to get closer and become familiar with the research area as the research progresses, as well as exploring important issues as they are revealed through the open ended nature of the interview questions (Gilmore and Carson, 2007). This approach corresponds to the features of emerging design where the researcher allows the design to unfold instead of “constructing it beforehand”. This is because what emerges during the interaction between the researcher and the participants is largely unpredictable (Lincoln and Guba, 1985). Therefore, it is when a researcher is engaged with the participants that the right framework and boundary of the study can be established (Tatnll and Jerzy, 2003). This can assist the researcher to ask questions that reveal a deeper understanding of the phenomena, reduces the risk of abstraction and generality during discussions (Schultze and Avital, 2011).

Unstructured interview was adopted initially to collect data in order to understand the current state of emerging ICT adoption in small service SMEs and have a broad and unconstrained view, help test the applicability of the key ANT concepts: *inscription, translation, framing and stabilisation* to sample the initial raw data and to help identify key actors that may be involved in the adoption and the initial set of factors.

#### **4.6.3 .2 *Semi-structured interview in the second round of interviews***

In order to enhance the theoretical codes, validate and confirm the findings, further in-depth investigations (semi-structured interview) were conducted. Semi-structured interview helps for an in-depth understanding of participants' social phenomenon, experiences and opinions regarding the research. Unstructured and semi-structured interviews provided a rich data for analysis. These data collection methods allowed for a broad picture on different social phenomena, which contributed in answering the research objectives.

### **4.7 Sample selection**

Selecting a study sample is considered to be an important step in any research since the entire population cannot be studied. It is a complex issue in qualitative research because it constitutes many variations in the literature (Coyne, 2008; Marshall, 1996). According to Manning (1992) the basic premise for conducting qualitative research is not for statistical generation rather it is for discovery. Because qualitative approaches consider the complex human issues more importantly than generalization, it aims to provide an understanding of complex issues and most importantly to answer humanistic (how and why) questions (Marshall, 1996).

Therefore, it is always important to ensure that the words of the key informants are in line with the voice of other sample members and the words of those that were sampled are similar to those individuals not selected for the investigation (Onwuegbuzie and Leech, 2007). Qualitative research requires not just a flexible and iterative data gathering, analysis and interpretation, but also a pragmatic approach to sampling (Marshall, 1996).

It is important to note that the sample for qualitative study is always small and must not be a representative sampling. According to Myres (2000), the problem associated with sampling and generalisations may have little or no impact to the objectives of the study and the reality of the situation. A small sample size may be considered as more useful in examining a phenomenon in-depth from different viewpoints while a large sample may not be necessary. This is because the goal of the study may be to concentrate on a selected contemporary phenomenon that allows in-depth description which would be a vital component of the process (Myres, 2000). Therefore, a suitable sampling size for any qualitative interview is one that addresses the research questions or objectives, gaining a more personal understanding of the phenomenon and the result can potentially contribute valuable knowledge to the community. The number is not always obvious from the outset until



saturation is reached (Marshall, 1996). Therefore, the two types of sampling technique adopted for this study are purposeful random sampling and snowball sampling.

#### *4.7.1 Purposeful random sampling*

This research adopts purposive random sampling since the research was qualitative and subjective in nature and the purpose was not for statistical generalisation (DiCicco-Bloom and Crabtree, 2006). Purposeful random sampling is a sampling technique in which the investigator first obtains a list of individuals from a sample frame, randomly selected from the sampling, purposefully (Onwuegbuzie and Leech, 2007).

The logic behind purposive sampling is to select units of analysis (individual based) that enable the researcher to make a reasonable comparison in relation to research objectives and not for statistical generalization (Mason, 1996). This is usually achieved through interaction (Lincoln and Guba, 1985). It is based on the practical knowledge of the researchers' research areas (Marshall, 1996). Miles and Huberman (1994), contend that one of the rationales for purposeful random sampling is that it adds credibility to a sample especially when a potential purposeful sample appears to be too large or to enhance the researchers understanding of the information-rich cases.

#### *4.7.2 Snowball sampling*

On the other hand, a snowball sample compliments purposeful sampling. This kind of sampling allows participants to suggest to the researcher other potential interviewees that have the knowledge and experiences that might contribute effectively to the study. Snowball sampling was used because the participants during the unstructured interview further introduced the researcher to other key informants that contributed to the interviews. One merit of this sampling method is that it helped the researcher to gain access to the other participants with less stress to the researcher.

#### *4.7.3 Selecting actors/ participants*

The research centres on small service business in the UK in general. There are nearly 4.5 million small businesses in the UK with an estimated employment of 13.8 million people and an estimated combined annual turnover of £1,500 billion, and out of these figures, they account for 58.8% of private sector employees and 48.8 per cent of private sector turnover

(at <http://www.fsb.org.uk/stats>) and 79% of small businesses still fall within the service sector compared to 6% in the manufacturing sector (Blankson and Stokes, 2002). The sector is essential in developing the economy, sustaining business competitiveness and supporting other private and public sectors (BIS, 2010b). Furthermore, Garud and Rappa (1994) note that the society (various human actors) is a means through which new technologies are produced and reproduced and that external forces suppliers and even non-entrepreneurial firms (Parker and Castleman, 2009) including government agencies play pivotal roles in influencing ICT adoption. In order to constantly keep updated with the latest emerging ICT, SMEs need to leverage their network of relationships or partners that provide new sources of information. In general, the sampling was not restricted to SME managers only, but extends to other external actors within the service SMEs. In general, the selection of participants were based on Ramesy et al's., (2008p. 649) classification of professional service businesses. They include management and business consulting and services, travel and tourism marketing and advertising, estate agent and property transfer engineer designers and consultants, computer services and software development, research and development, education and training and others such as accounting services, and security professionals. The size of the companies ranges from a one man band to 250 employees.

#### *4.7.4 Unstructured Interview participants*

The initial sample of 65 professional services SMEs relating to the list above were randomly selected purposefully from Crunch-Online and the Luton Business Directory. The selected participants were based on the following criteria; they must have adopted a new ICT adoption in the last three years, must be a service orientated SME, and the number of employees must range from 1 to 250, and must be operating in England. Before the interview, a formal letter was sent ahead of time detailing the purpose of the research and confidentiality issues. All the interviews lasted for about 45 minutes to 1 hour. It is important to note that because ANT was considered as the theoretical underpinning of the study and it is more effective at individual level analysis, the sample selection is based on individual rather than organisational level analysis. The initial unstructured interviews involved 11 participants (mostly SME managers) who agreed to participate in the interview. The selected participants include: security firm, marketing and advertising, social media and consultancy firm, social networking firm vendor/consultants, sales and distribution, engineering and construction.

#### 4.7.5 Semi structured Interview participants

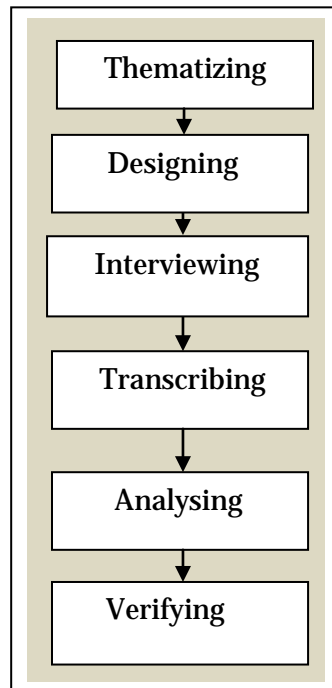
Bearing in mind that the aim of qualitative approach is to improve the researcher's understanding of complex and emerging views instead of generalization, 15 other human actors were interviewed using semi-structured interviews. Table 4.10 depicts actors involved in the research and includes government agencies, consultants, IT experts, vendors, customers and employees, the sampling technique, the interview types associated with these participants and number of participants (human actors) in the research.

Table 4.10: Sampling, interview types and participants

Sampling type	Interview type	Actors interviewed	Number of interviews
Purposeful random sampling and snowball sampling	Unstructured (1 <sup>st</sup> round)	-SME managers -Two IT staff	11
	Semi-structured (2 <sup>nd</sup> round)	-SME Managers -Customers -Government -Consultants -IT Experts -IT vendors -Employees	15

### 4.8 Stages of the interview process

Kvale (1996) notes that any research project should be considered from the outset and both the data collection approach, analysis and verification technique should be examined at the earliest possible stage. Therefore, to make the study more transparent, the stages of the interview process and data analysis process (see chapter 5) are explained in greater detail. Figure 4.3 depicts the stages of the interview process proposed by Kvale, (1996). These stages are important given that interviews in qualitative research involve a number of activities and these activities are not a one off event (Myers and Newman, 2007). Instead, they are continuous throughout the research. The process below guides the remainder of this chapter.



Source: Kvale, (1996)

Figure 4.3: Stages of the interview process

#### 4.8.1 *Thematizing*

A good interview requires the researcher to understand the subject area, the purpose of the study and the methods for data collection and analysis in advance. Therefore, thematizing does not involve just the conceptual clarification and the detailed theoretical analysis of the phenomena but extends to planning the interview questions (Kvale, 1996). At this stage, the primary purpose of the researcher is to gain a deeper insight of the subject matter. This is what guides and dictates in advance if the interviews are discovering any new insight and to be clear about the strategy for data collection. Reviewing a number of recent studies in ICT adoption and the support and guidance from the supervisors, some objectives were formulated. Although literature helped to unravel a number of objectives, the initial preliminary investigation formed the basis for comprehensive objectives and helped the researcher to gain deeper insights into the study. The preliminary investigation guides the researcher in preparing and designing.

## 4.8.2 Designing

The primary purpose of designing centres on the overall planning and preparation for gathering the raw information (Kvale, 1996). Designing aims to help the researcher gather empirical information and gain sufficient knowledge that would help to achieve the objectives of the study. In drawing-up the questions, a number of issues were considered such as, the types of questions, time and resources available for the research as well as the ethical consideration.

### 4.8.2.1 Unstructured interview question design

Oates (2006) notes that questions are designed to produce two types of data: factual data, (e.g., type of SME, type of emerging ICT adopted, number of employees) and participants' opinion and experiences (e.g., what the participants think about the research area). Although both data can be gathered within one questionnaire, it is argued that the researcher must be clear on what kind of data is expected from each question (Oates, 2006). Attention was paid to these types of data during the question design for the first round of the interview.

Closed questions were not appropriate because the respondents cannot express their opinion. As a result, a consideration was given to open questions that hold the full richness of the participants' views expressed in their own words.

Open questions were designed to ensure they generated the required data. Although such questions are less difficult to prepare, data generated from them were more difficult to code and analyse. The questions designed were initially tested to ensure they answer the research questions. Two major unstructured questions asked during the interviews are highlighted in table 4.11.

Table 4.11 : Unstructured questions

- 
1. How does your company regularly keep up with emerging ICTs at all times?
  2. What factors influence your company in adopting these emerging ICTs?
- 

Oates (2006) notes that the tone of open ended questions is likely to change depending on the respondent's views. Probing questions were also considered for a better understanding of the participants' own experiences. These were asked when the researcher is not clear about a particular concept or opinion of the participants. Open ended questions appear to be

suitable because it leads to: a relatively high response rate, all participants agreeing to be interviewed responding to all the questions, and allows the use of probing questions based on participants' responses (Oates, 2006).

#### **4.8.2.2 *Semi-structured interviews-framework design***

According to Schultze and Avital (2011) it is important to develop an explicit and effective framework. This helps the organisation of conversation and allows the participants to access their experiences while some degree of freedom is given to them to express their views. Before designing the semi-structured questions, a framework was developed after the preliminary study. This guides the development of the interview questions for the semi-structured interviews. As noted previously, the framework guides the participants during the semi structured interviews. The framework was considered useful in this research because, it helps in the development of the semi-structured interview questions, guides the participants to articulate and interpret their experiences and assessed different layers of the framework in order to reveal rich insights (Schultze and Avital, 2011) of the phenomenon.

#### **4.8.2.3 *Semi -structured question design***

While semi-structured interview is one of the most useful interview methods for conducting a qualitative study, questions designed for this kind of interview are not highly structured compared to closed ended questions or unstructured interviews where respondents are given the chance to express their opinion as they wish. However, DiCicco-Bloom and Crabtre (2006) recommended that the research questions may serve as the first interview questions but the researcher should develop at least 5 to 10 questions to obtain in-depth information on various aspects of the study.

Although two unstructured interview questions were designed at the initial round of the interviews, eight semi-structured questions with sub-questions were prepared. These covered all aspects of the research objectives. Attention was also paid to the wording of the questions to avoid ambiguity. This helps the participants to further express their thoughts on the issues raised. Table 4.12 depicts the semi-structured questions for the second round of the interviews. These questions are informed by ANT.

Table 4.12 : Semi-structured questions

Stages of emerging ICT	Questions relating to the stage
Questions on relating to company background	1. Can you tell me about your company's background? For example, number of organisational members, types of IT systems in place and organisational history.
Inscription	2. Can you give me an example of a new IT application your company has adopted recently? When was it introduced? Why was it introduced? 3. How did the initial idea for introducing the IT application come about?
Translation	4. What key stakeholders were involved? (For example, customers, employees, IT specialists, government agencies etc). What role did each stakeholder play in the process
Framing	5. How was the IT application developed? What people were involved?
Stabilization	6. Could you tell me how the IT application was implemented in the organisation? Were there any challenges faced? How were these challenges overcome? 7. Since its first introduction, have there been any unexpected improvements or problems which weren't originally planned from the outset?
Question relating to all the four stages above	8. Can you describe what factors motivated you to constantly adopt this IT application at each stage (inscription translation, framing and stabilization)?

Bearing in mind that ANT is a powerful method for data collection and data analysis (Cordella and Shaikh, 2006; Sarker et al., 2006), the semi-structured interview questions were designed and tailored to elicit further, the participants' ideas and opinion on each stage (inscription, translation, framing and stabilisation) of the initial framework.

Table 4.13 and table 4.14 show the interview profile. This represents a total of 26 participants (both unstructured and semi-structured interview participants). The profile includes the position of participants, the type of services and the company size.

Table 4.13: Interview profile

<b>Participants/ supporting cases</b>	<b>Positions</b>	<b>Company size</b>	<b>Services</b>
A1	Managing Director	30	Security
A2	Manager	25	Internet marketing and advertising
A3	IT support staff		
A4	IT support staff		
A5	Manager	9	Social media /consultancy
A6	Manager	-	Social networking provider
A7	Managing Director	25	IT Vendor /Consultancy
A8	Directors		
A9	Operational Manager	45	Sales and distribution
A10	Managing Director	80	Construction
A11	Manager	5	IT Vendor /Consultancy
A12	Manager	52	Business and Management /Consultancy
A13	Manager/IT support staff	99	IT
A14	Manager	8	Accounting
A15	Developer	1	IT and networking
A16	Designer	1	IT
A17	Test analyst	245	IT Quality control
A18	IT Designer/developer	2	IT
A19	IT Developer	1	IT and networking
A20	IT consultant	11	Consultancy
A21	Government	-	Support and advice
A22	Government agency	-	Support and advice
A23	Government		Economic development services
A24	Government agency	22	Learning and support
A25	Government	-	Support and advice
A26	Manager	102	IT consultant/business supports/advice

#### **4.8.2.4 Ethical consideration and gaining access**

In research of this kind, it has been argued that researchers must engage in their own personal ethical decisions regarding the research and also operate within the institutional forms of regulation. Ethics in research is a way in which the researchers legitimate self morality to ensure that the research conducted is according to best practice. According to Oates (2006) a researcher needs to obtain the respondents' agreement while outlining the



purpose of the interview and the duration. Ethical consideration was taken into account at this stage. This involves preparing a cover letter ahead of time to seek participants' consent. A formal letter (see appendix 2) was written stating the purpose of the interview, the duration of the interview and addressed confidentiality issues before it was sent to participants who indicated interest to participate in the interviews.

### *4.8.3 Interviewing*

It is important to recall in section 4.7.4 that first the sampling was randomly selected purposefully from Crunch-Online and the Luton Business Directory. The participants were subsequently contacted through telephone calls and emails for their consent. According to Oates (2006) it is useful to send the questions in advance so the respondents can think through their views and help establish the researchers' credibility. In most cases, interview questions were sent to those that agreed to participate two days before the interview to allow the participants to make their judgements and feel more relaxed before the interview. Kvale (1996) notes that research interview is a conversation about the mutual interest of both parties. Therefore, presenting the interviewing procedure is essential. The summary of the interview procedure for both the unstructured and semi-structured were similar. The step by step procedure includes:

- Sending a letter ahead of time and requesting for consent and accepting the interview
- Meeting up with the interviewee, thanking, and re-stating the purpose of the study
- Re-emphasising confidentiality issues by assuring them that the information provided would not be passed to a third party.
- Highlight the topics to be covered
- Ask permission to record the conversation using audio tape
- Collect demographic information
- It has been argued that whether unstructured or semi-structured, the interviewer may have to prepare the questions ahead of time; however, additional questions may emerge during the interview to cover emerging issues (Myers and Newman, 2007); where necessary, the researcher uses a probing technique to elicit further meaning on what the participants have said.
- And finally, thank participants for their time.

#### **4.8.3.1 Interview scheduling, length and recording (unstructured and semi-structured interview)**

The interviews were scheduled for 40 minutes to 1 hour but lasted from about 50 minutes to 2 hours. Recording is an essential part of an interview procedure. Oates (2006) notes that relying on memory is not recommended because the researcher would not be able to digest all the information and thus is prone to error and bias. As a result, the author identified three ways information can be gathered during interviews. This includes *field note, audio tape recorder and video tape recorder* (Oates, 2006). Audio and video tape recorder provides researchers with a complete record of the conversation. Audio tape recorder was used during the interview to ensure that the complete conversation was obtained. Both the unstructured and semi-structured interviews were recorded with permission and transcribed with supporting documents including electronic reports and power point presentation materials given by the participants in order to develop a deeper understanding of the conversation.

#### **4.8.4 Transcribing**

Transcribing the interviews is the starting point for data management. Though it is laborious, it aids the researcher to think on how best to approach the analysis. According to Oates (2006) in qualitative research, transcribing the raw information is necessary and the researcher needs to capture the respondents' views the same way the respondents have said it with their own informal notes and comments. While some researchers may try to transcribe and slightly edit the transcript (Oates, 2006), transcribing the interview verbatim was essential because during interpretation, the research is required to include some of the quotes in the findings. The interview was transcribed verbatim (see samples of transcribed interviews in the appendix) in order to develop a deeper understanding of the participants' views.

#### **4.8.5 Analysis**

One of the most vital aspects of qualitative data analysis is to reduce the data. Qualitative data can be managed using a traditional approach or computer based software. Although the traditional data analysis approaches were used at the initial round of the interview, generally the research adopted thematic analysis that used a Computer Assisted Qualitative Data Analysis Software (CAQDAS) (Lewins and Silver, 2009) called NVivo because of the volume of data involved.

#### **4.8.5.1 Thematic analysis**

Lacey and Luff (2001) admit that there is no quick technique in qualitative analysis as qualitative research is interpretive and subjective in nature and the researcher is closely involved in the process. It is important to note that there are several approaches to analysing qualitative data and no one approach is the best. However, the approach one chooses is dependent on factors such as the research questions and objectives, time for the research and the researcher must know what the data aims to contribute (Lacey and Luff, 2001).

This research adopts thematic analysis. This is a method for searching, identifying, analysing and reporting themes that are important to the phenomenon being investigated (Braun and Clarke, 2006). Braun and Clarke (2006), maintained that because qualitative research is complex, thematic analysis should be seen as a primary method for qualitative analysis as it provides the core skills for different forms of qualitative study. The flexibility of the method allows for a number of different ways to analyse the data. Thematic analysis is essential for research like this because it constitutes a step by step process that allows the researcher to transform qualitative information into qualitative data. It aids easy interpretations and communication of findings that allow more comprehensive understanding of the phenomenon (Boyatzis, 1998).

In thematic analysis, codes and themes are generated during the analysis process. The process by which data are analysed predominantly involves **coding** or **categorising the data** (Wong, 2008). Coding is a way categories are created in relation to the data. Categories are the fundamental concepts the researcher is trying to describe. It is considered as the most important stage in the qualitative data analysis process, and involves subdividing a huge amount of data and assigning them to categories (Wong, 2008). It can come from the data or from the investigator's prior theoretical understanding of the subjects being investigated. Miles and Huberman (1994P. 56) define coding as "an analysis...to review a set of field notes, transcribe or synthesized, and to dissect them meaningfully while keeping the relations between the parts intact". It includes tags for assigning units of meaning to the descriptive or inferential information generated during a study (Miles and Huberman, 1994).

Boyatzis (1998P.4) also notes that a **code** is "a list of themes: complex models with the themes, indicators and qualifications that are causally related or something in between these two forms". On the other hand, a theme is a pattern in the data set that organises the possible observation and at the same time helps in interpreting the phenomenon (Boyatzis, 1998); the process of recognising an important moment and encoding it helps in developing

themes and is referred to as a coding process (Boyatzis, 1998). Since codes and themes can sometimes be confusing, what constitute codes and themes in this research are highlighted in table 4.15.

Table 4.14: Illustration of codes and themes for the research

<b>Code</b>	<b>Theme</b>
The concept that the basic units of texts are describing	The merging of quotes from different transcripts that explain the concept. In this research they are referred to as <i>supporting evidence</i> . They constitute phrases or sentences.

#### **4.8.5.2 Approaches to thematic analysis**

A number of researchers have suggested various ways or steps to analyse qualitative data. Boyatzis (1998) provided a summary of stages and steps used in thematic analysis when using a theory driven approach or prior research driven and data driven approach respectively and hybrid approach. Similarly, Miles and Huberman (1994) note that qualitative data can be analysed using a data driven approach, theory and prior research driven approach and a hybrid approach- inductive and deductive approach. Data driven approaches are used when codes are derived from the raw data. Theory or prior research derived are used when codes are generated from either the conceptual framework, list of research questions, hypotheses, and variables that the researcher is investigating (Boyatzis, 1998; Miles and Huberman, 1994; Braun and Clarke, 2006). A hybrid approach is often deployed when a researcher follows both the inductive and deductive approach. The hybrid approach is the one featured in this research and uses the Computer Assisted Qualitative Data Analysis Software (CAQDAS) (Lewins and Silver, 2009) called NVivo.

#### **4.8.6 Computer Assisted Qualitative Data Analysis Software (CAQDAS)**

A computer assisted qualitative data analysis software (CAQDAS) package was integrated into the thematic data analysis process. This facilitates the analysis because of the large number of data involved. CAQDAS is used to refer to software packages and tools designed to facilitate a qualitative approach to analyse qualitative data and accommodates a variety of qualitative data including texts, graphics, audio or video (Lewins and Silver, 2009; Bryman, 2008). Generally, software that falls under CAQDAS includes a wide range of packages (NUD\*IST, Atlas/it, NVivo) that are used to code themes, concepts, processes and contexts

and to describe extensively the phenomenon being investigated, help in theory building and testing or extension of an already existing theory (Lewins and Silver, 2009).

Silverman (2000) notes that CAQDAS is useful because it is used to analyse a large volume of raw information. These packages are best in analysing many research approaches such as participant observation, action research, and grounded theory approach and conversation analysis. This package incorporates tools that aid in the analysis of quantitative data; however, Lewins and Silver (2009p.3) admit that they must be able to handle some type of qualitative data such as “content search tools, linking tools, coding tools query tools writing and annotation tools and mapping or networking tools” although such combinations vary in CAQDAS packages.

Because the type of research and the approaches vary from one researcher to another, many CAQDAS packages may be more suited for one research approach than the others (Silverman, 2000). However, the researcher is in charge of the interpretation of the data and should be able to assess the advantages and disadvantages of each tool and select the one that can facilitate data analysis more effectively.

Bryman (2008) maintained that NUD\*IST (Non–Numerical Unstructured Data Indexing Searching and Theorizing) is now one of the packages that is well recognised by name and has been developed more recently with the emergence of QSR NUD\*IST Vivo, called NVivo. Among the CAQDAS packages, NVivo is suitable for this research because it draws upon many features of CAQDAS packages, making the coding and retrieval process more efficient and aiding the development of models that assist in data interpretation and explanation (Bryman, 2008). In addition, NVivo gives an extraordinary level of transparency to qualitative researchers so the researcher can be more rigorous in the analysis.

#### ***4.8.6.1 Criteria for selecting NVivo software as a data analysis facilitating tool.***

Choosing a software package is dependent on how well the tool can serve the researcher over time and any software package should not be used just simply because the tool is available. Lewins and Silver (2009) suggested that it is important to think carefully on what the software can offer and how effectively it helps analyse the data. Lewins and Silver (2009) outline the basic functionality for most of the CAQDAS and these points served as the basis for selecting NVivo software to facilitate data analysis.

## **Structure of the software**

The extant data managed more effectively with a single file is one of the main reasons for selecting NVivo software package for qualitative data analysis. According to Lewins and Silver(2009) the project file that the researcher creates is regarded as a container that connects all the different data files within the current research project and includes internal and external databases (Richards, 2009). NVivo helps to import data which contains an individual file and connects the data file as the data remain in their original location. The immediate access to all components of the data allows the researcher to see all the data sets (Richards, 2009).

## **Closeness to data and interactivity**

According to Bryman (2008), NVivo software package allows instant access to all source data files as soon as they are assessed and accepted to be used in the project. It makes contact with source data easy and increases the interactivity and closeness to data. Although it has been argued that software acts as an obstacle between the researcher and the data, Lewins and Silver (2009), contend that customised CAQDA that is tailored to the needs of the qualitative researcher is much more reliable when comparisons are made with the traditional approach of working manually.

## **Data exploration**

NVivo offers different ways of exploring qualitative data. For example annotation tools provide footnotes which enable the researcher to make comments to be added to specific pieces of data without abstracting to the conceptual or coding level (Lewins and Silver, 2009; Richards, 2009). It is also considered in this research because it provides tools that significantly link between software or to statements and offers a flexible way data can be manoeuvred. Features such as text search tools offer a means to search for the collection of words around a topic. These features grant access where parts of the documents appear and allow for instant retrieval of related materials (Lewins and Silver 2009).

## **Code and retrieval functions**

Johnston (2006) notes that development of NVivo has paid attention to the ability to export coding information. NVivo like most other CAQDAS packages has retrieval and code functionalities. These functionalities allow the researcher the freedom to select the structure

of the coding scheme and coding strategy employed such as inductive or deductive or a combination of both (Lewins and Silver, 2009; Miles and Huberman, 1994). NVivo offers the researcher the opportunity to create data sets from qualitative data that may be exported to a statistics programme which enables the researcher to go back to the original text for further interpretation (Johnston, 2006). Lewins and Silver (2009) point out that dilemmas exist in coding and researchers should be aware of such dilemmas and methodological issues concerning coding. NVivo makes code generation easier and more flexible especially in refining coding.

### **Data organisation**

Lewins and Silver(2009) emphasised that files that are converted into formats and supported by software are regarded as data and literature lists and abstracts. It can be managed, cross referenced and coded within the software projects. NVivo helps in data organisation according to the facts, descriptive features and data types that are compared later and allows several works to be carried out even before the primary data are brought into the software and further descriptive information (attributes and variables) can be applied at this stage. This might result in new questions which the researcher might want to address. The use of NVivo is not a one off event; rather it is an iterative process which offers the researcher the opportunity to magnify their thoughts.

### **Searching and interrogating the database**

Like most, CAQDA provide ways for data sets to be cross-examined; Lewins and Silver (2009) note that such a process includes searching the content of data based on the relationships between codes depending on the way they have been applied to the data. Similarly, Johnston (2006) notes that NVivo is a powerful search tool that allows themes to be compared and contrasted. Nodes and document attributes allow the researcher to remove those themes based on known characteristics as well as revealing other new themes. Searching with NVivo tools also allows the researcher to combine the coding with the descriptive dimension of the research work (Lewins and Silver, 2009; Richards, 2009).

#### ***4.8.7 Verifying***

Qualitative research is interactive in nature and the analysis and verification is always a continuous process. As highlighted in chapter four of this thesis, verifying means ascertaining the reliability and validity of the findings generated from the interview (Kvale,

1996). Although Bryman, (2008) notes that reliability, validity and generalisability are linked to different kinds of measures of quality and rigour achieved with certain methodologies, these terms have different meanings in terms of how they evaluate and measure concepts. Reliability and validity have always been essential in studies although there are always debates among researchers.

Weber (1990) notes that validity and reliability are potentially confusing because of different ways they have been used in research. This has often led to several debates. According to Golafshani (2003), reliability is not a single concept; neither is it fixed or a universal concept but depends on a particular research methodology. Stenbacka (2001) also contends that because reliability links to measurements, they have little relevance in qualitative studies. The author argues that reliability is not important in judging the quality of the research. Lincoln and Guba (1985) on the other hand contend that there would be no reliability without validity and that validity is enough to establish reliability.

Despite debate on these concepts, studies have argued that the descriptions between reliability and validity have been used in a similar way when developing criteria for assessing research validity. Studies (Bryman, 2008; Golafshani, 2003; Lincoln and Guba, 1985) have developed ways to assess the quality of research specifically for qualitative studies. These approaches have been considered as alternative measures of reliability and validity. They include credibility, trustworthiness, conformability, dependability, creditability and transferability. While these approaches have been recognised and used in research, the approach featured is reliability and face validity which involves the use of judges and experts to ascertain the appropriateness of the codes and the associated supporting evidence.

#### **4.8.7.1 Reliability**

The purpose of evaluating the quality of any given study is one of the reasons reliability analysis is essential in qualitative studies (Golafshani, 2003). Reliability is referred to as “the consistency of a measure of concept” (Bryman, 2008p.149). Similarly, Golafshani, (2003) considers it as a concept often utilised in testing and evaluating the quality of the research. Krippendorff (2004) described three types of reliability namely: stability, reproducibility and accuracy. Table 4.16 indicates the types of reliability and the degree of their strengths.



Table 4.15 : Types of reliability

<b>Reliably</b>	<b>Design</b>	<b>Causes of disagreement</b>	<b>Strength</b>
Stability	Test-retest	Intra-observer inconsistencies	Weak
Reproducibility	Test-Test	Intra-observer inconsistencies + Intra-observer disagreement	Medium
Accuracy	Test-Standard	Intra-observer inconsistencies + Intra-observer disagreement+ deviation from a standard	Strong

Source, Krippendorff, (2004 p.215)

### **Stability**

Stability refers “to the extent the results of the content classification are invariant over time” (Weber, 1990p.17). This is determined when the same content is coded two or more times by the same coder. According to Krippendorff, (2004), data in this type of reliability is developed through a test-retest condition where an individual does all the rereading, recoding and reanalysis of all the raw information. Under a test and retest condition, inconsistency among coders comprises unreliability and this may be due to ambiguities in the coding rules, complexity in the text, cognitive changes with the person coding the text because one person is doing the coding. Such variation is called intra-observer disagreement and the weakest form of reliability (Krippendorff, 2004). This type of reliability is insufficient as the bases for accepting data as reliable (Krippendorff, 2004).

### **Reproducibility**

Reproducibility which is also called “inter-coder reliability”, “inter-subjectivity agreement and parallel –forms reliability” (Krippendorff, 2004p.215) refers “to the extent to which content classification produces the same results when the same text is coded by more than one coder” (Weber, 1990p.17). Reproducibility requires raw information that is gathered under a test-test condition. Weber (1990) notes that in reproducibility, inconsistency in coding instruments is due to cognitive variations, recording errors, ambiguities in coding instruments used or what Krippendorff called inter-observer and intra-observer differences in the interpretation and comprehension of a given instruction. This type of reliability is considered as the minimum accepted standard. One of the reasons for this is that while stability only measures the consistency of just a single coder in understanding the text, reproducibility measures the consistency of two or more independent coders (Weber, 1990).

As a result reproducibility is by far a stronger measure of reliability compared to stability and is the one featured in this research.

### **Accuracy**

Accuracy refers to the extent to which the text classified is in line with the standards or norms (Krippendorf, 2004). According to Krippendorf (2004), to achieve accuracy implies that data must be gathered under test-standard conditions where comparison from one person is compared against the other data processing procedure. In accuracy, observed differences between coders depend on the intra-observer inconsistency, intra-observer differences and deviation from the norm. Accuracy is regarded as the most powerful of the three types of reliability because it poses something used to assess the performance of the coders for quotes that have been established. However, this type of reliability is not predominantly used by researchers. Weber(1990) notes that many researchers that assess the reliability of their coding end up with practices that are not acceptable. For example, when disagreement exists between the coders, the researchers involved end up inviting a judge, perhaps a senior researcher, to resolve the disagreement. Weber (1990) argues that such judgement might lead to bias toward the opinion of the coders and suggested that reliability of the coding should be calculated before the disagreement is settled. For the purpose of this research, reproducibility is the one featured in this research and the rationale for adopting reproducibility is spelt out below.

### **Types of reliability analysis adopted for the study**

Reproducibility or inter-rater reliability was used in the research because the data coded were nominal. Second, and most importantly, the themes that were coded call for yes or no answers and required a presence or absence judgement by the judges (Boyatzis, 1998). The results of the reliability analysis presented in table 5.8 in chapter 5.

#### **4.8.7.2 Validity**

Validity “refers to issues of whether an indicator (or set of indicators) that is meant to gauge a concept really measures the concept” (Bryman, 2008p.151). While there is always internal and external validity, the internal validity is more appropriate in qualitative research. It allows the researcher to maintain a high level of similarity between what has been observed and the concepts the researcher seeks to investigate. Qualitative analysis has always relied so much on face validity and it is the one featured in this research.

## **4.9 Reflection on methodology**

Reflective writing has become essential to the notion of learning from experiences and a major part of reflective practices. Literature suggests that researchers indulge in reflective writing to contribute to cognitive developments, enable creativity and to contribute to new perspectives on issues investigated. According to Jasper (2005) all of these are essential and expected from a competent researcher. He argued that despite reflective practice being recognised in most qualitative research, the researcher needs to acknowledge it more and more as central to the methodology process and an important part of research methodology. Similarly, Myers and Newman (2007) note that one of the most commonly used tools for data gathering in qualitative research is qualitative interview and researchers have treated it as unproblematic. They argued that the qualitative interview is considered as a fairly simple way to collect data and the problems, difficulty and pitfalls encountered during the research should be accounted for rather than reporting how many interviews were conducted, the number of interviewees and who carried out the interview (Myers and Newman, 2007).

Although reflective writing is not without its criticisms as noted in studies (Jasper, 2005; Taylor, 2003 ; Cotton, 2001), the motive for reflecting on the research study is because reflective practices within the qualitative research process contributes to the trustworthiness of the research and offers the researcher a technique to enhance creativity, critical thinking and strategies in which data collected are analysed with new discovery (Jasper, 2005). Therefore, this section reflects on the problems encountered during the course of this research. More specifically, the reflection mainly focuses on the methodology settings or process and the data analysis process which has already been depicted in chapter 4 and this chapter.

### *4.9.1 Learning from experiences*

It is important to recall that the aim of the research was to understand the dynamic process of emerging ICT adoption in UK service SMEs from a dynamic process perspective. Considering the nature of the researcher in the first place, reviewing and selecting appropriate theory to underpin the research was not a difficult task. A huge number of studies in this area have focused on theories that have considered ICT adoption as a one off practice and these theories were not suitable in reflecting the complexities and dynamic process of ICT adoption. Therefore, reviewing many theories helps in the selection and justification for ANT in this research.

ANT was adopted in this research and the concepts associated with it were deployed to guide the data collection and analysis; determining the appropriateness or the credibility of these concepts involved the preliminary investigation which involved a number of unstructured interviews initially and testing the sample for applicability of the concepts to subsequent raw data. This exercise was a difficult task because it involves all the processes involved in data collection and analysis and verification.

The collection of empirical data and the analysis of the data were also difficult tasks. Observation shows that most people contacted to participate in the interview do not have time because they often engage in the day to day running of their business. This posed a great deal of difficulty in data collection for the study. As a result, data collection for this study took approximately two years to collect. In addition, unlike quantitative study that does not involve transcribing, qualitative research involves transcribing all the interviews verbatim in order to gain a deeper insight and knowledge of the phenomenon. Though this was time consuming, one of the experiences gained from this is that it helps the researcher to document all the processes involved which shows the elements of rigour (credibility) in the research.

While the researcher initially adopted codes from literature and considers the theoretical driven coding principle as important in testing and checking the creditability of the concepts/codes, the literature review suggests that theory development is associated with open coding. Although the concepts from theories provided the starting point for the coding, during the preliminary analysis of the initial set of data, opening coding was adopted where other codes emerged from the raw data. The advantage of this initial data collection was that it helped to identify other issues that the researcher did not consider; the difficulty faced at this stage is to determine the appropriate data analysis technique(s).

Two approaches of the thematic data analysis process (theory driven approach, data divining approach) were initially considered and designed separately; the problem faced here was how to link the two methods together in one process considering the fact codes were derived from theory as well as those that emerged from the empirical data. After a long reflection, thoughts and consultations and advice and guidance from my supervisors, a hybrid approach which is a pathway between the inductive and deductive approach, provided a means to the entire data analysis with the help of NVivo. This unveiled a new lens on how the data for the study was analysed, verified and reported.

## **4.10 Summary**

This chapter examines the research paradigms and methods mostly used in information systems. Although a positivist approach that addresses quantitative issues is a dominant approach in information systems research, this approach is not suitable for the research because it does not explore in-depth, the assessment of emerging phenomena within the real world (Choudrie and Dwivedi, 2005). The analysis in section 4.4 suggests that an interpretive approach that addresses qualitative issues that do not predominantly exist may offer opportunities for the researcher to make unique contributions. This approach provides a rich account of the participants' own experiences. In addition, the stages of the interview process also reveal how the interviews were designed, conducted as well as the approach to data analysis and verification adapted for the study.

# Chapter 5

## Data analysis and presentation of findings

This chapter reports the data analysis and the findings. It illustrates how codes and themes were generated, tested and verified and finally, the findings are presented.

### 5.1 Data analysis process

Figure 5.1 represents the data analysis process. The data analysis approach employed for this study is thematic analysis. More specifically, a hybrid (inductive and deductive) approach was used. This section illustrates in greater detail a step by step approach on how the findings of the research were derived.

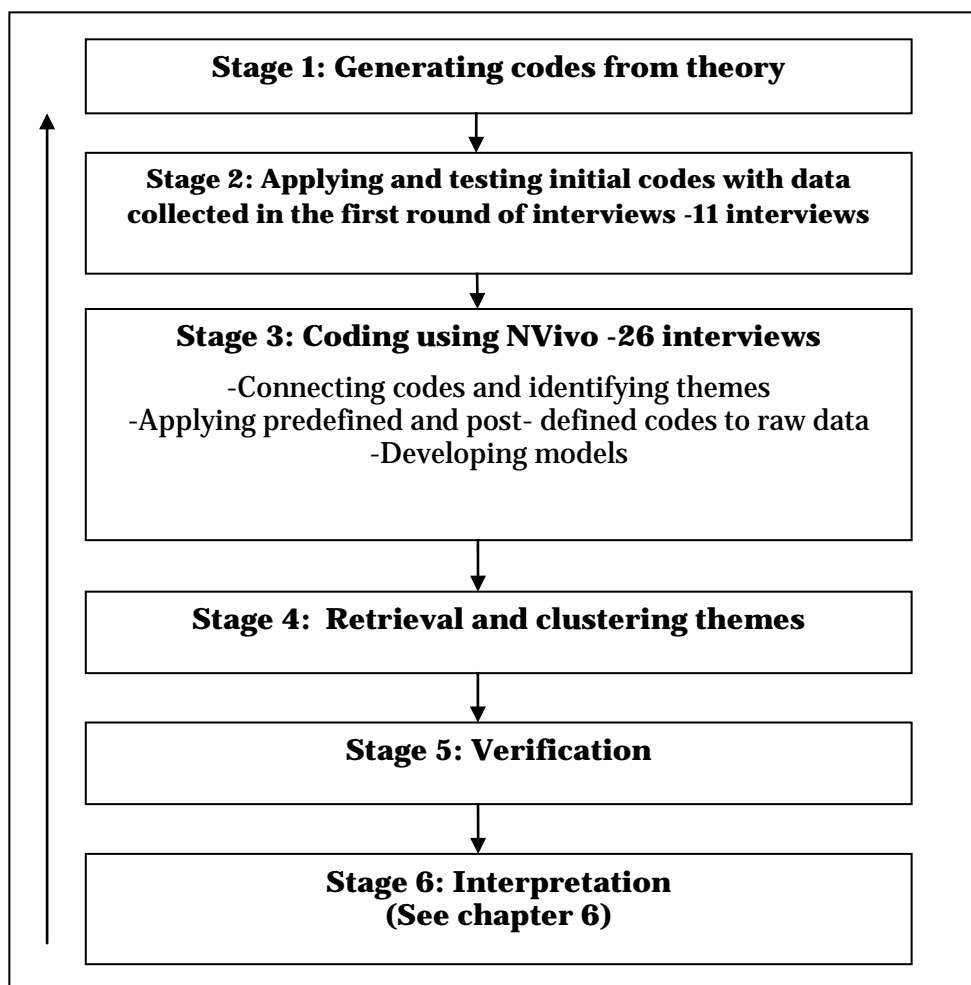


Figure 5.1: Data analysis process

### 5.1.1 Stage 1: Generating codes from theory

The data analysis process is one that involves a partway between inductive and deductive. Therefore, previous theories served as a starting point for interpreting the raw data. The literature review provided an insight on how the theoretical codes (ANT concepts) were derived. An extensive literature review revealed several books and journal articles used various inscription, translation, framing and stabilization and other ANT concepts adopted and used by previous researchers (Callon, 1986; Bijker et al., 1989; Latour, 2011) especially in the areas of IT adoption and development. This research adopted a similar approach.

### 5.1.2 Stage 2: Applying and testing initial codes with data collected in the first round of interviews -11 interviews

Boyatzis (1998) notes that to develop a guiding framework is an important step for determining the applicability of the codes (see appendix 4) to the raw data. Miles and Huberman (1994) also pointed out that whether code is generated from theory or emerged inductively, codes are more accurate when they are defined so that the judges can rate or code the same set of data and outline the difficulties they faced. According to Fereday and Muir-Cochrane (2006) this helps in clarity of definitions and good credibility check.

With reference to studies (Miles and Huberman, 1994; Boyatzis, 1998; Fereday and Muir-Cochrane, 2006), codes were written and identified using (1) code name (2) the definition of what the codes are (3) the description of how to know when the theme associated with each code occurs. These became the basis for categorising the raw data (See table 5.1). The characteristics of all the theoretical codes generated were written in simpler terms for easy applicability to the raw data. The preliminary analysis initially involved a traditional method of analysis which involves the use of long tables cutting, pasting, sorting, arranging and rearranging the data by comparing and contrasting the information (Wong, 2008). Following the preliminary coding process of the first round of interviews, *four* judges were invited to relate the quotes against the categories or the concepts generated. The reliability analysis of four concepts exceeded the 70% benchmark suggested by Miles and Huberman, (1994). The concepts of inscription, translation, framing and stabilization formed the basis for the management of the empirical data (appendix 5) for sample of the initial analysis of the first round of the interviews. It is important to recall that the purpose was to test the applicability of the key ANT concepts selected for this study to a sample of initial raw data and identify the initial set of factors. The outcome helped to put the study into a large context

by identifying the need to investigate the roles of actors. Table 5.1 provides the guiding framework for testing the codes with the entire empirical data collected for the stages of emerging ICT adoption.

**Table 5. 1 General guide for predefined code**

<b>Code name</b>	<b>Definition</b>	<b>Practical guide/ description for coding</b>
<b>Inscription:</b>	-How actors formulate emerging ICT that protects their interests.	<p><b>-Identify why and how the assumptions of the emerging ICT are formulated.</b></p> <ol style="list-style-type: none"> <li>1. This is indicated when a problem or a need for emerging ICT is identified and assessed.</li> <li>2. This is how ideas are defined and specified.</li> </ol>
<b>Translation:</b>	-How various actors seek the interest of others to support their claims or assumptions about the emerging ICT	<p><b>-Identify the practices of actors who assign responsibilities and the consequences of such actions.</b></p> <ol style="list-style-type: none"> <li>1. This is indicated when actors outsource project and delegate roles.</li> <li>2. This is indicated when misunderstanding of interests (conflict)arises</li> <li>3. indicated when consensus (common understanding) among actors is reached.</li> </ol>
<b>Framing:</b>	-How various actors support a certain version of emerging ICT	<p><b>- identify the practices of actors assessing validity.</b></p> <ol style="list-style-type: none"> <li>1. This is indicated when actors claiming validity engage in modification of the product (emerging ICT).</li> <li>2. This is indicated when actors claiming validity involve in product (the emerging ICT) testing or trial</li> </ol>
<b>Stabilisation</b>	-How key actors institutionalised the accepted version of the emerging ICT and why change subsequently occurs.	<p><b>-Identify the practices of actors involved in the implementation and use of the emerging ICT.</b></p> <ol style="list-style-type: none"> <li>1. This is indicated when such activities like training, for the emerging ICT is carried out.</li> <li>2. This is indicated when learning for the emerging ICT occurs.</li> </ol> <p><b>Identify the impact for using emerging ICT to adapt to work processes</b></p> <ol style="list-style-type: none"> <li>1. This is indicated when emerging ICT is used to communicate effectively and makes work easier.</li> </ol> <p><b>-Identify the practices that may lead to redefinition of problems.</b></p> <ol style="list-style-type: none"> <li>1. This is indicated when change occurs.</li> </ol>



While the theoretical driven coding principles are vital to understanding the phenomenon investigated and to help compare the phenomenon, theory development is tightly linked to open coding. Data driven or opening coding is another way raw data can be coded and can be significant to the phenomenon investigated which may not be in any way related to the theoretical driven code. Thus, events were also openly coded as they emerged. It is important to bear in mind that though lots of codes emerged inductively, the post defined codes depicted in tables 5.3 and 5.4 and those presented in the later part of this chapter formed the bases for further analysis and verification (See appendix 6 and appendix 7 for samples of the analysis on the roles of actors and the critical factors).

**Table 5. 2 Guide for post defined codes on factors**

Codes	Definition	Description
1.Awareness of multiple context	This means evaluation of the entire organisation and awareness of the possible outcomes of the emerging ICT.	This is indicated when actors echo evaluation of various aspects of the organisation and the assessments for the possible outcomes of the emerging ICT.
2.Openness to change	This means willingness to try out or accommodate new ideas.	This is indicated when actors echoed open mind as relevant and accommodate other people's views.
4.Shared support	Working together to a common purpose to achieve a shared goal.	This is indicated when actors seek support from others.
5.Safety and Security	This means protection of information, people and property from unanticipated conditions.	This is indicated when actors say security and safety is an important issue for emerging ICT adoption
6.Integration	Capability for the emerging ICT to interface with other applications.	This is indicated when actors maintained integrations or interface of the new ICT with others
7.Expandability	Capability of the emerging ICT to accommodate additional capabilities or capacity.	This is indicated when actors echoed that emerging ICT is important when it is scalable and can accommodate additional capabilities
8.Ease of use	Capacity of the emerging ICT to be simple to use and maintained.	This is indicated when actors mention that emerging ICT is simple or easy to use and maintain.
9.Manegrial Time	This means serving to save time through an efficient means.	This is indicated when emerging ICT saves time
10.Service quality	The capability of the emerging ICT to deliver efficient results.	This is indicated when actors maintained that emerging ICT is proficient, and provides good and fast services,

11.Customer Focus	Providing services that are useful and relevant to existing and potential customers.	This is indicated when actors echoed that emerging ICT are adopted to retain and satisfy customers' needs.
12.Differentiation	Distinguishing a service from competitors which provides a competitive advantage.	This is indicated when actors echoed that emerging ICT is adapted and differentiate their services from others or help them create a niche in the market.
13.Return on investment	A profit generated from an investment.	Indicated when actors echoed that emerging ICT is considered if it shows it generates return on investment, profit or revenue.
14.Competition	This means forces that may hinder the existence of an organization.	This is indicated when echoed that emerging ICT is considered because of fear of being left behind or competition.
15.Cost	This is associated with low price for the acquisition of emerging ICT or assisting in reducing costs.	This is indicated when actors mention that emerging ICT is adopted because of its low costs and also shows it can reduce cost.
16.Business Expansion	This means increase in size and staff strength.	This is indicated when actors echoed that emerging ICT can help the business grow both in size and also in staff strength.

**Table 5. 3 Guide on post defined codes on the roles of actors**

Roles	Definitions
<b>Manager :</b>	
<i>Innovativeness</i>	This means initiating and managing ideas or change.
<i>Empowering</i>	This means encouraging and guiding others.
<i>Controlling</i>	The process of ensuring that the right direction is adhered to.
<i>Monitoring</i>	This means verifying adherence to a particular situation.
<b>Government:</b>	
<i>Collaborative support</i>	This means connecting businesses to other entities that can help them change. An act of working with other entities to improve performance.
<i>Funding</i>	Financial aid given to support a project
<i>Research</i>	This means search for knowledge to help improve business activities. This can come in the form of a conversation that results in a novel idea.
<i>Legislative advice</i>	Advice associated with regulation.
<i>Training</i>	Acquiring knowledge and skills. This can be practical as well as vocational.
<b>Customers:</b>	
<i>Idea generation</i>	This means the development and communication of ideas. This spans from creation.

<i>Product testing</i>	The evaluation and verification.
<i>Product modification</i>	This involves trial and amendment of the new product.
<b>Consultants:</b>	
<i>Requirement gathering and evaluation</i>	This is a process involving specifying the purpose, understanding objectives, background information of the relevant projects and the limitations.
<i>Requirement transformation</i>	This means tailoring requirements to the needs. This may be in the form of developing a design or reference documents.
<b>IT experts :</b>	
<i>Education</i>	Knowledge acquired through skills and experience that is transferred to others.
<i>Design and development</i>	The process of transforming ideas or reference documents into a physical object and may depend on a particular approach
<i>Verification</i>	This means confirming that the technology is in line with the requirements.
<i>Training</i>	Acquiring knowledge and skills. This can be practical as well as vocational.
<b>Vendors:</b>	
<i>ICT adaptation</i>	The act of implementation. Ensuring that the phenomenon meets the organisation arrangement.
<b>Employees:</b>	
<i>Feedback</i>	An appraisal that forms the basis for subsequent development or modification.

### 5.1.3 Stage 3: Coding using NVivo -26 interviews

For easy management of data, all transcripts (26 interviews) after the second round of the interview were imported from a word processor to a new project as a document which constituted an internal and external source in Nvivo. Internal source allowed the researcher the opportunity to divide the folders into subfolders where the unstructured interviews and semi-structured interviews were documented. The external source incorporated other materials that were not brought into the project (see figure 5.2) but were relevant as the data is being interpreted. Figures 5.2 to 5.5 below show the activities performed with NVivo to achieve the task.

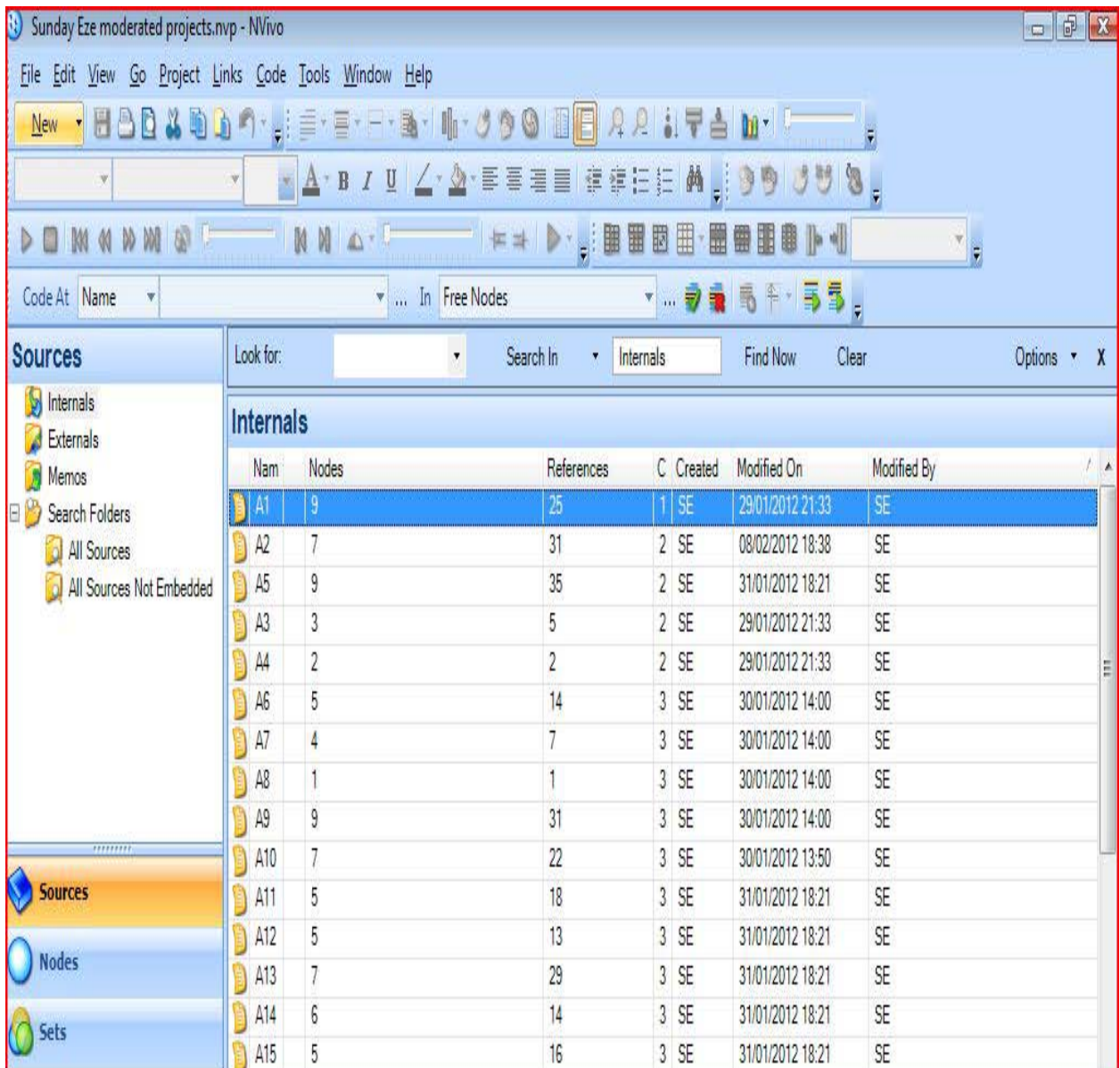


Figure 5.1: Textual data as documents into NVivo

### 5.1.3.1 Applying predefined and post-defined codes to raw data

NVivo provided data management tools that allowed all the results of a query relating to any data stored and to hold all references to the data in each case. In NVivo, codes were entered as nodes and formed the basis for categorising the data. Nodes are defined as containers for categorising the projects, ideas or topics the researcher is interested in (Richards, 2009). This brings together the important data content for reflection. The codes were entered in tree node section (see figure 5.3) which helped in identifying the patterns in the data.

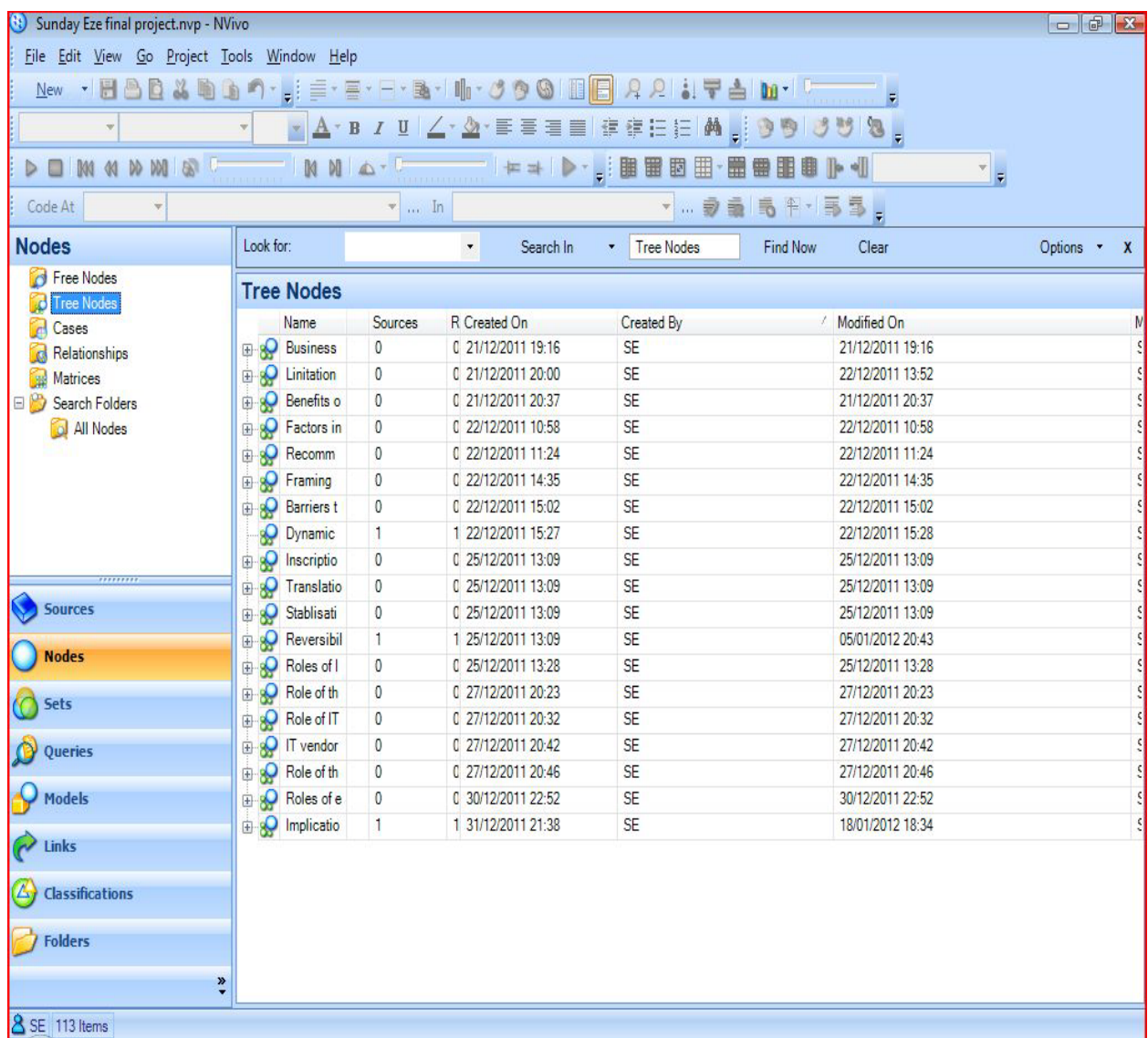


Figure 5.2: Predefined and post-defined codes in NVivo

### 5.1.3.2 Annotation

Annotation was used to encode the raw information. During this exercise codes were allocated to sections of the data that described the new code (Fereday and Muir-Cochrane, 2006). NVivo at this stage provided a quick and easy way of annotating texts (see figure 5.4). Texts were selected from each of the transcripts and linked to code related to them. Tools in NVivo were used to visualise the particular portion of each transcript that has been annotated and coded so that the same piece of data will not be coded twice. Annotations were edited or deleted where new meaning has been assigned to the data.

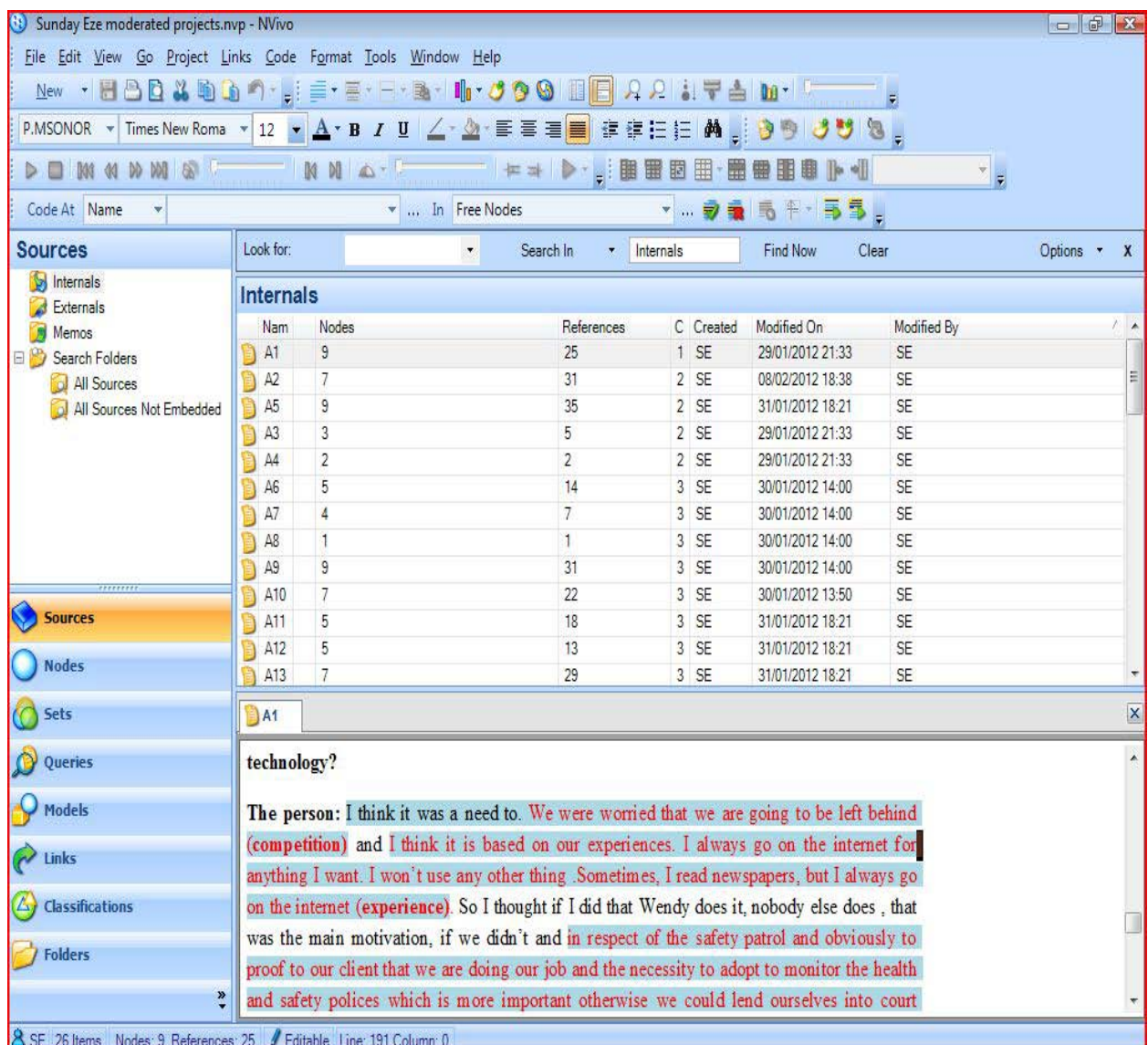


Figure 5.3: Annotating text in NVivo

### 5.1.3.3 Connecting codes and identifying themes

Tree nodes in NVivo were used to merge similar texts with and between cases together. This allowed patterns in the data to cluster together (see figure 5.5). Two important criteria for selecting what part of the transcripts (data) were included as supporting evidence were: if the part of the transcript illustrates either the theoretical or empirical driven categories and when quotes that clearly illustrate the theoretical or empirical categories were used as a representative of each category in a manner that the relationship between the quotes and the codes are recognised easily. With the help of tree nodes in NVivo, quotes extracted from the data were assigned to codes.

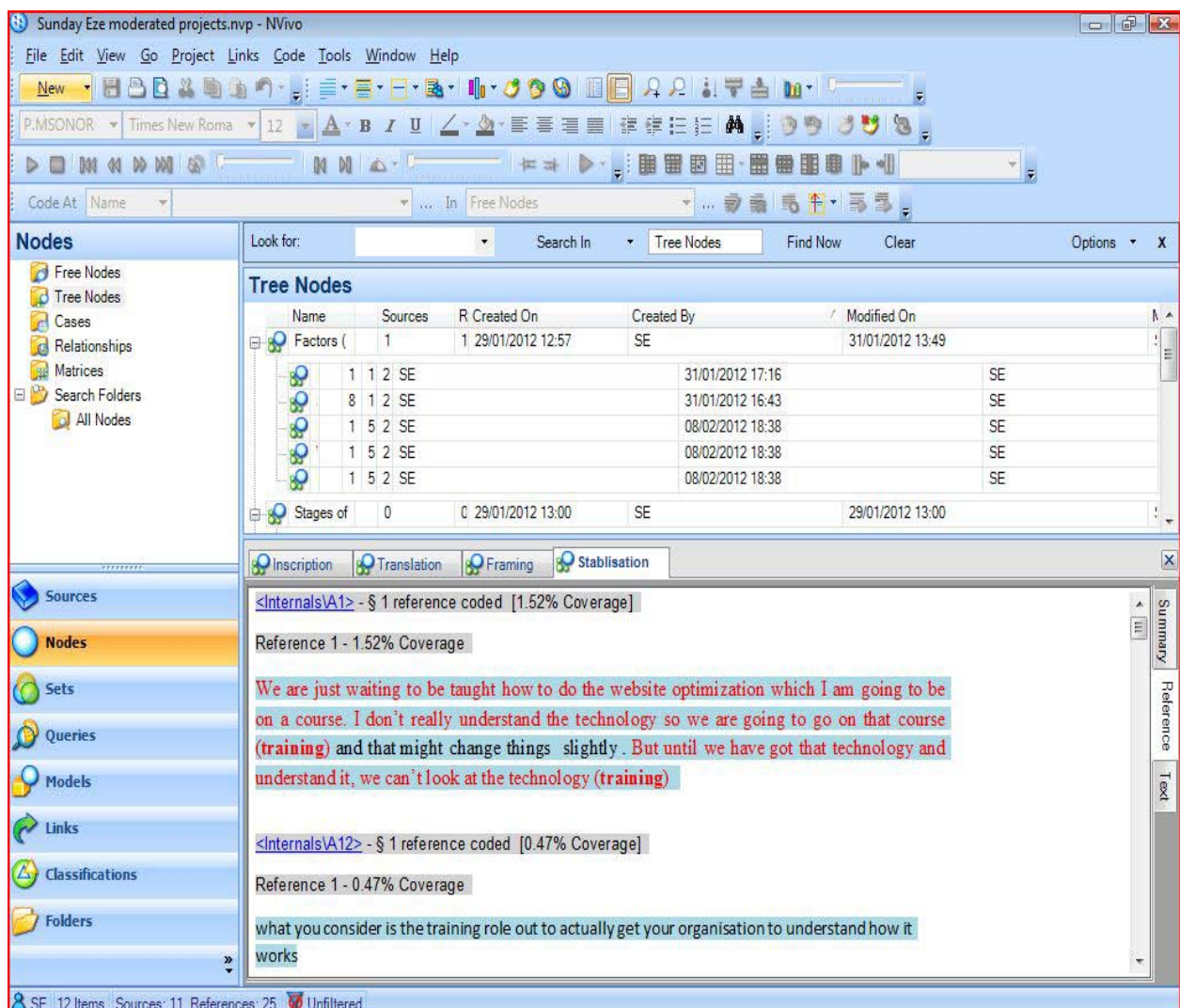


Figure 5.4: Connecting codes and identifying themes

### 5.1.3.4 Developing models

Models or visualisation are important ways to explore the relationships in qualitative interviews. Models consist of icon, document, nodes and attribute and their values. While patterns, associations, concepts were searched, interpretation of data is often guided by visual plots designed in NVivo providing a systematic diagram (models) that helps in the interpretation of data.

Memos generated during coding were linked where necessary to generate a more detailed interpretation of data. Figure 5.6 presents one of the NVIVO models which identified four ANT processes used to inform that research with the supporting cases (interviewees).

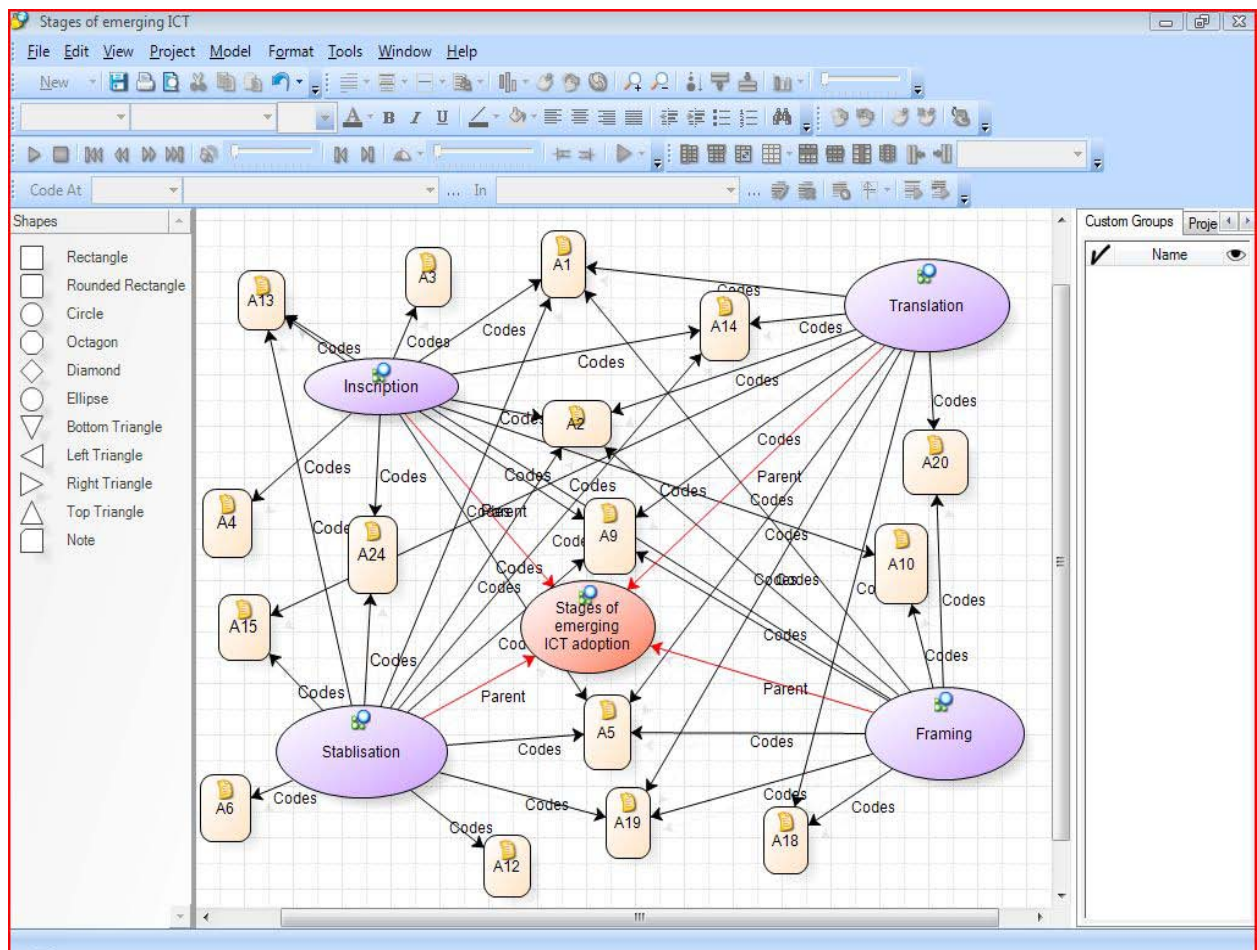


Figure 5.5: NVivo model on emerging ICT adoption



### 5.1.4 Stage 4: Retrieval and clustering of themes

The analysis in this research is based on all the raw data collected for the investigation. This includes the unstructured and the semi-structured interviews, comments on the preliminary interpretations and the pre-understanding of the theoretical concepts that informed the investigation. At this stage all the segments of texts coded were retrieved from NVivo and clustered themes were sorted and organised. Themes that emerged were both *theoretically and empirically clustered* (Boyatzis, 1998).

Figure 5.8 shows the NVivo model for theoretical clustered themes for emerging ICT adoption processes with supporting cases and for easy visualisation (see tables 5.4 to 5.7 below).

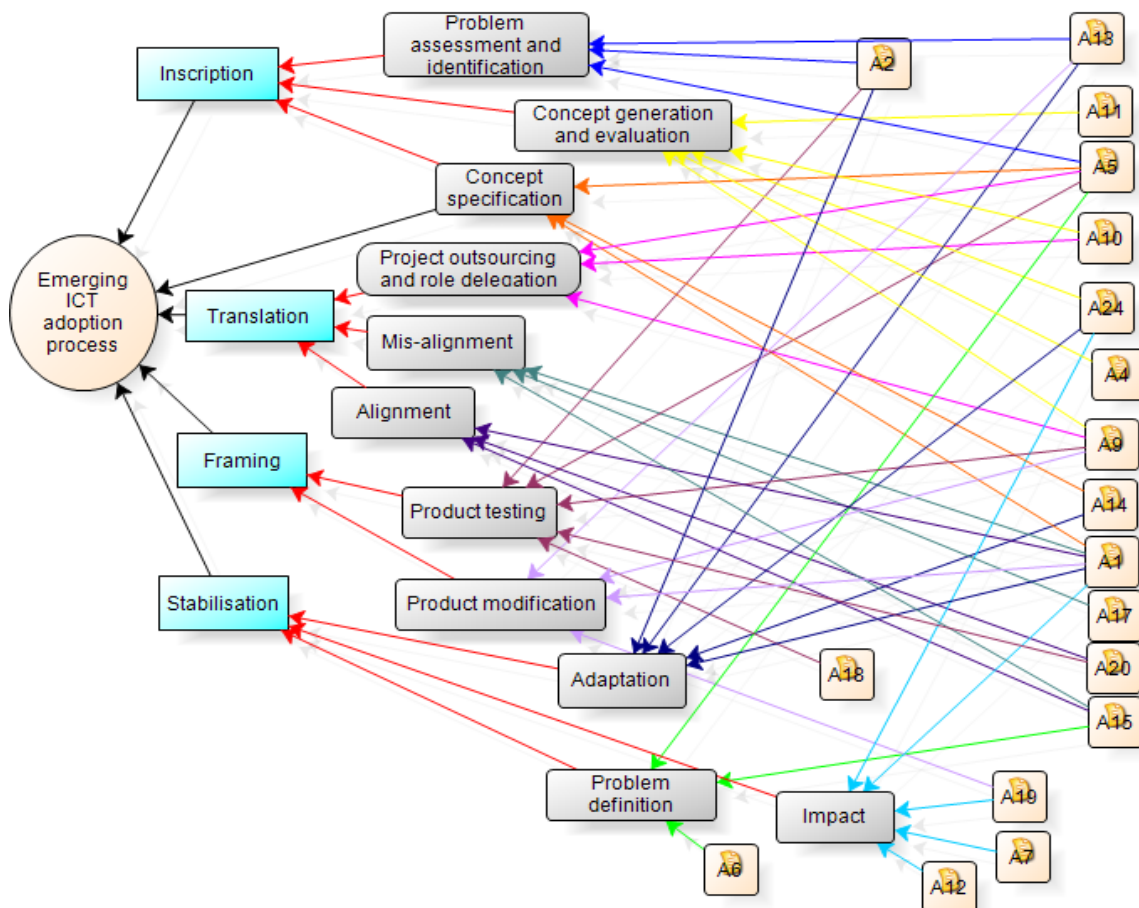


Figure 5.6: NVivo model for clustered themes on emerging ICT adoption stages

**Table 5.4: The key activities of actors at each stage and their associated supporting cases**

<b>Codes /Categories</b>	<b>% of coded sources</b>	<b>Activities of actors</b>	<b>Supporting cases</b>
<b>Inscription</b>	<b>52.09</b>	Problem assessment and identification,	A2, A5, A13
		Concept generation and evaluation,	A4, A9, A10, A11, A24
		Concept specification	A1, A5, A14
<b>Translation</b>	<b>88.19</b>	Project outsourcing and role delegation	A5, A9, A10
		Mis-alignment	A1, A15, A17
		Alignment	A1, A15, A20
<b>Framing</b>	<b>43.42</b>	Product trial/testing	A2, A5, A9, A18, A20
		Product modification	A1, A9, A13, A19
<b>Stabilisation</b>	<b>38.31</b>	Adaptation	A1, A2, A13, A14, A24
		Impacts	A1, A7, A12, A19, A24
		Problem redefinition	A5, A6, A15

The contents of Table 5.4 were extracted from the NVivo model because of the complexity of the models, which were easier to visualise for the key activities of actors, and their associated supporting cases. The category sources reveal that translation represents the highest percentage of coded sources (88.9%) with respect to what actors exert as translation, while stabilisation has the highest number of supporting cases.

**Table 5.5: The roles of actors with supporting cases**

<b>Actors</b>	<b>Roles of actors</b>	<b>Supporting cases</b>
<b>Managers</b>	Innovativeness	A5, A11, A12, A13
	Empowerment	A11, A12, A19
	Monitoring	A11, A14, A19, A24
	Controlling	A13, A15, A19
<b>Government</b>	Collaborative support	A21, A22, A23
	Fund	A21, A22, A23, A24, A25
	Research	A21, A23, A24
	Legislation	A12, A22, A23, A25
	Training	A21, A23, A26
<b>Customers</b>	Idea generation	A11, A12, A13
	Product testing and modification	A5 , A11 A12, A13, A17
<b>Consultants</b>	Requirement gathering and evaluation	A12, A13 A14, A20
	Requirement transformation	A12, A13, A14 ,A5, A18
<b>IT Experts</b>	Education	A15, A18, A23, A25
	Development	A15, A17, A19
	Verification	A15, A17, A18, A20
	Training	A15, A16, A19
<b>Vendor</b>	Product adaptation	A7, A13, A 6
<b>Employees</b>	Feedback on performance	A11, A12, A14,
<b>Emerging ICT</b>	Enhancing business processes	A1,A5,A7,A9,A24

**Table 5.6: Key factors with supporting cases**

<b>Factors</b>	<b>Supporting cases</b>
Awareness of multiple context	A6, A9, A11
Openness to change	A6,A10,A11,A12
Shared support	A1, A10, A14
Safety and security	A1, A9, A14
Integration	A3, A12, A13
Ease of use	A1, A2, A7
Expandability	A3, A5, A13
Managerial time	A3,A5,A6,A9
Service quality	A2, A6, A9, A12, A14,A 24
Customer focus	A5, A10, A11, A13
Differentiation	A5,A12,A15
Return on investment	A2, A5, A9, A12, A22
Competition	A1, A9, A10, A12, A13, A15, A24
Adoption cost	A6, A10, A14, A15
Business expansion	A2,A9,A11,A13

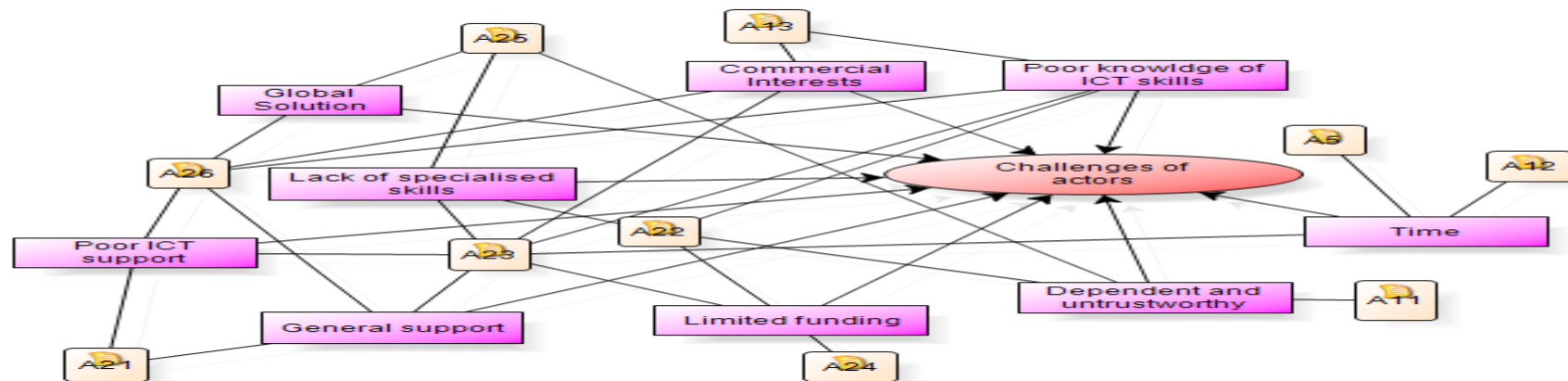


Figure 5.7 : NVivo model associated with challenges confronting actors with supporting cases

**Table 5. 7: Challenges confronting actors with supporting cases**

Actors	Challenges confronting actors	Supporting cases
SME managers	Poor Knowledge of ICT	A13, A22, A23 A26,
	Time	A5, A12, A23
Government	Poor ICT support	A21, A23, A26
	Lack of specialised skills	A22, A23. A25
	Limited funding	A22, A24, A26
	General Support	A21, A22, A23
Consultants	Dependent and untrustworthy	A11, A22, A25
IT Experts	Global solution	A11, A25, A26,
IT Vendor	Commercial interest	A13, A 23, A26

### 5.1.5 Stage 5: Verification

#### 5.1.5.1 Reliability and validity

Table 5.14 below depicts the result of the inter-coder reliability analysis involving percentage agreements (Boyatzis, 1998). The justifications for using reproducibility or “inter-coder reliability analyses are spelt out in chapter 4. The analysis reveals that the percentage agreement for the scope of the study suppressed the 70% benchmark suggested by (Miles and Huberman, 1994). Furthermore, expert validation or face validity involves determining the correspondence between the researcher’s definitions of codes and the associated basic unit of text (quotes) that defines the code/themes. Experts in the field helped to crosscheck the correspondence between the definitions of codes and their associated supporting evidence (see appendix 8, 9 and 10 for inter-rate reliability analysis presented to judges).

**Table 5.8: Reliability analysis**

Major areas of the study	Number of judges	Reliability	
Emerging ICT adoption process	4	0.88(88%)	0.85(85%)
Roles of actors	2	0.78 (78%)	
Critical factors	4	0.84(84%)	0.89(89%)
Challenges confronting actors	2	0.71 (71%)	

## 5.2 Presentation of findings

Tables 5.9, 5.10, 5.11 and 5.12 present themes and a sample of the quotations or supporting evidence.

**Table 5.9: Supporting evidence on emerging ICT adoption process**

<p><b>Inscription:</b> e.g., Problem Assessment and Identification</p>	<p>“looking at the future and ... now looking at the past, the company actually sat down and evaluated their business process, evaluated or reviewed where they hope to evolve into and based on that, try to map that into the current solution they had then and found out that from what they envisaged ... might not be possible for the current solution...to properly handle the companies processes” (A13).</p> <p>“Well, we will normally have a look at several... then someone will be tasked depending on what type of technology and make assessment of them. It could be technology guy, if it sorts of technology thing or it could be operations Guy if is</p>
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	something to do with account... And they will make a recommendation for that product that we use” (A2).
Concept generation and evaluation	<p>“We have a product meeting which includes the business part of the team. They defined the product and then we have a technical team that defined how we are going to reach that goal.” (A4).</p> <p>“If we get a problem, I design it in my head...” (A11).</p>
Concept Specification	<p>We always bring the business intelligencet together, what we call those imaginary aspects into it...like a product development, business case, everything from branding to what it should be called, how it is going to be distributed...” (A5).</p> <p>“The smart patrol is actually built around our specification and that is what we asked for” (A1).</p>
<b>Translation:</b> <b>e.g.,</b> Project outsourcing and role delegation	<p>...So for example, when we have a project on, and we need to let all of our outsource developers know what that project is. We cannot afford to contact them individually, so what we do is that we use online platforms whereby we can upload a particular project, upload the entire requirement and then send ... an alert and our entire consultant can access that and build for the business on online platform. And then we basically can go on with the lowest bid. So that is one example whereby external stakeholders in our business are able to access us and access what is happening without us having to spend the time and the money to go out to them individually”(A5)</p>
Mis-alignment	<p>It is possible that we [IT experts] have introduced issues and misunderstood the users [Key actors] and their requirements” (A17).</p> <p>“... Most times the issues we usually have is that [SMEs]... have a fixed ideal of what they want and I just don’t sell anything, I don’t do what they want me to do. I don’t do that. I take into consideration what is trendy, what is going to move in market and I also take into consideration my mark because that is very important in the sense that is the quality of what I do. So usually, most times we tend to have conflict there.” (A18)</p>
Alignment	<p>From the cost point of view, we want to minimize our cost because obviously we are small organization you know. So obviously there were challenges from the cost point of view and we try to negotiate with them. Well the breaking point you know, we [be] both parties will come together and agree” (A14)</p> <p>the negotiation was not an issue because the director was convinced because I made some reference to other business partners we have worked for, so that they made some enquiry from these businesses and be convinced (A19).</p>
<b>Framing :e.g.,</b> Product Testing	<p>“... after everything is done I test it online and I get five users, I get a wide range of people, I put them in an environment and time them because I know what I am looking for. To know how user friendly it is. I ask a lot of questions. If I found out that... they have issues, I go back to resolve that. But most time I never have these issues more than three times. So I have to call the same people again or use another</p>

	set of people to test it. When completed I now call the client to evaluate the product. If he accepts it is implemented” (A18).
Product Modification	They were kind of putting the module together thinking that is what we wanted and it became quite difficult and does not save us time, and we had to try and say to them, no this is not what we wanted, take some part off, and now is exactly how we wanted it. It took us about 18 months to do” (A1) “... I will bring it in the office and contact my customers in London, they will come and look at it and say that looks smaller, that looks bigger and I will say ok. I will go back to the engineers and say right the process are fine but I will want a few adjustments... then they will make it again. I will go straight back to the customers and everybody is happy” (A10).
<b>Stabilisation:</b> e.g., Adaptation	“We are just waiting to be taught...I am going to be on a course. I don’t really understand the technology so we are going to go on that course and that might change things slightly. But until we have got that technology and understand it, we can’t look at the technology” (A1) “YES staff were trained before they came on the system and then a catch up training was done after going live in case of those that have forgotten one or two things. For us we have always seen training as a continuous process. So staff were trained and continuously trained” (A13).
Impacts	Another thing is obviously all our clients have to use the new internet technology...to get information across to people quickly and we can check if they have got it. Is quite a good communication tool” (A1) ... we have embraced most of these technologies because we are much bigger, we are a big company but we had like 25 people working for us and we were turning over a million. With that size, comes a lot of complications, headaches and now one person... can manage all the task with these technologies” (A7).
Problem redefinition	“...because technology advances with time and because of that every company want to keep up to date with their applications. For that reason you have to keep changing stuff that is one major thing that cannot be compromised” (A15). “When you are an entrepreneur you need be able to do things quickly and fail, not necessary fail but just understand your mistakes and then change them and continue to evolve, you must always have that mentality” (A6).



**Table 5.10: Sample supporting evidence on the roles of actors**

<b>Codes</b>	<b>Supporting evidence</b>
	<b>Managers</b>
<b>Innovativeness</b>	<p>“As a CEO I may have a couple of young graduates and you say to them guys, I have got this business problem go and find me solution. So you would be the innovator deriving ideas through the organisation” (A12)</p> <p>“... the main stakeholder was the MD who was driving the project” (A 13).</p>
<b>Empowerment</b>	<p>“I also have a role through the process which is ... encouraging people with new ideas and new ways of doing things...” ( 13)</p> <p>“It is your responsibility to tell and help them build their business case so that the actual business moves” (A12).</p>
<b>Monitoring</b>	<p>“We [managers] went through you know and if there is any problem or reason, it will be brought to [IT experts] attention” (A 14)</p> <p>“...directors should be more responsible on what is going on in the company...as regards to legislation because they will be paying for an auditor, they pay for the services and knowledge of the auditor to make sure the auditor keeps the financial director aware of not only the current legislation but what is coming down the pipeline” (A 11)</p>
<b>Controlling</b>	<p>“From MD point of view he was controlling from the management point of view, looking at the cost, looking at the value each of the solution will add to the business” (A 13).</p> <p>“Basically as middle party [we]...make sure they install the product which will meet our needs” (A 15).</p>
	<b>Government</b>
<b>Collaborative support</b>	<p>“one of the reasons for our contact with your own university is that we wanted to try to deliver something in partnership with higher education institution that could help some of our small businesses in guiding them through the things they simply don't have”(A23)</p> <p>“We are currently working with UK Trading Investment to see if [small businesses] might exploit linkage externally” (A22)</p>
<b>Funds</b>	<p>“...because of the super fast funding that is coming, we have started to look most specifically, at the IT agenda and the needs of these small businesses--” (A23)</p> <p>“...occasionally we will take forward a project, and seek funding for it” (A25)</p>
<b>Research</b>	<p>“...what [SMEs] don't have is time to invest in the research to find out what is out there that could help them to do their business better [23]</p> <p>“...in my case I will look online, do some research before I see the client and understand what market sector they are in”(A21)</p>
<b>Legislation</b>	<p>“...it can be anything simple as the government changing their tax from17 .5% to 20%.The organisation deals with the fact that it has got to change all its invoicing, the fact that it has got to change all consumer pricing, and change and notify the</p>

	entire organisation that this is already happening. So simple change such as that has a serious knock on impact throughout the whole of the business (A12).
<b>Training</b>	<p>“I guess one of our roles has been and will continue to be with seminal programmes is to make sure that businesses out there know about this programme and can take them on”(A26)</p> <p>“What we are delivering them was training on the internet on computer network, on marketing [and] move on to running a programme called take IT on”(A26)</p>
	<b>Customers</b>
<b>Idea generation</b>	<p>“A lot of organisations would have a chain of customers, so what they have to do is that... they may use these customers to seek for some ideas” (A12).</p> <p>“The user contribution was invaluable because they were looking at it from the perspective of what they wanted to see from the system. They contributed immensely in terms of what we want... from the system” (A13)</p>
<b>Product trial/testing and modification</b>	<p>“We use the customer to trial test the solution... In fact, it would be your testing ground and obviously you may find that the client [is] sort of championing your new technology so he becomes a reference ground” (A 12).</p> <p>“...we are getting the customers involved in the modification of the product” (A 13)</p>
	<b>Consultants</b>
<b>Requirement gathering and evaluation</b>	<p>“As an IT consultant I consider the organisation past and present arrangements. What they have been doing? The kind of systems that is in place, and where they want to go next? This will help understand what system they will actually need” (A 20)</p> <p>“As I said it is the consultant that will become the champion to such process who will now say it makes sense..., evaluation of three or four alternative solutions of an emerging technology” (A 12)</p>
<b>Requirement transformation</b>	<p>“...SMEs do not have the skill set, they may call a consultant to write a business case” (A 12)</p> <p>“We have product analysts and consultants; they transform requirements into design documents...” (A 17).</p>
	<b>IT experts</b>
<b>Education</b>	<p>“I will let them know that there are off the shelf application or will they want me to develop the application from start...So what you have to do is to make them realize that there are various applications to do a particular job. There are different forms of applications...If they are not sure about any application, I have to make them realise the implication of each application that runs in their operating systems.” (15).</p>
<b>Development</b>	<p>“In small business ... the applications that are actually used are codes...by the developers” (A 17)</p> <p>“It depends on the methodology we use...If we decide to go for Ajax methodology; it simply means we have to divide the software into sections” (15).</p>

<b>Verification</b>	<p>If I develop software, sometimes they are not perfect. There are things that are overlooked because these are just minor things meanwhile the person that I am writing the software for will not overlook. So as a software developer I have to test my software ... I have to follow the entire requirement (A 15)</p> <p>“It is possible that we have introduced issues and misunderstood the users and the requirement that we tested against is not exactly what the users want. As a test analyst, you are testing to see that the applications that will be released are according to what is in the design document to the requirement that, that is what the users want... So we test to validate and to verify the requirement (A 17).</p>
<b>Training</b>	<p>“...we have to because those people who play a role in the IT sections have to train our staff on different applications to make sure there are not any problems. There was training given by the people” (A, 15)</p> <p>“in most cases we normally have to train the users, get them fully acquainted (A19).</p>
<b>IT vendors</b>	
<b>Product adaptation</b>	<p>“IT vendors came in to evaluate the systems and map out into their solution... also trying to look at if their product will fit into the solution. So what they did was to come down, get the information, went back to their company, use a copy of the application to replicate how they hope to set the system up in the company after doing that they came back to the site and try to confirm what the set could work and could actually fit into our organisation based on that a couple of changes were made until the company is happy with the system. From there we implemented the solution (A, 13)</p>
<b>Employees</b>	
<b>Feedback on performance</b>	<p>“Well, obviously my employees play a role because they give me feedback where our systems have weaknesses so I can finance it and what more applications we need...” (A 14)</p> <p>“Employees are also important because they are the ones running the system” (A 11)</p>
<b>Emerging ICT</b>	
<b>Enhancing business process</b>	<p>“... We have embraced most of these technologies because we are much bigger, there [are] 25 people working for us and we were turning over a million. With that size, comes a lot of complications, headaches and now one person... can manage all the tasks with these technologies” (A7)</p> <p>“...there are also a lot of advantages basically, going into this IT development infrastructure, you can be able to communicate effectively” (A24)</p>

**Table 5.11: Codes and sample of supporting evidence on key factors**

Codes	Supporting evidence
Awareness of multiple context	<p>“...we have to look at the bigger picture, how that technology is going to help the whole company” (A9).</p> <p>“...we have to evaluate the whole business ... because we just can’t bring in new technology” (A6).</p>
Openness to change	<p>“Lots of the younger people are mostly switched to new technology; they will come to me and say, have you seen ..., what is in the market and we will look into it” (A10).</p> <p>“You know ICT is... like every other thing. If you don’t have the right mind ready for change you are not going to achieve the change. What you need is an open mind?” (A11)</p>
Shared support	<p>“When I got a problem like that, a middle company or a middle man would help, so...I need to talk to somebody that actually specialises in it” (A1)</p> <p>“If there is a need for new technology, it is a joint thing, I won’t be selfish to say no it is not a good idea” (A10)</p>
Safety and security	<p>“If the new technology allows records to be kept for thousands of years, as long as they are maintained” (A14)</p> <p>“...in respect of the safety patrol, obviously is to prove to our client that we are doing our job and the necessity to adopt to monitor the health and safety polices which is more important otherwise we could lend ourselves to court actions” (A1)</p>
Integration	<p>“The companies... wanted to have the system that can combine everything at the same time” (A13)</p> <p>“Is all about how [emerging ICT] actually works with the rest of the other systems in use...how it interfaces with the rest of the product?” (A12).</p>
Ease of use	<p>“As I have said, the new smart patrol is imperative, it works well for us, is quite simple to use...” (A1).</p> <p>“...the new technology is easy to set up and easy to maintain” (A2).</p>
Expandability	<p>“...you know we got like 5 employees now... maybe in a couple of year’s time, we will have 50 employees, is the system scalable? Also are the functionalities and the capabilities scalable?” (A5)</p> <p>“...limitation within the current solution, because to be very sincere with you, while looking for a new solution when you have a solution that does everything you want” (A13)</p>
Managerial time	<p>“If we are going to spend a lot of time here... with the technology we will not adopt it” (A6)</p> <p>“... how much time do you need to read and understand? If everything follows a certain pattern, then it is much easier, but if the technology is totally different, it is another learning curve” (A3).</p>

Service quality	<p>“...you want to look at the quality of services you’re providing for people and this is driving the need for IT...” (A24)</p> <p>“The whole purpose of getting down this journey is for a reason: it is actually to improve your process and delivery” (A9)</p>
Customer focus	<p>“...the [technology] is actually quite expensive but we felt that it was worth us doing it in order to keep our clients...” (A5)</p> <p>“the main factor that is driving change for us is more or less meeting customer’s need” (A13)</p>
Differentiation	<p>“... Where the emerging technology can help.... differentiate against your competitors,” (A12)</p> <p>“If people see a phone using android, they will say it is a quality product. People believe it is a quality product. So differentiation makes a lot of difference as well” (A15)</p>
Return on investment	<p>“Is not just lack the resources, is return on investment. If anybody who invests £10,000 in something, as long as they will have £15,000 in return. Can demonstrate in 3 or 4 years you can make your money back easy” (A22)</p> <p>“I think for us to try and sum it up in one word, will be revenue” (A5)</p>
Competition	<p>“... if you are small medium enterprise, your competitors come out and say... we are doing it this way and there is a new technology that will help us. Then, I will look at that and add competition” (A12)</p> <p>“We are quite keen to know if there is anything that can actually fit into meeting competition out there” (A13)</p>
Adoption cost	<p>I feel the first time to develop student box...is the cost efficiency of the product”(A6)</p> <p>“Money goes a long way and is the reason companies change applications. Some applications are much more expensive to maintain”(A15)</p> <p>“But I don’t think there is anything wrong with new technology. Anything that can help the business run better and easier is fine by me if it is not too expensive” (A)</p>
Business expansion	<p>“Obviously as the company gets bigger...It becomes a bigger issue to adopt new technology” (A2)</p> <p>“One reason why we look at change is because we are growing ... changing from a one man band to 50 employees” (A11)</p>

**Table 5. 12: Codes and sample of supporting evidence on challenges associated with actors**

<b>Codes</b>	<b>Supporting evidence</b>
	<b>SME Managers</b>
<b>Poor Knowledge of ICT</b>	<p>“Say from start up businesses, some people don’t know what they want to do. There will be some people who have an idea but don’t really know how to progress it” (A22).</p> <p>I use educative buyers because the difficulty is, if you don’t know what you don’t, know, it is quite hard to make good buying decisions” (A26)</p>
<b>Time</b>	<p>“SMEs are constantly short on time, often decisions will be made by one or two senior people, (often the owners), who will be attempting to manage a business short on resources and, most likely cash. This creates a very different decision making environment to the norm” (A12)</p> <p>“...businesses just simply don’t have the time and knowledge; they are so busy getting on in running their business on day to day bases” (A23)</p> <p>“Time was a challenge... ”(A5)</p>
	<b>Government</b>
<b>Poor ICT support</b>	<p>“we are not really sitting down and working with them in terms of moving their business forward or all of the things you should consider doing, these are the areas you should be looking out, this is how you can move the business forward in this way. Is up to them to take that on board and put it into action” (A21)</p> <p>“...basically through the IT centre we deliver UK online for business programme and we choose what we want to deliver” (A26)</p>
<b>Lack of specialised skills</b>	<p>“Am not sure, I have enough knowledge of the extent which businesses are taking on or not taking on IT that could benefit them (A25)</p> <p>“--as to my involvement with the ICT project, am having to learn about broadband and ICT things. So they are all new to me” (A23).</p>
<b>Limited funding</b>	<p>“From a local authority’s point of view, one of my dilemmas is that funding is always going to be an issue” (A24).</p> <p>“we will constantly get criticism. I think from people that want to start up businesses and we don’t give them the financial support to help them start up” Particularly in the local authority in the current climate where budgets are very tight”(A26).</p>
<b>General support</b>	<p>“In the past, the ways we provide support tend to be general start-ups and grow on to business support. Within our department we would not have the specific knowledge” (A23).</p> <p>“We are not trying to promote a particular service and they are not trying to promote any particular philosophy” (A21).</p>
	<b>IT consultants</b>
<b>Dependent</b>	<p>“Well I think in the commercial world out there, those things inevitably happen in</p>

<b>and untrustworthy</b>	every sector. You know where there is a consultant, there will be recommendations and where there is a recommendation there is usually a relationship with the provider” (A 23). “... it also has to be trust [on] the quality of the advice you are getting” (A23)
	<b>IT experts</b>
<b>Global solution</b>	What [IT experts] are going to do is global solution” (A26) “It is going to be more difficult to get specific work done on supporting businesses with IT” (A25).
	<b>IT vendors</b>
<b>Commercial interests</b>	“One of the problems I have is the supply side of the industry, the guys that actually provide solutions; they are not really independent or impartial. They tend to sell a solution” (A26). “I can see businesses wary of the advice they [IT vendors] have been given, are independent with their interest in mind” (A25).

### 5.3 Summary

This chapter presented the hybrid approach as a technique used for the data analysis. This approach shows step by step how the analysis was conducted and validated and the findings with associated supporting evidence. The interpretations of the findings presented in this chapter are reported in the next chapter.

# Chapter 6

## Discussion

This chapter reports on the findings and discussions. It examines the activities that lead to the dynamic process of emerging ICT adoption, the roles of actors, the key factors influencing emerging ICT adoption and diffusion and the challenges confronting actors and establishes the conceptual framework. Finally, it discusses the findings and highlights the key recommendations for the actors.

### 6.1 Examining emerging ICT adoption process

The development and adoption of emerging ICT involves a number of processes because of its complex and unpredictable nature. Therefore, to understand how the “key actor” (small business managers) influence and are being challenged in the process, efforts were made to understand the situations that shaped the entire process; otherwise, it was feared, deep insights about the interactive process involving the conflicting forces characterised by the continuous change process will not be gained.

Ten themes associated with the four codes (ANT concepts) that formed the basis for the analysis emerged. Inscription relates to the themes: “problem assessment and identification”, “concept generation and evaluation”, “concept specification”. Translation relates to “project outsourcing and role delegation”, “misalignment and alignment”. Framing is linked to “product trial and product modification” while stabilisation relates to “adaptation”, “impact” and “redefinition of problems”. The quotations in table 5.9 of chapter 5 depict samples of supporting evidence. The quotations provide a rich qualitative and informative account of participants’ experiences, and aid the understanding of the multiplicity of actors in the process.

#### 6.1.1 *Inscription stage*

##### **Problem assessment and evaluation**

Emerging ICT often materialises as a result of current needs from the key organisation actors. The key actor or competing actor is used interchangeably throughout the interpretations with SME managers because they represent their views. The findings suggest



that the need for new ICT in most SMEs is linked to a number of reasons. First, the existing ICT in use may not be meeting small business manager's current business needs or the need for future growth. According to participants:

"looking at the future projections and ...now looking at the past, the company actually sat down and evaluated their business process, evaluated or reviewed where they hope to evolve into and based on that, try to map that into the current solution... and found that what is envisaged, ... might not be possible for the current solution...to properly handle the companies' processes" (A13).

"Well, we will normally have a look at several..., then someone will be tasked depending on what type of technology and make assessment of them. It could be the technology guy; if it is sort of technology thing or it could be operations guy if it is something to do with account... And they will make a recommendation for that product that we use" (A2).

This statement attests that the activities in most SMEs will vary; however, managers that are innovative in nature and have an interdisciplinary team with varying background, skills, and viewpoints may be included in the problem assessment and identification:

### **Concept generation and evaluation**

In addition to problem assessment and evaluation, participants comment that to adopt emerging ICT requires generating, defining and evaluating the concepts. This issue was highlighted across cases:

"...what we do here...is to come up with a new service that we can introduce. Now... is more of a concept. So... what ideas or concepts can we come out with, that can help introduce a new type of service? So, we come up with a concept and the requirements, then we generate the ideas, we evaluate the ideas and then plan the project" (A5).

"If we get a problem, I design it in my head, I will turn to the IT company with a little sketch and tell them this is what I got to do"(A11).

"We have a product meeting which includes the business part of the team. They defined the product and then we have a technical team that defines how we are

going to reach that goal... and in other meetings, we discuss other external parties we want to use” (A4).

While the patterns of concept generation may slightly differ from one business to another, evidence suggests that the reason the key actor engages in concept generation is to create services or products that are unique and can differentiate them from their competitors.

### **Concept specification**

The core activity identified from the interview transcripts is that, during concept specification, most of the key actors tend to outline or summarise the basic specification of the intended ICT. This was echoed by participants:

“We always bring the business intelligence together, what we call those imaginary aspects into it...like a product development, business case, everything from branding to what it should be called, how it is going to be distributed...” (A5).

“The smart patrol is actually built around our specification and that is what we asked for” (A1).

These suggest that the key actor at the inscription stage may be at the forefront of initiating the need for emerging ICT. However, it is worth mentioning that businesses that are open and innovative to some degree always involve internal and external actors. For example, evidence points out those lead customers remain an integral part of concept specification. As such, the key actors try to maintain a balance between what they wanted in the new ICT and what their clients are requesting. Therefore, it is worth noting that at this stage key actor’s decision, interests and assumptions about new ICT may not only be defined solely on their experiences, or what their beliefs and norms are, but may also be significantly influenced or even challenged by a number of internal and most especially external actors.

#### *6.1.2 Translation stage*

### **Project outsourcing/role delegation**

The finding suggests that there are two crucial decisions the key actor often considers when the intended ICT is specified. The first is the decision to build ICT in-house and secondly, the

decision to outsource the ICT. Participants echoed that the key actors that have the financial capabilities may consider building the application in-house; however, in most cases, key actors end up outsourcing ICT projects: this was perceived across cases:

“When you have got a problem like that, a middle company or a middle man would help you because I am not sure what I wanted. So I need to talk to somebody that actually specialises in it, so he can sort my brand...they would know because I can't do that myself” (A10).

“Yes because as I always say that the technical knowledge is new to me except operating this keyboard etc. Of course, if there is any special area, we have to consult all the relevant people who know the technology and that will put the system right” (A14).

Problem assessment, concept generation and evaluation and concept specification, are often strengthened as soon as various actors are integrated and roles delegated to them. Some participants note that:

“... being a small business, as I said, we have a company made up of two co-founders, two directors and then 5 employees. However, we have about 35 different outsource partners. Some of them are based in the... We have some in Canada, West Africa and all over the place. And as I have said we need them to be able to keep up to date with company policies, the way we do business and things like that. So that is one example whereby external stakeholders in our business are able to access us and access what is happening without us having to spend the time and the money to go out to them individually” (A5).

“We [SME managers] choose some companies ... that we like and we phone them up and arrange what we need. Then if they say ok ... then we go ahead. Basically, we give them [other actors] parameters. We say we need these things so if they can do this, is up to them according to our company ...” (A9).

The finding reveals that the key actor in most cases is better at outsourcing ICT projects. The reason being that ICT rapidly changes and because of their limited resources, employing IT staff with up to date knowledge or maintaining existing staff often appears to be expensive.

## **Misalignment and alignment of interest**

One of the problems that also shape the activities at the transcription stage is the differences that arise from and among different actors when roles are delegated. The finding suggests that the key actor believes the consultants so much. They often think that they are proactive and trustworthy to provide them with the right information to make informed decisions. As a result, they try to impose such ideas on IT experts. The study reveals that this results in a number of disagreements which occur in different ways: First, as highlighted:

“... most times the issue we usually have is that [SMEs]... have a fixed idea of what they want and I just don't sell anything, I don't do what they want me to do. I don't do that. I take into consideration what is trendy, what is going to move the market and I also take into consideration my mark because that is very important in the sense that it is the quality of what I do. So usually, most times we tend to have conflict there.” (A18).

Second, it was noted that the key actor may also try to impose to IT experts, in most cases, what has not been agreed from the outset.

“...because sometimes the client comes with different things which has not been discussed previously. Therefore, during ...negotiation the project continues or ends here” (A20).

Third the views of various actors may vary as noted by one of the participants:

“In respect of the smart patrol, it was very new and people who did it for us were IT specialists. They find it easy to work out, but their perception of what we wanted was different” (A1).

Fourth, controversy also arises not just because various actors such as the consultants, IT experts, vendors are interested in fulfilling the needs of the key actor rather, what most of them are after is what they can gain commercially from the project as highlighted:

“Those ICT providers both hardware and software are looking to make money” (A23).

Fifth, evidence suggests that conflict of interest also arises especially on contract price:

“From the cost point of view, we want to minimise our cost because obviously we are a small organisation.... So obviously, there were challenges from the cost point of view and we try to negotiate with them” (A14).

There are implications to these outcomes. First the study suggests that the tendency that the project would succeed to the next stage is something that is uncertain. Evidence also suggests that the key actor depending on the organisation may ignore the initial experts, and re-consider for new experts that may adhere to their interests, values and norms where such conflicts are continuous:

“...we pay IT people to provide the service, and if they cannot give us the service, we invite other companies as simple as that” (A9).

Second, the majority of the key actors in most cases, were not clear on how they intend to achieve their ICT adoption goals which involve going back to re-evaluate the decisions made at the early stage, to reassess what might best meet their needs. This is carried out when other actors such as IT experts challenge their decisions and re- educate them on what might satisfy their needs:

“What [SMEs] see is a finished product but they don't understand what is happening at the back end. Most times we have conflict...I know most times how we try to resolve problems when it comes to negotiation... We tell them that there is going to be a mark of quality in your work and we try to make them see the need to go the extra mile” (A18).

The negotiation between the key actor and other experts at this stage is unpredictable and would be successful where there is an agreement between the key actor and others in the process. Evidence suggests that this stage is one of the most challenging stages and takes a lot of time to overcome.

### 6.1.3 *Framing Stage*

The activities within the framing stage include product trial and product modification. The study suggests that the stage was challenging not because ideas generated at the early stages are not evaluated, but at this stage, these ideas may be transformed and a considerable amount of resources are committed for the emerging ICT.

## **Product trial/testing**

It was widely perceived that acceptance of the new ICT is evident where all the features and functionalities of a technology become part of the key actor's standards. The findings revealed a number of activities various actors engaged with, to ensure that the emerging ICT is accepted. According to an IT expert:

“... after everything is done, I test it online and I get five users, I get a wide range of people, I put them in an environment and time them because I know what I am looking for. To know how user friendly it is. I ask a lot of questions. If I found out that... they have issues, I go back to resolve that. But most times, I never had these issues more than three times. So I have to call the same people again or use another set of people to test it. When completed, I now call the client to evaluate the product. If he accepts it, is implemented” (A18).

From key actors:

“...what we do is for example, with the CRM System, [is] we try them internally, basically it is just one person, myself, and we also try it with three of our clients externally” (A5).

Similar statements were also echoed by participant (A9)

It is worth pointing out that the organisational structure and culture exhibited by any category of SMEs may significantly affect the extent the evaluation exercise takes. Organisations that are open may require several other actors in the evaluation exercise:

“Yes....somebody does try and come up and say I think this is good for this reason, and then we decide. If we decide to go ahead with it, then we will send either one person or 2 or 3 people if more people are required to get the technology out” (A2).

This suggests that there is a significant amount of input from integrating various other actors who take part in the validation exercise.

## **Product modification**

Participants note that although emerging ICT is evaluated, it may not always be up to the standard envisaged and therefore, requires adjustment. Evidence shows that emerging ICT standards are not always achieved initially as highlighted by participants:

“... the solutions have been developed which is the solution by SAPs... However, when we identify our interests and selected that as the final product, it involved some customization” (A13).

“It may not be the eye in which you are seeing the work that your client [key actor] perceives the application. He may not like the kind of images you displayed. But you are the expert, and you did it the way it is supposed to be. So if he rejects it, he might have some ideas or blueprint and you do redesign the product” (A19).

In product modification, a number of key actors and others are involved in the process:

“... I will bring it in the office and contact my customers in London, they will come and look at it and say that looks smaller, that looks bigger. I will say ok, go back to the engineers and say right, the process is fine but I will want a few adjustments..., then they will make it again. I will go straight back to the customers [until] everybody is happy” (A10).

There are constant challenges and movement of actors during the testing and modification process. This leads to design interest revisited which involves further negotiation or reconfiguration (adjustments). The evidence above suggests that customers not only take part in idea generation but may significantly influence the key actor's decisions at this stage.

### **6.1.4 *Stabilisation Stage***

#### **Adaptation**

New ICT may not adequately adapt to organisational arrangements when introduced and may affect the way the organisation operates. It was revealed that in most cases the majority of the key actors do not include most of their employees in the adoption decision making

process, neither do they encourage their ideas nor recognise their initiatives as echoed by the participants:

“As the operations manager, in that case, I don’t need to ask the employees, I am in a position to make that decision because I know what will benefit the business.” (A9).

The outcome of this is that employees in most cases are dissatisfied with the new ICT. This in most cases leads to resistance from switching from the old ICT to the newly introduced ones especially where the new ICT is not meeting employees’ needs as highlighted:

“...another challenge was staff... resistance” (13).

Aligning various actors according to participants requires learning. Training was widely perceived by participants as applicable in order to handle the situation so that everybody can understand the new ICT at the same level and interact together. This was widely perceived.

“When you implement the program, there needs to be training, adequate training and on-going support as well, until people feel confident” (A24).

“Every day new changes come... and sometimes we are a bit behind learning the skills ...” (A14).

“We are 25 people now, I think it is manageable but as more people come on board, we will have... more formalised training” (A2).

## **Impacts**

The impact of the new technology application is felt by the key actor when the new system becomes adaptable to both past and present organisation plans, and influences the roles of actors who inscribe their belief and assumptions on it. This assertion was noted by a participant:

“... We have embraced most of these technologies because we are much bigger, there [are] 25 people working for us and we were turning over a million. With that size comes a lot of complications, headaches, and now one person... can manage all the tasks with these technologies” (A7).



Participants also pointed out effective communication as another impact:

“Another thing is obviously all our clients have to use the new internet technology...to get information across to people quickly and we can check if they have got it. It is quite a good communication tool” (A1).

“...there are also a lot of advantages. Basically going into this IT development infrastructure, you are able to communicate effectively” (A24).

These impacts not only shape the roles of the key actor, but to a large extent improve existing and new business processes.

### **Problem redefinition**

Participants widely perceived that emerging technology advances and for businesses to continue to evolve, there is a need to adapt continually to meet the changing needs of the environment. This was an issue raised by a number of participants:

“When you are an entrepreneur you need to be able to do things that quickly fail, not necessary fail, but just understand your mistakes and then change them and continue to evolve. You must always have that mentality.”(A6).

“We need to move on with new technology, we just can't use the same old method or process. We need to move ahead to stay in business. If we don't use it, we can fall short or are unable to be at the level where other companies are” (A9).

The outcome in most cases trigger managers to reconsider their emerging ICT adoption decisions and re-evaluate the entire adoption process. This assertion was supported:

“... we already started looking for the other technology probably because there are other things that are better...I am looking at the next evolvement of the whole process really” (A1).

The statement attests that adoption of ICT is an ongoing process. It evolves and may require modifications or adding extended applications to previous applications or developing and implementing new ones to meet the organisation's need over time. The findings also reveal

that integrating others in the emerging ICT adoption process may help the key actor to build and implement ICT capabilities that are unique from others.

## **6.2 Identification of actors and their roles**

This section presents the roles the key actor, government, customers, consultants, IT experts, vendors and employees play as decisions to adopt are made and challenged along the adoption process. The sample quotations in table 5.16 in chapter 5 also represent some sample supporting evidence that provide a qualitative account of actors' roles.

### *6.2.1 SME managers as the key actor*

#### **Innovativeness**

However, as previously pointed out by participants it is the key actors that are innovative that often introduced ideas into the business. As highlighted:

“As a CEO I may have a couple of young graduates and you say to them guys, I have got this business problem go and find me a solution. So you will be the innovator deriving ideas through the organisation” (A12).

“... the main stakeholder was the MD who was driving the project” (A 13).

Participants note that actors generating the idea must not be discouraged in any way otherwise ideas will stop coming through. As noted:

“... you have to manage the situation to the effect that you want your team to continually come with new plans/suggestions new ways of moving things forward ... what you can't do is to say that this is a bad idea otherwise ideas stop coming through” (A 12).

This function is carried out primarily by the key actor that respects the opinion of others or encourages autonomy. Most ICT may be originating from small business managers, however, the nature, and the social development of SMEs may hinder them from advancing the innovation. This was a comment made by one of the actors:

“... all of the new innovations are actually starting at SME level. They started in a small company whether it is an individual entrepreneur or small business that needs to identify a new way of doing things simply because small businesses do not have the money and resources of big companies” (A5).

## **Empowerment**

Another role key actors pointed out was empowerment. Innovative managers do not only initiate ICT adoption, but guide and encourage others to ensure that the right strategy is in place. It was perceived that the development of a business case is always necessary when a significant number of ideas and propositions have been made and accepted. Participants note that it was the responsibility of the managers to direct and teach others to develop their business models:

“I also have a role through the process which is mentoring guiding role which will be encouraging people with new ideas and new ways of doing things...It is [my] responsibility to tell and help them build their business case so that the actual business moves” (A12).

“...your client [the manager] is the master so he will be telling you what he wants” (A19).

Empowerment was also extended externally as noted by a key actor:

“If you want [your customers] to do something you need to give them reasons why they should do it. If those customers know why you are doing it, they would engage more. If the customer knows that the project will benefit them they will be happy to be engaged with you more” (A 11).

This statement attests that the key actor does play a role of encouraging both internal and external actors where necessary. It is necessary to re-emphasise that this activity may be limited to the key actor that is innovative. This is made possible where the key actor has gained varied intelligent information; they learn from such information in order to overcome the failure of emerging ICT.

## **Monitoring**

Third, monitoring was another role echoed by participants. The purpose of monitoring is to ensure that the right directions as to what the intended ICT should be are adhered to. From a key actor's point of view:

“We [managers] went through you know and if there is any problem or reason, it will be brought to [IT experts] attention” (A 14).

From an IT expert's point of view:

“Yes, because your client [Manager] is the master, so he will be telling you what he wants” (A19).

Monitoring was necessary because the key actors in most cases were responsible for overseeing and ensuring that the emerging ICT is implemented. In addition, they also account for the overall activities of the organisation:

“...Directors should be more responsible on what is going on in the company...as regards to legislation because they will be paying for an auditor, pay for the services and knowledge of the auditor to make sure the auditor keeps the financial director aware of not only the current legislation but what is coming down the pipeline” (A 11).

## **Controlling**

Controlling was a role perceived by the key actor as a way of setting standards for the new ICT. This involves evaluating the performance, and taking corrective measures as well as evaluating the cost and values the new ICT may add to the business. As pointed out by participants:

“From an MD point of view he was controlling from the management point of view, looking at the cost, looking at the value each solution will add to the business” (A 13).

“Basically as a middle party [we] ...make sure they install the product which will meet our needs” (A 15).

Participants also note that customers directly or indirectly contribute to this role.

“...it is done together with the client. ... If I am not going to the direction of what he wants, I can change it” (A 19).

The key actor seems to involve at every stage of the adoption and/or development process. However, the degree of involvement often depends on the situations.

## 6.2.2 *Government*

### **Collaborative support**

There are a number of roles that governments play to support the activities of small businesses in the UK regarding adoption of ICT. One of these roles is what this research has identified as collaborative support. The finding suggests that the government supports key actors by connecting or linking them to others organisations with the right skills to help them make an informed evaluation exercise. Some of the comments made to support this assertion are highlighted:

“We are currently working with UK Trading Investment to see if [small businesses] might exploit linkage externally” (A22).

“We have a specialized staff team who works with partners such as Job Centre Plus, and some of the Enterprise Agencies in terms of organisation of people that want to start their own business” (A21).

“one of the reasons for our contact with your own university is that we wanted to try to deliver something in partnership with a higher education institution that could help some of our small businesses and guide them through the things they simply don't have or know” (A23).

### **Funding**

Governments not only assist small businesses in ICT initiatives but provide funding to these businesses. One of the participants noted that, in some cases, governments will contact some local authorities particularly where there is either high poverty or high unemployment level and provide additional money to help people start up in that area as noted:

“.. in the past we have contributed finance to ensure that provision here” (A24).

“Over the last 2 or 3 years, central government has been doing some activities. They have been funding all these activities, and they will do different types of things, doing web work, internet, and stuff like that developing lots of things” (A22).

“--because of the super fast funding that is coming in, we have started to look most specifically, at the IT agenda and the need of these small businesses--” (A23).

## **Research**

Small businesses lack the skills required to understand the ICT they intend to adopt. The findings suggest that research was a role government and most of its agencies play to support these businesses. Participants across cases note:

“...what [SMEs] don't have is time to invest in research to find out what is out there that could help them to do their business better [23].

“...in my case I will look online, do some research before I see the client[key actors] and understand what market sector they are in”(A21).

“Where they want to have information or benchmark survey or they want to do some desk top research about their market or customers, we can provide that” (A24).

The essence of this role is to promote and keep SMEs up to date regarding competitors, potential customers, new product lines such as new ICT and the potential market they may need to diversify in order to move their business forward.

## **Legislation**

In countries like the UK, regulation often comes with much information, which businesses are required to know. The study suggests that there might be changes in central government, changes in local government which businesses are required to be aware off. Such regulation may impact on small businesses negatively. As noted, this:

“... can be anything simple as the government changing their tax from 17.5% to 20%. The organisation deals with the fact that it has got to change all its invoicing, change all consumer pricing, and the fact that he has got to change and notify his entire organisation that this is already happening. So simple change such as that has a serious... impact throughout the whole of the business (A12).

This suggests that it is the responsibility of the government to ensure that businesses are aware of such changes. Some of the comments made by participants in support of this point include:

“there is lots of information that comes with regulations- that businesses should take advantage of ... so we might start some of those projects off” (A22).

“We have a particular function as a local authority in maintaining environmental health standard and trading standard” (A25).

This statement suggests that legislative function is a role achieved by educating key actors.

## **Training**

While some participants widely perceived that training was also a role government funds and performs, the majority of key actors do not spend time in learning despite it being an avenue through which the key actor is aware of what new ICT applications are available:

“... they [small business managers] don't have the time to invest in learning.” (A23).

Others note that training was necessary in order to create awareness of the existing and new ICT application and to ensure that the key actors adopt and make best use of them. This was noted across cases:

“I guess one of our roles has been and will continue to be with seminal programmes which is to make sure that businesses out there know about this programme and can take them on” (A26).

“What we are delivering them was training on the internet, on computer network...[and] move on to running a programme called take IT on.....It could

be things like helping another team or team leadership, appraisal processes, sales and marketing and general business training courses” (A21).

While these activities are been carried out to support the key actor, it was evident that in most cases the key actor might not have access to such training because of the limited funding. What is surprising is that the finding reveals that the training was not entirely carried out to support the key actor; instead, the main reason governments perform such training is to raise their profile:

“... is not because we [Government] want to ... we also want to raise our profile” (A23).

This suggests that some of these activities may not be solely designed with the intention of supporting SMEs.

### *6.2.3 Customer*

#### **Idea generation**

The semi-structured interview suggests customers considerably influence the decisions of the key actor at the early stage of adoption. This was commented across cases:

“A lot of organisations would have a chain of customers, so what they have to do is that... they may use these customers to seek for some ideas” (A12).

“The users’ contributions were invaluable... They contributed immensely in terms of what we want... from the system” (A13).

These statements suggest that customers contributed greatly to ensuring that the emerging ICT is in place or implemented; however, this depends on the opinions of the valuable customers.

#### **Product trial/testing and modification**

In addition to idea generation, a number of participants note that customers in most cases were involved in the testing/evaluation of the new ICT:



“...there is what is called users acceptance testing...Before [customers] accept the application, they will test it to see that it is what they want [and] check to see that it is able to do what they want. So the users validate the application” (A 17).

“We use the customer to trial the solution... In fact, it would be your testing ground and obviously you may find that the client is... championing your new technology so he becomes a reference ground” (A 12).

In addition to product modification, participants echoed that customers provide new insight for improving the new ICT when it is not up to the standard envisaged:

“...we are getting the customers involved in the modification of the product” (A 13).

“As a manager, you would want your customer to be engaged in the process and for them to feel special about being engaged” (A 11).

The contributions of customers enable the key actor to look for any possible changes and gain new insights into the situation. Customers not only play a role in the early stages but also ensure that the key actor institutionalises the emerging ICT.

#### 6.2.4 *Consultants*

##### **Requirement gathering and evaluation**

The interviews suggest that the key actor relies heavily on the knowledge transmitted by the consultants. Consultants were often responsible for providing the necessary direction for the emerging ICT and defining the information requirement in detail:

“As an IT consultant I consider the organisation past and present arrangements. What have they been doing? The kind of systems that are in place, and where they want to go next. This will help understand what system they will actually need” (A 20).

“Exactly, [consultants] come along; they try to evaluate what our weaknesses and strengths are. At that point, they will know what needs to be done” (A 14).

These attest that the consultants may be playing an active part in evaluating the key actor's ICT needs where the key actor believes that the long term benefit of the new ICT would be achieved were consultants involved in the process: This was further highlighted:

“As I said it is the consultant that will become the champion to such process who will now say it makes sense...,evaluation of three or four alternative solutions of an emerging technology” (A 12).

“...most times it is the consultant that will look at the idea and make amendments” (A 20).

### **Requirement Transformation**

In addition to requirement gathering and evaluation, participants widely perceived that key actors often lack the knowledge and skills. As noted before, most often the key actor relies heavily on consultants who tend to transform the ideas generated into design documents. This observation was noted across cases:

“...SMEs do not have the skill set; they may call a consultant to write a business case” (A 12).

“We have product analysts and consultant. They transform requirements into design documents...” (A 17).

“The consultant was trying to translate information from the users into a language understandable to the...IT team” (A 13).

#### **6.2.5 IT Experts**

### **Education**

As noted previously, the key actor most times has little knowledge about ICT. As a result, they often relied so much on the information provided by the consultants and have predetermined ideas which may or may not meet their needs. In support of this, participants note:

“...sometimes organizations [SMEs] come up with funny ideas that they think software...can do” (A15).

“... most times the issues we usually have are that [SMEs]...have a fixed ideal of what they want” (18).

Despite the heavy reliance on the consultants, the study revealed that, in most cases, consultants may not be independent and trustworthy. This was a point raised by some participants:

“I can see businesses [SMEs] wary of the advice...they are given” (A25).

“...It has to be a trust...on the quality of the advice you are getting” (A23).

Observation shows that education at this point was essential. This involves a situation where IT experts discuss alternative ways of developing and deploying emerging ICT that can benefit the key actor. The finding suggests that the essence of this is to ensure that the key actor understands the consequences of developing and implementing new ICT from scratch, as well as, the implication of relying on off-the-shelf applications. IT experts were responsible for evaluating all available options. Therefore, education entails revealing the implication of each decision made for new technology application earlier.

From the IT expert's point of view:

“I will let them [key actors] know that there are off the shelf applications or will they want me to develop the application from the start...So what you have to do is to make them realise that there are various applications to do a particular job. There are different forms of applications...If they are not sure about any application, I have to make them realise the implication of each application that runs in their operating systems.” (15).

From the key actor's point of view:

“These people[IT experts] play a very important role you know... obviously we can't tackle it from the technology point of view but the way they will explain to you, what function you will carry out with this technology”(A 14).

This role appears to be vital considering the fact that if the IT experts fail to reassess the ICT requirements, it may not be adapted to the existing and recent organisation arrangement if finally introduced.

## **Development**

Another role as noted by participants is development. Development entails designing the application according to the requirements using the right methods:

“It depends on the methodology we use...If we decide to go for Ajax methodology; it simply means we have to divide the software into sections. Once we have divided the software into sections, we will deliver the software to the client in sections. Obviously it saves money and it saves time which is one of the advantages of that methodology. So you have to divide it into sections, build the software in sections, deliver the software in sections (A15).

The process of actualising the designed requirements is always a herculean task; however the purpose of this is to ensure that whatever is designed is in line with the actual requirements:

“Having the concepts and trying to actualise the concepts... is one problem... So our role is to make sure that the template designed is acceptable to the client” (A, 17).

## **Verification**

Another issue participants raised during the interview is the inability of the new ICT to remain perfect when introduced as it requires constant evaluation. Verification involves testing the applications to ensure that it is up to the standards the clients wanted. As highlighted by participants:

“If I develop software, sometimes they are not perfect. There are things that we overlook because these are just minor things. Meanwhile the person that I am writing the software for will not overlook. So, as a software developer, I have to test my software ... I have to follow the entire requirement” (A 15).

“It is possible that we have introduced issues and misunderstood the users and the requirements...As a test analyst, you are testing to see that the applications

that will be released are according to what is in the design document [OR] what the users want...So we test to validate and to verify the requirement” (A 17).

The purpose of the verification is to ensure that the new application has the right components, functionalities and most importantly is user friendly.

## **Training**

One crucial role perceived by IT Experts is training. The aim of the training is to ensure that the organisation can adapt the new ICT to both the previous or current organisation arrangement. This assertion was supported across cases:

“...we have to because, those people who play the role... have to train our staff on different applications to ensure there are no problems” (A 15).

“In most cases we normally have to train the users, get them fully acquainted” (A19).

Training was essential otherwise the whole point of adopting the new ICT may be defeated. The above evidence suggests that IT experts play crucial roles in the adoption process. However the findings suggest a missed reaction as to what IT experts’ interests are in the process. It may be argued that how effective the roles IT experts play may depend on how honest, proactive and reliable they are.

### **6.2.6 Vendors**

#### **Product adaptation**

It was revealed from the interview that IT vendors are responsible for ensuring that the application is adaptable to the organisation’s previous and recent arrangements. This was highlighted:

“IT vendors came in to evaluate the systems and also try to look as if their product will fit into the solution. So what they did was to come down, get the information, went back to their company, use a copy of the application to replicate how they hope to set the system up in the company. After doing that they came back to the site and try to confirm if the set could work and could

actually fit into our organisation. Based on that, a couple of changes were made until the company is happy with the system” (A, 13).

This role is the role provided by vendors; a number of participants point out that these vendors may be doing this just to sell their product without considering the long term benefits of the product to the key actors. This issue arose during the interview:

“One of the problems I have with the supply side of the industry is that guys that actually provide solutions... are not really independent or impartial and they tend to sell a solution” (A26).

### *6.2.7 Employees*

#### **Feedback on performance**

The semi-structured interviews revealed that employees most times, are ignored in the decision making when the need for emerging ICT arises. Feedback on performance was echoed by participants as a role performed by the employees at the later stage. This happens when the ICT is not meeting their needs. As highlighted by participants:

“Well obviously, my employees play a role because they give me feedback where our systems have weaknesses so I can finance it and request what more applications we need...”(A 14).

Employees are also important because they are the ones running the system (A 11).

Feedback on performance helps the organisation to understand the areas in which the emerging ICT needs improving. It was noted that it helped to determine any inherent challenges the new ICT application may be posing to the organisation and to find ways to improve its performance.

### *6.2.8 Emerging ICT*

#### **Enhancing business processes**

The interviews reveal that emerging ICT plays important roles in improving the activities or operations of a business. Participants widely echoed a number of ways ICT has enhanced their activities:

First, key actors note:

“...we also use such platforms to market innovations as well. So at the moment we are working on a new social medium marketing strategy which we believe is going to be a leading edge and we use this platform as a way of gaining feedback from some of the leaders in the industries ”(A5).

“... We have embraced most of these technologies because we are much bigger, we [have] 25 people working for us and we were turning over a million. With that size, comes a lot of complications, headaches and now one person... can manage all the tasks with these technologies” (A7).

“...there are also a lot of advantages basically, going into this IT development infrastructure, you must be able to communicate effectively” (A24).

Emerging ICT not only influences the activities of various actors that use them but evidence also suggests that to a large extent, it improves business processes. This was mentioned by one of the key actors:

“...because before we just had products or we have the names on the paper, but then we started using codes like NU.100, NU. 105 to differentiate and make it easier...because there are hundreds of products that we are dealing with. So technology helped us ... sort the items alphabetically or you can say category wise...Also, this tells us how much stock is left and how much stock to order. So it really affected our business in a good way” (A9).

## **6.3 Critical factors influencing emerging ICT adoption**

This section presents the factors influencing emerging ICT adoption and/or development. Table 5.18 of chapter 5 depicts the findings with associated samples of supporting evidence.

### **Awareness of multiple contexts**

Participants perceived that adoption of emerging ICT is an enormous task and organisations must face the challenges that come with it in order to survive. This requires an understanding of the myriad of situations that might influence adoption. As highlighted by participants across cases:

“...we have to look at the bigger picture, how that technology is going to help the whole company” (A9).

“...we have to evaluate the whole business ... because we just can't bring in new technology” (A6).

“... You need to be clear [on] the entire outcomes you want ... and all of the stakeholders that are influencing... the outcomes ...” (A 11).

These imply that the key actors that assess their entire business processes, recognize the impending ICT adoption challenges, take into account various internal and external actors, and are more likely to determine the best opinions to overcome the challenges imposed by any emerging ICT.

### **Openness to change**

Openness to change is the willingness to try out or accommodate new ideas. Recognising all actors in emerging ICT and taking their ideas into consideration is necessary for emerging ICT adoption success. This was also a point that arose across cases:

“as a CEO, you would have to encourage new ideas within the organisation and what you should therefore do is you should be able to put a process or adopt a strategic role that will allow new ideas to flow...”(A12).



“Lots of the younger people are mostly switched to new technology; they will come to me and say, have you seen ..., what is in the market and we will look into it” (A10).

“You know ICT is... like every other thing. If you don't have the right mind ready for change you are not going to achieve the change. What you need is an open mind?” (A11).

The key actor that is liberal is more likely to adopt and cope with new ICT compared to those that take the decision alone. The finding also reveals that openness to change is determined by the organisation culture. Participants note that open business cultures create an opportunity for competitive advantage and add value to the business. It allows all members of an organisation including the managers to communicate and contribute to decisions about any changes in ICT.

“Any change is all round communication... It does not matter who you are and whatever part of the organisation you are dealing with. If you have an open culture and engage with your staff it is all about communicating to all your staff ... as to what is happening” (A11).

Cultures that do not allow sharing of business information or do not encourage others to take part in decision making impede successful emerging ICT adoption. The key actors that embrace group interactions, and participate in various activities are more likely to develop a long term ICT adoption strategy.

### **Shared support**

Actors' perceptions about emerging ICT can be viewed differently depending on the social setting and knowledge of different actors. Participants indicate that seeking relevant people, with the right skills that support the realisation of the right ICT is paramount. This point was echoed across cases:

“Yes because as I always say that the technical knowledge is new to me... if there is any special area, we have to consult all the relevant people who know the technology” (A14).

“When I got a problem like that, a middle company or a middle man would help so...I need to talk to somebody that actually specialises in it” (A1).

“If there is a need for new technology, it is a joint thing; I won't be selfish to say no, it is not a good idea (A10).

These statements reveal that, for effective ICT adoption, the meaning of the intended ICT must be justified by all parties involved. This involves sharing and disseminating business information that holds the same meaning to every player and also for different actors to understand what has been shared. Key actors that recognise the views of other actors are most likely to make the right emerging ICT adoption decisions compared to those that do not.

### **Safety and Security**

Participants stressed that if a new ICT is perceived to be questionable in terms of losing access to confidential information, the possibility that it would be considered for adoption is uncertain:

“Secure payment is a hard issue. Before you know there were several frauds. online security is a major issue...we adopt technology on a day to day basis, whichever one is more secure we go over to that (A9).

“If the new technology allows records to be kept for thousands of years, as long as they are maintained” (A14).

More so, the interview also reveals that safety and security also extend to seeking employees' welfare. The key actor is willing to engage with emerging ICT if it proves that it can keep track of not just the confidential information but also employee safety as noted:

“...in respect of the safety patrol, obviously it is to prove to our client that we are doing our job and the necessity to adopt to monitor the health and safety polices which is more important otherwise we could lend ourselves to court actions” (A1).

Safety and security concerns do not only relate to fear of losing data and confidential information, but to ensure that emerging ICT allows the key actor to monitor staff welfare and safety at work.

### **Integration**

Participants widely perceived that businesses need to identify and at the same time understand opportunities offered by any new ICT. This requires learning to overcome the failure by ensuring that they adopt and adapt to emerging ICT that is compatible to the business arrangements.

To support this participants note that:

“It is all about how [emerging ICT] actually works with the other systems in use...how it interfaces with the rest of the product (A12).

“If everything follows a certain pattern, then it is much easier to integrate the set of tools, but if the technology is totally different, it is another learning curve” (A3).

“The companies... wanted to have the system that can combine everything at the same time” (A13).

This attests that the key actor is likely to keep up with emerging ICT if the ICT integrates easily to existing and new organisation configurations.

### **Ease of use**

Participants widely perceived that the key actor struggles with new ICT because of their limited knowledge and skills. As such, any new ICT considered must be simple. This statement was made by a number of participants.

“We are not particularly IT literate. I struggle with IT. So it has to be a simple process to adopt with short teaching times, simplicity for both clients to understand...” (A1).

“... we have embraced most of these technologies because we are much bigger, we are a big company but we had 25 people working for us and we were turning over a million. With that size, comes a lot of complications, headaches and now one person... can manage the entire task with these technologies” (A7).

“As I have said, the new smart patrol is imperative, it works well for us, is quite simple to use...” (A1).

“...the new technology is easy to set up and easy to maintain (A2).

These statements imply that simplicity may be a key factor facilitating key actors' decisions to adopt emerging ICT. It also suggests that the key actor would not, in most cases, adopt new ICT if it is complex and frustrating. The reason being that the key actor still suffers from limited skills and knowledge of ICT. Therefore, if the IT experts are only involved in setting up an application, even if it is simple, the application may continue to work for years with great fear being expressed by managers as they have no idea how the legacy application and even the legacy computer system works. If it works they wish to continue to use it – even though a new system may be much better in their evolved business processes.

### **Expandability**

Another illustrative factor is expandability. Some new ICTs are modular in nature while others are flexible and expandable. Participants' note that those that are expandable are likely to affect the decisions to adopt compared to modular solutions. According to participants:

“...you know we got like 5 employees now... maybe in a couple of year's time, we will have 50 employees, is the system scalable? Also are the functionalities and the capabilities scalable?” (A5).

“...limitation within the current solution, because to be very sincere with you, while looking for a new solution when you have a solution that does everything you want” (A13).

These statements reveal that small business managers are willing to engage in emerging ICT if it demonstrates that it can accommodate new functions or allows existing ICT infrastructures to be integrated into it.

## **Managerial time**

The finding revealed that small business managers are often constrained by time. They always strive to meet the day to day management of their business. As a result, they often prefer if emerging ICT saves them time and reduces cost. This was highlighted across cases:

“It is always based on a commercial decision whether that commercial decision is because it saves us time which ... saves us money” (A5).

“... how much time do you need to read and understand? If everything follows a certain pattern, then it is much easier, but if the technology is totally different, it is another learning curve” (A3).

“If we are going to spend a lot of time here... with the technology we will not adopt it” (A6).

The finding suggests that the key actor would engage more with emerging ICT if such applications save time and improve business processes. This could be made.

## **Service quality**

Small businesses always face constant pressure to survive and therefore would take advantage of every small opportunity to be efficient and profitable. It was widely perceived that emerging ICT that is efficient and provides high quality services in most cases triggers adoption decisions. This was highlighted across cases:

“For us we really wanted an internet based solution because the services are good” (A2).

“...you want to look at the quality of the services you’re providing for people and this is driving the need for IT...” (A24).

“The whole purpose of getting down this journey is for a reason. It is actually to improve your process and delivery” (A9).

Service quality is linked to how efficient the emerging ICT is; it relates to speed, and improves service delivery and cost reduction. The finding suggests that small businesses

would be more interested in a new ICT if it proves to be efficient in delivering the services required.

### **Customer Focus**

One of the building blocks of any business is customers. Customers were not only involved in emerging ICT adoption decisions, but most importantly, they determine whether the businesses grow or not. Participants widely perceived that they were concerned about their clients' satisfaction and retention because they constitute an integral part of their decision making. This statement was widely mentioned:

“...the [technology] is actually quite expensive but we felt that it was worth us doing it in order to keep our clients...” (A5).

“...the main factor that is driving change for us is more or less meeting customer's need” (A13).

“Generally we adopt something mainly for the customers” (A10).

“As a business, my focus is constantly going to be retaining my customers” (A11).

This suggests that if new ICT cannot demonstrate that it can meet the needs of the customers, it is unlikely that the key actor would consider it worthwhile adopting.

### **Differentiation**

Advances in technology and globalisation have continually created swift competition in similar industries. Observation shows that small business managers consider adopting emerging ICT because of fear of losing their clients. Differentiation is one key factor that was pointed out as very important in achieving this. This was widely highlighted:

“What other companies in our area and size don't do is providing Web based online reporting. It is actually expensive but we felt that it was worth us doing it. The main reason we adopt new technology is differentiation, to separate ourselves from competition” (A5).

“Where the emerging technology can help...differentiate against our competitors” (A12).

“If people see a phone using android, they will say it is a quality product. People believe in quality products. So differentiation makes a lot of difference as well” (A15).

This attests that the key actor would often engage with emerging ICT if it shows that it is a unique solution that rivals will find difficult to imitate.

### **Return on investment**

Return on investment is one of the significant factors that participants widely perceived that would continually affect their decisions to engage with new ICT. It is unlikely that any emerging ICT that does not generate return on investments and expand the market share would be considered by the key actor, considering their limited resources:

“Consequently it is unlikely that any SME will give consideration to any new or emerging ICT if it cannot ... produce a very quick ROI for the business” (A12).

“... the new technology ... must show it can generate return on investment basically which is money” (A2).

“It is not just lack of the resources, it is return on investment. If anybody who invests £10,000 in something, as long as they will get £15,000 in return” (A22).

“I think for us to try and sum it up in one word, will be revenue” (A5).

In most cases the value small business managers attached to emerging ICT is directly linked to how much profit it can generate.

### **Competition**

Another illustrative factor revealed from the analysis is competition. It was widely pointed out that competition is a factor that determines if new ICT adoption would be adopted by SME managers.

“... if you are a small medium enterprise, your competitors come out and say... we are doing it this way and there is a new technology that will help us. Then, I will look at that and add competition” (A12).

“We are quite keen to know if there is anything that can actually fit into meeting competition out there” (A13).

In addition, participants also echoed that competition would also trigger subsequent adoption.

“We need to move on with new technology, we just can’t use the same old method or process. We need to move ahead to stay in business. If we don’t use it, we can fall short or be unable to be at the level where other companies are” (A9).

“I think the problem is when dealing with organisations, you need to keep up with new technologies and so you will not be left behind” (A10).

“If you don’t introduce new technology, you can be left behind quite easily” (A1).

The above assertions suggest that competition not only triggers emerging ICT adoption but also shapes its future adoption.

### **Adoption Cost**

It was obvious from the analysis that key actors are disadvantaged because of limited resources. Cost was a key factor most interviewees echoed that influences emerging ICT adoption. This was in line with the comments made by the participants:

“I feel the first time to develop student box...is the cost efficiency of the product” (A6).

“Money goes a long way and is the reason why companies change applications. Some applications are much more expensive to maintain” (A15).



“But I don’t think there is anything wrong with new technology. Anything that can help the business run better and easier is fine by me if it is not too expensive” (A10).

Cost is not only associated with how cheap or inexpensive the emerging ICT is, but how the new ICT can assist in reducing the workforce and provide the services that other costly ICT applications offer. This was echoed by participants:

“What we do is our need to use technology is based on our need to keep the cost down. Another reason we adopt new technology is cost effectiveness in terms of processes. Will it save us money or make us appear more professional to our client?” (A5).

“From the cost point of view, we want to minimise our cost. ...can it reduce manpower...? Can one person input the data instead of 3-4 people inputting it manually?” (A14).

The value most SMEs anticipate from emerging ICT is cost reduction. This evidence indicates that cost substantially influences the adoption of emerging ICT adoption.

### **Business Expansion**

Business expansion in this study is associated with an increase in size and staff strength, market share, turnover and sales volume and participants echoed that adoption of emerging ICT can take months and any businesses that intend to adopt one do believe that it would guarantee growth. As highlighted in cross cases:

“Obviously as the company gets bigger...It becomes a bigger issue to adopt new technology” (A2).

“What happens when the company grows larger than this? That is another question we keep asking. Will the system support us? What happens when the company grows outside of SME or outgrows SME...? So these are some challenges we have been looking at and then try to see if we could find another way out of it before we hit those break walls” (A13).

“Though sometimes you need to make decisions like whether this technology is going to help our business grow, if not we just don’t go on with it” (A9).

Business expansion may not only affect adoption of emerging ICT but may also influence future adoption. This issue was also highlighted:

“One reason why we look at change is because we are growing ... changing from a one man band to 50 employees” (A11).

## **6.4 Challenges confronting actors**

This section presents some of the challenges facing various actors. These challenges hinder the effective implementation of emerging ICT adoption. These challenges have been identified as those inhibiting emerging ICT adoption success and the sample quotations are presented in table 5.17 of chapter 5.

### *6.4.1 SME managers (the key actors)*

#### **Poor Knowledge of ICT**

Participants indicate that limited understanding of ICT is one of the greatest problems inhibiting the key actor from making informed evaluation exercises with regards to new ICT. This point was noted across cases:

“Say from start up businesses, some people don’t know what they want to do. There will be some people who have an idea, but don’t really know how to progress it” (A22).

“SMEs do not have the skill set” (A13).

“...businesses just simply don’t have the ... knowledge; they are so busy running their business on day to day bases” (A23).

“... if [SMEs] don’t know what you don’t know, it is quite hard to make good buying decisions” (A26).

## **Time**

In addition to this, time was also a challenge a number of actors echoed. As commented by participants:

“SMEs are constantly short on time, often decisions will be made by one or two senior people, (often the owners), who will be attempting to manage a business short on resources and, most likely cash. This creates a very different decision making environment to the norm” (A12).

“...businesses just simply don't have the time” (A23).

“Time was a challenge... ” (A5).

As such, in most cases, the key actor tends to rely heavily on external sources of advice, especially the consultants, who are normally the first point of contact.

### *6.4.2 Government*

#### **Poor ICT support:**

Poor IT support by the government was one of the challenges that hinder adoption success. A number of participants made reference to this point:

“We are not really sitting down and working with them[key actors] in terms of moving their business forward or all of the things they should consider doing” (A21).

“...basically through the IT centre, we deliver UK online for business programme and we choose what we want to deliver” (A26).

“... we signpost and if there are specific requirements for businesses in the field, we would expect our delivery partners to pick that up” (A23).

These statements suggest that the government often makes decisions on what services they can provide to the key actor; however, they may not be doing enough to support the key actor.

## **Lack of specialised skills and knowledge**

Evidence points out that the government is always at the forefront of ICT initiatives in small businesses. However, most government agencies do not have the range of skills necessary to put the key actor to the right people that would provide that right information. The finding suggests that the government still lacks the skills to provide adequate support for the key actor. This assertion was made by a number of participants across cases:

“Am not sure, I [government agent] have enough knowledge to the extent which businesses are taking on or not taking on IT that could benefit them” (A25).

“--as to my [government agent] involvement with the ICT project, am having to learn about broadband and ICT things. So they are all new to me” (A23).

“If they don't know, we [government agents] put them in touch with organisations that are better able to help them-- we are not experts in what business should do or shouldn't do” (A22).

“... we signpost and if they are specific requirements for businesses in the field, we would expect our delivery partners to pick that up” (A23).

These statements indicate that the majority of government agencies that support SMEs are merely facilitators who often engage in sign-posting small businesses to other organisations. This point was also highlighted across cases:

## **Limited funding**

Limited funding was another issue identified by participants during the interviews. Participants note that:

“From local authority's point of view, one of the dilemmas is that funding is always going to be an issue” (A24).

“...we will constantly get criticism, I think from people that want to start up businesses. We don't give them the financial support to help them start up”

Particularly in the local authority in the current climate where budgets are very tight” (A26).

Limited funding has its own implication as pointed out:

“What we do is just a quick introduction to raise their awareness of what things that they need to do to actually make benefits in business support [--] we don’t do that anymore, they were stopped in November. There is no more money left” (A22).

These statements attest that this support may not be exhaustive, and with the recent recession, the above statements may also suggest that it is going to be more difficult for SMEs to secure funding to adopting new ICT and improve their competitiveness in the near future.

### **General support**

The finding reveals that the roles played by the government and its agencies still appear to be general and may not specifically meet the needs of SMEs. This point was widely commented:

“In the past, the ways we provide support tend to be general start-ups and go on to business support. Within our department we would not have the specific knowledge” (A23).

“We are not trying to promote a particular service... [Or]...promote any particular philosophy” (A21).

“ [we provide] general business support in terms of how business is set up, what sort of licence they need, what sort of information they need to set up in the town itself” (A22).

These statements suggest that with the present economic climate, government may even witness more challenges since each small business has its own unique circumstances.

### 6.4.3 *IT Consultants*

#### **Dependent and Untrustworthy**

While consultants expect to help small businesses in the current problem solving, it was widely perceived that consultants were untrustworthy. One of the participants strongly emphasised that many consultants tell their clients what their clients want to hear, not what will help improve their business activities. The reason being that they do not want to lose their client. This was highlighted across cases:

“... a lot of business consultants will tell their clients what their clients would want to here... If I want my bills to be paid, I will tell him what he wants to here. IT consultants are not independent. They are trying to sell to you what they want to sell to you” (A 11).

“Well, I think in the commercial world out there, this inevitably happens in every sector. You know where there is a consultant, there will be recommendations and where there is a recommendation there is usually a relationship with the provider” (A 23).

“-- it also has to be trust [on] the quality of the advice you are getting” (A23).

“I can see businesses wary of the advice they are being given...They [Consultants] are not independent” (A25).

The implication of this statement is that some of the activities some consultants play may not be simply for the interest of SMEs but that they can benefit commercially.

### 6.4.4 *IT experts*

#### **Global solution**

Participants note that although IT experts may play substantial roles in the adoption process, most times they end up providing global solutions instead of specific solutions that will meet the needs of this specific business. As commented by participants:

“It is going to be more difficult to get specific work done on supporting businesses with IT” (A25).

“What [IT experts] do is... global solution” (A26).

These statements suggest that IT experts may not provide solutions to meet the specific needs of SMEs instead what they may be interested in is how they can benefit.

#### 6.4.5 *IT Vendors*

##### **Commercial interests**

Participants perceived that vendors may be responsible for ensuring that the product is adaptable to the needs of the small business managers; however, they might be much more interested in selling their products. This was highlighted:

“... from the vendor’s point of view, it was more or less trying to sell their product which is understandable from their point of view ...” (A 13).

“--then it has to be a trust not only of lack of commercial interest but it also has to be a trust of the quality of the advice you are getting” (A23).

“One of the problems I have is the supply side of the industry, is that the guys that actually provide solutions are not really independent or impartial. They tend to sell a solution” (A26).

Although various actors are directly or indirectly involved in challenging emerging ICT adoption in a small business context, the above findings suggest that these challenges may also contribute to emerging ICT adoption failure.

## **6.5 Conceptual Framework**

Figure 6.2 depicts the various sections of the findings in the framework. It is crucial to first establish the conceptual framework, which helps to account for the roles of actors and factors at each stage of the adoption process and to support the claims that adoption of ICT is not a one off-action but rather a dynamic and ongoing process. It presents a number of actors involved in emerging ICT adoption. Drawing on the interviews, participants note that when the need for emerging ICT and roles delegated for new ICT are established and introduced:

“...I bring it in the office and contact my customers in London, they will come and look at it and say that looks smaller or bigger. I will go back to the engineers and say... the process is fine but I will want a few adjustments... then they will make it again. I will go straight back to the customers and everybody is happy” (A10).

In support of this another key actor notes:

“When you are an entrepreneur you need be able to do things quickly and fail, not necessary fail, but just understand your mistakes and then change them and continue to evolve. You must always have that mentality.” (A6).

A similar assertion was also made by one of the IT experts:

“...because technology advances with time and because of that every company wants to keep up to date with their applications. For that reason you have to keep changing stuff. That is one major thing that cannot be compromised” (A15).

These statements demonstrate that emerging ICT involves the interplay among and between actors. The learning by members of the network makes the key actors (SMEs managers) more aware, sophisticated and responsive to the environment more often. Bearing in mind that the adoption process is not a one off process as indicated with the arrows in *figure 6.1*, it shows the dynamic and the evolutionary progression of activities from one stage to another. The finding suggests that:

1. Actors' concern in emerging ICT adoption process is inseparable and cannot be viewed in isolation.
2. Actors that challenge ICT adoption are both internal and external to small business managers (the key actors).
3. As a result the perception of these actors differs from one stage to another which makes the decisions change over time.



The outcome of these findings demonstrates that ANT has helped to understand both the dynamic process of emerging ICT adoption, the various roles actors perform and how these actors uniquely combine internal and external resources to make emerging ICT adaptable.

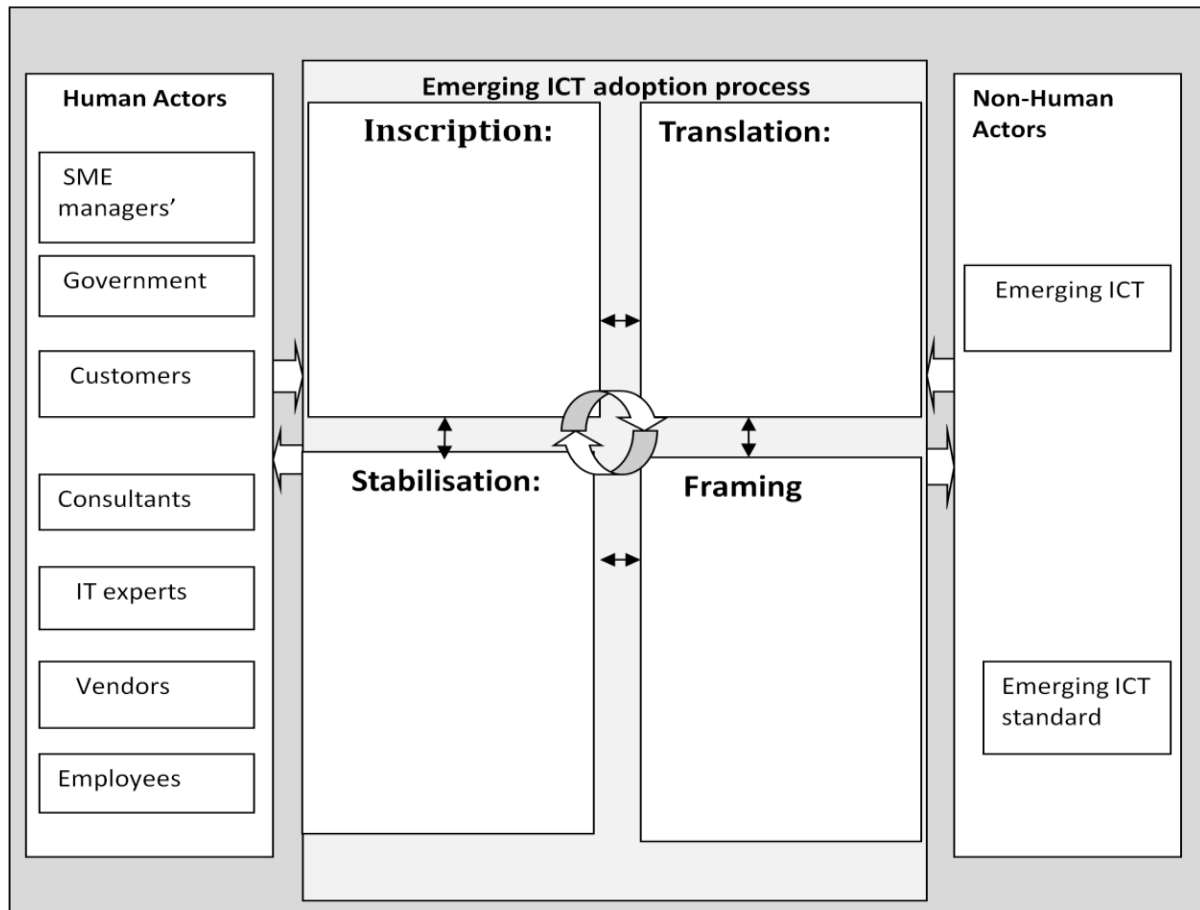


Figure 6.1: The conceptual framework

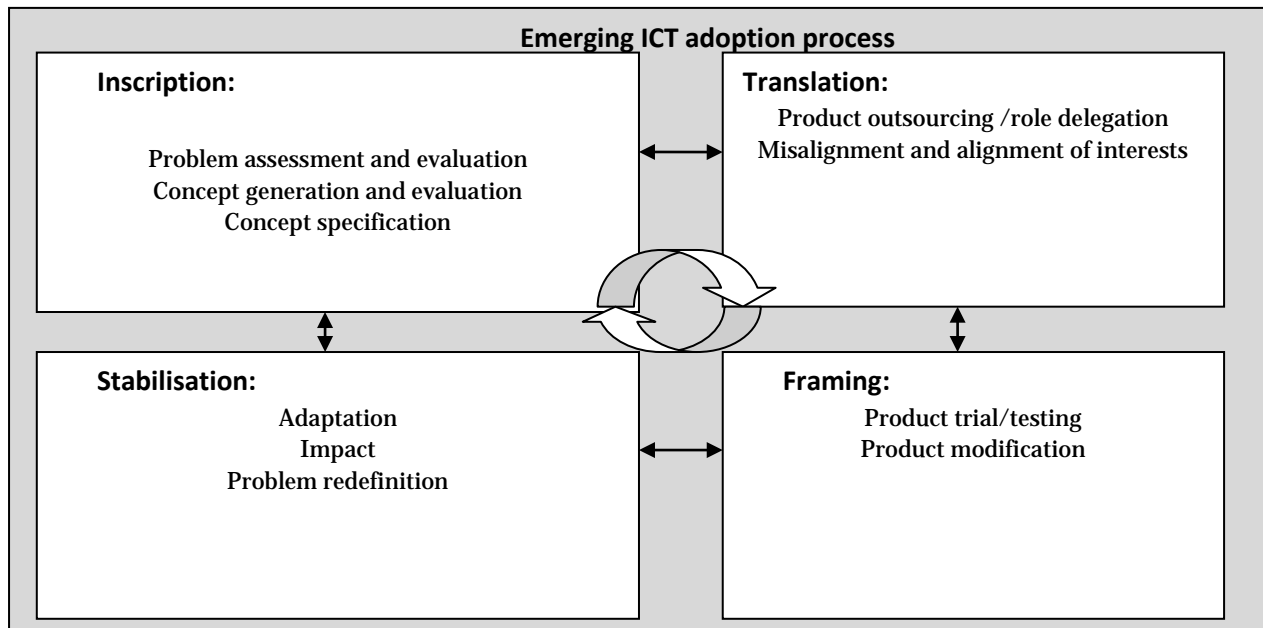
The framework helps to demonstrate and discuss:

1. The activities various actors are involved in the adoption process.
2. The actors and their roles at each stage of the emerging ICT adoption process
3. The key factors influencing the adoption process at different stages of the process

## 6.6 Discussion: Emerging ICT adoption process

The literature review has stated that studies have considered ICT adoption mainly from static and linear perspectives. These perspectives have been challenged for neglecting the complex activities of SMEs and most importantly, the multiplicity of activities involved in the process. Millerand and Baker (2009) argue that linear and static models have been replaced by the notion of iterative, spiral and systematic models. One of the objectives of

this study is to examine and understand the dynamic process of emerging ICT adoption. Understanding such processes is a way practitioners can reduce the time and planning process required for ICT implementation and most importantly avoid its failure. Therefore, this section discusses and the presents the emerging ICT adoption process based on the findings from the previous sections and supported with existing literature. Figure 6.2 made explicitly clear four interactive stages and illustrates the dynamic process and the key activities that led to the process.



**Figure 6.2: Emerging ICT adoption process with key activities in the process**

Drawing from the framework in figure 6.1 the finding suggests that humans and non humans do not have inherent boundaries, rather, they are integrated. The integration is what helps to assess the advantages of the potential ICT. The arrows in figure 6.2 demonstrate that as decisions to adopt proceeds from one stage to another, they are challenged by others who may be an integral part of the adoption decision process. Actions of these actors at each stage are not static; instead it is an ongoing process. Emerging ICT adoption is not straightforward, simple, predictable or certain; instead, it is associated with some organisational outcomes that are dynamic and unanticipated. The key activities are now discussed under each stage.

### 6.6.1 *Inscription stage*

Emerging ICT is associated with some degree of uncertainty and key actors are considered innovation conscious when they try to build their innovation to their own ideas and specifics (Swanson and Ramiller, 2004; Teo et al., 2011). Our finding lends support to this subject to the integration of experiences and knowledge of different informed stakeholders. The study identifies three interrelated activities that are associated with integration; they are problem assessment, concept generation and evaluation, and concept specification. In practice, a question may be raised as to how the key actor gains knowledge of the need for emerging ICT. The study suggests that most emerging ICT is driven by the enthusiasm of the key actor that engages in continuous integration of others in the process. The key actor assesses the technical options and analyses the surrounding situations. This is one of the critical business problems the key actor faces when a technology application is considered in order to help solve a problem. The outcome of this leads to concept generation, which entails generating ideas/ concepts and evaluating the ideas specified in a key actor's terms.

At the inscription stage, the findings suggest that a considerable amount of effort is made to identify actors that might be relevant in establishing the ICT and use it. In support of this finding, numerous other studies suggest that the key actor tends to exhibit greater closeness to external actors. For example, Teo et al., (2011) contend that technology will be useful if it serves the needs of both the internal and external users. Herstatt and von Hippel, (1992) and Gottfridsson (2011) have also recognised the importance of external actors in ICT adoption and suggest that external actors are more effective in generating ideas in small companies compared to large organisations. In addition, Simpson and Docherty (2004) found that the capacity for SMEs to strive for external support is far greater when compared with large organisations. The findings lend support to these studies and suggest that the key actor relies heavily on the external forces such as customers who in most cases challenge their decisions. One of the implications of this is that the activities of the key actor are not certain as they are challenged at the earliest possible stage. Therefore, at inscription, key actors use information about the consequences of the ICT generated internally and externally to make decisions on whether to create, adopt and implement the emerging ICT.

### 6.6.2 *Translation stage*

The finding unveils that for emerging ICT to be adopted successfully, managers have to be open-minded in order to realise the opportunities different experiences can offer in the business. In line with this, Akrich et al., (2002a) point out that actors that intervene to make

decisions are so many and so intertwined with each other that at the end of the decisions, it is difficult to understand to whom the result should be attributed. Recent studies (Lawrence, 2010; Kannabiran and Dharmalingam, 2012) in a small business context have reported the challenges associated with ICT adoption. Limited financial resources and most especially, poor knowledge of ICT have been reported. These limitations hinder the key actor from employing IT experts in-house because ICT advances and IT experts that have up to date knowledge today may not in the future. These increase the level of confidence or dependencies the key actor has on the external entities.

In addition, the study reveals that, in most cases, ICT is outsourced, and roles are delegated to third parties, which may not be directly controlled by the key actors. The study suggests that, at this stage, the key actor's decisions may or may not be supported when different external actors meet because the goals or perceptions of these actors in most cases are different. Most times the support these external actors provide depends on how much they conform to the key actor's emerging ICT interests.

Firms that have interests and assumptions leads to greater alignment; however, the study suggests that alignment is difficult to achieve and often results in unstable commitment from different actors involved in establishing emerging ICT. This is because the backgrounds and perceptions of actors are different. There are implications to this.

First, actors have diverse views about what the intended ICT should be. For example evidence suggests that the key actor often has preconceived ideas, which may or may not, be realistic. On the contrary, others may be more interested in what they can gain commercially instead of what would satisfy the needs of the key actor. This has been supported by previous studies. For example, Chibelushi and Costello (2009) found that one significant challenge facing most small businesses is linked to the number of untrustworthy and non-proficient sets of consultants that offer advice to them. Therefore, despite the potentials of emerging ICT, their long term feasibility often remains uncertain because of the enormous challenges along the adoption process.

Second, involving diverse actors may not always promote emerging ICT; rather, it may hold back the key actor from engaging in technology adoption/development. One of the advantages of this is that the key actor, that is innovative, may only consider developing and/or adopting any new innovation when it is conducive and in line with the actual organisation and other actors such as customers' requirements. Therefore, alignment is

based on the organisational context in which the various actors involved comply in order to realise the set objectives of the key actor.

### 6.6.3 *Framing stage*

The concepts and specifications may have existed in verbal description or a drawing, but at this stage, the findings reveal that they are transformed into physical objects. Garud and Rappa (1994) note that a firm that establishes a standard influences the way innovations are designed and used because the more a piece of technology conforms to the required evaluation criteria, the more valuable it is to the users. As stated earlier, the views of the key actor and others may be different and often results in resistance around ICT development and use. In line with this, much evidence from the semi structured interview suggests that emerging ICT is not always perfect; rather the efforts on the part of the key actor to apply the technology always reveal problems which are not anticipated.

Standards are essential in ICT because they are the basis for increasing return if suitable emerging ICT is institutionalised. The finding suggests that emerging ICT often undergoes rigorous functional testing. Product testing was a fundamental activity various actors including customers, key actors and others consider in order to ensure that the features of the new ICT not only measure efficiently but are also reliable. Similarly, Attaran and Attaran (2002) found that customisation of ICT usage enables an organisation to create optimally and efficient information resources. In most cases, customisation is made in order to enhance the key actor's appeal. This requires constant negotiation and confrontations between the key actor and other actors such as IT experts. Emerging ICT standards require the cooperative effort of the key actor, government legislation, customers and others who learn and reconfigure the new ICT to suit the key actors' appeal. One of the implications of this is that involving various actors in adoption and reconfiguration of emerging ICT may help the key actor in introducing the new technology application that may be unique and difficult for competitors to replicate.

### 6.6.4 *Stabilisation stage*

The unpredictable nature of the business environment has made organisation planning for ICT adoption and/or development follow an unpredictable path. Organisational characteristics may be stable at one point, but there is no guarantee it will continue to be stable over time. The general thread observed running through the findings is that adoption of emerging ICT does not always produce the expected results and this leads to problems and

individual adaptation. Stability of IT is constantly negotiated as a social process of aligning diverse interests and rests on the ability of the key actor to find suitable actors with their own values and interest (Hanseth and Monteiro, 1997). The finding suggests that aligning technology with business processes is crucial. The roles of the actors at this stage were to learn and adapt the emerging ICT. Litwin(2011) points out that adoption and diffusion of ICT requires the understanding of how humans and technology interact since it has been revealed that many of its benefits are due to the interplay of the IT and features of employee relationship. The study also suggests that new ICT does not instantly improve the activities of those that engage with it but is often interrupted. Since employees are users of the new ICT, most times they dictate problems not discovered during the initial stages or avoid using the new ICT. One of the challenges faced during adaptation is that the internal organisation actors (employees) in most cases are not always involved in the emerging ICT adoption decision making. The findings reveal that most times employees are neglected from taking part in ICT decision making.

While organisations that avoid the employees' involvement in technology change may be ignoring the strategic and functional aspect of the employment relation, if employees are allowed to use their initiative they may improve the quality and usability of the new ICT and reduce the adoption time. Similar to the findings, Tyre and Orlikowki (1994) concur that if employees develop an interest toward a routine behaviour, they find it difficult to change. The study reveals that employees were in most cases adamant to change and often reinvented the way the emerging ICT is used and its procedures. These suggest that small businesses may witness more adaption success where employees are an integral part of the innovation process. Therefore, the failure of technology adaptation in a small business context may be largely linked to (1) employees' inability to use the emerging ICT (2) lack of encouragement to employees' initiatives (3) outright resistance to change by employees from old to new applications.

Stabilisation of emerging ICT may be witnessed most where the new technologies impact significantly and improve organisational performance, processes and impact significantly (make work easier, improve business process, effective communication) on the organisation. However, stability of the emerging ICT is not steady. As the business environment remains unstable, so do firms constantly change or improve their processes especially where the impact derived from the emerging ICT is trivial or new problems emerge. Though SMEs deemed stabilisation extremely crucial, stabilisation of new technologies does not completely happen.

This study suggests that technology advances and organisations always look for new technology applications that would continually meet their needs. Similar to the findings, Walden and Browne (2009) contend that ICT evolves rapidly, and it is not clear; there would be a time when a stable equilibrium would be achieved. Adoption of emerging ICT in small service businesses happens through a rapid movement of ceaselessly going backward and forward, and shows a continuous flow of activities (Kim, 2009; Hanseth et al., 2004; Braun and Clarke, 2006; Herold, 2010). This process is dynamic, which underlines the mutual shaping of actors and reveals the situations where key actors move from a homogenous isolated entity to a group of reformulated entity (Millerand and Baker, 2009).

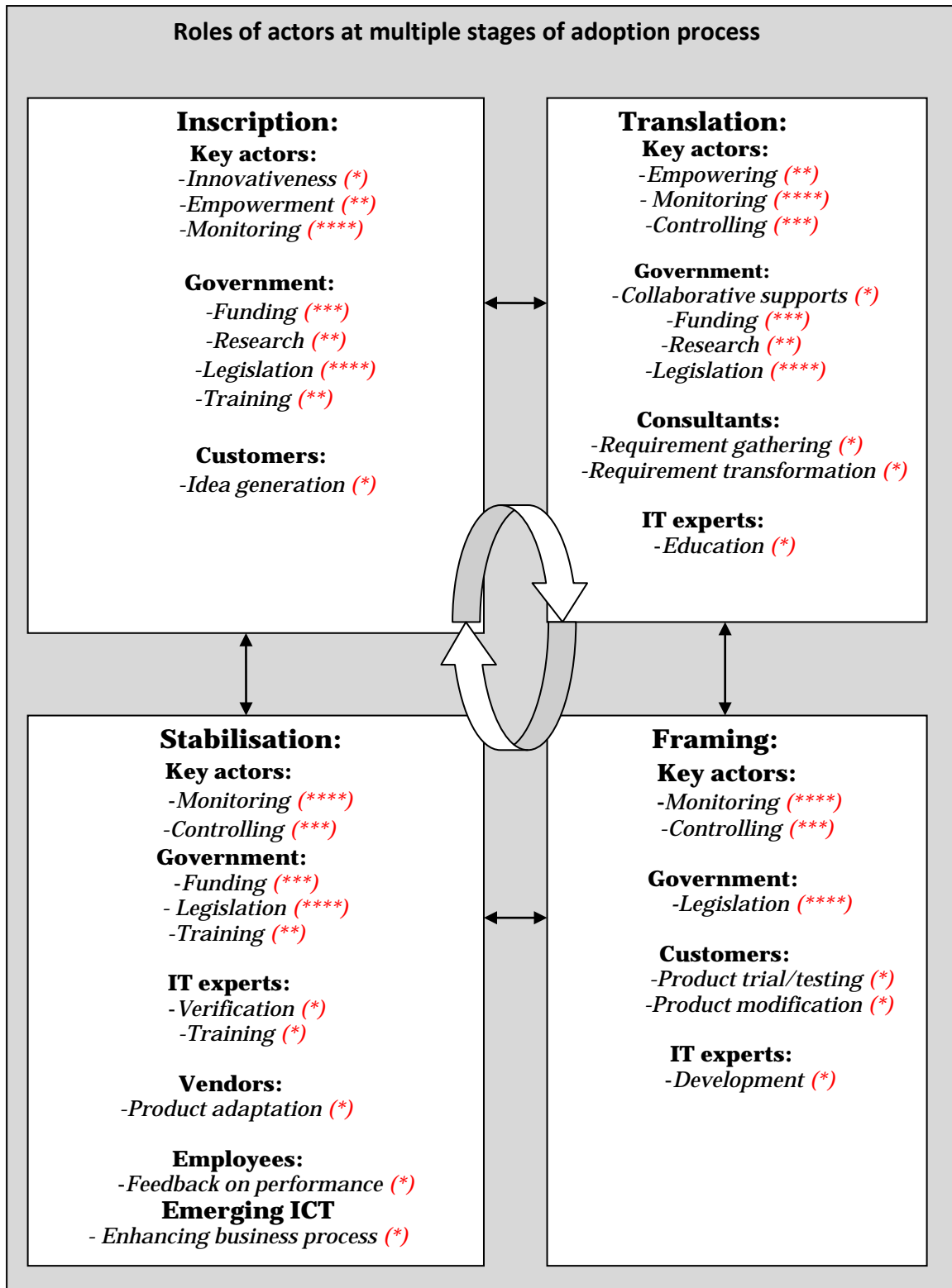
## **6. 7 Discussion: Roles of actors in adoption process**

According to Raza and Standing (2010) traditional adoption theories have contributed to adoption studies in the past; however, these models have failed to produce mechanisms as to how small businesses can successfully adapt technology applications taking into account diverse actors involved in the process. Although most traditional adoption models ignored end users during design, the finding suggests that users have refused to become just mere adopters, but an integral part of the design and adoption activities.

The finding reveals that small business managers are often initiating the ICT adoption; however, most times they run into significant issues that require the attention of other actors. Diverse actors that enable and constrain emerging ICT adoption are many. These actors have diverse skills, experiences and core competences. These actors constitute both internally and externally to the organisation and are part of the implementers of emerging ICT. They are involved in the re-evaluation and readjustment of existing organisation practices.

Figure 6.3 depicts various actors in the stages of the adoption process and the number of roles performed by these actors in these stages. Recalling that the emerging ICT adoption process is a dynamic process, instead of a one off event, actors and their roles in the process are not static at one decision point. Therefore, the roles were clustered based on the activities actors perform at each stage. These actors influence and are been influenced during emerging ICT adoption and implementation. The analysis of the roles of actors from the participants' views at each stage revealed that the **key actor** and the **government** are visible at all stages of adoption, while **IT experts** are linked to translation, framing and stabilisation. This suggests that the key actor, government, and IT experts significantly play roles at the stages of the adoption process. In addition, the finding reveals that **monitoring**

and **legislation** are the most consistent roles at multiple stages. One of the implications of this is that the government and the key actor remain the major drivers of emerging ICT. The roles of these actors are discussed in the next section.



\*=number of times roles occurred at different stages

Figure 6.3: Roles of actors at multiple stages of adoption process



Table 6.1: The roles of actors in adoption stages

Actors/roles	Stages			
	Inscription	Translation	Framing	Stabilisation
<b>Key actors:</b>				
<i>Innovativeness</i>	✓			
<i>Empowerment</i>	✓	✓		
<i>Monitoring</i>	✓	✓	✓	✓
<i>Controlling</i>		✓	✓	✓
<b>Government</b>				
<i>Collaborative support</i>		✓		
<i>Funding</i>	✓	✓		✓
<i>Research</i>	✓	✓		
<i>Legislation</i>	✓	✓	✓	✓
<i>Training</i>	✓			✓
<b>Customers :</b>				
<i>Idea generation</i>	✓			
<i>Product trial/testing and modification</i>			✓	
<b>Consultants:</b>				
<i>Requirement gathering</i>		✓		
<i>Requirement transformation</i>		✓		
<b>IT Experts:</b>				
<i>Education</i>		✓		
<i>Development</i>			✓	
<i>Verification</i>				✓
<i>Training</i>				✓
<b>Vendors:</b>				
<i>Product Adaptation</i>				✓
<b>Employees:</b>				
<i>Feedback on performance</i>				✓
<b>Emerging ICT</b>				
<i>Enhancing business process</i>				✓

### 6.7.1 Roles of SME managers (the key actors)

#### **Innovativeness**

*Innovativeness* in this context is an act of initiating and valuing other people's opinion and ideas by the managers. It relates to open-mindedness and creativity which helps businesses in generating new ideas (Macredie and Mijinyawa, 2011). A study has shown that new ICT would not succeed if there is no support from the managers (Ramsey et al., 2008). Managers are exceptional individuals that know and use their instinct to discover and bring an innovation into the implementation stage (Akrich et al., 2002a). The study reveals that at the inscription stage, the majority of the key actors were the pioneers of new ICTs. They are the driving force behind the emerging ICT and improve employees' work life and organisation performance. They also re-organise the mutual interest of those involved in the process in order to realise the organisational goal. Innovativeness was a role performed at the *inscription stage*.

#### **Empowerment**

*Empowerment* simply means encouraging actors to become more involved in day to day decision making and activities that affect the organisation. Empowerment is a management idea that has received enormous attention as a result of its impact on organisation effectiveness (Seibert et al., 2004). According to Farnande and Moldogaziev (2013) it improves performance by encouraging innovative ways of correcting mistakes and reorganising work processes. Organisations that encourage empowerment influence many organisation aspects and work practices. Empowering actors involves giving them an opportunity to show that they can generate excellent ideas and that they have all it takes to improve the skills to put the ideas into practice (Psoinso et al., 2000). Because organisations always constitute different functional units, the study reveals that one of the roles of the key actors is mentoring; who by their mere presence empower, teach and motivate others to develop appropriate business strategies that aid effective ICT adoption. Observation shows that empowerment is a management strategy used only by innovative small business managers to support work, set goals, as well as encourage open learning. This guides and encourages the exchange of ideas. This role is linked to the *inscription stage* and *translation stage*.

## **Monitoring**

Businesses are complex entities, and their goals are often broken down into tasks and determining appropriate monitoring control has an influence on the organisation success (Campbell et al., 2011) This task may be carried out in a different location depending on the size of the business. The tasks would often be of little importance unless various actors combine their initiatives to accomplish the task. In most organisations, if a single individual is a sole decision maker for a product, it can have an adverse effect on other people as well as the entire organisation (Carson et al., 1995). This means that for emerging ICT to be successful, diverse actors are involved and their views and interests should be represented in the new ICT. The finding suggests that close surveillance (monitoring) is important in all the stages to ensure various actors adhere to the emerging ICT adoption directives. Monitoring was a significant role performed at all stages of the adoption process.

## **Controlling**

Emerging ICT adoption can be influenced by people within and outside the organisation (Benamati and Lederer, 2008). Controlling was a role that was considered vital not just at the translation stage but also the framing and stabilisation stages. One of the reasons for this role is to ensure that the right standard of emerging ICT is achieved for the smooth running of the organisation, and to ensure that corrective measures are undertaken as and when needed. The key actor generally takes part in the inspection, screening, selection and adaption (Akrich et al., 2002a) of the emerging ICT. Therefore, the strategic implication of this is that they have a crucial role of stimulating uptake and usage (McAfee, 2006) and ensure that the right ICT is established. The findings reveal that the key actor plays significant roles at the *translation, framing and stabilisation stages*.

### *6.7.2 The roles of the government*

## **Collaborative support**

Increased global competition has been forcing organisations to engage in collaborative networks in order to improve themselves through the knowledge acquired (Drissen-Silva and Rabelo, 2009). *Collaborative support* is linked to assistance given to small businesses by government agencies by introducing the key actor to various agencies that may provide assistance on how best to take on new ICT. The role is to ensure that the key actor is aware of those external entities that can help meet and improve their overall business process. The

UK government has been designing policy guidelines that provide information about internet opportunities (Beckinsale et al., 2006) and launched several expansion initiatives to support the adoption and use of IT (Lacovou et al., 1995). In addition, the finding suggests that government also provides collaborative support that helps the key actor. This role was tightly linked to the *translation stage*.

## **Funding**

The global pace at which change occurs in SMEs is so rapid that these organisations must continually improve if they want to remain in business. A large number of SMEs require an enormous amount of funds for technology development and commercialisation (Sohn and Jeon, 2010). SMEs generally lack the awareness and concern over the cost of e-business deployment (Marasin et al., 2007). Funding is vital for starting, maintaining and growing SMEs. Martin and Matlay (2001) establish that through the European Development Fund, European Regional Development Fund, as well as the support programmes, governments fund projects to help SMEs for online learning opportunities through EU fund projects. These suggest that government investment in ICT adoption has generally been directed toward enhancing efficiency (Cordella and Bonina, 2012). Similar to the findings, government has funded most projects to support SMEs. For example, through the recent super fast funding available, the government is presently looking at a more specific IT agenda to help put small businesses at the forefront of taking a bold step to adopting new broadband; however, such support appears not to be sufficient. Funding was a role that was not only visible at the *inscription stage*, but extends to the *translation stage* and *stabilisation stage*.

## **Research**

Martin and Matlay (2001) contend that for small businesses to adopt and utilize IT effectively, they require undertaking a market analysis to enable them to match IT capabilities to organisation resource and market needs. Because small businesses are constrained by time, lack technical knowledge (Simpson and Docherty, 2004) and skill, they have always relied heavily on external actors. The finding suggests that government agencies often conduct research to help key actors keep up to date with the available data regarding competition, customers, as well as the products available to meet their needs. The role was evident at the *inscription stage* and *translation stage*.

## **Legislation**

Regulation of business activities has remained a key issue confronting national government and policy makers (Akinboade and Kinfack, 2010). Its impact to business is a concern for the economy worldwide. According to Low and Johnston, (2009), regulatory changes often affect businesses and at the same time come with so much information, which businesses are expected to be aware of. It can help improve the stability of trading conditions and develop a level of business trust which can benefit SMEs (Atherton et al 2008). The findings suggest that the government still provides first-hand information to small businesses regarding business and society in general. These activities are useful at the early stages of adoption decisions for SMEs because they help key actors understand how these changes might affect their businesses and what ICT might help improve their business process. Evidence suggests that this role also enables the government to know in advance what training activities to provide in order to facilitate ICT adoption. One implication of this role is that it saves the key actor time because they can access business information easily when the need arises. However, observation shows that most of the services are still not free and the bureaucratic process may often slow down the level of support needed by SMEs. Also, studies have also observed that regulation has a high compliance cost compared to large organisations (Akinboade and Kinfack, 2010). Legislation was a role performed at the *translation, framing* and *stabilisation stages*.

## **Training**

One important area in SMEs is the increased provision of training available to encourage SMEs to expand and develop their knowledge base (Collinson and Quinn, 2002). The finding reveals that recently the government has made efforts by organising seminar activities which include cloud computing and internet optimization. The aim is to create awareness of the opportunities associated with adopting new ICT. These activities include: providing access to relatively fast broadband to businesses across the UK with broadband related and carbon reduction support (e-marketing-procurement, access to off-site services, low energy ICT). 2. Delivering ongoing wider business engagement and knowledge transfer. 3. Project management and in addition, helping SMEs to develop the confidence required to take on ICT through ERDF funding projects. Similarly, Martin and Matlay (2001) in their studies identified some of these government agencies to include Learndirect and local UK portals. These agencies offer advice and training through European funding. Training was visible at *the inscription* and *stabilisation stage*.

### 6.7 .3 *The roles of customers*

#### **Idea generation**

The importance of having customers' views during innovation development has been recognised in the literature (Woodroof, 1996; Gottfrisson, 2011). Learning and understanding customers, and integrating their views in the emerging ICT adoption process often results in a successful outcome (Akrich et al., 2002a). While organisations can dictate who their clients are, the failure of any new ICT would be minimal if the company has an excellent relationship with their clients and allows their clients initiative (Akrich et al., 2002a). The finding suggests that customers were not only involved in the initiation of ideas, but they also engage in conceptual design and requirement analysis where they provide a list of well expressed ideas or requirements as well as the reasons for their choice (Kaulio, 1998). Emerging ICT adoption is always guided by customers' voice and ideas and the role is associated with the *inscription stage* and *framing stage*.

#### **Product trial/ testing and modification**

Product testing plays an important role in the development and adoption of a new ICT. It is used to estimate customer reaction which requires a number of design issues or activities which include stimuli design, respondent selection and response measurement (Peng et al., 2012). Kaulio (1998) has sought to operationalise different ways customers take part in the design process. This includes design for, design with, and design by. *Design for* is an approach where information is gathered from users to create the product. *Design with* means gathering data on customers' preferences and using such data to design the product and display the proposed solution, so customers can react to them. *Design by* means an approach where customers are actively involved in the design process (Kaulio, 1998). The finding suggests that, without the opinion of valuable customers that aims at finding a solution to their problems, it may be difficult for organisations to adopt and adapt to new solutions. Customers provide sound and knowledgeable insight and help to reduce the risk of emerging ICT failure. Product testing and modification is visible at the *framing stage*.

#### 6.7.4 *The roles of consultants*

##### **Requirement gathering and evaluation**

As noted previously, key actors most of the times do not have the required knowledge to align their emerging ICT need to their business processes. Consultants were often the first point of contact with key actors who further collate information and evaluate the strengths, weaknesses, and opportunities and threats of these ideas/concepts. This happens because key actors believe that the consultants are always proactive. As a result, most times key actors end up delegating roles to consultants that help in planning the new ICT. However, the findings suggest that consultants may not be performing such roles in favour of SMEs. In support of this, Hoon (2012) notes that highly innovative products may offer consumers greater benefits yet they have a high failure rate. The finding suggests that requirement gathering and evaluation is necessary for trustworthy consultants to ensure that the right product is introduced. This role was visible at the *translation stage*.

##### **Requirement transformation**

It was not surprising that consultants engage in developing ICT plan/business case and ensure that the ICT is implemented successfully, but the finding also reveals that they also transform key actors' requirement into a language that is understandable by other actors such as the IT expert that helps plan, develop and implement new ICT (Fang et al., 2011). This role is carried out at the *translation stage*.

#### 6.7.5 *The roles of IT experts*

##### **Education and Training**

Businesses have continued to invest in learning and development. In the US, organisations have spent nearly \$156.2 billion on employee learning in 2011. Of which service companies account for \$40.9 billion despite the slight drop in spending due to the present recession (Miller, 2012). However, in small business, the issue of learning by SMEs especially in obtaining ICT that will satisfy their need is low. Training and education lies in making SME managers understand the importance of some entrepreneurial competences (Lans et al., 2008). Most small businesses do not take full advantage of ICT because they are not open and do not sufficiently share business (Rantapuska and Ihanainen, 2008). The finding suggests that education was a role performed by IT experts because consultants may not be

able to tailor key actors' needs. IT experts undertake a series of roles to improve key actors' adoption experiences. They execute software designed to meet the needs of SMEs. Such organisation has launched e-learning tools to help SMEs succeed. These IT experts or professionals ensure that key actors get satisfactory ICT by re-evaluating their requirements, and provide available options in order to develop the appropriate solution. This exercise is to help the SMEs to understand various options (developing in-house or outsourcing) available. This is made possible by revealing the implications of choosing any option. Education is tightly linked to the *framing stage*.

### **Development and Verification**

Many businesses use ICT to support decision making (Cochrane et al., 2009). Designing ICT requires using a method that can sufficiently satisfy the needs of the clients. These methods often follow the stage of elicitation. Elicitation here means learning, uncovering and discovering the need of the users. During the process of uncovering the need of users, IT experts must understand the end users' requirements and elicit product and process knowledge from the right people (Cochrane et al., 2009). This lends support to the finding which reveals that IT experts are responsible for transforming the design documents into a physical object taking into account the requirement of the key actors. Development is a role undertaken by IT experts to transform the ideas into new ICT. This requires the use of appropriate methodology for the right ICT to be performed. Evidence reveals that development was a role performed by IT experts at the *framing stage*. On the other hand, emerging ICT is not always perfect when introduced. Verification is also a role performed by IT experts to ensure that the emerging ICT is adaptable to organisation arrangement and closely related to the task of elicitation. This is because it ensures that the ICT must meet the specific requirement of the end user (Cochrane et al., 2009). The finding suggests that one of the reasons for this is to ensure that a bug is not introduced, and most importantly to ensure that the system is user friendly. Verification is a role predominantly carried out at the *framing stage*.

#### *6.7.6 The roles of vendors*

### **Product adaptation**

ICT adaptation involves evaluating the application and ensuring it fits into the existing and new organisation values. The findings suggest that vendors make commitments to providing small business managers with the right ICT by customizing, creating interfaces with the new



ICT and the functional enhancements (Fang et al., 2011). This role is evident at the *stabilisation stage*.

#### 6.7.7 *The role of employees*

##### **Feedback on performance**

It is argued that when a user's participatory behaviour is considered in line with their needs, there is a stronger relationship between users' participation, system success and user satisfaction (McKeen and Guimaraes, 1997). Technology changes and its implication on SMEs business strategy is key to competitive advantage (Martin and Matlay, 2001). Teo et al (2011) note that what most stakeholders consider beneficial when implementing new technology is the internal organisational employees who use the organisation's services and product. The finding reveals that a number of employees that work with SMEs are curious when the need for new ICT arises and are eager to partake in the process. However, the majority of key actors do not see their employees as a source of new knowledge and ideas. Observation shows that employees at a later stage often resist the systems and challenge their usability. The finding reveals such reactions or signals go back to the key actors and in the reduction of risk since employees have a direct contact with the systems. Therefore, organisations should be mindful of the employees' ideas and requirements when decisions for new ICT are made. Feedback on performance was evident at the *stabilisation stage*.

#### 6.7.8 *The role of emerging ICT*

##### **Enhancing business process**

ICT is considered as the major technological innovation that has a broad applicability across many sectors of the economy with a range of different options and complementarities (Dimelis and Papaioannou, 2011). The role of emerging ICT in enabling various developments in the organisation and most especially in shaping the social actors is indispensable. The emphasis on how emerging ICT influences and enhances the quality of actors has been partly highlighted in the adoption process. ICT has become an integral part of society and plays a role in enhancing, supporting, changing and improving human lives (Herold, 2010). Its impacts are evident because it influences, changes and improves the way the organisation routinely functions as well as providing roles and competences to these actors. The findings suggest that emerging ICT is not just a tool designed to help key actors

achieve their tasks but mediates human actors' interactions in the process and has immense economic impacts. These impacts include improving business processes, services such as effective communication, and its influence is indirectly felt at all stages as decisions are made and change at all levels, but strongly enhances the business process at the *stabilisation stage*.

### 6.7.9 Three dynamic influences of emerging ICT adoption

Today's business environment demands that SMEs must cope better with the challenges of managing rapid changes in emerging ICT (Fang, et al 2011). Although these changes are globally recognised, SMEs cannot assume that they can adopt emerging ICT without making adequate decisions by taken into account the relevant actors to ensure that newly adopted ICT implemented today will continually meet their needs tomorrow. Part of the problem has been the social and technical nature of ICT which has been considered from a static and one off action. Drawing on the findings, the modern business practices involve multiparty relationships in which diverse actors work together jointly in adopting emerging ICT. In order to keep updated with the latest emerging ICT that will eventually meet the needs of SMEs over time, this study identifies three dynamic influences that must be recognised when the decision to adopt emerging ICT arises, which involves a number of actors. These include *commitment*; *resistance* and *compliance* and are illustrated in figure 6.4. These dynamic influences occur in one or more of the stages (inscription, translation, framing and stabilization) and remain an ongoing improvisation that actors try to make sense of and act coherently (Orlikowski, 1996).

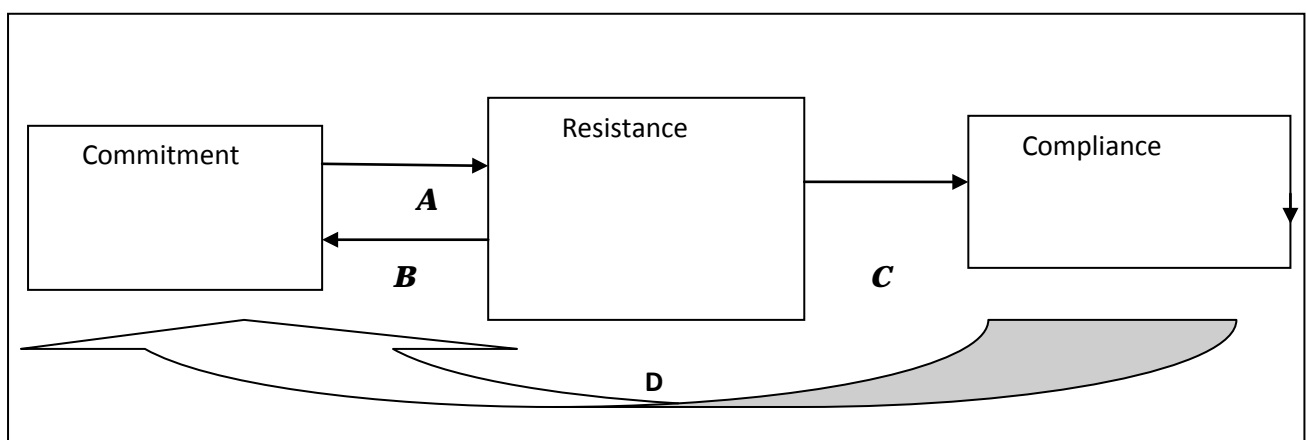


Figure 6.4 Dynamic influence of emerging ICT

A number of studies have pointed out that managers are the main source of organisational change and these actors often initiate and implement change in response to perceived opportunities to improve organisational business processes (Orlikowski, 1996). This lends support to the findings. The study suggests that at inscription, although key actors may sometimes have the sole decision on what to adopt, without the support and input of both the internal actors and external entities, decisions to adopt might be hindered if it moves to the next stage. Evidence from the findings also unveiled that when there is no *commitment*, support or enthusiasm from other actors, which should be an integral part of the decisions at inscription, negotiation appears to be difficult and takes longer than required at the translation stage. Most times, at the translation stage, *resistance* is bound to happen because the key actor often neglects the decisions of others, especially for example, the employee that may also provide the necessary direction for the new ICT. Since the translation stage is where detailed negotiations of different actors happen, the study suggests that conflict of interests easily arise because of different perceptions of these actors at this stage. As a result, agreement becomes difficult to achieve at this stage and often results in unstable commitment from different actors involved in establishing emerging ICT because of dissimilar backgrounds and perceptions.

The findings suggests that *resistance* helps shape the early decisions made at the inscription stage as decisions made at this stage are bound to be revisited (decisions made and moved through A return back through B). Drawing on the findings, one of the key reasons for this is that, the key actor often has preconceived ideas, which may or may not be realistic. On the other hand, others may be more interested in what they can gain commercially instead of what would satisfy the needs of the key actor. *Compliance* is exhibited when the interest of the key actor is ***aligned*** to that of other actors in the process (Inscription, translation and framing and stabilization stage). This requires either the conviction by one actor or the other or where compromise has been reached between the key actor and the others (decisions made at A moves to C). The study suggests that where compliance is achieved, the emerging ICT is implemented at the stabilization stage. These dynamic influences not only allow SMEs to be more innovative, but they also learn from their mistakes based on these experiences to improve their adoption decisions. It is important to note that compliance does not mean that SMEs will not experience further adoption decisions because of the changes in the business environment which may require new commitment (decisions start as arrow moves back from D to seeking commitment at the initial stage (Inscription stage) for emerging ICT adoption).

## 6.8 Discussion: Factors influencing emerging ICT adoption

The implementation of emerging ICT is a herculean task. Although numerous studies have investigated factors influencing ICT adoption, in general, SMEs remain slow in adopting ICT. As highlighted earlier, one of the reasons for this is that, most ICT adoption studies regard ICT adoption as a one-off practice. These studies appear to have ignored the fact that ICT adoption is a dynamic and ongoing process and factors influencing its adoption should be accounted for, as decisions to adopt are made and challenged along the adoption process. As a result it requires serious attention (Lacovou et al., 1995).

Simmons et al., (2008) note that though SMEs have limited resources, their nature and size help them to be more adaptive, flexible and responsive to changing conditions than large organisations. Yet there is rapid acceptance of emerging ICT in corporate environments compared to small business. Without in-depth knowledge of processes and factors that continually affect the adoption of IS innovation in SMEs, the zeal to adopt technology innovations will not contribute to SMEs competitiveness (Ramdani et al., 2009). One of the reasons cited in the literature is that the factors revealed in previous studies are not often clear, and have continually differed especially in SMEs (Simmons et al., 2008).

In addition, Chau and Tam (1997) stress that the majority of conflicting results on previous studies on technology innovation reported in the literature are often attributed to the contextual differences in studies. These are due to the failure on the part of researchers to recognise that technological attributes are perceived differently and categorising technology adoption variables by themselves will not be a strong predictor of adoption (Chau and Tam, 1997).

SMEs require adopting new technology applications continually to help leverage their potentials, exploit opportunities and to compete with their large counterparts (Shiau et al., 2009). Hence, it is more important to understand the key factors influencing emerging ICT as decisions are made and challenged along the process in order to arouse its adoption. *Factors discussed here are data driven but conceptually organised based on participants' opinions.* These factors are not static at one decision point; instead, they vary from one stage to another.

Figure 6.4 depicts factors influencing emerging ICT at multiple stages of adoption. The findings suggest that ***ease of use, managerial time, customer focus, and adoption cost and customer focus affect*** at least three stages and are the most recurring factors at

multiple stages. These findings suggest that actors often consider these factors as decisions proceeding from one stage to another. They are critical for informing emerging ICT adoption and development over time. These factors are now discussed below.

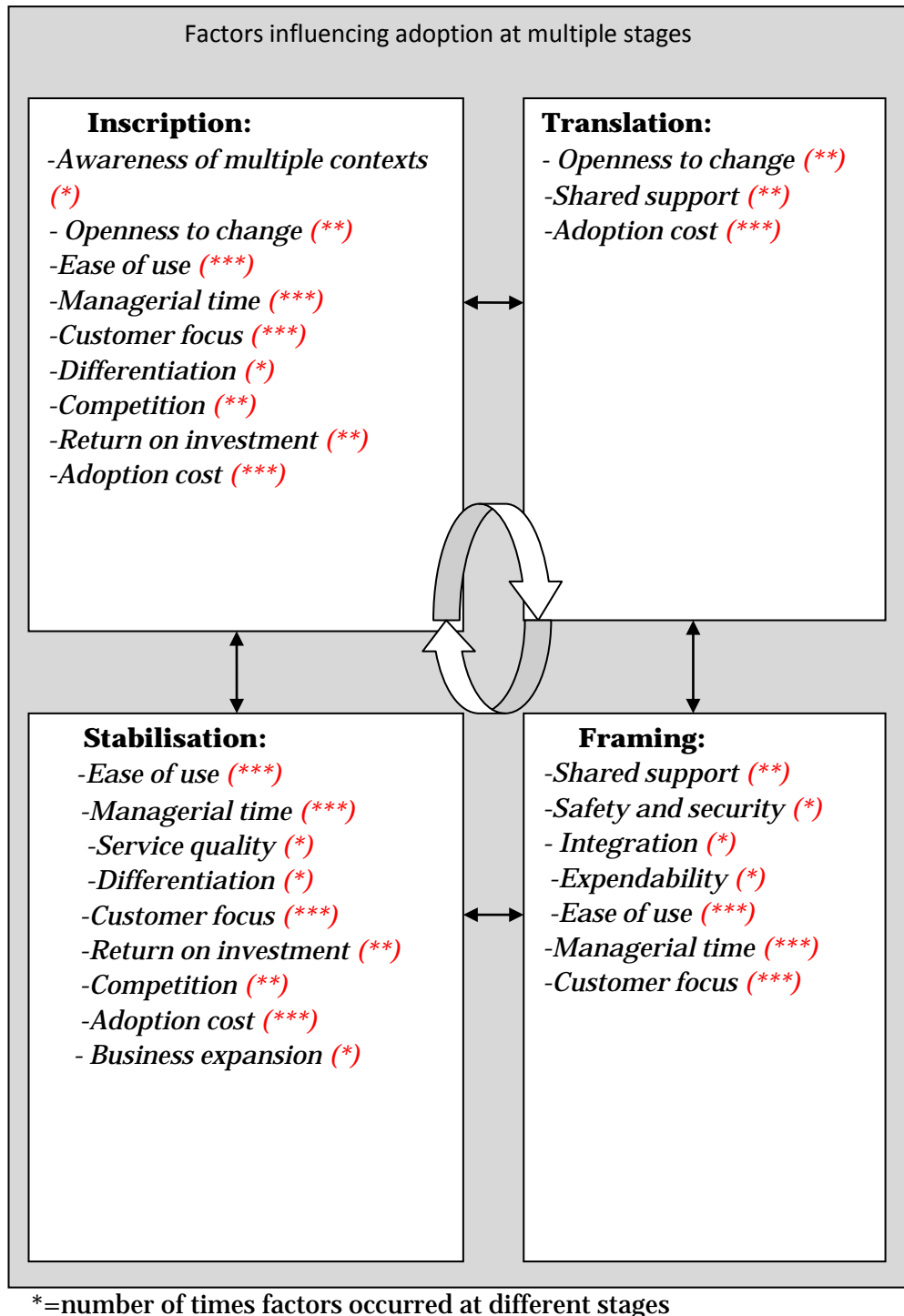


Figure 6.5: Factors influencing adoption at multiple stages

Table 6.2: Factors influencing adoption at multiple stages

Factors	Stages			
	Inscription	Translation	Framing	Stabilisation
Awareness of multiple context	✓			
Openness to change	✓	✓		
Shared support		✓	✓	✓
Safety and security			✓	
Integration			✓	
Expandability			✓	
Ease of use	✓		✓	✓
Managerial time	✓		✓	✓
Service quality				✓
Customer focus	✓		✓	✓
Differentiation	✓			
Return on investment	✓			✓
Competition	✓			✓
Adoption cost	✓	✓		✓
Business expansion				✓

### Awareness of multiple contexts

*Awareness of multiple contexts* is the ability to understand and evaluate all options and ensure that the impending challenges are evaluated. ICT is not a one off event; instead, it is fragmented and disjointed (Ramsey et al., 2004). While new ICT is complex and subject to continuous changes, the increased complexities inhibit the widespread adoption in SMEs (Brown and Lockett, 2004; Ritchies and Brindley, 2005). Teo et al (2011) contend that those internal organisational actors' external customers and suppliers who use the organisational products are the most influential and should not be neglected. Similarly, the finding reveals that SMEs that address the multiple internal and external actors that not only contribute to adoption success, but give considerations to all emerging situations surrounding successful adoption would likely engage in new ICT over time compared to others. Awareness of multiple contexts affects the *inscription stage* where the initial decisions for the emerging ICT are made.

## **Openness to change**

*Openness to change* refers to the extent managers recognise that diverse actors are the greatest resources any business can have and their opinions and ideas contribute significantly to organisation success. Openness to change fosters initiatives and freedom of actions and is related to greater performance (Elie-Dit-Cosaque et al., 2011). Therefore, encouraging others to participate in the adoption decision making requires recognising all actors and taking their ideas into consideration at the initial stages of adoption; this essentially triggers emerging ICT adoption often. This is substantially facilitated by innovation culture where actors internal and external to the organisation are encouraged to contribute their own ideas.

The finding suggests that openness to change encourages different ideas that enables fruitful debate on the possibility of failure and facilitates information exchange. This aids open discussions and diverse participation that partake in key organisation endeavour, paving the way to gaining knowledge from different sources and establishing different ways to view the organisation endeavour. Similarly Teo et al., (2011) note that to cope with the complex and dynamic business and environmental changes, organisations may be reluctant to simplify their duties and engage with others in order to create a comprehensive picture. This is evident in a small business context where the managers are mostly the decision makers. However if this is avoided, it becomes imperative for organisations to maintain diverse opinion (Teo et al., 2011) with respect to developing and adopting new ICT. Openness to change affects adoption at both the *inscription stage* and *translation stage*.

## **Shared support**

*Shared support* is defined as the working together to a common purpose in order to obtain a shared purpose and facilitate open interaction. Although most emerging ICT adoption originates from the key actors, their decisions are shaped by social dynamics associated with the technology application. Shared support is in the form of open participation involving different actors including vendors and consultants who may, by their presence and knowledge, involve in overcoming problems posed by the latest technology (Macredie and Mijinyawa, 2011) and promote mutual aid (Khoumbati et al., 2006) through shared knowledge. Nelson and Coopriider (1996) found that increasing levels of shared knowledge and support between groups is associated with increased level of operational performance, influencing IT assimilation (Armstrong and Sambamurthy, 1991) and level of IT business alignment (Reich and Benbasat, 2000).

The study suggests that because different actors may involve in emerging ICT adoption, key actors seek the support of those actors that may have the right knowledge to make an informed evaluation exercise, instead of relying on their knowledge and assumptions. Evidence also suggests that because most key actors are not technically sound to understand what ICT would meet their needs, they often have links with others external actors hence social support is a factor that triggers the adoption of new technology. This process aids the facilitation of dynamic interaction between various actors and provides a way to bridge the limited knowledge and skills associated with the key actors. According to Teo et al., (2011) such practice promotes open negotiations; stimulating new ideas and innovator thinking, and continuous learning. Shared support was a factor recognised at the *translation, framing and stabilisation stages*.

### **Safety and security**

In the context of this research, *safety and security* is the protection of information, persons and property from unanticipated conditions. IT security infrastructure has always remained the basis for a secure environment (Cavusoglu et al., 2004). Safety and security are necessary immediately after a business transaction moves beyond the boundaries of the offline methods of doing business. This has become a critical issue for some years now, especially businesses that use digital applications. Yousafzai and Yani-de Soriano (2012) found that insecurity is linked to distrust of the ICT and scepticism about its ability to work perfectly well, Cavusoglu et al., (2004) report that it provides a comprehensive plan that protects not just the confidentiality of information, but the integrity and availability of the information resources. Feeling of insecurity inhibits small business managers from sharing personal information or doing business with companies that are not well known to them. Awa et al., (2010) report that security issues occur because personal information supplied online or through digital applications moves through entrusted systems and stands a high risk of being intercepted. Important information and other confidential information may expose the user to risk. The study identified two aspects of safety and security issues that key actors were concerned with. First is during a transaction where a third party does not interfere in the business transaction and second, where the ICT assists in monitoring the safety of the workers and to ensure that employees are safe at work. Safety and security to a large extent motivates SME managers in adopting any new ICT and is tightly linked to the *framing stage*.



## **Integration**

*Integration* is the capability of the emerging ICT to interface or connect with organisations' previous or recent technology applications. It is also the capability of any new emerging ICT to attach to any internal or external component which is useful to the business. The non-integration of ICT infrastructure causes a number of problems to businesses (Khoumbati et al., 2006). Zhu et al., (2003) emphasise that connectivity eliminates incompatibility within the organisation. It can also restrict compatibility where new ICT is difficult to integrate with other applications. Integration happens when a firm's new ICT applications allow for intra and inter-organisational systems functions. It occurs when the functionalities of the emerging ICT fit into the features and existing values of the present organisation's IT needs (Fitzgerald and Kenny, 2003) and aids the exchange of information (Kim et al., 2011; Macredie and Mijinyawa, 2011; Rogers, 1995). The findings suggest that integration remains a factor affecting the emerging ICT adoption and key actors are enthusiastic to engage in a new ICT if it meets the existing and new organisational arrangements. Integration affects the *framing stage*.

## **Ease of use**

*Ease of use* is the capacity of the emerging ICT to allow people with little knowledge or learning effort to perform complex tasks. It is also linked to simplicity with which the new ICT is maintained in the near future. A number of studies (Chau, 1996; Hong et al., 2011; Awa et al., 2010; Polites and Karahanna, 2012) have pointed out that ease of use is the prerequisite for adoption and use. These studies are of the view that if any emerging ICT is highly usable regardless of the level of skills of those that engage with it, it would be most likely accepted by the users (Holden and Rada, 2011; Hong et al., 2011). Similarly, other empirical studies (Moore and Benbasat, 1991; Venkatesh and Davis, 1996) reveal that there is a positive correlation between ease of use and ICT adoption.

While ease of use has a positive impact, contributing to task accomplishments and job performance, this is not usually the case. Some new ICT has been considered as highly usable but rejected by the users. The study suggests that despite the ease of use being a significant factor that shapes emerging ICT, one of the reasons users or employees reject new ICT is that, in most cases, their initiatives are not considered before the actual development or implementation. Ease of use affects the *inscription stage*, *framing stage* and *stabilisation stage*.

## **Expandability**

*Expandability* refers to the capacity of the emerging ICT to remain flexible and continually accommodate new functionalities or features. In today's unpredictable business environment, acquiring or developing an expandable system is essential. Expandability of new ICT applications is the foundation on which processes can be developed easily. The study suggests that expandability of the ICT application aids innovation of the business process and reduces the cost of developing or adopting entirely new systems. This makes it easier to develop common systems that integrate various business units without having to develop completely new ICT, support core applications, skills, competences, commitments, values within both the technical and human component of existing IT infrastructure. Similar to the finding, Gholami et al., (2009) pointed out that technology applications that are flexible to handle changes can be used to achieve today's and future business goals. Expandability significantly affects emerging ICT adoption at the *framing stage*.

## **Managerial time**

*Managerial time* in this context refers to the capability of the emerging ICT to serve and save time through an efficient means. Boshoff (1999) notes that empirical study (Taylor, 1994) has illustrated that time delay increases felt anger of not only the adopters but also the service customers. As such, it has a negative impact on the service quality. To act quickly during business operations is imperative for constant improvement to business activities and most importantly to win new clients. The study suggests that the greater the emerging ICT saves time during business operations and service delivery the more satisfactorily the key actors are likely to engage with it. Following the example of the semi-structured interviews, it is noted that: "Time is very important. If the technology can capture somebody who had an accident an hour ago, 10 minutes ago, 5 minutes ago; we are going to be more likely to take up the technology" (A5). Managerial time significantly affects the *inscription stage*, *framing stage* and *stabilisation stage*.

## **Service quality**

*Service quality* is defined in this context as the capability of the emerging ICT to deliver efficient results to the users. It also relates to the extent the emerging ICT is fast and helps improve service delivery, the company's processes and profit. The sudden surge of service technology has incredibly changed the ways users interact with organisations to create service outcome (Xu et al., 2011). Self service technologies provide services to the users and

in a way that reduces not just cost, but the time those services would have taken if directly handled by customer service representatives.

Service quality is another crucial factor the study unveiled that shaped the adoption of emerging ICT. It may be determined by evaluating the expected performance of the systems against the actual performance. For example, if the organisations' evaluation of the actual performance of the new system is less than its expected performance, it is likely that it would negatively affect adoption. Therefore, the overall assessment or comparisons between the expected performance and the actual performance by the users often determines whether it is worth adopting or not. According to Awa (2010) the quality of services any new technology offers, triggers the users from being mere prospects to adopters. Users here not only include the managers, but customers since Yousafzai and Yani-de Soriano (2012) note that customers are vital given that they are involved in the online service context. The finding suggests that the more the emerging ICT assists in delivering efficient service and meets customers' needs, the more likely small business managers would consider adopting it. Service quality remains a critical component of any firms' success (Song, 2003; Xu et al., 2011) and affects the stabilisation stages.

### **Customer focus**

*Customer focus* is the capability of the emerging ICT to provide services that are able to satisfy the existing and potential organisation's customers. Emerging digital applications play tremendous roles in a number of stages in the buying process. Customers heavily rely on these applications to deliver information on items to purchase, make payments and provide follow up services (Moon, 2003). When these technology applications play pivotal roles in the purchase process, their perceived performance remains critical to organisations. If new ICTs are capable of performing effectively and meeting customer needs, the likelihood that the key actors would rely on them for regular assistance would be high compared to when the new ICT is not meeting their needs (Moon, 2003). The finding reveals that businesses would be willing to adopt emerging ICT where it helps organisations to retain previous customers and acquire new ones. Customer focus strongly affects the *inscription stage, framing stage and stabilisation stage*.

### **Differentiation**

*Differentiation* is the capability of the emerging ICT to create unique services, which rivals find difficult to imitate and boost the chances of creating a niche or winning new customers.

The impact of new ICT on differentiation strategies is one that is dramatic. Porter and Miller (1985) note that embodiment of ICT in their product or services is a powerful way small businesses differentiate from competition. Differentiation influences adoption of new ICT and assists in offering services or products that are unique by a wide range of clients and makes customisation possible. The finding points out that the reason most small businesses engage in new ICT is because it offers services or products that separate them from competition, especially where competitors offer products with identical attributes. Differentiation affects both the *inscription stage* and *stabilisation stage*.

### **Return on investment**

*Return on investment* relates to profit generated in the organisation as a result of investing in new ICTs. It links to the market values, residual income and future abnormal returns (Henderson et al., 2010) witnessed by a firm. A number of studies (Lim et al., 2011; Kobelsky et al., 2008) have examined the financial return on IT. Assessing such return on investment has always triggered investment on technology (Cavusoglu et al., 2004). While some studies (Hitt and Brynjolfsson, 1996) maintained that IT may increase the productivity but with little or no impact on profitability, others (Kobelsky et al., 2008), have found that IT investments may increase productivity and impact on profitability. Ramsey et al., (2008) note that the inherent assumption of economic theories is that businesses are profit-driven. According to Salmela and Turunen (2003) if a new ICT application increases the profit margin of any new adopter, both the existing players and new ones will attempt to adopt it. Similarly, the findings suggest that key actors are more likely to engage in emerging ICT if it allows firms to realise potential market values, indicate potential competitive advantages and return for shareholders (Low and Johnston, 2009; Lim et al., 2011) compared to those that do not indicate any potential return on investments. Return on investment affects the *inscription stage* of adoption and the *stabilisation stage*.

### **Competition**

*Competition* refers to the forces that constrain the continuation of an organization. Competition has been recognised as an important determinant of SMEs adoption of new ICT in the literature (Khoubati et al., 2006). Evidence suggests that key actors constantly respond to various external forces or pressure (competitors). While the pressures constrain the survival of most key actors, they often constantly look out for new technology practices to better coordinate intra and extra—organisation business processes (Khoubati et al., 2006). Current views of ICT based competitive advantage stress that the use of new ICT applications

can offer businesses a competitive advantage within an entire supply chain instead of a tool designed for an individual company, changing the firm's structure and spawning new businesses (Porter and Millar, 1985; Salmela and Turunen, 2003). The finding suggests that new ICTs that are configured and highly integrated would be difficult for competitors wanting to imitate or replicate the whole strategy. Competition affects not just the *inscription stage*, but also the *stabilisation stage*.

### **Adoption cost**

*Adoption cost* is linked to how cheap or inexpensive the emerging ICT is as well as how the emerging ICT can assist in reducing the number of employees and provide the services that other costly ICT offers. It is referred in this study as a force that hinders the existence of an organization. Studies (Lacovou et al., 1995) note that adoption cost is a factor that influences new ICT. One such study is Khoubati et al., (2006) that emphasised that several business organisations carry out cost–benefit analysis before engaging with any new technologies. The mechanism to overcome users' resistance to adopting emerging ICT is when the emerging ICT demonstrates its capacity to reduce cost and improve performance. Emerging ICT adoption is greatly determined when a business compares the benefits and costs of adopting and using the emerging ICT. The choice of any business to adopt or not to adopt greatly depends on conducting a cost-benefit analysis to enable the business to determine beforehand what could be realised in the long run (Pirich et al., 2001). Therefore, the more a business realises that the benefit derived from the adopting new ICT is far greater than the cost, the more likely it will be considered during decision making. Adoption cost significantly affects decisions at the *inscription stage*, *translation stage* and *stabilisation stage*.

### **Business Expansion**

*Business expansion or growth* encompasses staff strength, return on investment, market share. Locke (2004) notes that improved business performance is likely to be experienced by those SMEs that have specific growth objectives. While key actors or small businesses that are independent are more likely to experience low profit with no resultant influence on sales, those that want to achieve profit do not often experience an increase in profit level (Locke 2004). This implies that to achieve high performance key actors need to adopt business growth or expansion strategy (Locke, 2004) by adopting and implementing emerging ICT that improves performance.

Business expansion or growth is a factor that triggers key actors to consider emerging ICT. Although literature suggests that the size of an SME and the number of staff employed is relevant for business expansion, an increase in employment in some cases may not be an indicator that organisations would improve their performance. Business expansion extends to size and employment to include business performance. In contrast, key actors that witness growth in staff strength and profitability as a result of investing in emerging ICT may lead to acquisitions of other companies, change the way they do business and improve performance. ICT improves not just productivity, but enables key actors to carry out businesses outside the firm and create new industries. The study suggests that there is a relationship between ICT implementation/utilisation and business growth in small business although this may depend on the growth measures and the emerging ICT considered (Locke, 2004).

## **6.9 Discussion: Challenges confronting actors**

This section discusses some of the challenges hindering emerging ICT adoption success which the research has identified.

### *6.9.1 SME managers (Key actor)*

#### **Poor knowledge of ICT and Time**

The finding suggests that one of the challenges confronting key actors is that they still lack the knowledge required to invest in strategic implementation and use of emerging ICT. Evidence suggests that SMEs tend to indulge so much in the day to day running of their businesses and have no time. Simpson and Docherty (2004) note that although some small service organisations can address most of the general problems caused by their environment through paper leaflets, the majority of the key actors do not have the time to read reports, rather they prefer instant answers to their problems. As such, they do not invest time in learning before taking a decision on any new ICT. The implication of this is that most often key actors do not know exactly what they want, and this increasingly leads to tension and impedes the adoption success.

## 6.9.2 Government

### **Lack of specialised skills**

It is believed that the government would intervene to support key actors effectively as Beckinsale et al., (2006) note that generally, government has been at the forefront of encouraging SMEs to invest in internet technologies. However, the finding suggests that the government still does not have the specialised skills required to support key actors in adopting and implementing emerging ICT. Instead, they have continually signposted key actors to other organisations without follow up evaluation that ensures that they get the right support.

### **Poor support**

The study suggests that there is still poor government support. This has been the main reason why governments signpost key actors to various independent organisations. Observation during the analysis also suggests that even where these organisations (consultants, Vendors, IT experts) have their own commercial interest at heart, the government does not give adequate support to SMEs to ensure they overcome such a hurdle. There are still limits to the services government and its agencies offer to SMEs for free, while the rest are chargeable. Similarly, Simpson and Docherty (2004) pointed out that this has a strong negative influence on small business since they often believe that government services are free; however, they end up charging them fees. Most often small businesses do not associate with these agencies because of the perception they now have about the government (Simpson and Docherty, 2004).

### **Limited funding**

The study suggests that one of the reasons some small business managers still engage with government agencies is primarily to gain access to public funds. However, with the current economic meltdown (recession), the study suggests that limited funds and support have continually dwindled and this widens the gap in terms of the support that the government offers to small businesses.

## **General support**

Simpson and Docherty (2004) maintained that most of the government support agencies may not be serving the overall needs of the small businesses. Similar findings have been observed. The study suggests that most government activities are general and may not be serving the needs of most SMEs effectively. The reason according to Costello (2009) is that many projects designed to help small businesses have been directed towards the needs of the policymakers instead of addressing the specific needs of small businesses. As a result, SMEs still feel insecure with most government organisations set up to help them.

### *6.9.3 Consultants*

#### **Dependent /Untrustworthy**

One of the general trends running through the finding is that most times consultants are not independent or trustworthy. Similar to this, Chibelushi and Costello (2009) for example, found that the challenges facing small business managers is as a result of a number of untrustworthy and non-proficient sets of consultants that offer advice. Chibelushi and Costello (2009) found that 47 percent of the companies still questioned the capabilities or level of specialist knowledge offered by consultants. Although it is necessary for SMEs to have at least up to date knowledge that will help reveal the right services needed, most external actors are not proactive, neither are they independent. The finding suggests that SMEs should continuously rely on the network of partners that are dependent and trustworthy.

### *6.9.4 IT experts*

#### **General solutions**

Regardless of the various roles IT experts perform, the finding shows that IT experts often end up introducing solutions which are not organisation specific; instead what they do is to produce global solutions. One of the implications identified from the analysis is that actors' interest in the adoption process is difficult to align as further suggested by Hunter et al (2001). Similarly, Simpson and Docherty (2004) note that IT experts do not often consider the specific type of business they render these services to. The findings show that there is still a limit to what IT experts offer to ensure that key actors adopt the right emerging ICT.



### 6.9.5 Vendors

#### **Commercial gain**

The study reveals that vendors most of the time do not consider or unveil the long term benefit of the new ICT they intend to introduce to small businesses. The quality of the services and information vendors provide to SMEs appears to be relatively low. In a similar vein, studies (Simpson and Docherty, 2004; Hunter et al., 2001; Beaver, 2002) have also pointed out that most vendors do not ultimately meet the needs of key actors; rather their services are more generalist in nature. In addition, Hunter et al (2001) also revealed that most times, vendors provide ICT solutions based on the geographical location. This may create a very difficult situation since one ICT in a sector might vary considerably in another sector.

## **6.10 Key recommendations**

In this light, it is evident that the nature of emerging ICT adoption in a small business context presents some challenges. In order to reduce these challenges a number of recommendations have been put forward, not just for small business managers but also other actors - IT experts and consultants, vendors, and government; because decisions for emerging ICT adoption in SMEs do not rest on one person, rather it is holistic (involves diverse actors).

#### **Small business manager (Key actor)**

It is believed that the majority of the key actors have the feeling that they are isolated especially where they cannot secure some of the support offered by the government or access finance (Zindiye et al., 2010). Most small businesses also do not understand how IT can be used to improve business performance; rather what most do is to get recommendations from friends and families. More so, a lot of infrastructure companies are going into developing web applications without a thorough understanding of their business processes. Key actors should establish a relationship with some specific actors; trust them in such a way that they can support their online trading platforms. This can serve a useful step in gaining external support that is proficient and avoids common business mistakes through this way.

Key actors should rely solely on their informal networks and focus on actors that are knowledgeable about a particular ICT in that sector. They should develop a strategic

partnership and not rely on actors that have an interest in a particular product. Also, small business managers should identify their capabilities and where they are deficient using the framework to be able to identify where these actors can effectively help (Simpson and Docherty, 2004). It is also important for key actors to encourage employees to contribute their quota in ICT adoption decision making since it is evident that employees can play a substantial role in the adoption process.

### **Consultants and IT Experts**

The study reveals that in situations where small business managers do not have anyone to oversee the adoption of emerging ICT internally, consultants and external ICT experts are the next available option. Most IT experts and consultants do not consider how businesses vary in terms of sector or size; rather they tend to overemphasise on the requirements of the ICT applications and how this requirement can effectively be transformed. Although reliable consultants and IT experts to a large extent may assist, this would eventually require a large commitment to resources at one time and in turn result in resource commitment by the business (Hunter et al., 2001), Consultants and IT experts should bear in mind that in terms of the resource acquisitions, small services business managers would tend to minimize the resources committed at every stage of the adoption process. Consultants and IT experts should understand the attitudes toward the key actor, rely on a truthful and modest offer of services, make sure of the capability of the offer to produce results, charge reasonable fees for the services and have the willingness to build long term relationships.

### **Vendors**

Vendors are actors that supply hardware and software and provide support to small businesses. Evidence shows that small businesses might be relying on vendors for identifying and resolving problems with the emerging ICT including the enhancement of the functionalities of the emerging ICT and customisation of the new ICT (Fang et al., 2011). It was obvious that vendors are also not independent and most of the time IT companies communicate to vendors and pressure them to provide support which may or may not fit into small businesses' arrangements or needs.

Vendors should aim at providing more sector oriented suppliers directed at meeting the specific needs of these small businesses which will, to a large extent, address the priorities of small business managers. Furthermore, vendors should guarantee that the ICT provided performs the necessary functions to the businesses. This requires a thorough evaluation of

what activities the small business engages in to ensure that the right functionality of the products is in place and to monitor the performance from time to time. Also, vendors should make efforts to understand other actors within the sector that are an important part of small businesses' decision making and build strategic partnerships with them to provide the required ICT needed for small businesses (Hunter et al., 2001).

## **Government**

There are a number of roles presented in chapter 6 which the government has developed to support small businesses. Costello (2009) notes that the support services most often focus on personal career development in order to meet the target imposed by government since the support services are funded by the government. Furthermore, most grants are restricted especially in small service sector businesses and open to companies with certain annual turnover and are generally aimed at end users and are limited in use. Although the study reveals that government plays a role at all the stages, this support appears not to be enough. Government requires effective support for small businesses in relation to adopting ICT with the required finance incentives to improve their effectiveness. Second, in support of the findings Hunter et al., (2001) further state that a large part of these services are bureaucratic and still do not address the idiosyncratic nature of these small businesses. For example, SMEs still find it difficult accessing subsidies regardless of the support and encouragement by the government. Government should be providing more proactive services and establish direct contact with them and facilitate the exchange of information especially with those whose speciality is in IT since small businesses still rely on informal networks.

## **Internal actors**

Internal ICT staff and other employees play an important role for the majority of ICT usage, upgrade and maintenance. However, because emerging ICT evolves regularly, and an up to date internal ICT expert employed today may not be up to date tomorrow, coupled with the high salary imposed by these experts, small businesses were inhibited from engaging with these experts effectively; rather they are allowed to do some ancillary tasks. Hunter et al., (2001) argue that such a task (IT administration) may not be effective in a very busy work environment. In addition, the current study points out those employees (no ICT employees) are not considered at the initial stage of the ICT adoption decision, but play a very vital role during implementation. Small business managers should bear in mind that for smooth implementation of emerging ICT, effort should always be intensified to take into consideration the initiatives of diverse employees in the organisation. This corresponds to

Ramsey et al.,'s (2008) study which states that one of the difficult tasks facing the small businesses service sector is aligning employees into the new system, and the organisation's recent and previous arrangements which may subsequently involve developing an entirely new ICT.

## **6.11 Summary**

The three main objectives of the study were to examine the dynamic process of the emerging ICT adoption process, the roles of actors in the process and the critical factors influencing the adoption process. These objectives have been achieved through data collection and analysis using interviews. ANT has helped to unveil the findings and offers a valuable theoretical lens to investigate emerging ICT adoption. This chapter presents the key activities required for engaging in emerging ICT successfully with specific emphasis on how SMEs can adopt it and adapt to it over time. Secondly, the findings also show that adoption of emerging ICT requires a number of actors that perform a number of roles in the process. The findings identified these roles and the critical factors which vary from one stage to another. Furthermore, the study identifies some of the challenges confronting actors as they partake in ICT adoption, which in most cases affect the success level of adoption with some key recommendations for these actors.

# Chapter 7

## Summary and conclusion

This chapter provides the summary and conclusion of the thesis. First, it highlights the rationale for the research, objectives, research method and the key findings. Next, it presents the contribution to theory and knowledge, implications to research and practice, limitations of the study and finally the future research.

### 7.1 Research rationale

The research examines emerging ICT adoption from a dynamic process perspective and is focused on UK service SMEs due to their contributions to the UK economy and the importance of emerging ICT adoption for their business success.

Evidence from the literature also reveals that the diversity of research in terms of theory and methodology is still very low. The majority of these theories have focused on variance or factor approach which has limitations in capturing the dynamic nature of the adoption process. On the other hand, the majority of ICT adoption research is based on the quantitative methods using a deductive approach. It is argued that the dominant use of this approach will limit the research advancement in this field.

ICT adoption and development is also a complex issue. While studies often examine adoption from either social or technology perspectives, a substantial amount of studies have focused more on the technical aspects with less emphasis being placed on the role of human agency (Barrett et al 2006). Given that there are numerous actors involved in ICT adoption, how social actors who are part of the adoption decisions shape and are being shaped by ICT is still silent in the literature. The dominant approaches used by most previous studies consider ICT adoption as a static and one-off action. They are unable to capture the constant technology advances and the dynamic and evolutionary process of technology adoption. To advance our understanding of emerging ICT adoption in SMEs, this study examined emerging ICT adoption from a dynamic process perspective and provided new insights on how SMEs adopt emerging ICT continually.

## **7.2 Objectives of the study**

To achieve the research aims, this study attempted to understand issues relating to emerging ICT adoption by reviewing and analysing the existing literature, and exploring the current situations in UK small service businesses. It proposed and empirically validated a conceptual framework to depict the dynamic process of emerging ICT adoption in SMEs and explored the roles of actors in the emerging ICT adoption process, identified the critical factors influencing the emerging ICT adoption process and the challenges of actors. Finally, it provided implications and guidelines for stakeholders in promoting future adoption and diffusion of new ICTs in SMEs.

## **7.3 Research methods and procedures**

Bearing in mind the current criticism and limitations, this study adopted ANT and a qualitative approach to gain a richer and more in-depth understanding of the phenomena. More specifically, unstructured and semi-structured interviews were used with the six stage thematic data analysis (hybrid approach- deductive and inductive approach) process with 26 interviews. The data analysis incorporated NVivo for easy management of data, because of the large volumes of empirical data involved. The detailed interview process and the data analysis procedures are presented in chapter 4 and chapter 5 respectively.

## **7.4 Key findings**

The conceptual framework in figure 6.1 of chapter 6 demonstrates that adoption of emerging ICT in a small business context is not static, straightforward and certain; instead it is dynamic and ongoing. This is so because adoption decisions are not made by a single individual but are influenced or shaped by actors whose perceptions and views may differ from each other. ICT adoption in UK SMEs has moved from a simpler process to a more complex and interactive process. The framework identifies a range of actors (human and non-human) involved in the adoption process and provides the basis for understanding the adoption process, the roles of actors and the critical factors. Figure 6.2 in chapter 6 depicts *problem assessment and evaluation, concept generation and evaluation, concept specification, product outsourcing /role delegation, misalignment and alignment of interests, product trial, product modification, adaptation, impact, problem redefinition* as key activities that are involved in the emerging ICT adoption process at different stages from

a dynamic process perspective. Previous theories (e.g., traditional theories of adoption) and models (e.g., adoption ladder) appeared to be less adaptable.

Furthermore, the study unveiled a number of important roles that actors play in the adoption process (see table 6.1). While all these roles are vital for effective development and adoption of ICT, one significant finding is that these roles vary from one stage to another. The finding reveals that *monitoring* and *legislation* are the most recurring roles at different stages and the human actors associated with these roles are the *SME managers* and the *government* (see figure 6.3). This suggests that key actors and the government are still at the forefront in enabling ICT development and adoption in a small business context.

In addition, the study also unveiled key factors influencing ICT adoption (see table 6.2). While these factors are critical, they do not just influence the adoption at one decision point, instead they influence adoption at different stages. The findings suggest that *Ease of use*, *managerial time*, *shared support*, *customer focus*, and *adoption cost* remain the most recurring factors. These factors affected at least three different stages. Furthermore, *openness to change*, *return on investment* and *competition* affected two stages, while the rest affected a single stage (see figure 6.4).

In conclusion, the outcome of the findings demonstrates that ANT has helped to understand both the dynamic and the evolutionary process of emerging ICT adoption, the actors involved, their roles, factors and how they vary from one stage to another. The key activities, roles of actors, and critical factors are crucial for the successful development and implementation of emerging ICT. The study further reveals the key challenges facing actors and the recommendations which are presented in chapter 6. Key organisational actors who are responsible for adoption and various practitioners who are an integral part of the adoption process should bear in mind that these roles and factors can profoundly impact ICT adoption and decisions as decisions to adopt proceeds from one stage to another. ANT has been a valuable theoretical lens for examining emerging ICT adoption from a dynamic process perspective.

## **7.5 Contributions to theory and knowledge**

### *7.5.1 Contribution to theory*

This study contributes to the body of ICT adoption theory with the validated framework. The framework in figure 6.1 demonstrates various actors (human and non-human) and how they interact. This study reveals that it is always beneficial to consider the influence of technology in order to fully grasp the outcome of the interactions between technology and social systems. The key actor and other human actors involved in the process for example are always in a position to challenge each other. However, the intended ICT depending on the features and functionalities the key actor wanted, also influences the decisions of these actors. It also identified four stages of the adoption decision process which illustrates that decisions are not certain at any stage because of different perceptions and views of this actor.

The conceptual framework demonstrates how the technology is shaping and has been shaped by diverse human actors. It shows a process that is constantly reiterating and evolving. The framework reveals that the pattern of ICT adoption in a small business context is not a straightforward event. Therefore, the stages in the framework may be limited or become hindered at any point if there are conflicting views or challenges among various actors; this leads to withdrawal, or re-evaluation, of some or all of the stages. The dynamic negotiation process (Monteiro and Handset, 1996) in the framework necessitates actors to shift forward and backward between stages. The adoption stages include a distinctive iterative phase with the activities occurring continually over time and follow an unpredictable path throughout the lifecycle of the small businesses where diverse actors are involved.

### *7.5.2 Contribution to knowledge*

This study also has made valuable contributions to our knowledge on emerging ICT adoption with better understanding of and new insights into the ICT adoption process, actors and critical factors. Numerous studies have employed ANT to inform their study. These studies have relied on ANT concepts in the analysis and interpretations of their findings. While these vocabularies have helped to understand the phenomenon under investigation, studies do not often explore specific activities that relate to each ANT concept; rather they have always used these concepts in more generic ways in interpreting their findings. This study applied the key concepts of ANT- inscription, translation, framing and stabilisation in the context of emerging ICT adoption, and reveals specific activities that lead to emerging ICT adoption



from a dynamic process perspective in very simple and systemic ways. The key activities identified in each stage of the adoption process can help to learn how conflicting views and unanticipated outcomes around adoption and development of emerging ICT happen. These activities clearly support what Fleck (1994) refers to as “learning by trying”.

The study also provides a systematic way to analyse the critical factors and the roles of actors in association with each stage and the overall process. The outcome demonstrates that these factors and the roles are not static at one decision point but vary from one stage to another. Therefore, when studying ICT adoption from a dynamic process perspective, studies should also bear in mind that the decision to adopt may be influenced by the same or different factors at different stages and need to be accounted for.

The study also reveals three dynamic influences associated with adoption of emerging ICT in the process namely: *commitments, resistance and compliance*. The study suggests that innovative small business managers (the key human actor) always have a commitment to adopting emerging ICT. This is usually achieved where there is an agreement among the actors in the network. While evidence suggests that commitment may be the most beneficial outcome in building emerging ICT, there is always resistance in the process which may occur at any stage. Resistance occurs because various actors including small business managers often lack the confidence of the other actors in the process. The study reveals that the key actor is in the midst of the innovators, however negotiating for an ICT standard is an exceedingly difficult task when other actors are involved. Although compliance of various actors helps to accomplish the request of the key actor, most of the time the key actor lacks the compliance of others actors. Evidence points out the key actor may comply since they often lack the knowledge and ICT skills; however, in most cases they always use other information to challenge the views of IT experts, vendors and others in the process. Therefore, when studying ICT adoption from a dynamic process perspective, studies should bear in mind that commitment, resistance and compliance aid effective adoption. The three dynamic influences are important in understanding emerging ICT adoption from a dynamic process perspective and the identification of them adds value to the existing body of knowledge.

The research creates awareness of the need to diversify research. ICT adoption is often studied or considered as a one off action instead of an ongoing process. The reason for this may be due to the lack of awareness on the necessity of examining ICT adoption from a dynamic process perspective using theories that can explain how ICT adoption emerges over time. Also the majority of researchers that have studied ICT adoption have used a

quantitative approach which mainly involves testing hypotheses and confirming the findings. There are a number of alternative approaches that can be used to study emerging ICT adoption from a dynamic process perspective. Using ANT and especially employing a hybrid approach to thematic data analysis provides some new guidelines for eliciting meanings from the data. The hybrid approach to data analysis employed in this study demonstrated a number of ways data can be analysed, organised and conceptually and /or empirically clustered into appropriate categories. The approaches adopted in this study may help other researchers to consider using similar methods in their investigation.

## **7.6 Implication for research**

The conceptual framework provides an analytical instrument in the explanation of the emerging ICT adoption process and outcomes characterised by conflicting forces. The reiterating and evolving nature of the framework may be useful to researchers in tracing both the expectation of emerging ICT change as well as experiences of technology change. Therefore, researchers can examine the processes and outcomes of emerging ICT adoption and understand the changes caused by actors in the process over time. It can help the researcher to understand how those actors can positively influence the adoption over time. In addition, it provides a lens for articulating, analysing and understanding the roles and factors affecting emerging ICT at various stages of the adoption process.

In the design and development of ICT, studies argued that IT experts have always relied on methods that are structured in order to obtain information requirements from managers and the users of the technology (Orlikowski and Gash, 1994). It is argued that these methods do not pay sufficient attention to assumptions, expectations, values and beliefs and how these may differ from diverse actors involved in the process. Therefore, the study may help researchers in tracing and understanding the degree to which the values of actors involved in emerging ICT adoption relate or differ to that of key actor's interests.

## **7.7 Implication for practice**

Emerging ICT adoption requires alignment of other human actors to that of the key actor's interests. The study reveals that various actors involved in the process must focus their attention to understanding the key actor and ensure that the implementation goals are achieved. The study may be useful to consultants that do not often have any specific organisational context in which they operate. It can help them trace these activities easily,

and learn and understand the extent their knowledge and interpretation of the emerging ICT relate to the key actor's views and interests. The advantage of this is that it can reduce the conflicts and time spent in deploying emerging ICT. Also the key actor can make better decisions, by reviewing and analysing their surrounding environment and anticipated impact on the entire business and cope with unanticipated changes.

One of the features of a knowledge based economy is that it increases the rate of collaboration. A greater openness and multiple actor approach means a greater emphasis on collaborative sense making process that helps in developing, adopting and implementing adequate ICT. Partnering with diverse actors and understanding their activities can effectively help the key actor analyse their ICT priorities in order to select, develop and adopt an appropriate strategy in the future. This is likely to serve their long term needs instead of considering ICT as a purchasing event (Rantapuska and Ihanainen, 2008). Therefore, the study may be useful to all practitioners involved in the process in learning how to use the engagement experiences of different stakeholders to become a co-creative organization.

## **7.7 Limitations of the study**

Although ANT has contributed to this research, it is not without its limitations. It is important to highlight some issues that researchers should be aware of when ANT is considered to inform their study. First, researchers that intend to use ANT should be aware that it is problematic to claim or link the method of analysis employed by ANT to a larger organisational analysis (Allen 2004). Although in practice it is a good explanatory device at the micro (individual ) level, it has failed to explain the events that immediately go beyond the micro level (Allen, 2004; Hanseth et al., 2004). Although it has been argued that it is difficult to avoid ANT analysis when making references at the society level (Macro level), researchers should be aware that ANT is more appropriate at the individual level analysis.

One of the criticisms of ANT is the claim that it treats both humans and non humans (technology) as members of actor networks. Although studies (Hanseth et al., 2004) have argued that this limitation/criticism is baseless or unfounded, researchers should be aware that when ANT is deployed to study ICT adoption, humans and non humans are not the same; rather it is the outcome of the interaction of a human and technology that can help researchers unravel the advantages or disadvantages associated with adopting any new ICT or meet the social and economic impact of its adoption.

This research also has limitations regarding the methodology used. One of the features of qualitative research is that it is always subjective. Qualitative research is interpretive in nature, and limitations in the sample used are common in qualitative research. In addition, the scope of the factors presented may be limited to the views given by the participants involved in the investigation and the specific sector in which they interact. Therefore, while the findings are valid and useful in this research context, caution should be taken when applying findings to other contexts.

Finally, this study considers emerging ICT from its broader context and the researcher interviewed both end users of ICT and others without focusing on a single emerging ICT technology. Therefore, it is important to point out that while this is recognised as a limitation, it is also believed that adoption is an ongoing action and managers do not have to rely on a single system due to constant environmental changes; instead they have to rely on a number of technological applications that constitute multiple types of emerging ICT to accomplish their task.

## **7.8 Future research**

First, the current research has contributed to the body of knowledge by using alternative theory to explore how ICT can be adopted over time. While ANT helps to understand the dynamic and the evolutionary process of ICT adoption, researchers should be aware that ANT pays less attention to issues of social/organisational structure and focuses more on how things are done (Walsham, 1997; Allen, 2004). Therefore, future research may be needed to compliment ANT with other theories. Researchers may combine ANT with structuration theories (Hanseth et al., 2004) in order to bridge the gap between the individual and organisational level analysis.

Second, the conceptual framework developed in this study illustrates a number of factors and roles that actors play. The study involves a number of different actors, which are an integral part of emerging ICT adoption. Therefore, it may be worthwhile exploring the factors and roles further with a larger population of actors. This may provide an additional lens to interpreting and understanding these roles and factors.

Third, the research contributes to theory by developing a conceptual framework that explains how the needs for emerging ICT produces uncertainty and the uncertainty motivates the need to keep up with emerging ICT. The conflicting forces characterised by

diverse actors in the process suggest that there is a need for more research. Studies could explore why particular organisational actors may not keep up with emerging ICT compared to others. In addition, the research still raises questions as to whether all the items explored in the study provide useful information that will help reduce uncertainty when the need for ICT arises. While the framework lays the foundation, future study may be essential to collect and collate a large number of data to test the reliability and validity of the roles and factors across wider populations. Such study can provide decision makers with useful benchmarks on these roles and the factors.

Fourth, the study raises awareness of the need to diversify adoption research. As argued in the beginning of this research, the majority of research in this field has focused on a quantitative approach and variance or factor models. The number of methods and theories used by previous studies do not seem proportionate to the amount of theories and methods available to examine research in this area. There is a need for alternative management/organisational change theories and research methods such as mixed methods, case studies, grounded theories and longitudinal method. These could help advance our research.

Fifth, the current research also raises awareness of the challenges posed by the rapid change in ICT. This study argues that as ICT changes rapidly and because its adoption is unpredictable, dynamic and evolutionary in nature, the adoption is challenging. However, in combination with exploring how organisations constantly keep up with new ICT, further research is needed to examine the changes in ICT. Studies might explore specifically how such changes affect SMEs and why keeping up with new ICT may still appear to be challenging for SMEs. An understanding of how ICT changes and the best way to adopt it can help explain the best mechanisms for adoption and implementation over time.

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# Appendices

## Appendix 1: Conferences and Publications

### Conferences

Eze S.C., Duan Y. and Jackson S. (2010) "The Adoption and Evolution of Emerging Internet Technology in UK SMEs", 4th Annual University of Bedfordshire Conference; Bridging the Gap, Bedfordshire, London, UK.

Eze S.C., Duan Y. and Jackson S. (2011) Understanding the Dynamic Process of Emerging ICT Adoption in UK Service SMEs, 16th Annual UK Academic for Information Systems Conference, Oxford University, London, UK.

Eze S.C., Duan Y. Jackson S.(2011) Understanding the critical factors influencing the dynamic process of emerging ICT adoption in UK service SMEs, 5th Annual University of Bedfordshire Conference ;Outcome and Impacts, University of Bedfordshire London UK.

Eze S.C., Duan Y., and Chen H. (2012). Roles of actors in emerging ICT adoption process:A dynamic process perspectives. 6th Annual University of Bedfordshire Conference .going for gold, University of Bedfordshire London UK.

Eze S.C., Duan Y., and Chen H. (2012). Factors affecting emerging ICT adoption in SMEs: An actor- network analysis. International Conference on e-business, technology and Strategy (ICETS), Tanjin, China.

### Publications

Awa H.O., Eze S C., Urieto J.E. and Inyang B.J. (2011). The Upper Echelon Theory (UET): A Major Determinant of Information Technology Adoption by SMEs in Nigeria. *Journal of Systems and Information Technology* Vol 15, No 6, pp 278-295.

Eze S.C., Duan Y. and Jackson S. (2011) Understanding the Dynamic Process of Emerging ICT Adoption in UK Service SMEs, *AIS Electronic Library*. Available on line at: <http://aisel.aisnet.org/ukais2011/15/>

Awa H.O. and Eze S.C., Maclayton D.W., and Okoye J.C., (2012) User Voice and Democracy in Value Creation: Internally Lacked Competencies in Innovation Development, *International Journal of Management*, Vol 29, No1 pp.228-246

Eze S.C, Awa H.O, Okoye J.C., and Anazodo R .O., (Accepted ) Determinant Factors of Information Communication Technology (ICT) Adoption by Government-owned institutions in Nigeria: A Qualitative Approach, *Journal of Enterprise Information Management*.

Eze S.C., Duan Y., and Chen H. (2012). Factors affecting emerging ICT adoption in SMEs: An actor- network analysis.In Khachidze, V.; Wang, T.; Siddiqui, S.; Liu, V.; Cappuccio, S.; Lim, A. (Eds.) *Contemporary Research on E-business Technology and Strategy*, Springer, Canada.

## **Appendix 2: Cover letter and interview questions (1<sup>st</sup> round)**



Business Management Research Institute (BMRI)

University of Bedfordshire Business School

Luton Campus- Vicarage Street

Luton

LU1 3JU

Bedfordshire

13/03/2010

Dear Sir/Madam,

### **Interview on adoption and use of emerging ICT in Small and Medium Enterprises (SMEs) in UK**

I am a PhD student currently researching on the adoption and development of emerging internet technologies in SMEs. These are internet based applications that allow rapid communication, collaboration and information sharing and provide capabilities that enable organisations to react to immediate problems and needs.

The research aims to help SMEs improve their competitiveness and performance by means of implementing these new internet communication technologies. Therefore, your general opinions and practices regarding the adoption and development process of these technologies in UK SMEs will be studied.

I would be grateful if you inform two of your IT staff to join in the interview. The interview will take approximately 45 minutes. All the information would be treated with strict confidentiality.

I look forward to hearing from you. Thank you for your time and corporation in advance.

Yours Faithfully,

Sunday Eze

PhD Student

Email: [sunday.eze@beds.ac.uk](mailto:sunday.eze@beds.ac.uk)

Tel: 01234400400 ext 1228

**First round interviews:**

Unstructured questions

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1. How does your company regularly keep up with emerging ICTs at all times?

2. What factors influence your company in adopting these emerging ICTs?

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## Appendix 3: Cover letter and interview questions (2<sup>nd</sup> round)



Business Management Research Institute (BMRI)

University of Bedfordshire Business School

Luton Campus- Vicarage Street

Luton

LU1 3JU

Beds

Dear Sir,

### **Interview on adoption and development of emerging information communication technologies (ICT) in UK service SMEs**

I am a PhD student currently researching the adoption and implementation of emerging Information Communication Technologies (ICT) in SMEs.

The aim of the research is to help organisations particularly SMEs improve their competitiveness therefore; your opinions will be highly appreciated.

I would be grateful if you spare me at least 40 minutes to speak with you. All the information provided would be treated with strict confidentiality.

Thank you for your time and corporation in advance.

Yours Faithfully,

Sunday Eze

PhD Student

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## **Second round interview:**

### Semi-structured questions

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1. Can you tell me about your company's background? For example, number of organisational members, types of IT systems in place and organisational history.
  2. Can you give me an example of a new IT application your company has adopted recently? When was it introduced? Why was it introduced?
  3. How did the initial idea for introducing the IT application come about?
  4. What key stakeholders were involved? (For example, customers, employees, IT specialists, government agencies etc).What role did each stakeholder play in the process? How did they react to the new IT application?
  5. How was the IT application developed? What people were involved?
  6. Could you tell me how the IT application was implemented in the organisation? Were there any challenges faced? How were these challenges overcome?
  7. Since its first introduction, have there been any unexpected improvements or problems which weren't originally planned from the outset?
  8. Can you describe what factors motivated you to constantly adopt this IT application at each stage?
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## Appendix 4: sample of codes (stages of adoption) and supporting evidence for the initial analysis of the 11 interviews

Code	Raw data
<b>Inscription</b>	<p>“Well, we will normally have a look at several... then someone will be tasked depending on what type of technology and make assessment of them. It could be technology guy, if it is sort of a technology thing or it could be an operations Guy if it is something to do with account... And they will make a recommendation for that product that we use” (A2).</p> <p>“So what we do here...is come up with new service that we can introduce. Now... is more of a concept. So... what ideas or concept that we can come out with that can help introduce a new type of service. So it comes from the need to have what we call (IP) Intellectual Property. Something that we can have that we can say hey Mr. Marketer this is the service that we offer, then that nobody else offers or this is how we do this that nobody else does...So the technology comes up with a concept and the requirements, then we generate the ideas, we evaluate the ideas and then plan the project” (A5).</p> <p>“We have a product meeting which includes the business part of the team. They defined the product and then we have a technical team that defined how we are going to reach that goal... and in other meetings, we discuss other external party we want to use” (A4).</p> <p>“If we get a problem, I design it in my head “I will turn to the IT Company with a little sketch and tell them this is what I got to do” (A11)</p> <p>“We always bring the business intelligent together, what we call those imaginary aspects into it...like a product development, business case, everything from branding to what it should be called, how is going to be distributed...” (A5),</p> <p>“The smart patrol is actually built around our specification and that is what we asked for” (A1).</p>

Code	Raw data
<b>Translation</b>	<p>When you have got a problem like that, a middle company or a middle man would help you because I am not sure what I want. So I need to talk to somebody that actually specialises in it, so he can sort my brand...they would know because I can't do that myself" (A10).</p> <p>"Now being a small business as I said we have a company made up of two co-founders, two directors and then we are 5. However we have about 35 different outsource partners. Some of them are based in the UK but the majority of them are based in the UK. We have some in Canada, West Africa and all over the place. And as I have said we need them to be able to keep up to date with companies' policies, the way we do business and things like that...So for example, when we have a project on, and we need to let all of our outsource developers know what that project is. We cannot afford to contact them individually, so what we do is that we use online platforms whereby we can upload a particular project, upload the entire requirement and then send ... an alert and our entire consultant can access that and build for the business on online platform. And then we basically can go on with the lowest bid. So that is one example whereby external stakeholders in our business are able to access us and access what is happening without us having to spend the time and the money to go out to them individually" (A5).</p> <p>"Basically we give them [other actors] parameters. We say we need these things so if you can do this... is up to them according to our company ..." (A9).</p> <p>"In respect of the smart patrol, it was very new and people who did it for us were much of IT specialist and find easy to work out, but their perception and what we wanted were different. We want a quite easy system and they are making it complicated" (A1).</p>

Code	Raw data
<b>Framing</b>	<p>"Yes....somebody does try and come up and say I think this is good for this reason is better than that, what will you think because of this reason and then we decide. If we decide to go ahead with it, then we will send either one person or 2 or 3 people if more people are required to get the technology out" (A2).</p> <p>"So what we do is for example, with the CRM System we try them internally with basically is just one person, myself and we also try it with three of our clients externally. And we test it. When we realise that the client started to use it and find benefit in it. And we realise that if we went back to the old way of doing things, would not work, that is why we row it out" (A5).</p> <p>"Yes we do. We do try to test it for at least a month because we don't want to be like say for instance we use it and there is some error while the process is on, then we will have a massive... chain reaction. So we don't need that. We generally test it before we implement it. But it depends the software that we have" (A9).</p> <p>"They were kind of putting the module together thinking that is what we wanted and it became quite difficult and does not save us time, and we had to try and say to them, no this is not what we wanted, take some part off, and now is exactly how we wanted it. It took us about 18 months to do" (A1).</p> <p>"... I will bring it in the office and contact my customers in London, they will come and look at it and say that looks smaller, that looks bigger and I will say ok. I will go back to the engineers and say right the process are fine but I will want a few adjustments... then they will make it again. I will go straight back to the customers until everybody is happy" (A10).</p>

<b>Code</b>	<b>Stabilisation</b>
<b>Stabilization</b>	<p>“We are just waiting to be taught...I am going to be on a course. I don't really understand the technology so we are going to go on that course and that might change things slightly. But until we have got that technology and understand it, we can't look at the technology” (A1).</p> <p>“We are 25 people now, I think is manageable but as more people come on board, we will have that more formalised training (A2).</p> <p>Another thing is obviously all our clients have to use the new internet technology...to get information across to people quickly and we can check if they have got it. Is quite a good communication tool” (A1).</p> <p>.. we have embraced most of these technologies because we are much bigger, we are a big company but we had like 25 people working for us and we were turning over a million. With that size, comes a lot of complications, headaches and now one person... can manage all the task with these technologies” (A7).</p>
<b>Reversibility</b>	<p>“When you are an entrepreneur you need to be able to do things quickly [and] continue to evolve. You must always have that mentality” (A6,)</p> <p>“... we are already starting looking for other technology. Probably because there are other things that is better. “... I am looking at the next evolvement of the whole process...” (A1).</p>

## Appendix 5: Sample of codes/themes (stages of adoption) and supporting evidence for the 26 Interviews

<p><b>Inscription</b> <b>e.g.,</b></p> <p>Problem Assessment and identification</p>	<p>“looking at future projections and ... looking at the now and looking at the past, the company actually sat down and evaluated their business process, evaluated or reviewed where they hope to evolve into and based on that, try to map that into the current solution they had then and found out that what they envisaged ... might not be possible for the current solution...to properly handle the companies processes” (A13).</p> <p>“Well, we will normally have a look at several... then someone will be tasked depending on what type of technology and make assessment of them. It could be technology guy, if it is sorts of technology thing or it could be an operations Guy if is something to do with account... And they will make a recommendation for that product that we use” (A2).</p>
<p>Concept generation and evaluation</p>	<p>“So what we do here...is come up with new service that we can introduce. Now... is more of a concept. So... what ideas or concept that we can come out with that can help introduce a new type of service. So it comes from the need to have what we call (IP) Intellectual Property. Something that we can have that we can say hey Mr. Marketer this is the service that we offer that nobody else offers or this is how we do this that nobody else does...So the technology comes up with a concept and the requirements, then we generate the ideas, we evaluate the ideas and then plan the project” (A5).</p> <p>“You have got what is called an inscription stage which may say this is where ideas generated for emerging ICT” (A12)</p>
<p>Concept Specification</p>	<p>“We have a product meeting which includes the business part of the team. They defined the product and then we have a technical team that defined how we are going to reach that goal. ... and in other meetings, we discuss other external party we want to use” (A4).</p> <p>“If we get a problem, I design it in my head...I will turn to the IT Company with a little sketch and tell them this is what I got to do” (A11).</p> <p>“We always bring the business intelligent together, what we call those imaginary aspects into it...like a product development, business case, everything from branding to what it should be called, how is going to be distributed...” (A5).</p> <p>“The smart patrol is actually built around our specification and that is what we asked for” (A1).</p>

<p><b>Translation e.g.,</b></p> <p>Project outsourcing/ role delegation</p>	<p>“When you have got a problem like that, a middle company or a middle man would help you because I am not sure what I want. So I need to talk to somebody that actually specialises in it, so he can sort my brand... ..they would know because I can’t do that myself” (A10).</p> <p>“Yes because as I always say that the technical knowledge is new to me expect from just operating this key board etc. Of course if there is any special area, we have to consult all the relevant people who know the technologist and that will put the system right” (A14).</p> <p>“Now being a small business as I said we have a company made up of two co-founders, two directors and then we are 5. However we have about 35 different outsource partners. Some of them are based in the UK but the majority of them are based in the UK. We have some in Canada, West Africa and all over the place. And as I have said we need them to be able to keep up to date with companies’ policies, the way we do business and things like that...So for example, when we have a project on, and we need to let all of our outsource developers know what that project is. We cannot afford to contact them individually, so what we do is that we use online platforms whereby we can upload a particular project, upload the entire requirement and then send ... an alert and our entire consultant can access that and build for the business on online platform. And then we basically can go on with the lowest bid. So that is one example whereby external stakeholders in our business are able to access us and access what is happening without us having to spend the time and the money to go out to them individually”(A5).</p> <p>“Basically we give them [other actors] parameters. We say we need these things so if you can do this... is up to them according to our company ...” (A9).</p>
<p>Mis-alignment</p>	<p>“It is possible that we [IT experts] have introduced issues and misunderstood the users [Key actors] and their requirements” (A17).</p> <p>“... sometimes organizations come up with funny ideas that they think software ...can do... There are things they think that software will be able to do and you will be like, is it possible for software to be able to do this thing. In that kind of case, as a software developer, it takes us time... They could [say] I need software that can do this thing.... Gets it across to me and you start working on it? After 6 months or one year, they could bring something entirely different and they will tell you they want the software to be able to do this as well... those kinds of things will affect your project, it will affect the finance and it will affect the timing of a project” (A15).</p> <p>“... most times the issues we usually have is that [SMEs]... have a fixed idea of what they want and I just don’t sell anything, I don’t do what they want me to do. I don’t do that. I take into consideration what is trendy, what is going to move the market and I also take into consideration my mark because that is very important in the sense that it is the quality of what I do. So usually, most times we tend to have conflict there.” (A18).</p> <p>“Conflicts often arise because sometimes the client comes with the different thing which has not been discussed previously. Therefore, at ...negotiation, the project continues or ends here” (A20).</p> <p>“In respect of the smart patrol, it was very new and people who did it for us were much of IT specialists and they find it easy to work out, but their perception and what we wanted were different. We want a quite easy system and they are making it complicated” (A1).</p>
<p>Alignment</p>	<p>“From the cost point of view, we want to minimize our cost because obviously we are small organization you know. So obviously there were challenges from the</p>

	<p>cost point of view and we try to negotiate with them. Well the breaking point you know will [be] both parties will come together and agree” (A14).</p> <p>“What they [SMEs] see is a finished product but they don’t understand what is happening at the back end. Most times we have conflict... I know most times how we try to resolve problems when it comes to negotiation table. We tell them that there is going to be a mark of quality in your work and we try to make them see the need to go extra mile because you have to take into consideration what this represents in your business” (A18).</p>
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<p><b>Framing</b> e.g.,</p> <p>Product Trial</p>	<p>“... after everything is done I test it online and I get five users, I get a wide range of people, I put them in an environment and time them because I know what I am looking for. To know how user friendly it is. I ask a lot of questions. If I found out that... they have issues, I go back to resolve that. But most time I never have these issues more than three times. So I have to call the same people again or use another set of people to test it. When completed I now call the client to evaluate the product. If he accepts it is implemented” (A18).</p> <p>“Yes....somebody does try and come up and say I think this is good for this reason is better than that, what will you think because of this reason and then we decide. If we decide to go ahead with it, then we will send either one person or 2 or 3 people if more people are required to get the technology out” (A2).</p> <p>“So what we do is for example, with the CRM System we try them internally with basically is just one person, myself and we also try it with three of our clients externally. And we test it. When we realise that the client started to use it and find benefit in it. And we realise that if we went back to the old way of doing things, would not work, that is why we row it out” (A5).</p> <p>“Yes we do. We do try to test it for at least a month because we don’t want to be like say for instance we use it and there is some error while the process is on, then we will have a massive... chain reaction. So we don’t need that. We generally test it before we implement it. But it depends the software that we have” (A9).</p>
<p>Product Modification</p>	<p>“They were kind of putting the module together thinking that is what we wanted and it became quite difficult and does not save us time, and we had to try and say to them, no this is not what we wanted, take some part off, and now is exactly how we wanted it. It took us about 18 months to do” (A1).</p> <p>“... I will bring it in the office and contact my customers in London, they will come and look at it and say that looks smaller, that looks bigger and I will say ok. I will go back to the engineers and say right the process are fine but I will want a few adjustments... then they will make it again. I will go straight back to the customers until everybody is happy” (A9).</p> <p>“... the solutions have been developed which is the solution by SAPs, which is off the shelf. However, when we identify our interests and selected that as the final product, it involved some customization for it to really try to tailor it, I mean into our business need.” (A13).</p> <p>“It may not be the eye in which you are seeing the work that your client perceives the application. He may not like the kind of images you displayed. But you are the experts and you did it the way it suppose to be. So if he rejects it, he might have some ideas or blue print and you do redesign the product” (A19).</p>

<p><b>Stabilization</b> e.g., Adaptation</p>	<p>“We are just waiting to be taught...I am going to be on a course. I don't really understand the technology so we are going to go on that course and that might change things slightly. But until we have got that technology and understand it, we can't look at the technology” (A1).</p> <p>“Yes staff were trained before they came on the system and then a catch up training was done after going live in case of those that have forgotten one or two things. For us we have always seen training as a continuous process. So staff were trained and continuously trained. ...another challenge was staff acceptance in terms of resistance. But after given the proper training required to use the solution, such challenges like staff resistance was rectified” (A13).</p> <p>“Everyday, new changes come in, new technology come in and sometimes we are a bit behind learning the skills you know” (A14).</p> <p>“We are 25 people now, I think is manageable but as more people come on board, we will have that more formalised training” (A2).</p> <p>“People don't really like change irrespective of how really good the change is but however, due process was followed and... that is where the training comes in. When you implement the program there need to be training, adequate training and on-going support as well until people feels confident” (A24).</p>
<p>Impact e.g., Communication Easy applicability</p>	<p>“Another thing is obviously all our clients have to use the new internet technology...to get information across to people quickly and we can check if they have got it. Is quite a good communication tool” (A1).</p> <p>“...there are also a lot of advantages basically, going into this IT development infrastructure, you can be able to communicate effectively” (A24).</p> <p>... we have embraced most of these technologies because we are much bigger, we are a big company but we had like 25 people working for us and we were turning over a million. With that size, comes a lot of complications, headaches and now one person... can manage all the task with these technologies” (A7).</p>
<p>Problem redefinition</p>	<p>“...because technology advances with time and because of that every company want to keep up to date with their applications. For that reason you have to keep changing stuffs that is one major thing that cannot be compromised” (A15).</p> <p>“When you are an entrepreneur you need be able to do thing quickly fail, not necessary fail but just understand your mistakes and then change them and continue evolve you must always have that mentality.”(A6).</p> <p>“So sometimes you need to change the whole business process to ensure that the IT can improve business on a bad business processes .So you got to totally restructure your processes to take maximise the benefit of ant IT adoption”(A22).</p>



## Appendix 6: Sample of themes (roles of actors) and supporting evidence

Actors	Roles of actors
<p><i>SMEs</i> <i>Managers:</i></p> <p><i>Customers:</i></p>	<p style="text-align: center;"><b>Innovativeness :</b></p> <p>“Managers are the ones that are initialling the change...” (A11)  “As a CEO, you might have a couple young graduates and you will say to them guys I have got this problem go away and find me a solution to that. So you will be the innovator deriving ideals to the organisation” (A12)  “... the main stakeholders were the MD who was driving the project” (A 13).  “... all of the new innovations are actually starting at SME level. They started in small company whether it is individual entrepreneur or small business that needs to identify a new way of doing things simply because small businesses do not have the money and resources of big companies” (A5).</p> <p style="text-align: center;"><b>Empowering</b></p> <p>“I also have a role through the process which is mentoring guiding role which will be encouraging people with new ideas and new ways of doing things... It is [my] responsibility to tell and help them build their business case so that the actual business moves” (A12).  “...your client [the manager] is the master so he will be telling you what he wants” (A19).  “The main stakeholder was MD who was driving the project” (A13)</p> <p style="text-align: center;"><b>Idea generation:</b></p> <p>“A lot of organisations would have a chain of customer’s, so what they have to do is that if they have ideas or solutions they may use these customers to seek for some ideas” (A12)  “The customers will be willing to help your businesses process by contributing to ideas... is the matter of who is more valuable” (A11)</p>
<p><i>Consultants:</i></p>	<p style="text-align: center;"><b>Requirement gathering and evaluation</b></p> <p>“As an IT consultant I consider the organisation past and present arrangements. What have they been doing? The kind of systems that are in place, and where they want to go next. This will help understand what system they will actually need” (A 20).  “Exactly, [consultants] come along; they try to evaluate what our weaknesses and strengths are. At that point, they will know what needs to be done” (A 14).  “... Consultants come along; they try to evaluate what our weaknesses and strength. So when they evaluate our weaknesses, at that point they will know what need to be done” (A14)  “they may call a consultancy ... to do an evaluation on 3 or 4 alternative solution for an emerging technology and what is best”(A12)  “we had an IT consultant employed just for that reason to evaluate the Business processes and try to map users’ needs against the solutions” (A13)</p> <p style="text-align: center;"><b>Requirement transformation:</b></p> <p>“The consultant was trying to translate information from the users unto a language understandable to developers’ team and IT team” (A 13).  “As I said it is that consultant that will become the champion to such process who will now say it makes sense” (A12)  “Then they will obviously instruct the relevant people who will be able to do all those little bits of work” (A14)  “...SMEs do not have the skill set; they may call a consultant to write a business case” (A, 13)  “...what that mean essentially is that we [Consultants] help small businesses to</p>



	<p>myself and we also try it with three of our clients externally (A5)  “...we are getting the customers involved in the modification of the product” (A 13).  “As a manager, you would want your customer to be engaged in the process and for them to feel special about being engaged” (A 11).</p>
<i>IT vendors:</i>	<p style="text-align: center;"><b>Product adaptation:</b></p> <p>“..from the vendor point of view, it was more or less trying to sell their product which is understandable from their point of view but also, trying to look at their product to see if their product will fit into the solution whereby also trying to know if they can work with the company (A, 13).</p>
<i>IT experts</i>	<p style="text-align: center;"><b>Training:</b></p> <p>“In most cases we normally have to train them the users get them fully acquainted, providing the access via email such that. Even that after having the training they may still have some difficulties and this may lead me to go back to the office to support them”( A19).  “I have to make presentation and explain the possibilities of the system...“(A20).</p>
<i>Employees:</i>	<p style="text-align: center;"><b>Feedback on performance:</b></p> <p>“Well obviously my employees play a role because they give me feed back where our systems have weakness so I can be able to finance it and what more application we need...” (A14).  “Employees are also important because they are the one running the system and will provide feedback” (A11).</p>
<i>Emerging ICT</i>	<p style="text-align: center;"><b>Enhancing business processes</b></p> <p>“...we also use such platforms to market innovations as well. So at the moment we are working on a new social medium marketing strategy which we believe is going to be a leading edge and we use this platform as a way of gaining feedback from some of the leaders in the industries ”(A5).  “... We have embraced most of these technologies because we are much bigger, we [are] 25 people working for us and we were turning over a million. With that size, comes a lot of complications, headaches and now one person... can manage all the tasks with these technologies” (A7).  “...there are also a lot of advantages basically, going into this IT development infrastructure, you must be able to communicate effectively” (A24).</p>
<i>Government agencies</i>	<p style="text-align: center;"><b>Collaborative support</b></p> <p>“We are currently working with UK Trading Investment to see if [small businesses] might exploit linkage externally” (A22).  “We have a specialized staff team who works with partners such as Job Centre Plus, and some of the Enterprise Agencies in terms of organisation of people that want to start their own business” (A21).  “one of the reasons for our contact with your own university is that we wanted to try to deliver something in partnership with higher education institution that could help some of our small businesses and guide them through the things they simply don’t have or know”(A23).</p> <p style="text-align: center;"><b>Funding</b></p> <p>“.. in the past we have contributed finance to ensure that provision here” (A24).  “Over the last 2 or 3 years, central government has been doing some activities. They have been funding all these activities, and they will do different types of things, doing web work, internet, and stuff like that developing lots of things” (A22).  “...because of the super fast funding that is coming in, we have started to look most specifically, at the IT agenda and the need of these small businesses...” (A23).</p> <p style="text-align: center;"><b>Research</b></p>

“...what [SMEs] don’t have is time to invest in research to find out what is out there that could help them to do their business better [23].

“...in my case I will look online, do some research before I see the client[key actors] and understand what market sector they are in”(A21).

“Where they want to have information or benchmark survey or they want to do some desk top research about their market or customers, we can provide that” (A24).

#### **Legislation**

“... can be anything simple as the government changing their tax from 17 .5% to 20%.The organisation deals with the fact that it has got to change all its invoicing, change all consumer pricing, and the fact that he has got to change and notify his entire organisation that this is already happening. So simple change such as that has a serious... impact throughout the whole of the business (A12).

“there is lots of information that comes with regulations- that businesses should take advantage of ... so we might start some of those projects off”(A22).

“We have a particular function as a local authority in maintaining environmental health standard and trading standard” (A25).

#### **Training**

“I guess one of our roles has been and will continue to be with seminal programmes which is to make sure that businesses out there know about this programme and can take them on”(A26).

“What we are delivering them was training on the internet, on computer network...[and] move on to running a programme called take IT on.....It could be things like helping another team or team leadership, appraisal processes, sales and marketing and general business training courses” (A21).

“... they [small business managers] don’t have the time to invest in learning.” (A23).

## Appendix 7: Sample of themes (factors) and supporting evidence

	Critical factors
<i>Awareness of Multiple context</i>	<p>...we have to look at the bigger picture, how that technology is going to help the whole company (A9).</p> <p>... You need to be clear the entire outcome you want ... and all of the stakeholders that are influencing development of the outcome or dissolving the outcome” (A 11).</p> <p>“...we have to evaluate the whole business ... because we just can’t bring in new technology” (A6).</p>
<i>Openness to change</i>	<p>“Lots of the younger people are most switched to new technology; they will come to me and say, have you seen this? What is on the market and we will look into it” (A10).</p> <p>“You know ICT is... like every other thing. If you don’t have the right mind ready for change you are not going to achieve the change. What you need is an open mind?” A11).</p> <p>“I involve all the functional units of the organisations if such departments exist...I can’t do it alone” (A6).</p> <p>“as a CEO, you would have to encourage new encourage new ideas within the organisation and what you should therefore do is you should be able to put a process or adopt a strategic role that will allow new ideals to come flowing...” (A12).</p>
<i>Shared support</i>	<p>“Yes because as I always say that the technical knowledge is new to me... if there is any special area, we have to consult all the relevant people who know the technology” (A14).</p> <p>“When I got a problem like that, a middle company or a middle man would help so...I need to talk to somebody that actually specialises in it”(A1).</p> <p>“If there is a need for new technology, is a joint thing, I won’t be selfish to say no is not a good idea (A10).</p>
<i>Safety and security</i>	<p>“... online security is a major concern .So we adopt new technology on day to day bases” (A9).</p> <p>“...in respect of the safety patrol, obviously is to proof to our client that we are doing our job and the necessity to adopt to monitor the health and safety polices which is more important otherwise we could lend ourselves into court actions” (A1).</p> <p>“If the new technology allows records to be kept for long thousands of years, as long as they are maintained” (A14).</p>
<i>Integration</i>	<p>“Is all about how it actually works with the rest of the other system in use...how it interfaces with the rest of the product? (A12).</p> <p>“If everything follows the certain pattern, then is much easier to integrate the set of tools, but if the technology is totally different, is another learning curve” (A3).</p> <p>“The companies... wanted to have the system that can combine everything at the same time” (A13).</p>
<i>Expendability</i>	<p>“...you know we got like 5 employees now... maybe in a couple of year’s time, we will have 50 employees, is the system scalable? Also are the functionality and the capabilities scalable?” (A5).</p> <p>“...limitation within the current solution, because to be very sincere with you, while looking for a new solution when you have a solution</p>

<p><i>Ease of use</i></p>	<p>that does everything you want” (A13).</p> <p>“... in some cases, why we will introduce something new, is now, most of the things are done with set of servers not a cluster of servers. If you need to do that service because now traffic increases a lot, that-- certain service cannot handle. You need to come to different system and that is how we chose another technology” (A3).</p> <p>“We are not particularly IT literate. I struggle on IT. So it had to be simple process to adopt with a short teaching times both simplicity for both clients to understand and also for us to achieve the information” (A1).</p> <p>... we have embraced most of these technologies because we are much bigger, we are a big company but we had like 25 people working for us and we were turning over a million. With that size, comes a lot of complications, headaches and now one person... can manage all the task with these technologies” (A7).</p> <p>“As I have said, the new smart patrol is imperative, it works well for us, is quite simple to use...” (A1).</p> <p>“...the new technology is easy to set up and easy to maintain (A2).</p>
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<p><i>Managerial Time</i></p>	<p>“It is always based on a commercial decision whether that commercial decision is because it saves us time which ... saves us money (A5).  ... how much time do you read and understand? If everything follows the certain pattern, then is much easier, but if the technology is totally different, is another learning curve (A3).  “If we are going to spend a lot of time here... with the technology we will not adopt it” (A6).  “So that save us time...If we use the same old school technique... we are kind of losing money because they were ... time consuming”. (A9).  “Time is very important if the technology can capture somebody who had an accident an hour ago, 10 minutes ago, 5 minutes ago; we are going to be more likely to take up the technology” (A5).</p>
<p><i>Service quality</i></p>	<p>“For us we really wanted an internet based solution because the services are good” (A2).  “The use of internet technologies is very interesting because companies can promote what they are doing quite efficiently” (A6).  “...you want to look at the quality of services you’re providing for people and this is driving the need for IT...” (A24).  “The whole purpose of getting down this journey is for a reason: it actually to improve your process and delivery” (A9).  “... Whatever you do with regards to a strategy for adoption of the emerging technology. How does it make me sale more? How does it make me more effective (A12).  Well the first stage you know, the factor is that we want everything to be fast and speed that was very important (A14).</p>
<p><i>Customer focus</i></p>	<p>“Not really. Generally we adopt something mainly for the customers. (A10).  “...the [technology] is actually quite expensive but we felt that it was worth us doing it in order to keep our clients...” (A5).  “the main factor that is driving change for us is more or less meeting customer’s need” (A13).  “As a business my focus is constantly going to be I mine retaining my customers” (A11).  Now the [technology] is actually quite expensive but we felt that it was worth us doing it in order to keep clients we got and also win new business (A5).</p>
<p><i>Differentiation</i></p>	<p>“Our need for a new technology is based on our need to branch out into new market and win new client...” (A5).  “... in many instances where the emerging technology can help.... differentiate against your competitors,” (A12).  “If people see phone using android, they will say is quality. People believe is quality. So differentiation makes a lot of different as well” (A15).</p>
<p><i>Return on investment</i></p>	<p>Consequently it is unlikely that any SME will give consideration to any new or emerging ICT if it cannot be shown to produce a very quick ROI for the business (A12).  .. the new technology ... must show it can generate return on investment basically one basically which is money (A2).  Is not just lack the resources, is return on investment. If anybody who invest £10,000 in something, as long as they will £15,000 in return and</p>

<p><i>Competition</i></p>	<p>you can demonstrate in 3 or 4 years in can make your money back easy (A22)          “I think for us to try and sum it up in one word will be revenue” (A5)          “So this is all making profit. If you are not making a profit, there is no point doing business. Shut the company and go home and have a sleep” (9).</p> <p>“We need to move on with new technology, we just can’t use the same old method or process. We need to move ahead to stay in business. If we don’t use it we can fall short or not going to be at the level where other companies might be” (A9).          Not really. I think the problem is when dealing with organisation, you need to keep up with new technologies and so you will not be left behind (A10).          “... if you are small medium enterprise, your competitors comes out and says... we are doing it this way and there is a new technology that will help us. Then, I will look at that and add competition (A12).          “If you don’t introduce new technology, you can get left behind quite easily” (A1).          “...there is need for competitiveness basically; you want to be able to compete in the tight economy” (24).          We are quite keen of knowing if there is anything that can actually fit into meeting competition out there (A13).          “That still boils down to competition” (A15).</p>
<p><i>Adoption Cost</i></p>	<p>But I don’t think there is nothing wrong with new technology. Anything that can help the business run better and easier is fine by me if is not too expensive (A10).          “I feel the first time to develop student box...is the cost efficiency of the product “(A6).          “Money goes a long way and is the reason why companies changes applications. Some applications are much more expensive to maintain” (A15).          So why not. If you can reduce man power, instead of taking a couple of guys... one guy can put all the data and everything instead of 3 or 4 people doing data manually (A14).</p>
<p><i>Business Expansion</i></p>	<p>“Obviously as the company gets bigger..... It becomes a bigger issue to adopt new technology” (A2).          “What happened when the company grows larger than this? So that is another question we keep asking. Will the system support us? It is sold as a solution for SME, what happen when the company grows outside of SME or out grows SME... So these are some challenges we have been looking at and then try to see if we could find another way out of it before we hit those break walls” (A13).          “One reason why we look at change is because we are growing ... changing from one man band to 50 employees” (A11).          “Though sometimes you need to make decisions like whether this technology is going to help our business grow if not we just don’t go on with it” (A9).</p>



## Appendix 8: Sample of themes (challenges associated with actors) and supporting evidence

Actors	Themes and supporting evidence
SME Manager	<p style="text-align: center;"><b>Poor Knowledge of ICT</b></p> <p>“Say from start up businesses, some people don’t know what they want to do. There will be some people who have an idea, but don’t really know how to progress it” (A22).</p> <p>“SMEs do not have the skill set” (A13).</p> <p>“...businesses just simply don’t have the ... knowledge; they are so busy running their business on day to day bases” (A23).</p> <p>“... if [SMEs] don’t know what you don’t know, it is quite hard to make good buying decisions” (A26).</p> <p style="text-align: center;"><b>Time</b></p> <p>“SMEs are constantly short on time, often decisions will be made by one or two senior people, (often the owners), who will be attempting to manage a business short on resources and, most likely cash. This creates a very different decision making environment to the norm” (A12).</p> <p>“...businesses just simply don’t have the time” (A23).</p> <p>“Time was a challenge... ” (A5).</p>
Government	<p style="text-align: center;"><b>Poor ICT support:</b></p> <p>“We are not really sitting down and working with them[key actors] in terms of moving their business forward or all of the things they should consider doing” (A21).</p> <p>“...basically through the IT centre, we deliver UK online for business programme and we choose what we want to deliver” (A26).</p> <p>“... we signpost and if there are specific requirements for businesses in the field, we would expect our delivery partners to pick that up” (A23).</p> <p style="text-align: center;"><b>Lack of specialised skills and knowledge</b></p> <p>“Am not sure, I [government agent] have enough knowledge to the extent which businesses are taking on or not taking on IT that could benefit them” (A25).</p> <p>“--as to my [government agent] involvement with the ICT project, am having to learn about broad band and ICT things. So they are all new to me” (A23).</p> <p>“If they don’t know, we [government agents] put them in touch with organisations that are better able to help them-- we are not experts in what business should do or shouldn’t do”(A22).</p> <p style="text-align: center;"><b>Limited funding</b></p> <p>“From local authority’s point of view, one of the dilemmas is that funding is always going to be an issue” (A24).</p> <p>“...we will constantly get criticism, I think from people that want to start up businesses. We don’t give them the financial support to help them start up” Particularly in the local authority in the current climate where budgets are very tight” (A26).</p> <p>“What we do is just a quick introduction to raise their awareness of what things that they need to do to actually make benefits in sure business support [--] we don’t do that anymore, they were stopped in November. There is no more money left” (A22).</p> <p style="text-align: center;"><b>General support</b></p> <p>“In the past, the ways we provide support tend to be general start-ups and grow on to business support. Within our department we would not have the specific knowledge” (A23).</p> <p>“We are not trying to promote a particular service... [Or]... promote any particular philosophy” (A21).</p>

	<p>“ [we provide] general business support in terms of how business is set up, what sort of licence they need, what sort of information they need to set up in the town itself” (A22).</p>
<b>IT Consultants</b>	<p style="text-align: center;"><b>Dependent and Untrustworthy</b></p> <p>Well, I think in the commercial world out there, this inevitably happens in every sector. You know where there is a consultant, there will be recommendations and where there is a recommendation there is usually a relationship with the provider” (A, 23).</p> <p>“-- it also has to be trust [on] the quality of the advice you are getting” (A23)</p> <p>“I can see businesses wary of the advice they are being given...They [Consultants] are not independent” (A25).</p> <p>“... a lot of business consultants will tell their clients what their clients would want to here... If I want my bills to be paid, I will tell him what he wants to here. IT consultants are not independent .They are trying to sell to you what they want to sell to you” (A 11).</p>
<b>IT experts</b>	<p style="text-align: center;"><b>Global solution</b></p> <p>“It is going to be more difficult to get specific work done on supporting businesses with IT” (A25).</p> <p>“What [IT experts] do is... global solution” (A26).</p>
<b>IT Vendor</b>	<p style="text-align: center;"><b>Commercial interests</b></p> <p>“... from the vendor’s point of view, it was more or less trying to sell their product which is understandable from their point of view ...” (A 13).</p> <p>“--then it has to be a trust not only lack of commercial interest but it also has to be a trust of the quality of the advice you are getting” (A23).</p> <p>“One of the problems I have is the supply side of the industry, is that the guys that actually provide solutions are not really independent or impartial. They tend to sell a solution” (A26).</p>

## Appendix 9: Inter-rate reliability analysis table on adoption process presented to judges

Please indicate the Presence (P) or Absence (A) of the codes in Bold

Codes	Raw Data	P	A
<b>Inscription:</b> Problem Assessment and Identification	“looking at future projections and ... looking at the now and looking at the past, the company actually sat down and evaluated their business process, evaluated or reviewed where they hope to evolve into and based on that, try to map that into the current solution they had then and found out that from what they envisaged ... might not be possible for the current solution...to properly handle the companies processes” (A13).		
	“Well, we will normally have a look at several... then someone will be tasked depending on what type of technology and make assessment of them. It could be technology guy, if it sorts of technology thing or it could be operations Guy if is something to do with account... And they will make a recommendation for that product that we use” (A2).		
Concept generation and evaluation	... what we do here...is coming up with new service that we can introduce. Now... is more of a concept. So... what ideas or concept that we can come out with that can help introduce a new type of service. So it comes from the need to have what we call (IP) Intellectual Property. Something that we can have that we can say hey Mr. Marketer this is the service that we offer, then that nobody else offers or this is how we do this that nobody else does...So the technology comes up with a concept and the requirements, then we generate the ideas, we evaluate the ideas and then plan the project” (A5).		
	“We have a product meeting which includes the business part of the team. They defined the product and then we have a technical team that defined how we are going to reach that goal.” (A4).		
	“If we get a problem, I design it in my head..... (A11).		
Concept Specification	We always bring the business intelligent together, what we call those imaginary aspects into it...like a product development, business case, everything from branding to what it should be called, how is going to be distributed...” (A5).		
	“The smart patrol is actually built around our specification and that is what we asked for” (A1).		
<b>Translation:</b> Project outsourcing/role delegation	Now being a small business as I said we have a company made up of two co-founds, two directors and then we are 5. However we have about 35 different outsource partners. Some of them are based in the UK but the majority of them are based in the UK. We have some in Canada, West Africa and all over the place. And as I have said we need them to be able to keep up to date with companies’ policies, the way we do business and things like that...So for example, when we have a project on, and we need to let all of our outsource developers know what that project is. We cannot afford to contact them individually, so what we do is that we use online platforms whereby we can upload a particular project, upload the entire requirement and then send ... an alert and our entire consultant can access that and build for the business on online platform. And then we basically can go on with the lowest bid. So that is one example whereby external stakeholders in our business are able to access us and access what is happening without us having to spend the time and the money to go out to them individually”(A5)		

Mis-alignment	It is possible that we [IT experts] have introduced issues and misunderstood the users [Key actors] and their requirements” (A17).		
	“... sometimes organizations come up with funny ideas that they think software ...can do... There are things they think that software will be able to do and you will be like, is it possible for software to be able to do this thing. In that kind of case, as a software developer, it takes us time... They could [say] I need software that can do this thing.... Gets it across to me and you start working on it? After 6 months or one year, they could bring something entirely different and they will tell you they want the software to be able to do this as well... those kinds of things will affect your project, it will affect the finance and it will affect the timing of a project” (A15).		
	“... most times the issues we usually have is that [SMEs]... have a fixed ideal of what they want and I just don't sell anything, I don't do what they want me to do. I don't do that. I take into consideration what is trendy, what is going to move in market and I also take into consideration my mark because that is very important in the sense that is the quality of what I do. So usually, most times we tend to have conflict there.” (A18).		
alignments	From the cost point of view, we want to minimize our cost because obviously we are small organization you know. So obviously there were challenges from the cost point of view and we try to negotiate with them. Well the breaking point you know, we [be] both parties will come together and agree” (A14)		
	The director was convinced because I made some reference to other business partners we have worked for, so that they made some enquiry from these businesses and be convinced (A19)		
<b>Framing :</b> Product Trial	“.. after everything is done I test it online and I get five users, I get a wide range of people, I put them in an environment and time them because I know what I am looking for. To know how user friendly it is. I ask a lot of questions. If I found out that... they have issues, I go back to resolve that. But most time I never have these issues more than three times. So I have to call the same people again or use another set of people to test it. When completed I now call the client to evaluate the product. If he accepts it is implemented” (A18).		
Product Modification	They were kind of putting the module together thinking that is what we wanted and it became quite difficult and does not save us time, and we had to try and say to them, no this is not what we wanted, take some part off, and now is exactly how we wanted it. It took us about 18 months to do” (A1) “... I will bring it in the office and contact my customers in London, they will come and look at it and say that looks smaller, that looks bigger and I will say ok. I will go back to the engineers and say right the process are fine but I will want a few adjustments... then they will make it again. I will go straight back to the customers and everybody is happy” (A10).		
<b>Stabilisation:</b> Adaptation	“We are just waiting to be taught...I am going to be on a course. I don't really understand the technology so we are going to go on that course and that might change things slightly. But until we have got that technology and understand it, we can't look at the technology” (A1)		
	“Yes staff were trained before they came on the system and then a catch up training was done after going live in case of those that have forgotten one or two things. For us we have always seen training as a continuous process. So staff were trained and continuously” trained(A13)		

Impacts	<p>Another thing is obviously all our clients have to use the new internet technology...to get information across to people quickly and we can check if they have got it. Is quite a good communication tool” (A1).</p> <p>.. we have embraced most of these technologies because we are much bigger, we are a big company but we had like 25 people working for us and we were turning over a million. With that size, comes a lot of complications, headaches and now one person... can manage all the task with these technologies” (A7).</p>		
Problem redefinition	<p>“...because technology advances with time and because of that every company want to keep up to date with their applications. For that reason you have to keep changing stuffs that is one major thing that cannot be compromised”. (A15)</p>		
	<p>“When you are an entrepreneur you need be able to do thing quickly fail, not necessary fail but just understand your mistakes and then change them and continue evolve you must always have that mentality.”(A6).</p>		

## Appendix 10: Inter-rate reliability analysis table on roles of actors presented to judges

Please indicate the Presence (P) or Absence (A) of the codes in Bold

Roles of actors	Raw data	P	A
<b>Managers:</b> <i>Innovativeness</i>	“As a CEO I may have a couple of young graduates and you say to them guys, I have got this business problem go and find me a solution. So you would be the innovator deriving ideas through the organisation (A12).		
	“... the main stakeholders were the MD who was driving the project” (A 13).		
	“What happen with innovation is that ... all of the new innovations are actually starting at SMEs level. They started in small company whether it is individual entrepreneur or small business that needs to identify a new way of doing things.”(A5).		
<i>Empowering</i>	“I also have a role through the process which is mentoring guiding role which will be encouraging people with new ideas and new ways of doing things... it is your responsibility to tell and help them to build their business case so that the actual business moves” (A12).		
	“If you want [Customers] to do something, you need to give them reasons why they should do it. If those customers know why I [am] doing it, they would engage more. If the customer knows that the project will benefit them they will be happy to be engaging with you more” (A 11).		
<i>Controlling</i>	“From MD point of view he was controlling from the management point of view. Looking at the cost, looking at the value each of the solution will add to the business” (A 14).		
	At the development stage, it is done together with the client because he has to come at every stage so that if I am not going to the direction of what he wants, I can change it” (A 20).		
	“Basically we [Managers] as a middle party are just to make sure they install the product which will meet our needs” (A 15).		
<i>Monitoring</i>	“We [SME managers] went through you know and if there is any problem or reason, it will be brought to their [IT experts] attention” (A 14).		
	“Yes, because your client (Manager) is the master, so he will be telling you what he wants” (A19).		
	“...the directors should be more engaged on what is going on in the company... regards to legislation because they will be paying for an auditor, they pay for the services(A11).		
<b>Customers :</b> <i>Idea generation</i>	“A lot of organisations would have a chain of customers, so what they have to do is that... they may use these customers to seek for some ideas” (A 12).		
	The user contribution was invaluable because they were looking at it from the perspective of what they wanted to see from the system. They contributed immensely in terms of what we want... from the system” (A 13).		
<i>Product testing and modification</i>	“...there is what is called users acceptance testing....Before they[customers] accept the application, they will test it to see that that is what they want [and] check to see that it is able to do what they want. So the users validate the application” (A 17).		
	“We use the customer to trial tests the solution. So they will then use those clients to test the solutions. In fact, they would be your testing ground and obviously you may find that client [is] sort of		

	championing your new technology so he becomes a reference ground” (A 12).		
	“...now we are getting the customers involved in the modification of the product” (A 13).		
<b>Consultants:</b> <i>Requirement Gathering and Evaluation</i>	“we had business analysts and product consultant that goes to get the requirement from the users (A 17).		
	“IT consultant comes in to evaluate the business processes and try to map out user needs against the solution” (A 13).		
	“As I said, it is the consultant that will become the champion to such process who will now say it makes sense... [and] evaluation three or four alternative solution of an emerging technology” (A 12)		
<i>Requirement Transformation</i>	The consultant was trying to translate information from the users unto a language understandable to developers’ team and IT team .It is more or less trying to give everybody its or her roles and understanding each stakeholders limit”(A13).		
	“... SMEs do not have the skill sets, they may call a consultant to write a business case” (A 12).		
<b>IT experts:</b> <i>Education</i>	“I will let them know that there are off the shelf application or will they want me to develop the application from start...So what you have to do is to make them realize that there are various applications to do a particular job. There are different forms of applications...If they are not sure about any application, I have to make them realise the implication of each application the runs in their operating systems.” (15).		
<i>Design and development</i>	“In small business ... the applications that are actually used are codes that are written by the developers. The developers write the code” (A 17).		
	“Having the concepts and trying to actualised the concepts. The design is one problem and we try to make it unique from others. So your role is to make sure that the template designed is acceptable by the client” (A 16).		
<i>Training</i>	“...we have to because those people who play the role in the IT sections have to train our staff on different applications to make sure there are no problems” (A 14).		
	“In most cases we normally have to train them the users get them fully acquainted” (19).		
<b>IT Vendor:</b> <i>Product adaptation</i>	“IT vendors came in to evaluate the systems and map out into the solution... also trying to look at if their product will fit into the solution. So what they did was to come down, get the information, went back to their company, use a copy of the application to replicate how they hope to set the system up in the company after doing that they came back to the site and try to confirm what the set could work and could actually fit into our organisation based on that a couple of changes were made until the company is happy with the system. From there we implemented the solution (A13).		
<b>Government:</b> <i>Collaborative support</i>	“We are currently working with UK Trading Investment to see if [small businesses] might exploit linkage externally” (A22).		
	“We have a specialized staff team who works with partners such as Job Centre Plus, and some of the Enterprise Agencies in terms of organisation of people that want to start their own business” (A21).		
<i>Training</i>	“What we are delivering them was training on the internet, computer network, on marketing [and] we moved on to running a programme called take IT on” (A26).		

	It could be things like help another team or team leadership, appraisal processes, sales and marketing and general business training courses” (A21).		
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## Appendix 11: Inter-rate reliability analysis table on factors presented to judges

Please indicate the Presence (P) or Absence (A) of the codes in Bold

<b>Awareness of multiple Context</b>	<b>P</b>	<b>A</b>
"...we have to look at the bigger picture, how that technology is going to help the whole company..." (A9).		
"... you need to be clear the entire outcome you want ... and all of the stakeholders that are influencing development of the outcome or dissolving the outcome" (A 11).		
"...we have to evaluate the whole business ... because we just can't bring in new technology" (A6).		
<b>Openness to change</b>		
"Lots of the younger people are most switched to new technology; they will come to me and say, have you seen this? What is on the market and we will look into it" (A10).		
"You know ICT is... like every other thing. If you don't have the right mind ready for change you are not going to achieve the change. What you need is an open mind?" A11).		
"I involve all the functional units of the organisations if such departments exist...I can't do it alone" (A6).		
<b>Information sharing</b>		
"Another thing is obviously all our clients have to use the new internet technology...to get information across to people quickly and we can check if they have got it. Is quite a good communication tool" (A1).		
"...there are also a lot of advantages basically, going into this IT development infrastructure, you can be able to communicate effectively" (A24).		
"Any change is all round communication and it is the expectation management fundamentally around that change and it does not matter who you are and what ever part of the organisation you are dealing with..." (A11).		
<b>Shard supports</b>		
"Yes because as I always say that the technical knowledge is new to me... if there is any special area, we have to consult all the relevant people who know the technology" (A14).		
"When I got a problem like that, a middle company or a middle man would help so...I need to talk to somebody that actually specialises in it"(A1).		
"If there is a need for new technology, is a joint thing, I won't be selfish to say no is not a good idea" (A10).		
<b>Safety and Security</b>		
"...online security is a major concern .So we adopt new technology on day to day bases" (A9).		
"...in respect of the safety patrol, obviously is to proof to our client that we are doing our job and the necessity to adopt to monitor the health and safety polices which is more important otherwise we could lend ourselves into court actions" (A1).		
"If the new technology allows records to be kept for long thousands of years, as long as they are maintained" (A14).		
<b>Integration</b>		
"Is all about how it actually works with the rest of the other system in use...how it interfaces with the rest of the product?" (A12).		
"If everything follows the certain pattern, then is much easier to integrate the set of tools, but if the technology is totally different, is another learning curve" (A3).		
"The companies... wanted to have the system that can combine everything at the same time" (A13).		
<b>Expandability</b>		
"...you know we got like 5 employees now... maybe in a couple of year's time, we will have 50 employees, is the system scalable? Also are the functionality and the capabilities scalable?" (A5).		
"...limitation within the current solution, because to be very sincere with you, while looking for a new solution when you have a solution that does everything you want" (A13).		
"... in some cases, why we will introduce something new, is now, most of the things are done with set of servers not a cluster of servers. If you need to do that service because now traffic increases a lot, that-- certain service cannot handle. You need to come to different system and		

that is how we chose another technology” (A3).		
<b>Ease of use</b>		
“We are not particularly IT literate. I struggle on IT. So it has to be simple... to adopt with a short teaching times .Both simplicity for both clients to understand and also for us to achieve the information” (A1).		
“... we have embraced most of these technologies because we are much bigger, we are a big company but we had like 25 people working for us and we were turning over a million. With that size, comes a lot of complications, headaches and now one person... can manage all the task with these technologies” (A7).		
“As I have said, the new smart patrol is imperative, it works well for us, is quite simple to use...” (A1).		
“...the new technology is easy to set up and easy to maintain” (A2),		
<b>Time</b>		
“It is always based on a commercial decision whether that commercial decision is because it saves us time ( <b>time</b> ) which ... saves us money.” (A5).		
“... how much time do you read and understand .If everything follows the certain pattern, then is much easier, but if the technology is totally different, is another learning curve” (A3).		
“If we are going to spend a lot of time here... with the technology we will not adopt it” (A6).		
“So that save us time...If we use the same old school technique... we are kind of losing money because they were ... time consuming”. (A9).		
“Time is very important if the technology can capture somebody who had an accident an hour ago, 10 minutes ago, 5 minutes ago; we are going to be more likely to take up the technology”(A5).		
<b>Service quality</b>		
“For us we really wanted an internet based solution because the services are good” (A2).		
“The use of internet technologies is very interesting because companies can promote what they are doing quite efficiently” (A6).		
“...you want to look at the quality of services you’re providing for people and this is driving the need for IT...” (A24).		
“The whole purpose of getting down this journey is for a reason: it actually to improve your process and delivery” (A9).		
“... whatever you do with regards to a strategy for adoption of the emerging technology. How does it make me sale more? How does it make me more effective” (A12).		
“Well the first stage you know, the factor is that we want everything to be fast and speed that was very important” (A14).		
<b>Customer focus</b>		
“Not really. Generally we adopt something mainly for the customers”. (A10).		
“...the [technology] is actually quite expensive but we felt that it was worth us doing it in order to keep our clients...” (A5).		
“the main factor that is driving change for us is more or less meeting customer’s need” (A13).		
“As a business my focus is constantly going to be I mine retaining my customers” (A11).		
“Now the [technology] is actually quite expensive but we felt that it was worth us doing it in order to keep clients we got and also win new business” (A5).		
<b>Differentiation</b>		
“Our need for a new technology is based on our need to branch out into new market and win new client...” (A5).		
“... in many instances where the emerging technology can help.... differentiate against your competitors,” (A12).		
“If people see phone using android, they will say is quality. People believe is quality. So differentiation makes a lot of different as well” (A15).		
<b>Return on investment</b>		
“Consequently it is unlikely that any SME will give consideration to any new or emerging ICT if it cannot be shown to produce a very quick ROI for the business” (A12).		
“... the new technology ... must show it can generate return on investment basically one basically which is money” (A2).		
“Is not just lack the resources, is return on investment. If anybody who invest £10,000 in something, as long as they will £15,000 in return and you can demonstrate in 3 or 4 years in can make your money back easy” (A22).		
“I think for us to try and sum it up in one word will be revenue” (A5).		

“So this is all making profit. If you are not make a profit there is no point doing business. Shut the company and go home have a sleep” (9).		
<b>Competition</b>		
“We need to move on with new technology, we just can’t use the same old method or process. We need to move ahead to stay in business. If we don’t use it we can fall short or not going to be at the level where other companies might be” (A9).		
“Not really. I think the problem is when dealing with organisation, you need to keep up with new technologies and so you will not be left behind” (A10).		
“... if you are small medium enterprise, your competitors comes out and says... we are doing it this way and there is a new technology that will help us. Then, I will look at that and add competition” (A12)		
“If you don’t introduce new technology, you can get left behind quite easily” (A1)		
“...there is need for competitiveness basically; you want to be able to compete in the tight economy” (24).		
“We are quite keen of knowing if there is anything that can actually fit into meeting competition out there” (A13).		
“That still boils down to competition” (A15).		
<b>Cost</b>		
“But I don’t think there is nothing wrong with new technology. Anything that can help the business run better and easier is fine by me if is not too expensive” (A10).		
“I feel the first time to develop student box...is the cost efficiency of the product “(A6).		
“Money goes a long way and is the reason why companies changes applications. Some applications are much more expensive to maintain” (A15).		
“So why not. If you can reduce man power, instead of taking a couple of guys... one guy can put all the data and everything instead of 3 or 4 people doing data manually” (A14).		
<b>Business expansion</b>		
“Obviously as the company gets bigger..... It becomes a bigger issue to adopt new technology” (A2).		
“What happened when the company grows larger than this? So that is another question we keep asking. Will the system support us? It is sold as a solution for SME, what happen when the company grows outside of SME or out grows SME... So these are some challenges we have been looking at and then try to see if we could find another way out of it before we hit those break walls” (A13).		
“One reason why we look at change is because we are growing ... changing from one man band to 50 employees” (A11).		
“Though sometimes you need to make decisions like whether this technology is going to help our business grow if not we just don’t go on with it” (A9).		

## Appendix 12: Sample of the interview

**You:** ok let me start with sage 2. This stage 2 is where my frame work will come up. I just want to know how SMEs have been adopting and adapting to it. So my first question is how your company has been adopting and adapting new ICT applications?

**The Person:** Ok, that is a very good question. For me, the business arena and corporate arena is very similar to music and fashion. By that I mean what tend to happen in the music industry and in the fashion industry is that all of the new trends and all of the new ways of thinking starts from the street level, whether it is a new fashion, the way people are wearing cloths, the way they are wearing jeans, any new hair style, the way people wear their jackets and things like that. It starts form the street before it gets to the big designer label and then it comes back down into the high street shops. Very similar with music, what happen is any new trend of music, whether it will be the crime or rap or Rand B or Hip up, it starts from the street before it becomes the main screen then all the big main screen artiest and pick it up and then it becomes popular music. But it actually starts on the street.

Now what happens with innovation is that in business, all of the new innovations are actually started at SME level. They started in so companies, small enterprises, whether it will be individually entrepreneur or a small business that need to identify a new way of doing things. Simply because small businesses do have the money and the resource that big companies have. So if a small business needs to do marketing or develop a new piece of technology for the web site, they need to do it in a very efficient way. So what happen is all of the new processes and innovation to do with technology. They start up by research team somewhere or in a laboratory somewhere or in a small business somewhere and then it becomes popular. And all of the big companies take it up. And what happen are people tend to think is the big companies that come out with the innovation, but infect it isn't. That is just a general observation.

So what we do as a business, we identify our need for a new technology is based on our need to streamline our business processes, reduce cost or our need for a new technology is based on our need to branch out into new market and win new clients. And we find the best way that technology can help us do that. I will give you an example. We as a business has started to use cloud computing and cloud computing is a very efficient way for us to be able to get our information and access all of our clients data bases and every time from any where in the world. We can also give access to ARSUS partners. So access to more business, we don't have bunch of 10 developers sitting in an office. What we have is a very small team and then we have projects, we outsource those projects to outsource developers who are not full time employees, and they are contractors. However, they need to be able to access our company information and keep up to how we do business and we use that cloud computing. That is what we do. And small businesses have been using cloud computing for a long time and now are become main stream. So to answer your question, what we do, our need to use new technology is based on our need to keep things very efficient, (efficiency) keep the cost down but also be able to offer the services that the big companies do.

**YOU:** Thank you very much. What set of people do you think that encourages your organisation for the reason for the technology? Is there any actor or people outside that that have a link or a relationship with?

**THE PERSON:** Yes. Absolutely, I mean just as an example, we are a web business developers consultancy and what that mean essentially is that we help small businesses to develop their business module. In online arena and that could be anything forms an accountancy form, a law form to travel companies. It doesn't matter what it is. Bringing your business online new technology takes an understanding of the market place, your competitors, technology and in everything. Now being a small business as I said we have a company made up of two co-founders, two directors and then we have are 5. However we have about 35 different outsource partners. Some of them are based in the UK but the majority of them are based in the UK. We have some in Canada, West Africa and all over the place. And as I have said we need them to be able to keep up to date with companies' policies, the way we do business and things like that. So for example, we have a project on, and we need to let all of our outsource developers know what that project is. We cannot afford to contact them all individually, so what we do is that we use online platforms whereby we can upload a particular project, upload the entire requirement and then send down an alert and our entire consultant can access that and build for the business on online platform. And then we basically can go on with the lowest bid but very often, it is not always the lowest bid but the most cost effective bid in terms of time for delivery, their experience in that particular area. But it means that we do not have to spend time going to that market place. The market place comes to us and bids. This is very similar to an EBAY platform where essentially we option different project out. So that is one example whereby external stakeholders in our business are able to access us and access what is happening without us having to spend the time and the money to go out to them individually. So that is one example of how we do that. And it happens regularly properly at least once a month we do that as project comes on. So another example is that we have designers and we will put that business out to a group of designers that they will pitch for it. But we do not do it on the phone. We do not Email them and we literary tell them that there is a new project, go and have a look at it and that is it. We sit back and wait for the information to come back to us.

**You:** Ok that is perfect. Apart from that two actors, external people, is there any other people that are also involve in getting the relevant things that you need.

**The person:** Absolutely. For example specifically on the internet, what we have to do as a business is certainly be ahead of the curve. Now in a large organisation what they do for example is their IT people and marketing people can afford to send their people on training programmes to go all over the world, you know to seminars, industries and things like that. For example SES is an industry seminar that happens 7 or 8 times a year in 7 or 8 different countries and is called Search Engine Strategies. Now the large organisation can afford to send their technical account managers, their search engine specialists from Francisco for one week to go to Search Engine Strategies 2010. We cannot afford to do that so how do we keep ahead of the curve and know what is happening to our industry in cutting edge. How we do that are we use online platforms and information centres. So things like RSS Feeds, News Feeds, we join collaborated networks and we constantly network on a daily bases with forth leaders in industry. And in form of social networking but in a co-operate level. And we also use such platforms to market innovations as well. So at the moment we are working on a new social medium marketing strategy which we believe is going to be a leading edge and we use this platform as a way of gaining field back from some of the forth leaders in the industries as to what it is we are looking to come up with, things like that.

**You:** question no How is agreement reached on how new technology emerged. Do you have any consensus?

**The person:** Yes, we follow a simple rule test, test, and test again (framing). So what we do is very similar to the innovation processes. So what we do is we identify problems or problem will emerge we defined it and what we do is we research possible solution and we test them and basically the best one wins. It is a very simple process and you know the best one wins. For example over the last month, we have been looking for a CRM system (Customer Relationship Management System). And the option has been to buy one; you know the license the technology and the platform internally. The other option has been to build one, be spoke to us and the other option has been to use an off the shelf system which is well based. When we look at it we realise that buying one is not really worth it. The organisation is not big enough, we do not have enough members of staff, we do not have sufficient amount of clients to make it valuable to spend 2-3000 dollars a year to license a platform is not worth it. Building one again 11:38 will take 6 months to a year to build and it will cost at least £10,000 which is not worth it. So the option really was to use an off the shelf web based system. But in doing so we identified 3 or 4 very in cost, very in entry level and in the end what we did was we tried all of them for one month. And one of them which was a free system in the end we decided that the free system is not good enough. We try all the system for one month and we went for a paid for system. But that pair of system has a relatively low monthly fee and is sustainable. So as our employee level goes, you know we got like 5 employees now, we will get 10, 12, 20 maybe in a couple of years time, we will have 50 employees, that system is scalable. And also the functionality and the capabilities are also scalable and adaptable. And the other thing we can actually open up to our clients, so we can use that system to now communicate with our clients. If our clients has case, there may be an issue with the client website, instead of them calling up account managers, what they do is they log into that system and they put a request into that system, it comes with the account manager, the account management deals with it and then communicates backs to the clients using that system and it is very efficient. It means that they can contact us 24 hours a day, we get Email a lot, we can respond back to them 24 hours a day. The clients can be in the UK, it can be in France, Germany, wherever and we are not affected by time zone. So it actually helps us to manage the relationship with our clients. So basically what we do is we identify issues, find solution and try them and the best one wins.

**You:** Ok let's look at question number 11, at what stage do your organisation finally accepts that they can use new technology.

**The Person:** Basically we know that we cannot live without it. That is when we will officially adopt a system and roll it out to all of our partners and everything like that. So what we do is for example, with the CRM System we try them internally with basically is just one person, myself and we also try it with three of our clients externally. And we test it. When we realise that the client started to use it and find benefit in it. And we realise that if we went back to the old way of doing things, it would not work, that is why we rob it out. So when we reach the point that we know is going to be more cost effective or we cannot live without it that is when we adopt it fully. It is always based on a commercial decision. Whether that commercial decision is because it saves us time which in a sense saves us money or it saves us money really straight away or it makes us appear really professional to our clients or you know that is when we will adopt something.

**You:** There are some factors within you mention like time, cost.

**The person:** Yes time, cost and sometimes things will cost money but if it is going to differentiate, so differentiations are really important. So if we know that our competitors are not doing something like this, sometimes it is going to be worth the cost to do it because it differentiates us and we can use it as a USP.

**You:** Thank you very much, I know you must have touched everything, but in 12, in general terms I want to ask you to draw the processes involved over time in your organisation whenever you want to adopt the technology

**The Person:** In terms of need the process can change but it really comes down to need. So for example one of the services we offer is Search Engine Atomization. Over the last few years that area of the business has become saturated with competition. So what we need to do is find a way to differentiate ourselves. So that is the need there. The need there is differentiation; it is not so much cost saving but more differentiation so that is the need. So that then moves on to the next process. What can we do to differentiate ourselves? So then that need then goes into research. So what we will do is we will research the market and find out what all of our competitors are doing in the area of search engine atomization. And also identifying what they are not doing and what they are not doing will really put us into the direction of what we should do. So in our area of the market, with search engine atomization, we are an SME and we focused on providing services to SMES. What other companies outside our space do not do is provide web based online reporting. Ok so if we are doing a search engine optimization companies what we introduce is a website where we can give our client a username and password, they can log in and query the performance of the company without having to connect with us directly and other companies in our space are not doing that. And we use that as a differentiation. And we did not build that technology, we adopted it. Now the thing is actually quite expensive but we felt that it was worth us doing it in order to keep clients we got and also win new business because we can say look, ok there are companies in our space offering the same top service but they do not offer you this. So a need arises, that need will lead into research, that research will lead into identifying solutions and then is then going into the test and evaluation stage and then we chose. And when we choose, we monitor it to make sure it is doing what it is supposed to do and if so you know we keep it and keep our eyes on it.

**You:** So what you are trying to say is that the need arises, you differentiate and when you differentiate, your competitors are not going to compete too much with you.

**The Person:** For us, the reason why we will adopt new technology is differentiation, to separate ourselves from competitors (differentiation). That is one of the main reasons. The other reason why we will adopt new technology is to make us more efficient, more cost effective in terms of processes.

**You:** The process that you describe, does it often occur when you want to adopt a new technology or does it vary whenever you want to adopt.

**The Person:** We try to because you see using processes like this are the proper way of doing things. But again as a small business we are flexible but we also have very little resources. So we cannot afford to have someone in a corner somewhere and say right, be ahead of everything and test everything and let us know what we should have done. We have to do it

ourselves. As the founder of the business and the director of the business, there are times when we do not follow the process the way we should, we just go straight to the testing phase. We just say let just try it and all the other processes because we do not necessary always have the time to do the research. So it should always occur but it does not always occur. Sometimes we have to jump so of the steps because of time and everything like that and sometime to do the research may cost money and we just do not have it, so is better to just use our best knowledge to choose a couple and then test them.

**You:** What factor do you think motivates your organisation to adopt this new technology?

**The Person:** I think for us to try and sum it up in one word will be revenue (return on investment). Ability to maximise revenue and you could say profit. Automatically that is what it is. We adopt process and technologies that will affect our bottom line positively.

**You:** So that is exactly what makes your company adopt new technology.

**The person:** yes

**You:** To stay ahead of the competition

**The Person:** To stay ahead of the competitor and also if there is a new technology that comes out and we can build the service around it, that means that we can offer a new product or service based on the technology. So for example we started our business in 2005 and in 2005 social media were nothing like it is now. And we were one of the first companies that adopted social media and we essentially build our service around it. Social Media Marketing Service.

**You:** So how did you identify the need to adopt social media?

**The Person:** Essentially it is just through research. We identified the fact that social media was going to be a growth area and that advertiser, marketers; businesses will need to be in social media space moving forward. We have been doing social marketing media for nearly three (3) years now. In 2007 people are just about hearing of face book and we are already managing companies on face book. And we also use it not just face book I mean social media to win new business as well. And there are tools around that. So there are tools that we use to manage and optimize and track social media campaigns and what these tools do, they manage what is happening. And so if we are managing a client presence on face book, twitter, YouTube, my space link in academy, we have tools that measure all of that activity. How many people are looking at their twist, how many people are reading their block, how many people are reading their articles, how many people are watching their videos, how many people click on it?, how many traffic went back to the website and then relate that back to a conversion, you know how many sales they get from that video we did for them. We have tools that measure that and we adopt those tools so that we can provide that service. And is become quite common now but it was not couple of years ago so now we are thinking about what we are going to do that is new.

**You:** What are you thinking that will be new now, you may not follow the processes you mention before?

**The Person:** No the other process that we follow is what we called an Innovation process. It is very similar.



**You:** Innovation Processes?

**The Person:** Yes

**You:** How does that work?

**The Person:** The Innovation processes are slightly different and I can search something there for you to demonstrate that. So this is the Innovation processes. So what we do here is the innovation process is coming up with new general service that we can introduce, again that differentiate us and also give us a new product to sale. Now instead of there being a problem that we have to solve is more concepts. So we are still looking, what we can do? What ideas or concept that we can come out with that can introduce a new type of service. So it comes from the need to have what we call assess IP Intellectual Property. Something that we can have, that type of service that we can say hey Mr. marketer this is the service that we offer, then that nobody else offers or this is how we do this that nobody else does that is an innovation process. So the technology comes up with a concept and there requirements the analysis, then we generate the ideas, we value the ideas and then we project plans. Like ok how are we going to roll this up in the business? The next phase of this is implementation. You develop it, we construct it, come out with the or a new kind of documentation or a new language or technology that we can use and then we test it. We go out into the market place and we try the sale it and see what kind of feedback we will get on we defined that then we start and market it.

**You:** Do you see any shortcoming in adapting to this technology.

**The Person:** What it does do, I will not say is a shortcoming, but it helps us to identify shortcomings. So far example, they have been stuff that we have been doing for the past 18 months, we realise we should not be doing it. And that comes from, you know we are going through the innovation process right now where we try to develop a new service and as a result we realise that there is no way we can do it and still maintain the current service we have. Now what that means is we have to make a decision, do we start offering this new service and stop offering the current service or do we not offer the new service. The reason why that is a dilemma is because if we start to offer the new service, all of the current clients will say why but am not getting that new service seeing that am on a 12 months contract. So what we realise is that is more important for us to offer the new service. So we are going to offer the new service, stop doing the current service. But it means that we have to offer the new service to current clients for free, otherwise they will feel disenfranchise. But we realise now that the current service we are offering is dead or will be. We believe so for example this search engine atomization service because we introduce an online tracking tool and so on and so forth, and there are so many other companies doing web based tools that help with search engine atomization, we realise that as a revenue strain and the service module, in about 6-8 months it will become dead or it will become so saturated that it will become difficult to sale that service. So we are going to stop doing it. We are going to introduce a new service which is more gain towards what we call social search whereby we focus on what is happening in the stratosphere in the social media arena both on the cooperate and the personal level because that is going to be important. And they prove for that is for example that now if you search in Google you will realise that before you get the actual search result, you will get result from twitter or face book in my space or YouTube, will actually come up before the listing because what it is, is that a website to be static. A website may be only updates once a week, or once a month or once a day, whereas social conversations are

happening second by second. So if you want current knowledge and information, what is happening in the social space can be more current and relevant than what is happening on websites and we have recognise that so we are moving towards search engine optimisation for us is moving towards search person atomisation which is a new innovation that we are now rolling out whereby we do not focus on what the search engine are looking for, we focus on what people are talking about. It is going to be more relevant and current because of technology and because people have search really access to information and the ability to share information that is where a lot of the time and opportunities will be. For example we have a client that is a legal firm what they do is that they specialise in personal injury. So you have a road accident you can make a claim, you know someone knock you off your bike, you can make a claim and so on and so forth. Not at the moment that industry is very saturated, you have got claims for you, injury lawyers for you, claims direct all of these guys. This guys are very believe it or not spending over £20,000 a month in the UK alone on search engine advertising which means that if you are a small business, you could be a local business is very difficult for you to comfit on the internet with those companies. If you are using traditional search person optimization, what we do is we interrogate the social media. So if I got on to Google and I put in assess and claim lawyer Luton what will happen is they will get a lot of listings but most of that listings will be the big companies claim for you, claim direct so on and so forth and only on page 2 and 3 will you get access to the local companies. So if those local companies are trying to grab that customer, they will never get it, they will spend lots of money and never be able to capture that person. However, if you go on to twitter and you do a search for a conversation, maybe that search has had a accident, Luton you will get results of people who are communicating with their friends and colleagues and telling them that they just had an accident in Luton. And that is a current conversation that is happening right now. 35:22 It could be 5 minutes ago, 2 minutes ago, 1 hour ago. So as a legal firm, our clients, the course we do now for them we are not competing with all the guys on the search engines, what we do is that we identify real time opportunities right now and what we can do is we can engage with the user, we will say oh, sorry to hear about your accident, perhaps you should consider calling this guys. That is the real time opportunity right now and that is why it is powerful and that is how we innovates our processes and strategies and we set ourselves apart from our competitors. Time is very important if I can capture somebody who had an accident an hour ago, 10 minutes ago, 5 minutes ago; they are going to be more likely to take up my service and then if they had the accident a week ago, two weeks ago.

**You:** Let go to stage one. What are the basic requirements for successful adoption?

The Person: For you to successfully adopt a new technology, I think the skill is to identify the way the technology will affect your business. If you make that choice and you make it wrong, you can spend three month, six month changing your processes, adopting a technology, adopting a new process and it can actually take you a step back because you will spend time migrating all of your data and new system, repositioning your branding or changing the focus of your sales or your support, you can do all of that and make a mistake. So requirement for adopting a new technology or a new technological process or whatever it is having your own evaluation process, do not do things because other people do them, do things because it is going to positively affect what you are doing. That is really the key because in doing so we have, we have actually decided to stop doing things more than we decide to start doing things.

**You:** Thank you; now let's go to stage three. Do you see any specific reason or factor that you might think that will positively influence you in the future in terms of adapting to a new technology.

**The Person:** Growth. What we try and do is to practise, proving business processes and full processes. For example, in our business although we are small business, we take into fact factors. In marketing we have these PEST factors, this are the politically, economic, social and technological factors and even within that I will put legal factors within the political factors. We try and keep a breath of what is happening in that space, because if we know what is happening politically or economically or sociologically especially for us, those are the things that makes us decide what is going to be a growth area because for us is all about growth. If we can identify a growth area this is the one thing that will make us adopt something more than anything else. If we know then, if we switch into those right now, is going to help our business grow because we can see there is going to be a need for that in the next 3, 4 months. There is going to be a need for it or we can convince people that they need it; if this is going to be a growth area then we will adopt it. So the factor really is growth. Just even if you will grow in terms of sales, there may be something that will allow us to take on two more people, three more people for the price of one or I do not know but may be something we can identify in the market place that if you will spend to do things or offer v

This service, we can win 20, 30 clients in 6 months instead of in 3 years.

**You:** Do you have anything to say in terms of question 16.

**The Person:** One aspect of us right now is mobile. Mobile for us is a growth area and it has been for a while. But as a business, about 3 month ago, we have not been able to identify whether we can be able to entire the mobile industry in a cost efficient way. Because there is not much we can does that will benefit our client in the mobile side, until about six month ago when we realize that one thing we can do is develop mobile application? So that is one area that we moved to. It is growth and because of that we have actually hired an application specialist. They just rationalize in application development. And that is mobile application for Android, window, Mobile and of course you know I phone. And as a result in last month or so, we won two contracts to develop mobile application and that was from making decisions 2 months ago. In the last month we took two contract to develop mobile application and specifically for SMEs. Even now if a small business want to develop a mobile application, there is no way that really that will do it. You can get one man band developers on their own, but what they do not have is the business intelligent and the commercial understanding to be able to build an application based on commerciality. All they will do is doing what we tell them. Oh you want an application that does this. Ok I will build it. They would not go out into the market place and say well actually you know there are 15 business applications available right now on iTunes that do the same thing. So if you are going to develop application like that, your application has to offer something that is not on first of all, what is the cost factors, you know how much are you going to sale the application for. Is the application going to be free, is it going to be one dollar, 3 dollars and 5 dollars. If it is 3 dollars is it going to cost the same as that application? You understand what I am saying, they would not bring all the business intelligence together, and they will just build what we told them to build. We always bring business intelligent, what we call those imaginary aspects into it. Come like a product development business case, everything from branding to what it should be called, how is going to be distributed, do you do for I phones, do you do for

entries, you know that, that and that. And then say like ok this is what the specification should be, this is what it should like, this is what it means to say, it should be free, it should be just for iPhones and then develop an application. Small business can get that. Big company can get that level of service because they can afford to pay. They will go and evaluate the potential for that application and give them 5 grand, just to go and do that and come back and tell us, oh it is not going to work out, ok no problem and they have just spend 5 grand. Big companies can do that but small companies cannot do that so that same money will do all of those research, all of the evaluations, do the design, develop the application, test it and roll it out for that same money. We bring in that kind of blue chip service consultancy to SMEs businesses. So mobile is an area that we feel that we are not going to be able to live without moving forward because if you think about the internet, mobile application enables you to have internet in your pocket so growth penetration is going to be fat of 10. So for example, the population of this country is about 64 million at the moment. Take a piece of technology like the car. There are about 90 million cars in this country. So there is like 1.3 cars for every human being in this country. TVs is 150 millions. Most houses have 3 TVs, mobile phones are 200 million, and people have 3 or 4 mobile phones, one is on contract, one is the work phone and one is pay as you go. So the penetration and the potential for you to gain a position in the market using a mobile application is a lot faster, a lot quicker, a lot cost effective, the barrier to entry, the capability your brand can be in people so on and so forth. And if we can get small businesses to be able to do that, that is another growth area that we would identify for ourselves. So therefore we have to adopt that technology or adopt the capability in house by hiring an application specialist.

**You:** Thank you very much and that is it.

