BROADBAND ADOPTION BY SMES

A thesis submitted for the degree of Doctor of Philosophy

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Abstract

Because the benefits of broadband for businesses have been widely publicized, the UK government has tried to ensure that there is a wide and fast take-up of the technology. Initial figures showed that broadband adoption by SMEs was particularly slow and there has been little research on the use of broadband by businesses, particularly SMEs. An in-depth study into the roles and activities of the groups involved in broadband diffusion to SMEs was conducted. The innovation diffusion and social construction of technology theory were applied to develop a framework that addresses some of the issues not covered in previous literature.

The research was carried out in two phases and the empirical data from these was obtained and analysed using a qualitative and interpretive approach. Whilst broadband adoption figures have picked up more recently the research results show that SMEs have not adopted broadband in its full capacity. The results show that factors including cost, quality of service, and lack of awareness might be a reason for this. Implications for policy makers and groups involved in broadband diffusion to SMEs have therefore been provided.

The first phase of the research provides results that indicated that broadband has not necessarily changed the way the Internet is used by the SMEs. In the second phase, the results showed a wide if not incompatible difference among groups involved in the issues surrounding broadband diffusion to SMEs. Although the government has provided funds for SMEs' adoption of information technology, the level of awareness displayed by SMEs is persistently low. A case is put that this may be because SMEs are unique as are their needs and so need to be targeted as individual businesses with individual needs as opposed to a 'one size fits all' solution.

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Publications

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CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE: Introduction

1.1 Introduction to the research area

Broadband technology is a recent technological innovation that has raised the interest of many organisations and policy makers worldwide. It has been introduced to individuals and businesses at a rapid rate. Although there is no universally accepted definition of broadband, Aronsson *et al* (2002), defines it as "anything with a bandwidth larger than 4Hz". The word broadband is actually a hybrid of two words, broad and bandwidth (Dobers, 2002). Similarly, according to Firth and Kelly (2001), the term broadband has no established definition and varies from country to country. Broadband technology is an umbrella term, which covers varying high-speed access technologies including Asymmetric Digital Subscriber Line (ADSL), cable modems, satellite, and Wireless Fixed (Wi-Fi) Networks. Broadband provides an 'always on' and faster Internet connection than dial up. It is an emerging technology that promises to improve Internet use. There are many benefits that have been attached to the adoption and use of broadband. Productivity is cited as one of the major benefits of broadband technology (Lee, 2002). Small/medium size enterprises (SMEs) in particular could benefit from greater productivity if they adopt broadband and use it to access the Internet and conduct transactions. SMEs could experience growth from an increase in productivity resulting from greater process efficiency and improved information exchange (OECD, 2003).

However, in the UK, adoption of this technology has been quite slow in comparison to other countries such as Korea and Hong Kong (OECD, 2003). In spite of the benefits that have been highlighted for SMEs, their take up of broadband was very slow to begin with. More recently, the figures have improved but there is still room for improvement with the number of SMEs that have yet to adopt the technology as can be seen in section 1.2.1.

This study acknowledges the importance placed on broadband and its use for exploring the benefits of the Internet. In addition, the difficulties involved in its effective diffusion process are also clear and acknowledged in this research. This study intends to provide an in-depth view of the broadband diffusion process by examining the roles and activities of the bodies involved in the process. The most

widely used framework of diffusion of innovations is that of Everett Rogers. Although Rogers' theory has been widely criticised (Elliot and Loebbecke 2000; Kautz and Pries-Heje 1996), it is the most widely used work on diffusion and will be employed in this research with a view of understanding the broadband diffusion process. This research will also consider the various entities involved in this process and will look into the possible benefits of broadband technology to SMEs and the diffusion practices used today.

In the next section, current research in broadband technology is examined highlighting the focus of previous research in broadband diffusion studies. The previous and current figures in broadband diffusion among SMEs are also examined. Section 1.3 presents the motivation for this research and limitations of previous research. In section 1.4 the research aims, objectives are presented. In section 1.5 the methodology guiding the research is briefly discussed. In section 1.6 the research contributions are discussed and finally, section 1.7 provides a summary of the chapters in this research.

1.2 Current Research on Broadband Technology

Broadband has been used for educational, financial and entertainment purposes. Its adoption may be influenced by a number of factors such as government policies, stakeholder interests, geography and demographics, cost and user benefits (Lee and Choudrie, 2002). In previous studies for home uses, emphasis has been put on the educational and entertainment benefits of adopting broadband (Choudrie *et al,* 2003).

Broadband has also been stated to have a significant impact on users' on-line habits. Dwivedi and Choudrie, (2003), investigated the impact of broadband on users' habits and Internet usage and concluded that with broadband, users spent more time online. According to Stanton, (2004), users with access to broadband connect to the Internet a lot more often and for a greater variety of transactions than users with narrowband connection.

There has been considerable interest in home use of broadband. For example, Aronsson *et al* (2002) investigated which broadband services should be made available to residential and commercial users. Their findings indicated that residential tenants were most interested in information services while commercial tenants were interested in communications services. Stanton, (2004), investigated the factors affecting the adoption of the residential broadband and found that the high cost and lack of content of broadband were factors affecting the adoption. Choudrie and Dwivedi (2006) also examined socio-demographic attributes of the household consumers of broadband technology. Their findings suggest that the socio-economic characteristics such as age, gender, education, income and occupation can explain the adoption of broadband in the household.

Additionally, a substantial amount of research has been carried out in relation to pricing for broadband services (Yaiche *et al*, 2000; Falkner *et al*, 2000; Courcoubetis *et al*, 1998; Clark, 1997). The cost of obtaining and maintaining broadband could be a hindrance to its adoption, as it is slightly more expensive than narrowband (Zhang, 2002). This was taken into consideration in South Korea where the government recognised that in order to be successful, broadband access needed to be priced at affordable levels for middle-income households (Choudrie and Lee, 2004).

Different countries show different levels of interest and adoption of broadband. The UK is not currently one of the top countries in the ranking of global broadband adoption. In 2006, the UK was ranked in 18th place in the world and 15th place among OECD countries (ITU, 2006; OECD, 2006). A number of factors may contribute to whether or not and how broadband is being adopted in different countries. For example, Kim *et al* (2003) researched broadband uptake in OECD countries and identified factors such as preparedness of a nation and the cost condition of deploying advanced networks as the most possible factors to explain broadband uptake. Their research suggested that there are several compositions of both economic and political variables that can aid rapid broadband adoption in different countries. Similarly, Howell (2002), investigated broadband uptake and infrastructure regulation among the OECD countries and suggested that a better understanding of the dynamics of the broadband market may be gained from seeking content and user information-focused answers to why cable modem access

dominates broadband access in many countries, and why the total uptake is lower than expected, as opposed to relying upon infrastructure-based explanations.

In some countries, there have been low adoption rates. For example, Chang *et al* (2003) researched areas for attention in the deployment of broadband in Australia. They identified areas that have been holding up broadband adoption in the country and pointed out areas where more attention is needed. Similarly, Gillet and Lehr (1999) researched the availability of broadband in the United States and results showed that the technology was not widely available, and where available, was concentrated in higher income, higher density markets as might be expected. Aron and Burnstein, (2003), carried out an empirical analysis into broadband adoption in the United States. From their research, it appeared that broadband availability in a state is driven by facilities-based competition, demand and cost factors, but not necessarily by availability of broadband services. Their research supports that broadband is beneficial to the economy.

There are other countries where phenomenal high rates of adoption have been experienced. For example, South Korea has a particularly high rate of broadband diffusion, which has sparked a lot of interest. Lee *et al* (2003) considered the contributing factors to phenomenal growth of broadband in South Korea. The combination of the supply-side forces, such as infrastructure competition, with a demand-side factor, high demand (especially due to gaming) gave rise to rapid diffusion. Intense competition between vendors led to a high-quality service at a relatively low flat fee. Additionally, Ryu, *et al* (2003) in their study, state that a high penetration rate of broadband diffusion in Korea has been achieved with government policies and private market as the main contributing factors. In Singapore, aggressive investments in infrastructure contributed partly to the high broadband penetration (Ang, *et al* 2003).

There is also considerable interest in government policies aiding the adoption of the technology in various countries such as the UK and South Korea (Choudrie *et al,* 2003, OECD 2003). OECD, (2003), identified a number of strategies that have assisted the development of broadband markets, promoted efficient and innovative supply arrangements, and encouraged effective use of broadband services based on

experience from OECD countries. Such strategies include policies that promote investment in new technologies to ensure wide take up and effective competition between suppliers of broadband technology and maintaining transparent and non-discriminatory market policies. Similarly, Choudrie *et al* (2003) stated that the government of South Korea succeeded in the diffusion of broadband in the country by setting out a clear vision and strategy for the adoption of broadband. Hyun Kim *et al* (2003) investigated the influence of important economic and policy variables on the diffusion patterns of broadband. Lee *et al* (2003) highlighted the effort of the government of South Korea in encouraging Internet use which in turn led to greater broadband adoption. Choudrie and Papazafeiropoulou (2004) revealed that the South Korean government ensured a high degree of trust and certainty for private sector companies investing in broadband. They recommended the need to search for cultural sensitivity on the needs of users for promotional purposes as illustrated in the South Korean case since broadband adoption in most countries was demand and supply constrained.

The UK government had a strategy to make the UK one of the countries with the most extensive and competitive broadband country among the G7 by 2005 (Office of the e-envoy, 2001). However, in the UK, as at 2004, the adoption of broadband was considerably low (Ofcom, 2004). There have been improvements in recent years but despite these improvements, the statistics (ITU, 2006) do not show the UK as one of the countries with the most extensive broadband penetration.

As demonstrated earlier in this section, it is obvious that broadband has generated a lot of interest in different countries. However, there has been little focus on its adoption and use by SMEs. The focus of most existing research has been on pricing, entertainment, home and individual uses of the technology, and its economic benefits at national level. Apart from benefiting the individual users and the country's economy, broadband is expected to benefit SMEs in particular. However, despite the attention and effort directed towards SMEs adopting the technology, there is still room for improvement in the numbers of SMEs that have adopted broadband.

1.2.1 Broadband adoption by SMEs

Despite all the interest in broadband, there seems to be little information on its use within SMEs. As highlighted by Lee *et al*, (2003), there is little research on how SMEs can adopt new technologies at a faster rate. In 2004, according to Ofcom (2004), 68% of UK SMEs were connected to the Internet, of which 37% used broadband, 65% used narrowband, 23% use ISDN, 32% used a narrowband un-metered service, 21% used a narrowband metered service and 6% unsure of what type of narrowband connection they have. More recently, in 2006, 77% of SMEs were connected to the Internet while 62% of SMEs used broadband for their Internet connection. Its use was higher among larger SMEs with 50-250 employees 70% of which use broadband for their Internet connection (Ofcom, 2007). The numbers mentioned above provide information on the number of SMEs that have adopted broadband. However, there is little research on factors effecting broadband adoption within the SMEs in the UK. As noted earlier, there has been some growth in the numbers that have adopted broadband but there are no indications about their full exploitation of the technology.

There are some government initiatives aimed at improving broadband adoption by SMEs. Fife and Pereira (2002) highlighted the possibility that government subsidies to SMEs are an effective way to increase broadband take-up within this group. Additionally, specific government incentives have been made available such that the price of broadband for SMEs should be less of a constraint to take-up than for households (Affuso and Waverman, 2002). Edinburgh Parallel Computing Centre (EPCC) (2002), similarly, observed that the UK government sees broadband as the "next leap forward for the Internet" and expected SMEs in particular to benefit from the technology.

While it is not certain that all SMEs will benefit from broadband, EPCC (2002), highlight some possible benefits for SMEs that choose to take up broadband. One of the benefits is the ability to trade and conduct business electronically at a faster rate. For example, creating a web-based job sheet database considering the fact that most SMEs encountered by the authors still used a paper-based system, creating a job sheet each week showing the labour and materials used. This saved time and money

and eliminated a paper trail for both the clients and the SMEs. Affuso and Waverman (2002) stated that SMEs could potentially experience large transactions costs savings and productivity improvements should they choose to adopt broadband.

Potential benefits of broadband to SMEs and the government's interest in promoting it makes it worthwhile to look into the different ways that broadband can be beneficial to them, the groups involved in its effective diffusion and factors influencing its effective uptake.

1.3 Motivation for the research and limitations of previous research

Broadband has been said to be beneficial to companies and individuals. Communication is enhanced, various processes could be automated and carried out at a faster rate, and it could promote the image of the company (Dutton *et al,* 2004). Governments of different countries also see broadband as essential for achieving ecommerce goals and providing both social and economic benefits to their citizens (ITU, 2003 and OECD, 2003).

As highlighted in the previous sections, there is evidence to show that although the numbers of adoption of broadband technology among UK SMEs have drastically improved over recent years, there is room for improvement. It is therefore practical to look into the various reasons preventing a faster adoption. It is also worth looking into what the SMEs that have adopted the technology currently use it for. Current research in the adoption of broadband technology focuses on broadband services and government policies for home uses as highlighted in section 1.2, while there is little emphasis on its adoption by SMEs. Focus in the research of broadband has been in various areas such as broadband content, pricing, government policies, educational and entertainment benefits. The various bodies that have a part to play in broadband diffusion have also not been considered in previous research. There are various organisations that have an interest and others a vested interest in the SMEs' adoption of broadband. It would be valuable to examine these bodies and their views in order to provide a different perspective on broadband research particularly in relation to its

adoption by SMEs. In order to understand these bodies' interpretations of broadband diffusion to SMEs, the social construction of technology theory (SCOT) will be employed in this research in addition to the innovation diffusion theory.

Little research has been done on the diffusion of broadband within diffusion of technology studies as well. There has been research in the following areas of diffusion of technology: enterprise resource planning (ERP) (Rajagopal, 2002), expert systems (Shao, 1999), electronic data interchange (EDI), (Daamsgard and Lytinnen, 2001, Premkumar *et al,* 1994) Internet banking (Gopalakrishnan *et al,* 2003) Internet use (Dutta and Roy, 2003) and electronic commerce (Papazafeiropoulou, 2002). The study of broadband within the study of diffusion of technology is limited when compared with the aforementioned areas.

Since research in the area of broadband diffusion is limited, the research could be of benefit to a number of groups. The possible beneficiaries of this research include policy makers, SMEs and researchers. A detailed study examining the broadband diffusion process to SMEs could help policy makers in decision-making concerning the government's input in aiding broadband adoption and IT in general. It could benefit SMEs as it could aid in deciding whether or not they need to adopt broadband and how it could improve their businesses. Additionally, it could benefit researchers involved in SME or diffusion studies. The framework applied in this research could be used by researchers examining technology adoption by SMEs. It could also be applied to other diffusion studies.

As previously mentioned the focus of previous research on broadband has been on its home use, educational and entertainment benefit and pricing with little focus on its adoption by SMEs. This research therefore endeavours to bridge this gap by attempting to answer the following research question.

Who are the various entities involved in the broadband diffusion process to SMEs, what are their views and how do these influence the diffusion process?

1.4 Aims and objectives

Aim: in an attempt to answer the question, this research aims to identify the various entities and factors that affect the uptake of broadband by SMEs. To examine the views of these entities with intent to understand the broadband diffusion process to SMEs.

In order to achieve the aim, the following objectives are stated:

- *Literature review examining existing research on broadband, innovation diffusion and social construction of technology (chapters 1 and 2)*
- *An attempt to identify the relevant social groups involved in the broadband diffusion process (chapter 2)*
- *If possible, an examination of the views of these social groups particularly in relation to SMEs and the perceived innovation attributes effecting broadband diffusion through a field study (chapters 5 and 6)*
- *If possible, further examination of the views of the social groups to identify the attributes of broadband that adequately explain its diffusion through a follow up study (chapter 6)*
- *If possible, recommendations to practice and contribution to theory*

1.5 Research Methodology

The underlying research epistemology in this research is the interpretive approach. This is because as has been demonstrated in the previous sections there are many social, political and cultural issues related to this research. Interpretive research has been used in areas of information systems (IS) research such as, systems design, organizational intervention and management of IS and social implications of IS (Walsham, 1995). Furthermore, according to Klein and Myers (1999) interpretive research can help IS researchers to understand human thought and action in social and organizational contexts. It can help to produce deep insights into information systems phenomena.

The qualitative research methodology was selected for this study. According to Denzin and Lincoln (1994), qualitative researchers study things in their natural settings, attempting to make sense of phenomena in terms of the meanings people

bring to them. Qualitative research methods were developed in the social sciences to enable researchers to study social and cultural phenomena. They enable researchers to understand people and the social and cultural contexts within which they live (Myers and Avison, 2002). Within qualitative research, interviews are one of the most widely used methods (Seale *et al,* 2004). Interviews are social encounters with the speakers collaborating to produce retrospective and prospective accounts or versions of their past or future thoughts, actions, feelings and experiences (Rapley, 2004).

The research strategy that has been selected for this research is the field study. Field research involves the activities of the researcher, the influence of the researcher on the researched phenomenon, the practices and procedures of doing research and the methods of data collection and data analysis. The major advantage of a field study is the opportunity to capture natural behaviour as it occurs in everyday life (Coolican, 2004).

For the analysis of the data, intentional analysis was selected. Intentional analysis aims to understand a speaker's intentions and is particularly appropriate for the study of transcribed interviews. This is because the researcher is presumed to have much in common with the subject, such as living in the same epoch, speaking the same language and living in the same culture (Lacity and Janson, 1994). According to Sanders (1982) essences are derived from an intentional analysis of the correlation between the object as perceived and the subjective apprehension of that object or experience.

1.6 Research contribution

The research aims to demonstrate the use of social construction of technology and some attributes from the innovation diffusion theory for an in-depth examination of the broadband diffusion phenomenon. The research involves a theoretical and an empirical investigation of issues faced by the social groups in the broadband diffusion process and will lead to the development of a set of framework for the examination of their views.

The frameworks that have been developed will be useful to all relevant social groups that are interested in evaluating their actions in the context and particularly to decision-makers at a national and international level. This contribution is important for social groups involved in the broadband diffusion process in various categories. These are companies that use the technology, the vendors that are involved in providing and supporting diffusion activities and the policy makers at a regional or national level that support such activities.

In terms of theoretical contributions, this research contributes to both the innovation diffusion and the social construction of technology theories. In the first instance, this is achieved by synthesising these theories in an attempt to understand broadband diffusion phenomena and secondly, by applying these theories in a new political and social context, that of broadband diffusion in the UK. These contributions will become evident through the chapters in the thesis and will be reviewed in more detail in the final chapter.

1.7 Structure of the Thesis

This chapter presents an overview of the research. It provides the background to the research, motivation for the research, limitations of previous research, objectives, contributions as well as methodology.

The following chapter, chapter two, provides the background to the research, which provides insights on Small medium sized enterprises (SMEs) and the adoption of technologies such as the Internet, by SMEs. The chapter also examines the innovation diffusion theory, which is used in this research. In addition, the social construction of technology (SCOT) is also examined and will be employed to carry out the research in addition to the innovation diffusion theory. Previous research in SMEs, innovation diffusion and SCOT are also discussed.

Chapter three addresses the research methods used in this thesis to examine the diffusion and adoption of broadband by SMEs. The chapter discusses the issues that are necessary to consider before selecting an appropriate research approach. The chapter also examines the underlying research assumptions that guide Information

Systems research. In addition, chapter three discusses the rationale for approach taken and its suitability for this research is discussed.

Chapter four provides a detailed description of the participants involved in the fieldwork carried out in order to understand the empirical context of this research. These representatives are described in order to depict the context of this study. Additionally, there is some background information about the companies and organisations involved in the field study and their experience in broadband diffusion.

Chapter five presents the analysis of the field study conducted in the first phase of this research. The focus here is on the different viewpoints from each of the social groups concerning the perceived innovation attributes.

Chapter six presents the second phase of the research which is carried out using data obtained from field work involving representatives of the two social groups that wield the most influence over SMEs' adoption of broadband.

Chapter seven presents the conclusion to the research. It provides a summary of the research findings and contributions both to theory and practice. The limitations of the research are also presented in this chapter as well as directions for future research.

The structure of the thesis is summarised in figure 1.1 below.

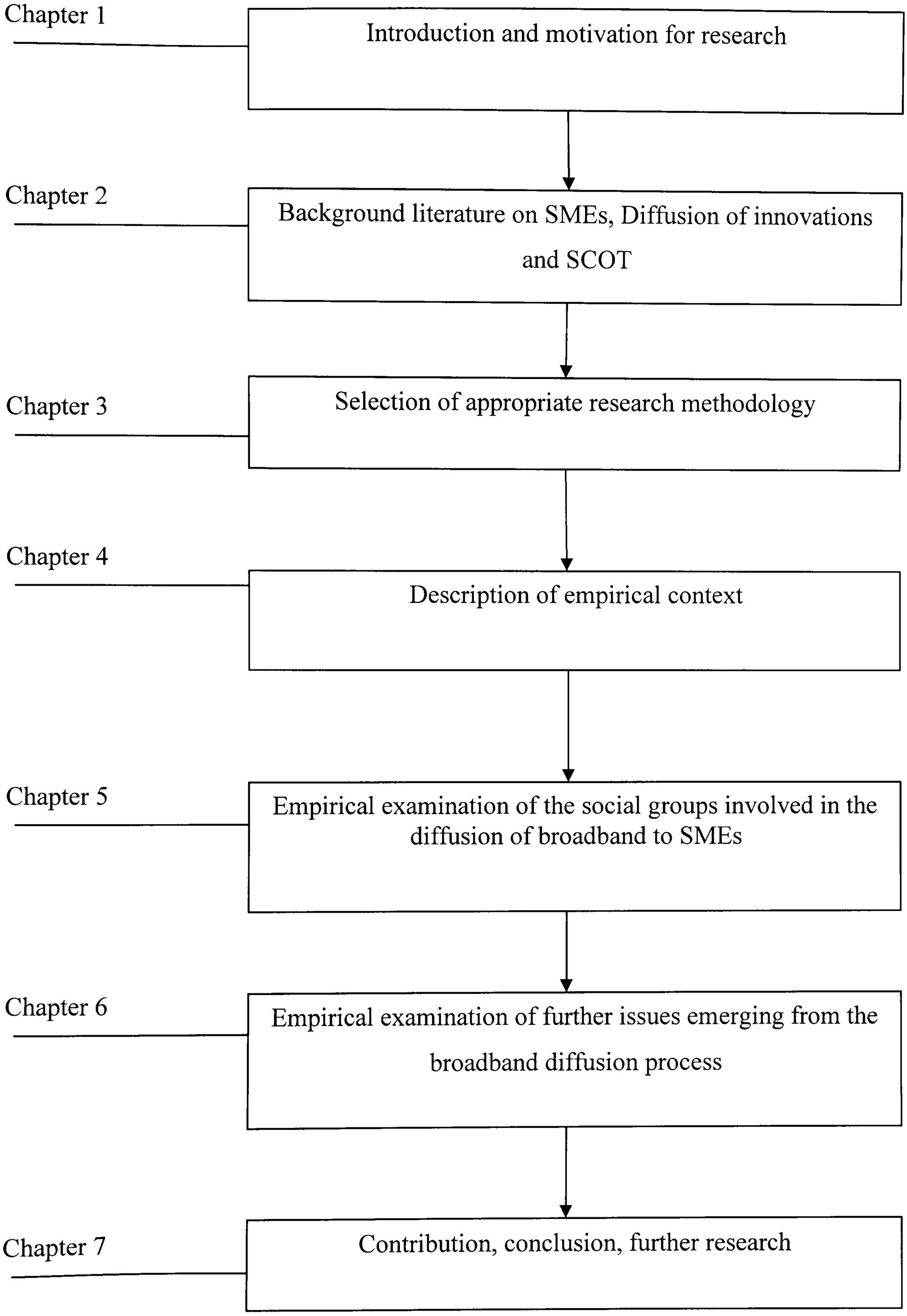

Chapter 1
Introduction and motivation for research
Chapter 2
Background literature on SMEs, Diffusion of innovations and SCOT
Chapter 3
Selection of appropriate research methodology
Chapter 4
Description of empirical context
Chapter 5
Empirical examination of the social groups involved in the diffusion of broadband to SMEs
Chapter 6
Empirical examination of further issues emerging from the broadband diffusion process
Chapter 7
Contribution, conclusion, further research

Figure 1.1 Structure of the thesis

CHAPTER TWO: Background research: SMEs, Diffusion of Information systems and Social construction of technology

2.1 Introduction

Broadband has been introduced to the business community as a fast and easy way of exploiting the Internet. The benefits of its use (fast reliable connection, always on) are widely advertised and broadband diffusion is one of the items at the top of the agenda for technology related policies worldwide. As a result, there has been some provision of government initiatives aimed at improving broadband adoption by SMEs in the UK such as increased spending on technology and telecommunications (DTI, 2004). As highlighted in chapter 1, existing broadband research has not focussed on its use by SMEs.

SMEs vary in size and nature depending on their area of business. In the same way, their attitudes differ when it comes to the adoption of new technologies. In some cases, SMEs are keen to accept new technologies while in other situations they are not (Kalakota and Robinson, 2001; Lawson *et al*, 2003; Merlin, 2004). There are many reasons why SMEs may decide to adopt new technologies but the diffusion of new technologies to SMEs is not always straightforward and simple.

This chapter provides insights on Small and medium sized enterprises (SMEs) and the adoption of technologies such as the Internet. The innovation diffusion theory is examined as a way to study broadband adoption in the SMEs environment. In addition, the social construction of technology (SCOT) will be examined and will be used to carry out the research in addition to the innovation diffusion theory. Previous research in SMEs, innovation diffusion and SCOT are also examined and discussed.

The rest of this chapter is structured as follows. In the next section, the characteristics of SMEs are examined and relating research particularly with reference to SMEs' adoption of information and Internet technologies are also analysed. In the third section, the supporting theory of this research, which is the innovation diffusion theory, is presented. The developments in innovation diffusion for information technology and SMEs are described as well. In section four, socio-technical approaches are introduced. One of these approaches is SCOT, which is also analysed in this section. In addition, the section also presents stakeholder identification process which is used to identify social groups concerned with the

diffusion of broadband to SMEs. Lastly, section five presents the summary of this chapter.

2.2 SME Characteristics

The European commission (2007) defines Small and medium size enterprises (SMEs) as enterprises with fewer than 250 employees. Micro enterprises are enterprises with fewer than 10 employees while small enterprises have between 10 and 49 employees with an annual turnover and/or annual balance-sheet total not exceeding 10 million euros. Medium enterprises on the other hand, have fewer than 250 employees with an annual turnover not exceeding 50 million euros or an annual balance-sheet total not exceeding 43 million euros.

SMEs represent a significant part of the European economy. They are a major source of entrepreneurial skills, innovation and employment (European commission, 2007). In the European economic area (EEA), SMEs account for 75 million jobs and 99% of all enterprises (European commission, 2007). In the UK in particular, as at 2006, according to the Office for National Statistics (2007) 99.3% of all enterprises in the UK were small enterprises, 0.6% were medium-sized and 0.1% were large. SMEs accounted for 58.9% employment and 51.9% of the sales turnover generated in the country.

There are various perceptions of SMEs and some of these will be considered with a view to gain a better understanding of how SMEs function. SMEs are generally considered to be sceptical when it comes to taking risks and they are driven by customer needs (Levy *et al,* 2001). The majority of small firms are owned by a single person signifying that most decision-making will rest on one person. SMEs are generally considered to be sceptical when it comes to the adoption of new technologies. As a result of their nature and size, they are unable to spend large sums of money on adoption of technologies to support the running of their business.

The decision to adopt certain technologies might depend on these varying sizes and nature. However, Burke (2005) highlighted the fact that not too many researchers have examined the size of SMEs as a factor in information systems use. The study

showed that as a firm grows, it could be expected that the need for information systems will be recognised, thus signifying that growth, rather than industry type or characteristics of the CEO is a more important indicator of whether or not a firm will adopt such information systems like Internet technologies. Similarly, according to Levenburg (2005) very small firms appear to be in the early stages of implementing ebusiness and tend to rely on simpler, easy-to-use technologies, placing particular importance on using the Internet to research new sources of supply and markets. The larger (medium-sized) SMEs tend to be the most sophisticated e-business technology users, as evidenced by the highest prevalence of a website, and higher means for usage of e-business tools.

There are also issues of how SMEs decide whether or not they need to adopt new technologies. As pointed out by Beckinsale and Levy (2004) SMEs' decision to adopt the Internet or not lies on the perceived benefit and relative advantage they might get. While it might not be possible to reap the profits of investing in new technology immediately, the long-term effect could turn out to be immensely beneficial to the SME. As pointed out by Sandler and Bogg (2001), the use of the Internet could put SMEs on a platform where they are able to compete with larger companies. More SMEs could decide to adopt if they were aware of this. However, Saban and Rau (2005) suggest that resources are more of a deterrent to adoption rather than lack of knowledge.

The various characteristics that have been discussed in this section have a major impact on SMEs decision to adopt new technologies. However, Lefebvre et al (1991) identified four categories of factors that influence SMEs' decision to adopt new innovations. They are characteristics of the firm, competitiveness and management strategies of the company, influence of internal and external parties on the adoption decision process and characteristics of new technologies.

2.2.1 SMEs and the adoption of information technology

The reasons for information technology (IT), Internet and e-commerce adoption by SMEs are complex and interrelated. In a research carried out by Chappell *et al,* (2002) it is reported that a mix of management eagerness and the need for better

communications motivates SMEs' adoption of IT while the main barriers to IT and e-commerce adoption appears to be the managers' unwillingness to take risks when it comes to technological change (Kalakota and Robinson, 2001).

SMEs vary in size and nature depending on their area of business. In the same way, their attitudes differ when it comes to the adoption of new technologies. In some cases, SMEs are keen to accept new technologies while in other situations; they are persuaded with the aid of government funding initiatives (e-business policy group, 2002). For instance, in the UK, the Government has spent more than any other country (£67m) on a comprehensive programme in the past three years in order to succeed in its ambition to get UK businesses online with the added aim of increasing the e-business readiness of SMEs (DTI, 2003). It is not clear if this was effective because according to an earlier report, UK SMEs have been hesitant to adopt ebusiness practices (UK Online, 2002).

There are many reasons why SMEs may decide to adopt new technologies. These reasons could be related to the desire for business growth (Levy *et al,* 2002). In other instances it could be as a result of a desire for better communications (Chappell *et al.*, 2002). However, whether or not SMEs have a need to grow, they do need to survive as a business. This might prove impossible because according to Taylor and Murphy (2004) SMEs need to put information and communication technologies (ICT) at the core of their business processes or they may not survive.

According to Lefebvre *et al* (1990), new technology such as information technology permits SMEs to become more flexible giving them the ability to become better committed to responding to customers' needs, at the same time improving their market image and providing a strategic edge for the firm. However, according to a study carried out by Levy and Powell (1998), this was not found to be so. In their investigation of the role of information systems in promoting or inhibiting flexibility in SMEs, their study shows that they exhibit relative inflexibility in their general approach. Furthermore, information systems do not seem to increase flexibility rather, it reinforces existing thinking. The reason for this is that SMEs see themselves as having a narrow product range, which is used for the benefit of one or two customers. This makes them consider the purchase of information systems to

improve efficiency and effectiveness of current processes rather than considering the capacity of information technology to increase flexibility and improve competitiveness.

Most barriers to SMEs' information technology adoption, as identified by Lawson *et al* (2003), were non-technical and they suggested some ways in which these barriers may be overcome such as government intervention and industry associations providing information to raise awareness, training, participation in the diffusion process and working with good quality consultants.

As will be demonstrated in the following section, one of the major technological innovations that can be of benefit to SMEs is the use of the Internet. However, while some SMEs have used and benefited from the use of this technology, some others are yet to experience the technology so are not in a position to decide whether or not it is beneficial to their business.

2.2.2 SMEs and Internet use

Internet usage by SMEs could vary depending on the industry. The adoption of the Internet and related technologies could depend on the sector within which the SMEs operate their businesses. According to Daniel *et al* (2002) the industry sector with the lowest levels of adoption of e-commerce were those in the public, education and charitable sector while those with the highest levels of adoption are those within the professional services sector.

There are many different reasons SMEs may have for using the Internet such as, Internet presence with web sites and email. Also activities like online payments, online purchasing, online banking, and customer services. Several benefits for SMEs to make use of Internet or e-commerce include reduced cost to business and greater market exposure (Saban and Rau, 2005). Provision of operational, managerial and strategic advantages such as better links between the SMEs and customers and business partners, greater market penetration, more information for decision making, greater access to external resources and expertise are even more reasons for SMEs' use of Internet (Chappell *et al* 2002). Merlin (2004) in his study of SMEs in the

wine industry in Chile and the coffee industry in Costa Rica found that the use of the Internet was very useful for communicating with importers around the world. It also aided easy provision of marketing materials. There was the additional benefit of increased turn-over and profit for the businesses.

The use of the Internet by SMEs provides them with the opportunity to compete at the same level as larger companies as stated by Sandler and Bogg (2001). Saban and Rau (2005) also highlight the SMEs use of websites to publish company and/or product information and interact with customers in foreign markets. However in contrast, their research found that limited resources prevented SMEs from using the Internet to conduct more sophisticated transactions thus arguing that the Internet allows competition on the same level between SMEs and larger companies only partially. The clientele serviced by the various SMEs also have a role to play in their use of the Internet and associated technologies. For instance, businesses that sell a larger proportion of their products and services to other businesses tend to use ecommerce more than SMEs that sell to consumers only (Daniel *et al*, 2002).

Electronic commerce (ecommerce) and Electronic business (ebusiness) are opportunities that are possible for SMEs to exploit as a result of the technology that is available to them such as the Internet and broadband. The UK government has been on a mission with the intention of encouraging businesses by creating the most conducive environment in the world for electronic trading (DTI, 2003). However, this is an opportunity that a limited number of SMEs have taken advantage of. As pointed out by Pavic *et al* (2003), while UK SMEs are adopting the Internet and associated technologies at rapid rates, they are yet to adopt e-business as the basis for their business communication and transaction.

2.2.3 SMEs and Broadband

According to Arbore and Ordanini (2006) in explaining reasons for broadband divide between SMEs, the divide is mainly due to the relative size of the firm. They however state that this is at a decreasing rate. Another reason that explains why some SMEs are adopting broadband and why others have not is a result of the geographical area where SMEs are located and this reason acts as a deterrent for the

smallest firms. However, these reasons seem to be corrected where organisational strategies such as outsourcing were used. The authors also point out that the firm's resources have a role to play in the decision to adopt broadband.

Dutton *et al* (2004) pointed out the fact that the lack of trust in information systems suppliers from experiences with previous applications that proved to be a lot more costly and difficult to use than had been promised by the suppliers is a significant factor in dampening business enthusiasm for the Internet and broadband. Another deterrent for SMEs could be the cost of obtaining broadband. This is a possibility considering that in terms of business Internet access, the UK was the second most expensive of the G8 group of countries (UK, Germany, France, Italy, Japan, Russia, Canada and USA) (DTI, 2003). However, the cost of obtaining broadband in the UK has dropped drastically according to a more recent report (OECD, 2007). Despite the cost of obtaining broadband, in a report by Ofcom (2006) more than 73 per cent of SMEs connected to the Internet were using broadband as their main method of Internet connection with 84 per cent of these believing that broadband offered good value for money.

The department of trade and industry (DTI) and the broadband stakeholder group (BSG), examined the benefits of broadband to business. Their report suggests that broadband creates the possibility of new commercial opportunities for SMEs and has the capability to change the way they operate and organise their businesses. This leads to an increase in productivity and competitiveness. The report also notes that the benefits of broadband include the possibility of home working, and reduces the cost and requirement of office space (DTI, 2004). The business benefits of Broadband are listed as including (DTI, 2004: 15):

- Evolving supply chain management with partners who demand on-line integration
- Introducing new collaborative working tools to enhance efficiency and effectiveness
- Providing flexible working in order to attract and retain employees
- Improving customer relationship management (CRM) to meet and exceed customer expectations for sales and support

- Outsourcing activities to save costs
- Aggregating content to achieve efficiency gains
- Linking the mobile workforce with the company and its data resources

In spite of the several benefits of broadband that have been listed as particularly beneficial to SMEs, there seems to be a mixed reception of the technology among the SMEs. According to research carried out by Ofcom, more than a third of SMEs with Internet access were likely to upgrade to Broadband in the following 12 months, while four out of ten SMEs thought that broadband would increase business efficiency. However, a similar amount did not think there was any benefit in upgrading (Ofcom, 2005). Table 2.1 below summarises the benefits of the Internet and broadband for SMEs and the reasons for their scepticism about technology adoption.

Advantages of Information systems, Internet and Broadband for SMEs	**Reasons for scepticism**
Better links between the SMEs and customers and business partners (Chappell *et al*, 2002)	Limited resources (Saban and Rau, 2005)
More information for decision making (Chappell *et al*, 2002)	Lack of trust in IS suppliers (Dutton *et al*, 2004)
Greater access to external resources and expertise (Chappell *et al*, 2002)	Unwillingness to take risks (Kalakota and Robinson, 2001)
Increased competitiveness (Sandler and Bogg, 2001)	Lack of awareness (Lawson *et al,* 2003)
Ability to compete with large firms (Sandler and Bogg, 2001)	Size of firm (Arbore and Ordanini, 2006; Levenburg, 2005)
Increased turn over and profit (Merlin, 2004)	Uncertainty about perceived benefits (Beckinsale and Levy, 2004)
Business growth (Levy *et al*, 2002)	Cost of technology (DTI, 2003)
Greater market exposure (Saban and Rau, 2005)	Concerns about security (OECD, 1998)
Enhanced communication (Chappell *et al*, 2002)	Lack of skill (OECD, 1998)
Exposure to global market (Merlin, 2004)	Geographic location (Arbore and Ordanini, 2006)

Table 2.1 Advantages of adopting the Internet and Broadband and reasons for SMEs' scepticism

2.2.4 Theories used for the study of information technology use by SMEs

Researchers in the study of information technology use by SMEs have employed various theories. Papazafeiropoulou (2002), in a study of electronic commerce (ecommerce) diffusion to SMEs, uses the stakeholder theory in addition to innovation diffusion theory. Similarly, Santarelli and D'altri (2003) use the diffusion model to measure the diffusion of ecommerce among SMEs. Kendall *et al* (2001) and Mehrtens *et al* (2001) in their studies on ecommerce and ebusiness adoption by SMEs also use the diffusion model.

Other theories that have been used include resource-based theory. For example, Caldeira and Ward (2003) consider how resource based theory can be used to explain success with the adoption and use of information technology in manufacturing SMEs. Daniel *et al* (2002) in their study on the adoption of ecommerce in the UK use a stage model to investigate the phenomenon.

Additionally, Technology acceptance model (TAM) (Davis, 1989), theory of planned behaviour (TPB) (Ajzen, 1991) and the decomposed theory of planned behaviour (DTPB) (Taylor and Todd, 1995 and Chau and Hu, 2001) are other theories that have dominated IS research where individual adoptions have been examined. As a result, neither of them has been applied in this research. With TAM, the model does not address the influence and personal control factors on behaviour, economic factors and outside influences such as suppliers, customers and competitors (Van Akkeren and Cavaye, 1999). Ajzen (1991) acknowledges that the relationship between the belief structures and the determinants of intention in TPB are not particularly well understood causing some inconsistency in results. According to Chau and Hu (2001) DTPB did not substantially increase the power for predicting behavioural intention. Their research also suggested that the attitudinal models could not be applied to all contexts. Furthermore, the theories are typically applied when considering individual adoption, whereas this study focuses on SMEs within a social, political and cultural context.

Of the theories that have been mentioned and used in the study of diffusion of technologies, one of the most frequently used is the innovation diffusion theory. This

theory as presented by Rogers (2003) is the most commonly used work in theory of diffusion of innovations and is presented in the next section.

2.3 Innovation diffusion theory

Rogers, (2003), defines innovation, as 'an idea, practice or object perceived as new by an individual or other unit of adoption' and diffusion as 'the process by which an innovation is communicated through certain channels over time among members of a social system'. Additionally, King *et al* (1994) define diffusion as "the spread of the capacity to produce and/or use innovation, and its use in practice". Roger's theory has been used in several studies on the diffusion of technologies (Rajagopal, 2002; Karahanna *et al*, 1999; Kumar and Swaminathan, 2003).

There are some aspects of the theory that are pertinent in explaining the rate of adoption of an innovation. These are known as the perceived attributes of an innovation. Individual perceptions of these attributes can help to predict the rate of adoption of an innovation (Rogers, 2003). The perceived attributes of an innovation that are important in explaining the rate of its adoption include: Relative advantage, compatibility, complexity, trialability and observability (Rogers, 2003).

Relative advantage in the theory of diffusion of innovations is described as the degree to which an innovation is perceived as being better than the idea it supersedes. The degree of relative advantage is usually expressed in terms of economic profitability, social prestige or other benefits. The nature of the relative advantage would be dependent on the innovation in question (Rogers, 2003). According to Rogers (2003), diffusion scholars found relative advantage to be one of the best predictors of an innovation's rate of adoption.

Compatibility is described as the degree to which an innovation is seen as consistent with existing values, past experiences and needs of the potential adopters. The innovation can either be compatible or incompatible with socio-cultural values and beliefs, previously introduced ideas or client needs for the innovation.

1. Socio-cultural values and beliefs: an innovation's incompatibility with cultural values can block its adoption.

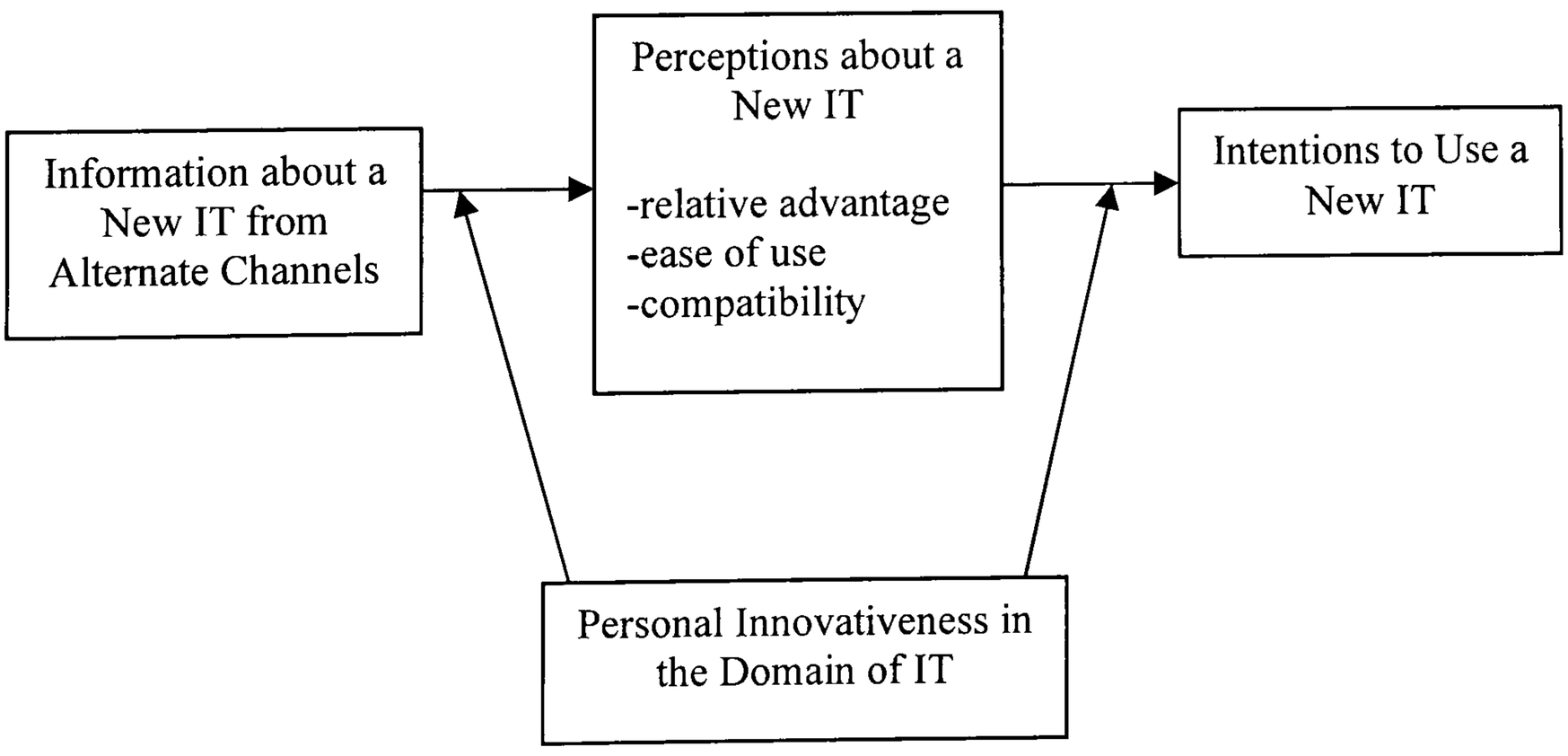
2. Previously introduced ideas: compatibility of an innovation with a preceding idea can either speed up or retard its rate of adoption. "Old ideas are the main mental tools that individuals utilise to assess new ideas. One cannot deal with an innovation except on the basis of the familiar, with what is known"
3. Client needs for the innovation.

Complexity is described as the degree to which an innovation is perceived as relatively difficult to understand and use. Some innovations are quite clear in their meaning while others are not.

Trialability is described as the degree to which an innovation may be experimented with on a limited basis.

Observability is described the degree to which the results of an innovation are visible to others. This means that the results of some ideas are easily observed and described while other innovations are difficult to observe and describe.

This study will be considering the first three innovation attributes (Agarwal and Prasad, 1998; Crum *et al.*, 1996; Cooper and Zmud, 1990). The study will extend the information systems diffusion model as presented by the above authors. This model specifies that technical compatibility, technical complexity, which is also termed, perceived ease of use and relative advantage, which is also termed, perceived need are the attributes that best explain adoption behaviour. The model is depicted in figure 2.1 below.



Source: (Agarwal and Prasad, 1998)

Figure 2.1 the information systems diffusion model

The diffusion model shows that compatibility, complexibility and relative advantage are the attributes that are the most consistent where Information Technology (IT) innovations are concerned. These three innovation attributes will be used in this study as additionally according to Tornatzky and Klein (1982) only relative advantage, complexity and compatibility have been consistently related to adoption behaviour.

2.3.1 Diffusion of innovations and critiques

In order to understand and explain how a new technology is adopted many studies have used the theory of diffusion of innovations developed by Everett Rogers. However, it also has been criticised for varying reasons (Elliot and Loebbecke 2000; Kautz and Pries-Heje 1996; Lyytinen and Damsgaard, 2001). Roger's idea is that an individual's decision to adopt a new technology is a process that occurs over a period of time and consists of a series of actions and decisions rather than an instantaneous act. This theory implies that businesses would decide to adopt an innovation mainly because of its characteristics, thus missing out other influences such as nature and size of business and background of business owners. This view is not likely to present the whole picture (Beynon-Davies and Williams, 2003; Lyytinen and Damsgaard 2001). In Kautz and Pries-Heje, Roger's theory is criticised for portraying diffusion as a simple linear process. They argued that his view failed to sufficiently consider the relationship between suppliers and adopters and an active participation of potential adopters in the diffusion process.

Beynon-Davies and Williams, (2003), describe Roger's theory as an S-curve where a few agents adopt an innovation early on and later, influencing the majority. Furthermore, the authors highlighted the fact that technological diffusion is usually portrayed as a rational process but postulated in their research that diffusion process is similar to broader social movements. Lyytinen and Damsgaard (2001) showed in their observations that complex technologies would not necessarily diffuse in a specific order. The theory seems to lack an understanding of the different views and agendas involved in the diffusion process. They are included in the communication channels but the way they are described in Roger's work is general and linked with the influence some individuals have on others towards the adoption or the rejection

of an innovation. However, this research is interested in examining how different groups involved in the diffusion process have different views about the same technology and its features.

Previously, literature that has criticized Roger's theory was examined and most of the literature describe the theory as portraying diffusion as a linear process (Beynon-Davies and Williams, 2003; Lyytinen and Damsgaard, 2001 and Kautz and Pries-Heje, 1996). There are many facets to a business; as such these should be taken account of in a study of the adoption of a new technology. As useful as the theory is to diffusion, it would not sufficiently portray all the parts played by the various entities involved in the adoption process. According to Woolgar (1996) technical and social factors are closely interconnected. Hence the need to ensure that the social factors, and not just the technical factors, involved in technology diffusion are clearly evident in this study. Different views, opinions and agendas of various groups involved in the process of the adoption of an innovation are not adequately represented in the theory of diffusion of innovation as presented by Rogers (Papazafeiropoulou *et al,* 2005). Theories embracing socio-technical approaches are particularly useful in such a situation where there are different views and opinions to be taken into account. For instance, Dutton *et al* (2004) demonstrate in their study that the social shaping of technology (SST) reveals how conceptions and responses from policy makers, administrators, developers, instructors and students can support or frustrate technologically enabled change in a higher educational institution. Similarly, this research takes the stance that responses from all the groups involved in broadband diffusion to SMEs can support or frustrate its adoption and application. Therefore, such socio-technical approaches would be beneficial to this research. Different kinds of socio-technical approaches will be considered in the next section.

2.4 Socio-technical approaches

Socio-technical approaches criticize the assumption of linear models of innovation that the supply of a technology would create solutions that corresponded to user requirements, which could be diffused to potential adopters. Socio-technical approaches have in contrast shown that identifying current and future demand for technologies can be difficult (Klein and Kleinman, 2002; McLoughlin, 1999).

Several researchers have used socio-technical approaches to unravel various phenomena in information systems. In Wilson and Howcroft (2002), SST is used to study the failure of IS systems. They use SST concepts such as interpretative flexibility, translation, persuasion, stabilisation and irreversibility. The authors found SST to be particularly useful since it has as its core concern an understanding of the dynamics of the society-technology relationship. Their research suggested that it is not necessary for a technology to have changed in order for it to be perceived differently over time.

Social shaping of technology (SST) conceptualises technology as socially shaped. According to Williams (1997), SST surfaced through the criticism of technological determinism. Technological determinism on the one hand presumes that particular paths of technological change are inevitable. SST studies on the other hand show that technology is a social product, which is patterned by its creation and use.

The origin of constructivist approach to technology can be found in the sociology of scientific knowledge (SSK) (McLoughlin, 1999). In social constructions, the nature of technology and what it can do are seen as a product of human interpretation. Social construction of technology (SCOT) provides a strong antidote to technological determinism. With SCOT, the development of a technological artefact is described as alternating between variation and selection; thereby resulting in a multidirectional model that contrasts linear models (Pinch and Bijker, 1989). The authors outline four components to the social construction of technology. They are: relevant social groups, interpretive flexibility, closure, and stabilization.

Relevant social groups: all members of a certain group who share the same set of meanings attached to a specific artefact

Interpretive flexibility: this is the idea that different social groups can have different meanings about the same technological artefact. Not only is there flexibility in how people think of or interpret artefacts but also that there is flexibility in how artefacts are designed.

Closure and Stabilization: closure occurs when a consensus emerges that a problem arising during the development of a technology has been solved. When social groups involved in designing and using technology decide that a problem is

solved, they stabilise the technology, the result of which is closure. However, the authors clarify that closure and stabilization are not isolated events but occur repeatedly during development of the technology. Various groups will decide differently not just about the definition of the problem but also about when closure and stabilization is achieved (Bijker *et al*, 1987).

Additionally the concept of a technological frame is also included in the theory. This concept refers to the ways in which relevant social groups attribute various meanings to an artefact.

In SCOT where the introduction of an innovation is faced with objections from different social groups, one seeks to find a solution that would make the innovation desirable for reasons that would supersede reasons for objections. The point of SCOT is that the successful stages in the development of an artefact are not the only possible ones.

Steps involved in SCOT include:

- Identifying the relevant social groups
- Describing them in more detail
- Identifying the problems each of these groups has with respect to the artifact
- Around each of these problems, several variants of the solution can be identified.

This way of describing the developmental process brings out all the different kinds if conflicts. This model highlights the multidirectional character of a technological artefact. The interpretative flexibility of an artefact must be shown. This sort of perspective allows researchers to examine the way specific users shape technology. In this case, the technological artefact is broadband and there are different social groups (SMEs inclusive) involved in its diffusion. It is hoped that the application of the components of SCOT would uncover the views of the groups involved in the broadband diffusion process thus providing insights into their thoughts about the perceived innovation attributes of broadband, its use and applications.

The interpretive flexibility principle of SST is useful where there is a need to understand how the problems and solutions associated with a technology present themselves differently to different social groups. According to Bijker (1995) studies taking this approach should aim to include a consideration of all the relevant social groups involved in interpreting a technology including whether or not the technology works. Similarly, Dutton et al (2004) argue that SST reveals how conceptions and responses from relevant social groups can support or frustrate technologically enabled change.

2.4.1 Use of SCOT in information systems research

SCOT has been utilized in several studies ranging from technological studies to information technology (IT) research. In a previous study of the relationship between IT and innovation in SMEs, Dierckx and Stroecken (1999), use SCOT in their study to determine the different views of various actors involved in car assembly firms. The authors created two scenarios to examine how car assembly firms decide on an order system for used parts. They then outlined the social spheres of influence affecting the scenarios and indicate the opinion of each relevant actor. Finally, analysis of the opinions of the various actors helped to determine the more advantageous scenario. Dutton et al (2004) use theoretical approaches from the social shaping of technology (SST) to study the adoption and use of virtual learning environments in higher education. Their study demonstrated the value of SST in providing a well rounded assessment of change that shows the key social and technical dimension that have to be understood if the innovation under study is to fulfil its potential. Kakola (1995) employed the interpretive flexibility construct in his study of computer based information systems. He argued that the interpretive flexibility of computer based information systems is too low and then presented conceptual guidelines for redesigning information systems with the aim of increasing interpretive flexibility. This research took its theoretical backing from Orlikowski (1992), which also agrees that there is flexibility in how people design, interpret, and use technology. Orlikowski however emphasizes that this flexibility is a function of the material components comprising the artifact, the institutional context in which a technology is developed and used, and the power, knowledge, and interests of human actors as well as time.

Despite the many studies that have employed the use of SST and SCOT, there are also various criticisms of the theories. Khoo (2005) argues that technology is not what it used to be and therefore some of the concepts proposed in SCOT should be re-examined. Similarly, Humphreys (2005) argues that the main concepts of SCOT, which are relevant social groups, closure and stabilization, should be re-examined. The author argues that SCOT provides no specific guideline for identifying social groups and that some of the relevant social groups could easily be left out. This research takes a similar stance and agrees that there is no guideline for identifying the relevant social groups. Therefore, the stakeholder principle is employed as demonstrated in section 2.4.2.

In this research, the model here will be based on the information systems model (Agarwal and Prasad, 1998) examining compatibility, complexity and relative advantage as the attributes that are of the most importance in Information Technology (IT) innovations. These attributes are considered to be the most important of the innovation attributes because according to a study carried out by Tornatzky and Klein (1982) only relative advantage, complexity and compatibility were found to be consistently related to the adoption of a technology. This model is nevertheless extended by identifying various social groups involved in the production and use of the innovation.

In the model, an extension to the innovation diffusion model is proposed by identifying the different social groups involved in the diffusion of broadband as described in SCOT. The views of the different social groups in relation to the relative advantage, compatibility and complexity part of the innovation diffusion model would also be obtained. However, SCOT provides no defined way of identifying the social groups (Pinch and Bijker, 1987). The research would therefore use guidelines prescribed in stakeholder research. This is because stakeholders are similar to social groups. Whitley and Pouloudi (1997) highlighted the fact that in previous stakeholder research, there have not been any specifications as to how stakeholders can be identified. They highlight the inherent problems that arise out of

the lack of a systematic stakeholder identification approach such as the fact that generic stakeholder lists are not applicable in every context. Finally, the authors prescribe a method of stakeholder identification, which will be used to identify the social groups, which are involved in the diffusion of broadband to SMEs in this study.

2.4.2 Identifying the social groups using stakeholder identification

Whitley and Pouloudi (1997) base the identification of stakeholders on four underlying principles. They are:

- Stakeholders depend on the specific context and time frame
- Stakeholders cannot be viewed in isolation
- The position of each stakeholder may change over time
- Feasible options may differ from the stakeholders' wishes

The authors suggest all these principles be put in use when attempting to identify stakeholders in order to understand organizational and inter-organizational reality, to explain past circumstances and to use the conclusions to plan for future activity in a realistic manner.

In the first principle, there is a need to draw a stakeholder map taking into consideration the particularities of the specific context and domain being investigated. Next, a stakeholder map has to be reviewed regularly for any changes over time (Whitley and Pouloudi, 1997). The second principle highlights the need for stakeholder inter-relations, which can be indirect and complex. This means that a stakeholder map is incomplete if only direct links from a particular organization to other actors in the environment are considered. To be regarded as complete, it must examine how each stakeholder is linked with other stakeholders (Whitley and Pouloudi, 1997). The third principle takes into account the reality that stakeholders' position might change over time. This suggests that a long-term perspective that considers the changes in the viewpoint of stakeholders over time is important to show reasons behind prior decisions and can serve as a guideline for exploring future scenarios. Finally, the fourth principle suggest the necessity of considering political issues underpinning stakeholder inter-relations which results in changes in their role

and position over time (Whitley and Pouloudi, 1997). The authors conclude that the identification and analysis of stakeholders is a process, which should be iterative.

In this study, the researcher began the stakeholder identification process by examining existing literature. The researcher had to consider how each stakeholder is linked with the others since they cannot be viewed in isolation. In addition to existing literature, when interacting with some of the identified stakeholders, resulting information helped to identify further stakeholders. For instance, at the beginning of the first phase of the research (chapter 5), the government was taken as a social group. This had to be re-considered because further interaction with some of the stakeholders and review of some documents showed that the government could not be taken as a whole but that there were specific agencies that were responsible and had an interest in the broadband diffusion process. In addition, further in-depth research with the vendor pointed to other application service providers as stakeholders (chapter 6). The social groups as identified using this process are presented next.

In accordance with the stakeholder identification process as carried out in this research particularly the first phase, the social groups involved in the diffusion of broadband to SMEs include: the SMEs, the government (Office of the e-Envoy, 2001; Choudrie *et al.*, 2003b) the UK government have presented a number of policies that indicate a strong interest in the broadband diffusion process, professional associations (Intellect, 2003), Independent bodies striving for broadband adoption (BSG, 2004), private consultants (Philpott, 2004) the private consultants offer a directory service of Internet and broadband service providers and help SMEs decide what service is appropriate for them and finally the vendors who are directly involved in the sales of the broadband service to the SMEs (Cisilion, 2002; BTOpenworld, 2002).

2.4.3 The proposed Framework

The various social groups that have been identified according to the stakeholder identification process outlined by Pouloudi and Whitley (1997) are SMEs, vendors,

government, private consultants, professional associations and independent groups. In order to carry out this framework, the various social groups were interviewed to determine their views concerning the innovation diffusion attributes which are technical complexity, compatibility and relative ease of use of broadband. The framework will be used in order to gather views of the participants in the study (chapters 5-6). The framework is presented below in figure 2.2.

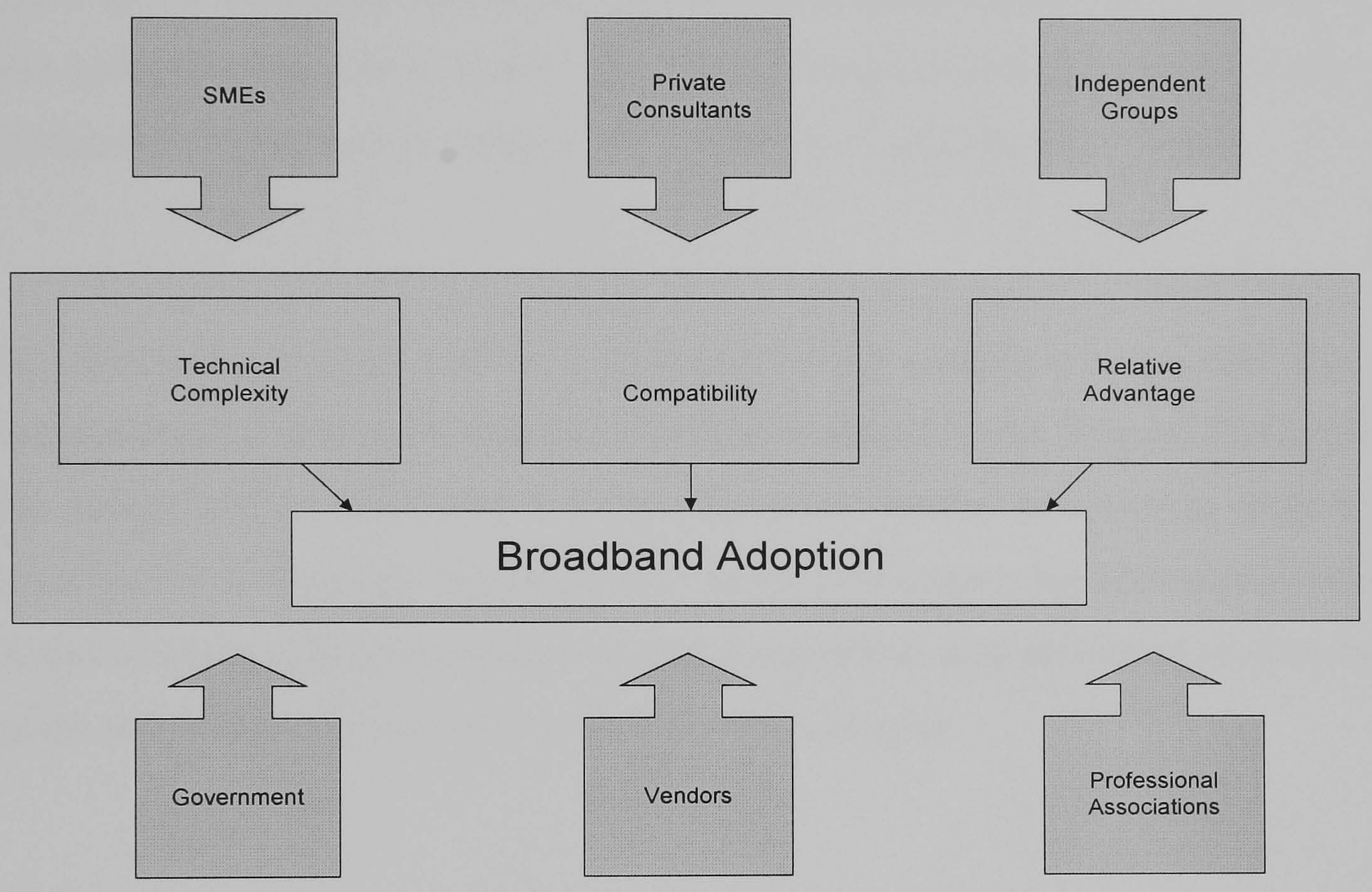


Figure 2.2 Framework guiding the research

2.5 Conclusion

This chapter has examined existing literature on SMEs with a focus on their adoption of the Internet, broadband, and associated technologies. In addition, SMEs' attitude to technology adoption is also examined. As observed in chapter 1, there has not been a lot of focus on broadband diffusion to SMEs. Focus has been on technological issues as well as the home, educational and entertainment uses of broadband.

The chapter has also considered various theories that have been used for the study of information technology adoption and use by SMEs and provided a detailed and critical overview of the theories used in this study. Particular emphasis was placed on the innovation diffusion theory and the perceived attributes of an innovation that

are important in explaining the rate of its adoption were examined. Socio-technical approaches were also examined with emphasis on SCOT as a result of the need to consider various views of the various groups involved in broadband diffusion to SMEs. In order to identify these groups, stakeholder identification was implemented.

In order to address some of the gaps that have been identified in the literature review, the innovation diffusion theory is synthesised with SCOT. This was done in order to focus on the perceived innovation attributes that explain adoption behaviour while also addressing the views of each of the social groups regarding these attributes. The synthesis of these theories resulted in the framework guiding this research.

The framework will be used as a guideline for the collection of the data. Existing literature in line with the framework has been explored in this chapter. The results of the study will be compared with the literature results in order to present the contribution of this study (Chapters 6-7). In the next chapter the philosophical stance of this research will be presented as well as empirical data collection method based on the framework that has been presented in this chapter.

CHAPTER THREE: Research Methodology

3.1 Introduction

This chapter addresses the research methods used in this thesis to examine the issues related to the diffusion and adoption of broadband by SMEs as they have been presented in chapter 2. There are several research methods that have been used in the study of information systems. Thus the decision to use a specific approach is not an easy one to make. However, based on the issues discussed in the previous chapters of this research, the interpretive research approach within a qualitative methodology has been selected as the most appropriate for this research. This is due to the fact that this study is exploratory in nature and this approach will be used to understand emerging phenomena within their context.

Interpretive research has been used in areas of information systems (IS) research such as, systems design, organizational intervention and management of IS and social implications of IS (Walsham, 1995). Furthermore, according to Klein and Myers (1999) interpretive research can help IS researchers to understand human thought and action in social and organizational contexts. It can help to produce deep insights into information systems phenomena.

The chapter is structured as follows. In the next section, the issues to consider before selecting an appropriate research approach are discussed. Section 3.3 examines the underlying research assumptions that guide Information Systems research. The section also discusses the rationale for selecting the interpretive research approach. In section 3.4, qualitative research including the qualitative research process is examined and its suitability for this research is discussed. Section 3.5 discusses the research design followed in this study.

3.2 Selecting an appropriate research approach

Galliers and Land (1987) suggest that before deciding on an appropriate research approach in the field of information systems, one should first consider the nature of information systems themselves and then look at what is expected to be gained from undertaking research in the chosen area. They further explain that IS is a meta-subject that spans many disciplines in business, social sciences and sometimes,

natural sciences. As a result, selecting an appropriate research approach is not usually a straightforward task. Similarly, Orlikowski and Baroudi (1991) highlight the difficulties faced by researchers in information systems. Unlike other disciplines such as anthropology, psychology, sociology, and their related fields, information systems has a limited option of research approaches.

There are many issues to consider when selecting an appropriate research approach. Galliers (1993) makes a case for the necessity of considering the organisational and managerial issues associated with IS research. Orlikowski and Baroudi also agree that there is a lot to be considered when selecting an approach. The authors therefore advice that researchers adopt a perspective compatible with their research interest and at the same time remain open to the use of other assumptions and interests. One of the challenges faced by researchers when attempting to select an appropriate research approach is the issue of data collection and analysis particularly when deciding between quantitative and qualitative methods.

The next section discusses research assumptions underlying various research studies.

3.3. Underlying research assumptions

According to Orlikowski and Baroudi (1991) following Chua's (1986) classification of research epistemologies, qualitative research can be positivist, interpretive or critical. Furthermore, also following Chua's (1986) classification, the authors explain that research can be classified as positivist when there is evidence of formal propositions, quantifiable measures of variables, hypothesis testing, and the drawing of inferences about a phenomenon from a representative sample to a stated population. Research can be classified as interpretive when there is evidence of a non-deterministic perspective where the intent of the study is to increase understanding of the phenomenon within cultural and contextual situations; where the phenomenon of interest was examined in its natural setting and from the perspective of the participants; and where researchers did not impose their outsiders' a priori understanding of the situation. Finally, research can be qualified as critical, if there is evidence of a critical stance towards taken-for-granted assumptions about organizations and information systems, and a dialectical analysis that attempts to

reveal the historical, ideological, and contradictory nature of existing social practices.

To further explain the philosophical stances that researchers adopt as classified by Chua (1986), Orlikowski and Baroudi (1991) explain that these are beliefs about physical and social reality, beliefs about knowledge and beliefs about the relationship between knowledge and empirical world. These beliefs include:

1. Beliefs about physical and social reality: Ontological beliefs have to do with the essence of phenomena under investigation; that is whether the empirical world is assumed to be objective and thus independent of humans in creating and recreating. Human rationality has to do with the intentions ascribed by researchers to the humans they study. Finally, beliefs about social relations deal with how people interact in organizations, groups and society.

2. Beliefs about knowledge: Epistemological assumptions concern the criteria by which valid knowledge about a phenomenon may be constructed and evaluated. Methodological assumptions indicate which research methods and techniques are considered appropriate for gathering valid empirical evidence.

3. Beliefs about the relationship between knowledge and the empirical world: These beliefs concern the role of theory in the world of practice and reflect the values and intentions researchers bring to their work. More precisely, what researchers believe is appropriate to accomplish with their research and what they intend to achieve within a specific study.

The underlying assumptions guiding the three research philosophies, which include positivist, interpretive and critical philosophies are further explored as presented by Orlikowski and Baroudi (1991) in Table 3.1

Beliefs	**Positivist**	**Interpretive**	**Critical**
Beliefs about physical and social reality	Physical and social world that exists independent of humans and whose nature can be	Emphasizes the importance of subjective meanings and social-political as	Social reality is historically constituted, and hence human beings,

	relatively un-problematically apprehended, characterised and measured	well as symbolic action in the processes through which humans construct and reconstruct their reality	organisations, and societies are not confined to existing in a particular state
Beliefs about knowledge	Concerned with empirical testability of theories, whether this requires theories to be "verified" or "falsified", this belief is hypothetic-deductive account of scientific explanation.	Understanding social reality requires understanding how practices and meanings are formed and informed by language and norms shared by humans working towards the same goal. The researcher constructs interpretations or explanations that account for how subjective meanings are created and sustained in a particular setting	Long-term historical studies and ethnographic studies of organisational processes and structures
Beliefs about the relationship between knowledge and the empirical world	As impartial observers, researchers can objectively evaluate of predict actions or processes, but cannot get involved in moral judgements or subjective opinion.	The researcher never assumes a value-neutral stance, and is always implicated in the phenomena being studied	The role of the researcher is to bring to consciousness the restrictive conditions of the status quo, thereby initiating change in the social relations and practices helping to eliminate the basis of alienation and domination

Table 3.1 summarising the underlying assumptions guiding the three research philosophies commonly used in Information Systems research

Interpretivism adopts the stance that our knowledge of reality is a social construction by human actors (Walsham, 1995). In this situation the researcher uses his/her preconceptions to guide the process of research as such, value free data cannot be obtained. This is in contrast to positivism, where the assumption is that the objective data collected by the researcher can be used to test prior hypotheses or theories.

Orlikowski and Baroudi (1991) distinguish between positivist and interpretive articles in their study of information technology in organizations. They identified positivist research methods as methods that encourage deterministic explanations of phenomena where theses explanations emerge from interactions between the researcher and his subjects. Here, the researcher dominates the relationship. The positivist approach is focused on the validity and control of the research procedures thereby adopting a predetermined and restricted stance towards the phenomenon under investigation. Interpretive research in contrast, provides evidence of a nondeterministic perspective with intent to increase understanding of the phenomena within a specific cultural and contextual setting and an examination of the phenomena and the setting from the perspective of the participants.

Walsham (1993) discusses the limitations of positivist methods as reported in existing literature in understanding the social processes involved in the design, development and use of IS in an organizational context. He proposes interpretive methods as a suitable alternative. Information systems research can be classified as *interpretive* if it is assumed that our knowledge of reality is gained only through social constructions such as language, consciousness, shared meanings, documents, tools and other artefacts. Interpretive research does not predefine dependent and independent variables, but focuses on the complexity of human sense making as the situation emerges (Kaplan and Maxwell 1994).

3.3.1 Selecting the interpretive research approach

As previously mentioned, selecting an appropriate research method can be a challenging task for a researcher considering the many different approaches that are available. According to Weber (2004) different research methods and different data

analysis methods have their different strengths and weaknesses. However, the author recommends that excellent researchers choose research methods that fit their purposes.

The interpretive research approach in IS research is "aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context" (Walsham 1993, pp4-5). This method of research adopts the stance that our knowledge of reality is a social construction by human actors (Walsham, 1995).

According to Galliers and Land (1987), research methods must take account of the nature of the subject matter and the complexity of the real world. A major reason for selecting the interpretive research approach is the fact that there are lots of social, political and cultural issues related to broadband adoption by SMEs. The study of broadband diffusion to small companies cannot be separated easily from its organisational and cultural context. Furthermore, the researcher in this study interacts closely with the human subjects of the enquiry, making the separation between facts and values impossible which in effect changes the perception of both parties (Walsham, 1995). Additionally, considering the social groups that were identified in the previous chapter this research attempts to understand phenomena through meanings that those groups assign to them (Walsham, 1993, pp4-5).

3.3.2 Phenomenology and intentionality in interpretive research

Phenomenology literally means the study or description of phenomena (Pivcevic, 1970). It is the search for "essences" that cannot be revealed by ordinary observation (Sanders, 1982). Phenomenological inquiry has been widely used in social sciences and usually describes a research approach that is distinct from more positivist research approaches (Bogdan and Taylor, 1975). Cope (2005) explains paradigmatic issues associated with phenomenology. They include:

1. The rejection of dualism between consciousness and matter: Phenomenologists reject the ontological separation between consciousness and matter, and reality and appearance. No assumptions are made about what

is or not real; rather descriptions of phenomena begins with how one experiences things.

2. The intentionality of consciousness: phenomenology's portrayal of consciousness as intentional is another way of saying that consciousness is always directed toward an object. This means that the description of experience shows it always to be the experience of something (Sokolowski, 2000).

3. A presupposition less philosophy: a central principle of phenomenology is that explanations should not be imposed before the phenomenon has been understood from within (Moran, 2000).

4. The suspension of the natural attitude: the primary feature of the natural attitude is that it is not concerned with philosophical inquiry into the basis of the world of experience. To move to a phenomenological attitude requires "bracketing" of one's presuppositions about the world adopted within the natural attitude. This way, attention is narrowed to the essential elements of the phenomenon in question.

5. The Lebenswelt: this concerns the notion of the "lived-world" described by Husserl (1931) as the Lebenswelt. The basic premise of existential phenomenology is that human beings cannot be studied in isolation from the world-context (lived-world) in which they interact and live.

Mingers (1984) identified the philosophical basis for the different types of interpretive approaches namely, phenomenology, ethnomethodology, the philosophy of language, and hermeneutics. Klein and Myers (1999), in their studies of determining a set of principles for conducting and evaluating interpretive studies selected phenomenology and hermeneutics as the philosophical basis for their work. However, they state that there are other forms of interpretive research. One of these is intentional analysis, which is a part of phenomenology (Sanders, 1982).

Intentional analysis aims to understand a speaker's intentions and is particularly appropriate for the study of transcribed interviews. This is because the researcher is presumed to have much in common with the subject, such as living in the same epoch, speaking the same language and living in the same culture (Lacity and Janson, 1994). According to Sanders (1982) essences are derived from an intentional analysis of the correlation between the object as perceived and the subjective apprehension of that object or experience. Following Husserl's (1931) description, the authors explain that intentionality refers to the correlation between the object and the appearance of the object to consciousness. Intentionality refers to the total meaning of the object, which is always more than what is given in the perception of a single profile or perspective. It is the direction and internal shape of experience or consciousness (Sanders, 1982). This method of analysis is particularly useful for this study as it assumes that the researcher and the subject are living in the same epoch and is further explained in section 3.5.3.

In the next section, qualitative research is examined to establish its suitability for this research.

3.4 Qualitative research

According to Denzin and Lincoln (1994), qualitative researchers study things in their natural settings, attempting to make sense of phenomena in terms of the meanings people bring to them. Qualitative research methods were developed in the social sciences to enable researchers to study social and cultural phenomena. They enable researchers understand people and the social and cultural contexts within which they live (Myers and Avison, 2002). Qualitative research is often mistaken to mean interpretive research. This is a wrong notion because qualitative research can assume various approaches such as, Interactionsim, feminism, post-modernism and ethnomethodology (Denzin and Lincoln, 1994). Also depending on the underlying philosophical assumptions of the researcher, qualitative research can either be positivist, interpretive or critical (Klein and Myers, 1999).

When attempting to select an appropriate method of data gathering, there are a lot of issues a researcher must take into consideration ensuring that the choice made is appropriately justified. In order to justify the suitability of qualitative methods for

this research, Marshall and Rossman (1999) describe the types of research for which qualitative research would be appropriate. They are:

- Research that delves in depth into complexities and processes;
- Research on little-known phenomena or innovative systems;
- Research that seeks to explore where and why policy and local knowledge and practice are at odds;
- Research on informal and unstructured linkages and processes in organisations;
- Research on real, as opposed to stated, organisational goals;
- Research that cannot be carried out experimentally for practical or ethical reasons;
- Research for which relevant variables have yet to be identified.

Researchers may hesitate to adopt qualitative research approaches because according to Lacity and Janson (1994) they could be unfamiliar with methods of analyzing qualitative data. However, qualitative research has been selected for this work because it is a useful approach to achieving a better understanding of the phenomena this research is studying. Furthermore, because qualitative research enables researchers understand people and the social and cultural contexts within which they live, it is a suitable approach for this study. This research can be categorised as one that studies in-depth the complexities of the broadband diffusion process, examining a new phenomenon while the linkages among the organisations involved in the process are highly unstructured.

In this study, the adoption of broadband by SMEs is examined with a view to understanding the perceptions of the social groups concerned with the diffusion process. In order to understand the views of these social groups, they were identified in the previous chapter and their views sought and analysed in chapters 5 and 6. A qualitative research approach is particularly useful for this study because it seeks to explore where and why policy and local knowledge and practice are at odds. Finally, qualitative research has been used in several research that are related to this study for example, in studies researching innovation diffusion to SMEs (Papazafeiropoulou,

2002) and studies researching broadband diffusion (Choudrie and Papazafeiropoulou, 2006).

3.4.1 The qualitative research process

Denzin and Lincoln (1994) define the phases of the qualitative research process in five headings. These are the researcher and the researched as multicultural subjects, major paradigms and interpretive perspectives, research strategies, methods of collecting and analyzing empirical materials, and the art of interpretation. Behind all phases stands the socially and historically situated researcher. These phases are described briefly below:

Phase 1: The Researcher. When carrying out a qualitative research, the researcher enters into complex traditions and research perspectives. These traditions locate the researcher in history, guiding and constraining work that will be done in any specific study. The role of the researcher in this research is presented in section 3.5.4.

Phase 2: Theoretical paradigms and perspectives. The net that contains the researcher's epistemological, ontological, and methodological premises may be referred to as a paradigm, or an interpretative framework, a "basic sets of beliefs that guides action" (Guba 1990) (p.17). After deciding on the paradigm with a focus on an empirical problem to examine, the researcher then moves to the next phase of the research process. For this study, the interpretive research approach was selected and reasons for its selection by this study are presented in section 3.3.1 of this chapter.

Phase 3: Research strategies. This phase begins with research design, which involves a clear focus on the research question, and the purpose of the study. It is also during this phase that the researcher is dealing with the problem of "what information most appropriately will answer specific questions, and which strategies are most effective for obtaining it" (LeCompte and Preissle 1993, p.30). Research strategies connect the researcher to specific methods of collecting and analysing empirical data. Selecting from different methods of collection and analysis is done in

the next stage. Section 3.5.1 explains the research strategy selected for this research, which is an interpretive field study.

Phase 4: Methods of collection and analysis. The researcher has to select from a range of data collection methods from interviews to direct observation, analysis of documents and use of visual materials or personal experience at this stage. As previously mentioned, the selection of those methods is usually based on the selected research strategy. In this study interviewing, observing, and document analysis are the methods selected for data collection. Different techniques of data collection are examined in section 3.5.2.

Phase 5: The art, practices and politics of interpretation and presentation. At this phase of the research process the researcher has to produce the public text that comes to the reader. This can be done using a variety of criteria of evaluation practices, which have to be applied in this phase to show the quality of the results. The findings of this research are presented in chapters 5 and 6.

In the next section, the research design for this study is presented.

3.5 The research design followed in this study

One of the purposes of having a research design is because it preserves the design flexibility that is a hallmark of qualitative methods. When building a research design, the following topics have to be addressed. The overall strategy and rationale; site selection, population selection or both; the researcher's role; data collection methods; data management; data analysis strategy; trustworthiness features; and a management plan (Marshall and Rossman, 1999).

Similarly, Janesick (1994) in her description of qualitative research design, considered qualitative research design metaphorically as a dance. Qualitative research design is made up of three stages. First there is the warm-up stage, or design decisions made at the beginning of the study; next is the total workout stage, during which design decisions are made throughout the study. Finally, the cool-down stage, when design decisions are made at the end of the study. At the first stage of "warm-up" the researcher decides what to study, the research questions and the research

strategy for data collection. The results of this process in this research are reflected in chapters 1, 2 and 3. The second stage, which is the "total workout" stage, involves some background work and the actual execution of the fieldwork. This is mainly reflected in chapters 2 and 4 of this thesis. Finally, during "cooling-down", the researcher has to decide when to "ease out" of the research setting and start analysing and presenting the findings. The results of this stage are reflected in chapters 5, 6 and 7 of this thesis.

3.5.1 Selecting the field study strategy

As mentioned in the previous section, the "warm up" period of the qualitative research design is when the research strategy is selected. Denzin and Lincoln (1994) give the following examples: ethnography, case study, and field study or field research. The research strategy selected for this research is the field study. Orlikowski and Baroudi (1991) explain that field studies are appropriate to generating valid interpretive knowledge, as these examine humans in their social setting.

Field studies are those that are carried out "in the field" which is the natural environment of the people studied (Coolican, 2004). According to Burgess, (1982) field research involves the researcher in a relationship with the subjects of the study; it is a social process in which the researcher plays a major part. Field research involves the activities of the researcher, the influence of the researcher on the researched, the practices and procedures of doing research and the methods of data collection and data analysis.

The major advantage of a field study is the opportunity to capture natural behaviour as it occurs in everyday life (Coolican, 2004). In this study, SCOT is used in order to understand the views of the social groups that are involved in the diffusion of broadband to SMEs. Participants from the social groups were therefore identified and their views sought in their natural environment. The social groups have different roles in the adoption and diffusion of broadband. Selecting participants from these various social groups allows for the views of the different social groups to be obtained therefore providing a better understanding of the phenomenon under study,

which is the adoption of broadband by SMEs. The research was carried out in two phases. During the first phase of the research several participants were involved. Fifteen SMEs, one broadband vendor and one government agency employee were involved in the study providing their views and experiences on the adoption and diffusion of broadband. The views of the professional associations and the independent groups striving for the diffusion of broadband were obtained from secondary resources. In the second phase a follow up research was carried out based on the findings of the first study carried out at the initial phase. This phase was more in-depth and it involved the government agency and broadband vendor. The participants in the second phase were selected because of the influence they wielded over the issues influencing the adoption and diffusion of broadband that were uncovered in the first phase of the research.

Field researchers may utilise any of the following methods of data collection: Participant observation, conversations, informal/structured interviews, formal interviews and personal documents most of which were used to collect empirical material in this research. The next section discusses the different techniques of qualitative data collection with specific focus of those used in this research.

3.5.2 Techniques of qualitative data (or empirical material) collection

According to Marshall and Rossman (2000) qualitative researchers typically rely on four methods for gathering data. These include participation in the setting, direct observation, in-depth interviewing, the review of documents and material culture. These techniques are discussed highlighting their strengths and weaknesses. In this research the following methods of data collection interviews, observations and analysing documents were utilised. These techniques are discussed in more detail highlighting their use in this research.

Interviews: according to Denzin and Lincoln (1994) the interview is the favourite methodological tool of the qualitative researcher. Interviewing can take many forms. It could either be structured, semi structured or unstructured (Fontana and Frey, 1994). The unstructured interview may appear to be without a structure but the

researcher still has to have a framework within which the interview can be conducted (Burgess, 1989). In this research, semi structured interviews were used extensively. In the previous chapter, the social groups involved in the diffusion of broadband to SMEs were identified as is reflected in the framework presented in chapter 2. In the first phase of the research, the views of the groups were sought with the use of semi-structured interviews. The researcher sought the views of the SMEs, vendor, private consultant and government agency with a semi-structured interview guide. The interviews were conducted between April and June 2006 and lasted between 15-40 minutes. In each meeting an interview guide, which contained 9 questions for each of the social groups was used. These questions covered themes relating to the perceived attributes of an innovation previously mentioned and were open ended to glean as much data as possible. Table 3.2 below shows the participants involved in the first phase and how long the interviews with them lasted.

Company	**Interviewee position**	**Duration (minutes)**
SME 1	Partner	15
SME 2	Manager	15
SME 3	Business owner	18
SME 4	Business owner	15
SME 5	Manager	18
SME 6	Partners	25
SME 7	Business owner	15
SME 8	Partners	15
SME 9	Partner	20
SME 10	Family member	15
SME 11	Manager	20
SME 12	Business owner	20
Private consultant	Director	35
Vendor	Manager	30
Government agency	Project officer	40

Table 3.2 Phase 1 interviews

In the second phase of the research, the researcher sought the views of two of the social groups namely, the vendor and the government development agency. Their

views were sought through interviews that lasted between 90 minutes to two hours. The interviews were based on a semi-structured guide. The interviews were tape-recorded and additional notes were taken by the researcher. Subsequently, telephone calls were made and emails were sent and received to clarify arising issues and to validate results.

Table 3.3 below shows the participants involved in the second phase and how long the interviews with them lasted.

Company	**Interviewee position**	**Duration (minutes)**
Vendor	Regional director	120
Government agency	Head of wired region	90

Table 3.3 Phase 2 interviews

According to Marshall and Rossman (2000), qualitative researchers rely extensively on in-depth interviews. In-depth interviews are usually more like conversations than formal events with predetermined response categories. In the second phase, in-depth interviews were used to gain a deeper understanding of the social groups that had the most influence on the process of broadband adoption and diffusion. The researcher in this study explored a few general topics to help uncover the social groups' views and respected the way the interviewees framed and structured their responses. This allowed the views of the social groups on broadband adoption by SMEs to unfold as they viewed it and not as the researcher viewed it (Marshall and Rossman, 2000).

Observation: this method of data collection in this study involved the systematic noting and recording of events, behaviours and artefacts in the social setting chosen for this study (Marshall and Rossman, 2000). Observation played a particularly important role in the interviews as it helped to note the interviewees' body language. Furthermore, as members of society, people generally make observations of the everyday world, which form a guide for forging paths of action and interpreting the actions and reactions of others (Adler and Adler, 1994). Observation in this research took place in the SMEs' business premises, the government agency office and the researcher's office.

The review of documents: According to Marshall and Rossman, (2000) the review of documents provides history and context surrounding a specific setting. This method is unobtrusive and rich in portraying the values and beliefs of participants in the setting.

This research combined several data collection methods. This is done because the different methods have their different strengths and weaknesses. Weakness in one method can be complemented by strengths in another (Marshall and Rossman, 2000).

3.5.3 Analysis of the data

The analysis of the data is based on the framework developed and presented in chapter two as well as intentional analysis. The framework combines innovation diffusion and social construction of technology (SCOT) theories (figure 2.1). SCOT is particularly useful for this purpose as it allows for the examination of views from all the social groups that are involved in the diffusion of broadband to SMEs. Analysis is also carried out drawing from SCOT concepts such as interpretive flexibility, closure and stabilization.

As opposed to using hermeneutics to analyse data, Lacity and Janson (1994), present the steps that according to Sanders (1982) guide intentional analysis. According to the authors, hermeneutics, though sometimes applied to modern text, is a more suitable approach when dealing with ancient text that the researcher had no input in generating. Intentional analysis suggests four steps to help researchers make sense of textual data. In the first step of intentional analysis, the researcher describes the facts of the phenomenon. The facts refer to socially shared realities that have been agreed on by the participants. Next, the researcher determines the way participants give meaning to their separate realities by how they perceive cause and effect. In step three, the researcher identifies themes that emerge from the text. The researcher then identifies themes that are used to develop common interpretations for an entire class of phenomena. Finally, in step four, the researcher abstracts the essences from the text. Essences can be described as the wholly subjective gestalts of what is learned

from studying the phenomenon. Abstracting essences requires creativity, intuition and reflection. The researcher no longer asks what the participants think about the phenomenon but rather, what the researcher thinks.

Based on the initial data there are differing viewpoints from each of the social groups concerning the perceived innovation diffusion attributes. These views are presented in accordance with the framework proposed in chapter 2. The analysis of the field study is accordingly made around the various social groups that have been identified.

In this study, these steps are carried out by analyzing the views of the identified social groups in accordance with SCOT in step 1. The facts of broadband are explained as seen through the eyes of the social groups and are analysed and presented in section 5.2. Step 2 is carried out by analyzing the views of the social groups in relation to the innovation attributes of broadband (see section 5.3). In step 3, the emerging themes are identified and these include themes that were not previously included in the framework. These are presented in section 5.4. Finally, in step 4, the essences are abstracted using notions from SCOT such as interpretive flexibility and closure. This will no longer reflect what the social groups think but what the researcher thinks (see section 5.5). figure 3.1 below illustrates the steps involved in intentional analysis as is used in this research.

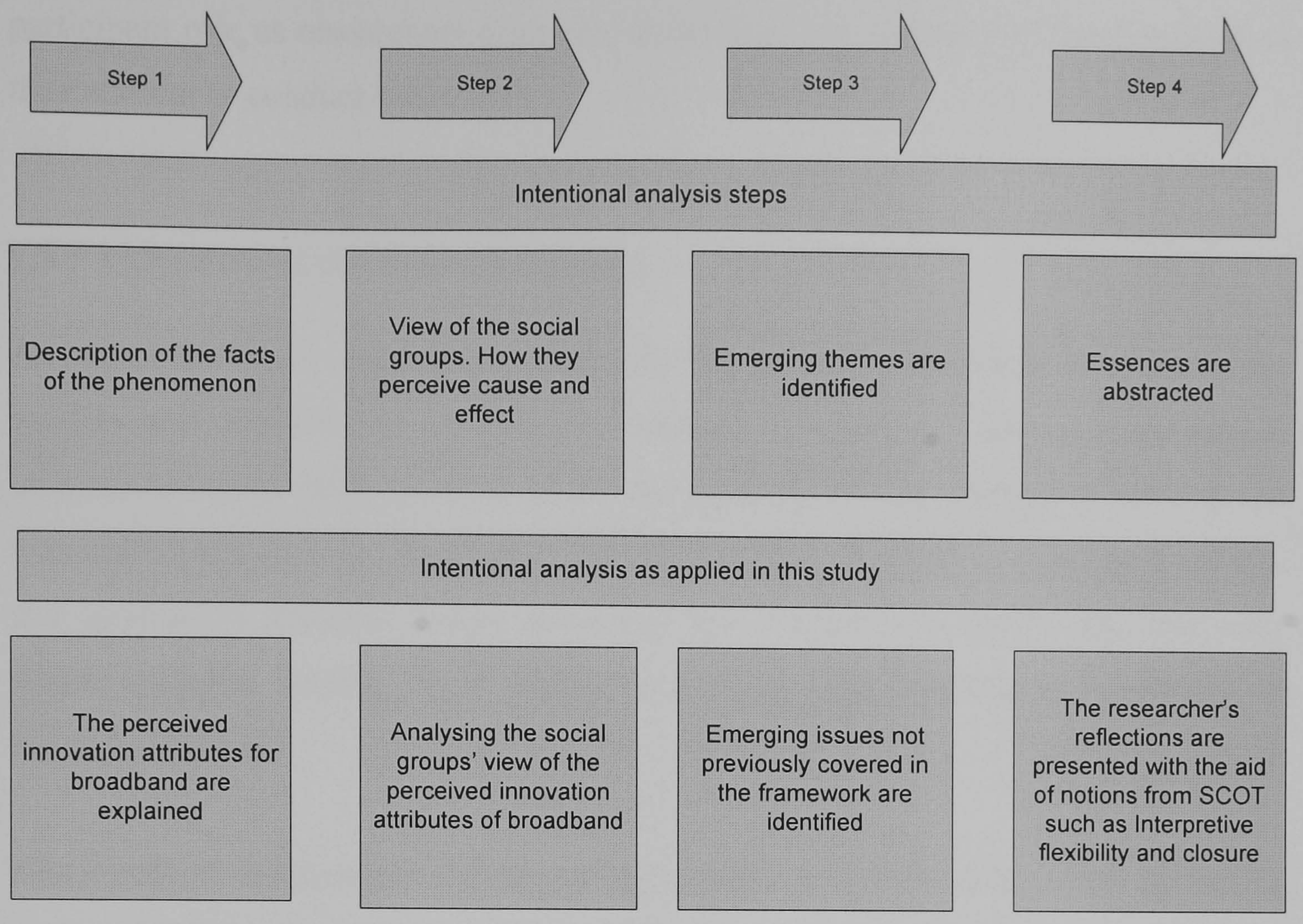


Figure 3.1 Steps involved in intentional analysis

3.5.4 The role of the researcher

Janesick (1994) stresses the importance of the researcher describing his/her role thoroughly. This is to enable the reader understand the relationship between the researcher and the researched. Also, according to Burgess (1982) it is important for researchers to define their projects and their roles as this will influence the entire research process. The subjects of the study often redefine these roles.

There are various roles, which can be assumed some of which are participant observer and non-participant observer. The non-participant observer completely removes the researcher from interaction with the informants. Similarly, Adler and Adler (1994) following Gold's (1958) outline of researcher's roles describe the following roles: complete participant, the participant-as-observer, the observer-as-participant and the complete observer. The role assumed by the researcher for this study is that of the observer-as-participant. This is because in this study, the researcher observed the participants from the social groups for brief periods while carrying out interviews. Adler and Adler, (1994) describe the observer-as-

participant role as researchers primarily observing their subjects for brief periods as they attempt to conduct interviews.

3.5.5 Validation of the research strategy

An important issue concerning researchers that adopt an interpretive stance is the validity and reliability of the research findings in a study. Validity in qualitative research has to do with the description and explanation and whether or not a given explanation fits a given description (Janesick, 1994). The author goes on to explain that qualitative research design inherently has a system of checks and balances, which includes staying in a setting over time and interpreting meanings in individual's lives.

One means of validating the results of such studies is triangulation, which according to Janesick (1994) is made possible by staying in a setting over time and allows for multiple views of framing the problem, selecting research strategies and extending discourse across many fields of study. Triangulation can be any of four types including data, investigator, theory and methodological and interdisciplinary triangulation. In this study, data triangulation is demonstrated by the researcher's use of various data sources such as interviews and documents. The synthesising of innovation diffusion and social construction of technology theories demonstrate theory triangulation.

3. 6. Summary and Conclusions

This chapter presented the various research approaches selected for this research. The chapter began by examining the various research epistemologies that a research can assume of which the interpretive approach was selected. The reason for this selection and its suitability was presented as well.

Qualitative research was selected and was discussed in detail as was the various methods of data collection under the qualitative research approach. Several interpretive studies have applied hermeneutics for data analysis. However, as opposed to using hermeneutics, intentional analysis is applied with notions from SCOT for the analysis of the data in this research.

The different choices that were made regarding the research approaches used in this study are presented in table 3.4 below.

Research approach	**Choices used in this research**
Research assumptions	Interpretive
Strategy	Field study
Role of researcher	Observer-as-participant
Data gathering approach	Qualitative
Data gathering techniques	Interviews, Observation and the review of documents
Analysis of data	Intentional analysis
Validation	Data and theory triangulation

Table 3.4 research approach choices made in this study

The next chapter presents a detailed description of the empirical context of this research. The different social groups that were involved in the first phase of the research are described. The social groups involved in the second phase of the research and their involvement are also described.

CHAPTER FOUR: The empirical context: description of the social groups and participants

4.1 Introduction

In order to understand the empirical context of this research, this chapter provides a detailed description of the participants involved in the fieldwork carried out. As mentioned in chapter 2, which defined the framework of this research, the social groups, which have been identified to be important in broadband diffusion to SMEs, are namely, the SMEs, vendors, the government, independent groups, private consultants and professional associations. Of the social groups identified, representatives are selected and interviewed in a field study. These representatives are described in order to depict the context of this study. Additionally, there is some background information about the companies and organisations involved in the field study and their experience in broadband diffusion.

When carrying out interpretive field studies, the principle of contextualisation is very important, as one of the main principles and cannot be ignored (Klein and Myers, 1999). Additionally the context of the study is important because a critical reflection of the social and historical background of the research setting allows the intended audience to see how the situation under investigation emerged. This chapter provides a detailed description of the context of this research and shows how the participants inform the framework described in chapter two. Figure 4.1 below shows the historical background based on the researcher's research experience

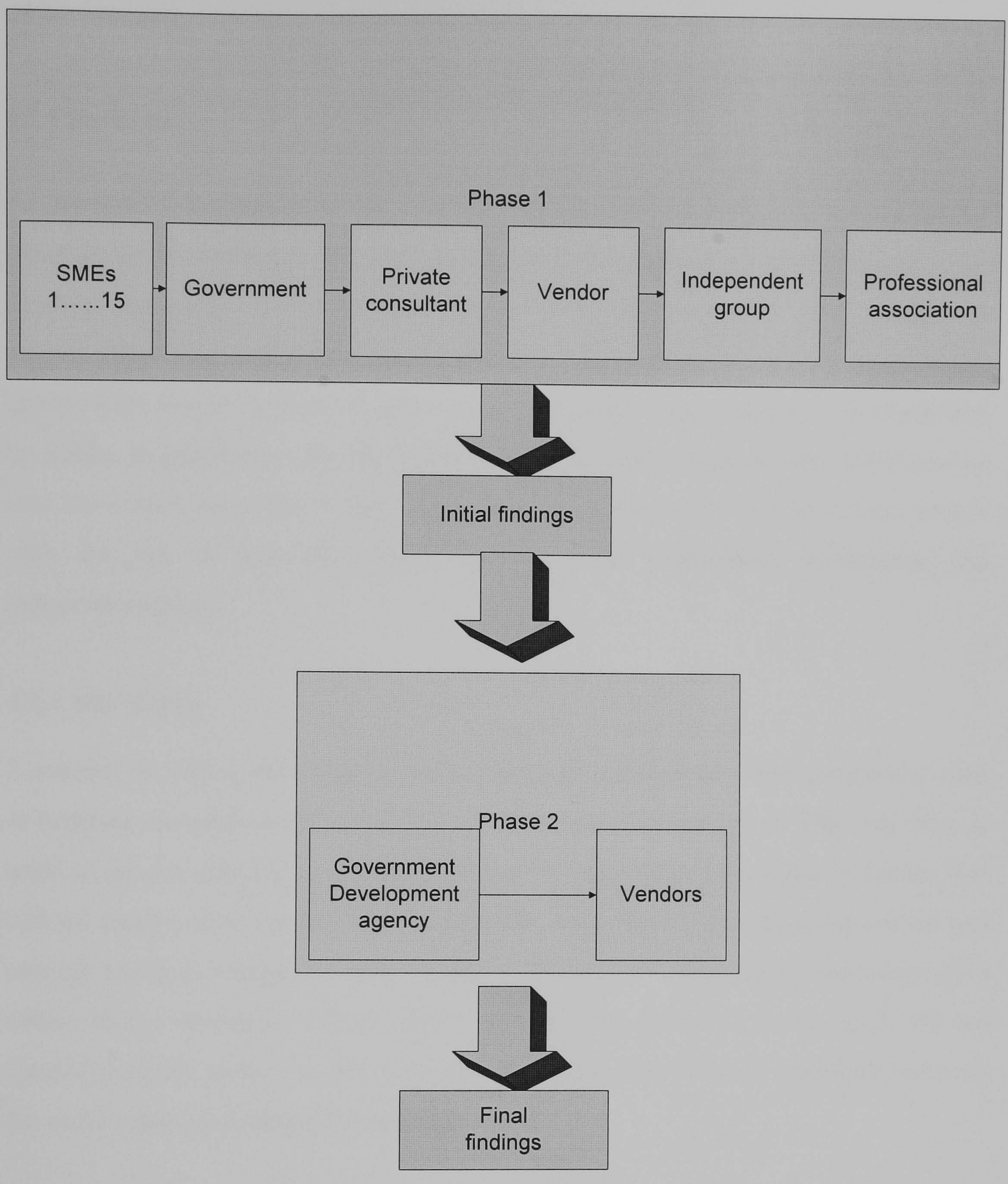


Figure 4.1 The two phases of this research

The chapter is structured as follows; the next section describes the participants in the first phase of the research and the participants involved. The SMEs involved in the study are also described in detail in section 4.2.1. Section 4.2.2 describes the vendor, section 4.2.3 describes the private consultant, section 4.2.4 describes the government

agency, 4.2.5 describes the independent group and 4.2.6 describes the professional group. Section 4.3 describes the background of the participants in the second phase of the research.

4.2 Phase one

As mentioned in chapter 3, this research was carried out in two phases. The first phase of the research was the pilot study, which was carried out over a period of six months. The study involved fifteen SMEs, one broadband vendor, one government agency employee and one private consultant. The views of each of these social groups were sought in order to gain a richer understanding of adoption of broadband by SMEs. In addition to the aforementioned participants, there are two social groups who have been presented as part of the framework but their views have been sought with the use of secondary data. They are, the professional association and independent group.

4.2.1 The SMEs

A number of SMEs were approached to take part in this study. The companies' area of business varied from cyber cafes to furniture and clothing stores. This was done in order to ensure that focus was not directed at a particular sector and to ensure that various sectors were represented in the study. Also, the SMEs that were chosen had varying levels of expertise when it came to the use of Information Technology (IT) within their companies. Fifteen SMEs in total were involved in the study. Of the fifteen however, three had not adopted broadband. The focus is therefore more on the twelve that have adopted broadband.

SME 1 is an estate and lettings agency with staff strength of three people. They provide services, which include sales, lettings, valuation etc. They provide specialist valuation services to advise on a home's market value and provide services actively matching up buyers and sellers. In addition, they provide expert mortgage and protection advice. They ensure that clients are kept up-to-date with developments on the sale, mortgage or search for a property. The company's management and data systems are computerised to support in providing an efficient service. In order to ensure that they have a wide reach, they are available on the Internet. This is to

ensure that they keep up with competition and keep up with changes in the property market. The company decided to use the Internet as a means of keeping up to date with properties they were trying to market and properties being marketed by competitors.

Since the company operates a lot of their business on the Internet, the staff were already computer literate and quite up to date with the use of computers. The move to operating business on the Internet was quite a recent one. As a result the staff in the company had never used dial up and were only familiar with the use of broadband for accessing the Internet. When it came to the decision of using dial-up or broadband, it was an easy decision for the company to make because at the time they decided to adopt the Internet, broadband was what was being marketed to them by their service provider. The business owners went along with the choice of broadband because they trusted their Internet service provider who was also their telephone service provider and had been for years.

This SME could not compare dial-up to broadband and as such could not inform the perceived innovation attribute, which is the relative advantage aspect of the framework as described in chapter two. On the compatibility aspect of the framework, SME 1 uses broadband Internet and sees it as important for the running of the business. On the complexity aspect of the framework, this SME had a technical background sufficient enough for them to be capable of using broadband with ease. Further more, because the broadband vendors carried out most of the technical installation, using it was not a problem. The participant that was involved from this SME is a part owner of the business.

SME 2 is a cyber cafe, which provides services to clients such as Internet connection, local and international calls, gaming, and service and sales of mobile phones. The cafe has many computer stations connected to a local area network (LAN).

Since the company sells time for the use of the Internet, the staff were already computer literate and quite conversant with the use of computers especially Internet services. The company previously used dial up and so were quite familiar with

differences between the use of broadband for accessing the Internet and the use of dial-up. When it came to the decision of using dial-up or broadband the company decided to move to broadband as soon as broadband was available. The business owners went along with the choice of broadband because speed was very important for the nature of business they were running. Cyber cafes can be competitive so they could not have continued with dial-up just for the reason of the speed dial-up provided. When choosing their broadband Internet service provider they went along with their telephone service provider because they had enjoyed the service provided and trusted the company.

This SME compared dial-up to broadband and for the perceived innovation attribute, which is the relative advantage aspect of the framework, preferred broadband to dial-up because of the speed it provides and because a phone line dedicated to Internet connection was unnecessary where broadband is used. On the compatibility aspect of the framework, SME 2 uses broadband Internet and sees it as important for the running of the business. On the complexity aspect of the framework, this SME had a technical background sufficient enough for them to be capable of using broadband with ease. The participant that was contacted from this company is a manager within the company.

SME 3 is another cyber café that provides similar services to the aforementioned cyber café but does not provide the sales and services of mobile phones. SME 3 had been in business prior to the introduction of broadband but was not an Internet café at the time. The company previously used dial-up for their Internet connection. The staff in this company were all computer literate and were to a large extent more technologically aware than SMEs in other sectors. The participant from this SME is the owner of the company.

With regards to the perceived attribute, relative advantage this SME had used dial-up previously and was therefore in a good position to differentiate between Internet access using either dial-up or broadband. They preferred the use of broadband because of the speed it provided and the versatility as well. SME 3 provided the use of web cameras (web cams) as well as calls using voice over IP (VoIP). The use of these technologies meant there was no way they would use dial-up to run their

business. The flat rate the use of broadband provides was another reason why SME 3 felt that broadband was better than dial-up.

With regards to compatibility, SME 3 needs broadband to run their café business and for the complexity aspect, like the previous SME they were quite competent with the use of information technology particularly the Internet and associated technologies. As a result, SME 3 uses broadband with little or no difficulty.

SME 4 is a furniture shop that deals in the sales of both new and used furniture and has been in the business for about ten years. The company uses its information and communication technologies mainly for making orders from their wholesale suppliers. SME 4 had not previously used dial-up but went straight to the use of broadband for their Internet connection and could therefore not inform the relative advantage attribute.

Technically, the company has limited knowledge of the capability of broadband and used it to send orders and to contact their suppliers. Therefore, with regards to the compatibility aspect of the framework, the use of broadband saves the company making unnecessary journeys. With regard to the complexity aspect, although the company staff had limited knowledge of computing, they had no problems using broadband because the broadband service providers carried out the installation. When choosing their service providers, the owner of the business already used broadband at home and had used the same provider who was their telephone service provider, so SME 4 went along with the same vendor for the business since they had experienced reliable service from them already. The participant in this case is the business owner

SME 5 is a security systems company that provides security needs for both households and business premises. They provide services such as access control accessories, all sorts of alarms, airport security equipment, security badges, and closed circuit television (CCTV). The company had a good experience of using computers and were conversant with using many computer applications for their business.

This SME, although quite technology aware, had never used dial-up in their business but the business owner had an experience of using it at home and felt that broadband was better because of the speed it provides and because it does not stand in the way of using the phone line at the same time. This is in line with the relative advantage aspect of the framework. With regards to the compatibility aspect, the business owners find it convenient to use broadband to run their business. SME 5 uses broadband to order supplies and to communicate with both their suppliers and their clients. Considering the complexity aspect of the framework, since, as previously mentioned, the staff in the company are computer literate and they have no difficulty using broadband but use it only for communication purposes. Installing broadband was not difficult either because the broadband service provider carried out their installation. When choosing their service provider, SME 5 went along with their previous phone service provider and still use their broadband service even though they had stopped using the phone service. The participant who took part in this research is a manager.

SME 6 is a training school, which was established in 2002 and provides training courses and is also a college. The college provides courses such as national vocational qualifications in a number of areas and short computing courses as well. The college is city and guilds approved and also provides free government funded courses. The college has many registered students who use computers for their training courses.

Although this SME has been in business for a while, they have never used dial-up for their Internet connection. Therefore, for the relative advantage aspect of the framework, the SME could not compare broadband to dial-up in their business. However, they chose to use broadband instead of dial-up because of the speed it provides and also because it would not require a separate phone line. For the compatibility aspect of the framework, SME 6 has an online presence but does not provide online learning and its online presence is purely for information and communication purposes. The SME uses broadband to send and receive emails. They also use it for training, carrying out research and for purchasing materials they need to run the college. For the complexity aspect of the framework, SME 6 employs the use of outsourcing for some of their information technology (IT) needs.

However, they had no difficulty employing the use of and installing broadband. When it came to deciding what supplier to use, SME 6 went along with their phone service provider, as they were satisfied with the service they were receiving but found it expensive. The research participants from this training institution are the co-owners of the business.

SME 7 is a printing business that offers a full printing service. They specialise in design, print and deliver printed products such as fliers and catalogues throughout the UK. The company offers fast, affordable quality printing and design, which they do to expose products and services in a professional and attractive way. A few of the staff in the company are reasonably computer literate and they use computers and the Internet, though not frequently, for running some aspects of their business. Additionally, they have an Internet presence that informs customers about the products and services that the company offers. However, the website is not used for receiving or processing orders.

The company had never used dial-up for their Internet connection but went for broadband when they decided to adopt the use of the Internet. Therefore, they could not inform the relative advantage part of the framework. With regard to the compatibility aspect, SME 7 use their broadband connection, though infrequently, to contact clients and suppliers and say that it has reduced the need to travel and reduced the need to make phone calls, which saves them money. For the complexity aspect of the framework, SME 7 found broadband easy to install and use, as most of the installation was carried out by the broadband service providers. When it came to the decision to adopt broadband, SME 7 decided to do so on the advice of a friend who had also adopted broadband. The SME receive their broadband service from the same service provider that the friend uses. The research participant from this company is the business owner.

SME 8 is a travel and estate agency that offers services to book, purchase airline tickets, organise tours and arranging travel insurance. They also provide sales, lettings and valuation services. The business has been running for a few years. Although the company had never used dial-up, the use of broadband is considered necessary for the quick purchase of tickets. This is because when booking or

purchasing tickets from an airline, speed is required to ensure that the client does not loose the particular ticket they are after and also because ticket prices can change quite quickly depending on demand, speed is necessary to ensure that the price does not increase. Aside from the business owner, the staff in the company are relatively novice where ICT is concerned.

For the relative advantage aspect of the framework, SME 8 had never used dial-up for their Internet connection and could therefore, not inform that aspect of the framework. However, regarding the compatibility aspect, broadband is seen as necessary for the daily running of the air travel tickets aspect of the business because speed is essential for the purchase and booking of tickets. However, the company does not offer online purchase of tickets. For the complexity aspect of the framework, SME 8 has not had an easy time using broadband. The company initially adopted broadband because of a promotion that was advertised by a broadband provider. However, the provider never turned up to provide the SME with the broadband Internet connection. SME8 then turned to a different provider, which was also disappointing for the company because despite the change, the service was down and they could not do anything about it. The company had at the time called the broadband provider and were awaiting response to restore the service. The research participant is one of the business owners.

SME 9 is a clothes-manufacturing business that deals in the manufacturing, wholesale and retail of clothes. The company employ a number of staff but none with a vast knowledge on the use of IT within the company. The company produces and then distributes clothing to other businesses. For this reason, they send and receive invoices over the Internet. However, SME 9 does not trade over the Internet. They do have an Internet presence and have their product catalogue online, which displays pictures of the products that the company offers. They have considered trading online but are yet to begin.

With regards to the relative advantage aspect of the framework, SME 9 previously used dial-up for their Internet connection. They moved to broadband on the advice of one of their clients and have found it to be better than dial-up because of the speed and the lack of necessity of a separate phone line. They also prefer it because there is

a fixed bill at the end of every month. On the issue of compatibility, SME 9 uses broadband to contact their clients, ranging from wholesalers to retailers. They use it to send product information and also used it to send and receive invoices. SME 9 uses broadband mainly for communication. Although they use it to order stock and to also send information on stock delivery, SME 9 have yet to notice any improvement in the running of their business since the move to broadband. With regards to the complexity aspect of the framework, the company had a bit of a hard time connecting to the Internet because the broadband service provider carried out the cable connection but expected SME 9 to carry out the installation on their computer. This was difficult because of the level of experience the staff in the company have with IT. The broadband company then had to be contacted to carry out a complete installation for SME 9. The broadband service provider did not respond as quickly as the SME would have liked and had to make constant calls, which cost them a lot of money but they turned up eventually.

When it came to deciding the move from dial-up to broadband and to decide which service provider to use, SME 9 simply moved from their previous dial-up service provider, who was also their telephone service provider. The research participant from SME 9 is one of the business owners.

SME 10 is a school uniform manufacturing and wholesaling business. The business manufactures and suppliers uniforms to shops that provide school supplies. The company uses broadband for communication to their clients by sending and receiving mails and receiving orders for processing. The company does not have an Internet presence and also does not trade online. It is however listed on several Internet sites in order to ensure exposure. A few of the staff in the company are reasonably computer literate.

With regards to the compatibility aspect of the framework, SME 10 needs broadband to ensure they maintain contact with their customers. It also helps the different aspects of their business communicate better without running up huge bills by using the telephone. The manufacturing part of their business is located outside the country and they send and receive emails to ensure that the specifications for the uniforms are adequately communicated. The company feels that they cannot operate without

broadband. For the relative advantage aspect of the framework, SME 10 previously used dial-up and found it disruptive to their telephone service. They therefore preferred using broadband because it freed up the telephone line. The speed that broadband provides is also another point that makes SME 10 prefer the use of broadband. The company takes photos of the different samples of the range of uniforms that they offer. They send out these photos back and forth between the customers and the manufacturing arm of their business. Uploading these pictures was time consuming when the business used dial-up and that is another reason why SME 10 prefers the speed that broadband provides. With regards to the complexity aspect of the framework, SME 10 has not particularly had any problems with their broadband connection. The installation was mostly carried out by their broadband service providers and the part of the installation that the business were expected to carry out themselves was done with little difficulty.

When it came to deciding the move from dial-up to broadband, SME 10 was advised by one of their customers, which was also running a small business and decided to try the same broadband service provider as that customer. SME 10 is a family owned business that has run for generations and the research participant from this SME is one of the family members.

SME 11 is a business that involves wholesale of greeting cards, stationary, gift-wrap, plush toys and party-ware and they supply other businesses. The company is a major wholesale distributor for many major manufacturers. They have an Internet presence for exposure and contact information but do not trade online. The company's website contains a catalogue showcasing the products that they offer. They send and receive orders from the card manufacturers and their customers via email. The staff in the company are quite conversant with the use of IT within their company. They maintain most of their records on their computers and rarely have paper based records.

SME 11 previously used dial-up for their Internet connection and moved to broadband on the advice of their dial-up service providers. For the relative advantage aspect of the framework, this SME prefers the use of broadband to dial-up because of the speed it provides and the lack of a need for a separate dedicated phone line as

dial-up regularly interrupted their phone service. For the compatibility aspect, SME 11 use broadband for communicating orders back and forth between their manufacturers and customers and reduces the need for the cost of making phone calls. With regards to the complexity aspect, the broadband service provider carried out most of the installation but SME 11 was required to carry out some of it like downloading the from the CD to activate the connection. That aspect of the installation was not difficult for the SMEs and they have had few problems with their Internet connection. They reported a few times when their broadband service was down but was eventually dealt with by the broadband service provider when it happened. The participant in this case is a manager.

SME 12 is a unisex hair salon business that also sells hair and beauty products. The staff in the company have very little computing experience but the business owner was up to date with the use of computing and the Internet. However, this SME outsourced some of their IT needs to an IT firm. The company had an Internet presence, which provided information on how to reach the salon and also information on the products and services that were on offer. The website also provided an allowance for on-line booking. Customers could use this facility to book a service before going in to have it done. Unfortunately, the website proved too costly for the business to maintain and so has been shut down.

SME 12 previously used dial-up for their Internet connection and moved to broadband. The company previously used broadband for sending and receiving mails and also for processing customers' bookings. More recently, they only use it for communication. With regards to the relative advantage aspect of the framework, SME 12 prefers the use of broadband because of the speed it provides and because it does not keep their phone line busy when there is a need to use the Internet. With regards to the compatibility aspect, this company used broadband for more than they currently use it for. They however feel it is still useful for the company because it allows for communication to their clients and their product suppliers reducing the need to make phone calls. For the complexity aspect, SME 12 has had very little problems with their broadband connection. Installation was relatively easy as the business owner was computer literate and was not required to do more than

connecting a cable to a computer and downloading from a CD to activate the connection.

When it came to deciding the move from dial-up, the business owner had started using broadband at home and went along with the same broadband service provider they used at home. Later, however, the SME found a cheaper phone service provider that provided a free broadband service and moved to this provider. This created a few problems because it took much longer than was anticipated for the broadband service to be connected. SME 12 had to wait for more than two months before the service was provided and has since had no further problems with their broadband connection. The research participant from this SME is the business owner.

The SMEs that were involved in this study have been described in order to give a feel of the experiences they have had with their use of broadband. They are also described to provide an understanding of their experiences of the perceived innovation attributes that are described in the framework supporting the research. Table 4.1 below summarises the SMEs that were involved in this research.

SME	**Nature**	**Broadband experience**
1	Estate agent	Company operates a lot of their business on the Internet. Staff are computer literate. Recently moved to Internet presence.
2	Cyber café	The staff in this company were all computer literate and were to a large extent more technologically aware than SMEs in other sectors. Their use of the Internet is extensive
3	Cyber café	They are quite competent with the use of information technology particularly the Internet and associated technologies
4	Furniture shop	The company staff have limited knowledge of computing but have not reported any difficulty using broadband

5	Security systems	The company have a good experience of using computers and are conversant with using many computer applications for their business
6	Training school	Many of the staff are computer literate. They have an online presence but do not provide online learning and its online presence is purely for information and communication purposes
7	Printing business	A few of the staff in the company are reasonably computer literate. They have an Internet presence that informs customers about the products and services but is not used for receiving or processing orders.
8	Travel and estate agency	Business owner is computer literate but the staff are not as literate. They use the Internet for ticket purchases
9	Clothes manufacturer	They have an Internet presence and have their product catalogue online. They have considered trading online but are yet to begin.
10	School uniform manufacturer and wholesaler	They are listed on several Internet sites in order to ensure exposure. A few of the staff in the company are computer literate.
11	Wholesale card and gifts	They have an Internet presence for exposure and contact information but do not trade online.
12	Hair salon	Business owner was up to date with the use of computing and the Internet. They outsourced some of their IT. The company had an Internet presence, which has since been shut down

Table 4.1 SMEs and their experience on broadband

4.2.2 The Vendor

The vendor is a company that was founded in the early 1990s and provides Internet access, domain name registration and web and email hosting services. The company prides itself on being innovative and providing what is best for their customers. The product and services are developed with the customers' needs in mind. They provide services for home users and businesses but do not have a specifically dedicated service for small or larger enterprises.

The company responds to customers as best as they can and promise that they have a genuine interest in their work and the customers' needs. They offer a customer service helpdesk that are available at normal British Telecom rates. They do not leave customers on hold and call back when they say they will. Their customers usually stay with them on a long term and most come based on recommendation from other satisfied customers. Although the company offers dial-up connection as well as broadband, unless the customer is living in non-activated exchanges or is travelling, broadband is usually the connection that they suggest to customers. The company does not offer the cheapest service available but have no download limit, which makes them different from many other broadband service providers.

With regards to the perceived innovation attributes of the framework, with the relative advantage aspect of the framework, except where it is not available, broadband is the preferred connection that would be offered to intending customers. They would not recommend dial-up to any SME. With broadband, the customer would not have to wait for the dial-up part, the connection is quick, there is a fixed fee in most cases, and it is always on. For the compatibility aspect, the company expects all SMEs to use broadband and say that using it allows for quick communication, which frees up time to allow SMEs carry out other important things like expanding their business. For the complexity aspect, the service that is offered by the vendor requires very little human intervention and installation would be completed within two minutes. Their customers have had very little problems with installation and have not any complains about the broadband service they provide. They have very dedicated customer services staff who are quick to respond to any

customer issues and have had reports of connection problems, which are out of their control. The research participant from this vendor is a manager within the company.

4.2.3 The private consultant

The private consultant is a firm that operates an online consultancy and has worked with royal institutions, credit card companies, security companies and small and large enterprises. It also operates a directory of Internet service providers, which has been classed among the top 100 websites in the UK by an Internet magazine. The directory helps businesses to find the right broadband service provider. The firm consists of a team of highly qualified personnel that provide support in all aspects of electronic business (e-business) and deliver end-to-end solutions, including user interface, Internet application development, purchase of domain names, managed hosting solutions and systems integration.

They work with clients to provide and maintain websites and graphics to help clients generate profit and exposure. They recognise the need for both strong technical and creative skills and blend these together to ensure that clients reap the benefits of both worlds. The firm provides their clients with a round the clock telephone and online support. The private consultant offers an impartial advice regarding companies' needs to use the Internet and associated technologies. They claim to provide great creative ideas, robust technical solutions and timely, on-budget delivery.

With regards to the compatibility aspect of the framework, the private consultant does not recommend broadband for all SMEs. Their stance is that not all SMEs need the Internet and therefore not all need broadband. The private consultant educates small businesses on the advantages broadband Internet can bring and also let the businesses know that it can take up to a year for usage to be optimised. With regards to the complexity aspect, the private consultant has not found broadband difficult to use but say that depending on the technical ability of the user, it may or may not be easy to use. With regards to the relative advantage aspect of the framework, the private consultant says that broadband is better than dial-up because it is faster and is always on. The research participant from this private consulting company is one of the directors.

4.2.4 The government agency

The government was initially taken as a whole when considering previous literature in chapter two. However, on getting further into the research, it was discovered that there were various bodies involved in the diffusion of innovations to SMEs. In an effort to determine which of the bodies was concerned with broadband diffusion, various documents were reviewed and then one of the development agencies was contacted.

The government agency was established as Government-sponsored public bodies set up by the Government as a means of improving the quality of life and economic advancement in England. They aim to achieve this through driving economic development and regeneration, developing business competitiveness and improving the skills base. The agency works with partners in the public, private, voluntary and academic sectors at regional and local levels. They organise and drive the development of initiatives and programmes, including regeneration, investment, skills development and enterprise. Generally, the objectives of the development agencies are to promote business efficiency and competitiveness, promote employment, enhance the development and application of skills relevant to employment, and contribute to sustainable development and further economic development and regeneration.

The agency says they are a business-led organisation that provides a crucial link between the needs of business and the policies of Government. They can put businesses in touch with business support and advice. They are there to bring investment into their regions and improve productivity. The agency set out a strategy to enhance connectivity in the region. One of the major agendas in the agency's strategy is broadband diffusion. The agency set out to ensure that broadband connection is available to all businesses. The research participant is a project officer within the agency.

With regards to the compatibility aspect of the framework, the agency is of the opinion that SMEs need broadband. The stance of the agency is that broadband and

ICT helps to increase productivity and participation. With regards to the complexity aspect, this agency is of the opinion that SMEs using broadband is easy provided you have the right support. The use of broadband will also bring about the need for new skills for SMEs. With the relative advantage aspect of the framework, the government agency says that broadband is better than dial-up because it is fast and has a flat rate. However, this group also says that using broadband would increase SMEs susceptibility to viruses and privacy issues.

4.2.5 The Independent group

The independent group in this study as described in chapter two is an organisation set up as an organisation, interested in the diffusion and adoption of broadband. This organisation was set up to provide a neutral forum for organisations to discuss and resolve the issues that relate to the development and deployment of broadband. This independent group is an advisory group that claims to focus on strategic, medium- to long-term challenges that affect the entire broadband-enabled value chain, with the aim of helping to create a strong and competitive UK knowledge economy.

The group has a vision of maximising the benefits of an inclusive broadband-enabled society to ensure UK competitiveness. It aims to be a 'critical friend' of government and the regulator, and comprises companies from the telecoms and technology sectors through to content providers, rights holders.

With respect to the perceived innovation attributes as discussed in the framework, the view of the independent group regarding compatibility is that broadband has the potential to improve the way SMEs carry out their business processes. However, they feel that the SMEs do not know how broadband can support or enhance their business activities. For the complexity aspect of the framework, this social group is of the opinion that SMEs do not fully understand what they can use broadband for. With regards to the relative advantage aspect, the independent group feels that broadband is certainly better than dial-up.

4.2.6 The Professional association

This professional association has been in existence for 50 years and claims to be the leading body for those working in information technology (IT). With a world-wide membership now over 60,000 members in over 100 countries, it is the qualifying body for Chartered IT Professionals (CITP). It was established with the aim of to promote the study and practice of computing and to advance knowledge of and education in IT for the benefit of the public. Through many programs this professional association claims to be leading and building IT professionalism.

The professional association also claims to enable individuals, organizations and society to realise the potential of and maximise the benefits from IT by: setting and maintaining the highest professional standards for IT professionals, initiating and informing debate on IT strategic issues with government, industry, and academia, advising the UK government and its agencies on IT-related matters regarding proposed legislation, representing the profession on issues of importance and liaising with other professional bodies, examining and initiating debate on topical IT issues, supporting individuals in their career development and providing opportunities for networking.

Regarding the perceived innovation attributes as discussed in the framework, the view of the professional association regarding compatibility is that broadband has the potential to improve SMEs competitiveness. For the complexity aspect of the framework, this social group is of the opinion that broadband is relatively easy to use and understand. With regards to the relative advantage aspect, the professional association say that broadband is better than dial-up because it is always on and because it is fast. However, they also say it brings about problems of security because broadband Internet exposes the SMEs to various cyber crimes.

Table 4.2 below shows the participants and highlights important issues arising from the first phase of the research.

Participants	**Important issues arising from the first phase**
SMEs	Most SMEs had reasonable technical experience of using computing and thought broadband was easy to use but

	some had technical difficulties and all used it mostly for communication
Vendor	They provide both dial up and broadband but will always recommend broadband unless its not available in the client's location
Private Consultant	Their belief is that not all SMEs need the Internet thus, not all SMEs need broadband
Government	Their belief is that SMEs need broadband to be competitive but that it is not always secure
Independent group	This group has a strong belief that broadband will improve the way SMEs carry out their business processes
Professional association	Also have the opinion that broadband is good for businesses but believe it exposes them to cyber crimes

Table 4.2 Important issues rising from the first phase of this research

4.3 Phase two

For the second phase of the research, the study goes into more depth to uncover the views of two of the social groups with regards to the important issues that were raised during the first phase of the research.

The two social groups are the vendors and the government agency. The reason why this part of the research focuses more on these two social groups is because they are the social groups that wield the most influence over the issues that were raised and required further study. For example, cost was one of the issues that were raised and the social group that wields the most influence over that aspect of the research is the vendor. Also, the issue of quality of service has been experienced by some of the SMEs. For this, the social group concerned is also the vendor.

The two social groups are described here to provide an understanding of the setting in which the empirical data for this part of the research was collected. Also, it provides an understanding of the participants under these two social groups.

4.3.1 The development agency

The agency in this second phase of the research is a Government funded agency set up in 1999 responsible for the economic and social development of one of the regions which is described as the driving force of the UK's economy. The economy

of the region is the 22nd largest in the world, bigger than several countries and its population makes it the largest region in the UK.

The aim of this government agency is to create a prosperous, dynamic and inspirational region by helping businesses compete more effectively, training a highly skilled workforce, supporting and enabling our communities, while safeguarding the natural resources and cherishing the rich cultural heritage in the region. It also aims to be a catalyst for change within the region, working with partner organisations- businesses, education at all levels, local authorities, government agencies, voluntary and community organisations with the aim of producing clearly recognisable results.

This agency receives funds from Government to enable it to invest directly in a range of economic and social development programmes, and is in a position to help secure European Union and private sector investment for the region. Although this agency is accountable to government, it is a business led organisation, governed by a board whose members have wide-ranging experience in industry and commerce, local government, education, trade unionism and voluntary service.

In the years since this agency has been set up, it claims to have achieved several laudable programs such as; Enabling more than 350 new businesses to be created; Rolling out Broadband programme, in partnership with the major telecommunications companies, to link up businesses and homes - especially those in remote areas - to the Internet; Helping small companies get the maximum benefit from information and communications technology and ensuring that more firms are able to train their managers and start in e-skills; among others.

As part of the broadband initiatives in this region, the agency is involved in partnership with several local authorities at a sub-regional level which are setting up public private partnerships that promises to accelerate the availability, take-up and exploitation of information and communications technology to benefit the social and economic development of their area. These partnerships are generally made up of committed organisations, both public and commercial.

The partnerships formed claim to support local businesses and consist of a collaboration of private and public organisations to provide independent, free information and advice to improve availability, access and take up of broadband services across the various counties in the region. They also say they provide grants to help businesses improve their sales, competitiveness and profits by using broadband and the Internet.

The particular participant that was involved in this research within the agency is the head of the wired region team. The participant is actively involved in the partnerships particularly with the diffusion and adoption of broadband within the region and also works with small businesses specifically on the use of the Internet and related technologies.

The following issues were tabled before this participant. They include awareness, cost, quality of service and full exploitation of broadband. On these issues, the participant was of the opinion that the lack of awareness was generally due to the fact that there is a lot more on a business owner's mind than researching and appropriately utilising new technologies including broadband.

4.3.2 The vendor

The vendor that was involved in this second phase of the research (different from the vendor involved in the first phase) is one of the largest telecommunications company in the country and claims to be a leading provider of communications solutions that serves customers throughout the world. This vendor says they provide several services which include networked IT services, local, national and international telecommunications services, and higher-value broadband and Internet products and services.

This particular vendor claims to be a key supporter of the government's broadband agenda and has helped to establish 54 broadband technology neutral partnerships across the UK. According to the vendor, these partnerships have contributed to the expansion of the broadband footprint and they focus on encouraging take up and usage.

The company provides broadband services to home users, small and medium sized businesses and large businesses as well. In addition to these services, they also provide leased broadband lines to other broadband vendors.

The participant that was involved in this research within this vendor organisation has been a part of the organisation for several years and is particularly involved in the partnerships between their company and the government funded agency responsible for broadband diffusion.

Social Groups	**Important aspects arising from the additional issues raised**
Vendor	The cost of providing free services that create awareness is quite high and cannot be borne by one or a few vendors. Other application vendors should also be involved. SMEs should take some responsibility for researching what will affect their businesses. SMEs are not willing to spend time and resources to obtain suitable IT and are thus missing out on quality
Government agency	Most of the support that is available for SMEs who are thinking of adopting new technologies is mostly available to those in rural areas. Cost of obtaining broadband is not an issue anymore because of the level of competition that has forced the broadband prices down

Table 4.3 Important issues rising from the second phase of this research

4.4 Summary and Conclusion

This chapter provides a detailed description of the participants involved in the first phase of the fieldwork carried out. This was done in order to understand the empirical context of this research. The principle of contextualisation is very important, as one of the main principles and cannot be ignored (Klein and Myers, 1999). The setting of the research was described to fulfil this principle. The relevant social groups which include the SMEs, vendors, the government, independent groups, private consultants and professional associations are described and there is some background information about the companies and organisations involved in the field study and their experience in broadband diffusion in relation to the framework described in chapter two.

The participants in the second phase of the research and their background are also described and their views regarding the framework briefly discussed.

In the next two chapters, the data obtained from the research participants described in this chapter is analysed and presented. Chapter five presents the analysis from the first phase of the research, which examines the views of the relevant social groups in relation to the framework guiding this research.

CHAPTER FIVE: Relevant social groups and the perceived innovation attributes

5.1 Introduction

The field study conducted in the first phase of this research will be analysed in this chapter. As presented in chapter 4, in this phase the participants were 12 SMEs, 1 vendor, 1 government agency and 1 private consultant. The focus here is on the different viewpoints from each of the social groups concerning the innovation diffusion attributes discussed in chapter 2. These attributes are compatibility, technical complexity and relative advantage.

For the purpose of this thesis the focus of the analysis is shifted from the level of a firm to that of the multi-organisational environment of broadband diffusion. In chapter 2, six social groups were identified as the social groups involved in the diffusion of broadband to SMEs. These groups are namely the SMEs, vendors, the government, private consultants, independent groups, and professional associations. The first four social groups were involved in the field study where first hand data was obtained. The views of the last two social groups were obtained through secondary resources. This was done because the last two social groups were approached several times to seek their participation in this study. However, they did not respond initially and when they finally responded, it was to indicate that they were not willing to participate in the research.

Based on the initial data there are differing viewpoints from each of the social groups concerning the innovation diffusion attributes. These views are presented in accordance with the framework proposed in chapter 2. The analysis of the field study is accordingly made around the various social groups that have been identified.

This analysis is carried out using intentional analysis which consists of the following steps where the researcher

- Describes the facts of the phenomenon
- Determines how participants give meaning to separate realities
- Identifies themes used to develop common interpretations
- Asks what the researcher thinks about the phenomenon

In the first step of intentional analysis, the researcher describes the facts of the phenomenon. The facts refer to socially shared realities that have been agreed on by the participants. Next, the researcher determines the way participants give meaning to their separate realities by how they perceive cause and effect. In step three, the researcher identifies themes that emerge from the text. The researcher then identifies themes that are used to develop common interpretations for an entire class of phenomena. Finally, in step four, the researcher abstracts the essences from the text. Essences can be described as the wholly subjective gestalts of what is learned from studying the phenomenon. Abstracting essences requires creativity, intuition and reflection. The researcher no longer asks what the participants think about the phenomenon but rather, what the researcher thinks (Lacity and Janson, 1994; Sanders, 1982).

In this study, these steps are carried out by analyzing the views of the identified social groups in accordance with SCOT in step 1. The facts of broadband are explained as seen through the eyes of the social groups and are analysed and presented in section 5.2. Step 2 is carried out by analyzing the views of the social groups in relation to the innovation attributes of broadband (see section 5.3). In step 3, the emerging themes are identified and these include themes that were not previously included in the framework. These are presented in section 5.4. Finally, in step 4, the essences are abstracted using notions from SCOT such as interpretive flexibility and closure. This will no longer reflect what the social groups think but what the researcher thinks (see section 5.5). These steps as followed in this research are presented in figure 5.1 below.

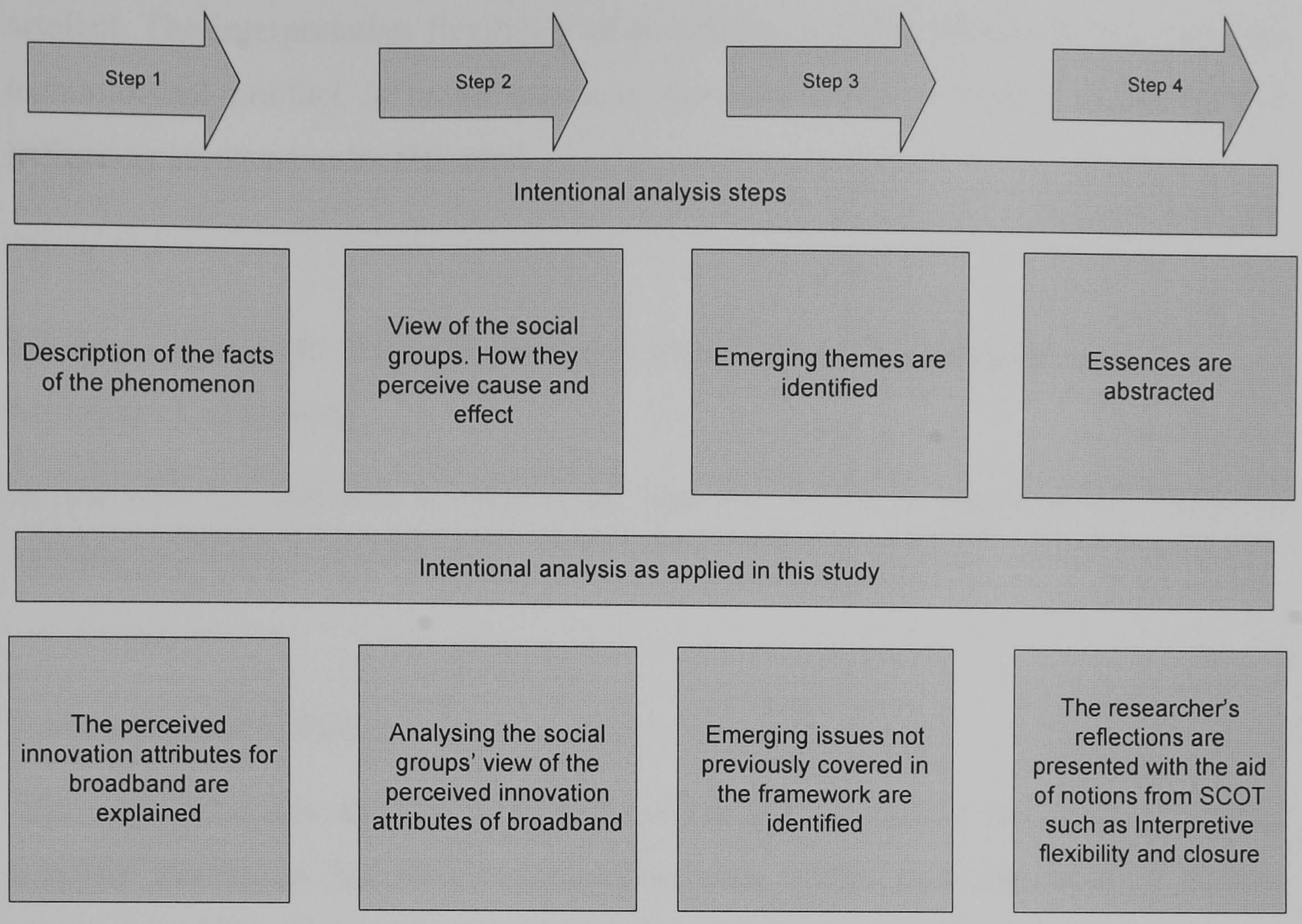


Figure 5.1 the intentional analysis steps as followed in this research

In the literature review, it was mentioned that Pinch and Bijker (1987) outline four components to the social construction of technology. They are: relevant social groups, interpretive flexibility, closure, and stabilization. In SCOT where the introduction of an innovation is faced with objections from different social groups, one seeks to find a solution that would make the innovation desirable for reasons that would supersede reasons for objections.

Steps involved in SCOT include:

- Identifying the relevant social groups
- Describing them in more detail
- Identifying the problems each of these groups has with respect to the artifact
- Around each of these problems, several variants of the solution can be identified.

This way of describing the developmental process brings out all the different types of conflicts. This model highlights the multidirectional character of a technological

artefact. The interpretative flexibility of an artefact must be shown. In this case, the technological artefact is broadband and there are different social groups (SMEs inclusive) involved in its diffusion.

5.2 Step 1 The facts of the phenomenon (Attributes explaining the rate of broadband adoption)

In line with the first step of intentional analysis, the views are presented based on existing research on broadband.

Technical compatibility

With regards to this attribute of broadband for SMEs, vendors report the following benefits that make broadband compatible with SMEs past experiences, current business practices and future needs. They proclaim that broadband provides greater download and upload speeds and provides SMEs with the flexibility to change existing practices, target new customers, increase productivity, drive changes in business processes, gives greater independence and allows them to take advantage of associated technologies (BTPlc, 2005; NTL, 2005). SMEs in the IT sector have an understanding of what they require from broadband services and how broadband is compatible with their business. According to independent groups, this is not the case with SMEs in other sectors (Intellect, 2003). These SMEs do not know how broadband can support or enhance their business activities. They also do not know what broadband service is ideal for them and in some cases have been sold a service that might not be particularly suitable for their nature of business (Intellect, 2005). Private consultants and independent groups argue that there has not been any study or service to determine what kind of broadband service is suitable for SMEs in various sectors, since their communication and technological needs will vary (Arnott, 2005). However, vendors claim that most SMEs that have adopted broadband are quite happy with the service (BT Plc, 2005; Viatel, 2005, Showcase05, 2005).

Technical complexity

According to groups that promote broadband as well as vendors, broadband is portrayed as easy to install and integrate into SMEs' existing systems (BSG, 2004; BTPlc, 2005). However, it has been reported by an independent group that SMEs find it difficult to adjust to the changes when using broadband (Intellect, 2003). In a study carried out on SMEs that were new to broadband, the time taken to achieve certain tasks increased with the use of broadband suggesting that they did not particularly find it easy to use (Intellect, 2005). Independent groups claim the vendors are doing little to educate SMEs on the need and proper use of broadband (Arnott, 2005; BSG, 2004). Furthermore, the organisation for economic co-operation and development (OECD) recommended that the government as model users of broadband should demonstrate the potential of broadband services and content, providing demonstration and mentoring for SMEs (OECD, 2005). Broadband may not be suitable for some SMEs' nature of business. They lack the time, information and knowledge to research the benefits of new technologies and will not know if they have the technological capability to handle any changes to their established business processes (OECD, 2005).

Relative Advantage

To further stress the point that broadband is superior to the dial-up, according to Intellect (2003) dial-ups do not allow SMEs enjoy the Internet fully. They do not allow SMEs to use the Internet to its full potential as a medium for e-business applications. SMEs fail to see this point because according to Cisilion, (2002) they do not see broadband as integral to helping their business. Independent groups infer that SMEs need to know exactly how broadband adoption would be beneficial to them in monetary terms and would need more information from the government and vendors. All they have heard is the advantage in terms of speed and they are unwilling to adopt broadband on the basis of speed alone (Philpott, 2004; OECD, 2005). Vendors however claim that broadband provides efficient data back-up, video conferencing and Voice over Internet Protocol (VoIP), which provides efficient and better communication than dial-up (BTPlc, 2005; Ntl, 2005; Viatel, 2005). It also helps to save money on calls and postage. There have been reports of SMEs susceptibility to spam, virus, hackers, and Internet fraud if they use broadband. Private consultants think this is possibly one reason why they have been reluctant to

adopt broadband (Philpott, 2004). Finally, the government mentions growth opportunities as a result of the speed, content and capabilities of broadband for SMEs that choose to adopt it (DTI, 2004)

5.3 Step 2 determining the way participants perceive cause and effect (Analysing the social groups' view of the perceived attributes of an innovation)

This is to reflect the way the social groups ascribe meaning to their separate realities by how they perceive cause and effect. In this study, the innovation attributes discussed earlier are used to explain the adoption of broadband by SMEs.

5.3.1 Analysing SMEs' view of the perceived innovation attributes

Technical compatibility

As was mentioned in the previous section, technical compatibility in this research is the degree to which broadband, as an innovation, is seen to be consistent with existing values, needs and past experiences of SMEs as the potential adopters. Of the SMEs that have been interviewed, 3 do not use broadband and are unsure of what benefits it could have for their businesses. However, those that have started using broadband, the 12 SMEs that are used in this analysis, have various views about the compatibility of broadband to their businesses.

The SMEs that have been considered in this study are from varying sectors ranging from estate agents, training institutes, travel agents, cyber cafes furniture suppliers to wholesalers and retailers. The SMEs, 7 of them, found that using broadband was good for their businesses. They thought it improved their ability to communicate without having to run up high telephone bills and also saved up on the cost of sending physical mail. Furthermore it avails them the opportunity to make purchases online without the need to make a physical journey. They are able to communicate with both their suppliers and customers and it makes it a lot easier and cheaper to do business that way. SME 4, a furniture company, said "it helps us to communicate with wholesalers without having to travel so it saves time, money and having to make a journey".

They also felt it gave them the ability to be able to compete with rival businesses. SME 1, an estate agent for instance, explained why using broadband helps their business. In their words, "it allows us compete with rival agents not only with our physical presence but with an online presence as well. It is important to keep abreast with changes in the property market and using the Internet helps us in that regard".

For the cyber cafes, (2 of them) they stressed the importance of the fact that with broadband, they could use the Internet and the phone lines at the same time. In addition, it also meant that they could use functions only available with broadband such as voice over IP. With voice over IP, they can use the Internet to make calls at minimal cost to the company. In the words of SME 2, "I'm not sure we can stay in this business without the use of broadband. Customers are happier if they can surf faster and they have the choice of using things like voice over IP so they can talk while surfing and they won't have to spend money on the call."

For others such as SME 8, a travel agent, speed is quite important to them because of the nature of their business. In their words, "We use broadband because it's a lot faster and is cheaper than making calls since it has a fixed price. Besides we can't possibly operate without the Internet and more so broadband because of the type of this business. We need to book tickets and the bookings are usually done instantly and the speed of broadband helps for this purpose".

Technical complexity

As previously mentioned, technical complexity is described as the degree to which broadband as an innovation is perceived as relatively difficult to understand and use. Furthermore, some innovations are quite clear in their meaning while others are not. To a large extent, while the SMEs that have been interviewed have found broadband easy to use they may not realise that the technology can be used for a lot more than they are currently using it for.

10 of the SMEs said they found that broadband was quite easy to use. They also had very few problems with installation and rarely had complaints about the services they received from their broadband vendors. However, it has to be mentioned at this point that the SMEs that have been interviewed do not utilise broadband in its full

functionality. SMEs 4 -12 only use it for communication and others for placing orders and making purchases.

SMEs 8 and 9 have had some problems with their broadband vendors. They complained of having problems with the initial installations and subsequently problems of the service being down too frequently. In the words of SME 8 "when we first started the business, the service provider we chose had a promotion with a free phone so we decided to go along with them. Unfortunately, the connection wasn't working properly and despite several attempts to contact the company we did not get them to fix it and that messed up business for 3 months".

At such times, the small companies had no idea what to do and were helpless in those situations. SME 8 decided to switch to another broadband vendor after their bad experience. At the time of the interview, SME 8 was experiencing some problems with their broadband connection. According to the interviewee "we use a new provider but right now the service is down and that's why no one here is doing any work. That is the trouble with technology".

Relative advantage

A good number of these companies, SMEs 1, 4, 6, 7 and 8 precisely, had not used the Internet prior to getting broadband and so had no experience using dial-up. Similarly a number of them, SMES 1, 6 and 8 had not been in business without the use of broadband at all. They were quite new to their business and had started their businesses with the Internet using broadband. In the words of SME 1 "We have never been in business without broadband. We only started the company a few years ago". There were a few however, SMEs 2, 3, 5 and 9-12, who had changed from the use of dial up to broadband.

They found broadband to be better than dial up because with broadband they can use the Internet and talk on the phone at the same time. With dial up, this is not possible unless you have a different phone line for accessing the Internet and another for making calls. In the words of SME 5, "It's a lot quicker to use broadband and it doesn't stand in the way of using the phone line at the same time". The SMEs also

found broadband to be better than dial up because no matter how long they stayed using the Internet, the cost remains fixed for the month. With dial up, they paid for what they used and could never tell what the bill would come up to every month. According to SME 10 "since we moved to broadband we've had fixed bills for our Internet use."

Some of the SMEs, SMEs 2, 3, 9 and 10, also found that they had greater download speeds with the use of broadband as opposed to dial up. This function is particularly useful for SMEs 9 and 10, which are both clothes manufacturing businesses, because they regularly upload images for client's viewing.

Table 5.1 below summarises the SMEs' views on the perceived innovation attributes.

SMEs	**Compatibility**	**Technical complexity**	**Relative advantage**
1 Estate agents	Need it to upload property searches	It is easy to use	Had not used dial-up
2 phone shop/cyber café	For customers who use the Internet and also to make calls	It is easy to use	It is faster than dial-up and allows for voice over IP
3 cyber café	Sell browsing time to customers	It is easy to use	Customers would not be happy to use dial-up because of speed
4 furniture shop	Helps to make online purchases	It is easy to use	Had not used dial-up
5 Security systems	To order supplies and to communicate with both clients and suppliers	It is easy to use	Had not used dial-up
6 Training institute	For training students, purchasing materials and carrying out	Easy to use	Had not used dial-up

	research as well as for communication.		
7 Printers	Mainly for communication	Easy to use	Had not used dial-up
8 travel agents	To access information for airlines, companies, to make enquiries and for communication	Found it easy to use but has had problems with a previous provider and was at the time experiencing network failure.	Had not used dial-up
9 Clothes manufacturer	To send and receive emails and invoices. Considering an online presence	Found it difficult at first because no one had the expertise to complete the installation	Had previously used dial-up
10 Uniform manufacturers and wholesalers	Send and receive emails and upload pictures of samples on offer	Have found it easy to use	Had previously used dial-up
11 Card wholesalers	Send and receive emails and orders and have an online presence but do not trade online	Have found it relatively easy with a few times when a breakdown in service was experienced	Had previously used dial-up
12 Hair salon	Previously used it to process bookings but now only use it to send and receive emails	Have found it easy but moved to a free broadband provider who waited two months before connecting	Had previously used dial-up

Table 5.1 A summary of SMEs and their views of broadband based on the innovation attributes

In the literature review it was mentioned that the government thought broadband was important for SMEs and was providing incentives to ensure broadband was taken up by SMEs (DTI, 2004). In contrast however, the SMEs that have been interviewed revealed that they do not receive any government support and are in fact unaware of any schemes promoting the adoption of new technologies by SMEs.

Similarly, most of the SMEs that have adopted broadband have done so for numerous reasons such as the need for affordable communication, but none have done so as a result of the vendors pushing or encouraging them to adopt. When choosing or selecting a provider, many of the SMEs simply decided on vendors that were already offering them other services such as phone lines. Some of them already used broadband at home and such SMEs decided to continue with the same vendors in their businesses. This shows that there is a link between home use and business use of broadband.

When asked what the SMEs used broadband Internet for they mostly said they used it to send electronic mails and a few to make orders for goods online. These SMEs were quite happy with their use of broadband and oblivious to the possibility of using it for other tasks. In section 5.2 however, the vendors state that broadband provides efficient data back-up, video conferencing and Voice over Internet Protocol (VoIP), which provides efficient and better communication than dial-up (BTPlc, 2005; NTL, 2005).

5.3.2 Analysing the government agency's view of the perceived innovation attributes

Technical compatibility

In the opinion of the interviewee from the government agency on technical compatibility of broadband to SMEs, it enables them to buy supplies without having to leave their place of business. It could also enable SMEs to provide better services to their customers. For instance, as opposed to having the customers come to them all the time, the SMEs could communicate with their customers with the use of

broadband. They could also send things like invoices, for example, over the Internet saving on the cost of mailing them. Unlike the vendor however, the interviewee from the government agency was of the opinion that despite the many benefits, the use of broadband does bring its own problems. In the interviewee's words, "It does bring its own problems. Such as security issues they will have to deal with the fact that using broadband will make them more vulnerable to viruses and privacy issues as well."

In the opinion of the interviewee from the government agency, the SMEs should all have broadband, as it is quite affordable these days. In the interviewee's words, "Initially it was quite expensive to install and use but as competition has increased, the cost of obtaining broadband has decreased". This group also thinks that in order for SMEs to keep up with rivals in the same business area, they need to adopt the Internet and broadband in particular. According to the interviewee, "Competition is using broadband and so should you. You should do it to keep up with them or they'll take your business away".

This agency also states that they have tried and are still in the process of creating awareness. They have projects that create awareness of broadband and the benefits of its use to SMEs. In the interviewee's words "Our project is trying to create awareness. E government agenda and some local government councils are trying to get the message across to SMEs."

Technical complexity

The interviewee from the government agency was of the opinion that SMEs using broadband should find it relatively easy to use. In his words, 'hardware is cheap and provided you get the right support from the broadband vendors, the SMEs should really have no problems using broadband'. The government agency also thinks that the SMEs need to know what to use broadband for. In the interviewee's words, "They need to know what to use broadband for. You could buy things, you could provide better services to your customers, and you could send things like invoices, for example, over the Internet saving on the cost of mailing them".

Additionally, adopting broadband also brings about the problem of the SMEs adjusting to something they are unused to. Some of the SMEs could be new to the use of information and communication technologies and therefore also new to the use of the Internet. According to the interviewee from the government agency, "The people involved will also have to develop new skill set such as using the Internet to transfer files and things like voice over IP as well. These are things that might hinder them from wanting to adopt broadband".

Relative advantage

In agreement with many of the other interviewees the interviewee from the government agency is of the opinion that using broadband is definitely better than using dial up. This is because with broadband you have a flat rate and it is a lot quicker. With broadband, charges are fixed at the end of the month and not pay as you use as is the case with the use of dial-up. The speed associated with the use of broadband is also a key advantage. Also certain functions that businesses would need to use the Internet for would be better if broadband was used as opposed to dial-up. In the words of the interviewee, "If a business uses functions such as uploading or downloading files, then they would be better off using broadband because with dial up, it can be quite frustrating having to cope with how slow files will download".

In addition to the speed and higher download rates, broadband does not stand in the way of using the telephone line. With the use of dial up, the SME would have to loose the use of the telephone while using the Internet, or would have to get a separate phone line if they did not want the interruption.

5.3.3 Analysing the vendors' view of the perceived innovation attributes

Technical compatibility

The vendor that was interviewed was of the opinion that broadband is consistent with the needs of the SMEs. According to the interviewee "The key factor is time because people can communicate much more quickly, it frees up time for other things or expansion". When asked how well broadband would fit in with the normal

running of the business when introduced to an SME, the interviewee replied, "Very easily - I think people would wonder why they had waited so long to use it".

The vendor is of the opinion that broadband is steadily being adopted. In the view of the vendor that was interviewed, "Sales have been steady - but not a huge rush. Some users are initially looking for the cheapest package, but don't realise that they are losing quality". The vendor also gave reasons for SMEs' reluctance or lack of enthusiasm for adopting broadband. In the vendor's words, "I feel that people are resistant to change and don't like the idea of upheaval". Another reason the vendor suggested was a lack of awareness of the benefits of broadband to SMEs. According to the interviewee "Awareness is key - the local enterprise companies have really been pushing broadband in rural Scotland".

Technical complexity

Similarly, the vendor that was interviewed was of the opinion that SMEs using broadband would not find it too much of a challenge. The interviewee claims that broadband is easy to use and that they would not face difficulty installing the technology. Particularly if the SME was using a service specific to the vendor interviewed. In the interviewee's words "Installation of our services is very simple. With plug and play devices the setup process would be completed within about 2 minutes. There are very little details that are customer specific so the human intervention is limited".

The vendor did agree that the SMEs could be faced with some degree of technical difficulty but that those difficulties have nothing to with the broadband service that they offer. The vendor was so confident of the service they provided that he stated: "our customers have expressed the fact that setup is easy and we've not had any complaints so far in relation to our services (though we do hear of secondary issues, for example to do with telephone lines that's out of our control)".

Relative advantage

Broadband is usually said to be better than dial up because of the possibility of using the Internet without necessarily interrupting with the telephone lines. It provides

higher connection speeds than dial up. Additionally, broadband users are usually charged a fixed fee at the end of the month as opposed to dial up where the user is charged for every connection and the total cost using the service is unknown until the user receives a bill.

The vendor is also of the view that broadband is better than the technology it replaces which is dial-up. She highlights the advantage that the broadband service they provide has over dial up. According to the interviewee "Our service isn't the cheapest out there, but there are no download limits or usage charges". The vendor then went on to list the various features that put broadband ahead of dial-up. These features include "Faster service - download speeds, always on, quick connection - no waiting for the dialup part and fixed price (in most cases)".

5.3.4 Analysing the private consultant's view of the perceived innovation attributes

Technical compatibility

Contrary to the view of both the vendor and the interviewee from the government agency the private consultant view of adoption of broadband by SMEs is that it is not for every business. The private consultant was also of the opinion that broadband on its own will not necessarily benefit a business. In his words "only with suitable training in the advantages Internet can bring a business can it help." The private consultant's view differs from those of the vendor and the interviewee from the government agency on the issue of compatibility. When asked if SMEs needed broadband, the private consultant replied, "For some businesses Internet may not be appropriate". The private consultant felt this need arose only "when an always on connection is needed and faster downloads". He also did not think that SMEs that adopt broadband would experience immediate benefits. In the private consultant's words "If they have been using dial-up, very easy but if it's a new user to the Internet there is probably a 12 month period until usage is optimised". He went on to explain that broadband on its own it could not benefit a business. In his words "Only with suitable training in the advantages Internet can bring a business can broadband help the SMEs".

Technical complexity

The private consultant does not sound as convincing as the vendor on the issue of the ease of use of broadband. In his view "From personal experience I've found broadband easy. However this depends on the technical knowledge of the user". In many cases SMEs are unfamiliar with using computers, the Internet and related technologies and are therefore unfamiliar with the use of broadband.

The SMEs are therefore not always in a position of finding technologies such as broadband, easy to use. Furthermore, some level of training is usually required to enable SMEs take advantage of technologies such as broadband and the Internet but the SMEs are not always willing to take the time out for such training purposes. Additionally, in the view of the private consultant, broadband is not ideal for all SMEs.

Relative advantage

The private consultant shares the view of the government agency interviewee. In his opinion, broadband is always on and faster and therefore better than dial-up. The main reason why the social groups have the opinion that broadband is better than dial-up, which is the technology that broadband replaces, is as a result of the speed it provides. However, as a result of the speed that the use of broadband provides, there is also the problem of SMEs being exposed to hackers, spam, virus and Internet fraud.

5.3.5 Analysing the independent group's view of the perceived innovation attributes

Technical compatibility

In contrast to the views of the vendor and the government agency, the view of the independent group is quite different. According to an independent group, the SMEs do not know how broadband can support or enhance their business activities. They also do not know what broadband service is ideal for them and in some cases have been sold a service that might not be particularly suitable for their nature of business

(Intellect, 2005). They also argue that there has not been any study or service to determine what kind of broadband service is suitable for SMEs in various sectors, since their communication and technological needs will vary (Arnott, 2005).

Technical complexity

Even though setting up and installation of broadband might be easy, the same cannot be said for the SMEs' understanding of how to use it and adjust to it in the view of the independent group. The independent group was of the opinion that SMEs find it difficult to adjust to the changes when using broadband (Intellect, 2003). In a study carried out on SMEs that were new to broadband, the time taken to achieve certain tasks increased with the use of broadband suggesting that they did not particularly find it easy to use (Intellect, 2005). Independent groups claim the vendors are doing little to educate SMEs on the need and proper use of broadband (Arnott, 2005; BSG, 2004).

Relative advantage

The view of the independent group is also similar to that of the vendor. According to the independent group dial-ups do not allow SMEs enjoy the Internet fully (Intellect, 2003). Broadband can enable the SMEs transfer files between networks and can enable them transfer and receive images without having to wait a long time. In addition, it provides the possibility of working from home since files can be accessed over the Internet.

5.3.6 Analysing the professional association's view of the perceived innovation attributes

Technical compatibility

In the view of the professional association, broadband and similar new technologies increased SMEs' competitiveness and their ability to expand their businesses and increase profit. According to BCS (2007b) by enabling the UK's SMEs to take full advantage of new technologies not only do we improve their competitiveness, but we also improve the competitiveness of the UK economy as a whole. Additionally,

businesses that do not make use of these technologies are said to be putting themselves at a disadvantage if they choose not to embrace change. This group explains that businesses that choose not to embrace change should be aware that they have competitors who will.

Technical complexity

For the complexity aspect of the framework, this social group is of the opinion that broadband is relatively easy to use. However, they highlight the fact that businesses can be unaware or confused by new technologies such as the internet, broadband and associated technologies. They go on to elaborate that it is important for the SMEs to have at least an overview of these sorts of technologies to ensure that they are able to use them to improve their businesses.

Relative advantage

The professional association while agreeing that broadband provides higher access speed and is always on, highlights the possible dangers that small businesses might be facing when they decide to adopt broadband. According to BCS (2007a) "a combination of a lack of understanding, coupled with inadequate technical know-how, has already put smaller firms at risk from hackers and cyber-vandals". They further go on to state that "Broadband users are nearly five times more likely to be targeted than those using standard dial-up connections, with attackers seeking to hi-jack the hosts for use as stepping stones for further attacks, the storage of illegally copied software, launching new waves of SPAM email."

5.4 Step 3 Identifying themes to develop common interpretations (Emerging themes not previously covered by the framework)

In line with step 3 of the intentional analysis, in this research, emerging themes are identified. The views that have been sourced from the social groups show the differences in the way broadband is perceived. The innovation is seen as the next big thing by both the vendors and the government. As a result several government policies and initiatives have been aimed at broadband diffusion (BSG, 2004). From

the data collected, the SMEs do not share these views and it does not seem that they have been impacted by these initiatives. The government agency interviewee explained that the government have incentives to fund the SMEs adoption of the technology. According to the interviewee, "The grants we give SMEs only pay for the first year they get broadband". The expectation after this first year is that they continue to pay for broadband by themselves. According to the interviewee "if they get it the first year, chances are they'll never want to do business without it so they normally continue paying for it themselves".

Training was a point that was raised by the private consultant. He said the SMEs would not realise economic gain from using broadband if they were not trained on the advantages it could give. The SMEs that were interviewed had not received any funding nor had they received any training on the advantages using broadband could give. This was evident among the SMEs even though they were using broadband, they only used it to send and receive mails and a few used it to upload and send pictures but only one of them had considered trading online and only two were using VoIP. This leads to the conclusion that broadband has not necessarily changed the way the Internet is used. Further investigation will be necessary to determine whether more SMEs would adopt broadband if they knew all they could use it for and how beneficial, in economic terms, it could be.

Broadband providers, the UK government and other interest groups have continually stressed the importance of broadband but with little results where SMEs are concerned. There are many factors that could influence SMEs in deciding whether or not they would adopt a new technology such as broadband. Relative advantage seems to be the only attribute where there is a general consensus among the social groups. Nevertheless the government agency employee raised the issue of security because SMEs vulnerability would be heightened with the use of broadband. Also, the professional association was of the opinion that using broadband increased SMEs' vulnerability to cyber crime. On the issue of compatibility and complexity the SMEs that have adopted broadband use it to send and receive mails. A few others use it to make purchases. However, the vendor and the government agency interviewees both are of the opinion that broadband provides several other

advantages such as flexibility to change existing practices, target new customers, greater productivity, improvement in business processes, and greater independence while allowing them to take advantage of associated technologies. The SMEs seem to be unaware of these advantageous uses.

This research has argued that the perception gaps between different social groups could explain reasons for adoption or non-adoption. The initial findings show that in the case of broadband adoption and diffusion it seems that there is no consensus as to how the technology is useful, cheap or convenient for SMEs to use. There are a number of assumptions taken by the vendors and the government about broadband adoption that seem to not be shared by SMEs. This seems to be mainly due to a lack of awareness from the SMEs about the benefits of broadband and its opportunities for ebusiness and ecommerce. The analysis showed that was one issue that needs to be further analysed. The next sections address the main issue, which is awareness under which other emerging issues such as cost, quality of service and full use are explained.

5.4.1 Awareness

The vendor raised the issue of awareness and this has been mentioned by the interviewee from the government agency but the SMEs that have adopted broadband did not do so as a result of awareness programmes aimed at them. Some other issues came to light which were not included in the framework guiding this research and they are equally related to lack of awareness. Such issues include cost and funding, full use, quality of service and access.

5.4.2 Cost

The cost of obtaining broadband was a recurring issue in the interviews conducted. Many of the SMEs that had not adopted broadband said it was an unnecessary expense. The government agency interviewee said that cost might have been a deterrent originally but that the cost of obtaining broadband has reduced significantly in recent times. While the vendor was of the opinion that as a result of costs, SMEs

might want to cut corners: "Some users are initially looking for the cheapest package, but don't realise that they are losing quality". The cost of obtaining broadband would also require further investigation because in the literature review the government and vendors all state that it would save money on the long run. If SMEs were shown how broadband could save them money then their response could possibly be different

In the literature review it was revealed that there are government initiatives to fund broadband adoption by SMEs. However, the SMEs that were interviewed said they had received no funding and were unaware of any such initiatives. The government agency interviewee agreed that funding was available but was unavailable in some urban areas. Further research would require investigation into the kind of funds available to SMEs and how the government agencies decide which SMEs get funded.

5.4.3 Full use

Previously, in section 5.5, it was mentioned that there are several advantageous uses for broadband. These include opportunities for e-business, efficient data back-up, video conferencing and Voice over Internet Protocol (VoIP). The SMEs that were interviewed have been using broadband to send and receive mails while a few others use it to make purchases. This shows that SMEs are not making full use of broadband. Further research will be required to determine if the lack of full use is due to a lack of awareness and if training will improve the use possibly resulting in a better uptake of the technology thereby providing opportunities for expansion and growth through ebusiness and ecommerce.

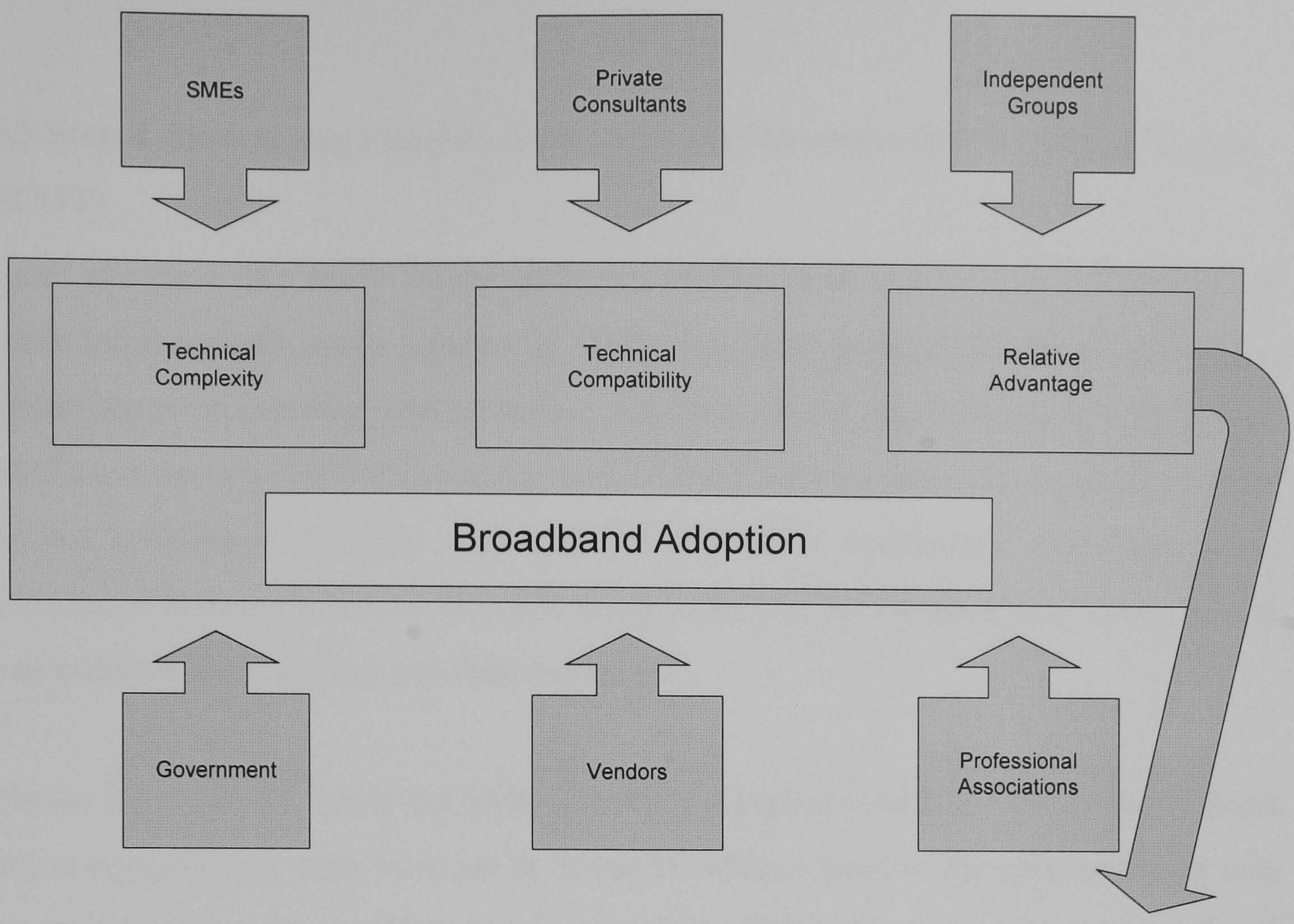
5.4.4 Quality of service

Another issue that came up and was not previously considered in the framework is quality of service. The vendor mentioned quality as a reason to select a broadband provider carefully. Some of the SMEs that were interviewed have experienced poor quality of service from their broadband providers. One of the SMEs was experiencing a problem with his broadband connection while the interview was

going on and did not know what to do about it. Another SME, which had previously used a different vendor, had an interrupted service for 3 months and did not know what to do about it either. Such experiences would possibly deter other SMEs who would have otherwise decided to adopt broadband.

5.4.5 Enhancement of the framework

The initial framework presented in chapter 2 (figure 2.1) considered three innovation attributes which included compatibility, complexity and relative advantage. The views of the social groups were sought in relation to these attributes. Analysis of which resulted in uncovering some other issues which affect SMEs adoption of broadband namely awareness, full exploitation of broadband, cost and quality of service. In order to go deeper into how these issues affect the adoption of broadband by SMEs, an updated view of the framework is proposed in figure 5.2. This is done to provide a deeper understanding of the diffusion process.



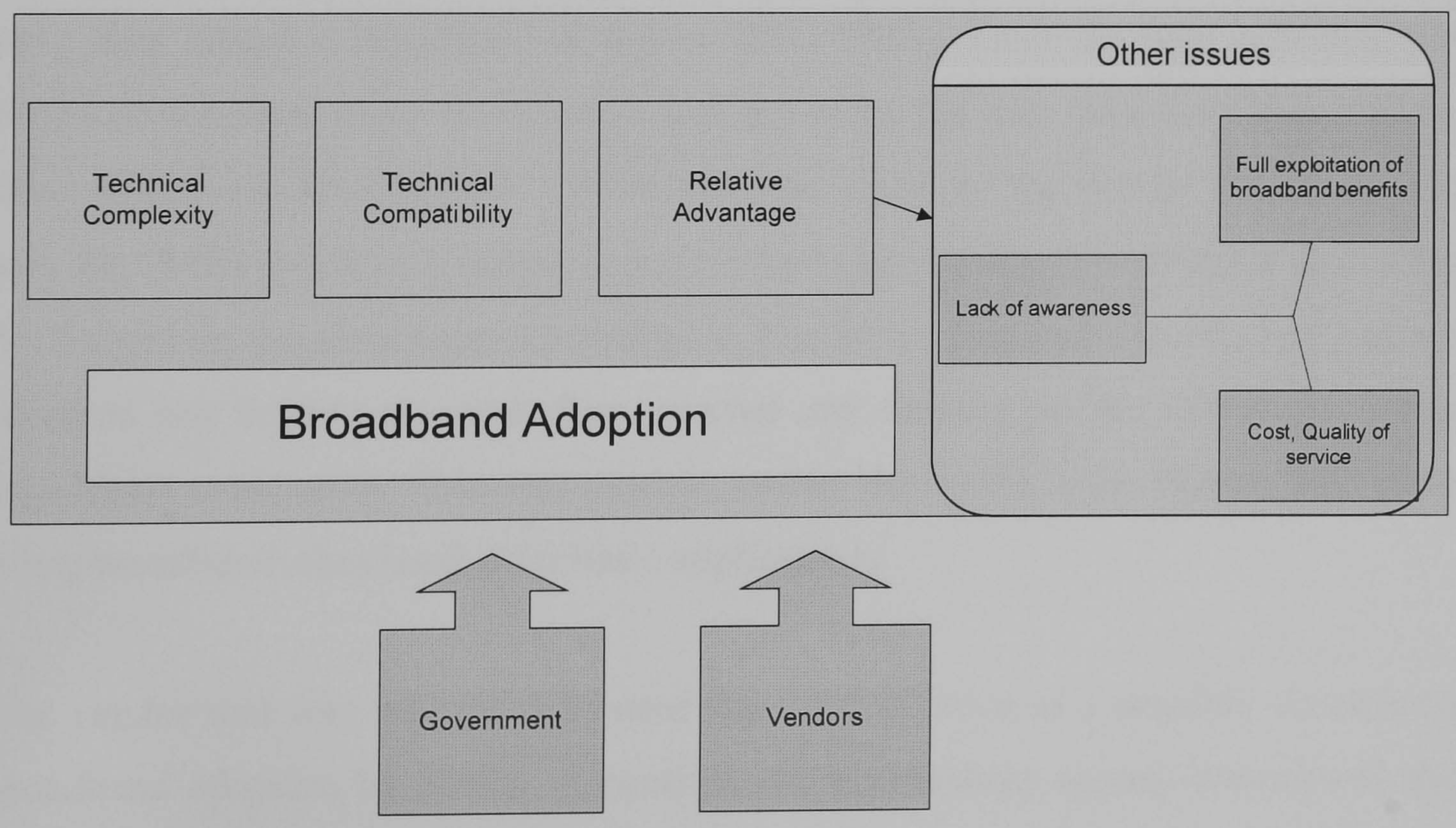


Figure 5.2 The enhanced framework

5.5 Step 4 Abstracting essences from the text (The researcher's reflection using SCOT)

From the time this study began until this analysis was carried out there has been some improvement in the number of SMEs that have adopted broadband. However, communication (sending and receiving emails) seems to be the primary reason why SMEs use broadband. Furthermore, some of the SMEs do not seem to know whether or not broadband adoption adds any value to their businesses. They just adopt broadband because it seems the right thing to do and not because they know how it can improve the way they run their businesses.

On the issue of cost, while the SMEs that have adopted broadband rarely complained about cost, the few who were yet to adopt broadband were of the opinion that it was an unnecessary expense. However, some of the SMEs that have adopted broadband tended to look for the cheapest broadband service provider.

The views that have been sourced from the social groups show the differences in the way broadband is perceived. The innovation is seen as the next big thing by both the vendors and the government. As a result several government policies and initiatives have been aimed at broadband diffusion (BSG, 2004). From the data collected, the SMEs do not share these views and it does not seem that they have been impacted by these initiatives. Training was a point that was raised by the private consultant. He said the SMEs would not realise economic gain from using broadband if they were not trained on the advantages it could give. The SMEs that were interviewed had not received any funding nor had they received any training on the advantages using broadband could give. This was evident among the SMEs even though they were using broadband; they used it for basic applications.

The vendor that was interviewed raised the issue of price as a possible obstacle to broadband adoption by SMEs. In contrast, the government agency interviewee did not think that cost was an obstacle now and supported this by explaining that broadband was a lot more popular than it used to be and as a result was cheaper. However the cost of obtaining broadband would also require further investigation

because in the literature review the government and vendors all state that it would save money on the long run.

In order to have closure, all the different views have to be aligned. The government have all these initiatives but they are carried out by various bodies. For example, when interviewing the government agency interviewee, he mentioned the economic development and procurement department of local councils, business link and chamber of commerce the regional development agencies as bodies that have a part to play in broadband diffusion. It could be worthwhile investigating these bodies and their views on the innovation attributes of broadband for SMEs.

Drawing from SCOT notions, the relevant social groups whose views have been sought have their various interpretations regarding the use of broadband, which shows the interpretive flexibility in the use of broadband. These differences tend to arise because social groups have different interests and resources (Law, 1987). The differences in the views of these social groups demonstrate that technology is not fixed by nature alone.

The differences in the view of social groups regarding broadband and its use by SMEs are demonstrated by the way they view the perceived innovation attributes. While the government and vendor proclaim the usefulness of broadband to SMEs and why they should not run their businesses without the technology, the private consultant is not convinced that all SMEs require broadband. The application of the technology is another source of difference for the groups that have been involved in this study. Different benefits of broadband have been identified in the literature and include; evolving supply chain management with partners who demand on-line integration, introducing new collaborative working tools to enhance efficiency and effectiveness, providing flexible working in order to attract and retain employees, improving customer relationship management (CRM) to meet and exceed customer expectations for sales and support, outsourcing activities to save costs, aggregating content to achieve efficiency gains, linking the mobile workforce with the company and its data resources (DTI, 2004). These are pertinent benefits of the technology as recognised by the government, the vendor and independent group. However, these benefits have not been realised by the SMEs that were involved in this study.

As mentioned earlier, their main use of broadband is not different from what they used dial-up for. As a result, although the use of broadband among SMEs is becoming widespread, its full exploitation does not seem to follow the adoption of the technology. Many problems associated with the lack of full exploitation of broadband stem from the SMEs lack of awareness regarding the technology and its application. However, as mentioned by Pinch and Bijker (1987), problems seldom have equal pertinence for all the social groups. So while the SMEs who have adopted broadband may not be enjoying all the benefits, this is really not a problem for the vendors because the SMEs have already adopted broadband and are therefore paying for the vendors' service. In order to describe what prevents various uses of an artefact, Bijker (1987) introduced the SCOT notion of a technological frame. The SCOT concept of a technological frame refers to the ways in which relevant social groups attribute various meanings to an artefact. This concept is broad and includes different elements such as current theories, goals, problem solving strategies, and practices of use, which focuses on consumer practices. The element which is used in this study is the practices of use. Technological frames are a link between relevant social groups and artefacts, and just as they can be viewed as constructing an artefact, so can they be viewed as constructing a relevant social group (Bijker, 1995, p195).

The level of information and communication technology knowledge and experience of many SME owners is not usually high unless the SMEs are actually directly involved in IT sales and services. The use of the Internet and associated technologies therefore does not fall within the SMEs' area of expertise. The SMEs are therefore not in a position to fully realise the benefits of broadband because it does not fit in the technological frame of their community.

The meanings attributed to an artefact by members of a social group play a crucial role in Bijker's description of technological development. The technological frame of that social group structures the attribution of meaning by providing a grammar for it. This grammar is used in the interaction of members of that social group, thus resulting in a shared meaning attribution. The interactional nature of this concept is

needed to account for the emergence and disappearance of technological frames (Bijker, 1987).

The technological frame within which each social group belongs seems to determine what their fears or concerns about a technology and what its use would be. For example, the professional group highlighted the possibility of the SMEs' vulnerability to viruses, hackers, cyber fraud and other cyber crimes being heightened by their adoption and use of broadband. The government agency interviewee also echoed these fears. However, these fears were not considered by any of the SMEs that were involved in this study. The vendor also did not highlight this possibility. Both the professional group and the government are well aware of crime users would have experienced as a result of their use of broadband and consequently voiced these fears. This is another difference that is evident in the views of the relevant social groups involved in this study.

In order to address the differences in the views of the social groups with the aim of attempting to achieve closure, all the issues that have been raised will be discussed in more depth with the social groups with whom these differences lay. These issues are presented in the next chapter.

5.6 Conclusion

Initially, 6 social groups were identified which were namely, SMEs, the government, independent bodies, private consultants, professional associations and vendors. In the first phase of this research, only 4 of the social groups have been investigated to determine their views. The other two social groups and their views have been considered using the review of documents and secondary data. Also, in chapter 2, the government was identified as one of the social groups involved in the diffusion of broadband. However as a result of the initial field studies, the government cannot be taken as a whole but have to be considered at the central and local levels. The bodies that were pointed out as those entrusted with broadband diffusion were the regional development agencies.

This chapter has discussed the framework using fieldwork where representatives of the identified social groups were asked to offer their opinions these opinions where then analysed to get a better understanding of broadband diffusion to SMEs. Thus leading to the conclusion that broadband has not necessarily changed the way the Internet is used by the SMEs. In chapter 6, the second phase of the research is carried out delving in depth into the views that have been raised by the various interpretations of the relevant social groups.

CHAPTER SIX: Analysis of further emerging attributes

6.1 Introduction

In the previous chapter, the views of the social groups involved in the diffusion of broadband to SMEs were identified and sought. The exercise discovered that based on the initial data there are differing viewpoints from each of the social groups concerning the innovation diffusion attributes. The analysis of the field study was accordingly done around the various social groups.

The social groups that were identified in chapter 2 include the SMEs, the government, professional associations, and independent bodies striving for broadband adoption, private consultants and vendors. However, the fieldwork that was carried out included the SMEs, the government, private consultants and vendors as the relevant social groups. The views of the other social groups were sought with the use of secondary data as explained in section 5.1. Most of the issues that were raised that required further analysis fall into the expertise of the vendor and the regional development agency social groups. Further analysis uncovered that a lack of awareness was an umbrella issue that encompassed components that need to be looked into in the second phase of the research activity. These components include awareness about cost, full exploitation of broadband benefits and quality of service and they will be examined in this chapter.

This leads to the importance of getting in-depth data collection about the issues from social groups who are more involved in addressing them. Government agencies talk about broadband adoption and their immense benefits to SMEs and have created incentives to encourage broadband adoption by SMEs. Thus awareness about broadband benefits falls into their expertise. While vendors can give insights as to why they follow specific costing strategies as well as issues related to quality of service offered. The results from chapter 5 show that the cost of obtaining broadband has an effect on the quality that can be expected.

In this chapter, the second phase of the research will be carried out using data obtained from fieldwork involving representatives of the two social groups of government and

vendors. More specifically, a vendor and one of the regional development agencies will be participating in an in-depth study. In the course of analysing the results from the first phase of the research, it was discovered that the government as a social group, could not be taken as a whole but have to be considered at the central and local levels. Some of those at the local levels are the regional development agencies as they are the government agencies directly involved in the broadband diffusion process. The views of which will be considered comprehensively in the detailed phase of this research.

In the previous chapter, complexity, compatibility and relative advantage were discussed as the three perceived attributes of an innovation that are important in explaining the rate of adoption. Of the three attributes, relative advantage was shown to be of the most importance as it was the most recurrent. Further analysis of the results showed that in addition to these attributes and as a result of them, particularly from relative advantage the issue of lack of awareness on cost and quality of service has to be pursued. This is to ensure that a deeper understanding of the diffusion process of broadband to SMEs is gained.

6.2 step 1. Description of the facts of the phenomenon (the emerging issues as agreed by participants)

Following the steps for intentional analysis as was done in chapter 5, in the first step, the facts of the phenomenon are described. Next, the researcher determines the way participants give meaning to their separate realities by how they perceive cause and effect. In step three, the researcher identifies themes that emerge from the text. In step four, the researcher abstracts the essences from the text.

In the previous chapter, the perceived attributes of an innovation were discussed. These are complexity, compatibility and relative advantage. Further issues were raised which include awareness, cost, quality of service and full exploitation of broadband.

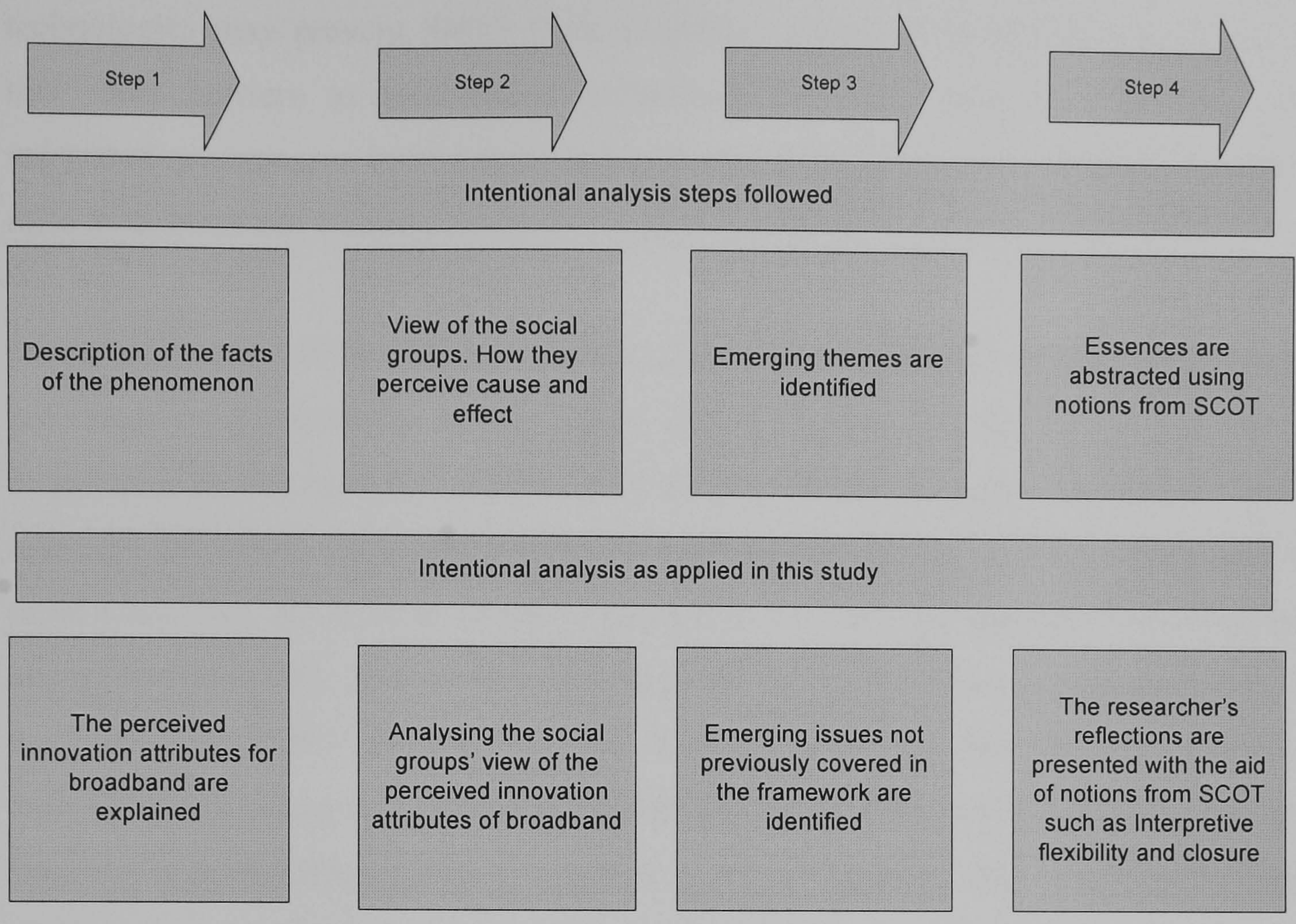


Figure 6.1 the intentional analysis steps as followed in this research.

As previously mentioned the issues that were raised in the initial phase and therefore pursued in this in-depth phase are awareness, full exploitation of broadband, cost and quality of service. Following the first step of intentional analysis as applied in this research, on the issue of cost, Arbore and Ordanini (2006) highlight the fact that the SMEs' resources have a role to play in their decision to adopt broadband. Additionally, Saban and Rau (2005) found that limited resources prevented SMEs from using the Internet for more versatile and sophisticated transactions. On the issue of cost as was mentioned in the previous chapter, there are funding initiatives introduced by the government to persuade the SMEs' take up of broadband (e-business policy group, 2002).

On the issue of awareness, as highlighted in chapter 2, one of the reasons for SMEs' scepticism on the subject of technology adoption is as a result of their lack of awareness about the technology and its application for their businesses. According to Beckinsale and Levy (2004) a lack of understanding and uncertainty about the benefits of new

technologies may prevent SMEs from adopting. Lawson *et al* (2003) also recognised that most barriers to information technology adoption were non-technical. They suggested government intervention and industry associations providing information to raise awareness and training as ways in which these barriers may be overcome.

One of the results of the SMEs' lack of awareness is the problem of a lack of full use of broadband and associated technologies. On the issue of the full exploitation of broadband and its benefits, according to the department of trade and industry (DTI), although UK small and medium-sized enterprises (SMEs) are adopting the Internet at rapid rates, they are slow to adopt e-business as the basis for business communication and transaction (DTI, 2003). Saban and Rau (2005) blame the lack of full exploitation of the Internet on SMEs' limited resources. The lack of full use has also been blamed on their size. According to Levenburg (2005) very small firms appear to be in the early stages of implementing ebusiness and tend to rely on simpler, easy-to-use technologies, placing particular importance on using the Internet to research new sources of supply and markets. The larger (medium-sized) SMEs tend to be the most sophisticated e-business technology users, as evidenced by the highest prevalence of a website, and higher means for usage of e-business tools.

On the issue of quality of service Dutton *et al* (2004) pointed out the fact that the lack of trust in information systems suppliers from experiences with previous applications that proved to be a lot more costly and difficult to use than had been promised by the suppliers is a significant factor in dampening business enthusiasm for the Internet and broadband. While this drawback may serve as a deterrent, it could possibly explain why there are high broadband adoption rates in Korea. According to Lee *et al* (2003) intense competition between vendors in the country led to a high-quality service at a relatively low flat fee.

6.3 Step 2 the researcher determines the way participants perceive cause and effect (The participants' views of the emerging issues).

The issues that were raised in the initial phase and therefore pursued further in this in-depth phase were awareness, full exploitation of broadband, cost and quality of service.

6.3.1 Analysing the view of the interviewee from the development agency regarding awareness, cost, full exploitation and quality of service

In the view of the interviewee from the government agency, the SME definition is too broad and covers most businesses in the UK. He felt that size was an issue when it came to how SMEs adopted new technologies. The larger SMEs could afford to spend as much as they wanted or needed while the smaller SMEs had to determine what was more important to them and consider carefully before embarking on adopting new technologies. So in his opinion, prioritising, in terms of ICT (information and communication technologies) needs was more of a problem for the smaller SMEs.

Similarly to the interviewees in the previous chapter, this government agency interviewee agreed that broadband was definitely better than dial-up citing the speed and versatility of its use for accessing the Internet as reasons for saying so. He also felt that the SMEs who have already adopted broadband were not necessarily happy with it but would not go back to doing business without it. In the interviewee's words, "If you asked any of the SMEs none of them would go back to life without it. It's just like the telephone, you might not like the telephone but would you live without it? ". The interviewee was of the opinion that if the SMEs were asked, they might have experienced set backs but he did not think any of them would like to go back to living without broadband

He also felt that the difficulty experienced when it came to installation and use of broadband was not too much of a problem and that this too depended on the size of the business. The bigger SMEs would most likely have an IT department that would be able to handle the technical difficulty that might be encountered. For the smaller SMEs however, the interviewee felt that many businesses now provide the IT support that

SMEs need to get through problems that they encounter when adopting new technologies. In his words "There is a need to provide external technical support for businesses that are too small to employ their own in house ICT. There is no shortage of the technical support that is available now".

6.3.2 The development agency interviewee's view of awareness

The issue of awareness was recognised as a deterrent to the full adoption of broadband and could also determine whether or not SMEs need broadband. However, according to the interviewee, there are many other aspects of running a business that the SMEs will be more concerned about than finding out about what new technologies can help their businesses. This factor can be quite unhelpful because as was discovered in the first phase of the research, many of the SMEs that had adopted broadband did not particularly know how it could help improve their businesses. In the interviewee's words "Small businesses, their biggest problem more than anything else put together is finding customers so the owner of the business ends up doing everything and there can be a huge conflict between devoting time to running the business, winning business and learning new technologies". So in his opinion, the challenge there is to find ways of encouraging advantages of these new technologies to SMEs.

There are some awareness programs that have been introduced for example; the interviewee mentioned that there was a provision of "e-learning grants" for the SMEs. These grants are awarded to SMEs to introduce and improve computer literacy. "One of the partnerships has a program of e-learning grants for SMEs". They are yet to evaluate the effectiveness of that program, but the grants were awarded to help businesses with different levels of computer literacy.

The interviewee also mentioned that there are stages in the way they ensure that businesses are aware of the technological possibilities available to them. He said "In the first place because we have a grant to encourage broadband adoption we try to get businesses on what we call the e-adoption ladder. We help businesses move up that ladder for extensive use of IT and the Internet".

6.3.3 The development agency interviewee's view of cost

In his opinion, the interviewee felt that although the SMEs faced problems with broadband, cost was the least of the problems. He said that it could have been a problem before the 'price wars' but was certainly not in more recent times. Broadband is a lot cheaper than when it was introduced. "We have to go back a year or two a couple of years before the price wars really kicked in and I would say price was a major concern. That's not there anymore". In the interviewee's opinion and experience, broadband is really cheap now. He did not think any business would complain about the cost now and as far as he is concerned that is a non-issue now. In his experience the SMEs complain about other aspects of service but not cost.

Funding was another issue that was raised under cost in the previous chapter. Funding was said to be available but was not beneficial to the SMEs that were interviewed. A reason for this is because most financial aid is given to businesses in rural areas. According to the interviewee "with majority of businesses there is always an urban/rural divide. And so wherever possible we try to focus more on rural businesses. That's just because businesses needing help tend to be more in rural areas". Apart from the urban/rural divide, there are other problems when it comes to the allocation of funds to SMEs. The funds available are very limited and thus difficult to distribute to the businesses that are most in need of them. In the interviewee's words "it is important to bear in mind that our programs are all aimed at supporting. The difficulty is that there are 8 million people to support in the southeast with a budget of 200 million to support everything from infrastructure to transport. This brings the problem of the government agency having to find different ways of ensuring that the funds go to the right people. One of the ways it does this is by prioritising in terms of needs. The interviewee said "It's important to have filters in place. You target those that are most in need. In terms of one of the filters is for those who are disabled for instance, then very selectively you would be able to direct help". This would help with ensuring that the limited grants are not misused because as the interviewee pointed out, that is usually an issue with government grants.

Another problem with respect to the urban/rural divide is that ADSL broadband is not available in some rural areas and this makes it even more expensive for businesses in such areas to adopt broadband. According to the interviewee one of the ways in which they have encouraged the rural businesses to get onto broadband is to form themselves into cooperatives so that they can share the cost of a wireless service. In his words 'the cost of providing a service like that for one business is very high you can get 20-30 of them to share these costs. Rural business cooperatives consider us giving 20 individuals £200 each. If we pooled that together that's £4000 and with that they can negotiate with a wireless supplier".

6.3.4 The development agency interviewee's view of full exploitation

The interviewee was of the opinion that this factor was an important issue raised in this research and had not been previously considered. In the previous chapter, it was discovered that SMEs had not necessarily adopted broadband in full. Broadband provides a plethora of possibilities when used to access the Internet. For example, web conferencing, voice over IP, video conferencing, the ability to work from home, networked communities. However, the SMEs that were interviewed in the previous chapter only used it for sending and receiving emails. When asked about this, the interviewee stated that "At the lower levels of the e-adoption ladder it's just email. At the higher end it is used to automate every part of their business so that from purchase to web presence where they are able to draw attention to themselves. Where they are able to do that then it is an effective marketing tool, I suppose". In his opinion, the next part of using broadband is for potential clients in appropriate cases to go all about doing everything online.

6.3.5 The development agency interviewee's view of quality of service

When asked about the issue of cost, the interviewee mentioned that it was not a problem but that other problems existed with the adoption of broadband, one of which was the quality of service that is available to SMEs. The claims made by the vendors do not seem to match the service that the SMEs actually receive. The interviewee said "First of

all speed they talk of all sorts of potential. So great broadband speed tends to be quoted but it never runs at that speed". There are different factors that affect the speed that the SMEs actually experience and the interviewee provides an explanation for one of the factors. According to him "the claimed broadband speed at about one o clock the service slows down and that is because it's the start of business for United States Eastern Time".

Another problem that was raised as part of the failures of vendors to provide the quality of service that is expected can be as a result of their size. The vendors could run into difficult situations and be unable to render the service expected. In the interviewee's words "The other one really importantly is reliability of service. All sorts of small broadband suppliers many of them struggle in this situation and then the suppliers sometimes close business".

6.3.6 Analysing the view of the vendor regarding awareness, cost, full exploitation and quality of service

In the view of the interviewee from the vendor organisation, SMEs are only just beginning to gradually understand what broadband is and what it can do for them. One of the reasons for this is because in his word, 'SMEs are gaining an understanding of what broadband can deliver by business links, by regional development agencies and by others who have yet to understand it themselves.' He also felt that it is wrong to assume that all SMEs are the same. The same way it would be wrong to assume that they all have the same needs. An example the interviewee gave was that of an SME who is a plumber and an SME who deals with weapon systems. While they are both SMEs, without a doubt, their need both technological and otherwise would be different. Hence the importance of reaching each of the SMEs in a way they would understand and in a way that was useful to them.

In addition, like the previous interviewee, the interviewee from the vendor company is also of the opinion that broadband is better than dial up. This is because it makes a lot of tasks much easier for the SME. He however felt that it was not enough to say broadband is good for SMEs. Rather, each SME should know in specific terms how broadband

benefits their specific business. Instead, he felt that the government agencies instead of focussing on what SMEs currently use broadband for are pushing for greater speed broadband. According to the interviewee 'they're asking for 100mb because some high rise buildings in Korea and Japan have 100mb so in order to be competitive they want to have a 100mb too. This is an inane push for a large pipe when most SMEs can't use a simple copper pair broadband which requires three quarter to 2mb.'

6.3.7 The vendor's view of awareness

The vendor that was involved in this part of the research has participated and been involved in training and awareness programs for SMEs. Unfortunately, there are not many other vendor companies who are also involved in training. 'For the last five years we've been developing these programs and delivering them across the UK we've discovered we're the only one, we're the only corporate in the southeast region who have stayed the course.' The interviewee reckoned that the reason why not many vendors want to be involved in educating SMEs about the benefits of broadband to their businesses is because it does not generate money directly.

This interviewee also said that the SMEs were not aware of how broadband and information and communications technology (ICT) could help them because not enough vendors are interested in taking the time and spending their money to educate SMEs. As a company, they have formed broadband partnerships with the regional development agencies. This has helped to provide some funding and awareness for SMEs in rural areas. They have provided training materials to help educate them about broadband and associated technologies and they have done this in many different ways. For example, they have used prints, compact discs, conferences and many other ways to ensure that they reach as many SMEs as they can. The interviewee however made it clear that there was a lot more to be done to educate them, as SMEs are not being treated as individual businesses with individual needs.

In addition, the interviewee was of the opinion that the SMEs are ignorant about a lot of what technology should and can do for them and their businesses. For instance, in his

words 'it's amazing how many people set up a website and actually think that people will send them the money. How are they going to send the money? They don't think about that.' The SMEs do not make it their business to find out how to exploit various technologies because it takes time and money away from doing their actual business.

6.3.8 The vendor's view of Cost

In the opinion of the interviewee from the vendor organisation, the SMEs expect technology to be very cheap or free. He said they were unwilling to spend money on technology because, in their opinion, if the SMEs waited long enough, then the technology would become cheaper. The interviewee also felt that the SMEs wait to get on to technology because they are hoping it will cost less. In his words, 'that's why there is a lot of hesitancy about when do they step on to broadband, when do they step on to ICT. If you wait a little longer it will get cheaper, if I buy my laptop next year and not this year it will be half the price'. However, the interviewee was of the opinion that if the SMEs do not keep up to date with technology, then they would be out of business.

In the opinion of the interviewee, perception is the biggest problem for an SME. He provided the example of a café business. The biggest thing for a café now is to have wireless broadband so that they can increase their services and business and gain a new revenue stream. The partnership formed by this vendor company and the regional development agency will give this to cafes in rural areas within the southeast for free. They get a box, which costs £200 and that is a wireless router going on the back end of a broadband line which allows 10 laptops to work simultaneously within about a 100 ft. this is ideal for cafes with outside areas. In order to ensure that the cafes used the wireless broadband, the partnership gave a further £220 worth of free vouchers, which they can sell. In addition, the partnership markets it for them free.

Unfortunately, this has not received the kind of positive reception the vendor was hoping for. In the interviewee's words 'you'd be amazed how many of them say what happens when the £220 is used up? Do I have to buy vouchers? We say yes, but you get 25% commission. So you keep a quarter of everything you sell'. Upon hearing that they

have to buy more vouchers when the ones given to them free have been used up, many of the cafes turn the offer down. In the interviewees words 'if it's not their business and they expect it free. You can't blame the SME but the SME does need to take some responsibility about being able to assess what they need and how they're going to get it'.

In the opinion of the interviewee, the SMEs are often misled by the promise of very cheap or free broadband. In his words 'SMEs do have a perception about technology. They think that technology is so cheap because they see broadband prices keep falling and falling and there's all this talk about free broadband from other vendors'. In his experience however, the interviewee stated that there is no free broadband in this country. He said that they had tried free broadband in America but it crippled the companies that did it. What the interviewee thought happened as opposed to the companies offering free broadband only subsidise one product set from the other and do not really offer free broadband.

The SMEs, in the experience of the interviewee from the vendor company, do not like to pay a lot of money for technology because that is not what they are trading in directly. As a result, they would rather pay a little for broadband and in turn, they do not get the kind of service that they would be happy and content with.

6.3.9 The vendor's view of quality of service

The interviewee agreed that there are quite some problems with the quality of service that broadband vendors provide. This is particularly evident with SMEs who buy cheap. The vendor is of the opinion that they will have a problem in that the service level agreement (SLA) determines what the price value perception is and in the interviewee's experience none of the SMEs he has come in contact with have ever looked at the SLA.

The interviewee is of the opinion that SMEs are faced with all kind of misleading information about the speed and quality of broadband that is available to them. Many of the vendors say you can get 8MB broadband. However, in the interviewee's experience, 'the only place you can get 8MB is inside the telephone exchange'. This is possible at

the very beginning of the signal and as soon as you move 100 meters it's 7MB, 400 meters it's 6MB, half a mile it's 4.5MB, 3miles it's 2MB. This the interviewee explains as 'the laws of physics taking over.'

According to the interviewee, many vendors sell broadband at a rate that will reach the SMEs, which might be half MB. This is usually stated in the Service level agreement (SLA) but according to this interviewee 'the SMEs only look at what it says on the outside of the tin and if it says £5 a month they think that's fantastic and they read 8MB for £5. In reality, they're getting a half MB maybe all the time for £5 because the physics laws are the way they are'. In some instances, people happen to live outside the telephone exchange and in such cases, the interviewee from the vendor organisation states that they are getting a bargain because they are getting as much broadband speed as they can possibly want to use.

As a company, this vendor claims to have very stringent service level agreements for all its product sets including broadband. According to the interviewee, until recently they were not able to set a price for broadband so ofcom told them what price to charge. He claims that they are the only telecommunications company in the UK with that privilege. According to the interviewee they work in a heavily regulated environment and ofcom constantly in his words 'looks over our shoulder and says how much, for what? Show me your SLA.' He further claims that they have got the highest standards in the UK. In his opinion however, SMEs get poor service from other vendors because what they see on the advert is not what they actually get but they do not bother to read the SLA, which shows the level of service the vendor is willing and able to provide.

In terms of support that is available to SMEs in the event that their broadband service is down, this vendor explains that they have various levels of support. In the first phase of the research, a number of the SMEs had experienced poor or no service at some time and were not able to resolve the problems. In such cases, they either waited until the vendor was able to fix the problem or moved to a different provider. The interviewee from this vendor however said that every product that goes out from their company has

a web-based solution as well a communication-based one. In his words 'every product set that goes out has a solution resolution attached to it'.

According to the interviewee, support available from their company is huge but the level of support that is made available is also determined by the SLA. This service also comes at different prices. For example when an SME buys a product set, if they want 24 hours service for their communications systems, or a 1 hour service, replacement of all their kits, it is all available at a different price. In the interviewee's words 'your service pack, it's entirely up to you. SLA is the key thing. What do you get for it? I don't know an SME in my 10 years with this company who's ever looked at this'. In the interviewee's opinion, they are only interested in doing their primary business. According to the interviewee, SMEs can buy communications at bare basic price and this affects the quality they get in return.

The interviewee also explained that the SLA also has to have in it what the vendor will do if the broadband service goes wrong. According to him 'Some SLAs for example, says if you are cut off for more than four hours we will start to pay you a fixed rate in compensation. The fixed rate, if I'm a city broker, goes nowhere to covering my losses if my broadband goes down'. In addition to the compensation that the SLAs determine within this vendor company, there are individual complaints assessment panels and according to the interviewee, if an SME does not agree with their final ruling they can go to the ombudsman. In his words 'from phoning up and complaining to the ombudsman there are plenty of options between.'

6.3.10 The vendor's view of full exploitation

The interviewee from the vendor company was of the opinion that there was not enough focus on how SMEs are using broadband and how they are applying it to their business. Instead, according to him, the regional development agencies are asking for a higher speed of broadband.

One reason why the interviewee felt there was not much success with SMEs use of broadband is because they do not have sufficient knowledge of what broadband can do for their business. In his words, 'It is finding the right trigger for broadband connectivity that is the reason why an SME will take it up and use it.' The interviewee provided the following example. 'If the SME is a plumber for instance, and he is able to get training from wireless Internet on a PDA for a new boiler he has not seen before, at the point where he needs it there is a chance that the plumber would be interested.' In the interviewee's opinion, it is the trigger that determines whether or not SMEs will adopt broadband and associated technologies. Telling them how easy it is or forcing them to use it will not work because in his words 'they will chuck it in a bin because it has not switched anything on for them.'

Also, according to the interviewee, there are many soft and hardware applications that are critical for SMEs and run on the back of broadband. For example in his opinion, it cripples SMEs' businesses when they are not able to back up their files. In addition, he also said that SMEs should not work in isolation. They need support and this they can get by joining communities and forming networks. To form networks, SMEs need shared working space. All these are made possible by broadband.

SMEs that have to trade with larger companies might be in a situation where they are forced to adopt technologies such as broadband because that is the only way they can trade with those larger companies. For instance according to the interviewee, even though they are very enthusiastic about working with small companies, SMEs cannot trade with their company unless they were firewalled and online.

6.4 Step 3 Identifying themes to develop common interpretations (Emerging themes not previously covered by the framework)

This view sought from one of the social groups provides some new insight into the process of broadband adoption by SMEs. The social group is one of the government agencies. In the literature review, a study was mentioned which considered size as a factor which affects SMEs' decisions when it comes to the adoption of new

technologies. Size was not necessarily considered in this research but the various SMEs that were considered had varying sizes and are thus representative of the very small and the medium. The interviewee in this phase of the study highlighted a very important point that was not previously considered. He said "The smaller the business, the greater the impact of ICT and broadband" this implies that even though the very small businesses might not think it necessary to adopt broadband, it would benefit them the most. Size was another factor that emerged when the interviewee mentioned the quality of service SMEs experienced from their broadband vendor or service provider. He mentioned that the smaller providers sometimes closed business and left the SMEs without the connection they paid for.

Another important issue that was raised is the fact that many SMEs have adopted broadband but have not adopted it in full and are only using a fraction of the possibilities of the technology. As the interviewee pointed out "Broadband in itself is insignificant, broadband is a tool, it is the use to which the tool is put that is the point". One of the possibilities that broadband provides according to this social group, is the possibility of working without having to travel. This is termed as tele-working and in the interviewee's words "Tele-working particularly in the south east is an important way of small business operations".

The reason given for this is because of the volume of traffic experienced in some areas in the UK can be particularly daunting. As a result, the interviewee mentioned several benefits that could result from not having to make a needless journey since there is availability of broadband Internet. In the interviewee's words "A colossal amount it makes a big difference in savings, productivity, productivity that is lost in travel not to mention the amount of fossil fuel that saves". This system of working (tele-working) is said to help SMEs work smarter.

Another point to consider is the issue of the level of awareness that the SMEs have regarding the technologies that they choose to adopt. The interviewee here thought that even if they need education regarding the use of broadband and other associated

technologies, in his words "They're too busy doing their day jobs to worry about getting the necessary skills, to find the time to devote to some of those issues". The SMEs therefore do not find it high on their list of priorities to get awareness about technologies they want or have already adopted.

Finally, the issue of the urban/rural divide and the funding that is available to SMEs depending on where they run their businesses. According to the interviewee, the funding provided an opportunity for SMEs who had been considering broadband in his words "Just a sort of minor incentive £100-£200 provides ground changing experience. They see that this is something I have been thinking about and here's the chance to do something about it".

When identifying the various social groups involved in the diffusion of broadband to SMEs, the broadband vendors were considered as one of the social groups. Other vendors of applications that run on the back of broadband were not considered but the interviewee from the vendor company in this part of the research raised the issue.

Search engines, digital vault for automatic back up, web presence and trading environments are some of the necessities pointed out by the vendor, that are essential for SMEs if they are going to survive and be competitive. According to the interviewee, 'one of the biggest killers of SMEs today is the fact that they do not back up and when they have a failure in the system, they go down as a business.' The vendors of such applications therefore also have role to play in the adoption and diffusion of broadband. The prospect of future technologies that are coming on the back of is another reason why broadband is important to SMEs in the view of the vendor. In his words, 'we mustn't think of broadband in what an SME is going to buy it is what will affect an SME.'

The pressure that can be put on SMEs to adopt certain technologies as a result of their association with larger companies was also not previously considered. However, as mentioned earlier, this could be a deciding factor for whether or not SMEs choose to

adopt broadband or other technologies. In addition, the idea of SMEs not working in isolation but to work in networks and communities could also present a need for them to adopt broadband. 'This is because as pointed out by the interviewee from the vendor company, to form networks you need to have shared working space and to have shared working space, you need broadband.'

Another thing that the interviewee raised as an important issue is the environmental aspect of broadband. According to the interviewee from the vendor company, 'the biggest driver in the southeast for broadband is the environmental and transportation driver.' He further explained that it is the only reason the regional development agencies are so keen to give grants to help businesses get on broadband. By working from home and by video conferencing, a lot of movement is prevented thus reducing carbon emission. However, as pointed out by the interviewee, home working cannot happen unless the SMEs have broadband. This is because a networked secure access to their corporate Internet is required. In the interviewee's words, 'the big driver was climate, transportation problems, environmental issues but the answer was broadband'. This was in line with the view of the interviewee from the government agency.

Continuity is another issue that is very important for the SMEs. In the view of the interviewee from the vendor organisation, it is not sufficient to introduce broadband without continuing to provide awareness to SMEs. Growth training is one area the interviewee felt required continuity for the SMEs. In his word, what is required for SMEs is 'online training at the point you need it in the subject area you need it in a language that you need'. Also, according to the interviewee, it is important that the government realises that the web is multidimensional and in terms of broadband use, should not expect one SME to go down the same route ever as another SME does.

The interviewee pointed out that our way of life is now dominated by broadband. This is so in many ways because it is an enabler for various uses. For instance, 'SMEs could be providing CCTV services to a community shopping centre'. There are many services that an SME would be enabled to provide as a result of broadband.

6.5 Step 4 Abstracting essences from the text (The researcher's reflection using SCOT)

While there is no doubt that the social groups prefer the use of broadband to dial-up for their Internet connection, there are many issues that have to be considered. For instance, the cost of obtaining broadband may not be significant for some SMEs, for others they could see it as an unnecessary expenditure. As it was also pointed out, SMEs do have their own problems, which include how to get new customers or clients. To enjoy the benefit of broadband adoption in full, some level of education will be needed and this can prove too much of a disturbance for some SMEs.

When it comes to the issue of funding, there is a difference when it comes to the location of the SMEs. SMEs in rural areas tend to receive more government support than SMEs in the urban areas. In the previous chapter, the interviewee from the government agency said that funding was available to help SMEs who were interested in adopting broadband and other ICT technologies while the SMEs interviewed had not received any funding and were unaware that such schemes were available. In this second phase of the research, the interviewee from the government agency made it clear that most of the support was for the SMEs in the rural areas. The SMEs were all from an urban area and that explained why they had neither heard about nor received any funding.

It is not sufficient to leave the diffusion and full exploitation of broadband in the hands of others who have not got as much to loose. Several applications run on the back of broadband. The vendors of such services also have a part to play in educating the SMEs on the adoption and full use of broadband. It might not directly generate money to educate the SMEs, but in the long run, the vendors will surely benefit if SMEs gain an adequate understanding of the technological innovations and use it to its full potential.

It would also be particularly useful if the government bodies that are involved in educating and encouraging broadband adoption and use also take the time to listen to the

SMEs, identify their individual needs and then get an adequate understanding of the technology themselves. When these government bodies have an adequate understanding of the technology, then will they be in a good position to offer aid to the SMEs that need the particular technology. It is important to note that not all SMEs are the same. To generalise and assume that they are is going to help a few SMEs and not reach as many as is possible. In addition, the focus for the government agencies concerned with broadband adoption by SMEs should be on their adequate and full exploitation of the technology first, before advocating or pushing for higher broadband speed in a situation where the limited speed that is available is yet to be used in full.

Unfortunately, the SMEs do not take the time to find out how to exploit various technologies because it shifts their focus and takes time and money away from doing their actual business. In many cases, it is the usual practice to feel that SMEs need so much support and so much help, but they also need to be able to take responsibility for whatever will improve the way they run their business. Also, while it might be a good idea for the SMEs to wait for technology to become cheaper, it might take away the advantage of being able to compete with other SMEs or larger companies. While attempting to save money they sometimes have obtained their service from the cheapest provider who in turn provides poor service. In addition, because SMEs do not have or take out the time to research the technological innovation, in this case broadband, they only consider what the advert states and not what they are getting in reality.

It is important to determine how the individual SMEs' needs would be met with the adoption of broadband and associated technologies. It is not enough to assume that because it is available and there is an incentive to obtain it, that the SMEs will use it in its entirety. In some situations, the SMEs may have no choice but to adopt certain technologies. For instance, SMEs that have to trade with larger companies might be in a situation where they are forced to adopt technologies such as broadband because that is the only way they can trade with those larger companies.

As described in the previous chapter, the SCOT concept of a technological frame refers to the ways in which relevant social groups attribute various meanings to an artefact. This concept is broad and includes different elements such as current theories, goals, problem solving strategies, and practices of use, which focuses on consumer practices. Technological frames are a link between relevant social groups and artefacts, and just as they can be viewed as constructing an artefact, so can they be viewed as constructing a relevant social group, (Bijker, 1995, p195).

The goals and problem solving strategies, which are elements of a technological frame, of the two social groups regarding broadband diffusion to SMEs have a few similarities but are mainly quite different. As can be observed in the previous sections, the vendor and the government's regional development agencies have different ideas about broadband and its diffusion to SMEs. This is evident in the government's push for greater broadband speeds when businesses are yet to make full use of the speed that is available. Also in the opinion of the interviewee from the vendor company, the government agencies are only beginning to understand broadband technology and its application. The government agencies are therefore not in a position to adequately educate the SMEs on the effective use of broadband.

The difference in the approaches of these social groups is also evident in the way that the SMEs are perceived. The government agencies approach to encouraging broadband adoption to SMEs is general and targeted towards all SMEs. The interviewee from the vendor company however raised the importance of dealing with each SME as individually as possible. This is because they are all unique and each of them has different needs. Additionally, the government, as a result of the importance placed on the SMEs and the way they are viewed as helpless, are of the opinion that they need all the help that they can get. This differs from the view of the interviewee from the vendor company who was of the opinion that SMEs should start taking responsibility for adopting technology that would improve their businesses. This makes it evident as mentioned by Pinch and Bijker (1987), that problems seldom have equal pertinence for all the social groups.

One of the issues that both of these social groups agree upon is the environmental aspect of broadband diffusion. As highlighted by the interviewee from the regional development agency. Transportation and congestion are problems that the UK government have been confronted with. One of the solutions to the congestion was that more businesses should consider working from home without having to travel. The interviewee from the vendor organisation also stated that broadband provides the possibility of working remotely. This is an important driver for broadband diffusion and that is why the government has been encouraging its adoption.

A technological frame is composed of the concepts and techniques employed by a community in its problem solving (Bijker, 1987). Problem solving is a broad concept that should encompass the recognition of what counts as a problem as well as the strategies available for solving the problems and the requirements a solution has to make. The identification of the crucial problems with broadband diffusion to SMEs and the problem solving strategies taken by each of these groups is quite different. For instance, on the issue of cost, the interviewee from the regional development agency stated that cost was no longer a problem for the SMEs and that broadband is a lot more affordable now. The interviewee from the vendor company however, did not think that cost was not a problem. In his opinion, as a result of the SMEs trying to cut costs and going for cheaper broadband solutions, they were loosing out on quality and not getting a decent service from the broadband providers.

The difference in the technological frame within which each of the social groups involved in this study belongs is also evident in the issue of quality of service. None of the SMEs that participated in this study mentioned the service level agreement that determined what sort of service would be delivered by their broadband service providers and also what would happen if the service went down. The interviewee from the vendor company also stated that he was not aware of any SMEs that had ever looked at the service level agreement. In addition, this was not pointed out by the interviewee from the regional development agency. As previously mentioned, the SMEs do not take the

time to find out how to exploit various technologies because it shifts their focus and takes time and money away from doing their actual business. This can explain the reason for not taking their time to study the service level agreement between the SMEs and their broadband service providers.

Drawing from SCOT notions, the interpretive flexibility of broadband is evident in the UK SMEs' experience of broadband adoption. The government and the vendors have a long list of the uses and benefits of the technology but the SMEs seem to not have a good understanding of what the technology is and what it can do for their businesses. In order to achieve the possibility of closure (resolution of conflicts and reaching an agreement), these two social groups have to pay attention to what SMEs need, in terms of what aspect of their business processes need improvement and how broadband can bring about such improvements. In turn, the SMEs themselves have to take the time to research what certain technologies can do to improve their businesses and how they can.

6.6 Discussion

There are many benefits for SMEs' use of broadband as has been discussed in the literature review. These include better links between the SMEs, customers and business partners, greater market penetration, greater access to external resources and expertise, increased competitiveness, increased turn-over and profit, greater market exposure, enhanced communication, exposure to global market, and more information for decision making (DTI, 2004). In the previous chapter, it was discovered that the SMEs that were involved in this research were not aware of all the benefits.

The reasons why the SMEs that have adopted broadband as described in the previous chapter may have problems recognising the benefits of broadband to their business and have not made adequate use of the opportunities it presents is due to a number of issues that were highlighted in section 6.1. These issues include awareness under which further issues are cost, quality of service and full exploitation of benefits. These could also serve as barriers to other SMEs that are yet to adopt. As highlighted in Lawson *et al* (2003), most barriers to IT adoption were non-technical. The authors then suggested

some ways in which these barriers may be overcome. These include government intervention and industry associations providing information to raise awareness, training, participation in the diffusion process and working with good quality consultants. This is in line with the results of this research. The government recognises the need for training the SMEs and provide some level but in the view of the interviewee from the vendor organisation, specific training and the need for each business to be treated uniquely is still lacking in the efforts of the government.

As discussed earlier in this chapter, the government have intervened and have provided funds for SMEs as incentives to adopt broadband. These funds are however more accessible to SMEs that are in rural areas. Awareness is also being raised but as discussed in section 6.4 is not currently tailored to SMEs' specific business needs or interests. Additionally, contrary to what is specified by Lawson *et al* (2003) not enough vendors are involved in creating the necessary awareness to the SMEs. More so, with the SMEs that were involved in the first phase of this research, many of them adopted broadband for use in their businesses not as a result of government initiatives or the vendors' push. In a number of cases, their friends were already using it and suggested it to them. In other cases, they already used broadband at home thus suggesting a link between home use and SMEs adoption.

Burke (2005) raised the issue of size of the SMEs as a reason for adoption or non-adoption of Information Systems. In this research, size was not necessarily considered as an issue but the SMEs that were involved ranged from micro to medium businesses. There was no significant difference in the way that they adopted and used broadband in carrying out their various business processes. However, the vendor felt that size was an issue when it came to how SMEs adopted new technologies. He highlighted the point that the larger SMEs could afford to spend as much as they wanted or needed while the smaller SMEs had to determine what was more important to them and consider carefully before embarking on adopting new technologies. So in his opinion, prioritising, in terms of ICT needs was more of a problem for the smaller SMEs. The issue of size was also a factor that determined how well the SMEs would be able to handle technical difficulties

they encountered with broadband and other similar and associated technologies. According to the interviewee from the development agency, the larger SMEs would probably have their own IT department that would be able to handle potential technical difficulty. The smaller SMEs in his opinion would have to get IT support from other firms. However, he also raised the point that despite the very small companies hesitating to adopt broadband, it would benefit them the most.

Also on the issue of size of the SMEs, according to Levenburg (2005) very small firms appear to be in the early stages of implementing ebusiness and tend to rely on simpler, easy-to-use technologies, placing particular importance on using the Internet to research new sources of supply and markets. The larger (medium-sized) SMEs tend to be the most sophisticated e-business technology users, as evidenced by the highest prevalence of a website, and higher means for usage of e-business tools. However, as earlier mentioned, in this study, there was not much of a difference in the SMEs' use of broadband and the Internet regardless of their size.

According to Taylor and Murphy (2004) businesses that do not put ICT at the core of their business processes may not survive. This in line with the thoughts of the vendor involved in the second phase of this research who said the majority of small businesses like to wait for technology to be cheaper before they decide to adopt. This decision to delay could cost them their business in the vendor's opinion. Similarly, the professional group also are of the opinion that small businesses would lose business to their competitors if they did not adapt to the changes necessary for the proper use of new technologies.

Chappell *et al.* (2002) postulated that SMEs decision to adopt new technologies comes as a result of a desire for better communications. This is evident in the SMEs' use of broadband for sending and receiving emails. As mentioned in chapter 5, with many of the SMEs that were involved in this study, their main use for broadband was to send and receive emails. Also, as stated in the literature according to the department of trade and industry (DTI), although UK small and medium-sized enterprises (SMEs) are adopting

the Internet at rapid rates, they are slow to adopt e-business as the basis for business communication and transaction (DTI, 2003).

Although this is their main use for the technology, it can be used for a lot more as discussed under the issue of full exploitation of broadband. However, this has not been realised by the SMEs that participated in this study. One reason why the interviewee from the vendor organisation sensed there was not much success with SMEs use of broadband is because they do not have sufficient knowledge of what broadband can do for their business. In his words, 'It is finding the right trigger for broadband connectivity that is the reason why an SME will take it up and use it.' This is aligned to Beckinsale and Levy (2004) who stated that SMEs' decision to adopt the Internet or not lies on the perceived benefit and relative advantage they might get. Additionally, the UK government has spent more than any other country (£67m) on a comprehensive programme in the past three years in order to succeed in its ambition to get UK businesses online with the added aim of increasing the e-business readiness of SMEs (DTI, 2003). While it seems that the government may be succeeding with an increase in the numbers of SMEs that are adopting the Internet and broadband, evidence from the data obtained in this research does not show an increase in their employment of e-business.

As previously mentioned in the background literature, Dutton *et al* (2004) pointed out the fact that the lack of trust in information systems suppliers from experiences with previous applications that proved to be a lot more costly and difficult to use than had been promised by the suppliers is a significant factor in dampening business enthusiasm for the Internet and broadband. This was experienced by some of the SMEs that were involved in the first phase of this research. In one instance, one of the SMEs had an Internet presence but then decided to shut the site down. In another instance, an SME experienced a breakdown in their broadband service that lasted for three months.

The clientele serviced by the various SMEs also have a part to play in their use of the Internet and associated technologies. For instance, businesses that sell a larger

proportion of their products and services to other businesses tend to use ecommerce more than SMEs that sold to consumers only (Daniel *et al*, 2002). This situation was echoed by the interviewee from the vendor company. He highlighted the point that the SMEs may have no choice but to adopt certain technologies. For instance, SMEs that have to trade with larger companies might be in a situation where they are forced to adopt technologies such as broadband because that is the only way they can trade with those larger companies. For instance, for the interviewee's company to trade with any SME, the SME would have to be firewalled and online. This is also in line with Levy *et al* (2001) who state that SMEs are driven by customer needs.

According to Arbore and Ordanini (2006) in explaining reasons for broadband divide between SMEs, the divide is mainly due to the relative size of the firm. They however state that this is at a decreasing rate. One other reason that explains why some SMEs are adopting broadband and why others have not is as a result of the geographical area where SMEs are located. As can be observed in this chapter, the regional development agencies are trying to avoid this divide in the UK. This is evident in the amount of support that is provided for SMEs in rural areas in terms of the provision of broadband other ICT and training.

As mentioned in the literature, according to Kalakota and Robinson (2001) the main barriers to IT and e-commerce adoption appears to be the managers' unwillingness to take risks when it comes to technological change. The results from this research however show that a lot of time and effort goes towards the adopting and adapting to new technology. This is sometimes too much for the SMEs to bear as they are unwilling to take the time away from their everyday businesses.

6.7 Validation of results

In an effort to ensure validity, Klein and Myers (1999) suggest a set of principles for evaluating interpretive field studies. They however state that not all of the principles

may apply in every situation. These principles are examined below as they apply in this research.

- *The fundamental principle of the hermeneutic circle.* The principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form. This can be seen in the way that the views of the individual social groups are considered in relation to the whole picture of broadband diffusion to SMEs. The views of each the social groups involved in the diffusion process are presented not only in isolation but also in relation to the views of the other social groups and the entire situation in the country.

- *The principle of contextualization.* This requires a critical reflection of the social and historical background of the research setting. This principle is evident in chapter 4 where a detailed description of the research setting is provided. The chapter provides a description of the context of this research and shows how the participants inform the framework described in chapter two. The relevant social groups which include the SMEs, vendors, the government, independent groups, private consultants and professional associations were described and there is some background information about the companies and organisations involved in the field study and their experience in broadband diffusion in relation to the framework described in chapter two. The participants in the second phase of the research and their background are also described and their views regarding the framework briefly discussed.

- *The principle of interaction between the researchers and the subjects.* Requires critical reflection on how the research materials or data were socially constructed through the interaction between the researchers and participants. This is evident in chapters 5 and 6 where the researcher not only analyses the data but also presents her own reflection on the views. The use of intentional analysis as described in chapter 3 involves four steps. In the first step, the researcher describes the facts of the phenomenon which is broadband in relation to its perceived innovation

attributes. Next, the researcher determines the way the social groups give meaning to their separate realities by how they perceive cause and effect. In step three, the researcher identifies themes that emerge from the text. Finally, in step four, the researcher abstracts the essences from the text where the researcher no longer asks what the participants think but what the researcher thinks.

- *The principle of abstraction and generalization.* Requires relating idiographic details revealed by data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and social action. The findings of this research are discussed in relation to the social construction of technology theory. In chapter 5 and 6, as part of the fourth step in intentional analysis as applied in this research, the views of each of the relevant social groups are discussed and analysed using notions from SCOT such as interpretive flexibility, technological frames, inclusion and closure.

- *The principle of dialogical reasoning.* Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings with subsequent cycles of revision. The framework guiding the research was adjusted in chapter 5. Also, necessary changes were made to one of the relevant social groups. In chapter 5, the views of the social groups regarding the perceived innovation attributes as described in the framework were analysed. This resulted in the emergence of additional factors that also explained adoption behaviour. These included awareness, cost, and quality of service which were included in the framework and applied in the second phase of the research. Additionally, the government was initially considered a social group but during the analysis of the first phase, it emerged that there were specific bodies responsible for broadband diffusion which are the development agencies.

- *The principle of multiple interpretations.* Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study. This is evident in

the presentations of the differing views of the social groups regarding the innovation attributes of broadband. In chapters 5, the views of the social groups were presented and analysed. This study did not focus only on the views of the SMEs regarding their experience; the views of the other relevant social groups were also examined in order to present a well rounded picture. The views analysed in the second phase also highlight differences in the opinions of the social groups regarding the same subject matter. For example, while the development agency interviewee was of the opinion that cost was no longer an issue, the interviewee was of the opinion that cost influenced SMEs' decision on when to adopt and also influenced the quality of service they received.

- *The principle of suspicion.* Requires sensitivity to possible "biases" and systematic "distortions" in the narratives collected from the participants. This was addressed though unsolved by ensuring that multiple views were sought.

6.8 Conclusions

In chapter five, analysis of the perceived innovation attributes as observed through the eyes of the relevant social groups uncovered a lack of awareness as an umbrella issue that encompassed components that need to be looked into in more depth. These components include awareness about cost, full exploitation of broadband benefits and quality of service and were considered in more depth in this chapter.

In this chapter, the second phase of the research was carried out using data obtained from fieldwork involving representatives of the two social groups of development agency and vendors. The data collected was presented and analysed with the aim of understanding the views of these two social groups regarding the lack of awareness, cost, full exploitation and quality of service regarding broadband.

The results of the research were discussed in relation to existing research in the areas of broadband diffusion and the diffusion of related technologies. The views of the

interviewees in this phase provide a deeper understanding of what is lacking and what changes need to made in the diffusion of broadband to SMEs.

Finally, the importance of ensuring validity in interpretive research is demonstrated in this chapter by evaluating this research against the interpretive principles as suggested by Klein and Myers (1999). The next chapter presents the conclusions, contributions and future research for this work.

CHAPTER SEVEN: Conclusions and future research

7.1 Research overview and findings

Chapter 1 began the research with an introduction and detailed explanation of the limitations of previous research and the motivation for this one. This research identified the importance placed on broadband and its use for exploring the benefits of the Internet. The technology has been said to be beneficial to individuals, businesses, and particularly SMEs. Furthermore the UK government has shown a strong desire to ensure that the country is one of those at the top of the list for broadband penetration. This is apparent because of the policies that are focussed on achieving this goal as explained in the chapter. The difficulties involved in its effective diffusion process are also clear and acknowledged in this research. The literature showed differences in the views of the entities involved in the broadband diffusion process. Additionally, the need for examination of the broadband diffusion process by identifying the roles and activities of the bodies involved in the process was identified. The various social groups that have a part to play in broadband diffusion have also not been considered in previous research. The chapter then states the aim of the research, which is the identification of the various entities and factors that affect the uptake of broadband by SMEs, the examination of the views of these entities with a view to understanding the broadband diffusion process to SMEs and to look into the usefulness of the technology to SMEs.

Chapter 2 provided the background literature to this research. SMEs characteristics and the effect of their characteristics on the adoption of information technology were discussed. The chapter provided insights on SMEs and the adoption of technologies such as the Internet. In addition, previous research that examined SMEs and their use of information systems, the Internet and broadband were also discussed. The chapter has also considered various theories that have been used for the study of information technology use by SMEs. This has been done with particular emphasis on the innovation diffusion theory according to Rogers (2003) since his theory has been used in several research on diffusion of technologies. Furthermore, the chapter considered the perceived attributes of an innovation that are important in explaining the rate of its adoption. These perceived attributes were explained and their importance discussed. Socio-technical approaches were also examined with particular emphasis on SCOT as a result of the need to consider various views of the

various groups involved in broadband diffusion to SMEs. In order to identify these groups, stakeholder identification was implemented. These relevant social groups were identified as seen in existing literature. Previous research studies that have applied the innovation diffusion and social construction of technology theories were also examined leading to the presentation of the initial framework that guided the research. This was done with the aim of positioning this research in relation to existing work.

Chapter 3 This chapter addressed the research methods used in this research to examine the diffusion and adoption of broadband by SMEs. An extensive examination of the underlying research assumptions that guide Information Systems research was done. The issues to consider before selecting an appropriate research approach were also discussed. Based on the issues discussed in the previous chapters of this research, the interpretive research approach within a qualitative methodology was selected as appropriate for this research. This is due to the fact that this study is exploratory in nature and because this approach is useful for understanding emerging phenomena within their context. Interpretive research can help IS researchers to understand human thought and action in social and organizational contexts and can help to produce deep insights into information systems phenomena. Qualitative research including the qualitative research process was also examined and its suitability for this research discussed in addition to the research design followed in this study. The various methods of empirical data collection were discussed with particular focus on those used within this research. In addition, the method of data analysis selected was also examined.

Chapter 4 observes the principle of contextualisation as prescribed in carrying out interpretive research. The context of the study is important because a critical reflection of the social and historical background of the research setting allows the intended audience see how the situation under investigation emerged. The chapter provided a detailed description of the context of this research and showed how the participants informed the framework described in chapter two. This was done in order to provide an understanding of the empirical context of this research. The chapter therefore provided a detailed description of the participants involved in the fieldwork carried out. As mentioned in chapter 2, which defined the framework of

this research, the social groups, which were identified to be important in broadband diffusion to SMEs, included, the SMEs, vendors, the government, independent groups, private consultants and professional associations. Of the social groups identified, representatives were selected and interviewed in a field study. These representatives were described and some background information about the companies and organisations involved in the field study and their experience in broadband diffusion was provided.

Chapter 5 analysed the results of the field study conducted in the first phase of the research. In the first phase 15 participants were involved. The chapter focussed on the different viewpoints from each of the social groups concerning the innovation diffusion attributes discussed in chapter 2. These attributes are compatibility, technical complexity and relative advantage. In chapter 2, six social groups were identified as the social groups involved in the diffusion of broadband to SMEs. These groups are namely the SMEs, vendors, the government, private consultants, independent groups, and professional associations. The first four social groups were involved in the field study where first hand data was obtained. The views of the last two social groups were obtained through secondary resources. Based on the initial data there were differing viewpoints from each of the social groups concerning the innovation diffusion attributes. These views were presented in accordance with the framework proposed in chapter 2. The analysis of the field study was accordingly made around the various social groups that have been identified with the aid of notions from the social construction of technology.

The analysis was carried out using intentional analysis which consists of the following steps where the researcher

- Describes the facts of the phenomenon
- Determines how participants give meaning to separate realities
- Identifies themes used to develop common interpretations
- Asks what the researcher thinks about the phenomenon

The analysis in chapter 5 led to the conclusion that broadband has not necessarily changed the way the Internet is used by the SMEs. The analysis also led to the identification of umbrella issues which were not previously included in the framework but were important in explaining SMEs reasons for adoption or non-adoption. They included awareness, cost, quality of service and full exploitation of broadband benefits. The framework was therefore adjusted to reflect these findings.

Chapter 6 here, the second phase of the research was carried out using data obtained from fieldwork involving representatives of the two social groups of government and vendors. The data collected was presented and analysed with aim of understanding the views of these two social groups regarding the lack of awareness, cost, full exploitation and quality of service regarding broadband.

The views analysed in chapter 6 further brought forward other issues that were not previously considered. These included the level of division between the social groups regarding their actions on broadband diffusion. For instance, where the government is of the opinion that SMEs need all the help they can get, the vendor is of the opinion that SMEs need to start taking responsibility for identifying and adopting necessary technology that would propel their businesses further. Another source of disagreement was the issue of continuity. While the government feel that many people have adopted broadband and are therefore in a position to demand greater speeds, the vendor states that they need to use the broadband speed they have fully. An issue that these two social groups agreed on is the environmental benefit of SMEs adoption of broadband. These examples showed the reasons for the differences that seem to dominate the scene of broadband adoption and use by SMEs.

7.1.2 Major research contributions

As stated in chapter 1, this research set out to meet some objectives. They have been achieved as follows.

- *Literature review examining existing research on broadband, innovation diffusion and social construction of technology*

Literature review examining existing research on broadband and the Internet which showed that the focus of most broadband research have been on home use,

educational use, pricing and government policies with little emphasis on its use by SMEs. Existing literature examining the innovation diffusion and social construction theories and their critiques was also examined.

- *The identification of the relevant social groups involved in the broadband diffusion process*

Employing the social construction technology and supporting this with the stakeholder theory, the relevant social groups were identified. In the first phase, these included the SMEs, broadband vendors, the government, private consultant, independent group and professional association. In the second phase, the relevant social groups were the development agency and broadband vendor.

- *Examination of the views of these social groups particularly in relation to SMEs and the perceived innovation attributes effecting broadband diffusion through a field study*

The views of the relevant social groups regarding the perceived innovation attributes have been analysed with the aim of providing a rich picture of the broadband diffusion process in relation to the SMEs. The participants were 12 SMEs, 1 vendor, 1 government agency and 1 private consultant. The focus was on the different viewpoints from each of the social groups concerning the innovation diffusion attributes discussed in chapter 2. These attributes are compatibility, technical complexity and relative advantage. The analysis gave rise to further issues that were previously not considered in the framework. The main issue was awareness under which other emerging issues such as cost, quality of service and full use were discussed.

- *Further examination of the views of the social groups to identify the attributes of broadband that adequately explain its diffusion through a follow up study*

The views of the social groups that were most concerned with the further issues that were raised have been analysed to provide a deeper understanding of the broadband diffusion process. This revealed where the focus of the attention and the efforts of these social groups were concentrated. A representative from the development

agency and another from a broadband vendor company were involved in the second phase of the research. Their views were sought regarding the additional issues that emerged from the first phase of the research which were awareness, cost, quality of service and full exploitation of broadband benefits. This revealed the differences in the way that these social groups viewed broadband diffusion to SMEs. For example, the government's approach to broadband diffusion to them is general and targeted towards all SMEs. The vendor however, highlighted the importance of treating each SME as uniquely as possible because they all have different needs.

In chapter 1, this research highlighted the point that while some countries have low broadband adoption rates, other countries have experienced phenomenally high rates. As a result, researchers in countries like the UK have investigated factors that contributed to the high success rates in countries such as Korea and Honk Kong. Although there is still a lot more than can be done to improve the adoption and use of the technology by the SMEs the UK has experienced some degree of success. Thus, other researchers may adopt the use of the framework as applied in this research to understand the social groups and their views in other countries.

Some of the problems that have been identified in chapter 2 that can act as barriers to the diffusion of new technologies to SMEs have also proved important in this study. Issues such as the cost of obtaining new technology, lack of resources, quality of service, awareness and lack of adequate understanding of the new technology are examples of the barriers to the adoption of new technologies by SMEs that were identified in existing literature and also confirmed in this research. As a result of the importance placed on these issues as can be observed in the analysis from chapter 5, they were included in the framework and further analysed in chapter 6. Therefore, studies involved in the diffusion of innovations can in addition to the perceived innovation attributes as described in the theory of diffusion of innovations (Rogers, 2003) and as applied by Agarwal and Prasad (1998); Crum *et al.* (1996) and Cooper and Zmud 1990) include these issues as innovation attributes since they have also been proved to explain adoption behaviour.

In addition to this research being beneficial to other researchers, it would also be beneficial to the relevant social groups that have been identified as pertinent to the

broadband diffusion process to SMEs. As was highlighted in chapters 5 and 6, the relevant social groups had different views about what explained the adoption behaviour of SMEs (perceived innovation attributes) with regard to broadband adoption. The results from this study provide an in-depth understanding of the views of the social groups regarding these attributes thus providing an insight for social groups that seek to understand the views of other social groups. For example, it emerged in the previous chapter that environmental issues were a reason for the government's emphasis of broadband adoption by SMEs, funding was only available to SMEs in rural areas, SMEs transacting with larger companies may be forced to adopt certain technologies such as broadband, the need for continuity in terms of growth training for the SMEs also emerged. A need for other technologies that run on the back of broadband could be a factor that determines SMEs broadband adoption.

7.2 Research contributions

This research has made specific contributions to the field of broadband adoption, innovation diffusion, social construction of technology and to policy and practice. It was possible to achieve some of these contributions after a framework was developed by the synthesising of the innovation diffusion and the social construction of technology theories. Although the diffusion of innovations theory accounted for some social issues involved in diffusion of technologies, social groups needed to be considered which resulted in the introduction of SCOT to ensure that the views of the social groups were adequately represented. In addition, the stakeholder identification was utilized for identifying the relevant social groups involved in broadband diffusion to SMEs since SCOT does not provide any specific guideline for identifying social groups. This framework was employed to examine their experience of the broadband diffusion process.

The opportunities offered by the limited literature in the subject areas that were examined in chapters 1 and 2 gave rise to the aim of the research, which was to identify these social groups, examine their views to provide an understanding of what is happening with the SMEs and their use of broadband thus contributing to both research and practice. The contributions from this research are evident throughout the study. This can be seen in chapters 1 and 2 where the contextual

information provides a reason and setting for the research, in chapter 3 the research methodology, in chapter 4 the description of the research context and in chapters 5 and 6 empirical analysis and modification of the framework.

The framework that has been developed in this research can be applied by researchers considering studies in similar fields such as the diffusion of new technologies and other studies involving SMEs. For example, their use of Tele-working and IP telephony might benefit from using the framework. The use of the stakeholder theory for the purpose of identifying relevant social groups shows that it might also be applied to other studies considering the use of social construction theory for analysing the use of new technologies. This is particularly useful because SCOT provides no specific guidelines for identifying the social groups. Studies considering innovations such as ebusiness and egovernment might also find this research framework particularly useful. Additionally, although this study was set in the UK, it might be useful for researchers considering broadband diffusion in other countries.

The next section provides details on the contributions of this research to theory.

7.2.1 Contributions to theory

In chapter 1, this study identified the limitations of previous studies in the field of broadband and innovation diffusion. One of the limitations that were highlighted was that the various bodies that have a role to play in the diffusion of broadband to SMEs have not been considered in previous research. These bodies have been identified as the relevant social groups as described in the social construction of technology theory. These social groups were identified using directions from the stakeholder theory. The research has therefore made contributions to both the innovation diffusion and the social construction of technology theories and provides an opportunity for further research in the area.

The social construction of technology theory has not been previously used with the diffusion of innovations theory. Previous research has tended towards criticizing one approach and embracing the other. However, by synthesizing both theories, weaknesses in one are complemented by strengths in the other and vice versa. Also,

critiques of the social construction of technology have highlighted the point that the theory does not specify exactly how the social groups are identified. As a result, the identification was carried out by implementing the stakeholder identification process thus contributing to SCOT theory.

The perceived innovation attributes have been explained as factors that explain adoption behaviour. However, the focus usually tends to be on the technology in question. In this research however, not only are the attributes of broadband considered, the views of each of the social groups on these attributes are also considered. Therefore the focus is not only on the technology, but also on the groups that have an effect on its adoption thus introducing a new dimension to the innovation diffusion theory. As highlighted by Papazafeiropoulou *et al* (2005) different views, opinions and agendas of various groups involved in the process of the adoption of an innovation are not adequately represented in the theory of diffusion of innovation as presented by Rogers. This research therefore contributes to the innovation diffusion theory by identifying each of these groups and seeking their views regarding the perceived innovation attributes of broadband. The social factors involved in the diffusion of broadband are considered in addition to the technical factors.

In addition, this study initially considered three of the perceived innovation attributes according to Rogers (2003), Agarwal and Prasad (1998) and Tornasky and Klein (1982) these included compatibility, complexity and relative advantage. However, in chapter 5, further issues that also explained adoption behaviour emerged from the analysis thus contributing to the perceived attributes in innovation diffusion theory. Table 7.1 below summarises the contribution of this research to broadband, innovation diffusion, social construction of technology (SCOT), and stakeholder theories.

Research area	**Existing research**	**Contribution of this research**
Broadband	Focused on pricing, content, home, education and entertainment use.	Examination of the UK SMEs' experience of broadband.
Innovation diffusion	Focus is usually on the technology in question	The identification of the relevant social groups, their

	and not on the groups involved in the diffusion of technologies.	roles and views regarding broadband diffusion to SMEs.
	Perceived innovation attributes explaining adoption behaviour are listed as compatibility, complexity, relative advantage, observability and triability with the first three being the most consistent.	Additional factors explaining adoption behaviour are identified and include awareness, cost, quality of service and full exploitation of the technology.
SCOT	Socio-technical approaches tend to criticize technological determinism	Both approaches are synthesised in this research and each approach complements the other
	No specified guideline for identifying social groups	The social groups in this study were identified by applying guidelines from the stakeholder theory.
	Typically applied in studies examining single organisations.	This study applies SCOT across multiple organisations
Stakeholder theory	Not usually used in combination with SCOT	The stakeholder identification process is applied to identify social groups.
SCOT and innovation diffusion		The synthesis of both theories for the examination of broadband diffusion to SMEs

Table 7.1 Research contributions

7.2.2 Contributions to methodology

As highlighted in chapter 1, most of the studies that have examined broadband diffusion have focused on the home use and individual adopters of the technology. However, this study has considered various organisations hence the need to carry out a field study involving these organisations. Field studies tend to focus on a particular context or organisation but this study has applied the approach to a multi-organisational context.

Additionally, studies that adopt an interpretive stance usually combine phenomenology with hermeneutics as highlighted in chapter 3. However, Lacity and

Janson (1994) suggest that hermeneutics is more appropriate to a situation where the researcher has not generated the data. Therefore this research employs the use of intentional analysis for analysing the empirical data.

Another contribution to methodology is the combination of intentional analysis with notions from social construction of technology for the purpose of analysing the empirical material.

7.2.3 Contributions to policy and practice

This research has contributed to policy and practice by providing a rich insight into the SMEs' experience of broadband diffusion. This is particularly evident in the way that the differences in the views of each of the social groups involved in broadband diffusion to SMEs have been revealed. An analysis of the views of each of these social groups exposed areas for further attention of the government and vendors in chapters 5 and 6. The SMEs can also as a result of this study benefit from better diffusion approaches. Each of the other social groups can also benefit from this research as they will be more aware of the other relevant social groups and their views.

This can result in the SMEs in particular, becoming aware of certain government policies and how they affect them. In addition, in other to ensure that their businesses are enhanced, the SMEs need to become more aware of their own needs and take some time out to learn about the technologies that would fulfil those needs. These would lead to their ability to identify and maximise whatever benefits the technology they adopt have to offer to their businesses. This follows the view of the interviewee from the vendor organisation in the second phase of the research. He highlighted the fact that the broadband speed and standard of services SMEs would receive from their service providers would depend on the service level agreement. These agreements are however seldom examined by the SMEs.

From the results of this research, some of the broadband vendors have been involved in awareness programmes aimed at SMEs. However, very few of them have participated in these programmes thereby resulting in too much of a strain on those

involved. However, if more vendors were involved, more SMEs could be targeted and more could adopt broadband, which would be beneficial to the vendors in the long run. Also, as stated by the SMEs, some of the vendors have provided poor services to them and resulted in the SMEs changing service providers. If the level of service provided to SMEs were improved, the vendors would not be in the position where they lost customers.

The government could also benefit from this research by recognizing the effects of some of their policies on the diffusion of technologies to SMEs. In the literature review, it was stated that the government provided funds to support SMEs' broadband adoption. Further research in chapter 6 revealed that these funds were only available to SMEs in rural areas. The SMEs involved in this research were all in urban areas and most still lacked an understanding of the benefits of broadband to their businesses. This suggests that SMEs in urban areas could also benefit from the awareness programs supported by funding from the government. There is also a need for the government to acknowledge that SMEs are unique as are their needs and make provision to address each SME according to their needs as opposed to lumping them together and providing the same initiatives for all of them. Additionally, the individuality of SMEs as agreed by both of the participants in the second phase makes both research into SMEs and providing support for them a bit of an uphill task. SMEs have different needs and different experiences and no two of them are the same.

The beneficiaries of this research in other less technologically advanced countries can also learn from the initiatives that have been applied in the UK and they can also make necessary changes to ensure better results. The implication of the findings of this research for policy and practice was made evident during the second phase of the research. The participants involved, which included a representative from a regional development agency and one from a broadband vendor organisation expressed their interests in the results of the research. They thought it would be useful for their work and have asked to receive a copy of the thesis.

7.3 Limitations of the research approach

As highlighted in chapter 3, where interpretive research is employed, the researcher never assumes a value-neutral stance, and is always implicated in the phenomena being studied. The possibility of this drawback has been acknowledged and addressed in this research by using material from various sources and eliciting views of the different social groups. Furthermore, when eliciting the views of the social groups, in-depth interviews were employed. This allowed the views of the social groups on broadband adoption by SMEs to unfold as they viewed it and not as the researcher viewed it (Marshall and Rossman, 2000).

Another limitation is the fact that the collection of empirical material will depend greatly on the level of access that the researcher is allowed to have. The social groups could either prove difficult to access or decide to hide vital information from the researcher. An example of this was the failure of two of the social groups to participate in this research. In order to combat this, their views were sought with the aid of secondary data which proved sufficient for their level of involvement in the broadband diffusion process to SMEs. In addition the other social groups showed a very strong interest in the research which helped to negate this limitation.

Finally, the field study focussed on broadband diffusion and relevant social groups only in the UK.

7.4 Areas for further research

This research has contributed to a deep understanding of the views of the relevant social groups regarding broadband and its perceived innovation attributes. The views of these social groups were analysed and further research areas were raised. One of such areas is the identification of another social group which includes other application providers. In the second phase of this research, the interviewee from the vendor organisation highlighted the point that the vendors of applications that run on the back of broadband such as IP telephony and data backing-up packages also have a part to play in the diffusion of broadband to SMEs. The view of this group can be sought to provide further insight into their part in broadband diffusion to SMEs. In addition, the diffusion of associated technologies such as IP telephony could also be studied using a similar approach to that used in this research.

The views of social groups on the broadband attributes could also be sought in different countries other than the UK in order to provide further implication on the relevant social groups and what their experiences are with broadband diffusion. Additionally the views of the social groups in relation to broadband diffusion to larger companies could also be examined to explore the factors that ensure a smoother diffusion process. Their views could also be compared to determine whether there are similarities in their experience of the broadband innovation attributes.

Further research can also examine the diffusion of other technologies associated with broadband such as IP telephony. In addition, the adoption and diffusion of other phenomena that have come about as a result of broadband such as tele-working could also be investigated.

7.5 Personal reflection

In the course of carrying out this research the researcher has been through an intense learning curve. She was initially faced with a huge mountain with no map to guide her around it. Three years of independent study with the need to produce a dissertation at the end of it just seemed like a task that would never end. However, with the guiding hand of her supervisors, the mountain began to look like a sand hill with little bits blowing off until it became plane ground.

The researcher has learnt some valuable life lessons from this process. Some of these included the difficulty of getting participants for in-depth interviews. Some of the participants objected to having the interviews tape recorded which resulted in the researcher relying on field notes alone. It also took a considerable amount of time before some of the participants that had been contacted made themselves available for an interview. These have taught the researcher that just because you ask does not mean you receive. It has also taught a valuable lesson in patience.

Although the researcher was faced with some challenges, she experienced a number of opportunities as well. For example, some of the participants she was privileged to involve in the research. They were very open about what they did and are happy to

respond to further research should they be contacted by the researcher in future. In addition, the process has helped the researcher learn to question anything including herself which has led to self belief.

7.6 Reflection on the benefits of this type of research

Research considering technology adoption by SMEs can be particularly tasking and challenging. This is because no one SME is the same as another. This study considers not just one but fifteen SMEs. The SMEs were involved in providing a variety of products and services each one different from the next. The differences in the SMEs made it obvious that their needs and aspirations were well varied. Particularities of SMEs, their lack of awareness and exposure to research results all add to the challenge of carrying out research in this area.

As a result of the socio technical issues surrounding technology adoption, the technology could not be viewed in isolation but all the social groups that had an influence on broadband adoption by SMEs and their views also had to be examined. Identifying the social groups was another challenging aspect of this research. While the SMEs were an obvious social group, the other social groups had to be identified following steps from the stakeholder theory.

While the research is beneficial to other researchers carrying out research into SMEs, it also demonstrates that with SMEs, there is no 'one size fits all' solution that can be applied to their technological needs.

List of Abbreviations

ADSL- Asymmetric Digital Subscriber Line

DOI-Diffusion of innovations

IS- Information Systems

IT- Information Technology

SCOT-Social construction of technology

SMEs- Small medium sized enterprises

UK-United Kingdom

VoIP-Voice over Internet Protocol

WiFi- Wireless fixed networks

APPENDIX A: Topic guide for interviews taken during the first phase of the phase of the research

This appendix contains the list of semi-structured questions that guided the interviews carried out during the first phase of the research.

Interview details

Date of interview:

Time of interview:

Interviewee:

Position:

Organisation:

Duration:

SME Questions

- what is the nature and size of your business?
- do you use the internet/ why not?
- how does using the internet help your business?
- what sort of connection do you have?
- why did you choose dial up/ broadband?
- how do you find broadband better than dial up?
- in what ways has it improved your business?
- have you found it easy to use?
- how easily did using broadband blend into your existing practices?

Government Questions

- would you recommend broadband for all SMEs?
- on what basis do you recommend broadband?
- what policies are in place to ensure awareness?
- are there any policies to keep broadband affordable?
- in what ways is broadband better than dial up?
- do you think it is easier to use?

- how easily do you think SMEs would find incorporating broadband into existing practices?
- what bodies are responsible for broadband diffusion to SMEs?
- any suggestion on who else can provide insight on these issues?

Vendor Questions

- would you recommend broadband for all SMEs?
- on what basis do you recommend broadband?
- in what way/s is it better than dial-up?
- in what ways would it affect/improve SMEs business?
- how easy is it to use?
- how receptive are SMEs towards broadband?
- how easily would it blend into SMEs existing practices?
- who would you say is responsible for diffusion of broadband to SMEs?

Private consultant Questions

- what sort of businesses do you provide services for?
- do you think SMEs need to use the internet for their businesses?
- would you recommend broadband or dial up?
- why broadband/dial up?
- do you think SMEs would find it easy to use?

APPENDIX B: Topic guide for interviews taken during the second phase of the phase of the research

This appendix contains the list of semi-structured questions that guided the interviews carried out during the second phase of the research.

Interview details

Date of interview:

Time of interview:

Interviewee:

Position:

Organisation:

Duration:

Vendor Questions

- Do you have pricing policies specifically aimed at SMEs?
- Do you have any programs to ensure awareness?
- Are there benefits or incentives aimed at SMEs e.g. size?
- Do have customer service aimed at SMEs?
- Is broadband for all SMEs?
- Do you think they know how to apply it to their businesses?
- How do you handle technical problems reported by SMEs?
- Are your pricing policies in proportion to quality that can be expected?
- How do you settle disputes with customers?

Development agency

- What programs do you have to ensure awareness of broadband among SMEs?
- Are there any policies that specify quality of service consumers should expect?
- How do you promote computer literacy (specifically Internet use) for SMEs?
- What do the SMEs currently use the Internet for (those who already use dial-up)?
- Why does your organisation think SMEs should adopt broadband?

- What reasons do SMEs give for hesitating to adopt broadband?
- Do SMEs complain of the cost of adoption?
- Are there differences in funding for urban and rural areas?
- If yes, is there any reason for this?

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