A conceptual framework for guiding SMEs in the application of IT from a South African point of view

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Abstract

Companies cannot keep up with the change occurring in the ICT arena. As a result of companies being chased by an untamed animal namely IT evolution, they fear that they cannot run, as running feels like floating in air. This ICT evolution has become a fearful sight for Small Medium Enterprises (SMEs). This research project acknowledges this fear and provides a conceptual framework whereby SMEs can familiarise themselves when engaging in ICT investments from a South African point of view. The data collected in this qualitative study is based on ten different SMEs as well as one larger company, to try and obtain a benchmark which SMEs can strive towards. The outcome of this research project allows SMEs to be less fearful when deciding on ICT and seeing how ICT can benefit these organisations.

Acknowledgements

Key words

Adoption, Adoption models, Building Blocks, Conceptual Framework, Information communications technology (ICT), outsourcing, Skills, Small to Medium organizations (SME), strategy, Technology

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Chapter 1 - Background and motivation for the study

1.1   Introduction

When starting up a new organization, or trying to adapt to the rapid rate of IT evolution experienced all over the world, it is crucial to understand what the requirements are in terms of Information and communication technologies (ICT). Bentellis & Boufaïsa (2008:139) notes that over the last twenty years, the markets have been changing fast, which has led to the evolution of the business environment. Entering the market as a small competitor, you need to ensure that you adapt and implement some kind of ICT strategy in order to ensure that you connect with the right target market. However, one cannot compare the use of ICT based on the size of the organization alone as Small Medium enterprises (SMEs) are not only based on size, normally classified between 1 to 500 employees, but on their complexity as well (Brown & Kaewkitipong, 2009:219). Section 1(15) of the National small business act (102/1996) of South Africa indicates certain criteria which have been developed to establish whether or not a business can qualify as a small business. (Criteria can be viewed in Annexure A). The act also defines small businesses within the South Africa context as a "*distinct business entity, which is managed by an owner or more*", and which satisfy the criteria as set out in Annexure A. When analysing this criteria, it becomes evident that within a South African context, a SME is classified as a business which has no more than 200 employees and certain turnover criteria based on their industry. Thus, if a business has less than 200 employees but the revenue is more than the indicated value per industry, the argument of Brown & Kaewkitipong (2009:219) whereby SMEs are not only based on size, but also on complexity becomes true. According to Fink & Disterer (2006:612) SMEs has to be divided even further, namely micro, small and medium sized, with micro being one to five employees, small being six to 20 employees and medium between 20 and 500 employees. However, these numbers are used in a study on SMEs both in Australia and Germany. Thus for this research project, the assumption would be that SMEs are between 1 and 200 employees.

Kaynak *et al.* (2005: 623) state that SMEs can be seen as the power house of a country's economy. Kapurubandara & Lawson (2007:486) continue by stating that the development of the economy is affected by SMEs everywhere. Most governments have also realised the effect and impact small organizations have on the country's economies as it leads to the growth of the economy as well as job and wealth creation (Oke *et al.* 2007:735).

According to the Canadian e-Business initiative (as discussed by Hilson, 2003:1) 60% of the economy of Canada is generated by SMEs and up to 80% of the overall national employment forms part of the SME market. Yu (2001:185) continues by saying that small firms dominate the Asian markets and that the success of countries such as Hong Kong and Taiwan is attributed to the small firms and their dynamics. Kapurubandara & Lawson (2007:486) reported that 75% of Sri Lanka's labour force is within the SME market of that country. As South Africa has such a high percentage of unemployment,

one begins to understand why the successful implementation of ICT in order, to ensure success of a small organization, becomes such an important area to focus on.

Hilson (2003:1) indicates that some of the main reasons why SMEs in Canada will not adopt IT are due to cost, lack of time and expertise, as most of the IT skills are being swept up by the large firms. It seems as if the skills acquired by students from tertiary institutions are highly specialized and thus the students feel that they could be "better utilized" within larger organizations. Fast Forward (2005:15), a report from the Canadian e-Business initiative, states that there are two factors which hinder SMEs to adopt IT. These are a lack of readily available financial resources as well as a lack of internal expertise. As mentioned above, the larger organizations tend to utilize all the IT skills as the resources have a better chance of progressing and "climbing the corporate ladder". Hilson (2003:1) only focuses on Canada, a first world country. The lack of resources both financial and human is even bigger in developing countries, as stated by Ellis & van Belle (2009:41). They also list four reasons for the lack of IT adoption by SMEs, such as a lack of in-house staff, a shortage of available funds for training, and a lack of awareness and product representation from an Open Source point of view. [1]

1.2   Problem statement

According to Hilson (2003:4) SMEs are seen as the driving force of any economy and one has to realize how important the effective and successful implementation of ICT is and what the impact thereof can be. What happens when the primary IT foundations of such organizations are not laid or not laid properly? If the organization grows, even at a slow pace, how do they adapt to these changes in an emerging IT environment? However, due to the lack of resources, whether financial or human, SMEs tend to be reluctant to adopt ICT (Celuch *et al*., 2007:188). Yu (2001:185) continues by saying that all firms start out as small firms. However, smaller firms tend to have lower levels of technology but higher levels of efficiency. Thus, if all firms start as small firms, or SMEs, imagine the catastrophe when they hit the large markets and they never had their technology infrastructure in place? It would be the same as trying to build a house without any foundations.

Wixom & Todd (2005:100) mentions the need to develop a set of characteristics which can be applied across a range of systems in order to integrate user perceptions and IT adoption. There is a need to identify what has been done to date with regards to IT adoption models and if these models can, in some way, be combined to develop a standard conceptual framework which can be used by SMEs and extended into future studies as a guideline for any organization's IT strategy.

When searching through literature based on the South African SMEs and ICT adoption, one tends to find numerous articles showing the proliferation of ICT adoption either within households (Dwivedi *et al.*, 2008) or within the retail sector (Brown & Russel, 2007:251) or how SMEs currently use ICT (Johnston *et al*., 2008:1043). Thus in South Africa or even in other African countries, there is an awareness of the benefit SMEs can gain from adopting and using ICT. There are however several

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[1] Open Source will be discussed as part of the literature findings, in chapter 2 – Technology and infrastructure

barriers which need to be addressed before ICT adoption can become the answer to all problems. Kapurubandara & Lawson (2007:492) identified a whole list of barriers which SMEs face when adopting ICT. Barriers are divided into internal or external barriers. Internal barriers are a lack of skills, security concerns[2] and e-Commerce not financially viable. External barriers are cultural barriers, a lack of infrastructure, political and social barriers which include a lack of a one-shop facility and access to reliable experts. The last barrier is the legal aspects. Even though this paper will not focus on all of these barriers, the one which stood out is the lack of a one-stop facility. In other words, SMEs do not feel that there is one single "place" or point of reference where they can turn to assist them in ICT selection and the adoption thereof.

1.3   Research topic justification and motivation for studying the problem

SMEs has been under the microscope of many great researchers for quite some time, and most of them look or focus on specific aspects such as skills, the impact on the economy, influencing factors of ICT decisions. However, in order for an SME to gain a clear understanding of ICT and what really affects their choice in the types of ICT seems to be a grey area, especially in the South African market. As stated by Andric (2009:22) SMEs can start to compete with larger organisations, and they do, by adopting the correct technology.

From a South African point of view, one has to realize that even though ICT ensures that we are "crossing borders" in the sense that anybody can be contacted anywhere at any time, within the rural areas of South Africa the infrastructure does not always allow for ICT implementation. As confirmed by Sandberg & Wahlberg (2006:2) there are two threats that SMEs in rural areas face with regards to ICT; firstly a lack of infrastructure and secondly businesses from outside these rural areas use ICT to bypass these areas rather than working with them. As stated before, SMEs need a "place" or some sort of guideline which will help them to realize what ICT is and what benefits it will hold for them and their future potential.

The table below shows the distribution of the total number of SMEs in South Africa across the nine provinces. (South African Department of Trade and Industry's annual review of small business in South Africa, 2005 – 2007).

Even though this table clearly depicts the distribution of SMEs throughout South Africa, the exact number of SMEs in South Africa is not clear. This is due to the fact that some businesses are not registered. Some are part of the formal sector, and some part of the informal sector which also limits the amount of information available.

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[2] The focus of his paper was SMEs and e-commerce

Province	Formal sector	Informal sector
Eastern Cape	5.3%	13.4%
Free State	3.2%	6.6%
Gauteng	48.3%	24.6%
KwaZulu-Natal	13.0%	18.8%
Limpopo	2.9%	14.3%
Mpumalanga	4.1%	7.7%
North West	3.2%	8.0%
Northern Cape	1.2%	0.7%
Western Cape	19.0%	5.9%
Total	100% (512,518)	100% (1,747,578)

Table 1. DTI at annual National Skills Research Agency (NASRA) JOBWORX, August 2008

Even though the exact figures are not available in terms of the number of actual SMEs, what is clear from the table above is that the larger part of SMEs, 80% of the formal and 49.3% of the informal sector are either in Gauteng, Kwazulu Natal or the Western Cape. As these provinces are more likely to have a fixed infrastructure, the main focus of this research will not be to ensure that each province has a standard for developing an infrastructure, but rather for guiding the SMEs to be able to optimally adapt ICT as a competitive advantage in the SME market, even if that infrastructure is also a constraint. Table 2 below indicate a section of how the South African government classify SMEs to provide a clear understanding of which companies and what type of companies are included to provide the figures as shown in table 1.

Sector or sub-sectors in accordance with the Standard Industrial Classification	Size or class	Total full-time equivalent of paid employees *Less than:*	Total annual turnover *Less than:*	Total gross asset value (fixed property excluded) *Less than:*
Agriculture	Medium	100	R 4.00 m	R 4.00 m
	Small	50	R 2.00 m	R 2.00 m
	Very small	10	R 0.40 m	R 0.40 m
	Micro	5	R 0.15 m	R 0.10 m
Mining and Quarrying	Medium	200	R30.00 m	R18.00 m
	Small	50	R 7.50 m	R 4.50 m
	Very small	20	R 3.00 m	R 1.80 m
	Micro	5	R 0.15 m	R 0.10 m
Manufacturing	Medium	200	R40.00 m	R15.00 m
	Small	50	R10.00 m	R 3.75 m
	Very small	20	R 4.00 m	R 1.50 m
	Micro	5	R 0.15 m	R 0.10 m
Electricity, Gas and Water	Medium	200	R40.00 m	R15.00 m
	Small	50	R10.00 m	R 3.75 m
	Very small	20	R 4.00 m	R 1.50 m
	Micro	5	R 0.15 m	R 0.10 m
Construction	Medium	200	R20.00 m	R 4.00 m
	Small	50	R 5.00 m	R 1.00 m
	Very small	20	R 2.00 m	R 0.40 m
	Micro	5	R 0.15 m	R 0.10 m
Retail and Motor Trade and Repair Services	Medium	100	R30.00 m	R 5.00 m
	Small	50	R15.00 m	R 2.50 m
	Very small	10	R 3.00 m	R 0.50 m
	Micro	5	R 0.15 m	R 0.10 m
Wholesale Trade,	Medium	100	R50.00 m	R 8.00 m

Table 2. Department of Trade and Industry: South Africa, 1996

This study will guide the decision-makers of SMEs by developing a conceptual framework for SMEs, as part of a support-management strategy in order, to either adapt their business IT strategies to the pace that they are growing at, or for new emerging SMEs to have a guideline of the minimum requirements for ICT in their organization based on the size of the SME.

Smeyers (2008:691) mentions that a conceptual framework is not only developed to describe and discover categories, but also to indicate the relationships between categories, and the reason why we would use a conceptual framework in research studies is to help make sense of a multitude of concepts or categories.

Wixom & Todd (2005:100) indicated the need to develop a set of characteristics which can help and guide SMEs in the adoption and implementation of ICT. After reading through the relevant literature, it became evident that there is not one single model or guideline for adopting ICT when starting up a new business in South Africa. From previous experience the business owner often only wants his product or service to be sold. They do not really think or realize the importance of starting the business with a solid foundation, especially if it is a one-man-show. Another problem which arises is that the business is bought from another person, and one tends to inherit their ICT shortfalls if ICT is available at all.

Thus the researcher sees the urgency of providing a set of guidelines which can be followed by SMEs to ensure that their business stay competitive not only on a local front, but also help them to open up their doors over to international markets.

1.4   Research question

Main question

What should the characteristics for an ICT adoption framework for South African SMEs be?

Sub questions

- What role does ICT play in the success of SMEs?
- What type of technology is suitable and available for SMEs in South Africa?
- What are the challenges faced by SMEs during ICT implementation?
- What are the best adoption techniques for IT?
- How should SMEs approach and manage the challenges of ICT adoption?

1.5   Research objectives

The main objectives of this research paper are as follows:

1. Developing a conceptual Framework to guide SMEs with ICT adoption

2. Assist SMEs with identifying possible adoption challenges and how to face these challenges
3. Provide an understanding of the urgency for ICT adoption for new SMEs
4. Identify whether there is a need for training of IT skills in-house or if outsourcing is a better option
5. Guiding SMEs in their search for the correct technology to perform their core functions

Throughout this research project, the researcher will focus on SMEs primarily to develop a conceptual framework which could be used by SMEs when adopting ICT, amongst others, by investigating various IT adoption techniques or models.

1.6 Research methodology

1.6.1 Research paradigm

The research paradigm used in this research project is that of interpretive research. Myers (2009:38) states that interpretive research assumes that knowledge is gained or reality is accessed by the use of social structures such as language and shared meanings. He continues by saying that interpretive research focuses on human sense-making and that the only way to make sense of a subject matter is to investigate it from the inside out, rather than standing on the outside and trying to see what is happening. To understand the feedback, the researcher has to "*understand the context of a phenomenon, since the context is what defines the situation and what makes it what it is"* Myers (2009:39). Klein & Myers (1999:67) confirm the impact of the social context of an organization on interpretive research and that interpretive research has the potential to create valuable insight into organizational systems and processes. Due to the fact that this paper will be based on qualitative data gathering, which involves discussions with the research participants, the researcher had to take time to understand the business before certain assumptions could be made and the context wrongfully interpreted.

1.6.2 Research design

The research project will firstly discuss the literature based either on SMEs or on various techniques and technologies available for adoption. After a clear understanding of the literature has been obtained, the researcher will conduct interviews with the research population and these results will then be analyzed and interpreted to gain a real-world picture of how SMEs regard ICT and how they adopt these technologies. The researcher will then combine the findings from both the literature review and the interviews in order to provide a conceptual framework which will assist current as well as prospective SMEs in their quest to adopt ICT.

1.6.3 Research population

The target research population is SMEs within a South African context. The research will look at ten SMEs based in various towns to identify what their experiences were when starting their business, and how they experience the use and benefits of ICT. Four of the SMEs interviewed, operate their business in a more rural environment and this will also provide an understanding of services and support available in these areas.

An interview will also be conducted with one of South Africa's larger companies to see what their guidelines are for ICT adoption and to see if some of these guidelines can be built into the conceptual framework for SMEs. By conducting interviews with this broad spectrum of SMEs, the researcher will get a better understanding of what South African SMEs are looking for when adopting ICT, and also if the differences between urban and more rural based SMEs are at all significant.

1.6.4 Data gathering

The data gathering will be done largely by conducting interviews with the owners of the SMEs. Due to the fact that travelling will be involved to interview the various businesses, the data gathering will be done over the course of two weeks. During the interviews, the researcher will make notes and the interviews will be recorded by using a digital recording device.

1.6.5 Data analysis

Once all the interviews have been conducted, the transcripts will be typed up and common themes which have emerged will be identified. The contents of the interviews will be summarized and each question asked during the interview will be analyzed in order to see which aspects of ICT are important for SMEs.

The research participants will be divided into four constructs, as discussed by Fink & Disterer (2006:611) to provide a background for the SMEs and used as a guideline for data analysis: Interactions, environment, affiliations and identities. These constructs will be discussed in-depth in Chapter 3.

1.7   Chapter outline

Chapter 1 – Background and motivation for the study

In this chapter the researcher has described the problem statement and the importance of developing a conceptual framework for SMEs to assist them with the adoption of ICT. This chapter also provides an introduction to the research methodology used and what the expected results would be.

Chapter 2 – Research methodology

This chapter describes how data is gathered and the approach followed in order to gather the data as well as the findings thereof. The research protocols, instruments as well as the research participant selection are discussed.

Chapter 3 – Literature review

The sub-questions asked throughout this research paper will be analyzed by reviewing and researching current literature in the field of ICT adoption and SMEs with certain themes or topics drawn from the research questions.

Chapter 4 – Data analysis and concept mapping

All data gathered from the interviews will be discussed and analyzed. The research participants will be introduced first after which the feedback from the interview questions will be analyzed.

Chapter 5 – Research results and conceptual framework development

The researcher will use the data gathered in chapter 4 and analyze it by comparing it to the literature and discovering whether the main building blocks for the conceptual framework, which were identified in chapter 2, did indeed emerge from the data gathered.

The conceptual framework will be introduced and discussed based on all the findings of the research conducted.

Chapter 6 – Research summary and conclusion

All the findings will be summarized, and the conclusion and research questions will be answered at this stage. The contributions of the research paper will also be discussed as well as possible limitations to the research and suggestions for future research.

References: A list of the all the referenced material used in this research paper

Annexure: A list of additional material which is relevant to the study can be viewed in this section

1.8 Concluding summary

Throughout this chapter, it is evident that there is a gap in the current literature as to what the actual framework for adopting ICT is. This chapter also introduced the barriers or challenges that SMEs face within IT adoption and it provides a guideline as to how the researcher proposes to solve these questions and what the expected results would be, based on the research approach. The rest of this research project looks at the research approach and the literature in depth, and taking the barriers into consideration, main focus areas have been identified. The research project will then focus on the research itself in terms of the interviews conducted and findings derived from the interviews. Lastly the conceptual framework will be developed and introduced.

Chapter 2 - Research methodology

2.1 Introduction

Various authors have various viewpoints on different kinds of research aspects, and one cannot help but think: Is this really necessary?

One quickly realizes that no matter how big or small, each entity has its own unique processes. These processes need to adapt to change in an ever changing environment. Mobility has become the new trend among SMEs due to the fact that the key personnel, whether it is the owner himself or one or two of his employees, have to go out and have face-to-face meetings with their customers, thus, the need to be able to connect anywhere, at any time.

One realizes that all the processes, not only within SMEs but in today's life in general, have some sort of IT connected to it. However, as each organization's processes are unique, where does one start to find answers, or solutions or guidelines? Where does one even start to gather information which could assist in decision-making? This chapter will identify the best approach when gathering information and how one will go about to analyze the data into knowledge about SMEs and how IT has helped or could help SMEs to become all they can be.

2.2 Research methodology

Qualitative research has been a popular research approach in various research studies (Myers & Newman, 2007:3; Myers, 2009:121). Qualitative interviewing, if used correctly, could be a powerful tool in a research environment. But even though most researchers use the interviewing process as their means of data gathering, it is also loaded with difficulties and shortcomings. Myers (2009:121) states that an interview allows the researcher to "*gather rich data from people in various roles and situations"* thus focusing on the social aspect of the interviewee. As was stated earlier, it is important to realise the SMEs have a huge focus on the social aspect of an organisation because qualitative research is a technique to gather data from people. This indicates the obvious use thereof in this study.

The model below is taken from Myers & Newman (2007:16) which illustrates the guidelines for conducting qualitative research. Below the model, each of the guidelines is briefly explained and these guidelines were used during the interviews to ensure that the maximum amount of information was obtained from the interviews. They continue by stating that one has to regard an interview as a drama, a performance, whereby one has actors, a stage, an audience and even a script. The guidelines below have to be used during the "drama" in order to obtain the maximum amount of data possible. However, one has to be careful to use these guidelines as a checklist as they are just guidelines to guide one in conducting a meaningful interview. Guidelines can only be learned and applied correctly by doing or acting them out. Myers & Newman (2007:16) rightfully state "*conduct research with real people in real organizations".*
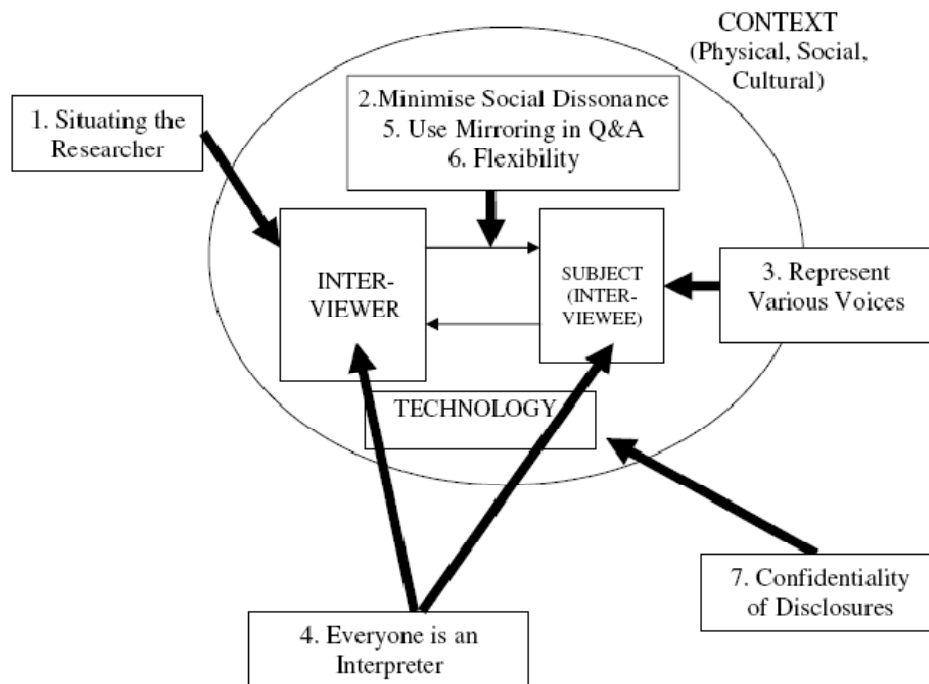
Figure 1: Guidelines for the qualitative research interview. (Myers & Newman, 2007, p. 16)

1. Situating the researcher

   This can be seen as the relationship between the interviewer and the interviewee. It could be done by asking questions such as: Who are you? Provide some background on your experience?

2. Minimize social dissonance

   One has to avoid discomfort between the interviewer and the interviewee. This could be done by dressing up or down, ensuring that one is familiar with the gender, age and background so that the interviewer can familiarize herself/himself with the interviewee to avoid discomfort. One also has to respect opinions and avoid conflict as this will not provide any usable information. Myers (2009:121) indicates that to ensure that you gain the most information from your subject one has to ensure total comfortability.

3. Represent various voices

   Avoid being biased by only interviewing top management. Most of the times in IS, the clerks are the ones working with the system and thus they know of the problems and shortfalls. Some people guide, some are the stars and some the gatekeepers but everyone is an interpreter.

4. Everyone is an interpreter

Understand the interviewee's "world". Everyone translates his or her understanding of a concept in their own words. However, one has to be able to understand the context, their attitudes as well as the inherit meaning of certain words being used.

5. Use mirroring in Q&A

The interviewer has to take the feedback provided by the subject and structure it into meaningful feedback which "mirrors" what was said. The best questions to use are open questions, in other words, questions where the subject is forced to elaborate. However the interviewer has to guide the feedback to stay within the relevant boundaries.

6. Flexibility

During semi-structured interviews, one has a script with questions which need to be answered, but one has to allow the subject to explain and by mirroring the feedback, the interviewer needs to construct new questions, which relates to the feedback or environment provided.

7. Confidentiality of disclosures

All transcripts need to be kept in a secure location. It is also advisable to provide feedback to the subjects on progress and to build trust in case re-interviewing is required.

2.2.1 General research design

As most of the research will be based either on newly established SMEs, or SMEs which might have a fair amount of IT experience, the best approach would be to conduct interviews with certain SME owners (in the case of small companies) as well as some operational staff and IT managers or IT specialists, if there are any available, to understand how they experienced starting up their companies.

The researcher will use the guidelines as presented by Myers & Newman (2007:16) to structure the interviews. Semi-structured interviews will be used in order to gather a clear understanding of the technologies and infrastructures currently being used by SMEs. Semi-structured interviews are not only the most commonly used qualitative interview technique but also provide some structure whilst providing the opportunity for improvisation.

The semi-structured interview will be divided into four sections. The first section will focus on the type of SME and what the sector is within which the SME functions. The second part will focus on the employees, the skills levels as well as the training of the employees. The second part will also focus on communication between the SME and personnel, customers and what the impact of competitors is in the marker. The third part will focus on the current ICT infrastructure in place as well as the support and service providers being used. Lastly the interviews will focus on security and the possibility of a business continuity plan as well as the deciding factors for the SME when considering investment in ICT, and future goals and possible wish list that the SMEs might have for the SME's ICT.

2.2.2 Research protocol

Later on in the study, an in-depth literature study will be conducted on SMEs and how various authors view certain aspects within the ICT environment. Various IT adoption models will be discussed to identify the key areas to focus on when adopting IT. During the literature discussions, various "building blocks" will be identified as potential focus areas for the conceptual model as well as the area to focus on during the interviews.

During the data gathering stage of this research, the participants were identified by looking at the size of the organizations. All of the participants were introduced to the researcher. What the research is about were briefly explained and the participants were asked whether they would like to be part of this study. This part of the research was mainly done via emails as most of the participants had email addresses. Those participants who either did not have email addresses or whose email addresses were not known were contacted via telephone to discuss the role which they would play in this research. Thirteen SMEs were identified as potential research participants. Eleven responded and indicated that they would form part of this study. However, only 10 were interviewed. One large organization also formed part of the study to see what they use as guidelines to adopt ICT.

Once the participants were identified, interview appointments were made. During the interviews, all participants were briefed on the study and provided with an introductory letter in order to provide some detail of the study (Annexure D). All participants were also informed that they would benefit from the results of this study and would receive feedback on the results. All participants signed an ethical permission document which can be viewed in Annexure E. The interviews were conducted over a two week period as this was the only available time for both the participants as well as the researcher.

All interviews were recorded by using a digital device. All these recordings were transferred from the digital device to the researcher's Laptop and a backup copy was made and kept in safe storage. These recordings were then transcribed and the data analyzed, based on the categories discussed during the general research design as well as using Fink & Disterer's (2006:611) four constructs namely interaction, environment, affiliation and identity[3]. The conceptual framework was then constructed and introduced in chapter 5.

2.2.3 Model development

The focus is to identify what the most important aspects are which SMEs focus on in their need to decide on which ICT to invest in. The last part of the next chapter will identify the building blocks which were used as guidelines to construct the conceptual framework. The interviews were used to identify what is important for SMEs in South Africa and the analysis of this data is compared with the literature from chapter 3 and discussed to develop a conceptual framework which will help and guide SMEs with their choice of ICT investment.

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[3] Fink and Disterer's (2006:611) four constructs will be discussed in chapter 3

2.3 Data collection instruments

2.3.1 Observation

Even though observation was not used as a data gathering technique, by observing the research participants during the interview the researcher could identify the correct timing of asking certain questions and whether certain questions were indeed relevant to the research participant. By observing the research participants also helped to in identify if a participant became uncomfortable with certain questions and thus these questions could either be rephrased or explained in depth. This approach assisted the researcher in ensuring that Myers & Newman's (2007:16) guidelines for interviewing especially the guideline to minimize social dissonance as well as flexibility were met,

2.3.2 Semi-structured interviews

During the interviews, each interviewee received a short summary of the purpose of the research and an introduction as to why they were chosen to be interviewed. All the research questions were constructed during the literature study as the literature was used in gaining a better understanding of what is available and what areas are important for SMEs to focus on when choosing ICT or even making strategic decisions for their organization. The time duration of the interviews ranged from nineteen minutes to just over forty minutes with an average of 34 questions asked.

The brief introduction as well as the research questions can be viewed in Annexure D.

2.3.3 Audio tape-recording

All interviews were recorded by using a digital recording device to ensure that all the data gathered could be used afterwards together with the transcripts. All of the interviewees were aware of the research and were also informed of the confidentiality of their responses. All recordings were transferred to the researcher's laptop where the recordings were transcribed and analyzed. These recordings were also stored on an external storage device which was kept in a safe storage facility with restricted access to ensure confidentiality at all times.

2.3.4 Document analysis

Documentation can be divided into two sections, the first being the analysis of accredited articles and publications and in some instances the Internet was used as some data could not be found in these articles. A limited number of publications which are not accredited were used in conjunction with accredited articles as another form of data verification. All articles and publications used in this study are also stored on an external storage device in electronic format for future reference and a list of all the references used, can be viewed at the end of this paper.

The second type of documentation that was not used during analysis but was used to gain a better understanding of the research participants was some marketing material about their company which was provided by some research participants. This assisted the researcher in getting a broader overview of the background and type of business and industry within which the SME operates.

2.3.5 Personal experience

The researcher worked at an organization that started out small and grew at a tremendous pace where ICT was never a priority. The result was that the organization ran a multi-million rand operation with nothing more than Excel spreadsheets. There were never proper guidelines or assistance given to the decision-makers. This was the reason for the research topic. However, the researcher tried not to use own personal experience as a reference or guideline in this instance as the researcher is an IT expert and thus certain bias opinions could be formed based on personal experience instead of allowing the literature and SMEs to "speak for themselves". However, it did provide the researcher with the knowledge to discuss ICT within the SME's context.

2.4 Research participants

As was mentioned earlier, research participants were identified based on the size of their business. These participants came from a range of industry sectors, which include:

- Digital voice recording
- Supplier in the poultry industry
- Liquor store operations
- Print and photocopy centre
- Dietician
- Photographer
- Agricultural industry
- Independent insurance company
- A Reading and writing centre for children
- Property marketing agents

After the interviews, it was identified that even these small companies had to be divided into different sectors as there are "one-man" operations as well as a highly successful business with only 33 employees. This classification will be done in chapter 4 when the data is analyzed.

2.5 Analysis and interpretation of data

After all the interviews were conducted, they were transcribed into text per question. The companies' backgrounds are provided in chapter 4. As part of the company background, each of the companies' four constructs (Fink & Disterer, 2006), as will be discussed during the literature review, are indicated and briefly analysed. After the basic introduction of these companies, all the responses were analysed based on the questions asked during the interviews. Some common themes that emerged were also discussed during this analysis.

After the interviews have been analysed and categorised per theme, the information will be compared to the literature study to find common grounds between the literature and the real-world. This comparison will be used to finalise the conceptual framework in guiding SMEs with decision making tasks.

2.6   Validity and reliability

Most of the literature study is based on accredited sources, it ensures that the concept upon which the conceptual framework is built, is reliable and valid. The data gathered from the interviews' validity is based on the type of organization being interviewed as well as the key personnel or decision-makers being the research participants. To ensure that no data went "missing" all the interviews were recorded and transcribed. The procedure to analyze data, as discussed earlier, ensures that all the main focus areas of the data gathered are portrayed accurately.

2.7   Concluding summary

This chapter introduced the reader to the steps and protocols which were followed during the research. This chapter also indicated how the data was analyzed to ensure that only relevant data was used during data analysis and that all the data is seen as reliable and accurate and most important, relevant to the study of SME's IT adoption.

The next chapter will be an in-depth literature study on SMEs as well as certain focus areas which were identified as main focus areas in developing the conceptual framework.

Chapter 3 – Literature review

3.1   Introduction

To best understand the problems faced by SMEs when they have to adopt new ICT, one needs to study current literature available. As SME is such a widely investigated area, there is an endless amount of literature available. The next part of this chapter will discuss literature findings which are grouped together under various topics. At the end of this chapter the findings will be discussed and used during the data analysis process as guidelines for possible answers to the research questions and building blocks for the conceptual framework.

3.2   IT Strategy and skills – when does IT become relevant

Strategic planning and skills availability within an SME are two of the most important aspects when one begins to investigate the adoption of ICT, and this could be for two reasons. Firstly one has to realise where you want your business to go within the IT environment to ensure effective management and cost-effective solutions.

Secondly, you can adopt the best systems in the world, but if you or your employees do not know how and what to do with these systems, one will surely waste money and the value for ICT. As the two quotes below rightfully state, ICT is seen as one of the most effective influential factors for an organisation and its strategies.

3.2.1 IT strategy

"*The strategic importance on ICT to an organization also effects the decision to adopt; the more central that ICT is to the business strategy, the more significant the effect is on the organizations cost structure." (Ellis & van Belle, 2009:43).* "*ICT can be used as one of the strategic factors to help improve business processes and change the function of the markets"* Chibelushi & Costello (2009:211). An interesting and important factor to consider is that of Pati & Desai (2005:283) where they say that an organisations' competitive advantage is not gained through infrastructure or skills but rather to engage in outsourcing as an alternative strategy in order to gain a competitive advantage. The reason for this is that infrastructures can be replicated. Thus, there is no guarantee of your infrastructure being your competitive leverage. (Outsourcing will be discussed in section 3.5.3)

Sandberg & Vinberg (2000:221) noted that for SMEs to survive and grow in the future, it becomes a matter of strategic importance to adopt information technology. When developing a tool to "ease" the workload of the employees, it is also critical to involve these employees to ensure that the strategies as well as the tools are relevant to their occupation to improve productivity. They continue to mention that only those who are affected by change or implementations can decide what is best for them. It is also stated that learning by doing is the best way or strategy to acquire new skills, as learning goes hand in hand with context. A person can only be taught certain aspects of IT but not how the business and IT work together, as this person would need to experience the business' needs.

Sandberg & Vinberg (2000:224) discuss the findings of Ellström (1992) in terms of the two types of competencies, namely adjustment competency and development competency. Adjustment competency is when certain pre-defined goals are set for the individual in order to meet these goals; he/she needs to develop the competency required. Development competency is when an individual develops competencies which are required to influence his/her work or life. They also state that employees should not have repetitive simple jobs, but rather challenging and complex tasks as this could enhance work motivation. Sandberg & Vinberg (2000:221) realized that IT is not used by small firms to the extent that larger firms are using these technologies, and Celuch *et al.* (2007:189) note that there could be two reasons why this is happening. Firstly the cost of these systems or technologies is too high for smaller firms to adopt, and secondly, these implementations require a strong commitment and therefore resources which smaller firms do not have; and thus the reason why smaller firms lack "*strategic decision-making perspective in approaching IT investments*" (Celuch *et al.*, 2007:188). However, Celuch *et al.* (2007:188) focused more on the flexibility of strategies as a competitive advantage mechanism due to the fact that the small firm can adapt easily to changes, whether proactive or reactive.

Figure 2 Sandberg & Vinberg (2000) illustrate how the business strategy is impacted by the IT strategy and that they work in collaboration with each other. The whole organisation is related to IT as it becomes integrated with all the processes of the organisation and thus ultimately streamlined with the organisational strategy.

One of the most important aspects standing out very strongly in this study at this stage is the importance of having an organisational strategy and goals which will influence what an SME's IT strategy will be. Although this research project does not aim to design an IT strategy for SMEs it will become important and part of the conceptual framework as one needs to know how you want to grow your business before you know what technology can assist you in this growth process.
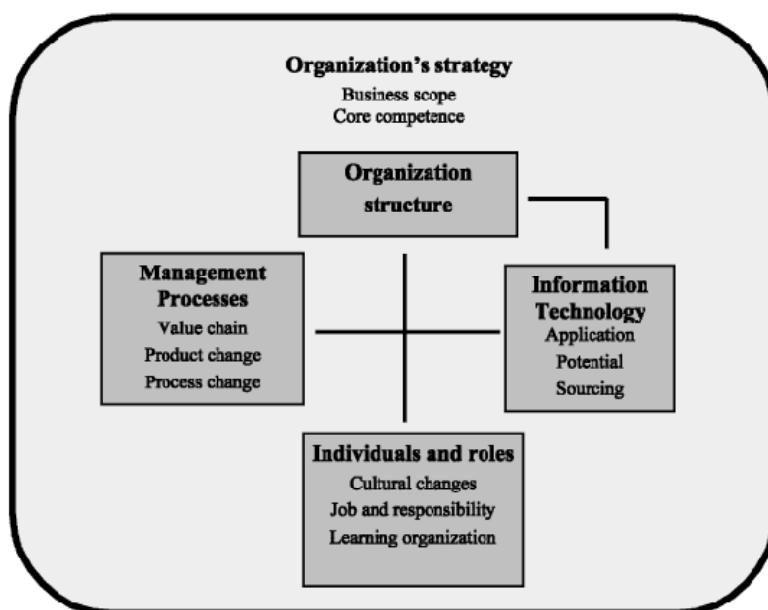
Figure 2: General model for the impact of IT strategy and learning (Sandberg & Vinberg, 2000, p. 222)

3.2.2 Skills development

Which skills are required within a SME and when does skill become important within an organization? Jackson & Sloane (2009:71) conducted a study based on organisational profiling and the organisation's adoption of ICT, and they found that the highest rated resource, as seen by organisations, is the human resource. They even suggest that some organisations see the human resource as more valuable than their commercial commodity which these organizations trade.

Yu (2001:187) states that the physical resources for smaller companies consist mostly of unskilled workers. Although they focus more on the factory industry, what does become evident is that the need for skilled workers in SMEs is not a high priority and thus tends to "fall behind". And even though skills can be developed, Coff & Laverty (2001:3) acknowledge that these skill-specific individuals are less prone to stay at one firm for too long and thus cannot be seen as a resource with which to gain competitive advantage; and the market becomes a pool of head-hunting vultures in search of acquiring these skills. This in turn makes it difficult for the smaller firms to retain their skilled workers or to invest in the development of the necessary skills due to the fact that larger firms have access to resources required to perform these developments, or they steal the developed skill from smaller firms. Another challenge, highlighted by Chibelushi & Costello (2009:211) is that some firms feel that the skills required by graduates are not sufficient or relevant as they are not "work-ready" when they start to work.

Jackson & Sloane (2009:72) suggest that the organisational culture is not clearly understood by organisations and therefore it tends to be less important for organisations to focus on. However, they did find that group or team work is essential for the organisation's success and thus small companies need to work together to ensure that knowledge transfer does take place.

Coff & Laverty (2001:3) suggest that one should rather train social groups or teams that are cross-functional to ensure that the knowledge is shared among various individuals. However, when looking at SMEs, one has to realise that often there is only one person who can perform a specific task. Sometimes the company is only comprised of one individual, and thus the luxury of cross-training does not exist. Even when trying to establish cross-functional groups, establishing these groups tend to waste too much time to be productive.

Celuch *et al.* (2007:189) point out that due to the generic pattern some of the technologies available for implementation has, IT skills are not the only skills required. Managerial skills or ability to sustain a competitive advantage by developing and leveraging IT applications, which in the end will support their business functions, are just as important as IT technical skills. Let's think for a moment if this makes sense… Who signs for any expenses? Who approves and allocates resources? People in management positions or in this case, the owners of the small organization make the decisions or "pays the bills". The main actor when making decisions is thus seen as the owner or manager. (Rantapuska & Ihanainen, 2008:586)

Yu (2001:187) noted that there is no separation between ownership and control within a small firm. Even if one looks at the diagram above, one realizes that the information technology integrates with the organizational structure, as well as the management process. Thus the importance of a manager or owner realizing what the impact or effect of IT could have on their organization is extremely high. As mentioned by Fink & Disterer (2006:619) *"IT skills have to be complemented with business skills to ensure organisational effectiveness"* and this statement was made specifically where ICT in SMEs were investigated. The smaller firms focussed more on working with the customers and thus feel more comfortable to outsource IT skills. However, it does seem that as companies grow larger, the need for business oriented individuals is becoming more relevant.

Fink & Disterer (2006:609) & Chibelushi & Costello (2009:211) state that there seems to be a form of stagnation of IT adoption by small firms. This could be attributed to the cost of implementing IT as well as the training required which the smaller firms have to invest in and then the larger firms have the financial resources available to take over these trained specialists. This leads to the thought that IT within small firms is weak and this reflects on the management of IT which is weak, even if some sort of IT is available.

Although Celuch *et al.* (2007:188) also state that smaller firms are reluctant to adopt IT due to lack of evidence of the value of IT investment, and thus there should be compatibility between IT and managerial skills. It is also mentioned that within small businesses, there tends to be "implicit strategizing" which is informal and unstructured. Yu (2001:192) states that smaller firms tend to be more inclined to outsource than larger firms due to the fact that their technologies are established, tacit knowledge is divided and there is a decline in the transaction costs. Chibelushi & Costello (2009:212) also mention that SMEs do not necessarily need the IT skills in-house as they could source these skills from their service provider (which could be the ICT SMEs).

Another factor which emerges from the literature is the fact that owners of the small firms often want their children to take over the family business, thus adopting nepotism (Yu, 2001:188). This could also directly affect the reluctance to develop in-house skills as these skills might not be required when the family member takes over the business. And as stated by Reimenschneider *et al.* (2003:270) *"decisions … are typically made by a single executive"*.

3.2.3 Outsourcing

When to outsource or rather why? For these two questions to be answered, one has to firstly understand what outsourcing is.

As indicated by the Global Insight report (Palvia, 2008:75), IT off-shoring contributions to the United States GDP will be about $125 Billion. Pati & Desai (2005:281) state that outsourcing has become a powerful IT strategy for most organizations. Outsourcing is seen as using external resources to assist the organization in IT decision-making as well as providing support. But even though outsourcing can solve a huge amount of IT issues, many companies have outsourced their IT services without considering the implications and effect on their strategies. Pati & Desai (2005:281) indicated that according to the National Public Radio's morning edition on 18 December 2003, there was a 78%

failure rate in outsourcing initiatives. Even though this study is rather old, what is clear is that a business should have an in-depth strategy in place as to why and what need to be outsourced before they indeed outsource. One has to consider internal capabilities, IT services required in terms of solutions and the strategic business values. Harland *et al.* (2005:839) continue by saying that one of the risks identified with outsourcing is that internally you have to have management competencies as well as decision-making processes in place to determine which functions to outsource.

So why does one outsource? According to Harland *et al.* (2005:833) outsourcing reduces costs in terms of operational and capital cost as well as freeing up assets.

However, Pati & Desai (2005:290) identified that there is limited literature available which can guide originations or SMEs when deciding whether to outsource or not. Thus this area needs more attention in future. Nonetheless the decision to outsource goes hand in hand with a SME's IT strategies and goals which they wish to achieve in future as well as the skills level required within that specific SME. Some SMEs are so straightforward that IT or ICT has such a small impact on their operations that outsourcing is not even a factor. However this does not mean that there is no company out there, not necessarily contracted, which can assist with certain ICT functions on an ad-hoc basis.

3.2.4 Business continuity

Being able to recover data and having your office up and running within 24 hours after a disaster struck, having a plan in place to be able to adapt and survive the tragedy and carry on as normal is exactly what a business continuity plan is. Savage (2002:254) indicated that even though everybody knows the importance of a business continuity plan (BCP) it is not always as high on the agenda as it deserves to be. They also continue by saying that there tends to be a lack of imagination. As some have never experienced a major disaster, they find it difficult to imagine any disaster ever happening. Beck (2007:12) continues by saying that not having a BCP in place is a risky approach. But how do we classify a disaster? This can be anything from a flood or fire through to a virus infecting your system and thus to an irrecoverable loss of all you data (Beck, 2007:12). Savage (2002:25) continues by saying that the plan should involve activities such as:

- Risk and impact analysis
- Documenting activities
- Identify activities on managing a disaster
- Test and audit the disaster recovery process
- Train staff and implement process

One can continue in more detail with regards to setting up a business continuity plan and it could result in rather an expensive exercise. However as SMEs are small "structures" and mostly run from home, the main aspects which need to be addressed by SMEs are the backup and safe off-site storage of all electronic data on a regular basis.

Another focus point SMEs should consider is having updated anti-virus protection on their machines, whether it is one laptop, or a hundred. Beck (2007:12) states that viruses and worms are the hardest

to protect against and predict. Thus, one should ensure that both the backup and anti-virus updates are done on a regular basis.

Another important aspect for SMEs is that a BCP should be tested, even if that only means to try and recover data which is on some kind of backup device (Beck, 2007:12). The frequency of backups is also becoming a crucial aspect. How frequent is frequent? That depends on the SME's business operations. Do they mainly work on computers or do they only capture data once a week or once a month, thus totally dependent on the business processes of each individual SME? It is recommended that backups are made every two weeks.

3.3 Evolution of ICT and SMEs

There are only a few recent publications on the origin of IT available. It is only when one begins to browse through archives, that publications on this topic is found. Even though this paper does not primarily focus on the origin and evolution of IT, the author would like to set aside a small section and explain the origin and evolution of Information Technology and information systems for two reasons. The first reason being that when one realizes what the origin of an item is, one tends to relate more on an emotional level and appreciate it more, and secondly, as stated by Thomas J. Watson, Sr. *"First look backward in order to look forward" (Williams, 1997:iii).* In other words, people tend to use certain technologies without understanding what the root or the idea behind them are and then tend to underutilise them.

Williams (1997:2) noted that the simplest system in past centuries was holding up a hand, and asking how many fingers were seen? Simple, but this type of system is limited, as there are only a fixed number of fingers per hand, generally speaking of course. To express the evolution of calculations, which in turn, is the "reason" for automated machines in the late 50's; a law was passed in the 17th century which stated that one could only be used as a witness in court, if one had the ability to count to nine. In today's world this would probably include the largest part of our society; people are taught how to count to ten before they even start school.

A few years later the Abacus was created as a means to perform calculations by moving objects such as pebbles across a line to perform simple addition and subtraction functions. The mathematical calculations grew to a point where mechanical calculating machines were developed (Williams, 1997:118). Although there seem to be contradictions as to who was first, Schickard or Pascal? Williams noted that even though early studies have shown this to be Pascal, it emerged during the 1950s, 1960s that in fact Schickard invented the first automated calculating machine in the early 1600s. On September 20, 1623, the following was written by Schickard to Kepler, *"What you have done in a logistical way, I have just tried to do by mechanics. I have constructed a machine consisting of eleven complete and six incomplete (actually "mutilated") sprocket wheels which can calculate. You would burst out laughing if you were present to see how it carries itself from one column of tens to the next or borrows from them during substraction" (*Williams, 1997:119, as quoted by using lecture notes from Loringhoff, 1976); Pascal developed a calculating machine in 1642.

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From these simple mechanical calculation machines, the computing machines grew to the point where one can literally dream of anything to be computerized. The possibility that it has already been developed and placed into operation is almost certain. We can almost say… "And the rest is history" or is it? Bell, 1986 also spoke about the evolution of personal workstations. He divided it into decades from 1950 up to 1985 and beyond. His evolution is as follows:

1960
Breadboards, larger computers with graphical displays

1981
Personal workstations introduced

1985
Health industry

??? – And beyond

1950

2011

1983
Full-scale use, JAWS

1970
Supply industry established. Wroking prototypes of personal workstations

1950
Small stand alone computer to stimulate ideas
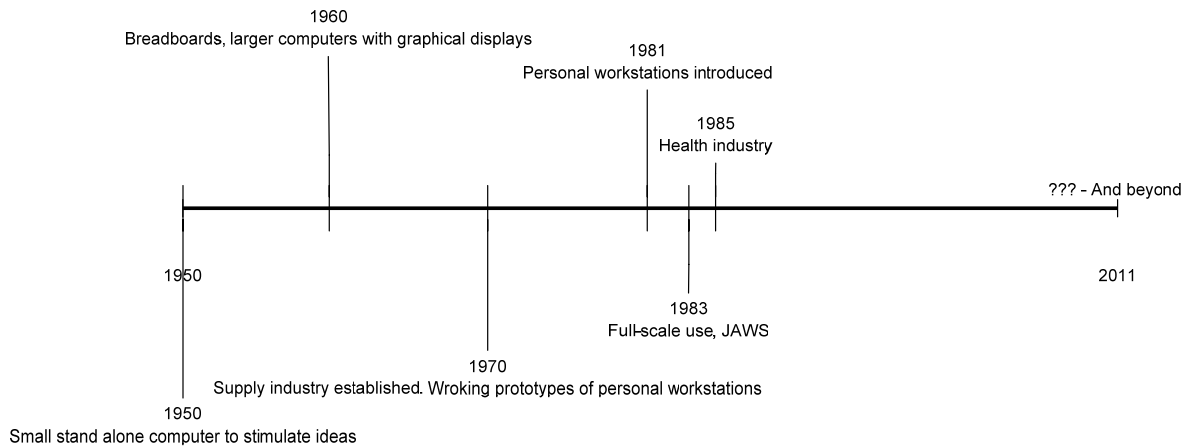
Diagram 1. ICT evolution timeline (Bell, 1986:6)

"???" and beyond – *"decline through replacement or superposition of functions in some other form of information processing appliance (e.g., conventional personal computers)"*, Bell (1986:6) and then extinction… Even in 1986, they realised that this field called IT or ICT, will evolve at an almost unmeasurable pace.

In 1975 it became evident that for a computer to be classified, this classification will be based on memory size. One tends to want to say "wow" and "duh" at the same stage. Wow for the fact that already in 1975 and in 1986, they predicted that the ever-changing environment of ICT will always be surpassed by a greater, more superior machine or information processing appliance; and duh because today that is common knowledge. Technology is changing at such a rapid pace that it is barely measurable.   For SMEs to stay ahead and maintain a competitive advantage becomes critical for survival. Yu (2001:189) notes that the origins of small enterprises' competitive advantages have not yet been critically examined. However, recently the evolution of firms have expanded to such extend that it opens up a whole new dimension to be examined from a business enterprise viewpoint.

It is concluded by Yu (2001:185) that small firms have two distinctive assets; these assets are the access to a simple capital structure and entrepreneurship. Small firms also have the capability to produce or deliver within a limited time span, as they are more flexible than larger firms to adapt to changes. Chibelushi & Costello (2009:217) also confirm this by saying that SMEs are more flexible, innovative and can respond to changes in their environments much faster. Based on the rapid rate of IT evolution, IT becomes a "tool" to gain the upper hand in the industry and ensures it doesn't become just another entry on a timeline going nowhere.

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In the next section of this paper we will focus more on technology from a business point of view in order to see what kind of technology is currently available to SMEs and later focus on the background of technology implementations and adoption of IT in SMEs currently.

3.4   Technology characteristics

There is a magnitude of technologies available in the market, and one quickly realizes that there are such a large number of products available, that one is reluctant to dig deeper into this mountain of information.

3.4.1 Systems

Where does one start? What technology to buy, how to communicate with various stakeholders, up to what level can ICT be adopted? These are all questions which sometimes scare the final decision-makers. Without a professional opinion, it is at this level where decisions start to influence your bottom line (Dyerson *et al*, 2009:39) and will either enhance competitive advantage or start a slow downward spiral towards closing the doors. So let's stand still for a moment and investigate the various levels of technologies available, and identify where SMEs fit in. Stair & Reynolds (1999:336) used diagram 2 to identify the various levels of systems or applications within an organization. In the diagram, the following acronyms need to be explained briefly in order to gain a clear understanding of what these levels are and how they fit into business.

- TPS: Transaction processing systems - These are systems which form the basis of all information systems within an organization. These systems perform mostly routine functions and contain detailed data in order for core business functions to be performed. Thus, it contains the transactions of the organization. Examples of these types of systems are: ordering system or a point of sale system.

- MIS: Management information systems - These systems provide managers with information, which is processed data, to be able to make informed decisions to ensure that the organization operates effectively and efficiently. These systems provide reports which managers use during decision-making. It is also mentioned that MIS assist in gaining a competitive advantage if used correctly. At this stage, systems tend to become more expensive and thus not all SMEs go into this level or past this level.

- DSS: Decision support systems - These systems are used for strategic planning and the goals to be achieved are identified. There are three stages when making decisions namely choice, design and intelligence which are all used for problem solving.

- AI/ES: Artificial intelligence/Expert systems - "*systems include people, procedures, hardware, software, data, and knowledge needed to develop computer systems and machines that demonstrate characteristics of intelligence*" (Stair & Reynolds, 1999:480). The cost of developing such a system can become expensive and thus for SMEs it does not justify the expense.

Information		Less	More	Less	More
	AI/ES				
	DSS	Routine	Decision support	Input and output	Sophistication and complexity of processing and analysis
	MIS				
Data	TPS	More	Less	More	Less
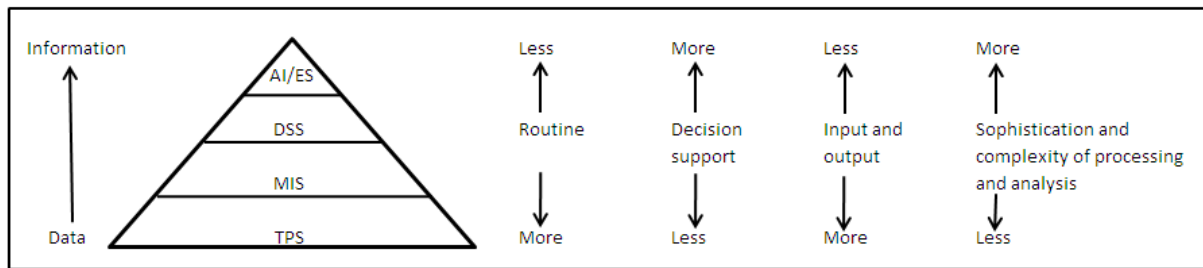
Diagram 2: TPS, MIS, DSS and AI/ES in perspective (Stair & Reynolds, 1999:336)

From the research of Chibelushi & Costello (2009:225) it emerged that most SMEs firstly seek advice on what type of ICT to adopt from friends, relatives or other SME owners and secondly, due to these owners not having enough knowledge of IT, they do not necessarily adopt the correct ICT, if any at all. However, Dyerson *et al.* (2009:39) conducted a study on about 519 SMEs in the UK, and they found that the largest area where SMEs will start to gain advice from are IT consultants and secondly from personal sources such as family and friends. This does not make the fact that SMEs tend to look for sources outside the company worthless, but rather indicate their lack of internal resources which the SME might have available.

For SMEs one of the biggest deciding factors when investigating ICT is the cost involved, and for this reason, it became evident that most SMEs would only, if at all, reach the MIS level.

Chibelushi & Costello (2009:215) also continue by saying that the three areas to cover when adopting ICT is technology (hardware), communications and applications. For this reason, the next section will divide the types of technologies to adopt into these three aspects and see what the best options or rather available options within the South African markets are.

According to Dyerson *et al.* (2009:41) the following technologies are the ones mostly used by SMEs, in no particular order:

- Company Website
- Email
- Extranet or electronic data interchange
- Groupware (E.g. Lotus Notes)
- Internet
- Intranet
- Computer network
- Video/Audio conferencing
- Wireless access

The next section will look at what some of these technologies are and how they can fit into the three themes that emerged from the studies of Chibelushi & Costello (2009:215).

3.4.2 Hardware

Even though the technologies listed above, did not include hardware, this section will look at the physical technology available to be able to assist SMEs in using the technology mentioned above.

An article published, in the September issue of iWeek by Goldstuck (2009:11) as well as Nel (2009:1) both discussed the findings of the World Wide Worx report which had interviews with about 1000 SME decision-makers. It became clear that most of the key staff or in some cases all the staff are out of the office at least once a day visiting customers. As a result of this, SMEs are more concerned with the type of mobile device, such as the cell phone and laptop which they can use while on the go. Nel (2009:1) mentions that 24% of key personnel work "outside" the office and 29% have to leave the office at least twice a day. Due to the fact that most technologies today allow for mobility, it has become a huge advantage and it created the ability for these personnel to become mobile.

Interestingly, mobile devices are nothing "new", and the first mobile devices were introduced during the 1960's and 1970's with devices such as digital watches and calculators (Hart & Hannan, 2004:201). Thus, using a mobile device is not a new attraction. However, what is "new" and changes, on a daily basis are the advances made with technology today, which makes it hard to stay on top of the latest and best devices available.

Emails and access to the Internet are important functions for SMEs. To be able to access these functions from anywhere at any time, some of the best tools available are Smart phones and PDA's. Smart phones and PDA's allow mobility as well as easy access.

Smartphone

What is a Smartphone, or a mobile phone?

The primary use of a Smartphone is to send and receive emails via a wireless network. Most devices are built with a QWERTY keyboard. Due to the fact that the South African keyboards are also QWERTY, South Africans can acceptably relate and experience the use thereof. Some of the mobile devices would require the organization to implement a mail server to assist in managing the more advanced email capabilities (Blackberry online, 2009). This should however not be seen as a barrier as one can easily connect to the Internet and thus one can download one's emails from the Internet by using email accounts such as Yahoo and Gmail at no cost. However, one has to realize that to download emails does require data to be transferred, and the user is charged by the service provider for these downloads.

As mentioned earlier, most SME key personnel will be seeing customers. The fact that most devices have a build in GPS which will assist in the navigation to reach their customers also becomes a great advantage. (Blackberry online, 2009)

Some other features which most Smart phones have are listed below (Blackberry online, 2009):

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- World Phone Capabilities

- 3G Network

- Camera (3.2 MP)

- 256 MB Built-in Memory

- Enhanced Media Player

- Organizer

- Browser

- Phone

- Corporate Data Access

- SMS/MMS

According to Hart & Hannan (2004:201) the following aspects will determine if a mobile device is indeed as mobile and usable as it should be:

- Availability of these devices

- Useful to everybody

- Easy to use and to understand

- Convenience to users eg. battery life

Wireless access

Even though a mobile device can be seen as completely wireless, some organizations invest in wireless technology for their office rather than "building" a cable infrastructure throughout the entire office.

Bandwidth and access thereto are one of the mayor headaches when setting up a network. Hart & Hannan (2004:202) indicate that wireless speed can only be determined by the network that it links to. Wireless access can indicate two areas, firstly connecting through your mobile device such as your smart phone from anywhere in the world.

The second focus area is the way the wireless devices such as 3G cards or even smart phones, can connect to the office, or the applications running in the office and literally allows one to work from anywhere in the world on your company's database.

Another critical aspect of Wireless access is that of security and privacy. Lu et al. (2003:216) state that security includes confidentiality and privacy. When installing a mobile network within an office environment, one of the means to secure your network, is by having a private key, which has to be entered each time the user wants to access the network. Even though this assists in securing the network, it is the responsibility of either the service provider (if the function is being outsourced) or the responsible resource within the organization to ensure that the wireless device has been setup with all the necessary security layers intact and to safeguard the private key or password.

Smaling (2003:34) acknowledges the fact that it is much more difficult to control radio waves than it is to control cables. And this makes so much sense; let's think for a second of a kite. As long as you hold on to the string hanging underneath the kite, you have a fair amount of control of how high the kite can go or not. However, should you let go of the string, and have the kite fly through the air; there is no guarantee as to where it will go or land, if at all. The same principle can be applied to wireless air waves. Smaling (2003:34) mentions that the only way to secure a wireless network is by using layered security architecture, in other words, virtual rings around the mobile devices. That means if one of these rings is breached, there are still a couple of layers or rings to be breached before your network is ultimately in danger. Another point to take into consideration is that a maximum of 25 users per access point should be managed as this could have an impact on the load on the network. (Smaling, 2009:35). And lastly, he states that when implementing a wireless network, get the end users involved and make them excited about the implementation, and everything should be smooth sailing. "Should" being the keyword!

Lu *et al.* (2003:212) focused their study on Wireless Internet via mobile devices (WIMD) and the definition thereof is as follows: a mobile device should allow the user thereof to be able to access services such as Internet, voice or information from anywhere in the world by using radio-connected devices and servers. There are four criteria which lead to wireless device effectiveness and these four are "*efficiency of data transfer; system functionality; interface design; and mobile device capacity.*"

Even though this section only focuses on Smartphone and wireless access, there are still an endless number of technologies available to SMEs, technologies such as laptops, netbooks, and then more advanced biometric access control and even surveillance cameras on the premises. Even though the smaller SME's will most probably only adopt up to Laptops, it does not mean that they cannot investigate any of the other types of technologies available in the market. From the interviews, the study will find out which types of technology most SMEs within South Africa do indeed adopt in real life.

Interface design, system functionality as well as mobile device capacity have been briefly discussed in the previous section called Smartphone. Efficiency of data transfer relies heavily on the communication and infrastructure available within the specific country. In the next section this project will focus on communication and the infrastructure related to communication focusing especially on the available South African infrastructure.

3.4.3 Communication

Communication is the primary way of interaction between human beings. The only way you can express yourself is by saying what is on your mind. Even though language is a huge "problem" when communication across multiple cultures takes place, ways to communicate are still found and within South Africa, which has 11 official languages, language alone never mind the cultural differences, becomes a barrier.

As mentioned earlier, one of the key features for using a Smart Phone is to connect to the Internet and view emails from anywhere. It became evident that the way to communicate and connect to the Internet becomes rather crucial. We are in fact building a globally connected world without any borders to cross. Sussman & Siegal (2003: 48) stated that already in 2003, more than 10-billion emails were being exchanged on a daily basis. However, Reardon (2009:1) projected that in 2009, 247 billion emails were send on a daily basis, with a projection of 507 billion emails being send on a daily basis by 2013. According to the international data base (International Data Base online, 2010) there are just over 6.7 billion people in the world. Even though we know that not everybody has access to Internet or emails, this still means that according to prediction made in 2009, an average of 38 emails send per day for every single person living on earth. This also means that an SME has the ability to send an unlimited number of emails to anywhere in the world… imagine how far your marketing campaign can reach by pressing the send button.

Kaynak *et al.* (2005:623) set out to see what the adoption profile of E-Commerce would be within the SMEs market. They identified that two of the most powerful forces which affect the world economy today are the increasing rate of globalization and the rapid advancements within the ICT environment of the global economy. Jackson & Sloane (2009:67) also acknowledge that the centre point of operations and formation of e-chains is communication.

Kaynak *et al.* (2005: 624) continue however by saying that one of the shortfalls identified within the growing environment of ICT is the lack of infrastructure in developing countries, such as in Africa. What could be a contributing factor is the lack of a telecommunications infrastructure especially towards the centre of Africa. This could be contributed to the fact that Africa is seen as a "poor" continent and in many of the countries the biggest concern for the population is survival; to ensure that there is enough food, and not to ensure that everybody has a telephone or a computer to work on. Kapurubandara & Lawson (2007:487) confirm this by saying that in developing countries, such as Africa, the problems faced with ICT adoption are, amongst others, a lack of telecommunications infrastructure. Infrastructure includes *"poor Internet connectivity, lack of fixed telephone lines for end user dial-up access and the underdeveloped state of Internet Service providers" (*Kapurubandara & Lawson, 2007: 488). As the infrastructure is seen as an external barrier, these barriers cannot be resolved or addressed by SMEs internally. What they can do is to search for a solution which will be best suited to their needs.

Gillwald (2007:53) set out to investigate the causes why broadband in South Africa is so poorly adopted. He continues by saying that apart from the island states, Tunisia's mobile market is the fastest growing market in Africa. Below is a diagram published in the Sunday times in 2006, and referenced by Gillwald (2007:54). It provides an introduction or even a broad overview of the suppliers who dominated and are still dominating broadband in South Africa. (No similar recent comparison of the service providers in South Africa could be found). Currently there are a large number of service providers within South Africa, because a large number of new competitors have entered the broadband service provider arena. However, diagram 2 only illustrates the top service providers for the year 2006 in South Africa. If one takes a look at the diagram, the top three service providers are

Telkom, Vodacom and MTN. (The coverage of Vodacom and MTN can be viewed in Annexure B. A Telkom coverage map of South Africa could not be found.)
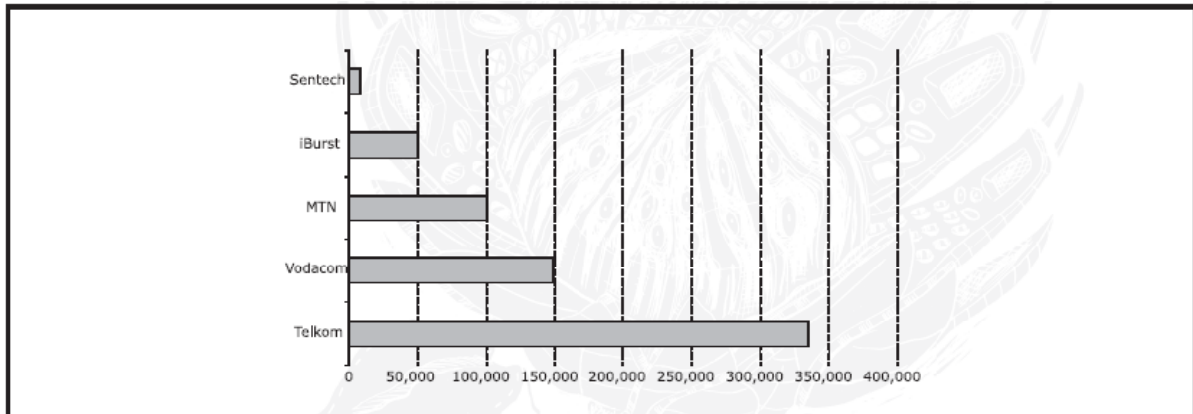
Diagram 3: SA market share in 2006 (Sunday times referenced by Gillwald, 2007:54)

In the earlier days, service providers such as MTN and Vodacom were the only competitors in the wireless mobile arena. However, Telkom, who currently has the largest uptake of Broadband users in South Africa, as can be seen in diagram 3, has now also entered the wireless market. Gillwald (2007:54) mentions that even though it seems as though Telkom and other service providers are covering a large area and a large part of the population, this is in fact not happening. This is due to the high cost of access to broadband within South Africa. He continues to say that South Africa still lags behind when compared to other lower-middle and middle income countries, when it comes to broadband adoption.

A business article published in 2009 in Timeslive (Online) called "Why broadband is expensive in SA" mentions the technologies available in South Africa, iBurst Wireless, IPWireless, UMTS, (3G/HSDPA), Wi-Fi and CDMA2000. They also list the top service providers as being Vodacom, MTN, iBurst, Sentech and Neotel. However, as stated earlier, this paper will focus mainly on the three as indicated by Gillwald (2007:54) as the top three service providers. What emerged from the Business article (Timeslive, 2009) is that Telkom had the "de facto monopoly" in South Africa when it comes to fixed lines. It continues by saying that Telkom has fixed lines in most households already, and thus access to broadband is through Telkom in most cases anyway. In Annexure B one can see that Vodacom and MTN seem to have coverage across the whole country, so why can everybody not be connected to the Internet? It boils down to cost. Even though this research project is not focusing on the actual cost involved when choosing a broadband service provider or setting up an infrastructure, this fact cannot be ignored. It is interesting to read what the experts have to say about the high cost within South Africa.

However, Gillwald's (2007:53) article which is referred to was written in 2007. During 2009, South Africa got "connected to the world" through the implementation of the Seacom cable. This new Seacom cable should ensure a reduction in the cost of broadband according to Moneyweb (2009). On the 23rd of July 2009 Seacom announced that a fiber optic cable, linking India and Europe to South and East Africa, was completed and ready to go. This cable is 17,000 kilometers long and all of this to establish affordable faster communication and links from the rest of the world, to Africa.

The main objective of Seacom is, "*lowering the cost of communication to spur growth within the urban and rural Communities"* in Africa.

There are multiple options available to the end user, but how can the SME ultimately decide what the best solution is for him? The two ugly truths to consider are cost and coverage. If there is no Vodacom coverage in your area, no matter what the cost, you have to take whatever else is available. Only when coverage provided by all the service providers reaches the entire country, can price really become an issue. Throughout the later part of this project, the researcher hopes to see exactly what the reason is for choosing the one above the other. As all the providers have excellent marketing campaigns, what and why does the end user select a specific service provider? What truly influences their choice? In section 3.5, the project will look at how technology choices are being made and how end users make a final decision by investigating various models of adoption.

3.4.4 Applications

What is an application? Applications in this project refer to the software being used in the mobile devices, desktop computers and laptops all over the world. In today's struggle for power, there is a great distinction to be made between proprietary software and Open Source software. The next part will introduce these two types of applications and discuss some features of each.

Proprietary Software: According to Wikipedia, proprietary software is software which is either not free or where the source code is not open or available (Wikipedia: Proprietary Software [Online], 2009). In other words, software such as Microsoft Windows or MS Office is seen as proprietary as one can only purchase a new release every year or so, and you, as an end user, cannot "adjust" the software towards your requirements. The first part of the application will look at Windows as an operating system and why Windows seem to be dominating the market at this stage, after which Open Source will be discussed briefly as another possible solution for SMEs, and if indeed it makes sense to rather choose Open Source above Proprietary.

Microsoft XP, Windows 7 or Vista – What more can be said? Everybody knows Microsoft, and everybody has at some point in their life used at least one of Microsoft's applications, such as Windows XP, Microsoft office. In January 2009, Palmer (Online) reported that Microsoft is losing some of its market share, and that the market share of Windows was reduced to 88.7% in December 2008. However, according to NetApplications (2009, Online), the current market share that Windows held worldwide for the year up to October 2009 is 93.17%, as can be seen below. Palmer continues by acknowledging that Windows still has the largest installed base machines. And even though Windows seem to be losing the market share, the fact is, more than 90% of the desktops around the world have Windows installed on it.

Diagram 4: Total market share – Operating systems

If you want to buy a desktop from a local vendor in South Africa, (https://www.incredible.co.za /ProductsByCategory.aspx?Cat=1&Sub=2&Page=0, 2009, Online), most of them either has Windows XP, or Windows Vista or even Windows 7 installed. Out of 17 desktops in their catalogue, only one has an Open Source operating system. Looking at notebooks, as was mentioned earlier, most SMEs prefer a device which is mobile, the picture not being that different. Below is a summary of the catalogue of notebooks available. Even though 21 out of 58 did not mention what the standard operating system installed on the notebook is, the majority, more than 60% of the notebooks on offer, have Windows installed. Now, one can argue that users might downgrade or upgrade, depending on their preference, to an Open Source system, but in SMEs, as already mentioned and will be seen later in this paper, IT skills are rarely available (Ellis & van Belle, 2009: 41, 44, 46) and thus to switch to an unknown operating system might be risky or even not happen at all.

Catalogue Page	1	2	3	4	5	6	7	8
Operating system								
OSS	1	0	0	0	0	0	0	0
Windows	4	7	6	8	8	2	1	0
No mention	3	1	2	0	0	6	7	2

TOTAL Number of notebooks	58
Total OSS	1
Total Windows	36
Total Not mentioned	21

Table 3: SA Vendor catalogue standard operating systems for Notebooks

Open Source software (OSS): *"… nearly all free software is Open Source, and nearly all Open Source software is free*" (GNU operating systems, 2009, Online). With Open Source, the source code is mostly available and free even though it should be measured against a certain list of criteria (Open Source initiative, 2009, Online). These criteria include:

- Free redistribution

- Source code

- Derived work

- Integrity of the author's source code

- No discrimination against persons or groups

- No discrimination against fields of endeavour

- Distribution of license

- License must not be specific to a product

- License must not restrict other software

- License must be technology-neutral

Ellis & van Belle (2009:41, 44, 46) also noted that the current monopoly is held by Microsoft for a large portion of desktop software. However, during their studies and by using the Technology-organization-environment model, it emerged that Open Source could be a more viable option for SMEs especially in the South African market. Although they also note that due to the lack of exposure and knowledge of the available products, SMEs tend to be reluctant to adopt this software, the lack of technical skills also seen as a reason for not adopting OSS. Another issue which could also strain the adoption of OSS or E-Commerce and Internet is the poor bandwidth infrastructure especially in the more rural parts of South Africa, as discussed earlier. Chibelushi & Costello (2009:222) mention that SMEs could rather use OSS and thus reduce the cost of having to buy software. However, not all SMEs know about OSS and those who do know are Microsoft Licensed companies. Another problem is the skills. One has to have the necessary skills to not only operate, but change or add certain functions as changes made without knowledge, could lead to system problems.

However, the current trend is still in place and most of the notebooks or PC's being sold today have Microsoft products installed and one would have to keep an eye on the future trends followed by suppliers to see whether or not they will adapt to include more Open Source machines. As most SMEs will go out and buy a laptop from a supplier, it seems as if most of these SMEs will then adopt Microsoft packages. During the interviews the researcher wishes to gain more insight into the reality of which applications are currently being used by SMEs.

There are still a large number of "other" systems which are used by most SMEs, systems such as MS office, which is the full Microsoft office package to be able to write a letter in Word, do basic and advanced financial calculations in MS Excel, or send emails via Outlook. Currently one of the predominant ways to communicate is through email facilities, and with the right email application, one can even start to build internal databases within your email which is accessible to everybody in your company.

From a financial point of view, packages such as Softline Pastel or QuickBooks are South African financial solutions which cater for smaller, medium and large organizations (Pastel, 2009; QuickBooks, 2009, Online). But a solution such as a financial package would only be necessary if the SME indeed does its own accounting functions. Most of the time, this is an outsourced function. Outsourcing will be discussed later in this chapter.

To identify the specific software that a SME will need is almost impossible. This section introduces SMEs to some of the available options such as what the difference is between Open Source and proprietary. However this section of the research project is only to introduce SMEs to various software and hardware options and not to provide a list of software applications that will suit their organization as such a list would be never ending. Even though this research paper provides a guideline, outside influence and personal choice play a major role in selecting the appropriate technology or applications. As was seen in section 3.2 the necessary skills are not always available within an SME to be able to make the right choice of software and these SMEs have to rely heavily on external advice.

3.5 Challenges faced by SMEs during ICT implementation and adoption

When engaging in new projects, one of the biggest concerns is if it will succeed. Will the project, whether it is buying a new notebook or purchasing new software, be successful and ensure a return on investment? This section will focus on implementations of software such as Enterprise resource planning (ERP) or Enterprise systems (EIS), even though these systems are more commonly used within larger organizations, the researcher wanted to identify any patterns as to why certain ICT implementations fail. These patterns can be highlighted for SMEs at an early stage which will allow them to watch out for these potential pitfalls.

When talking about IT and projects one realizes that there is a certain opinion about the success of the implementation of projects.   As stated by Lai *et al.* (2006:224), Agourram *et al.* (2007:67), and Ignatiadis & Nandhakumer (2007:36), to determine a successful implementation is one of the most enduring topics. Although they focus primarily on multinational implementations, what does become evident is that successful implementations are largely based on perceptions of end-users and management. Parthasarathy & Anbazhagan (2007:52) indicated quite strongly that *"Customizations is found to be a major annoyance in most of the ERP projects."* They continue by stating that in order to ensure reduced customization, and thus enhancing the success of implementations, it is best to rather have business processes adapt to the system than to spend time and money on customizations, which could also be done by using the Open Source Software as discussed earlier. It is also stated that due to limited end-user participation during implementation, there is an unavoidable gap between the systems and certain business processes.

Taking this into consideration, one has to try and find a system that best fits your organisation and by adjusting your processes for example, would ensure that there will be no future customisations required when the SME does grow but rather understand your own business processes.

Whitten *et al.* (2004:143) states that projects are successful if the following is true:

- Information produced by the system is acceptable to the user
- Delivered on time

- Within a set budget

- *"Development process had a minimal impact on ongoing business operations"*

Even though Whitten *et al.* (2004:143) summarised the factors that can be used to determine the success of implementations or projects, Liebowitz (1999:66) lists the following as reasons why projects are successful. Take note of how many of these aspects relate to the social aspects of the projects:

- User involvement at the development stage
- Senior management support
- Realistic expectations
- Good communication
- Joint agreement on the project plan
- Expectation management
- Well structured development process
- Personnel
- Well defined requirements

According to Lai *et al.* (2006:246) successful implementations can be attributed to dependability or reliability. However, even though the dependability of the system plays a crucial role, what is also evident from these implementations, is the role the managers of the end users play together with the quality of the system. It is stated that managers must communicate the necessity and quality of the system to the employees, to receive conformity back from the employees, also known as end users.

A similar statement made by Zarotsky *et al.* (2006:21) mentioned that software implementations were not as successful as they had hoped because of the lack of management involvement as opposed to the dedicated involvement during the actual implementation. Rantapuska & Ihanainen (2008:585) noted that investment in ICT is seen as a technical process with not enough attention being given to the social aspects of ICT. As can be seen from these studies, a crucial aspect when investigating and implementing ICT, is the involvement of the people. Thus the SMEs need to focus on their employees or in some cases, their customers, as they will ultimately determine if they are successful or not.

Chibelushi & Costello (2009:214) point out that even though their research paper focus on ICT SME's, the challenges faced are mostly the same across all sectors.

These challenges include SLEPT:

- **S**ocial
- **L**egal
- **E**conomic
- **P**olitical
- **T**echnological factors

However, even though the above mentioned challenges are the most common ones, they continue by listing three more, which is relevant to ICT SMEs but could be traced back to all SMEs' in terms of ICT adoption. These three are "*Technology changes, customer behaviour and attitudes*" (Chibelushi & Costello, 2009:214)

Coff & Laverty (2001:3) noted that the following resources become crucial when trying to gain and maintain a competitive advantage in the market; physical, human, reputation, financial and technological. Interestingly, two of the five resources are intangible resources, which relates to the social aspect of the organisation. Even though the main focus of the findings of Coff & Laverty (2001:3) is not focussed on the successful implementations or adoptions of ICT, it does shed light on the aspects which assist any organisation in gaining a competitive advantage.

Based on the above findings, one theme clearly emerged and that is the need for social interaction between all the various role players which leads one to focus on a model for the rest of this paper, which has a high focus on the social aspect of IT adoption.

Fink & Disterer (2006:611) state that the way in which support of ICT is carried out within SMEs will determine the success of ICT. Chibelushi & Costello (2009:214) point out the issues of support provided by the service provider, which also influence the adoption of ICT. These issues state that external consultants could be sourced, but they are often too expensive. Public support advisors could be sourced who might be more cost effective, but do not always have the relevant knowledge to support in a timely fashion. This will lead to SMEs still seeking advice from informal networks rather than knowledgeable sources. From a South African point of view, this is also relevant. South Africa currently has one telecommunications provider which holds the monopoly, but there are a few question marks surrounding their support to the public.

Fink & Disterer (2006:611) realise that determining IT adoption within SMEs, is influenced by the social aspect of IT and how IT affects the social aspects of the organisation. Social networks can be described by using figure 2 where four constructs namely, interactions, environment, affiliations and identities are determined to investigate IT within the SME's environment. These four constructs will also be used during this research as guidelines of how SMEs focus on these areas as well as to provide background and identify the type of SME interviewed. Fink & Disterer (2006:611) introduce these constructs as follows:

Interaction: users use ICT to interact with others within their work environment. Thus the information and resources are being *"mobilised as people engage with affiliated organisations."*

Environment: Location that limits organizational actions and the organizational needs are identified to recognise the environment by using ICT as well as what the organisational industry focus is.

Affiliations: Social networks being created by people with their computers, within the organisation as well as in the industry within which they operate.

Identities: Identify the kind of staff employed as well as acknowledgement of the members within the organisation either as individuals or as collective entities.

41
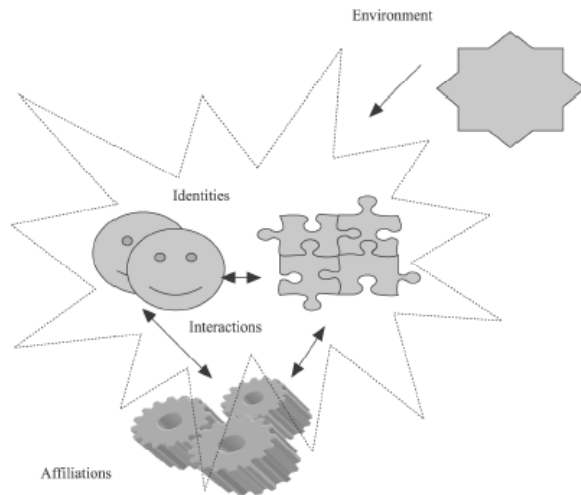
Figure 3: Research construct in the context of an SME (Fink & Disterer, 2006: 611)

As these four constructs are used to identify or rather classify SMEs, they will be used during the data analysis to provide a clear understanding of the kind of SME which was interviewed as well as the way in which these SMEs communicate and identify both their employees as well as their interaction with their environment.

Coff & Laverty (2001:2) state that organisational success can be attributed to the people-dependent resources available to these organisations and that any problems within the organisation need to be addressed on both an individual as well as an organisational level to gain a competitive advantage.

Multi-national end users

Even though most research promotes the implementation of an ERP through a multi-national organization to enhance control, Ignatiadis & Nandhakumer (2007:37) state that this might in fact have the opposite effect. Reduced control is due to *"the more integrated a system is the faster and farther side effects have an impact, and the bigger their consequences*."

Agourram et al. (2007) look at the implementation of information systems across a multi-national organization. They indicated that when one conducts implementation across multi-national organizations, one of the greatest aspects to consider is culture. Because of the cultural aspect one cannot merely transfer certain processes and assumptions from one country to another.

Agourram et al. (2007) define culture as: "*a group of people who share a common understanding and meaning of things around them".* During their implementation of an ERP in France, it emerged that the French people like to be in control and therefore would want to maintain power over the system. A System is merely a tool to structure certain data inputs in order to make logical decisions. It was also clear that the French do not like uncertainty and unstructured situations. As South Africa is truly a rainbow nation with a magnitude of cultures and languages, eleven official languages to be precise,

one has to realise the effect of dealing with different cultures when looking at the usage of ICT. Except for the different cultures within South Africa, one also has to realise that a large portion of the South African people has never used any form of technology due to inaccessibly. The biggest need is food, not IT, as stated earlier.

3.6 Various IT adoption models

As most SMEs do not always understand what the benefits are which they can gain when investing into new technologies, they also do not understand how to choose certain technologies. This section will look at IT adoption models which can help SMEs to know which technology will suit their business models the best.

When introducing a new concept, the first reaction is mostly one of questioning motives or being threatened by it. But as mentioned by Diefenbach (2006:129) change is inevitable and one does not really have a choice as it is an "unavoidable necessity". The TINA principle is mostly seen as a "technique" to assist in managing the change, but what does this mean? "*There is no alternative".* In other words, there are no choices and you have to adapt. However this technique scares people into accepting change. Yu (2001:189) continues by stating that due to the perceptions of certain people, the mind maps which was built by previous experience, needs to be torn down and new maps need to be created in order to be able to adapt to new systems.

Chibelushi & Costello (2009:213) also state that without a clear understanding of the model and scope of adoption, the result could be that the investment on ICT does not deliver any value.

However, there are a number of models available which has been developed to assist in ICT adoption within a social context. Models such as *"the theory of reasoned action, the technology acceptance model, the motivational model, theory of planned behaviour, a model combining the technology acceptance model and the theory of planned behaviour, the model of PC utilization, the innovation diffusion theory and the social cognitive theory"* - Venkatesh *et al.* (2003:425), They continue by saying that one of the most mature research discussions in information systems is that of explaining how users accept certain technologies. They conducted a study which looked at eight various models in an attempt to discover a unified model in a quest to combine the most common and important aspects of all of these models.

As mentioned by Bhattacherjee & Sanford (2006:810), Rogers 2005 said "*IT acceptance is fundamentally a problem of social influence"*. Handy *et al.* (2001:46) say that one has to be careful to view the technical and social side of information systems isolated from each other. Thus, there is a huge interaction between humans and the implementation and success of ICT, as was stated earlier.

Rantapuska & Ihanainen (2008:594) continue by saying that a model should be developed which can be used in the ICT investment process "*that counts more on the human capacity as a learner."* They also continue by saying that there are three categories which decision-makers within an SME tend to

focus on; these are problem, product and provider. Decision-makers will rather look at the problem related to IT and will see the purchase of some sort of IT as solving the problem. From a product viewpoint the software product to be purchased is the deciding factor and the decision maker will choose a provider who they can rely on. The acquisition of IT is thus done based on these three categories. When looking at the various models, these three categories will have to be considered and taken into account for the final framework.

3.6.1 Model discussions

In the following section three adoption models are introduced followed by brief explanations of how these models are being used in certain areas of research. The reason why these three models were chosen is due to their impact on the social aspects of IT adoption as well as the fact that the unified model already contains most of the important aspects of the eight models mentioned earlier (Venkatesh *et al.,* 2003:426). Another reason why only these three models were identified is due to the statement Bagozzi (2007:225) made where he said that adoption models are reaching a point of chaos and each new model leads to new fragmentations of already created models. These models will be compared to find the best one and the best concepts will be used to build the conceptual framework for ICT adoption by SMEs within a South African context.

MODEL	ABBREVIATION
Elaboration Likelihood model	ELM
Technology Acceptance model	TAM
Unified theory of acceptance and use of Technology	UTAUT

Table 4: List of IT acceptance models

Elaboration likelihood model: This model was developed in 1986 by Petty & Cacioppo (Wikipedia, 2009 & Fadel *et al.,* 2008:2) and it points to a role played in the forming or changing of attitudes. Fadel *et al.* (2008:2) continue by saying that ELM is used to account for "*variations in information influence across individuals and contexts".* Thus, it realises the importance of individual perceptions and how these perceptions are formed. They expanded by stating that it is a way in which the utility of information is judged through cognitive elaboration.

Bhattacherjee & Sanford (2006:807) noted that there are two routes which influence the attitudes amongst individuals. Fadel *et al.* (2008:2) call these channels whereby characteristics of processed information are evaluated. Bhattacherjee & Sanford (2006:807) continue by saying that the two core drivers of the acceptance of IT are attitude and perceived usefulness. On the other hand, Sussman & Siegal (2003:52) state that ability and motivation are seen as influencing factors of elaboration.

The first route would be the central route, within which one has to be an expert on your subject matter and requires great deal of thought (Elaboration likelihood model online, 2009). By choosing to "travel" the central route, the message received will determine the outcome; messages such as advertisements or a speech are the primary influence. Then if the thoughts being generated by the decision-maker are favourable towards these messages, this message or product will be accepted.

The second route is the peripheral route where one will be less knowledgeable on the subject at hand, but rely on others for assistance (Bhattacherjee & Sanford, 2006:807) and often rely on the environmental characteristics of the message (Elaboration likelihood model online, 2009). These two effects will directly determine your attitude and the route chosen is determined by motivation and ability (Elaboration likelihood model online, 2009). It is also stated that high elaboration = strong attitude. Multiple roles are identified which also affect attitudes based on context within which it is applied, such as an argument, or a biased factor, a peripheral cue or the way of information processing and lastly self-validation role.

Fadel *et al.* (2008:2) mention that the central route refers to argument quality and the peripheral route refers to source credibility. While explaining the Innovative diffusion theory, Bhattacherjee & Sanford (2006) state that it is mentioned that adoption is viewed as a one-time decision and the long time effects or post-adoption effects are ignored. However, it is stated that the central route of ELM is more stable in terms of the influence effects than the peripheral route.

ELM however suggests that external messages are the variables as well as the influencing factors which are missing for IT acceptance.

A few aspects are identified which influence adoption, and these are: time spend on the subject, the credibility of the source, or the expert. When using the ELM model, most studies indicated that attitude is the dependant variable for accepting technology. However, it emerged from the studies of Sussman & Siegel (2003:50) that the quality of the argument will determine the influence gained though information.

In the study conducted by Bhattacherjee & Sanford (2006:811), they used the Elaboration likelihood model to see which other influencing factors could emerge in regards to IT acceptance. In a nutshell, Bhattacherjee & Sanford (2006:805) state that the ELM uses the quality of the argument and the credibility of the source to influence the attitudes. However, Fadel *et al.* (2008:6) found that source credibility has no effect on how useful knowledge gained is, but rather that validation of the information before the information is useful to the end user.

Below are some of the main categories which emerged from the studies of Bhattacherjee & Sanford (2006:813):

- Relevance = Motivation degree
- Expert user level = Effort degree required
- Ease of use

- Influence = Decreases over time

Bhattacherjee & Sanford (2006:811) identified seven constructs that influence the adoption of technology. They are perceived usefulness, attitude, acceptance intention, argument quality, source credibility, and user expertise and job relevance.

Technology acceptance model: According to Wikipedia (Technology acceptance model online, 2009) TAM was developed by Bagozzi and Davis in 1992 and 1989, respectively. TAM's main focus is perceived usefulness and perceived ease of use, and thus this could "*limit the freedom to act*" if not considered. TAM was specifically designed to be applied in the adoption of new technologies. It is used to indicate the way in which users accept and use new types of technologies. In other words, it is used to measure and determine if there is a way in which an end user's perception of the acceptance of technology can be measured. Again, it tends to focus on attitude, the end user's attitude, which clearly puts the focus on the social side of IT adoption.

Reimenschneider *et al.* (2003:271) noted that TAM is the model most likely to be used for IT adoption in small businesses due to the social approval of this model. Bagozzi (2007:244) continues by mentioning that TAM has been the leader model of technology acceptance for more than two decades.

Reimenschneider *et al.* (2003:271) divided TMA into two cognitions, namely perceived usefulness (U) or ease of use (EoU) and attitude (A). Lu *et al.* (2003:207) define Davis' TAM theory of ease of use and usefulness as follows:

> Perceived ease of use: Extent to which a system can be used without any mental effort, "*free of mental effort*".
>
> Perceived usefulness: *"Extent to which a person believes the system would enhance his/her job performance."*

Lu *et al.* (2003:205) state that TAM focuses on the "*consciously intended behaviours*". In other words attitudes lead to intentions which lead to behaviours. The primary "belief" of TAM is that all IT adoption relates to ease of use and usefulness, as was also indicated above. They continue by stating that attitude will be the deciding factor of the intention to adopt a specific system. However, according to a study conducted by World Wide Worx (Goldstuck, 2009:11) 80% of South Africa's SMEs noted that ease of use is an important criteria for adopting wireless technology, with 79% also stated that quality is important. Continuing with the findings of the study, 74% noted that maintenance is important and 72% chose reliability. Price was only ranked as the 5th most important aspect of why SMEs will adopt wireless technology. These findings are a clear indication that certain parts of TAM could be used as the basis for technology adoption within SMEs such as ease of use, one of TAM's measurements which are rated as the number one reason for adoption within the South African market.

Figure 4 introduces the TAM model:
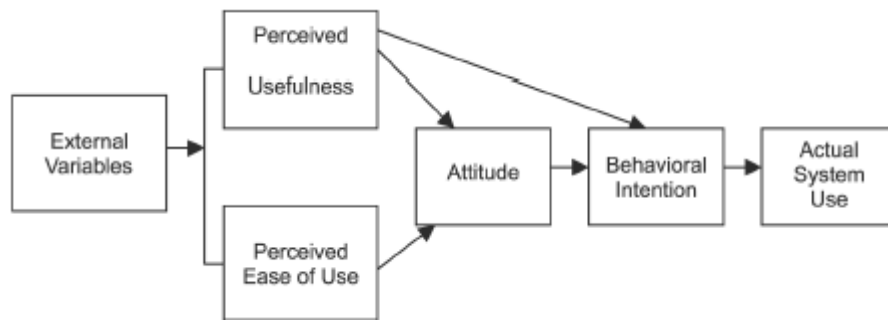
Figure 4: Technology acceptance model (after Davis 1993) Lu *et al.* 2003

On the other hand, TAM is a model used to explain computer usage. Mehrtens *et al.* (2001) identified three factors which ultimately influence or affect the adoption of the Internet by small firms. These factors are perceived benefits, organizational readiness and external pressures. One thing to keep in mind at this stage is that the research paper investigates SMEs which, as stated earlier, usually involve one owner who tends to be the decision-maker. Yu (2001:189) also states that the owner's perceptions are mostly the cause of the sluggishness of information technology adoption. Dyerson *et al.* (2009:42) however indicate that very few SMEs adopt technology as a result of external pressures, but rather to gain a competitive advantage, to enhance operational efficiency as well as to improve their services to their customers and to satisfy their staff. As mentioned earlier, one of the issues faced by SMEs during IT adoption is attitudes as well as customer behaviour (Chibelushi & Costello, 2009:214).

Reimenschneider *et al.* (2003:269) continue by acknowledging that small businesses face problems when implementing IT in terms of the adoption of IT and the use thereof. Two models are investigated and they try to generate a combined model to be used in the implementation of IT in smaller businesses. Reimenschneider *et al.* (2003:273) identify the following three aspects which influence IT adoption: Anticipated consequences, social approval or disapproval and perceived difficulty in enacting/implementing decision.

It is clear that there should be a fit between the task or nature of the job the user is performing and the system. (Wikipedia quoted Stewart, 1986)

Lu *et al.* (2003:214) continue by saying that the adoption of Wireless Internet via a mobile device is strongly influenced by prior experience as well as the adopters' level of innovation. They say that the more innovative a person is, the more one tries new things and should then develop more positive perceptions towards new technology. Gender and age also play a large role in the adoption of wireless Internet especially. Lu *et al.* (2003:214) noted that Germany, the United Kingdom and Italy have a male dominated mobile phone market. Even though this is not the main focus of this research paper, it is worth looking into the genders at various SMEs and see whether the adoption of technology is strongly influenced by the male partners in the company or not.

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At the end of Lu and his colleague's studies (2003: 217) they created a number of additional constructs to the TAM framework which are required for Wireless Internet via mobile devices. These constructs are technology complexity, individual differences, facilitating conditions, social influences as well as wireless trust environment. Some of these constructs, even though not all of them, could be used as building blocks for the conceptual framework which this paper is creating.

Unified theory of acceptance and use of technology: Venkatesh *et al.* (2003:425) conducted a study to create a unified acceptance model which took eight prominent adoption models into consideration and proposed the UTAUT model. They did however acknowledge that the model still requires some additional research but the foundations of UTAUT will now be discussed.

After conducting intensive studies into the eight different research models, there seem to be seven constructs which has a direct influence on the intention of usage in the individual models. Venkatesh *et al.* (2003:446) have identified four constructs or building blocks which play a considerable role in determining user acceptance as well as behaviour. These four construct or building blocks are: performance expectance, effort expectancy, social influence as well as facilitating conditions. Figure 5 shows the unified model as proposed by Venkatesh *et al.* (2003:447) after which the model will be explained in more detail.
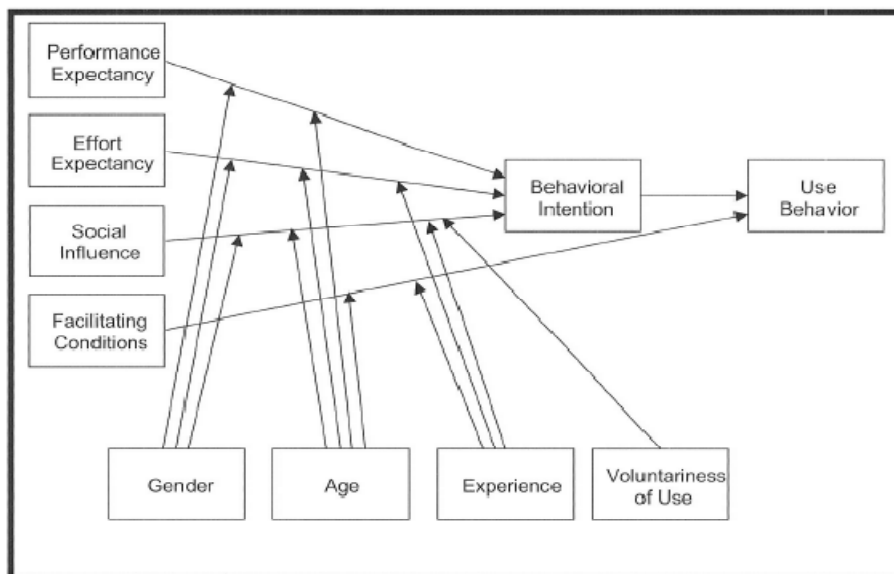
Figure 5: Research model, Venkatesh *et al.* (2003:447)

Performance expectancy: This includes beliefs which an individual has related to job performance. Based on the various models, there are five constructs which form part of the performance expectancy. These constructs are *"Perceived usefulness, job-fit, extrinsic motivation, relative advantage and outcome expectations"* (Venkatesh *et al.*, 2003: 447). This means that performance expectancy relates to the way in which a person believes that a specific system or technology will benefit him in his day to day activities. Venkatesh *et al.* (2003:450) continue by saying that gender and age also determines the way in which a system is perceived to enhance the performance of the

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individual. For the purpose of this study, gender and age will not be determining factors and will thus not be discussed in depth.

Effort expectancy: Relating to the easy usage of a system, there are three constructs which were used to compile effort expectancy and they are *"perceived ease of use, complexity and ease of use".* However, Venkatesh *et al.* (2003:450) state that effort expectancy will only play a role during the introduction of new technology and will be overshadowed as time goes by and experience is gained. Even though age and gender is not part of this study, it is interesting to note that older individuals tend to find the processing and focusing on the system more difficult and thus have an influence on the perceived ease of use.

Social influence: Venkatesh *et al.* (2003:451) state that social influence is based on the individual's perception of what other think of him after using the system. Most of the time these "others" are influencing the individual's behaviour, especially as these influences are from the more senior staff. As is the same with effort expectancy, this social influence will only come into play during the early stages of adoption. They also continue to state that women are more sensitive and the intention to use technology, based on the social influence, becomes more relevant. However, this effect will decline with experience.

Facilitating conditions: *"The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system"* Venkatesh *et al*. (2003:453). *"Perceived behavioural control, facilitating conditions and compatibility"* are the three constructs which were used to generate facilitating conditions. Factors such as control over system, necessary knowledge in using the system, available guidance and compatibility to a specific function within the organisation are issues that play a role in this construct.

3.6.2 Advantages vs. disadvantages

Each of the models discussed, have certain benefits as well as disadvantages attached to them which might have an impact on their outcome which could affect the way in which SMEs adapt these models. Some of the advantages and disadvantages which emerged from the literature will be discussed in the following section.

Disadvantages:

ELM: Fadel *et al.* (2008:2) state that the central route requires focus on the application and thus could be costly as high elaboration is required. However, because of the peripheral route, it will not halt the decision process completely.

Sussman & Siegal (2003:51) highlight that ELM does not include usefulness of information during the influence process even though it does contribute to the perceived usefulness of the message.

TAM: Handy *et al.* (2001:39) indicated that there are three shortfalls which relate to organizations but are not part of Davis' TAM model. These are as follows:

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- Perceived system acceptability: It is stated that if end users cannot see that the system deals with critical issues such as security, the system will not be adopted, even if ease of use and usefulness are present.

- TAM does not always focus on the contextual or organizational factors. For larger organizations, issues such as system cost, training and support might not be such a big issue. However, when one starts to work with smaller organizations, these factors carries a bigger weight for acceptance of technology.

- The attitude towards the system and ultimately the adoption thereof is directly influenced by the characteristics of the individual himself.

Lu *et al.* (2003:208) state that TAM fails to supply meaningful information on certain opinions which the users might have about a specific system. The intention to use is also one of TAM's shortfalls. They continue by saying that TAM needs to focus on the theory as developed by TPB, which includes the innovation diffusion. TAM also focuses on IS/IT adoption in organizations rather than on the individuals, and seeing that most SMEs are individually based or focused, this could be a cause for concern. Lu *et al.* (2003:214) also states that TAM should have looked at the innovation level of the adopter as well as the age, gender and level of prior experience.

However, one area of concern is that Ellis & van Belle (2009:42) noted that the TAM focuses on the individual adoption of Information technology and not on the organization's IT adoption as stated by Lu *et al*. (2003:208) and they continue to say that TAM needs to be explored to identify the general individual acceptance of IT.

It is identified that one of the gaps in TAM is that even though it is said that external variables can have an effect on the acceptance of technology, it does not indicate which specific external variables. Bhattacherjee & Sanford (2006)

UTAUT: As mentioned by Bagozzi (2007:225), there are a few limitations when looking at Venkatesh's UTAUT model, such as:

- Predicting intentions are influenced by the fourty one independent variables as well as eight independent variables to predict behavior. Even though there is such a large number of prediction variables, two things are problematic, firstly the confusion which could be caused and secondly future research is bound to discover more variables which seem to have been left out due to the generics or fundamentality of these factors.

Venkatesh *et al.* (2003:468) also mentioned that some of the facets of the original models could have been lost and not fully represented.

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Advantages:

ELM: Fadel *et al.* (2008:2) state that decision-making could be a costly process due to extended focus on a certain message being portrayed by using the central route. The peripheral route allows one to make a decision based on a message received from a trusted friend rather than from an advertisement. The decision for the product or message is based on the characteristics of the individual providing the message without really taking into consideration the quality of the message.

Within SMEs, it is clear that mostly, the decision-maker will ask a family member or friend for advice on certain products, rather than launching a huge research campaign to find the correct product. With limited resources, the option to launch a research campaign barely exists for SMEs. The level of expertise will influence whether or not the peripheral route is followed, quite simply stated, the more experienced the recipient of the message, the more they will tend to lean towards choosing the central route. But once again, as stated later, there are not a lot of in-house skills available within SMEs and thus they will usually rely on someone else's expertise. (Fadel *et al.*, 2008:2)

TAM: According to the study conducted by the World-wide worx as discussed by Goldstuck (2009:11) the most important aspects for SMEs is ease of use during IT adoption.

- TAM focuses on the perceived ease of use and usefulness. TAM does seem to be suited to the South African market to a large extent and most of the core aspects of TAM can be used as a basis framework to work from when creating a conceptual framework for IT adoption.

Because of the social approval of TAM, it is most likely to be used in small businesses according to Reimenschneider *et al.* (2003)

UTAUT: Venkatesh *et al.* (2003: 425; 467) realised that when looking at the adoption of IT there is a variety of models available which carry significant constructs or building blocks. Thus the UTAUT attempts to bring forward building blocks to find one model for IT acceptance instead of searching though an unlimited number of overlapping models which is trying to resolve the chaos currently experienced, as mentioned by Bagozzi (2007:225)

3.7   Building blocks

After reviewing the models, it became clear that there is a "golden thread" which actually links all three models together. UTAUT is bound to incorporate aspects which form part of TAM but there is still a strong correlation between ELM, TAM ad UTAUT. Upon drawing a mind-map of all the characteristics of these three models (Annexure C), it became evident that the relationships between the characteristics are rather strong. As stated by Korunka *et al.* (1997:53), organizational flexibility

and competitiveness increases through the use of information technology and can be used as a basis to explain the urgency of adoption of these systems.

The next section will indicate all the main characteristics which emerged from the models as well as the literature in the form of building blocks. These building blocks were used for setting up the interview questions as well as building blocks for the framework. After the building blocks have been introduced, some will be discussed to ensure clarity of choice of these blocks.

Theme or model	Building Blocks								Resources
ELM	Attitude	Perceived usefulness	Job relevance	Source credibility	Intention	Job relevance	Argument quality	Expertise	Fadel *et al.* (2008:2); Bhattacherjee & Sanford (2006:807); Sussman & Siegal (2003:52)
TAM	Attitude	Perceived usefulness	Job fit	External pressures	Intention	Job fit			Reimenschneider *et al.* (2003:271); Lu *et al.* (2003:207); Bagozzi (2007:244); Yu (2001:189); Dyerson *et al.* (2009:42)
UTAUT		Usefulness / Ease of use	Job fit	Social factors		Job fit	Expectancy		Venkatesh *et al.* (2003:425)
Mobile Devices		Easy to use / Useful						Availability	Hart & Hannan (2004:201)
Successful projects				User & Management involvement			Expectation		Liebowitz (1999:66)
Challenges	Attitude			Customer behaviour				Technology changes	Chibelushi & Costelle (200:212)

Table 5. Building blocks

Aspects which emerged from the literature which forms part of the building blocks will now be briefly explained. (All the main aspects which will be used to develop the framework will be indicated by bold print.)

Problem, product and provider are the three categories which SMEs are focused on during the decision-making phase (Rantapuska & Ihanainen, 2008:589). Jackson & Sloane (2009:71) found that processes are the most important factor when organizations consider the adoption of ICT.

Fink & Disterer (2006:610) noted that for ICT to grow within an organisation, you have to use the seven Ss of Cragg in 2002. These are **strategy, structure, systems, staff, style, skills and shared value**. The seven S's as mentioned above, will be grouped as followed: Strategy; skills and staff which were discussed in section 3.5; structure and systems falls within the literature as discussed earlier in section 3.5 as well as in section 3.4; style and shared values will be discussed during the adoption section.

As mentioned in section 3.3 four critical aspects which users look at when deciding on technology, specifically mobile devices, were identified according to Hart & Hannan (2004:201):

- **Availability** of these devices
- **Useful** to everybody
- **Easy to use** and understand
- **Not an inconvenience** to users which is caused by something such as a short battery life - mobility

Interestingly to notice the correlation between these aspects and the characteristics that emerged from the discussion of the adoption models.

In section 3.4, the success of IT projects were discussed. The following emerged when looking at successful implementations:

- Information produced by the system is **acceptable to the user** (Whitten *et al.,* 2004:143)
- Liebowitz (1999:66) lists the following as reasons why projects are successful:
  - **User involvement** at the development stage
  - **Senior management support**
  - Expectations which are realistic
  - **Good communication**
  - Joint agreement on the project plan
  - **Expectation management**
  - The development process was well structured
  - **Personnel**
  - Well-defined requirements

It is important to note that even though these aspects were listed as reasons why projects are successful, one has to realise when engaging into ICT whether it be investing into something new, or changing current structures, it should be handled and managed on the same basis as a project, and thus all of these aspects should be taken into consideration. Once again, there is a correlation between these "reasons for success" and the building blocks identified from the framework.

Chibelushi & Costello (200:212) indicate the following as challenges for ICT adoption: "*Technology changes, customer behaviour and attitudes*".

When looking at the building blocks above, it is evident that all three of these models place a high emphasis on the social aspects of IT adoption. During the adoption of IT, it seems like a high emphasis is placed on the ease of use and usefulness of the technology being adopted as well as the attitude of the users whom will be the end users of these technology, as attitude will lead to intention which will lead to a specific action by the user. Job fit is also an aspect which emerged throughout all

three models which includes compatibility with a user's job functions. External influence, whether it is via a friend or via an expert, also seems to be a determinant of the adoption of certain types of technology. These would thus be the characteristics which will be used as the first characteristics to build the conceptual framework in chapter 5.

During the discovery of what the literature says about IT adoption for SMEs, two things clearly stand out, that of people and the social side of IT and secondly that ICT is crucial for the survival and growth of SMEs (Chibelushi & Costello, 2009:213). They close off by saying "*some companies are not aware what is available, what new technology can do for their business, how to get it or how to use it*".

Another interesting aspect which should be considered when focusing on ICT adoption is the type of industry within which the organization operates. Oke *et al.* (2007:736) identified that organizations operating in industries such as manufacturing, electronics, engineering and high technology industries are more likely to adopt ICT and thus the size of the organization does not really determine the type of ICT adoption.

3.8   Concluding summary

Throughout this chapter various viewpoints from the literature which relates to SMEs and ICT were discussed in a quest to see how SMEs would adopt technology as well as strategic focus areas which SMEs need to focus on when investigating the possibilities of adopting new technologies.

In the following section the interviews, which were held with the research participants, will be analysed based on the interpretive research approach whereby the researcher had to have an understanding of the SMEs being interviewed to provide useful and relevant information related to this study.

Chapter 4 - Data analysis and concept mapping

4.1   Introduction

Data gathered for a research project, whether through interviews or surveys, brings about uniqueness to the research as well as the researcher (Myers, 2009: 123). Data can be broken into primary or secondary data. Primary data is data which is gathered through some kind of research technique such as interviews and surveys, and secondary data is data which is gathered through journals or books already published. Up to this point, the data used has only been secondary data. And although secondary data is important for one to gain a clear understanding of the research topic, primary data becomes the "added value" that one has to bring forward within a research project. The next section will introduce the reader to the interviewed companies with brief descriptions of backgrounds. Each company will also be structured within the four constructs of Fink & Disterer (2006:611) which are:

- Interaction
- Environment
- Affiliations
- Identities

The reason why each company will be introduced in this specific manner is because according to Myers (2009:39) it is crucial to understand the context of the business as this defines the relevance of data. According to the research methodology discussed in chapter 2, Myers & Newman, (2007, p. 16) state that the various voices of an organisation should be taken into consideration when doing interviews. However, what emerged during the setting up of the interviews is that most of the companies only have a certain number of employees, and thus the owner was mostly the guide, the star as well as the gatekeeper.

After the company introductions, all the data will be analysed, based on three focus areas as per interview questions and data gathered. These three areas are:

1. Employees, their skill levels as well as training provided. Communication between SME, personnel and customers, and the impact of their competitors in the market.
2. Current ICT infrastructure in place as well as support and service providers currently being used.
3. Security and the possibility of a business continuity plan are deciding factors for the SME when considering investment in ICT, future goals and possible wish lists that the SMEs might have for their ICT.

4.2 Company background

A total of eleven participants or companies were interviewed. Each company will be provided with an alphabetical letter, for example company A, to ensure company confidentiality.

Company A

Company A's main focus of business is the recording of arbitration, disciplinary and insolvency hearings as well as the transcription of these recordings and the preparation of appeal records for the courts. Advanced voice-recording devices are used with four microphones each. This allows for voice recording in larger rooms such as courtrooms.

Recordings are done in the field which needs to be transcribed. These recordings are placed on a local file and print (ftp) server, and the typist can then log into the ftp as a client to retrieve the recordings and do the transcriptions.

Company A is owned by two partners, one of whom is based in Pretoria, the other in Cape Town. It is a 50/50 partnership.

> Number of employees: 2 partners
>
> Number of employees working on IT: 2
>
> Years in operation: Almost 3 years
>
> Types of technologies being used: Recording devices, CDs for storage of recordings, PC, photocopy machine, Skype and Internet modem

Interaction: Currently most of the communication between the employees is done through email. There is also an ftp server available whereby employees have access to download voice recordings and the storing of the transcripts of these recordings.

Environment: At this stage, the recordings are mainly done in courtroom based scenarios as this is a controlled environment with regard to voice-recording. The main operations are currently run from one of the partners' houses in Pretoria.

Affiliations: As most of the employees have worked in the same industry for quite some time, there seems to be a highly trustworthy relationship between the employees. Although there is no mention of a social network it does become evident that the employees, as well as the industry, are familiar with one another. Technology is being used to ensure interaction takes place.

Identities: Although there are a number of employees working for company A, most of them are not permanently employed. However, all potential employees have to have security checks done before they can become part of the company. Even though the employees were

mentioned, most of them are not fulltime and thus only receive remuneration based on their input.

Company B

Company B distributes and provides products to the poultry industry within the South African market and is currently operated by the owner and his wife, who helps with administration. There is also a driver who delivers the produce to the customers. The office is based at their house and the stock is also kept on the premises.

Products provided are chemicals and soaps to clean and disinfect the poultry, as well as lime which is also used in the cages, and products such as vitamins and other medical supplies. The suppliers are mostly based in and around Gauteng with one supplier based in Cape Town.

Number of employees: Owner and 2 additional employees

Number of employees working on IT: 2

Years in operation: Company B was registered in 2004 but has only truly been active for the last year.

Types of technologies being used: Two laptops, all-in-one print, fax and scanner, 3G for Internet connection.

Interaction: As the owner and his wife work from home, most interaction is through verbal face-to-face communication. However the owner does go out to customers as does the driver who delivers the products, and communication is done mostly by telephone. Emails and telephone conversations are mostly used for interaction with customers and suppliers.

Environment: Most of Company B's operations are currently done from the owner's house although they intend to relocate to bigger premises for safer stock-keeping of larger volumes. Even though the operations are currently run from their premises, the office is located outside the house which does provide some kind of privacy.

Affiliations: Although both of the employees have laptops, there is no network infrastructure in place. However there is some kind of social interaction between the employees and their customers, even though the only form of marketing is face-to-face visits to customers, thus building relationships.

Identities: Due to the fact that company B is mainly run by a husband and wife team, there are no real visible acknowledgements for individuals except that the driver is entrusted with the delivery of stock to the customers' sites.

Company C

Company C is truly a one-man or rather one-women show. The research participant has her own photography business specializing mostly in wedding photography although she has also taken photos of ballet dancers at ballet schools, family portraits, children and matric farewells. Although most photo shoots are done by the owner, she does have a freelance photographer who helps out if there are double photo shoots on one day. Company C is operated from the owner's house as it is still a growing business with one employee, the owner, and there is no need for any other infrastructure.

> Number of employees: Only the owner although she also has a freelance photographer who sometimes helps out with photo shoots.

> Number of employees working on IT: 1, Freelance photographer has her own equipment and thus has no influence on Company C's IT infrastructure.

> Years in operation: One year.

> Types of technologies being used: Apple Mac Machine, laptop, printer, digital cameras.

Interaction: The only interaction Company C has with the freelance photographer is through email and limited phone calls as a means of cost saving. Communication with customers is mostly done by telephone as the customers contact the owner to enquire about packages etc. Further communication with the customers is through email and face-to-face verbal discussion. In terms of the suppliers, the owner will first upload the album design through the Internet and then she will physically go to the store to discuss the printing of photos and albums in depth. Thus most interactions are through contact sessions and by phone.

Environment: The office is located at the owner's home. Since it is located in an already existing IT infrastructure, it allows the owner to optimally take advantage of this structure at a very low inset cost. The office is based in Pretoria.

Affiliations: Technology is not used to create social networks between customers and suppliers, although the end-product cannot be delivered without the extensive use of IT. The social networks are formed based on communication and email contact.

Identities: As this is a one-man business, this area is not applicable.

Company D

Company D is a franchisee who bought a reading centre franchise for kids. The centre tests the reading ability of children as well as the level at which they read, their ability to remember what they have read as well as their spelling and comprehension abilities. The level of the child's reading abilities is determined according to a norm model designed by the franchiser whereby a development program is setup for each individual. Individual programs are

developed for these children who go to the centre on a weekly basis for an hour and a half at a time. During these sessions, forty-five minutes are spent on a computer which allows them to perform eye exercises as well as comprehension tests. The next forty-five minutes are spent with audio blocks to develop their memory as well as their concentration abilities. The centre ended their 2009 year with 79 learners.

As the owner is a teacher by occupation, she has transformed her classroom to accommodate the ten computers for the centre. The centre is run after school and thus has a limitation on the number of children who can be accommodated within a weekly time-frame.

Number of employees: 2, one being the owner herself

Number of employees working on IT: All employees as they should be able to assist the children on the computers.

Years in operation: One Year

Types of technologies being used: Ten PC's for children to work on, laptop for owner.

Interaction: As all the children have to attend their weekly sessions, the interaction with the customers is mostly done on a face-to-face basis in contact sessions. Contact with the parents of these children used to be through letters distributed via the children, but because parents complain about not receiving statements and invoices, this process is now being done via emails from the beginning of this year. The supplier, who is more often than not the franchiser, is contacted via email or telephone when required. Interaction with the employee is mostly through cell phone communication however emails are also used when necessary.

Environment: As the main operations are run from a classroom, this ensures that the children are comfortable and familiar within the environment. Although there is limited space for the ten computers, the owner has managed to optimise the available space as best she can. The business is based in Pretoria.

Affiliations: As Company D has recently started to use email communication with the customers/parents, they have begun to build a network whereby communication and interaction can be optimised by the use of electronic media. Marketing can also be distributed to other parents much faster than before. As this franchise is part of a bigger national group, there is a bigger network, although not through the use of Internet or intranet. The franchisees have the ability and opportunity to discuss problems and other matters with their franchisor as well as other franchisees.

Identities: As this company only has two employees, acknowledgements could not be identified during the interview. However, through the use of the computers, the children's progress of their reading ability is enhanced to a great extent and every employee should have at least attended the franchisor's training.

Company E

The speciality of a dietician can be divided into three aspects, nourishment service management, community practice and clinical dietician. Company E consist of a clinical dietician within a private practice, in other words a practise which includes doctors or physicians who work in the same business operation. Patients are referred by doctors, with medical conditions such as diabetes but some patients will see the dietician for a weight problem.

Company E was started about 29 years ago by the research participant's mother as a result of the passion she had for helping people. When the practice started, the service was provided free of charge as this was not the primary source of income. However since October 2009 the service is now paid for by either the patients or their medical aids as the second dietician needs to make a living from the practice.

Number of employees: Company E consists of two partners.

Number of employees working on IT: Two

Years in operation: 29 years

Types of technologies being used: Laptops, printer, sms facilities, scale for weighing patients and flash disk.

Interaction: Consultations with patients are about an hour long whereby the patient and the dietician have to meet on a face-to-face basis for optimum service delivery. Communication between the employees is also physical as they share the same office and thus see each other the whole day. Customer will call for appointments but after that, everything is done on a face-to-face basis.

Environment: the office is situated in the owner's house but is separate from the house to ensure privacy with patients. The business is located in Middelburg which is a small urban town in the Mpumalanga province.

Affiliations: The only social networks created are through the contact sessions with the patients. However, as these sessions are an hour long, this creates ample opportunity for the dietician to create a relationship with patients. Computers are used to print a diet plan for every patient.

Identities: All employees should have some degree of formal qualification as required. As Company E only consists of a mother and her son in the practise, acknowledgement is applicable.

Company F

Company F is a company who owns and runs two liquor stores. The two stores are situated about two kilometers apart. The main aim of a liquor or retail store is to sell its products and to make profit. One of the main aspects in managing these stores is cash flow, as liquor sales are mostly run on a cash basis. It is extremely important to monitor stock as well as cash flow on a weekly basis as stock is ordered by the owner. However, since some packaging of liquor, such as a six pack of beer can either be sold separately or as a mixed case, the stock-keeping of these items is extremely difficult. It is for this reason that weekly stock-taking is done manually by physically counting all the stock on the premises. After stock-take has taken place, the owner reconciles the stock and she then decides on stock to be ordered and then places the orders with the relevant suppliers. Except for managing the stock and cash flow, they need to know their customers as well as the latest products in the market.

Company F believes in a totally transparent system. In other words, everybody in the business knows exactly what the total sales to date are. This is done to motivate staff as they receive bonus on a monthly basis if the store reaches its target.

> Number of employees: Each shop has about 5 employees with additional staff over weekends.

> Number of employees working on IT: 2 cashiers per store who works on till points, that is run through a computer. Each store's manager works on a PC to update stock-after stock take. Thus three per shop and then the owner also work permanently on a laptop.

> Years in operation: 7 Years

> Types of technologies being used: Computers, laptop for owner, printer and scanning devices for item prices

Interaction: Interaction with customers is on a face-to-face basis as the customer has to come into the store to buy liquor. Communication with staff is also on a face-to-face basis as they work in the same shop. There are limited telephone conversations between the two shops. Interaction with suppliers is by telephone as all orders are placed via telephone.

Environment: Both of the stores are situated within a shopping centre. Both of the shops use till-points to accommodate the customers. These till points are placed next to the exit to ensure customers know exactly where to pay. For security reasons there are cameras in the store to minimise theft. Both liquor stores are located in Witbank, which is also a smaller urban area within Mpumalanga.

Affiliations: The cashiers normally work at their till-points. However at the till points they only operate the software to process transactions. There are no other social networks except for the interaction with the customers.

Identities: Company F believes in a totally transparent business, in other words all the employees know what the target is and how far away they are from reaching the target. Once the target is met, the employees receive a bonus in monetary value. The target is set monthly; this means that if employees work hard enough, they will be rewarded. Although it also means that the team has to work together in order to achieve these goals.

Company G

Company G is also in the retail business, and although it is part of a franchise, the owner makes all the decisions with regard to the day-to-day operations of the company. The main focus area of company G is that of a postal business which consists of three legs. Firstly there are the postal services with postboxes and a courier service. Secondly there is a business division where customers are assisted with matters such as typing, sending faxes, binding of documents and laminating, and thirdly there is a communication aspect with seven computers which are permanently connected to the Internet where customers can read and send emails, scan, and print and surf the Internet.

> Number of employees: 5
>
> Number of employees working on IT: 3 However, all employees are able to assist the customers on the computers when assistance is required.
>
> Years in operation: 3 Years
>
> Types of technologies being used: Computers, laptops, photocopy machines, scanner, fax machine, large cutting machine and sms facilities.

Interaction: All interaction takes place on the premises of the company between staff and customers as they all have to be present to "do business". Communication with suppliers is mostly by telephone with very limited email communication.

Environment: Although the premises of company G are located within a shopping mall, there is still a matter of confidentiality. The premises are also laid out in such a way that it is easily accessible to all customers as well as employees. As most of the operations are run through technology, company G strives at all times to be on top of the latest technology and software in order to accommodate all their customers. . The premises of the company are located in a shopping mall and Company G is based in Witbank.

Affiliations: Once again, the social networks being formed within company G are only through contact between employees in the store, and with the customers.

Identities: All employees should at least be computer literate.

Company H

Company H is in the property industry and is also part of a franchise. However company H is independently owned by the shareholders of each individual office across the country. Company H operates within four main areas; these are residential property selling, rentals, commercial buying and selling as well as companies who do not own a property. This company is thus not only focusing on property, although about 80% of the business is property based but they also assist small businesses with their business activities. Even though company H is independently owned, they do have the opportunity and access to the franchise's software package as well as to advice and support of the franchise if required.

Number of employees: Company H has 24 staff members.

Number of employees working on IT: Seven people, 4 on the residential side and 3 on the admin side. And then there are PC's available to the contractors when they do go to the office where they can access the Internet and software. These contractors are independent and they do have their own independently owned laptops.

Years in operation: Nine years although the research participant has now been part of company H for 3 years.

Types of technologies being used: PC's, laptops, Internet, premi-cells, sms facilities, television.

Interaction: Interaction with employees is mainly done through announcements via sms as they are mostly out in the field. The second level of communication is via telephonic communication or face-to-face discussions; this type of interaction is both between employees as well as customers. There are limited paper interactions due to the uncertainty of when an employee will be in the office. However the admin personnel do use emails and all emails sent to company H are routed to the administration office, where the admin personnel will then manage further communication with the rest of the employees.

Environment: The availability of an international property software package allows all employees to have access to the stock, or property available. Mobility is extremely important for Company H and thus the accommodating cellular technology being used is highly relied on. The offices of company H is also based in Witbank.

Affiliations: Due to access to the Internet, social networks are being formed by the use of systems such as Facebook and Twitter. Communication through sms facilities also ensures that communication between all employees takes place on a regular basis.

Identities: As the agents are independent contractors, they have to "push" their own acknowledgment in terms of sales.

Company I

Company I was founded in 1987 as a brokerage / administrator business to assit brokers who did not have the expertise or experience to place their business with bigger insurers in South Africa. Company I grew and eventually became an underwriter financial management after which the owner divided the company into two separate companies, one being an admin broker-house and the other being an underwriting management. In 2009, the admin house merged with an administration company and became part of a bigger underwriting management. The main focus is short term insurance. The bigger underwriting management company has several branches in South Africa, but this study will only focus on the Pretoria-based branch. This branch is a totally independent company, and their biggest portfolio is trucks and transport insurance.

As the company was founded in 1987, initially no IT was used. However, the owner himself built up a database which was eventually carried over to MS Excel, and then to MS Access. They then moved over to a software package, thus keeping up with IT as far as possible.

Number of employees: Twenty employees at the Pretoria branch and on a national level about 200 employees

Number of employees working on IT: 19

Years in operation: 23 years

Types of technologies being used: Mostly desktops and laptops, all of the equipment is on a lease contract and all of the equipment uses the same operating system.

Interaction: Communication with employees is done through monthly minuted staff meetings. Internal correspondence is sent via email and the nature of the correspondence determines whether or not a recipient must sign that they have read and understood the email. Interaction with customers and suppliers is also mainly through email. Due to legal requirements all instructions from brokers have to be in written format, either via email or fax. Voice logging is also used to record all telephone conversations to protect company I.

Environment: Company I's offices are based in Pretoria but the company uses technology intensively in order to have discussions with other branches. They also recently started to use Video conferencing. Their entire business model has also now moved to a web-based model to empower the broker to perform live online quotes from any location, thus ensuring mobility to enhance business functions.

Affiliations: Company I uses an intranet to communicate with employees. Their head office also has an intranet, but the Pretoria branch is not yet connected to the national Intranet.

Identities: Every employee receives the necessary training required for their specific industry. However Company I is big on training and the company will pay for any employee to study, as long as it is in line with the company's focus.

Company J

Company J is a trading company which trades in both hard and soft commodities on an international level. Company J is part of a world wide company with a total number of almost 12 000 employees. The group is one of the third largest family owned companies in the world. The Johannesburg based branch is the research participant and this study will focus on their South African based office. The South African based office is currently the largest exporter of maize in South Africa and in Africa. Due to the fact that Company J is part of a world wide group, a large amount of support is provided by their international offices. On the IT side, Company J relies on support from local vendors but they do get advice and support from the international branches.

> Number of employees: The South African branch has 33 employees in Johannesburg and a remote office in Durban with 8 employees.

> Number of employees working on IT: Thirty in Johannesburg and 7 in Durban

> Years in operation: Company J's group company was founded in 1853 and the South African office was established in 1924, thus making the South African office 86 years old.

> Types of technologies being used: Laptops, desktops, copiers, biometric access control to premises, video camera surveillance, and live feeds for daily trades on the South African Foreign Exchange.

Interaction: Most interaction with employees within Company J is through the use of email as well as face-to-face discussions within the office. Company J also has to ensure that interaction with its international offices takes place on a regular basis. Thus, the following is used to ensure this interaction: Firstly Company J uses Lotus Notes which has a build-in chat facility whereby instant messaging takes place immediately between the South African based office and any other office in the world. Secondly, emails are also extensively used for interaction with employees as well as customers and suppliers. Since South African legislation requires all trades or legal contracts entered into, to be kept on record, it is recorded and a backup of these recordings is made daily. Lastly, telephone as well as video conferencing is also used regularly as well as Microsoft live meetings, whereby you can sit anywhere in the world, and see what someone else is doing on his laptop. This is used to reduce the need to travel abroad for meetings.

Environment: Due to the current setup in IT, company J has the opportunity and ability to interact with its environment regularly without any problems through the use of IT.

Affiliations: Due to the interactivity of using systems, communication between employees takes place regularly. This ensures open communication levels which build a strong social network between employees.

Identities: Company J has annual performance based bonus structures. However during the interviews these structures were not discussed and will thus not be included in this study.

Company K

Even though Company K is not a SME, it is interesting to see how the larger companies adopt IT using it as a bench mark for the framework so that SMEs can understand how they need to adjust certain processes if they also wish to become part of the larger organizations at some stage.

Company K was formed in 1923 and started off by providing support to farmers only. However over the last 10 years it has become more commercialized and had to find other means of income streams due to a big drought in South Africa. The number of farmers as well as the income from the farmers dropped and thus the reason why other sources of income had to be found. One of the areas they are currently focusing on is the poultry business and eggs industry. Company K has a total number of 140 IT sites. There are 65 shops and 85 silos. Their biggest office is in Centurion hosting 400 users and two remote sub-sites, one in Bethal with 80 users and one in Boksburg with 100 users. Thus the business consists of multiple business units such as retail, trading in commodities, administration, poultry industry as well as storage and animal feed productions.

> Number of employees: 4500 across South Africa
>
> Number of employees working on IT: 1500 IT users
>
> Years in operation: 87 years
>
> Types of technologies being used: PC's, laptops, copiers, scanners, VOIP telephone systems, wireless 3G connections at some silos, audio conferencing and currently limited video conferencing, access control, the list is almost endless.

Interaction: Interaction with employees is done mainly through emails as well as pamphlets which accompanies the employees' payslips as most of the employees do not have corporate email facilities. Interaction between customers and suppliers is done mainly through emails as well as the website, which allows communication to take place via the extranet with customers.

Environment: Since most of the farmers, who form part of Company K's customer base, live in remote and rural areas, company K realises that not all customers have access to the Internet and thus they had to make use of SMS communication to establish contact with their customers. Some of the sites, such as the silos, do not have fixed infrastructures and thus the need to have remote wireless connections.

Affiliations: Social networks are created by email communication as well as by face-to-face communication and telephone discussions. The monthly pamphlets provided to employees also inform them of activities during the month.

Identities: Company K also has annual bonus structures. However, these structures were not discussed during the interviews and will thus not be included in this study.

4.3   Summary of company background

As mentioned earlier, SMEs for this study will include anything from 1 to 200 employees. However, during the interviews the researcher realized that SMEs have to be broken down even further on account of their size, as was done by Fink & Disterer (2006:612). They divided SMEs into micro, small and medium sized, with micro consisting of one to five employees, small of six to 20 employees and medium of 20 to 500 employees. However, for this study, the classification will be as follows: micro one to 5 employees, small 6 to 30 employees and medium 31 to 200 employees and large, even though not part of SMEs, 201 to unlimited according to the South African classification as discussed earlier.

Company K falls outside the category of a SME but it is used as a guideline to see what a company should have in place when becoming part of the "large" industries in the market.

Thus, for this study, the companies introduced above will be divided into four categories as follows:

Micro (1 – 5): A, B, C, D, E, G

Small (6 - 30): F, H, I

Medium (30 – 200): J

Large (200 – unlimited): K

(From this section onwards for simplicity, the classification micro, small and medium will be used instead of mentioning company A, B, C etc.). If however one of the companies made interesting comments to a specific question, the comments will be provided and referenced to the relevant company.

4.4   Data interpretation

In this section, the interview questions will be discussed in terms of the feedback received form the participants. These findings will be analysed and related to the literature to see how the literature ties in with practise.The first questions, relating to the different kinds of communication with employees, customers and suppliers as well as the kind of technology being used, were discussed during the

company introductions as part of the interaction of each company. After each question, a brief explanation as to why the specific question was asked will be provided.

What is the gender of the decision-maker of IT adoption in your company?

(This question is asked as a result of the study conducted by Lu et al. (2003) where men are the biggest adopters of mobile technology, and the researcher wanted to see if there is a relationship to decision-making as well)

Micro: Based on owners, not related at all to gender, as some of the companies are owned by both men and women. There is no correlation between gender and decision-makers.

Small: Based on either the owners or the directors, and thus no correlation between gender and decision-makers

Medium: Decisions are not made according to gender, but according to the position/ status, whether it be male or female. However, currently this position is held by a male person.

Large: On the IT side of the company all decisions are made by men. Company K did not elaborate as to why this is the case.

According to the feedback provided, decisions are not made according to gender, but rather by the owner or according to the position/status of the final decision-maker. Celuch *et al.* (2007:189) noted that the decision-makers or management should be knowledgeable about decision-making in their specific area. Thus Rantapuska & Inhanainen (2009:586) state that the main actors in decisions-making are in most cases the owners or else the management.

Thus, there is no correlation to be found between decisions and gender.

Type of employee and their skills levels
(Yu (2001:187) indicated that the majority of the workforce of smaller companies comprise of unskilled workers. Even though they focused their study on the manufacturing industry, it is necessary to see whether or not this is true for other industries as well.)

Micro: Most of the employees are computer literate relating to the industry they are operating in, as company C states: "*die persoon moet passie en ondervinding hê" ("the person should have passion and experience")*. In other words, a photographer does not need qualifications but they should have a passion for what they do and they should have experience. What is clear from these research participants is that the industry and in some cases even the franchisor determine the skills level. Two of the five companies did not mention anything about formal school qualifications, but rather that good people skills as well as computer literacy are required. Thus, what emerged is that even if you are unschooled, you should be able to find some kind of occupation within the South African SME industry.

Small: Of the three small companies, one stated that no formal schooling is necessary. Thus once again raising the issue of employment provided to the "unschooled". Relating back to the position these employees hold within the company, it focused more on skills than schooling. The two other companies focus on qualifications but once again, only to a certain extent. A grade 12 qualification is necessary within these companies because of certain legal requirements. Most of their employees have to undergo certain training relating to the industry before they can commence with any operational activities, once again relating back to the industry and legal requirement.

Medium: Company J prefers graduates only on the trading side. As for the rest of the organization, the employees should have at least grade 12 with some kind of accompanying diploma, degree or MBA relating to their position. Thus it seems that this medium organization tends to recognize the importance and necessity of a qualification in order to perform certain tasks.

Large: Most users will be computer literate with most of their skills required in the extensive use of email and Excel. However, the research participant could not provide details of the skills levels and qualifications of all the employees because of the number of employees.

It emerged from this question that the skill levels required are determined by the industry within which these companies operate. It does seem that retail companies are more open to untrained or qualified employees although most of the other companies will also consider untrained or qualified employees. This relates closely to Lu *et al.* (2001:187) whereby small companies tend to focus more on unskilled workers although the industry determines which skills levels are required.

When a company grows, it seems that emphasis is placed on qualifications determined by the positions held by the employees.

Do you perform or promote any kind of training within your organization and if so, who does the training?

(Smaller companies are reluctant to train in-house as they know that the larger organizations will "steal" those skills and thus there would be no return on investment for them (Fink & Disterer, 2006:609; Chibelushi & Costello, 2009:211), this question relates to IT training but also user training and other skills which might be required within the specific company.)

Micro: Four of the six micro companies do their training internally. Of the two other companies, one receives training from the franchisor and thus no employee of Company D is allowed to work with any child without this training having been completed. Company E is forced to do continual professional development as a result of the medical industries' requirements.

The dietician has to stay on top of the latest products and diets as this industry is an ever-changing industry.

Small: Except for Company F which is retail based, training is performed by professional bodies within the small companies whether it be by the franchisor in-service training or the Franchisor's international university of technology whereby employees can study online or enroll in courses and degrees which are in line with the company's focus. Thus the development of the employee's skills is important.

Medium: Interestingly, the medium sized company performs all its training in-house by a senior person training the more junior staff.

Large: The large company has two employees who perform training in-house, again no formal training is provided. However, the large company is in the process of using an e-learning server whereby the user can run through training programs. However, these courses are not certified.

An interesting fact which emerged is that both small companies are more likely to do their own training because of "simpler" processes. The medium and large companies also perform in-house training and not really formal training. This could be due to the fact that small companies do not always want to spend time and cost on training as the larger firms will then just steal these skills away (Fink & Disterer, 2006:609; Chibelushi & Costelle, 2009:211).

The staff seems to transmit the necessary skills required to perform this training and thus there is no need for other formal training. This could also be due to the extensive industry experience as well as the staff available. Celuch *et al.* (2007:188) acknowledge the fact that small businesses have informal and none-structured strategizing which is internal and which could result in training beign informal and internally. All the small companies, except for company F acknowledge the importance and necessity of training. However it could be that this necessity is brought about by the industry within which these SMEs operate.

Who are your competitors in the market and are they a threat, if so why?

(This question did not focus on the competitors themselves, but rather on what makes them competitors and if IT plays a role in gaining a competitive advantage, Stair & Reynolds (1999:336) said that if you implement a management information system correctly, it will assist you in gaining a competitive advantage)

Micro: Interestingly, all of the micro companies say that service and relationships are what distinguishes them from their competitors. Only two of the companies mentioned that technology and the use of IT are what allow them to gain a competitive advantage. For all the other companies it is service, relationships, products delivery and experience. If IT does play a

role, the service being provided by the use of these technologies is what distinguishes competitors in the market.

Another interesting aspect which company C highlights is word-of-mouth and time in the industry. *"Tyd wat jy in bedryf is, speel 'n rol. Kostes is nie 'n faktor nie, want dan word kwaliteit bevraagteken"* (*"Time in the industry is what plays a role, not the cost of your product, because then your product's quality is being questioned"*). In other words, in this industry price is not relevant, as people will underestimate your products' quality if you come in at a too low price. It all boils down to service, relationships and product quality. Company F also states that "*Ons is nie die goedkoopste nie maar ons diens is 110%*" (*"We are not the cheapest but our service is 110 %"*).

Small: Two of the three small companies say that service plays a role in their market. However, one of them also acknowledges that technology has become a major issue. The third company, company I, states that reputation in the industry plays an important role. The industry is very *"old-fashioned"* as the insurers want to work with a broker and the broker will not simply move to a new underwriter. So again duration in the industry and reputation play an important role. Interestingly, company I states that their industry is not at all service based.

Medium: For the medium sized company, the business model is unique which distinguishes them from their competitors. Nothing is mentioned on service or types of technology.

Large: Because of the diversity of the large company, they have a unique business model which distinguishes them from their competitors. As both the large company and one of the competitors are using the same system, there is no indication of any advantage gained by IT systems.

It appears that most of the research participants do not acknowledge IT as a means to gain a competitive advantage. They focus more on service delivery and their reputation in the specific industry market. What is also interesting is that the cost of the product is never mentioned as a means of competing in the market. Thus there is an extremely high focus on the social interaction with customers and how the customers perceive the company in the market. Although no literature study was conducted on marketing and industry competitors, it is interesting to note that service stands out as the leverage over your competitor, not the type of technology you use.

How do you do marketing, if any at all?

(This question was asked to see whether or not the participants acknowledge that IT could be used to market them and if they are indeed using technology to ensure this.)

Micro: Four out of the six micro companies say that they do not actively do marketing as they believe more in word-of-mouth and referrals. Even though one of these companies is currently engaging in a small scale marketing campaign, their aim is to do no marketing at all in the future. One of the other companies only focuses on physical presence or visits to their customers.

The other two companies, who do have a marketing campaign, focus mainly on printed material such as pamphlets and calendar advertisements. One has its own website whereas the other company pays a marketing fee to the franchisor for marketing purposes.

Small: The three companies which are part of the small organizations have three different marketing approaches. The first company says that they do very little marketing as "*drank is 'n snaakse ding, hy bemark homself*" ("*alcohol is a funny thing, it market's itself*") – Company F. Company I uses cold-calling, word-of-mouth, website and sometimes road shows although cold-calling is the strategy which is used most often. The third company uses Facebook, Twitter, the Internet, magazines and newspapers, brochures and direct marketing via email and sms. Thus, technology is used extensively in their marketing campaign. Radio adverts were used in the past but one cannot market a house over a radio so this was cancelled.

Medium: Marketing is mostly through face-to-face gatherings or farmer days which are hosted by institutions such as NAMPO. Sometimes magazines are used.

Large: The large company does have a website, although their statistics show that farmers will rather call than to use a website because a lack of infrastructure on the farmer's side. Farmer days and brochures are also used as a marketing strategy.

It is interesting to see that most of the smaller companies do not place a high value on marketing as they feel that word-of-mouth and reputation help them to reach their audience. Another strategy which seems to be popular is face-to-face meetings and communication and this ties in with what Fink & Disterer (2006:619) say that smaller firms will rather focus on service and working with customers.

Only one company uses IT extensively as a marketing tool in order to reach a broader audience.

Are you in favor of using IT for your business operations and to what extent? Has the use of IT had any impact on your company?

(When this question was raised during some of the interviews, the researcher had already established that IT plays a role in the organizations. Thus, not all companies were asked this question.)

Micro: Although five of the micro companies indicated that IT is crucial for their business, two of them made the same statement: *"Kan nie daarsonder nie" ("Cannot work without it")* – Company A, C and G. The rest of the five companies realize the importance of IT for their day to day activities and operations. The only company which indicated that technology is not a necessity for day-to-day operations is company E. The dietician can write down a diet on a piece of paper.

Small: All three the small companies acknowledged the importance of using IT to enhance their business operations. One of the small companies mentioned that the employees are not necessary computer literate and she, herself was never trained in using computers, "*as daai goedjies gaan staan, dan maak ek sommer die deur toe, dan weet ek nie wat om te doen nie*" *("if those things (referring to IT and technology) stand still I will close my doors as I do not know what to do")* – Company F. This statement makes one aware of the high level of dependence which small companies have on some sort of support structure, as they cannot work if the technology is malfunctioning.

Medium: IT plays a crucial part of their business operations as the medium company trades live on-line each day; they cannot afford to have any kind of downtime.

Large: Yes, sms is also being used to send information such as the SAFEX prices to farmers as well as used for a marketing tool.

Can any of these companies function without IT? It seems that only the dietician can, and that seem to be linked to the industry in which the SME operates. For all the other participants, the answer is no. And they rightfully acknowledge the fact that IT has become an integral part of their day to day operations. Tying it back to Sandberg & Vinberg (2000:224) where they state that for an SME to grow and survive, it has become a matter of strategic importance to adopt IT. As can be seen from the interviews, most of them stated that they cannot function without it. They even acknowledge that if IT fails, they will close their doors until help arrives.

If there is a lack of support, companies could be forced to close their doors. Support will be discussed later on.

Which of the following technologies do you use?

(The selection list was compiled from Dyerson et al.'s (2009:411) list of the most popular technologies which are most often used by SMEs and each participant had to indicate whether or not they are making use of it. This question's feedback will be provided in table format and if there are any important comments, these will be listed below the table.)

Micro:

Technology / Company	A	B	C	D	E	G
Email	X	X	X	X	X	X
Internet	X	X	X	X	X	X
Intranet	X					
Wireless	X	X			X	X
Company Website	X		X	X		
Video / Audio conferencing						
Own computer network	X		X			X
Other						

Table 6: Micro companies' technology

All of the micro companies do have access to email and Internet, although the Internet is not necessarily for the expansion of the company's productivity. In some cases, the Internet is only available on the owner's laptop. On asking company B whether or not they have a computer network or infrastructure, their answer was: "*dit sal nice wees" ("That would be nice").* Most of these companies know what technology is available but once again, due to insufficient support and knowledge, they do not always adopt these technologies.

Company C also states that for them the type of software is extremely important for the editing of photos for the end product.

Small:

Technology / Company	F	H	I
Email	X	X	X
Internet	X	X	X
Intranet			X
Wireless		X	X
Company Website		X	X
Video conferencing		X	X
Audio Conferencing			X
Own computer network	X	X	X
Other			

Table 7: Small companies' technology

In addition to the above-mentioned technologies, company H also uses Dictaphones to record important information which is then passed on to the administration personnel to be transcribed.

Medium & large:

Technology / Company	J	K
Email	X	X
Internet	X	X
Intranet	X	X
Wireless	X	X
Company Website	X	X
Video / Audio conferencing	X	X
Own computer network	X	X
Other		

Table 8: Medium and large companies' technology

In addition to the above-mentioned technologies, company J also uses Blackberry as a tool which is linked to their emails through Lotus Notes 8. Sametime is a chat tool which allows all employees of company J to communicate with anybody in the global company online, thus reducing the cost of making long-distance calls.

As can be seen from the tables above, all the companies acknowledge the use of at least email and Internet facilities. As the companies grew, so the needs of these companies expanded, up to a point where the large companies realized that they should have at least the bare minimum IT in place to assist their employees in becoming more productive.

As stated by Dyerson *et al.* (2009:41) most SMEs use the above mentioned technologies as well as an Extranet. As can be seen from above, this is indeed true. However, cell phones need to be added as all the research participants make use of Cell phones and mobile devices. This confirms that most of the employees do require mobile devices as stated by Nel (2009). Thus access to the Internet from anywhere.

What type of operating system are you working on in your organization?

(The list of operating systems emerged from the applications as discussed in chapter 3.)

Operating system	Company										
	A	B	C	D	E	F	G	H	I	J	K
Windows XP	X		X		X	X	X	X	X	X	X
Windows VISTA		X		X							
Applemac			X								
DOS	X			X							
MS Server 2003											X
HP Thinclient											X

Table 9: Operating system

It is clear that most of the companies (80%) prefer Windows XP. The two companies using Windows Vista do so because the laptops they bought came out with Vista. Both of these companies cannot familiarize themselves with Windows Vista as it is not always compatible with software and certain hardware devices. Company D even stated that Vista should be a *"no-go zone"*. The owner says that apart from the fact that Vista is not always compatible with external programs it is also not user friendly.

One company, company C, uses something different from Microsoft products. There are two reasons why an Applemac was bought, the first reason being the storage capacity of a Mac, as the photos do take up a lot of space. For example, on a photo shoot between 1000 – 2000 photos are shot, by using a 5D Canon camera, which is a rather important feature. To download these photos to your machine in raw format means that each photo's size is between 11 and 12 MB. Thus, the laptop the owner used to work on could not accommodate these size images and still be fast enough to perform editing. The graphics of the Mac is also better.

There are two companies that still use the "old" DOS and there are various reasons for this. Company A uses Word Perfect for typing most of their appeal records due to certain limitations on MS Office. Company D bought 10 PCs as part of the franchise and the software that is used to test and train the children can only operate on DOS.

The above mentioned findings tie in with the earlier discussion in section 3.3.3 where it emerged that most laptops today are issued with Microsoft XP already installed on them. Thus the reason why most of the research participants have Microsoft XP on their machines, and even though Ellis & van Belle(2009:41, 44, 46) stated that OSS could be a more viable option for SMEs, Thus at this stage it does not seem as if OSS is a viable option for these SMEs. Skills necessary to adopt OSS are scarce and this would also influence the adoption of Open source software (OSS).

Are you familiar with MS office, such as Word and Excel (2003 or 2007), and what is your primary function for these applications?

Software Package	Company										
	A	B	C	D	E	F	G	H	I	J	K
MS Office 2003	X				X		X	X	X	X	X
MS Office 2007		X		X	X	X	X		X		X
Word Perfect (DOS)	X										
Openoffice			X								

Table 10: Office packages

What is evident from the table above is that only one of the research participants does not work on a Microsoft package. The daily operations of company C are run on an AppleMac machine. Already installed on this machine is OpenOffice, and as the owner works on this machine most hours of the day, there is no need or reason for her not to use OpenOffice. It does seem as if Microsoft office is still dominating the market or industry. This could be attributed to familiarity, in that you will be more accepting of what you know and this relates to the ELM model's central route whereby one would become more favorable towards adoption as a result of time begin spent on the subject matter.

How high do you value a standard within your organization with regards to the use of operating systems, applications and hardware?

(As there is such a large number of applications available it is important to understand whether or not companies see that the standard of all their applications are important as this could have an effect on their future IT expansion.)

Micro: Most of the micro companies acknowledge the fact that there should be standards within a company. Their reasons are that anybody should be able to open any document from any machine. Even though most of the companies do recognize the importance of all the machines being standardized, one of the companies realized that maybe he does not know enough to form an opinion. *"Ek weet nie genoeg daarvan om regtig 'n opinie te vorm nie maar as ek met 'n flashdisk loop moet hy darem by al die rekenaars kan lees en dokumente oopmaak"* *("I do not know enough to really have an opinion but if I walk with a flash disk, all the computers must at least be able to read the flash disk and be able to open documents")* – Company E. Company E says that to ensure that a diet can be used on anybody's computer, he would rather use a more simpler form of software. Mobility also plays an important role for Company E.

Small: All the small companies also acknowledge the fact that all machines should have the same standard of operation; once again the issue of opening documents from a flash disk on

any machine is raised as well as personnel moving between branches, especially company F. If all software and machines are the same then there is no training required when the employees move or switch places.

Medium: *"Should be important, if not, then you will run into problems later on, so it is important to us"* – Company J. Thus, there could be future problems when one does not realize that all systems should be standardized.

Large: *"Out of 10… 11"* and the reason is maintenance. If all the machines are standardized, then maintenance of these machines becomes much easier.

As can be seen from above, standards of hardware or software within an organization are extremely important, whether it is to open certain documents, or whether it is to sort out future problems. What is important is the comment that Company K made. Standardization should not just be to be able to open documents, but for future growth. Maintenance also becomes a problem and thus all machines should be standardized. It could link back to what Sandberg & Vinberg (2000:221) mentioned that SMEs need to adopt IT to survive. However, one has to remember firstly that SMEs need to keep cost into consideration and then skills also play a vital role in IT adoption (Celuch *et al.*, 2007:189).

Why do you regard the use of ICT in your company as important?

(As most companies had already answered this question, not all companies provided feedback again.)

Micro: Company B – "To make thing easier, effective and faster"

Company C – Better product, precision and colour

Company E – Professionalism and saving time. A template can be used for diets as 70% of the diets are similar and only 30% of the diets change. Thus not everything need to be retyped.

Company G – Does not want to struggle, must be able to help clients when they enter. The business must benefit from the use of IT

Small: Company F – To save time by scanning all the products in the shop.

Company H – To save cost, and prevent overlapping of certain functions within systems and for marketing purposes and to be able to use the current database to contact customers without being prevented by law.

Company I – Service and relationships with brokers, reliable system for better service, to gain a competitive edge, fast, accurate and user friendly system for everybody to use as well as training on the new website.

Medium: Company J - "*Reliable information to make management decisions*"

Large: N/A

Each company has its own goals and objectives which they strive towards. What did become clear however is that companies do not want to struggle. They want something which is reliable and which can be used to get accurate data. They want to be able to use a system for functions such as marketing, saving costs, and above all to be user friendly so that anybody can make use of it. This tie back to the building blocks identified from the models as discussed in section 3.6. However, two additional aspects emerged, and that is that a reliable system and output ensures professionalism.

Where do you get advice and support with regards to IT issues? Do you use external or outsourced support from an external organization? If yes, why, if not, why not?

(Chibelushi & Costello (2009:225) said that SMEs first look for advice from family and friends whereas Dyerson et al. (2009:39) said that SMEs will firstly look at more formal sources and secondly at family and friends. As these two statements are contrasting, it is necessary to understand what the real views of SMEs are.

As the answer to both questions are related to one another, the feedback of these answers will be combined)

Micro: Of the six Micro companies, only one has a maintenance contract with an outsourced company. The outsourced company comes in once a month for maintenance of all PCs and if urgent support is required, they will be called out and paid an-hourly fee. Company D does receive support from the franchisor; however it can take up to a week before the problem is resolved or before someone will come to her office to see what the problem is. A great amount of support is thus provided by the owner's husband. Company C does have access to a support structure, however they cannot support the owner with her Mac machine and so she does not have any access to support in actual fact.

 The rest of the companies rely on friends and family for advice and support, and if there is a major crisis, they call an IT company in town that might be able to help, but this rarely happens.

Small: All three of the small companies have some sort of agreement with an outsourced company which will service the servers once a month. Other ad-hoc support is paid for per hour. Company I also states that some of their employees do have limited technical skills and can assist with certain matters without having to call the outsourced company. All of their equipment are on rental contracts and is replaced if they break.

Medium: There is a dedicated IT person on site, but support is also provided through their Geneva-based office.

Large: Support on IT is done by the research participant. However they do have a service level agreement with an outsourced company; they have been with this company for about 9 months

now. They decided to move to a new outsourced company as their old outsourced company did not provide the service required to run such a big operation.

As can be seen, the smaller companies do not always have the necessary support structure in place which will guide them with their decision-making, and most of the time, friends and family assist them with their IT needs, confirming Chibelushi & Costello's (2009:225) statement. Most of the time they buy a printer, for example, when they need a printer. There is no real process of investigation or of truly finding a more cost effective solution.

On the other hand Dyerson *et al.* (2009:39) found that SMEs look for advice from IT consultants first and secondly from personal sources. Thus from the small companies onwards they clearly realize the need for an outsourced company to provide certain support functions. However, these functions are all outsourced as the cost of a permanent employee exceeds the cost of paying a monthly maintenance fee. And as can be seen from the data above, the smaller to the larger companies realize the need for more formal support such as an outsourced partner.

(Later on in this paper, there will be a short summary of the monthly cost expenditure spent on IT to indicate actual IT expenditure)

Do you perform your own financial accounting or is that outsourced? If you do, what packages do you work on, e.g. Pastel or QuickBooks or other, and why this package?

(This question was asked to see whether or not SMEs require technology for their financial operations, if they have a formal financial process in place or if they outsource their financial functions).

Micro: Of the six micro companies, four of them perform their own financial processing. Most of the time the financial statements are audited annually by an external accounting firm. QuickBooks accounting software is used by two of the companies and their reason for using QuickBooks is that it is easy to use. However, company B also enters information using MS Excel and then sends this information to the accountants who then do the financial processing. QuickBooks are only used to send out invoices and statements.

Company G uses Pastel 5.2, but this is only used because it was recommended by their accountant. Company E has someone who does all the financial transactions on a medical software package called MedeMass for a year now as the medical practice of Company E does not focus on making money.

Company C has no financial package or mention of a financial accountant. Upon asking if she does perform any financial transactions and who does this, the answer was: *"Self, op 'n stuk papier, glad nie 'n pakket nie" ("Myself, on a piece of paper, no software package at all")*.

One of the companies could not provide feedback as all of their financial recordings are sent to their Cape Town branch that performs the processing.

Small: All three of the smaller companies use a Pastel version for their financial recordings. Even though company F uses an external person for these recordings, it is still done on Pastel. When asking company H why Pastel is used, the answer was simple: most bookkeepers are trained on Pastel and they therefore have the knowledge to work on Pastel without additional training required.

Medium: There is currently a financial package being used but with limited functions. However, company J is looking at various alternative options to replace their financial package in the near future.

Large: In-house accounting using mainly SAP, Pastel and Great Plains. QuickBooks is also used but they are aiming to move all these small financial packages over to SAP.

Most of the companies also use Internet banking for payments as it is more manageable than having to go into a bank and stand in long queues, which is time consuming.

All of the companies except one provided information on how their financial transactions are recorded. It seems as if QuickBooks and Pastel accounting are two of the most popular packages used by smaller companies. What is also interesting is that company H acknowledges that most of the bookkeepers in South Africa are trained in Pastel and this makes it easy to choose Pastel for their accounting purposes. However, one has to realize that most of the Micro companies perform their own financial recordings and they are not necessarily trained in any form of accounting, and thus they want a basic accounting package, even if that means working on MS Excel.

During section 3.3, these two packages, Pastel and QuickBooks, were introduced as financial solutions that cater for small businesses. There is however, no clear indication as to which one of the two packages is the best option. What did emerge from the micro companies though is that QuickBooks seem to be easy and simple to use, as they do not require advanced financial transactions. On the other hand, most accountants are trained in Pastel, and thus there is no need for further training in the software package used.

Even though no clear indication could be provided on which package is the best, it does seem that SMEs will adopt either one of these two packages. Thus a new SME could look at either one of these packages and they should be able to perform all their financial transactions.

What type of network infrastructure do you have in place?

(SMEs are reluctant to invest in IT as they do not always know the true benefit of it. By asking if they have a network infrastructure in place provides an understanding of the participants realizing the importance of investing in IT.)

Micro: Companies B, D and E have no network infrastructure in place. Company A uses iBurst wireless which allows remote access from the employees to the owners' FTP site.

Although company C does not have its own network infrastructure, the location of the office allows the owner to connect through the fixed network infrastructure on site. Company G has a fixed IP network infrastructure.

Small, medium and large: All of these have IP network infrastructure in place.

It is clear that the micro companies do not focus as much attention on having a fixed network infrastructure. This could be due to the fact that often there is only one, maybe two machines and with today's technology one can connect to the Internet by using a cell phone or a 3G card. Thus, there is no reason to spend money on installing a fixed line or investing in a fixed infrastructure. Kaynak *et al.* (2005:624) state that even though ICT is growing, there is still a lack of infrastructure in developing countries. They stated that one would rather buy food than invest in an infrastructure. It does seem as if the micro companies would rather spend money on their equipment than on implementing an infrastructure, although all of them see the benefits of having a network infrastructure in place.

Who is your mobile phone service provider?
(The list is compiled from Diagram 2 which indicates the market share of service providers in 2006)

Service provider	Company										
	A	B	C	D	E	F	G	H	I	J	K
MTN					X	X					X
Vodacom	X	X	X	X	X		X		X	X	
Cell C											
Autopage (any SP, depending on SP specials)								X			

Table 11: Mobile service provider

The majority of the research participants (72%) do seem to have Vodacom as a mobile service provider.

According to Gillwald (2007: 54) Vodacom was the second largest service provider next to Telkom in 2006. According to the coverage map in Annexure B, Vodacom covers almost the entire country. This means that one should be able to connect to your network and be "online" if one has a Vodacom connection. This does not rule out the other service providers but Vodacom does seem to be the leader in this area.

Does your company have a land line? If so, who is the service provider or support?

(The purpose of this question was to see whether or not a physical line connection is still being used by SMEs?)

Of the eleven participants interviewed, only one of these companies does not have a Telkom land line installed. Some companies have even more than one line and also a separate ADSL line for their network. This verifies Gillwald's (2007:54) statement that Telkom has the largest uptake of broadband users in South Africa. Even Timeslive (2009) acknowledges the fact that Telkom has the De facto monopoly within South Africa, with connecting a line in almost every household, which is confirmed by the data presented.

How high do you value security within your company in terms of data security and access to your premises?

(Security was broken down into two parts, data and premises security, Data related to: Do you back-up any of your data on a regular basis, if so how regular? And premise security relates to: In terms of technology, what do you use to ensure a secure environment? The reason why these questions are all grouped together is because the answers cover all three questions. Each company's feedback is provided individually.)

Micro: Company A acknowledges the fact that data and documents are confidential; however documents are not password protected. The researcher could not detect any form of backups or firewalls on the server. This does not mean that company A does not have it at all; during the interview it was simply not clearly indicated.

Company B does have an external hard drive for backups. The hard drive is kept in the office, not in a safe. Backups are done once every two weeks or so, but not on the owners' laptops. Based on premises security, Company B does have an electric fence and alarm system. However; the alarm was removed from the office and needs to be replaced again. Stock is kept where there is an alarm for safe-keeping of stock, but not access-controlled at the house of the owner.

Company C makes two backup copies, on an external hard drive as well as on CD. However the backups are both kept in the office, and not in a secure storage facility. In terms of premises security, the owner does have insurance but because of the location of the business operations, it is not necessary to invest in safety measures.

Company D has no data security at all although the owner could manage to make some sort of backup on her laptop. This data cannot be accessed from her machine at all. However when a child goes for therapy, there is a written evaluation form which is completed and updated weekly. Thus, there is some form of weekly backup which is kept in the classroom where the computers are kept. Premises security has been enhanced by burglar bars on windows and a security gate at the front entrance as well as an alarm system and security guards at night. The owner also has short and long term insurance.

Company E has no form of backup, except for the physical piece of paper patients have to complete which is then entered into the system on a weekly basis. No data or patient files are kept in a safe. Software is password controlled. They would not really know if someone's data has gone missing as there is no real process of data security, and the only real data that they work with are patient details and weight, no medical history. The premise does have an alarm and the house can be locked.

Company G acknowledges having data security but does not have any backup process. A backup of the financial transactions are only done once a month on a flash disk which is kept in the office. She wanted to know where the backup should be kept. There is an alarm system on the premise as well as armed response units available, and the shopping centre also has security on site.

Small: Company F states that each person in the retail outlet has his/her own password with restricted access, and backups are made every two weeks and kept in a safe in the shop. There is camera surveillance on the premise as well as alarm systems in every store.

A backup is made nightly of the data running on Company H's servers on tapes and kept off-site; a backup is also downloaded to the outsourced company's premises each night for data security. A backup is however not made of the data on an employee's machine or laptop. The premise has access control via codes as well as an alarm system, and an armed response unit.

A backup is made on disks daily of company I's data. One disk is kept of-site. In terms of the data on the website, this backup is done by head office. All documents have to be sent out in puff format. Only two people have access to the server room at the premise. The building has an alarm system as well. Access to the premise is done by having outside visitors sign in at security.

Medium: Backups are done with assistance from the outsourced company as lost data could cost the company millions. So the company has to ensure that data is recorded and stored correctly. The building dictates the security measures currently in place and this causes frustrations. The office itself does have an alarm systems as well as surveillance cameras and is access controlled.

Large: All systems are password protected. Backups are done by an outsourced partner on a daily, weekly and monthly basis. The ERP's log files are also stored off-site on an hourly basis. In terms of the premise, the Centurion office is currently access controlled but their Boksburg branch as well as the silos are not access controlled.

It seems as if most of the companies know that backups are crucial. However, not all of them have the necessary measurements in place to ensure that data is secure and controlled, especially the micro companies. From the small to the large companies, one can identify that they realize the importance of their data and are trying to secure the data as well as keeping backups off-site, thus assisting with some form of disaster recovery plan. Beck (2007:12) states

the importance of backups and that these backups should also be tested on a regular basis. From the interviews however, it emerge that backups are not tested regularly.

For Premises security, alarms are the most common form of securing the premises. However this does not mean that the data is secure; it just means that the alarm could assist with safety but with no guarantees

What keeps you awake at night, with regards to IT issues?
(This question was asked to gain a clear understanding of what SMEs see as possible threats to their organization.)

Micro: Company A: Deadlines. Company B: Nothing really, only if a computer breaks, it is complete chaos. Compnay C: How to grow faster. Company D: Correspondence with parents. The owner caries a 100% risk as she placed everything she has into this business. Company E says that accounts not being paid are an issue. Company G states personnel and finances.

Small: Stock as well as personnel and the level of training of the personnel are problems for company F. Company H realizes that sales as well as communication feedback to customers are a frustration. An example is feedback via sms, where a sms can only accommodate 160 characters; this limits the message that can be conveyed to the customers. Company I states that their systems development over the last few months has been a huge frustration as well as training and deadlines for the go-live.

Medium: Company J states that their biggest concern is not to knowing what their actual trading position and real results are. This could however be resolved by implementing a proper trading system.

Large: The Company was busy with a whole clean-up action, and thus a large number of employees lost their jobs, and they might not be finished yet and that raises concerns.

Most companies want to grow faster. Finances, accurate information as well as personnel seem to be biggest concerns for SMEs, even for the larger organization.

What would be your deciding factors be to choose or adopt IT?
(From the building blocks identified in chapter 3, it became necessary to see which factors the SMEs see as important when adopting IT.)

IT purchasing deciding factor	Company										
	A	B	C	D	E	F	G	H	I	J	K
a. Easy to work with?	X	X	X	X	X	X	X	X	X	X	
b. Cost	X	X	X	X	X	X	X	X	X	X	X
c. Easy to implement?	X	X	X	X	X	X	X	X	X	X	X
d. Support	X		X	X	X	X	X	X	X	X	X
e. Return on investment?	X		X	X		X	X				X
f. Advice from support vendor?		X	X	X		X	X		X	X	X
g. Attitude of users						X		X	X	X	X

Table 12: IT purchasing deciding factors

The preference of the research participants when choosing new technology is listed above. However, a large number of these participants listed other factors which are also relevant to them when they investigate or purchase new IT technology. Below is a list of other factors which was listed by the various companies.

Cost: Company C says that even though they will try and save costs when choosing technology, they will not compromise their product or service by buying the cheapest. Thus there is a two way cut to costs.

Upgrading: Company D wants to know that when they buy something, the upgrade of that specific software is included in the license fee which is already paid.

Compatibility: Company D

Reliability: Company D, Company J

Feedback or word-of-mouth from others: Company E says that they will listen to other people about certain products to try and see what their experience of that specific product is.

User-friendly: Company F wants a computer to be user friendly, even if that means putting pictures on the screens. Company G also wants user friendliness, as their clients come in from outside and there is no control over their knowledge skills. Company I mentions individual user requirements, and this can be tied up with user-friendliness.

Battery life: Company H wants to be sure that mobile devices have an extensive battery life because their employees are often on the road seeing potential customers.

Mobility: Company H

World-wide trend: Company K acknowledges that they need to try and keep up with the world-wide trends of IT, "*where does IT go to*".

The following was identified during the model discussion earlier namely, easy to work with, cost, easy to implement, support, return on investment and advice from support vendors which seem to be the factors which most companies relate to when adopting ICT. Attitude does not seem to play a role in the micro companies but will most definitely be deciding factors in the small and larger organizations.

The additional factors which the SMEs listed will be investigated during the building of a framework to indicate which one of these factors could be incorporated into the conceptual framework.

What is your current cost expenditure on ICT per annum? (Average) *(Most companies could only provide their monthly IT expenditure.)*

Monthly cost	Company										
	A	B	C	D	E	F	G	H	I	J	K
Not Sure	X				X						
Nothing			X								
R1 - R 2500		X					X				
R 2 500 - R 5 000				X		X					
R 5 000 - R 15 000									X		
> R 15 000								X		X	X

Table 13: Monthly IT expenditure

As most of the small companies do not have an exact monthly cost, the values above are based on average IT expenses per month. It is clear that the small companies do not have a large monthly IT cost although this should be seen in correlation with their turnover. However, one gets a clear indication that it is more cost effective to outsource IT functions or even just "pay as you go" whereby no agreement exists rather than to employ someone with IT skills on a permanent basis as confirmed by Chibelushi & Costello (2009:212).

However, three of the companies did provide an indication of what their once off start up cost was. This however does not only include IT but in company D's case the franchise cost as well. The other two companies indicated their IT cost.

Once-off cost	Company		
	A	B	D
R 10 000 - R 50 000		X	
R 50 000 - R150 000	X		
> R150 000			X

Table 14: Initial once off cost

Although these numbers are based on the specific needs of the various small companies, it provides an indication of what small companies can expect to pay for IT hardware, software or support. It is interesting to see more or less what the startup cost could be for the specific industry.

Would you say that your business goals include investing in IT?

Micro: All the micro companies said that they want to expand or perhaps move to new premises. However, company A and E do not necessarily see that investing into more IT at this stage will help reach their goals, but rather by delivering a good service. On the other hand, company B, C, D and G mentioned that they would like to expand their business and this includes relocating to bigger premises, investing into more and even the latest technology. Company D stated that their software should be modernized and be more child friendly.

Small: The focus and future goals of the small companies are a lot more specific than the micro companies. Company F is looking into opening a new retail outlet and this new location should have the same IT infrastructure which the other two stores currently have. The software is used in assisting performance of business operations and thus there is no need to change this.

Company H wants to use technology to deliver a better service. They want a mobile DVD player so that customers can be shown potential new houses, without having to physically go to each house.

Company I does not want to stop being part of the biggest underwriting company in South Africa. They want to be an insurance company and once they exceed R 5 Billion, they want to be listed on the JSE (Johannesburg stock exchange).

Medium: Company J acknowledges that IT plays a role in their future goals. They are looking at a trading package to assist with international trading which can be linked to their overseas offices.

Large: Company K has two primary goals. They want the whole company to centralize to one ERP package, as well as a new voice infrastructure.

Each company strives towards some sort of goal, whether it is to increase their annual turnover, or whether it is to get listed on the Johannesburg stock exchange. Each company should strive towards becoming better. However, it seems that companies only start to realize the impact that IT can have on their growth when they have grown to some extent themselves. The micro companies tend to realize the need to grow, but not all of them see that investing into more technology can help them, and rightfully so. Even if the large companies invest millions into the development of the latest and greatest technology but the requirements were wrongfully identified or not optimized, these millions mean less than a grain of salt in a salt shaker. Therefore, companies need to have clearly defined goals as well as methods on how to reach these goals with some kind of checklist as to the goals being met. As the company grows, these goals will change and need to be adapted to the new environment. The goals will provide a clear indication of what role IT will play in future growth. These goals should form part of the business strategies and as Sandberg & Vinberg (2000:22) stated, organizational strategies incorporates an IT strategy. What is emerging is that strategies need to be in place so that the SMEs know what they want to achieve. Based on these strategies and goals, ICT needs to be identified.

Do you have processes within your organization which is not automated, and what are they? Do you have a need to automate these processes?

Micro: Company A and C could not think of any processes which they want to automate. Company B would like to have a website for marketing purposes as well as a network infrastructure so that documents can be saved on a server and accessed by all without having to distribute it via email. Company D would like to have the weekly report cards of the children done via a system. This could be tracked as the child works on a PC and the details of the usage can be pulled and compiled into a progress report. Company E would like to have patient details immediately available electronically. This could save costs as the time spent by the accounting body would be cut by more than half. Company G would like to automate the postage registration system as everything is currently based on a manual system.

Small: Company F wants fully electronic stock control and monitoring. According to Company H and I all their processes are automated. However, company I mentioned that there is currently an overlap between the old and the new system.

Medium: Company J wants a daily stock sheet, which is currently done manually on an Excel spreadsheet, to be automated as well as trading slips of the deals done daily, which is currently also done via MS Office.

Large: Company K realizes that their factory operations are IT Limited with regards to the workflow and production process. However, everything else is 90 – 95% automated.

In an ideal world, the doors open on a Monday morning and the whole operation functions without any human interaction. Is this not what everybody has in mind when we talk about automation? No more human interaction? The answer is no for two reasons. First of all, companies will always require some kind of social aspect, whether it is via face-to-face connections, or via some social network or facility such as email or Facebook. Especially in smaller companies, there is a tendency that if they can manage their day to day operations, there is no need for any further automation. The micro and small companies also include a large portion of a country's economy, as can be seen from Hilson (2003:1). This means that automation is not necessarily a priority but rather to get the work done and thus contributing to the country's economy. The second aspect which affects full automation is cost. Cost plays a vital role in the survival of small companies, and even though there is a certain amount paid for IT, more seems to be invested in service delivery and relationships.

Do you have some sort of business continuity plan (BCP) for your business?

Micro: of the six micro companies, one was never asked this question. However, none of the other five companies has a BCP in place. However, company E states that the only way in which their business cannot go forward is if the owner dies, as a diet can be worked out without any kind of technology. Company G had a huge laugh and said: "*ons sal maar in die garage werk" ("We will work in the garage").*

Small: Company F has a unique scenario, although nothing is stipulated. Their two sites are so close to one another that one site automatically becomes the backup for the other. Company I has a full Disaster Recovery (DR) plan as the annual internal audits forced this to be in place. Company H has a plan, but nothing on paper.

Medium: Company J says that they have backups but they will not be able to be up and running within 24hrs, due to hardware constraints. There is however no formal plan.

Large: Yes and no, the head office has a DR as well as BCP in place which are audited. At the factories however, A BCP becomes difficult. However the necessary safety mechanisms are in place at all the factories. There outsourced partner also provides a service on demand which removes the risk of IT downtime for the company itself.

Being able to "restart" a business after a disaster normally only becomes priority after the disaster happens, Beck (2007:12). One does not spend time or energy on this process until it is too late. As mentioned by Savage, a BCP is never high on the agenda even though the importance thereof is recognized. The micro companies do not have any guarantee that they will be able to have their business operations up and running with the minimal amount of damage after a disaster. The small and larger companies do realize that there is some risk and have put some measurements in place, although it is not always documented.

A BCP and DR should however be documented as this could be the only document available immediately after a disaster strikes. As Savage (2007:12) indicated in his required activities, analyze the risk and impact, document, identify activities on how to manage a disaster, test this plan and train your staff. Even though the SMEs above do not have BCP, they should at least engage in a formal backup procedure, to ensure that data does not go missing when a disaster does strike, as well as an updated anti-virus package, Beck (2007:12).

Do you have any process whereby you research or investigate new technology and if so, what is that process?

Micro: Company A was not asked this question as the question was added after the first interview. Of the remaining five companies, only one has some sort of process to investigate new alternatives for IT. Company C clearly stated that she is: *"nie goed met sulke goed nie" ("Not good with such thing").* In other words, she does not do Internet browsing for new options. However, Company D states that they are currently busy looking at rewriting their needs. Her husband is helping her to develop an administration system with suggestions to propose to head office, the franchisor, to assist Company D as well as other franchises with certain constrains which they currently face.

Small: The small companies do not have a formal process, although they do tend to look for new opportunities or systems which might assist in the day-to-day operations. Company H mentioned that they are constantly bombarded with representatives of various promotional new systems and technologies, and they have to listen carefully as each product is the best, according to the representative.

Medium: Company J does not have any process.

Large: The IT community, which consists of 6 people, has monthly IT steering committee meetings whereby problems are discussed and where they must decide whether or not to start a research project to investigate the problem.

There is not always a formal process whereby IT research is carried out by the smaller companies. This could be attributed to the fact that research involves both cost as well as resources. As was evident earlier not all the micro and small companies have resources available, and thus do not engage in a research process.

How often do you print documents? Do you still print a large number of documents or is IT helping you to become greener towards the environment?

Micro: Company A was not asked this question. The question was added after the first interview. Most of the micro companies did not realize what was meant when asked if they do anything to become greener towards the environment.

However, most stated that they only print if truly necessary. Some of them are now sending invoices and letters via email to reduce the cost of printing and thus reducing paper wastage. Company C stated that she does not have a process, but she does not print much. Then she stated "*weet nie regtig wat ek in my bedryfie kan doen nie*" ("*Does not really know what I can do in my small industry*"), meaning that within her small operation, she cannot really see or understand the reason why the need to go greener. Company G also mentioned that printing is dictated by the customers who come into the store, and thus they do not always have control on what is being printed.

Small: Company F does not really do anything to print less, but they do recycle their glass bottles, which is a way of looking after the environment. Companies I as well as H are forced by law and legislation to have hard copies of contracts and policies. Thus they cannot get into a paperless environment even though they have made attempts to do so.

Medium: There is no policy at company J. However, they have started an international Zen project which is supposed to help the employees become more aware of their environment and becoming greener.

Large: Due to the agreement Company K has with the hardware provider; they now have access to who is printing what. Even though nothing was said about printing, their printing has been reduced from 250 000 pages per month to 75 000 per month, just by making it visible as to who is printing what.

Although some companies have begun to realize that paper is being wasted by unnecessary printing, it still has a long way to go in making people understand what it means to be greener and how each company can make a difference. Legislation also seems to be a problem and thus there seems to be a need to investigate how legislation can adapt to accommodate a greener South Africa. Even though this question does not relate directly to the study, the researcher wanted to see if there is an understanding amongst SMEs of Green IT and if they can change some of their processes in becoming greener.

Other / Comments

During the last part of all the interviews each research participant had an opportunity to either provide a wish list of what they would like to get from IT or what would help them survive in the world out there, or suggestions on certain topics which they have already encountered or overcome which could be valuable advice for other SMEs.

These companies' concluding statements will now be briefly summarized as it also provides guidelines for the framework being developed.

Micro:

A: No advice or comments

B: No advice or comments

C: There is currently limited support for the Mac machines. Courses which help users to use certain applications do not exist.

D: Company D wants a server to connect all her PC's with a functioning administration system. She also wishes to have an air conditioning unit in her class-room, she requires an intranet through the franchise for advice and support as all the other franchises probably have the same problems and frustrations.

E: *"Sal sê die rekeningsisteem werk nie optimaal nie, wat ek wil hê weet ek nie presies nie"* *("Would say that the accounting system is not optimal, but what I want I do not specifically know")*. Company E would like clients to pay immediately or that the medical aid pays while they are busy with the consultation with the client.

G: Company G says a PC is like a car, it requires regular servicing, like you look after your car, has it cleaned and serviced regularly, the same should be done with the PC.

Small:

F: Company F said that if she could start over, she will not buy an existing liquor store but rather start from nothing. Knowledge and experience are extremely important and thus here systems are currently in place which ensures that the owner has control over the business. One should also know one's employees, and train them. There should be at least one person who can take control whenever the owner is not available or not able to continue with the day to day operations. This ties back to Jackson & Sloane (2009:72) who stated that small companies need to transfer knowledge between staff to ensure that everybody work together.

H: Company H would like system integration to reduce duplication, almost like a one-stop system which can import certain files. There is also a wish from company H to have more user friendly voice recognition software for laptops.

I: There are two challenges for company I and for any company moving over to a new system. The first one is that the software is the brain child of one programmer, and when the work is either getting to much for him or if something should happen to him, there is no one who can take over. Linking back to Jackson & Sloane (2009:72) there should be support resources which can "take-over" should the need arise. The second challenge is the employees or users themselves, who are unwilling to change and learn new systems and thus a process of change needs to be implemented, linking back to the building block attitude, as identified earlier for the conceptual framework.

Medium: IT and HR are the two functions within a company which also falls last on the to-do list and this could be due to the cost factor. However, IT and HR should be looked at thoroughly and then the rest should follow.

Large: When a company grows, so must the support vendor. The guy around the corner was great while the company was small but companies tend to stick to the guy around the corner and as the company expands, vendors' knowledge does not. Thus, the company will struggle because of a lack of knowledge and support from the guy around the corner. As soon as you fix your technology, all you other problems should disappear. Company K also states that the biggest problem for small businesses currently is that they do not realize that IT can assist them in making their business a success, IT adoption within small SMEs tend to be stagnating due to cost (Fink & Disterer, 2006:609 & Chibelushi & Costello, 2009:211).

Although all of the above are only recommendations provided by the various research participants, these recommendations could also be used during the Conceptual framework development. This helps shed some light on additional aspects which SMEs see as relevant when discussing and ultimately choosing ICT.

4.5   Concluding summary

Interviews help and assist in truly understanding the end users' needs and frustrations by just chatting with them. Although the interviews were semi-structured, all the research participants opened up and provided their "inner-most" wants from the use of IT; they also verbalised their frustrations and wish-lists. One thing that the researcher picked up is the total trust in hopefully getting the answer which they are looking for.

This chapter introduced the research participants and their companies as well as their interview responses. All the information gathered during chapter three and four will be used in chapter 5 to introduce a conceptual framework which can be used by SMEs in their quest for ICT and to assist them in making the right choices in specific areas of technology.

Chapter 5 - Research results and conceptual model development

5.1 Introduction

Throughout this research project, the researcher explored various types of SMEs and technologies, and how SMEs can adopt these technologies within the South African market to gain a competitive advantage. This project also pointed out the possible deciding factors when deciding to engage in these technologies. This exploration has to end at some point and an outcome should be produced. The next part of this project will look at all the aspects which emerged from both the literature as well as the interviews in order to build a conceptual framework to guide SMEs in their quest to adopt IT within the South African market.

5.2 Conceptual framework

In this chapter, the researcher attempts to provide a generic conceptual framework which could assist SMEs with the adoption of ICT within their organization.

Taking everything that was said about IT adoption and SMEs into consideration, there seems to be a magnitude of advice and data available surrounding the adoption of IT. As was identified earlier, there are specific adoption models which highlighted the main characteristics of IT adoption for SMEs. There is also an endless wave of technology and ways in which an SME can adopt IT, available not only within South Africa but throughout the world. The following section will indicate what SMEs see as relevant to their business and industry, to try and identify certain main IT requirements for their sector. After the relevant "IT" per business sector has been identified and explained, the characteristics decided on, based on the adoption models, will be indicated and discussed. After this discussion, all the characteristics as well as "relevant IT" will be introduced in a conceptual framework after which the framework will be discussed.

5.2.1 Relevant IT

Micro: As was identified during the interviews, micro SMEs realise that they cannot function without IT but they do not necessarily require high-level state of the art technology. All of these companies have emails, access to the Internet as well as a Telkom line. They seldom have a fixed network infrastructure and thus they will tend to use 3G devices to connect to the Internet and emails, thus ensuring mobility is achieved. It seems as if a financial package is not always required, except for those who do see the need for financial transactions. QuickBooks accounting is seen as a simple and easy way to adopt for their "simple" business operations. What did emerge though is that backups of data are not always a priority for these companies but they will have to start implementing a procedure whereby data is stored on a backup device and stored off-site to ensure confidentiality

firstly and secondly, to familiarise themselves with a business continuity plan. Even not formal, this is the first step towards achieving this goal. An updated anti-virus system is also required to protect their PCs or laptops, as recommended by Beck (2007:12).

Small: When companies expand and become part of the small group, everything relevant to micro companies is included but small companies will tend to focus more on Pastel rather than QuickBooks. This is due to the comment made by Company H whereby most accountants are familiar with Pastel as they are trained in Pastel and thus there is no extra cost involved in training. At the small level, skills development also starts to play a role. Skills development might not necessarily involve IT skills although small companies start to realise the benefit and importance of outsourcing their IT functions and that IT could assist them in their business needs. Small companies will also start investing in websites mostly for marketing purposes, as well as network infrastructures to connect the employees with one another. It is also at this point where the need arises for some kind of operational system to ensure productivity and accurate information for management decision-making. Here the TPS systems of Stair & Reynold's (1999:336), which are the first level of information systems, come into play where they say that the core business functions and transactions are now being recorded by using operational systems.

Medium: Medium companies have the same requirements as micro and small companies. However, they realise the need to employ in-house IT resources. At this stage a company starts to introduce more advanced operational systems such as enterprise resource systems especially on the financial side of the business. The need for accurate information for decision making now starts to influence IT decisions thus relating back to Stair & Reynold's (1999:336) MIS systems. These systems do tend to become more expensive and thus the small and micro companies do not venture into them.

Large: Everything which emerged from micro, small and medium companies but with additional add-ons are required by large companies. The large company has already invested into IT and infrastructure; they now start to look at what the world wide IT trends are and which of these trends can be invested in to ensure that maximum competitive advantage is reached. As this study does not focus on the large organisations, this part will only serve as an introduction for future research to expand the framework introduced.

Thus, the relevance of IT to the size of the company can be introduced as follows:
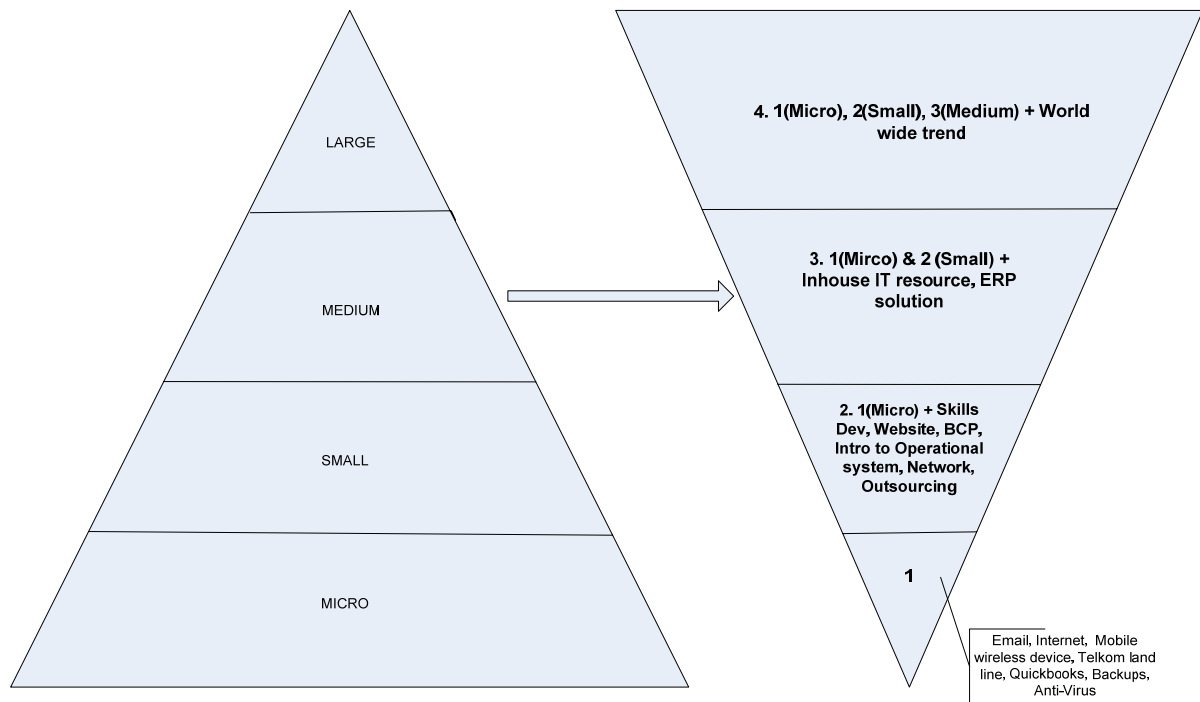
Diagram 4: IT relevance framework

From Diagram 4, one can notice the correlation between the size of the organisation and their level of IT adoption as discussed above.

5.2.2 Adoption characteristics

To buy or not to buy, that is the question… in the cause of this research project, a lot was said about adoption of IT, but which of these techniques suit the SME adoption framework the best. As indicated in section 3.7 the following characteristics will be taken from the adoption models:

- Ease of use
- Usefulness of the technology
- Attitude of the users
- Job fit
- External influences, whether it is via a friend or via an expert, also seem to be a determinant of the adoption of certain types of technology. External influences also relate the credibility of the source providing the external influence.

The research participants emphasised reliability of the technology as they specifically indicated reliable battery life for mobile devices, reliable information being produced etc. Other aspects such as cost, upgrading and compatibility were also mentioned. Cost is relevant to the specific technology, as one cannot get away from the cost factor in any technology. All of the research participants indicated that the cost of an article will determine whether they will invest in it or not. Cost is noted as important but inevitable and thus will not be included in the framework. Upgrading can be seen as part of

support which in turn forms part of the external influence characteristics. Compatibility forms part of reliability as well as usefulness, and will thus not be mentioned again in the framework.

Thus the only additional characteristic that will be added to the above mentioned characteristics will be reliability.
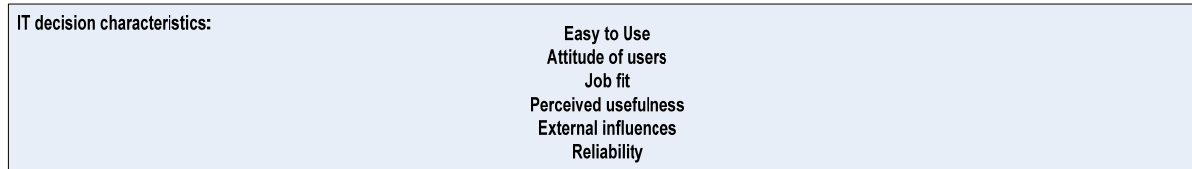
IT decision characteristics:	
	Easy to Use
	Attitude of users
	Job fit
	Perceived usefulness
	External influences
	Reliability

Diagram 5: IT decision characteristics

These characteristics will be displayed at the bottom of the framework as the SMEs need to remember them when choosing the best technology to invest in.

However, one shortfall at this stage is how one measures these characteristics to ensure that the right technology is chosen. As this study only introduces the framework, there is a need for future research in order to develop a measurement instrument which could be used by someone who is not IT skilled, to ensure that proposed technology options are easy to use, useful etc.

5.2.3 Organizational strategy

As was mentioned earlier, one has to understand what the company's strategy is; namely vision, mission and objectives. Once the organisational strategy is known, one can incorporate the business processes which will lead to the IT strategy, thus ensuring that the adoption of IT within the company becomes integrated with the business' objectives. Thus the company's strategy will become the glue which assists a SME with adoption and future growth.
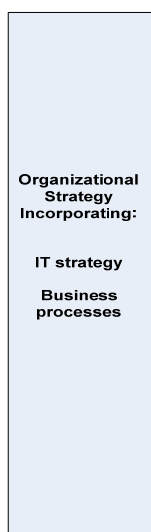
Organizational
Strategy
Incorporating:

IT strategy

Business
processes

Diagram 6: Building organisational strategy

Organizational strategies include the IT strategy. What is emerging is that strategies need to be in place so that the SMEs know what they want to achieve, and based on these strategies and goals, ICT needs to be decided upon, thus providing the necessary glue to build the company's structures and IT requirements.

5.2.4 Combined framework

Diagram 7 illustrates, combined in one framework, all the concepts which can be used by SMEs to adopt IT from a South African point of view, based on the size of the company. All of the building blocks of the framework are interlinked in order to ensure that the SME knows what to look for when choosing IT to invest in.

The conceptual framework serves as a guide to help one to make sense of a magnitude of concepts as indicated by Smeyers (2008:697). It does not mean that micro cannot adopt one of the concepts of the small companies. Therefore, the role of this framework is to support personnel of SMEs in their decision making with regards to the use of ICT.
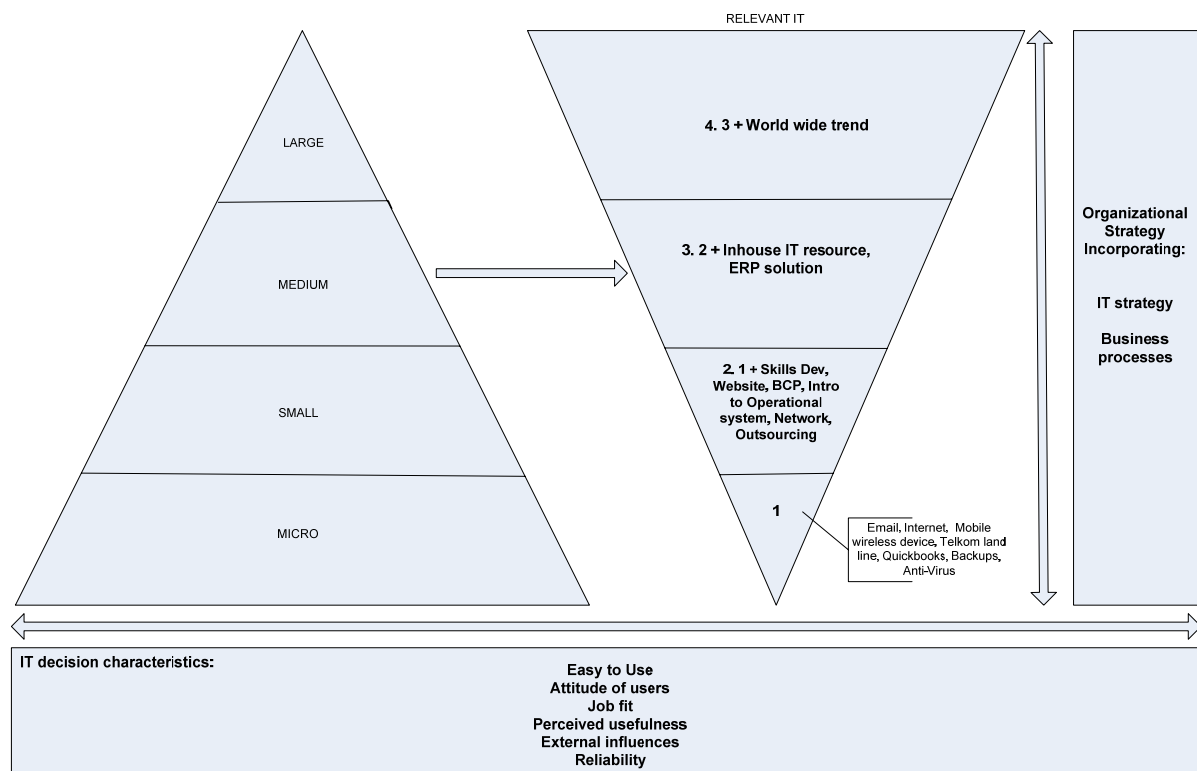

Diagram 7: Conceptual framework for guiding SMEs in adoption of IT from a South African point of view

5.3   Concluding summary

As the conceptual framework was introduced in this chapter, it is necessary to see whether or not these findings do indeed tie in with Cragg's 7 S-model for IT adoption: **Strategy, Structure, systems, staff, style, skills and shared value (**Fink & Disterer, 2006:610).

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Throughout this chapter, findings from the literature as well as the qualitative research have been combined to develop a conceptual framework which can be used by SMEs to ensure that they adopt the relevant technology and to ensure that they consider the adoption characteristics identified when choosing technology. This conceptual framework has formed the heart of this research project. The next and final chapter will set out to answer the research questions as set out in chapter one. The contribution which this study can make to the academic world will also be discussed.

Chapter 6 - Research summary and conclusion

6.1   Introduction

This research project has introduced common themes and developed a conceptual framework which can guide SMEs in their quest to invest in and implement new technologies. The last section of this paper will indicate how the research questions and objectives as proposed in Chapter 1 have been answered as well as what contribution was made in this study. Possible limitations of this study are identified and recommendations are made for future research.

6.2   Research questions

This research project set out to answer specific research questions which were identified in the first chapter. In the following section, these research questions will be answered based on the findings made thus far. Thereafter the research contribution will be explained.

What role does ICT play in the success of SMEs?

As discussed in Chapter 3, the first type of automated calculation machines was introduced in the 1600s. In the 1950s the personal workstation was introduced and thus supposedly the start of a simplified life. According to the data which was gathered and analysed in chapter 4 small firms realise the importance of IT and how IT can enhance their day to day operations, As SMEs realise the importance of IT in their day-to-day operations, they try and adapt to the latest technology which is relevant to their industry. For others, the industry determines the type of technology which is required.

What type of technology is suitable and available for SMEs in South Africa?

In chapter 3, a large number of available technologies were discussed. During the data gathering in chapter 4, technology which is actually used by SMEs was identified. Although it is difficult to identify exactly which technology to use, recommendations were made in the conceptual framework as well as in section 5.2.1. The most difficult recommendation is whether to buy a laptop or a PC and which type of mobile device or phone to use. During this study it emerged that SMEs should investigate the option of investing in a laptop rather than a PC, as well as investing in a smart phone which allows them to receive email and connect to the Internet from any location, thus assisting them in their daily operational tasks.

What are the challenges faced by SMEs during ICT implementations?

A big challenge emerged when companies engage in projects or begin to investigate new IT solutions. One of the biggest challenges, as discussed in section 3.4, is that of a lack of internal resources or skills. As could be seen from the gathered data, not all SMEs have someone internally whom they could turn to for assistance. Another aspect which one needs to keep in mind when adopting new technologies or solutions is the social factors which play a tremendous role in IT

adoption as stated by Fink & Disterer (2006:611). As mentioned by Coff & Laverty (2001:2) an organisation's success is attributed to the people dependent assets within organisations. Thus, even though Chibelushi & Costello (2009:214) point out, the common challenges faced by SMEs namely social, legal, economic, political, and technological factors. The biggest challenge relates to the social aspect of a business. The social aspect includes skills and available in-house resources, managerial or decision-making skills, attitude of users and ultimately how they perceive the system to fit into their specific job in terms of usefulness.

What are the best adoption techniques for IT?

As discussed in section 3.6.1 there are numerous models available, and to find the one most suited to your specific needs is almost impossible. However, throughout this research paper, the researcher has attempted to develop a conceptual framework which can guide the owners or decision-makers in a company to investigate and ultimately decide upon specific technology. However, this conceptual framework has not been tested as the testing thereof falls outside the scope of this research paper and should be part of a future research study. However, going back to the previous question, one of the best techniques to ensure that the chosen technology is the "right-fit" is by ensuring the relevant skills are available or at least accessible via a reliable source.

How SMEs should approach and manage the challenges of ICT adoption?

ICT adoption is an area that small companies are fearful of venturing into. By following the guidelines as set out in the conceptual framework, SMEs should be able to approach and manage challenges which they face when investigating or even invest in new IT.

6.3   Research contribution

Although interpretive research is seen as a useful method to employ in gaining an understanding of the social aspects of an organization, some reviewers and editors have been questioning the validity of these results (Klein & Myers, 1999: 67, 68). They set out to design certain principles which can be used when performing or even evaluating interpretive research. Even though they acknowledge that interpretive research cannot be followed in a mechanical way, they do realize that having something to measure against is better than having nothing at all. However, Atkins & Sampson (1992:102) indicated nine guidelines for evaluating qualitative papers as derived from the work of Greenhalgh in 1997. These nine guidelines will be used in this project to assist in the evaluation of the contribution made and can be viewed in Table 14 below.

1	Did the paper describe an important clinical problem addressed via a clearly formulated question?
2	Was a qualitative approach appropriate?
3	How were the setting and the subjects selected?
4	What was the researcher's perspective, and has this been taken into account?
5	What methods did the researcher use for collecting data, and are these described in enough detail?
6	What methods were used to analyse the data , what quality control measures were implemented?
7	Are the results credible, and if so, are they clinically important?
8	What conclusions were drawn, and are they justified by the results?
9	Are the findings of the study transferable to other clinical settings?

Table 15: Nine guidelines for evaluating qualitative papers

(Atkins & Sampson, 1992:102. Referencing Greenhalgh 1997)

1. *Did the paper describe an important clinical problem addressed via a clearly formulated question?*

   In chapter one, the research problem was stated and explained in depth with the help of various literature sources. The research questions as well as the research objective discussed in chapter one provide a clear understanding of the research problem and how the use of ICT can improve the way in which SMEs perform their daily operations within the South African context.

2. *Was a qualitative approach appropriate?*

   As it took time for the researcher to understand each of the research participant's businesses and gain a better understanding of the business operations of each of the SMEs interviewed, the best way of gaining this understanding was through discussions or interviews with the research participants and thus doing qualitative research. The researcher did not want mathematical facts but rather a softer approach and to gain a better understanding of the needs and wants of the SMEs being investigated.

3. *How were the setting and subjects selected?*

   As the focus of this paper is to provide a conceptual framework to guide SMEs in the adoption of IT within a South African context, the researcher tried to approach a broad spectrum of research participants or subjects from various industry sectors. These participants were interviewed in their places of business to ensure that they were comfortable and so that the researcher could experience the day-to-day operations herself.

4. *What was the researcher's perspective, and has this been taken into account?*

   The researcher realised that there is a need for small companies to receive support and an understanding of how their businesses deals with the adoption of IT. In this research project, the researcher provided her thoughts and ideas on which IT would be beneficial to the research participants, and from these thoughts, the literature themes as well as some of the research questions. However, the researcher did try and keep an unbiased opinion to ensure that the data speaks for itself.

5. *What methods did the researcher use for collecting data, what quality control measures were implemented?*

The procedures followed during data gathering were as follows:

- Research participants were identified and asked to participate.
- All interviews were scheduled at the participants' places of business.
- After an interview, the recording was briefly played back on the digital device, to ensure quality of sound as well as that recording did indeed take place.
- All interviews were transcribed per research participant per interview questions
- Recordings were stored on a external storage device for safe-keeping
- Each company was divided into a category depending on size, for example micro, small, medium and large, and allocated an alphabetical letter to ensure confidentiality
- Data was analyzed per question and the results were provided in chapter 4.

6. *What methods were used to analyze the data and what quality control measures were implemented?*

The data was analysed per research participant per question. By doing the analysis this way, each participant's "voice" could be heard and their answers to these questions were brought into account. The analysis of the internal findings were then also tied back to the literature as discussed in Chapter 3 to see whether or not the literature could be validated or maybe not fit into the South African context.

7. *Are the results credible, and if so, are they clinically important?*

As the results are based on the findings made by both the literature as well as the responses from the South African research participants, it does ensure that the findings are credible and can be used by SMEs in South Africa as guidelines when they are investigating which IT to use in their daily operations.

8. *What conclusions were drawn, and are they justified by the results?*

The main conclusion from this research paper is that of a conceptual framework which SMEs can use to help them. It also emerged that SMEs do not always have internal IT skills and thus there is a need for them to receive relevant help and guidance in their IT decision-making.

9. *Are the findings of this study transferable to other clinical settings?*

As this study relates to SMEs within South Africa, the researcher believes that the findings of this study can be used in future research papers even if just as a reference for research findings.

6.4 Research recommendations

Even though this framework has been developed to help guide SMEs within South Africa to investigate and adopt ICT, one has to realize that this framework was not tested during this study and thus it is recommended that a measurement tool be developed which can be used when the framework is being implemented. What emerged from this study though is the impact of the social presence relating to decision-making within SMEs. Thus it is recommended that one engages with the employees within your organization as it allows for multiple inputs from these employees which could guide you in your decision-making.

6.5 Research suggestions for future research

Throughout this study, some interesting suggestions for future research have emerged. These suggestions will now be listed as possible future research questions:

1. What are the guidelines assisting the decision-makers of an organization to outsource or not to outsource?
2. Why do some larger companies prefer to do in-house training and if large companies encourage people to enrich themselves through continuous studies or training which of these companies will pay it?
3. As this study does not focus on the large organisations, the framework could in future be expanded to include technology adoption for larger organizations.
4. As this study is only an introduction to the framework, there is a need for future studies to develop a measurement instrument which could be implemented by someone who is not IT skilled, to ensure that proposed IT characteristics are met.

6.6 Concluding summary

This research project focused on how SMEs may benefit from the use of IT and how they may gain a competitive advantage by looking into different ways of adopting ICT from a South African point of view. Some companies might not have the ability to adopt this framework, but they can still become big players in the world out there. What does matter though is what they keep close to their "heart" and in their strategy. And one can provide framework upon framework, but it is up to the SME whether or not to consider the facts and embrace the challenge. As stated by Josh Billings (2009): "*Advice is like caster oil, easy enough to give but dreadful uneasy to take.*"

And as stated by Dyerson et al. (2009:48), *"the typical SME is likely to be a small clog in a much broader supply chain."* And as the well-known saying goes: "a chain is only as strong as its weakest link" – Anonymous. Thus keeping up to date and on top of the latest trends in that specific industry becomes the biggest playing card in a company's competitive advantage.

THE END

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Annexure A – South African SME classification

Sector or sub-sectors in accordance with the Standard Industrial Classification	Size or class	Total full-time equivalent of paid employees *Less than:*	Total annual turnover *Less than:*	Total gross asset value (fixed property excluded) *Less than:*
Agriculture	Medium	100	R 4.00 m	R 4.00 m
	Small	50	R 2.00 m	R 2.00 m
	Very small	10	R 0.40 m	R 0.40 m
	Micro	5	R 0.15 m	R 0.10 m
Mining and Quarrying	Medium	200	R30.00 m	R18.00 m
	Small	50	R 7.50 m	R 4.50 m
	Very small	20	R 3.00 m	R 1.80 m
	Micro	5	R 0.15 m	R 0.10 m
Manufacturing	Medium	200	R40.00 m	R15.00 m
	Small	50	R10.00 m	R 3.75 m
	Very small	20	R 4.00 m	R 1.50 m
	Micro	5	R 0.15 m	R 0.10 m
Electricity, Gas and Water	Medium	200	R40.00 m	R15.00 m
	Small	50	R10.00 m	R 3.75 m
	Very small	20	R 4.00 m	R 1.50 m
	Micro	5	R 0.15 m	R 0.10 m
Construction	Medium	200	R20.00 m	R 4.00 m
	Small	50	R 5.00 m	R 1.00 m
	Very small	20	R 2.00 m	R 0.40 m
	Micro	5	R 0.15 m	R 0.10 m
Retail and Motor Trade and Repair Services	Medium	100	R30.00 m	R 5.00 m
	Small	50	R15.00 m	R 2.50 m
	Very small	10	R 3.00 m	R 0.50 m
	Micro	5	R 0.15 m	R 0.10 m
Wholesale Trade,	Medium	100	R50.00 m	R 8.00 m

(Department of Trade and Industry: South Africa, 1996)

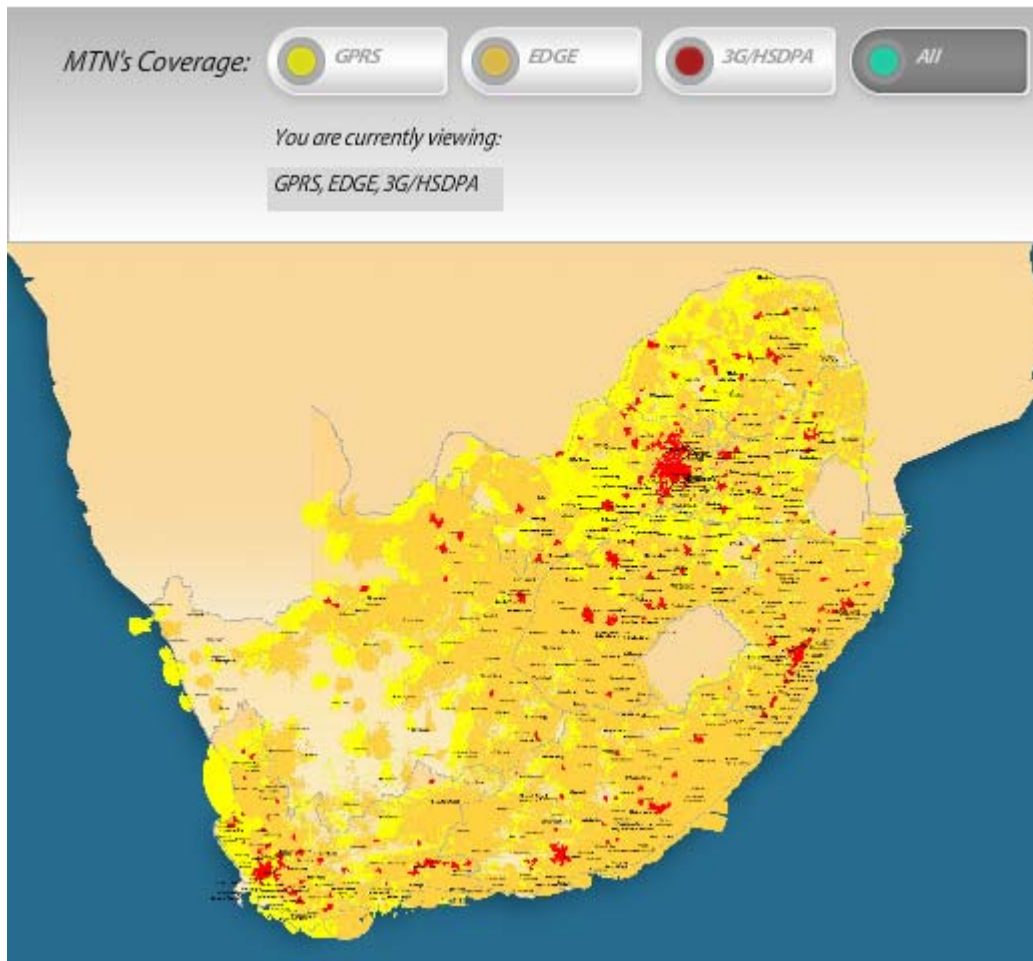# Annexure B – Coverage Maps of Service providers in South Africa

Vodacom
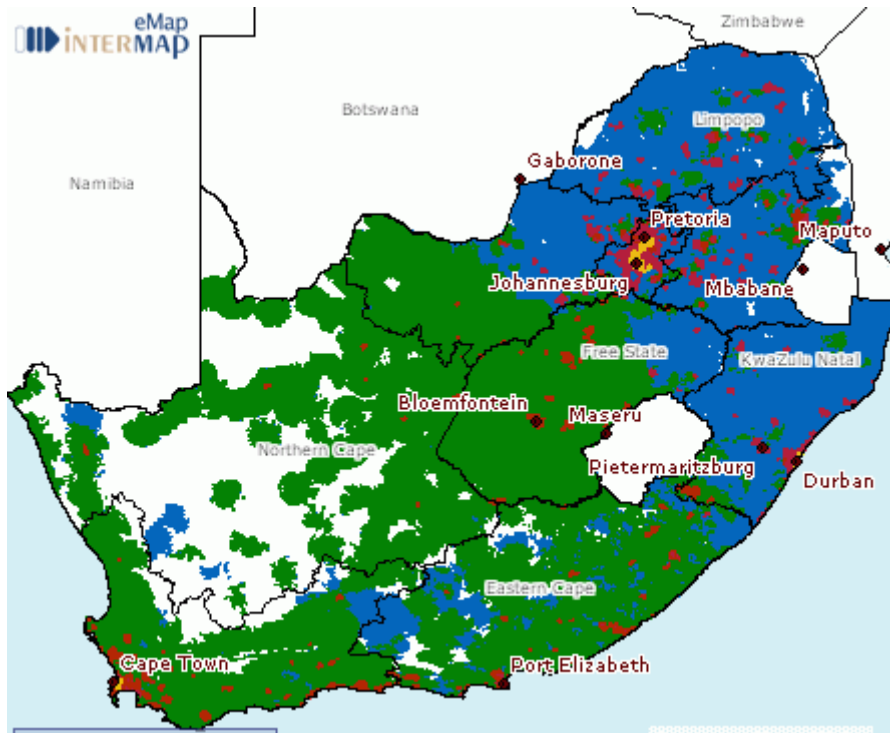
- ☑ WiMAX
- 3G/ HSUPA
- ☑ HSDPA 1.8,3.6
-   HSDPA 7.2
- ☑ EDGE
- ☑ GPRS/GSM
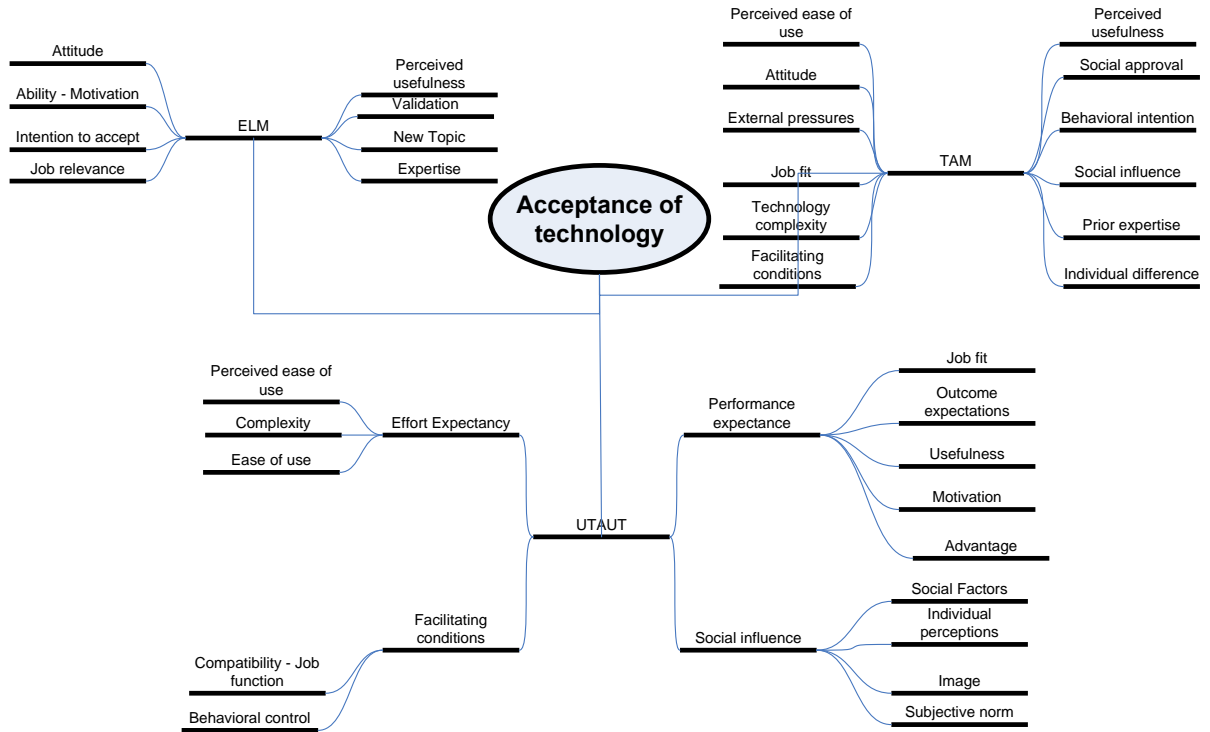
(Vodacom coverage, 2009)

MTN

(MTN, 2009)

Annexure C – Mind Map

Adoption model characteristics

Annexure D – Interview introduction and questions

Conceptual framework for guiding SMEs in adoption of IT from a South African point of view

Thank you for participating in my research and I trust that together we will be able to identify what the importance of ICT or IT is within your business and how you can better utilize IT to ensure that your business grows to even more new frontiers. Below is a brief introduction as to the aim of this research paper is and what the desired outcome thereof will be. After the findings have been analyzed, you as a participant will also receive a summary of the findings which you can then use as guidelines for your own business.

Starting up a new organization, or trying to adapt to the rapid rate of evolution experienced all over the world, it is crucial to understand what our requirements are in terms of Information and communication technologies (ICT). According to Milson (2003) Small to medium sized organizations (SME) are seen as the driving force of any economy and one has to realize the importance of effective and successful implementation of ICT is and what the impact there off can be. What happens when the primary IT foundations of such organizations are not laid or not laid properly? And if the organization grows, even if at a slow pace, how do they adapt to these changes in an emerging IT environment? However, due the lack of resources, whether it is financial or based on a physical person, SMEs tend to be reluctant to adopt ICT (Celuch *et al.*, 2007). Wixom & Todd (2005) mentions the need to develop a set of characteristics which can be applied across a range of systems to be able to integrate user perceptions and IT adoption.

This study focus on finding such a set of characteristics which will be developed into a conceptual framework to guide and assist SMEs with their choice in investing in ICT and how this investment can be beneficial and ensure a competitive advantage within the South African business industry.

Interviewee: _____

Date: _____   Time: _____   Duration: _____

1. Type of SME and industry sector, background of business
   a. Type of SME
   b. Industry sector
   c. Background
   d. Number of years in operation
   e. How long have you been using ICT?
   f. Number of employees
   g. Number of employees working on ICT
   h. Number of employees not working on ICT
2. What is the gender of the decision maker of IT adoption in your company?
3. Type of employees and their skill levels?
4. Training within your organizations, who does this and how is this done?
5. How do you primarily communicate with employees?
6. How do you primarily communicate with you customers or suppliers?
7. Who are your competitors in the market and are they a threat, if so why?
8. How do you do marketing, if any at all?
9. Are you in favor of using IT for your business operations and to what extend?
10. What types of technology do you use?
11. Which of the following technology do you use:
    a. Email
    b. Internet
    c. Intranet
    d. Wireless
    e. Company website
    f. Video/Audio conferencing
    g. Own computer network
    h. Other
12. What type of operating system are you working on in your organization?
13. Are you familiar with MS office, such as Word and Excel (2003 or 2007), and what is your primary function for these applications?
14. *How high do you value a standard within your organization with regards to the use of operating systems, applications and hardware?*
15.
16. *Why do you regard the use of ICT in your company as important? Where do you get advice and support with regards to IT issues?*

17. *Do you use external* or outsourced support from an external organization for IT support, if yes, why, if not, why not?

18. Do you perform your own financial accounting or is that outsourced? If you own, what packages do you work on, e.g. Pastel or QuickBooks or other? And why this package?

19. What type of network infrastructure do you have in place?

20. Who is your mobile phone service provider?

21. Does your company have a land line? If so, who is the service provider or support?

22. How high do you value security within your company in terms of data security and access to your premises?

23. In terms of technologies, what do you use to ensure a secure environment?

24. Do you back-up any of your data on a regular basis, if so how regular?

25. What keeps you awake at night?

26. What would be your deciding factors to choose or adopt IT be?
    a. Easy to work with?
    b. Cost
    c. Ease to implement?
    d. Support
    e. Return on investment?
    f. Advice from support vendor?
    g. Attitude of users
    h. Other?

27. What is your current cost expenditure on ICT per annum? (Average)

28. Has the use of IT had any impact on your company?

29. What would your business goals be for your organization and does it include investing in IT?

30. Do you have possesses within your organization which is not automated, and what are they?

31. If yes to 29, do you have a need to automate these processes?

32. Do you have some sort of business continuity plan for your business?

33. Do you have any process whereby you research or investigate new technology and if so, what is that process?

34. How often do you print documents? Do you still print a large amount of documents or is IT helping you to become greener towards the environment?

Annexure E – Ethical permission form

Ethical permission form

1   Title of research project: Conceptual framework for guiding SMEs in adoption of   IT from
a South African point of view

2   I ……………………………………… hereby voluntarily grant my permission for participation in
the project as explained to me by

……………………………………………………………………………..

3   The nature, objective, possible safety and health implications have been explained to me
and I understand them.

4   I understand my right to choose whether to participate in the project and that the
information furnished will be handled confidentially. I am aware that the results of the
investigation may be used for the purposes of publication.

6   Upon signature of this form, you will be provided with a copy.

Signed: _____   Date: _____

Witness: _____   Date: _____

Researcher: _____   Date: _____