



**A REVENUE GENERATION MODEL FOR
ADOPTION OF
VOICE TELEPHONY APPLICATIONS**

BY

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OF VOICE TELEPHONY APPLICATIONS**

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Abstract

Amongst various Voice Telephony Applications discovered, IBM India has developed the Spoken Web which enables voice commerce capabilities that are ideally suitable for underprivileged rural communities. Admittedly, these communities are barred from fully utilising ICT enabled electronic commerce services such as the Internet for business marketing processes as a consequence of poor literacy and financial constraints. The advent of Voice Telephony Applications aids accessibility and participation of the underprivileged rural communities to the ICT world. It should be noted that users are not compelled to be computer savvy to make voice calls, but high voice call costs are the deterrent. Therefore, devising an appropriate Revenue Generation Model would enhance the accessibility and participation of the underprivileged rural communities to the ICT world. As guided by the Design Science Approach, and the *Diffusion of Innovations* and *Social Exchange* theories, this research project has discovered and applied five models such as the Freemium, Affiliation, Advertising, Incentives-driven and Subsidy within each development stage of Spoken Web. This research project is of the idea that reimbursing content providers through supporting the proposed Revenue Generation Model as a de facto solution will help in reducing voice call costs to the users of Voice Telephony Applications in future.

Keywords: Underprivileged Communities, Voice Telephony Applications, Rewards, Costs, Revenue Generation Model, Diffusion.

Declaration

I, Mr Sekelo P. L. Mazwi, hereby solemnly declare that:

- The work in this dissertation is my own.
- I am fully aware of the University of Fort Hare's policy on plagiarism and I have taken every precaution in my capacity to comply with the set regulations. All sources used or referred to have been documented and recognised.
- This dissertation has not previously been submitted in full or partial fulfilment of the requirements for an equivalent or higher qualification at any other recognised educational institution.
- I have to the best of my knowledge complied with the set protocols on research ethics as deemed fit by the University of Fort Hare and am in this regard fully aware of such requirements.

Name:

Ethical Clearance Number:

Signature:

Date:

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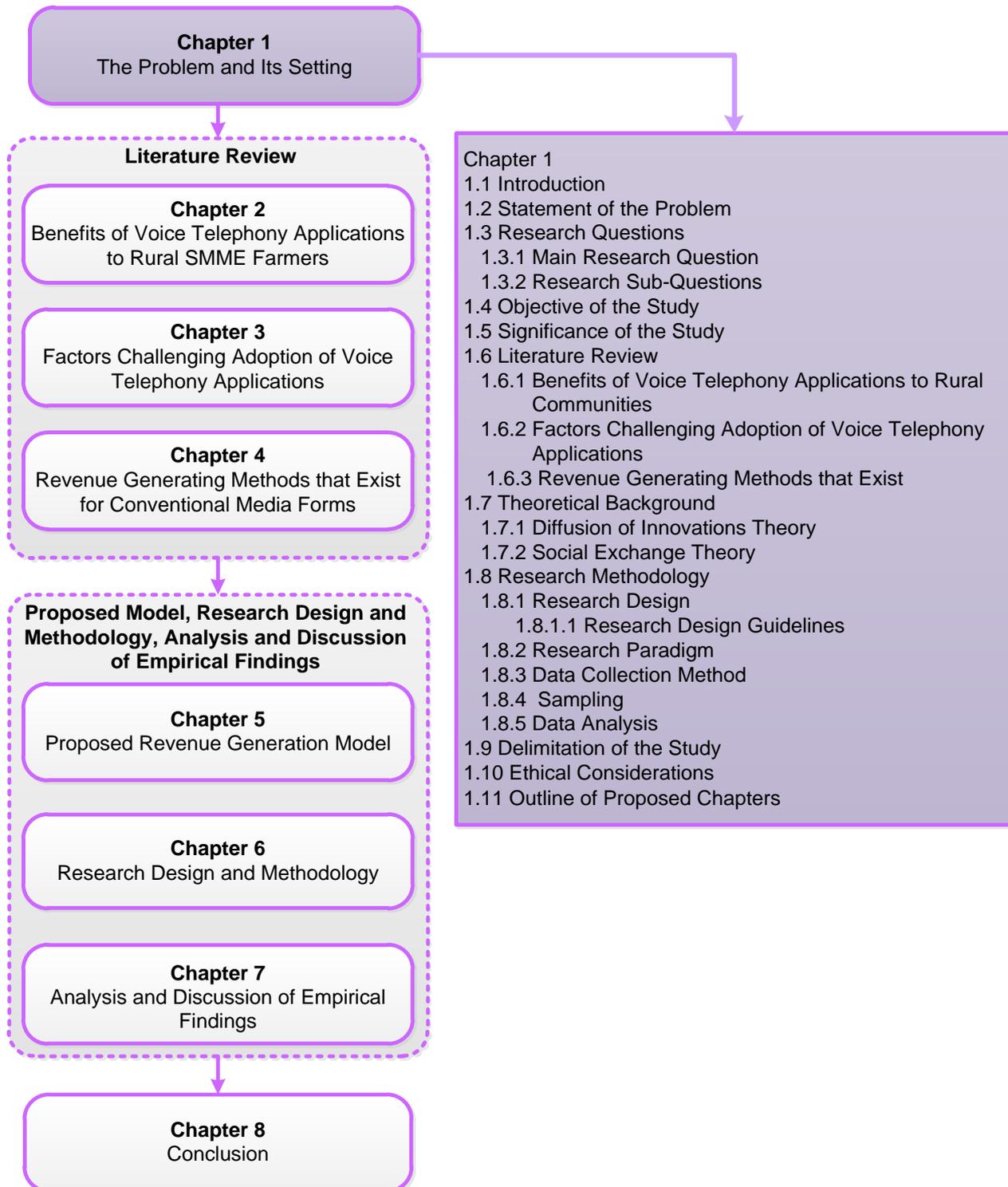
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1. The Problem and Its Setting



1.1 Introduction

The way in which information technology users access and interact with information for their daily use has been drastically transformed by the Internet (Chen, Power, Subramanian, & Ledlie, 2011). Businesses can tap into niche consumer markets through electronic commerce, mobile commerce and voice commerce telecommunication networks (Oz & Jones, 2008). E-commerce is defined as utilising electronic platforms such as the Internet to communicate and do transaction activities between enterprises, suppliers, and consumers. On the other hand, m-commerce is purely an extension of e-commerce to mobile and wireless phones. Lastly, v-commerce refers to audio and voice as it converts text to speech or speech to text, and also identifies a voice. This is the technology that enables voice marketing services via a telephone (Sung, 2006), ideal for underserved rural communities. Mobile telecommunication is expected to be accessible to more than five billion users by year 2015 (GSM Association, 2007).

To date, information technology has six user interface paradigms. These include: graphical user interface (GUI), gestural interaction (GI), facial expression, physical action, biometrics, and voice user interaction (VUI) or Voice Telephony Applications (also known as voice-telephony services). The VUIs are the focal area of this research project (Wahlster, 2006). In this regard, as noted by Williams (2011), various VUI forms such as Asterisk (VoIP PBX), Freedom Fone (PBX without VoIP), and Spoken Web (a system that hosts voice web site) exist. In this context, as the most ideal VUI application identified for underprivileged rural farmers, Spoken Web is defined as an audio format of the Internet. This Voice Telephony Application is accessible through devices such as low end mobile phones and fixed-line telephones. VUIs are within the reach of Small Medium Micro Enterprises (SMMEs) in peri-urban and rural communities (Prasad, 2013). SMMEs in South Africa have a staff compliment of less than one hundred employees (Elliot, 2005). This research project is targeting farmers with ten or less employees within underprivileged rural communities of Eastern Cape Province (ECP). Stats SA (2012a) affirms that as the second largest province of South Africa, ECP has an illiteracy rate of 11%, unemployment is sitting at 37%, whilst the average income in ECP is R64 550. Furthermore, black Africans constitute 86.3% of the total population that speaks IsiXhosa in the province (Stats SA, 2012a).

This Voice Telephony Application also resembles an Interactive Voice Response (IVR) system that customers encounter when calling services such as banks, and in its format is an advanced IVR application (Ananthaswamy, 2008). According to Rogers (2003), he predicts that only a few innovative users will put to trial the new technology. In this regard, rural SMME farmers can participate in the new Voice Telephony Applications, and since Spoken Web is accessible through

affordable and compatible devices, such as low-end mobile phones, therefore assists them in using it (Kumar & Agarwal, 2012).

In its technical composition, compared to other websites, the Spoken Web uses a less complex VoiceSite to store an individual subscriber's profile just as the Internet uses a website. An illiterate user with poor or no primary school qualification can access different contents on sites in Spoken Web by means of voice browsers and use web browsers to access relevant pages on the Internet respectively. This Voice Telephony Application has Voice Extensible Mark-Up Language (VXML). VXML is analogous to how the Internet uses Hyper Text Mark-Up Language (HTML) as its programming language to design and create the structure of its site, and applications. The Voice XML page serves as an audio interface application between people and machines (Kumar, Rajput, Chakraborty, Jindal, & Nanavati, 2007c). Additionally, according to Kumar *et al.* (2007c), Voice Telephony Application uses Hyper Speech Transfer Protocol (HSTP) as its platform protocol to allow users in sites similarly to the Internet's Hyper Text Transfer Protocol (HTTP) which allows the communication and transfer of voice or data. Voice Telephony Applications are comprised of application features similar to how the Internet uses its web applications to execute telecommunication activities (Duggan, 2002). Similarly, the Spoken Web utilises VoiceLinks to connect and navigate between different contents or sites just as the Internet uses hyperlinks. In Voice Telephony Applications, voice is the navigation tool and the content of material in sites, and applications is in voice format, while on conventional Internet it is text based (Duggan, 2002). In simple terms, a less literate user can make a call and be guided by VoiGen, audio web software for the Spoken Web, through a process to create a VoiceSite of his/her choice (Kumar *et al.*, 2007c).

Explicitly so, the adoption of Voice Telephony Applications is riddled with challenges such as call costs that continue to inhibit the use of these applications (Ward, Rivera, Ward, & Novick, 2005). These call costs culminate into a lack of willingness on the part of users to pay for the high call costs (Boyera, 2009). Further to this quandary, an additional study has to be carried out as a means of addressing the cost issue, as this will help in sustaining use of Voice Telephony Applications in future (IBM, 2010). Hence, this research project proposes a revenue generating model as a means of addressing voice call costs to accommodate the financially constrained rural ECP communities. Against this backdrop, prior to Williams' (2011) study, Hoffman and Novak (2005) found that in order to sustain any form of communication, an ideal source of funding has to be established. Therefore, the main objective of this research project was to derive a suitable revenue generation model which according to Jonnalagedda (2011) and IBM (2010) will help in sustaining Voice Telephony Applications such as the Spoken Web in ECP. Objectively, this is done to minimise call costs to underprivileged rural SMME farmers in ECP, the intended users of these Voice Telephony

Applications. This requires the review of various funding models in platforms such as the Internet and Short Message Service (SMS) in order to uncover mechanisms for revenue generation in these forms of communication. This research project determined the impact of voice call costs in the adoption of Voice Telephony Applications, as noted earlier by Nusbaum (2008). The following section explains the problem statement in detail, in relation to the challenges facing Voice Telephony Applications.

1.2 Statement of the Problem

A recent study revealed that central to challenges posing a threat to the effective use of Voice Telephony Applications are high voice call costs. These costs can curtail underprivileged rural users from realising anticipated benefits that can be earned through accessing these Voice Telephony Applications (Isabirye, Flowerday, & Von Solms, 2013). This is in line with the findings of Williams (2011) who noted in her report that unwillingness on the part of the users to pay for the service due to high voice call costs poses a challenge to the adoption of Voice Telephony Applications. In order for rural users to make affordable voice calls, there must be enough revenue, profit or funds to compensate the content providers for their associated costs. Additionally, this to a lesser extent helps in providing an incentive to reduce voice call costs to the rural users (Hoffman & Novak, 2005). These content providers are advertisers, research institutions, government organisations and other stakeholders who have vested interest in Voice Telephony Applications. Therefore, as viewed by Jonnalagedda (2011) and IBM (2010), reviewing various revenue generating mechanisms, and assessing whether these mechanisms can be applied to achieve a reduction in voice call costs for users of Voice Telephony Applications in rural areas is key to this research project. This problem statement has been addressed through developing and finding a solution to the upcoming questions.

1.3 Research Questions

1.3.1 Main Research Question

How can revenue generating models be applied to reduce call costs to users of Voice Telephony Applications in order to enhance their adoption?

In an article by The Economist (2009) it is stated that as long as the users in emerging economies intend to use Voice Telephony Applications, they ought to pay a certain charge for each voice call. Therefore an objective analysis and study has to be undertaken to evaluate the application of various revenue generating models such as advertising, in order to enhance the underprivileged communities' participation in Voice Telephony Applications, the intended users. The main research question is divided into the following three sub-questions that will critically examine the identified problem.

1.3.2 Research Sub-questions

- i. How can Voice Telephony Applications be utilised to benefit rural farming communities?**

In this section, the research project will compare the value that can be derived from Voice Telephony Applications against the use of Internet enabled services, comparing benefits of using low-end mobile phones against high-end mobile phones.

- ii. What are the main factors challenging the adoption of Voice Telephony Applications?**

Views, knowledge and experience pertaining to Voice Telephony Applications will inform the discussion in this section.

- iii. What revenue generating methods exist for conventional media forms such as the telecom sector and the Internet service?**

Revenue generating methods such as advertising, affiliations, taxation and subsidy models have to be investigated at length to build a picture of how revenues are drawn in the telecommunications sphere. This amongst others is in line with promoting adoption and user participation so as to increase revenue sales within the target audience: an issue that speaks on the objective of this research project, as contained below.

1.4 Objective of the Research

As advised by IBM (2010), this research project has to devise a revenue model that can minimise voice call costs to the user for the effective adoption of Voice Telephony Applications in underserved rural farming communities. It is imperative that both the objective and significance of the research are discussed in full for an anticipated social benefit. In order to illustrate the anticipated benefits to carrying out this research project, it is imperative that the significance of the research is examined; this will be better explained in the following section.

1.5 Significance of the Research

Voice Telephony Applications have a distinct feature and functional advantage over text-based Internet services. In a nutshell, by virtue of their design, the utilisation of Voice Telephony Applications such as the Spoken Web is not dependent on the financial capacity, literacy level and computer accessibility of its end-user (Ananthaswamy, 2008). In this regard it is fit to also note that voice applications such as the Spoken Web are the most ideal Information and Communication Technology (ICT) tools for underprivileged rural users. These tools enable accessing of information and services in developing countries, particularly by underprivileged rural households. Therefore, in the context of disadvantaged rural farming communities, Voice Telephony Applications should be the preferred mode of communication for users who are less educated and who have limited access

to conventional PC-based Internet services (Agarwal, Jain, Kumar, Manwani, & Nanavati *et al.*, 2010a). In the case of the Spoken Web, users expect the voice application to be relatively less expensive to access. However, high voice call charges will make the Spoken Web less accessible. The Economist (2009) postulates that users will have to pay money for the voice calls they make, regardless of a cost charge. Additionally, Boyera (2009) cautions that it is relatively more expensive to pay for a call in developing countries than it is in developed ones. Therefore, devising a revenue generation model would be an initial step towards promoting accessibility of Voice Telephony Applications through reducing user costs, as reviewed below.

1.6 Literature Review

A literature review must entail a solid theory base; have a detailed context of work; should add to a pool of knowledge, and should be unequivocally of significance to the field of study (Hofstee, 2010). In this context, this research project will infuse relevant assertions, as ground work will be laid on concepts and elements which are the cornerstones of revenue and benefits. This will be done in the sub-sections to follow.

1.6.1 The Benefits of Voice Telephony Applications to Rural Communities as against PC-based Internet

It has been discovered over the past five years that there has been insufficient commitment to studying systems that retrieve information or data through spoken queries, despite the pervasive nature of speech as the most used communication medium (Crestani & Du, 2006). Ananthaswamy (2008, p. 2) hypothesised that “A voice web for cellphones could be the answer to bringing the power of the Internet to the developing world”. This claim by Ananthaswamy (2008) simply implies that Voice Telephony Applications such as the Spoken Web have an inherent and competitive advantage to perform even in challenging economies. These economies have no access to broadband or conventional Internet connections and illiteracy is rampant. Prasad (2008) further notes that as the Spoken Web is not dependent on the technical literacy level of the user as is the case with PC-based Internet, thus its utilisation augurs well with being able to hear and speak.

PC-based Internet access is faced with other challenges such as high cost, low accessibility due to broadband and being largely confined to affluent communities (Chen *et al.*, 2011). Figure 1-1 below shows the Internet chasm that exists within households in developed and developing countries (ITU, 2013); adopting Voice Telephony Applications would close the gap. Spoken Web also referred to as the World Wide Telecom Web, can serve the needs and aspirations of rural, and peri-urban communities for communication (Prasad, 2008). This owes to the fact that Spoken Web, called World Wide Telecom Web (WWTW), as a low-end mobile phone enabled application is not defined by the literacy level, vision capability and PC accessibility of its end-users (Agarwal *et al.*,

2010b). Against this backdrop, ITU (2009) identifies mobile phones as very ubiquitous devices as it is claimed that globally there are more than 4.6 billion mobile phones, a number which is expected to grow in future. This growth is due to their wireless capability (Sadi & Noordin, 2011).

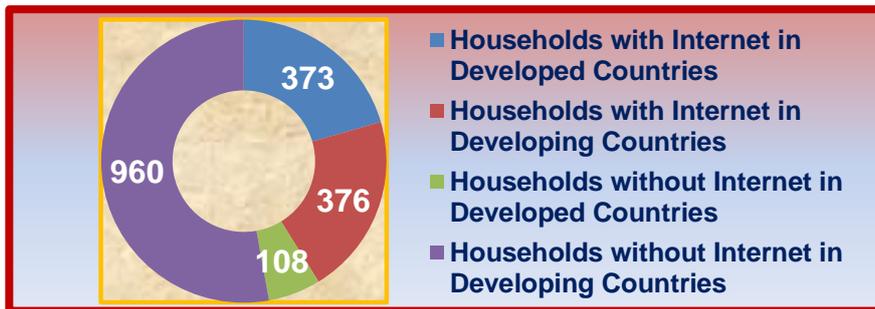


Figure 1-1: Doughnut Chart on Households (in millions) with the Internet (ITU, 2013)

The fact that Voice Telephony Applications are accessible through low-end mobile phones implies that they are accessible anytime and anywhere. Mobile phones are an effective marketing tool for underserved areas (Warden & N’getich, 2010; Communications of the ACM, 2008; Interactions, 2008). IBM (2010, p. 3) adds that Spoken Web offers a “one-gate knowledge hub” for underprivileged communities. Having completed an in-depth study on some of the benefits of Voice Telephony Applications, this research project has in the upcoming section proceeded to identify the challenges that impede the realisation of the benefits that can be attained through voice marketing by rural communities.

1.6.2 Factors Challenging the Adoption of Voice Telephony Applications in Rural Farming Communities of Eastern Cape

The optimum performance of any technology that enters or exists in the Information Technology industry is susceptible to a myriad of challenges that can only be eliminated through continuous improvement and innovation (Oz & Jones, 2008). Key to the challenges facing Voice Telephony Applications is the unwillingness of the users to pay for the high voice call costs (Boyera, 2009). It would be another task to convince communities to adopt this new ICT tool as individuals vary in their degrees of innovativeness (Grantham & Tsekouras, 2005; Rogers, 2003). Additional factors that would impede communities from adopting ICT tools is the influential role played by cultural values within a community, peer pressure, and a propensity to be acknowledged and respected within a community (Shu-Chuang & Kim, 2011; Warden & N’getich, 2010; Boyera, 2009). The Voice Telephony Application interface allows interaction between the customer and the computer-aided machine with no human interaction. Users perceive Voice Telephony Applications to be devoid of human intelligence and personal warmth in social interaction (Bouزيد & Ma, 2010). This absence of human interaction exacerbates matters when the computer system malfunctions, thus leading to irritation, reduction of trust, and insecurity from the user (Dawes & Rowley, 1998). A

holistic view premised on the benefits and challenges facing Voice Telephony Applications can set a platform for evaluating various revenue generation mechanisms in telecommunication.

1.6.3 The Revenue Generating Methods that Exist for Conventional Media Forms

In evaluating these revenue generating models, this research project incorporated some of the elements of advertising, fee based, premium rate, referrals and selling models as investigated by Duggan (2002). In the same vein free access services, affiliations, public private-partnerships, introduction of tax incentives, and promotion of an enabling competitive environment are some of the models that this research project assessed within the context of telecom services (Dhage & Prasad, 2013; Calandro & Moyo, 2012; Jain, 2012; Jonnalagedda, 2011; The Economist, 2009; Oz & Jones, 2008). Various mechanisms such as Free Call Back messages, SMSs and MMSs derive revenues for relevant service providers through advertising and promoting other services or goods (The Economist, 2009). Through advertising, affiliations and free trials, retail businesses or content providers can contribute a payment to encourage adoption of this technology for increased sales in the future (IT Web, 2013; Jonnalagedda, 2011; Nusbaum, 2008). The Economist (2009) proposes that the voice calls can also be partly free or be subsidised by government. Project Isizwe (2013) reiterates that access to the Internet must be seen as a basic right and not a privilege. The same view should hold ground on Spoken Web as The Economist (2009) views this application as the telephony Internet of the underprivileged. Based on the studies conducted by Hofstee (2010), Le Roux (2005) and Collis and Hussey (2009), this literature review has been soundly informed by the theories that follow in the upcoming section.

1.7 Theoretical Background

As an interpretive study that has adopted an inductive approach, views solicited from relevant literature, concerned rural SMME farmers and identified ICT experts have been interpreted as informed by applicable theories. This entails moving from a particular theory to general literature and findings (Collis & Hussey, 2009). Below are two theories that underpin this research project.

1.7.1 Diffusion of Innovations Theory

This theory states that within a certain social context, innovation is communicated differently over a set time period (Rogers, 2003). On record, historical studies as prescribed by the *Diffusion of Innovations Theory* attest that individuals have varying appetites when it comes to adopting a new technology (Rogers, 2003). This is surely laid bare by the attributes of individual innovativeness such as *innovators*, *early adopters*, *early majority*, *late majority* and *laggards* (Grantham & Tsekouras, 2005). Introducing a new technology such as the Spoken Web to rural users who have limited knowledge about it, for instance, can eventually induce uncertainty on the new technology

as it has not yet proven itself to be a success story. The new technology can overcome this predicament by innately proving itself to be the best alternative (Agarwal & Prasad, 1998). Putting the telephony application to trial would be another means to gain user confidence, particularly on innovators as they are likely to support the initiative (Warden & N'getich, 2010). Economically within a social exchange context, reward realised during an exchange is an incentive for continuous support (Mohr & Fourie, 2007), as the theory below posits.

1.7.2 Social Exchange Theory

This *Social Exchange Theory* states that entities through their actions render “material or non-material goods” or services to their customers and by the same token, recipients of those goods or services react by rewarding their service providers. Then, goods or services are provided at a cost while services, goods or assets that are received constitute a reward or profit as the consumer will reach a certain level of satisfaction. Non-material goods refer to *profits, rewards, status, reputation* and *trust* that can accrue between parties during the exchange transaction (Cook, 1977). In this context, this transfer of either material or non-material goods could be the resultant effect of the social exchange relationship between the rural farming communities and content providers (agro-businesses and telecom operators) through marketing via Voice Telephony Applications. The Economist (2009) postulated that relevant content providers derive revenues through advertising and promoting other services or goods through the exchange of mobile messages.

1.8 Research Methodology

As part of illustrating its course of action, in the methodology chosen, this research has incorporated the Research Onion Process (Saunders, Lewis, & Thornhill, 2009), as seen in Figure 1-2 below.

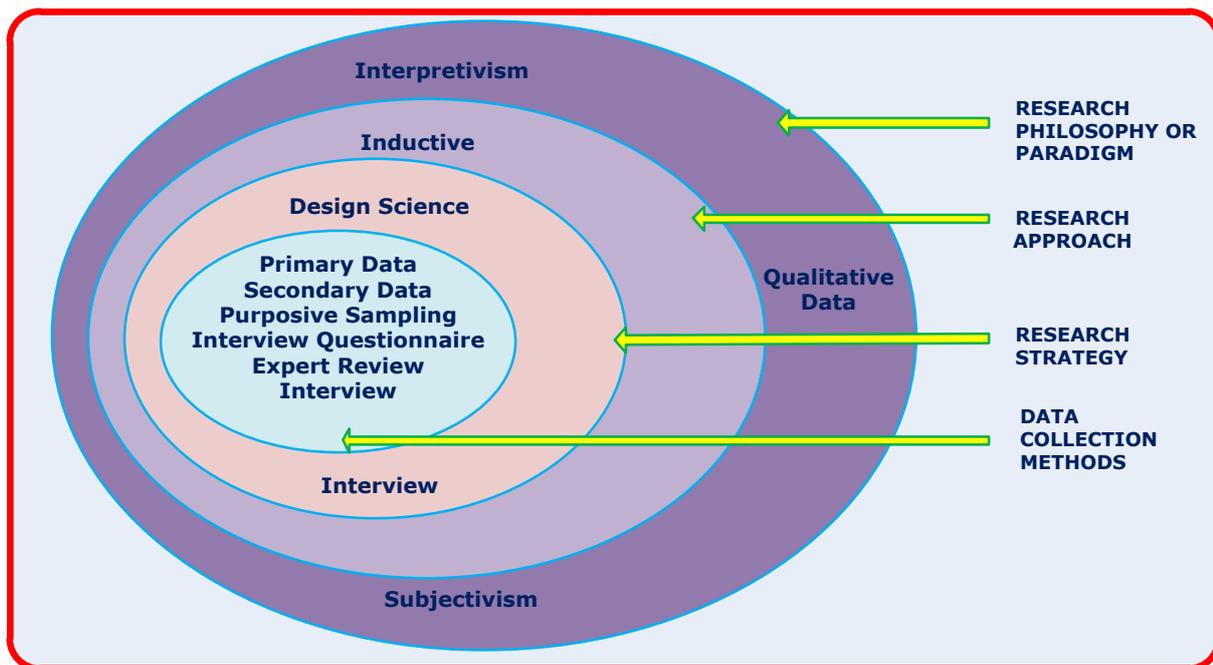


Figure 1-2: Research Onion Process (Adapted from Saunders, Lewis, & Thornhill, 2009)

Hofstee (2010) concedes that there must be a blueprint that serves as a structured map to technically depict how through a chosen theoretical background the author arrives at his/her conclusions. This methodology section is comprised of design, paradigm, data collection methods, sampling and data analysis, as they follow concurrently below.

1.8.1 Research Design

Design Science is the basis for excellent scientific contributions. The creation of an artefact is comprised of two processes: building and evaluation of the constructed item between researchers and experts (Hevner, March, & Park, 2004). Through Design Science, the created and evaluated IT artefacts can be solely developed for the purpose of solving an identified research problem (Peppers, Tuunanen, Rothenberger, & Chatterjee, 2008). Hevner *et al.* (2004) assert that the final product of the designed artefact entails four main scientific elements: a construct (language and symbols that communicate the problem and solution); model (representation structures that can solve the problem); method (best practices or processes to solve the problem), and the instantiation (demonstrate the feasibility and assessment of the artefact on its anticipated use). On the basis that this research project has chosen Design Science as its recognised template, the Design Science guidelines will immensely feature throughout this research project, as outlined below.

1.8.1.1 Design Science Guidelines:

The process in Figure 1-3 below depicts a model that exists in Design Science and it entails seven basic guidelines as affirmed by Hevner *et al.* (2007).

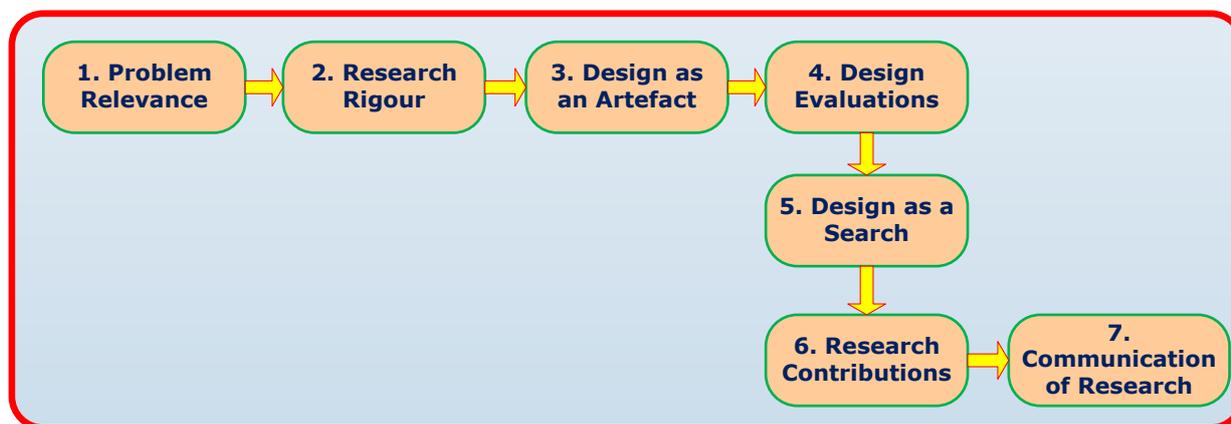


Figure 1-3: Design Science Guidelines (Adapted from Hevner *et al.*, 2004)

▪ **Guideline 1: Problem Relevance:**

This initial guideline entails that the Design Science research must devise technology-based solutions to crucial and relevant problems such as devising revenue generation methods to reduce voice call costs.

- **Guideline 2: Research Rigour**

This guideline affirms that during the search for an effective artefact, the designer needs to utilise every possible infrastructures (means), find their use and constraints (ends), and specify every costs and benefit constants (i.e., satisfy laws in the problem domain). As this research project will incorporate the elements of the interpretive methods to analyse its data, relevant theories will be used to validate the findings. Semi-structured questionnaires with in-depth open and closed-ended questions have been sent to ICT experts, and underprivileged farmers.

- **Guideline 3: Design as an Artefact**

The third guideline informs that Design Science ought to present a viable artefact either as a model, method or construct. This research project ought to produce a Revenue Generation Model to enhance the adoption of Voice Telephony Applications in underserviced rural areas.

- **Guideline 4: Design Evaluation**

This stage guides that efficacy, quality and utility of the design artefact must be vigorously displayed through fairly implemented evaluation methods. As a new study, interview questionnaires have been completed by a sample of six ICT experts and twelve rural farmers.

- **Guideline 5: Design as a Search**

The fifth guideline argues that Design Science research is centred upon the application of rigorous means, techniques or instruments to construct the final model. This entails analysis of findings together with expert opinion, as this refers to the application of experts' contributions to modify the artefact.

- **Guideline 6: Research Contribution**

This guideline clearly states that a robust Design Science research ought to give unambiguous, verifiable and validated contributions in the facets of the *design artefact*, *design foundations*, and/or *design methodologies*. Therefore, constructing a Revenue Generating Model would be an initial step towards promoting accessibility of Voice Telephony Applications through reducing user costs, which this research project will investigate.

- **Guideline 7: Communication of Research**

The last and seventh guideline informs that Design Science research ought to be communicated effectively to both users, and investment parties of the proposed Voice Telephony Applications. This includes presenting the findings or proposed Revenue Generation Model to the University of Fort Hare, IBM, Nedbank, and Momentum.

It is prudent that the methodology section is composed of the *research paradigm*, *data collection method* and *data analysis* sections which discuss the intricate elements, and approach to the methodology adopted (Saunders *et al.*, 2009), as described below.

1.8.2 Research Paradigm

This research project will adopt the elements of interpretive epistemology as it views reality as a social construction, as highlighted in Figure 1-4 below, and will infuse these elements with qualitative research techniques to evaluate the projected artefact (Collis & Hussey, 2009).



Figure 1-4: Typology of Assumptions on Continuum of Paradigms (Collis & Hussey, 2009)

In the interpretive paradigm, reality is socially created and is applied by researchers to analyse organisational behaviour (Berg, 2000). In this paradigm, reality is socially created and is what humans comprehend it to be (Cleven, Gubler, & Huner, 2009). This assertion was also alluded to by Collis and Hussey (2009), Hevner *et al.* (2004) and Berg (2000) respectively. Interpretivism is highly subjective by nature as it depends on the level of understanding of the researcher in his/her interpretations and this can influence the results of the research (Blaxter, Hughes, & Tight, 2010). According to Cleven *et al.* (2009, p. 3): “Characteristics of the evaluation object are not appraised on a numerical, but on a value basis, and this emphasises the description and understanding of the situation behind the factors”. From their own understanding Blaxter *et al.* (2010) accentuated this claim by stating that qualitative research is subjective and descriptive as data can be grouped into categories.

In recapping, a paradigm is defined as a function of scientific beliefs or assumptions about the world as commonly perceived by researchers in a certain area of study (Maxwell, 2005). At the core of Design Science research are evaluations on constructed IT artefacts that are utilised by businesses and users in meeting their information needs, and objectives (Collis & Hussey, 2009). However, for an artefact to be fully conceptualised and developed, its design should be centred on relevance, and rigour. The former of the two involves solving the business expectations by the artefact, and the latter is realised when there is a rational application of abundant theories and methodologies (Cleven *et al.*, 2009). As clearly informed by this paradigm, the data collection method below puts into context the tools incorporated to solicit primary data for this research project.

1.8.3 Data Collection Method

The collection method refers to instruments used to gather research data and includes, among others, interviews and questionnaires (Saunders *et al.*, 2009). Philosophy and research design

inform the type of tools that aid the collection of the necessary primary data (Blanche, Durrheim, & Painter, 2007). Data has been collected through conducting interviews with twelve rural SMME farmers and six ICT experts. These are in open and closed-ended format as this affords respondents with ample space to explain a matter further (Gerber-Nel, Nel, & Kotze, 2003). A one-on-one interview has been conducted with twelve underprivileged rural farmers, while electronic mails have been sent to six experts as advised by Collis and Hussey (2009). To a greater extent, face-to-face interviews have been conducted on an ad hoc basis. Conducting interviews with rural farmers helps to clarify ideas and questions when there is a need, and this method helps to obtain more information. One should bear in mind that these are less literate people with primary education qualifications of grade six or no formal education at all (Stats SA, 2012a). In addition, this method allows respondents to really feel part of the research project (Gerber-Nel *et al.*, 2003). An Expert Review method is used as it provides an expert's analysis and solution to a particular problem under study (Le Roux, 2005), which is the Revenue Generation Model in this context.

1.8.4 Sampling

Purposive sampling is used since it is renowned for affording the researcher an opportunity to apply his/her mind in selecting suitable parties that will meet the research project objectives, particularly answering the research questions of an interpretive study (Collis & Hussey, 2009; Gerber-Nel *et al.*, 2003). Frankly, it is acceptable for studies to have more than two participants in their samples as long as this helps in addressing the research problem and meets the anticipated solution (Skulmoski, Hartman, & Krahn, 2007). Olson (2010) also lends credence to this claim that it is not far-fetched. The two sample groups laid below attest to this claim.

The *first* sample group is purely composed of twelve rural SMME farmers who are less literate and have at their disposal limited financial resources. Therefore, one should note that these are expected to be the main beneficiaries or end-users of Voice Telephony Applications.

The *second* sample of six ICT experts that will review the model is comprised of three academic researchers, two mobile telecommunication experts and one team of two IBM experts who are at the forefront of doing research on the Spoken Web, as motivated below:

- Three academic researchers will be chosen due to their accredited work on various publications on the Voice Telephony Applications and electronic marketing for rural SMMEs.
- Two mobile telecommunication experts will be the preferred choice for this research project.
- Two IBM India experts who are the leading luminaries on research projects pertaining to the development and implementation of the Spoken Web for underprivileged rural communities. This team has been part of the expert panel and it must be taken into cognisance that they are still making significant investments in Voice Telephony Applications.

As guided by the Stats SA (2012a) report on ECP's demographics, information from interviews conducted with the underprivileged rural farmers who are based in ECP's rural municipal districts of Alfred Nzo, Amathole, Chris Hani and OR Tambo has been studied, and analysed. This enabled the researcher to assess the legitimacy of the benefits, challenges and models from the real-world perspective of underprivileged rural communities.

1.8.5 Data Analysis

This research project adopted an inductive method to analyse its data as this method is premised on making sound literature findings from the theories underpinning the research project. This includes critically evaluating the literature as it tries to address the research problem and answer research questions. The critical review of the literature and findings was used to construct a model. The questions asked have been determined by the elements of the theories and models. As noted by Bentley and Whitten (2007), an in-depth study of the data collected from interview questionnaires was conducted as this data was grouped accordingly for an effective interpretation of results. The feedback from the small rural farmers and ICT experts was used together with the relevant theories to analyse findings, and draw up the necessary recommendations. One should, in this regard, note that valuable input from expert reviews helped in refining the constructed model. On top of this, data from interview responses received from the underprivileged rural SMME farmers will only be compared with the research literature, nothing else. Microsoft Excel spreadsheet was an appropriate tool used for presenting responses that had to be analysed and interpreted. The primary data from responses is presented in tables and graphs.

1.9 Delimitation of Research

Key to any study, as affirmed by Hofstee (2010), is to clearly set the boundaries on the scope of investigation, as contained by this section. This research project critically investigated further the benefits, and factors challenging the adoption of Voice Telephony Applications as discovered by Williams (2011), IBM (2010) and Boyera (2009). On top of this, it also did evaluations as prescribed by Jonnalagedda (2011) on revenue generation mechanisms that exist within the ICT sector as a means to come up with an appropriate revenue model. Mechanisms such as advertising, free-based, innovative pricing schemes, switch costs, affiliations, private-public partnerships, tax incentives, creating a competitive telecom market and subsidies were investigated further in this research project to devise an appropriate model. Revenues generated through advertising within Internet borne interfaces, and mobile phone services such as Free Call Back messages, SMSs and MMSs are some of the mechanisms that have been used as a basis for evaluating the studied revenue generation models. This research project drew its results by making references to literature studies conducted in underserviced rural communities of India and Africa where Voice Telephony

Applications are making inroads. These literature studies are investigated and contextualised to suit the daily interactions of agro-businesses with ICT services. This is done within the context of rural ECP's district municipalities such as Alfred Nzo, Amathole, Chris Hani and OR Tambo which are part of Stats SA's (2012a) study.

In this context, this research project has embarked on investigating various mechanisms for generating revenues as a means to address user costs as this remains to be a deterrent towards the adoption of Spoken Web (Isabirye *et al.*, 2013; Williams, 2011; IBM, 2010). This research project focused on cost as one of the challenges confronting effective and efficient use of Voice Telephony Applications. *Firstly*, reduction of telecom costs other than those that are directly or indirectly linked to voice call costs; *secondly*, the technical aspect of Voice Telephony Applications, and *lastly*, other related technologies fall beyond the scope of this research project. The following section explains the ethical considerations of conducting this research project as affirmed by Punch (2006).

1.10 Ethical Considerations

A research project must infuse the common ethical considerations when conducting a survey (Punch, 2006). These ethical considerations have been drawn and customised for this particular research project as advised accordingly:

- The participants have been informed beforehand about the goals and objectives this research project aims to achieve, and all the critical information that relates to this research project has been divulged. Respondents have been invited to participate in this research project pending their full consent and have been afforded an opportunity to withdraw from the research anytime they deem fit to do so.
- Confidentiality on sensitive and private information pertaining to participants has been highly maintained, and any information solicited through this research project is strictly subject to the aims and objectives of this research project as this is informed by the outline of the chapters.

1.11 Outline of Proposed Chapters

Chapter 1 of this research project is an introduction chapter. This chapter presents a brief background of the topic chosen and also delves into the identified problem, research question and its sub-questions. A concise description of the objectives and significance of this research project ensue, and this is followed by a brief explanation of the literature review, theoretical background, and methodology sections of this research project. Towards the end of the introduction chapter, delimitation of study area is drawn.

Chapters 2, 3 and 4 outlay a detailed critical review of the relevant literature relating to the dynamics of the Voice Telephony Applications so as to address the identified problem, and sub-

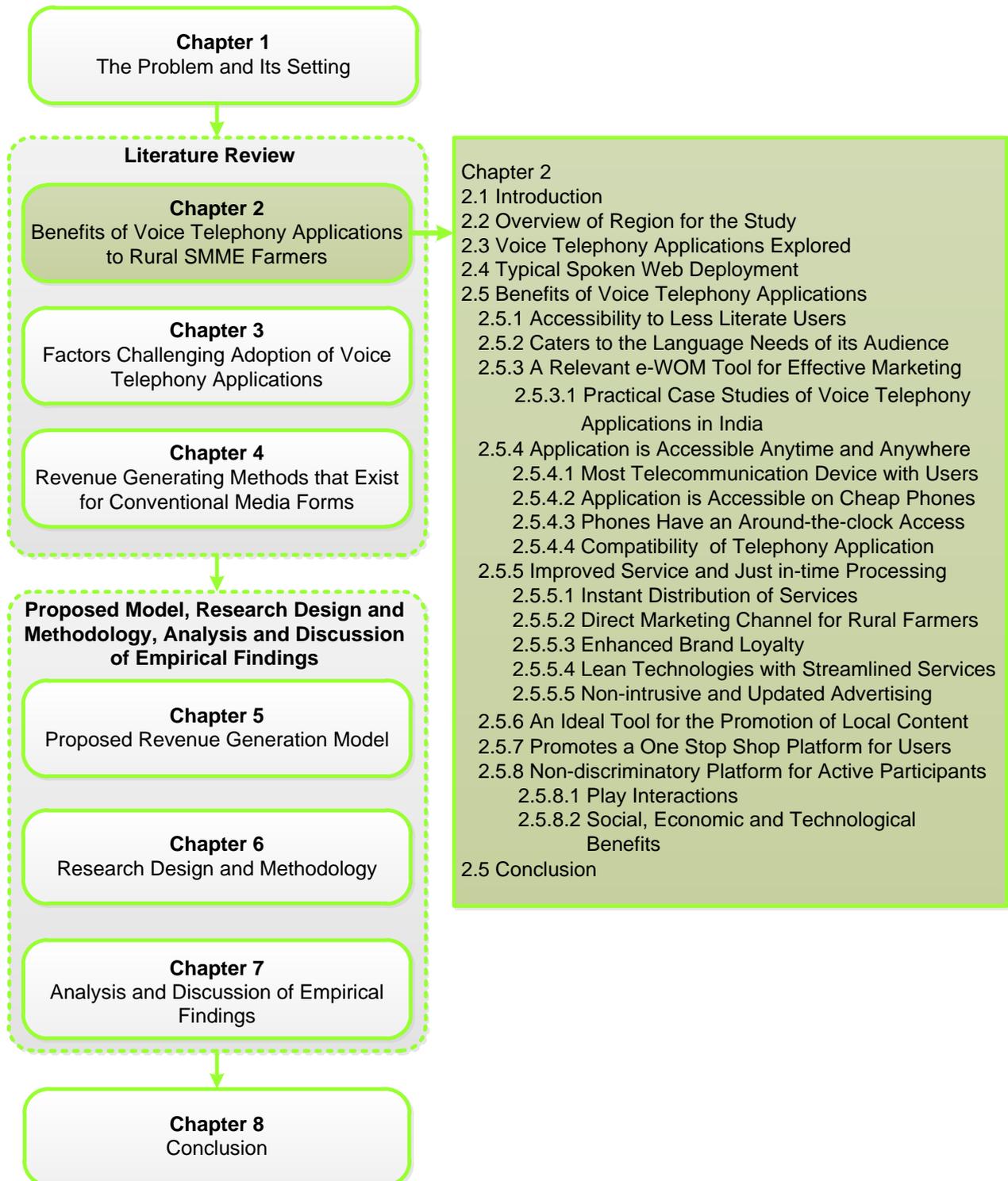
problems of this research project. *Chapter 2* identifies and discusses the benefits of Voice Telephony Applications to underprivileged rural SMME farming communities against PC-based Internet and/or fixed telephone services. *Chapter 3* investigates and discusses the factors challenging the adoption of Voice Telephony Applications in rural farming communities. *Chapter 4* unpacks the revenue generation methods that exist for conventional media and telecoms, and evaluates how these mechanisms can be adopted through Voice Telephony Applications.

Chapters 5, 6 and 7 are determined by the nature of Design Science. *Chapter 5* provides the proposed model as a recommended solution to the identified problem of this research project. *Chapter 6* discusses the methodology section respectively. Research paradigm, data collection methods and data analysis also feature in this chapter. *Chapter 7* entails an analysis and discussion of the findings of this research project together with the theoretical background. These results are incorporated into the proposed solution which is the proposed model.

Chapter 8 concludes with a brief summary of the whole research project, highlighting the contribution made by this research to the body of knowledge, as well as making suggestions for any future research as the empirical evidence from the interview process entails within the appendices.

Having introduced the reader to the context, objective, significance, literature survey, methodology and structure of the entire research project, now it is paramount that a first chapter of the literature review is fully discussed as contained in the upcoming chapter.

2. Benefits of Voice Telephony Applications to Rural SMME Farmers



2.1 Introduction

This chapter will overview the context of research, explore Voice Telephony Applications, and draw out a simple deployment chart until it delves deeper into the benefits of Voice Telephony Applications. This is done in line with Spoken Web, an ideal tool for rural communities. This entails reviewing the relevant literature as informed by the *Social Exchange* and *Diffusion of Innovations* theories which are the main theories for this research project. Benefits identified in this chapter are discussed alongside the lives of underprivileged rural farmers of Eastern Cape Province, hence drawing references from India which has a microcosm similar to this partly rural province. It should be noted that Voice Telephony Applications such as the Spoken Web were developed and are still only applied in India, and some of the issues were purposefully overlooked by a study from Isabirye *et al.* (2013) and Williams (2011). As one reads through this chapter, and the entire research project, note that Alfred Nzo, Amathole, Chris Hani and OR Tambo District Municipalities have been interchangeably referenced to set a clear and balanced view on the similar demographics of these municipalities in ECP.

2.2 Overview of Region for the Study

It is public knowledge that most ICT technologies are not catered to accommodate communities based in developing regions (Agarwal, Kumar, Nanavati, & Rajput, 2009). To lend more credence to this claim, issues such as illiteracy, cost, user interface, culture and poor infrastructure continue to deny developing regions from participating in the mainstream ICT sphere (Kumar *et al.*, 2007c). District municipalities of ECP are not immune from this quandary as the majority of people in this province come from underprivileged rural households, with illiteracy and limited resources being cited as the major inhibitors of development (MDG, 2010). There is corroborating evidence which suggests that 14.6% of people in rural Chris Hani District Municipality of ECP are illiterate. One should also note that above 86.3% of the people in this province are non-English first language speakers. Additionally, the greater majority of these people come from the rural households (Stats SA, 2012a).

In general, illiteracy is cited as the contributing factor to 64.8% of households that are barred from using the English dominant Internet services in South Africa (Stats SA, 2012b). ECP is dominated mostly by rural people who use IsiXhosa as their language of communication as the majority of people in this province are Black Africans (Stats SA, 2012a; MDG, 2010). To address this exclusionist predicament, Voice Telephony Applications such as the Spoken Web are an ideal platform that can be used to conduct voice marketing by underprivileged farming communities (Boyera, 2009). It should be noted that the use of this Voice Telephony Application is not determined by literacy level and income capacity of the user (Kumar, Rajput, Chakraborty,

Agarwal, & Nanavati, 2007a). The fact of the matter is that economic state of affairs attest that ECP lags behind on income and telecom infrastructure capacity, but nonetheless households in this rural province are willing to spend a portion of their income on telephony services (Chetty, Blake, & McPhie, 2006). In spite of low incomes and inadequate telecom infrastructure, there is high penetration of less expensive wireless telecommunication devices such as low-end mobile phones in developing regions. Thus, access of Voice Telephony Applications through low-end mobile phones can acutely alleviate this quandary in developing areas (Kumar *et al.*, 2007c), as further explored in the section below.

2.3 Voice Telephony Applications Explored

Generally, Voice Telephony Applications enable information exchange between users via a telephony medium. To a greater extent voice content can be delivered in varying community languages between SMMEs and consumers. These Voice Telephony Applications have ICT features that are analogous to the Internet (IBM, 2010). In a nutshell, the applications afford users with a platform to send and retrieve data and/or information through a landline or mobile phone by dialling a relevant number. Users are usually given pre-coded messages with audio input or dial tone commands (Duggan, 2002). Navigation through a menu of available options is usually voice interactive as this is a voice-interface platform that requires speech or audio commands. Therefore, touch-tone-input, speech recognition and text-to-speech capabilities are the main features that are ideal for the effective operation of Voice Telephony Applications such as the Spoken Web (Kumar & Agarwal, 2012). In this logic, callers can send queries to the telephony services or retrieve information from the network-based data service through a designated number (Boyera, 2009). Examples of Voice Telephony Applications include Asterisk, Freedom Fone and Spoken Web which are contextualised to suit the ICT needs of non-IT literate communities (Williams, 2011).

For instance, for people with poverty, low levels of education and technology phobia, Spoken Web can be an ideal platform where conventional PC-based Internet has failed. As VUI applications that can be accessed by a critical mass for social network voice-driven conversations, Voice Telephony Applications can largely feature as the best alternative for people who cannot read and/or write (Lobo, Doke, & Kimbahune, 2010). Lobo *et al.* (2010) further add that benefits from Voice Telephony Applications include: (a) interaction with friends; (b) interaction with experts; (c) participation in community related issues; (d) voicing of opinions; (e) creation of new forums; (f) viewing of current newsfeeds, and (g) viewing of customer oriented “data feeds”. These Voice Telephony Applications have in this regard managed to break the barriers of affordability, poor literacy, local relevant-content and local-based languages in underprivileged rural communities. In recapping, one should affirm that Voice Telephony Applications are driven by voice commands,

and the list includes Spoken Web or a Telecom Web application (Kumar, Agarwal, & Manwani, 2010). It would be an indictment to bring the benefits that can be realised by the rural user through Voice Telephony Applications against text-based Internet if one does not have an idea of the simple deployment process of VUI applications such as the Spoken Web as illustrated in Figure 2-1 below.

2.4 Typical Spoken Web Deployment



Figure 2-1: Typical Spoken Web Deployment Flowchart

The chart above is comprised of the following features below (Kumar & Agarwal, 2012):

1. **Phone Lines:** Voice calls are delivered through the identified phone lines.
2. **Media Gateway:** A demodulation and modulation device that converts text to speech.
3. **Voice Platform:** This platform facilitates the interaction between callers and application.
4. **Speech Server:** This device has *Text To Speech* (TTS) and *Automatic Speech Recognition* (ASR) interpretation features that render text and recognise speech inputs.
5. **Application Server:** This server locates voice interfacing and this is where connection between voice applications happens through Hyper Speech Transfer Protocol (HSTP).
6. **Database Engine:** Any data files or material are stored in the database server.

Voice Telephony Applications will never be accredited as the best ICT tools for underserved areas if the benefits that can accrue through them are not brought to the fore as unpacked below.

2.5 Benefits of Voice Telephony Applications

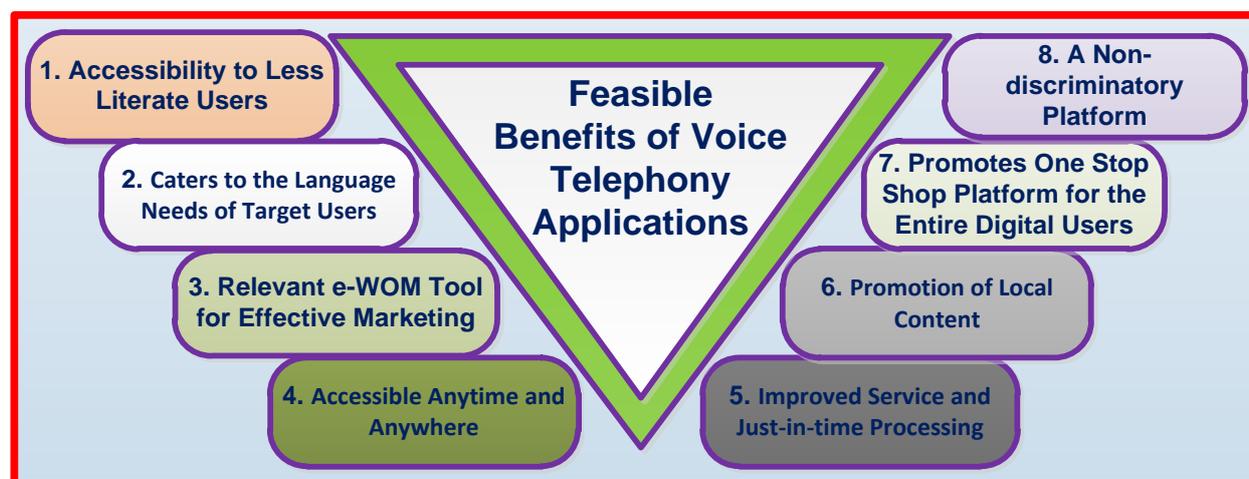


Figure 2-2: Pictorial View on Discovered Benefits of Voice Telephony Applications

As depicted in Figure 2-2 above, invention of electronic marketplaces has opened up “one stop shops” where businesses can virtually interact with their customers for marketing activities (Chang, Jackson, & Grover, 2003). This amongst other benefits has led to the reduction of transaction costs; improved customer relationship; just in-time processing, and an opportunity to tap into niche consumer markets (Chong, Shafaghi, Woollaston, & Lui, 2010). However, the majority of people in developing communities are barred from using conventional electronic commerce services that are accessible through the Internet for buying and selling purposes, and under-resourced agribusinesses are no exception (Qiang, Kuek, Dymond, & Esselaar, 2012). One cannot dispute the fact that people in developing regions lack access to the Internet as this network is cited as being unreliable, expensive and a reserve of urban areas (Chen *et al.*, 2011). Internet access can only be possible if prices of computer components and semi-conductor cables decrease as might be the case in the future (Interactions, 2013). However, unlike the expensive Internet devices and complex websites, this Voice Telephony Application has VoiceSites that are suitable for underprivileged rural users (Kumar, Rajput, Chakraborty, Agarwal, & Nanavati, 2007b). By virtue of their design making, basic mobile phones afford the user an opportunity to make voice calls regardless of his/her literacy level or dexterity (Kumar *et al.*, 2010). In this context, this research project has a mandate to explore the benefits that can be realised by underprivileged rural communities, as the sub-section below discusses.

2.5.1 Accessible to Less Literate Users

It is one thing to expect rural farmers who are financially constrained to afford expensive technologies, and another thing to expect people with low literacy skills to operate complex technologies like the Internet (White, Duggirala, Srivastava, & Kummamuru, 2012). The less complex, more consistent and unambiguous the set of ICT tools to the user, the more potent the degree of human computer interaction (Shelly, Cashman, & Rosenblatt, 2008). This is particularly possible through less complex voice interfaces (Kumar & Agarwal, 2012). In the end, this encourages seamless ICT diffusion as less ambiguity means applying a user friendly set of tools by underprivileged rural farmers (Qiang *et al.*, 2012).

Interactions (2008, p. 44) states that “If I knew how to use it, that’s the factor and the fact is, I do not know how very well!” This claim seeks to affirm that one needs a skill; for instance to operate complex text-based interfaces such as the Internet. However, Voice Telephony Applications can alleviate illiterate rural SMME farmers from the ordeal of texting. For instance, browsing or creating voice sites into simple-organised voice portals is a no brainer as these tasks can be easily performed by illiterate people (IBM, 2010). Therefore, those who cannot read and write are afforded the opportunity to use audio commands to send or retrieve voice call messages from the

voice sites. There is no need to be computer savvy or literate as the Spoken Web is not dependent on a text-based interface (Mahelaqua, Basson, Rajput, Shrivastava, Srivastava, & Thomas, 2013). The user can just call the voice web without necessarily texting (Agarwal, Chakraborty, Kumar, Nanavati, & Rajput, 2007). One should bear in mind that as the majority population (with 99.1%), black Africans in OR Tambo have a literacy rate of 17.3% (Stats SA, 2012a). Therefore against the backdrop of this empirical data, less literate rural users can utilise Voice Telephony Applications to exchange information (Agarwal, Jain, Kumar, & Rajput, 2010c).

Interactions (2013) assert that any poor execution of, or inability to properly execute commands in mobile devices, such as laptops, tablet computers and smartphones, can lead to incomplete information. This will dismally fail to achieve the social imperatives of closing the digital divide in South Africa, an ideal pronounced by Van Zijl (2012) and Chetty *et al.* (2006) on technology regulations. The fact that Spoken Web does not discriminate people simply because they are illiterate implies that being afforded the opportunity to communicate in their indigenous languages does to a greater extent attend to their communication needs (Dhanesha, Jain, Kumar, Menon & Rajput *et al.*, 2010). Furthermore, IBM (2010) assures that Voice Telephony Applications such as the Spoken Web support local community languages. One should note that this application does not only cater to less literate users, but also to the language needs of the target audience, as argued in the sub-section below.

2.5.2 Caters to the Language Needs of its Target Audience

Emerging economies face huge challenges of illiteracy in their communities, as the authors of Interactions (2013, 2010) confirm that the literacy rate is very low in rural areas. Majority of people are left in the cold with regards to the Internet as this medium needs people who are capable of communicating in English, a dominant language used in World Wide Web. Even those who do manage to access the Internet discover that they are poorly represented in the Internet space (Kenny, 2002). To amplify this claim by Kenny (2002), a study in Nigeria discovered that even though Igbo constituted about 17 million in one Nigerian community, their language was poorly represented on the Internet. Stark contrast highlights that the Internet bombarded users with content and commands presented to them in foreign languages such as English, French and German. These languages are rarely used as mother tongues in this rural community, and on top of this it was discovered that there were only 8% of multilingual Internet sites, even though 31% of others used French and German.

Kenny (2002) claims that South Africa is not immune from this dilemma as languages of African origin are poorly represented on the Internet. There is corroborating evidence which suggests that 10.5 % of people in the ECP and 14.6% in Intsika Yethu Local Municipality are illiterate; these are

at the front end of this predicament. These are people above 24 years of age. This is the case with ECP in general as 86.3% of the people are non-English first language speakers; a greater majority comes from the rural households (Stats SA, 2012a). A report by Stats SA (2012b) further corroborates this assertion by stating that, for instance, 93.6 % of the people in ECP's Chris Hani District Municipality are black Africans who speak indigenous African languages and these by submission come from the rural areas. Through design then, English enabled Internet platforms exclude communication in indigenous African languages (Kumar *et al.*, 2007a).

Kumar and Agarwal (2012); Agarwal *et al.* (2010b); Chong *et al.* (2010); Kumar *et al.* (2010), and Kenny (2002) affirm that in Spoken Web platforms there would be less language barriers within the local farming communities from sellers, buyers and community members at large. A study done in peri-urban and rural cities like Bangkok and Jakarta discovered that the likelihood of English speakers to use the PC-Internet is two to four times compared to non-English speakers. This owes to the English dominance on the Internet (Kenny, 2002), which is contrary to the Spoken Web where voice commands and voice calls are made in the local language of the concerned rural community (Dhanesha *et al.*, 2010). ECP is a region that is dominated mostly by rural people who use IsiXhosa as their language of communication as the majority of people in this province are black Africans (Stats SA, 2012a & 2012b; MDG, 2010). In this regard, there is a genuine need for an application that is configured to afford people from rural areas to communicate with each other in a language of choice that is a relevant one they are comfortable with (Patel, Chittamuru, Jain, Dave, & Parikh, 2010). Voice Telephony Applications could be a better option as they are not language dependent, and the community populated and managed portals can be easily created, and maintained by end-users in their language of choice. Even voice prompts and commands for creating VoiceSites are moulded in the user's language of preference (Kumar & Agarwal, 2012). Time will tell if these Voice Telephony Applications will fully cater to African languages, and not just a far-fetched dream. If Spoken Web can promote use of indigenous languages as assured by IBM (2010), then it means that in the ECP context users can convey and receive voice calls that are relevant to their needs, as discussed in the sub-section below.

2.5.3 A Relevant e-WOM Tool for Effective Marketing

On record, there is strong evidence from IBM (2010, p. 1) which asserts that "locally relevant information in local language could be made available in rural areas without internet access." In this regard, then Voice Telephony Applications can properly fit in as ideal electronic word of mouth platforms for underprivileged communities. Relevant and crucial information pertaining to these communities can be exchanged through VoiceSites (Boyera, 2009). This leverage to use the application independently to exchange relevant information by rural users, particularly farmers,

encourages a sense of belonging and accomplishment (Agarwal *et al.*, 2010b); people in rural communities do not only become spectators and stand on the sideline when it comes to technology (Interactions, 2008). It is fundamentally justified to highlight that underprivileged people are always kept at the periphery of ICT, whilst those who are literate, computer savvy, command high incomes, and come from affluent areas utilise the digital space for their daily needs (Research ICT Africa & Intelcon, 2012). This is usually the case with the Internet as most of the content is written in English, a language that applies across the board within the digital community in the World Wide Web (WWW) (Chen *et al.*, 2011). This is the same argument that has been levelled by Kenny (2002) on the World Wide Web environment, a complete contrast of the World Wide Telecom Web or Spoken Web platform (Kumar *et al.*, 2007a). Those who have been kept at the periphery of ICT due to being illiterate and financially constrained are given a new window of opportunity to voice their ideas or product offerings through this voice application according to their needs (Kumar & Agarwal, 2012).

One of the most fundamental ways of encouraging user participation in the use of the technology is letting the user and business independently use the technology for effective marketing purposes (Interactions, 2013; Communications of the ACM, 2008; Interactions, 2008). Agarwal *et al.* (2010b) and Kumar and Agarwal (2012) identified the above statement as the challenge with Internet borne services as users should have some level of training to type or read in order to properly text and interact with each other. This ability to communicate between various parties through Voice Telephony Applications improves the understanding of the market and ICT dynamics (White *et al.*, 2012). Therefore, making applications that appeal to the broader community in general, that is Information and Communication Technology for Development (ICT4D) services, that can be a conduit of conveying relevant and crucial information by users who are less literate is a noble cause (Interactions, 2013). The underprivileged rural communities can interact through this convergence voice platform (Kumar *et al.*, 2007b). One would infer from these statements that through VoiceSites rural farmers, buyers, experts and agents can interact with the entire farming community on issues pertaining to farming, and service lines (White *et al.*, 2012; Agarwal *et al.*, 2010b; Patel *et al.*, 2010; IBM, 2010). This is a rare benefit that can be realised by illiterate users from the complex text-based Internet services-domain (Mahelaqua *et al.*, 2013). Conventionally, ICT4D can fit in as an intermediary tool for communicating business community related issues such as new and existing product offerings. In collaboration with local community radio stations, Voice Telephony Applications can be ideal mechanisms for this objective as community related services and products will be raised, and shared between communities via this platform (Agarwal *et al.*, 2010b). Local issues can be raised and shared by community members through local community radio stations in relevant vernacular commands, and be interpreted for

local communities before they are shared in ICT platforms (Kenny, 2002). Agarwal *et al.* (2009) pronounce that there was also an exchange link to communicate with local experts and access to information on consulting schedules of the designated local doctor. Agricultural and health related information, and services on veterinary support, for instance, can be published through voice platforms (IBM, 2010). Agarwal *et al.* (2010b) cite that interactions and engagements within the farming community exacerbate the sharing of farming information between colleagues, peers and experts through VoiceSites. Case studies below practically amplify and validate this e-WOM concept.

2.5.3.1 Practical Case Studies of Voice Telephony Applications

Various Spoken Web portals have proved to be ideal platforms for: (a) promoting information pertaining to agro-business services and products, and (b) acting as conduits of awareness and policy issues within underprivileged rural households of India (Kumar & Agarwal, 2012). Data on mobile phone, radio and Internet penetration in Figure 2-3 below from Stats SA (2012a) draws a clear picture on the role Voice Telephony Applications would play in four rural district municipalities of ECP. Kumar and Agarwal (2012) posit that through the adoption of the Spoken Web portals, an added advantage can be earned which involves narrowing the digital divide through Voice Telephony Applications, as listed in the examples below.

Avaaj Otalo: In 2010, in the rural part of Gujarat, India, an application was developed in partnership with an NGO that broadcasts a weekly radio show on farming aspects and practices. Callers from the farming community would voice their comments, queries, ask questions and then expert advice would be given by agriculture experts or colleagues (Patel *et al.*, 2010). Patel *et al.* (2010) state that these comments, queries and advice would be recorded through a VoiceSite application, and later be retrieved on the next broadcast. This VoiceSite served as a data mining tool for the local farmers.

Mobile Bazaar: Local farmers would subscribe to a VoiceSite which allows access to fruit or vegetables sold on government identified market places. Agents would be hired for their services by farmers to monitor the market prices of such perishable goods, as the agents would upload the prices of such goods on these VoiceSites (Agarwal *et al.*, 2010b). Agarwal *et al.* (2010b) posit that product information would be used to gauge, and compare the prices of such goods and the consumer buying patterns, as defined by both the price of the goods and the consumer purchasing power. This information would better inform the farmers on products to sell and agents would use it to give market advice on bidding for the best market prices to the farmers.

VoiKiosk: In a rural part of India known as Andhra Pradesh, an application in local Telegu language was developed as a portal VoiceSite with the help of the local NGO to provide information and services that relate to agriculture to the local community members. The VoiceSite

would publish information pertaining to schedules on vocational education seminars held by the NGO. Through the VoiceSite local community members were even afforded an opportunity to advertise their businesses, interact with local experts, and obtain information pertaining to consultation details on local doctors as the site had a bulletin board type of area (Agarwal *et al.*, 2009). This was a pilot study and it proved to be a success story as it started with a mere 50 village members, grew to 976 villagers who made 20499 voice calls within a space of four months, and by year end expanded to 6500 village members (Agarwal *et al.*, 2009, pp. 8-9). The ability to seamlessly share relevant and crucial information during the time of will is augmented by the ubiquitous nature of mobile phones; devices that are renowned to be compatible to Voice Telephony Applications (Kumar *et al.*, 2010).

2.5.4 Application is Accessible Anytime and Anywhere

Warden and N’getich (2010) affirm that mobile phones have become very pervasive, and accessible devices compared to the Internet and telephones. On top of this, one in three people has access to a mobile phone (Communications of the ACM, 2008). The picture presented in Figure 2-3 below from Stats SA (2012a) bears testament to this assertion.

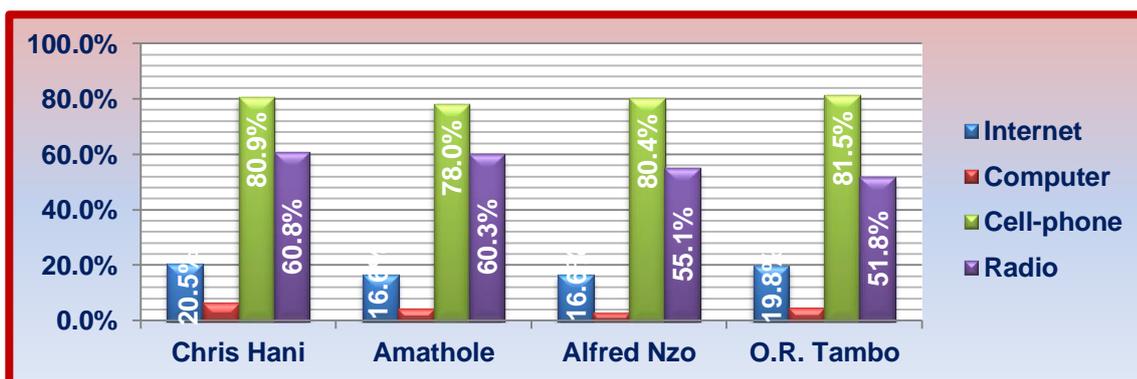


Figure 2-3: Multiple Bar Graph Showing Use of ICT Services by Households in ECP District Municipalities (Stats SA, 2012a)

Agarwal *et al.* (2010a), Agarwal *et al.* (2010c), and Kumar *et al.* (2010) affirm that Voice Telephony Applications such as the Spoken Web can be accessed through low-end mobile phones. Despite this, Boyera (2009) cautions that varying price policies on each network and limit in hosting platforms will bring uncertainty to this voice application. Contrary to the views by Cook (1977) and Rogers (2003) on accrued exchange benefits, Williams (2011) add that ownership of development and hosting rights of this application by India will further exacerbate this quandary in ECP. The claims below validate these assertions and statistics reports further.

2.5.4.1 Most Telecommunication Device with User Participation

Figure 2-3 above attests that, for instance, Chris Hani has about 20.5% of Internet users and 6.6% of its community members having access to computers, compared to 80% of households having access

to mobile phones (Stats SA, 2012a). Agarwal *et al.* (2010a) and Agarwal *et al.* (2010c) state that rural communities have no access to computers and Internet as they more access to mobile phones. The report by Stats SA (2012a) further reads that compared to the Internet, cellphone penetrations in Amathole, Alfred Nzo and OR Tambo District Municipalities is in the regions of 78.0%, 80.4% and 81.5%, respectively. Thus, there is more user participation in mobile phones in ECP rural districts due to affordability of mobile devices.

2.5.4.2 Application is Accessible on Affordable Hand-held Devices

Kumar *et al.* (2010), Warden and N'getich (2010) and Ananthaswamy (2008) sum up the benefits of mobile phones as devices that command lower costs, and which are less complicated to use compared to the PC-Internet and computers in general. Low-end mobile devices are relatively less expensive to own and are highly adaptable to areas where electricity infrastructure does not exist. Compared to computers, mobile phones use less power as they rely on small batteries that can last for days without recharging, and this is one of their competitive advantages. In less developed communities, mobile phones are the most ubiquitous devices which are easily affordable to majority of the local community members (Zhang, Liu, & Li, 2009).

2.5.4.3 Mobile Phones Have an Around-the-clock Telecommunication Access

Mobile phone services can be accessed through various mobile network service providers such as MTN, Vodacom, Cell-C and Telkom during anytime of the day. These handheld, ubiquitous mobile phones are the most easily accessible telecommunication gadgets due to their “anywhere anytime” concept (Warden & N'getich, 2010). In simple terms, mobile phones are portable gadgets that have an “around the clock” wireless connectivity capacity as their primary competitive advantage (Zainudeen, Samarajiva, & Sivapragasam, 2011).

2.5.4.4 Compatibility between Voice Application Functionality and Telephones

Affirmations from Kumar *et al.* (2010) assure that one can give mobile phones the benefit of doubt not only on their around-the-clock access nature, but also due to their compatibility to the Spoken Web. To give credence to this claim, various voice-commerce telephony applications such as *AvaajOtalo* and *MobileBazaar* have been adopted in India for use in agro-business marketing (Kumar & Agarwal, 2012). IBM (2010) accentuates these assertions by unequivocally attributing that by virtue Voice Telephony Applications such as the Spoken Web are 2G mobile telephony services. The end-users do not need Internet or 3G connections for accessing the Spoken Web as this Voice Telephony Application proves to epitomise an advanced IVR system with Internet attributes (IBM, 2010). The crux of the matter here is that users are saved from the ordeal of acquiring expensive Internet broadband services or mobile devices such as tablet computers and smartphones to access the Internet (Kumar, Rajput, Agarwal, Chakraborty, & Nanavati, 2008). The

fact that users can use mobile phones to access voice-services for marketing implies that there is a higher possibility of improved customer service, as shared in the sub-section below.

2.5.5 Improved Customer Service and Just-in-time Processing

The Spoken Web promotes the creation of new farming opportunities as appropriate buyers can be quickly paired with relevant sellers (Patel *et al.*, 2010; White *et al.*, 2010). As this Voice Telephony Application brings buyers directly to sellers in underprivileged communities, it means that it endorses the new ways of marketing which make producers, buyers and the community to interact in one common market (IBM, 2009; Palmer & Koenig-Lewis, 2009; Kumar *et al.*, 2007a). It should be clear that with the adoption of Voice Telephony Applications, there is likely to be improved customer management and processing as the farming community will telephonically interact via these ICT voice services, as discussed after Figure 2-4 below.

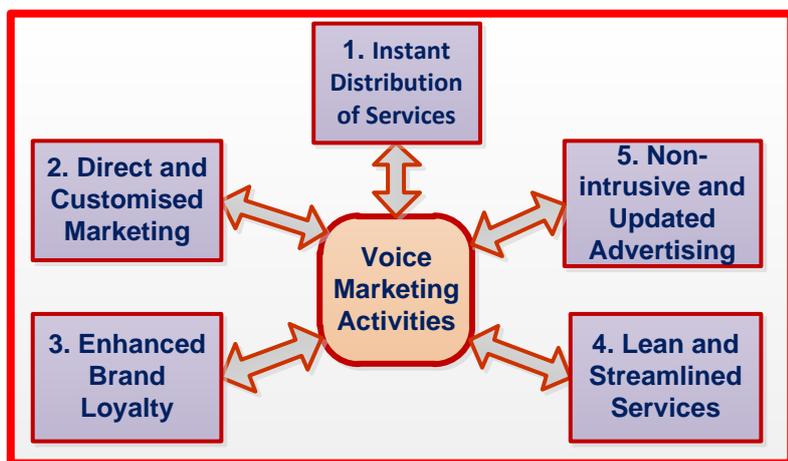


Figure 2-4: Customer Activities Earned through Voice Telephony Applications

2.5.5.1 Instant Distribution of Services

It is a fact that through electronic platforms, marketing can be distributed instantaneously at a tiny portion of costs compared to conventional media such as print and television (Dholakia, Dholakia, Zwick, & Laub, 1999); this is the case with the marketing capabilities of these Voice Telephony Applications. Therefore, according to the words of Kumar *et al.* (2007a, 2007b), as part of e-marketing, Voice Telephony Applications provide minimised marketing costs compared to other traditional sales mechanisms, as new channels are created to marketing and selling of products within underprivileged rural communities. In this context, agro-businesses can make quotation requests from current and prospective customers telephonically in split seconds (Patel *et al.*, 2010). One can indirectly confirm that with voice-enabled marketing, marginalised rural farmers are afforded the opportunity to shorten distribution schedules as information flows faster and easily (Agarwal *et al.*, 2010b; Patel *et al.*, 2010; Kumar *et al.*, 2007a, 2007b). To the knowledge of Dholakia *et al.* (1999), this includes comparing service offerings and prices as results on required

services can be presented in an immaculate manner to the relevant user; this is one feature of direct marketing channels.

2.5.5.2 Direct Marketing Channel Customised for Underprivileged People

Digital technology users in rural areas who cannot operate “brick and mortar” businesses (Litvin, Goldsmith, & Pana, 2008) due to being less literate, visually impaired, and poor can use Voice Telephony Applications such as the Spoken Web to market their service offerings directly to their consumer market (Kumar & Agarwal, 2012; Agarwal *et al.*, 2010a; Agarwal *et al.*, 2010c; Dhanesha *et al.*, 2010). Rural people from Alfred Nzo, Amathole, Chris Hani and OR Tambo District Municipalities of ECP can enable this voice marketing process through their mobile phones on the basis of high adoption rates as contained in the Stats SA (2012a) report. The narrower the information chasm between the business and its consumer market, the better the chances of its customer knowledge and the more relevant its product offerings are to current, and prospective customers (Chong *et al.*, 2010). In its premise to close the digital divide as advocated by ITU (2009) and Prasad (2008), it should be concluded that integrating rural farming activities for buyers and sellers with information technology would be a noble idea. Cloete and Doens (2008) have never been silent in their ICT vision as they hailed this as a great and justifiable cause, one that advocates marketing through ICT as brand loyalty is enhanced.

2.5.5.3 Enhanced Brand Loyalty

New business opportunities and brand awareness can open up to niche consumer markets through voice platforms, particularly markets that were out of reach for rural communities. The Internet market has for years been a reserve of users who are computer savvy or literate and those with financial capacity (Kumar *et al.*, 2008). This is one predominant hindrance to customer relationships and brand loyalty in rural communities. In trying to forge strong customer relationships, Dholakia *et al.* (1999) suggest that businesses ought to promote a culture of “customer intimacy” through increased customer loyalty and later customer retention. In a nutshell, building a strong customer brand identity from a rich customer knowledge management translates into customer loyalty and retention in future. On this juncture one can also add that voice marketing through low-cost Voice Telephony Applications can be an appropriate tool for building brand loyalty within the underprivileged digital farming community (Agarwal *et al.*, 2007). Feedback between farmers and their target audience can add value in customer relationship management as this will enhance customer service, and later boost loyalty (Agarwal *et al.*, 2009). The impact of influential people, that is those who command huge following, can never be downplayed in brand building (Mahelaqua *et al.*, 2013; Warden & N’getich, 2010).

2.5.5.4 Lean Technologies with Streamlined Services

As a form of lean technologies, electronic marketplaces are aggregated one-stop shops that have the ability to streamline, integrate and prosper in future, on the backdrop of brand loyalty (Chong *et al.*, 2010; Chang *et al.*, 2003). This is no exception to Spoken Web (IBM, 2010). Electronic mail lists and newsgroups can be created by farmers to group customers, and required services according to their interests, buying patterns and social demographics through homophily (Chu & Kim, 2011). This will make farmers aware of their market demographics and buyer behavior patterns, and thus will be enabled to contextualise their services according to the customer needs of their target market (Chong *et al.*, 2010). The noble idea of “information overload” can be avoided as the relevant information can go to the relevant customer without bombarding customers with unnecessary service lines. In simple terms: customers receive services that are attuned to their needs and objectives (Dholakia *et al.*, 1999). This intelligent marketing strategy attained through Voice Telephony Applications can enable agro-businesses to ring fence their target audiences for customized services that will be determined by highly demanded services within the identified market. Therefore Agarwal *et al.* (2010b) posit that the greater the capability of sellers and buyers to fully exchange market information on identified products, the greater the propensity of the services offered to be popular in the affected market without necessarily being intrusive, as outlaid below.

2.5.5.5 Non-intrusive and Updated Advertising

Boyera (2009) affirms that the main advantage with telephony marketplaces such as the Spoken Web is that an underprivileged user is at liberty to conveniently access only what interests him/her anytime or anywhere. This is a perfect ingredient for a “non-intrusive” advertising, which is contrary to a “mass market hard-sell approach” (Dholakia *et al.*, 1999, p. 18). According to Dholakia *et al.* (1999), this promotes “pull type” marketing (as customers get the information) rather than traditional “push type” marketing (information goes to customers). Information can be published, updated and retrieved anytime, meaning that a huge volume of data can be analysed, and results interpreted immediately by underprivileged communities (Williams, 2011; Agarwal *et al.*, 2010b; Agarwal *et al.*, 2009; Kumar *et al.*, 2007a). This fosters an epoch of “low-cost micro marketing”, whose cornerstone is customised marketing (Dholakia *et al.*, 1999, p. 20). Any ICT service that intends to promote customer loyalty through improved processing ought to be relevant to the market it is serving in order to gain a competitive advantage over its peers (Patel *et al.*, 2010; Effy & Jones, 2008; Kumar *et al.*, 2007b). The lesser the clash within the business, information and its ecosystem the better, as expounded upon in the next section below.

2.5.6 An Ideal Tool for the Promotion of Local Content

Nothing is fundamentally unjustified in this day and age than having an ICT product or application that completely fails to cater to the capability, and demographic needs of its target market (Interactions, 2013). National leaders and communities alike, particularly in developing areas, have a mandate to close the digital divide that persists because of this quandary (ITU, 2009). Studies by Mahelaqua *et al.* (2013) reveal that when features of an application are contextualised according to local constructs, then statistically the likelihood of improvement in the completion lags of tasks is significantly realised. Voice Telephony Applications such as the Spoken Web provide a convenient platform compared to other media channels for rural communities, as users are encouraged to create local content material through VoiceSites (Agarwal *et al.*, 2010b). The VoiceSites in Spoken Web afford users the opportunity to create a voice content that is relevant to the community's orientation and preferences (Prasad, 2013).

Key to making any inroads towards a user appeal is a service that is designed to meet, represent and reflect the cultural dynamics of its target audience (Lynch, 2012). Embracing, promoting and incorporating the cultural values of a target audience are key activities for an effective customer relationship management exercise (Oz & Jones, 2008). This relationship can be carried through attracting, engaging, retaining, learning and relating to the relevant consumer market (Chong *et al.*, 2010). This appeal and propensity to keeping a constant relationship within the entire farming community from urban to rural areas helps in avoiding any cultural clashes that may ensue between businesses, technology and the community in future. One can allude from the knowledge of Agarwal *et al.* (2009) that as a channel of interconnected platforms, the voice user interface (VUI) of Spoken Web can promote local content creation between urban, peri-urban and rural communities. As an ideal platform of integrated services for emerging economies, local community members can use Spoken Web to share ideas on crucial matters. Voice Telephony Applications such as the Spoken Web are renowned for closing the information technology gap that exists between the computer-savvy and non-computer savvy populations (Kumar *et al.*, 2007b).

Oz and Jones (2008) have never been shy to assert that toleration and promotion of varying language dialects is a key factor to gaining popularity as this would later lead to increase in support base. Stats SA (2012a) affirm that ECP, Chris Hani and Intsika Yethu Municipalities have black African majority rates of 86.3%, 93.6% and 99.9% respectively, and these constitute the greatest numbers of IsiXhosa speaking people. For instance, IsiXhosa has the strongest pool of people in Chris Hani District who use it as their mother tongue. For example due to its local content or language appeal, officials reported that India's mobile phone marketing tool *CellBazaar* has received an average of 100 thousand hits, with 550 new posts per day on their mobile phones in

India. The *CellBazaar* application has become popular in both rural and urban areas with a 51% market penetration in rural areas due to its relevance to its target audience (Zainudeen *et al.*, 2011).

This embrace and relevance to the cultural values, buying patterns and market dynamics to the community values or cultural dynamics by an Information Technology facet manifests into a much wider user application appeal, and accessibility to niche markets. The Spoken Web is contextualised to appeal to various audiences, not solely to those of Indian descent (White *et al.*, 2012). The relevance of this Voice Telephony Application cuts across the African continent too, and this can also inculcate the rural areas of ECP. Mahelaqua *et al.* (2013) further state that Spoken Web conducts the most adoption of ICT4D in local communities as its audio browsers are built to complement the local constructs. Rural farmers and customers can use Voice Telephony Applications such as the Spoken Web as electronic voice platforms for conducting marketing related activities (Patel *et al.*, 2010). To further accentuate this understanding, The Economist (2009) pronounced that in rural areas this application can be used as an ideal platform for the communication or distribution of relevant information amongst local community members. Mahelaqua *et al.* (2013), Kumar and Agarwal (2012), and Agarwal *et al.* (2010b) opine that through creating VoiceSites, users become fully involved in personally making these VoiceSites to suit their style of preference. This by definition implies that the Spoken Web is customised to promote and reflect local content, be it in terms of community values and needed or available local services (Dhanesha *et al.*, 2010), and acts as a one stop shop platform too, as explored upon below.

2.5.7 Promotes a One Stop Shop Platform for the Entire Digital Users

Strong evidence suggests that prospective and current buyers are more likely to believe, and trust messages obtained from electronic platforms. On top of that, conventional marketplaces are losing their viewership market to digital media, particularly the aggregated viral markets (Palmer & Koenig-Lewis, 2009). As articulated by Kumar and Agarwal (2012), Agarwal *et al.* (2010b) and Agarwal *et al.* (2010c), one can not dispute the fact that underprivileged users in rural parts of India have in this regard adopted Voice Telephony Applications due to accessibility and affordability. This is done largely for buying and selling (Agarwal, *et al.*, 2010a), of which Figure 2-5 below pictorially puts this relationship into a more refined context. It is a known fact that through Voice Telephony Applications such as the Spoken Web, people from rural, urban and peri-urban areas are brought to one common place. In a nutshell, this is a one stop shop where buyers and sellers interact to exchange products, and services (IBM, 2010; White *et al.*, 2010; Patel *et al.*, 2010). This demographics concept is further revisited within the two mini sub-sections that are outlined below.

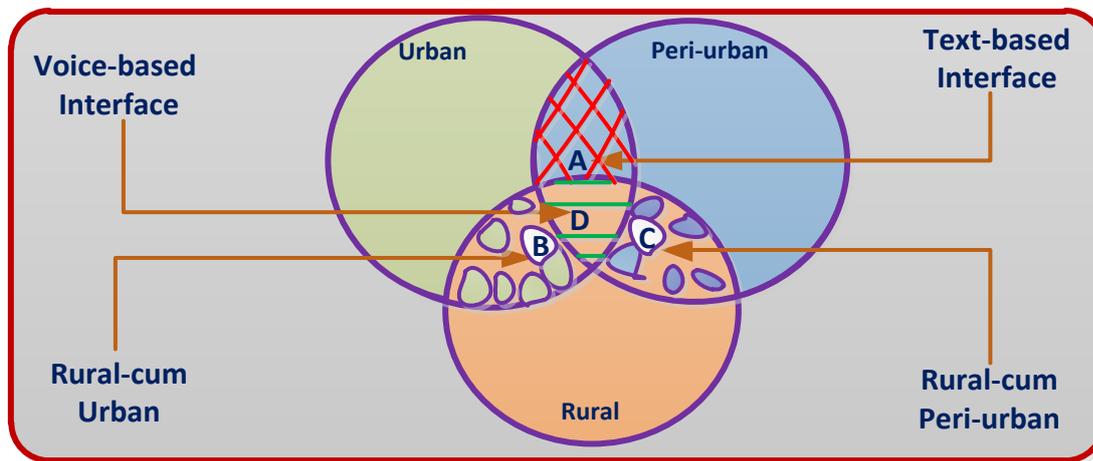


Figure 2-5: One Stop Shop Voice Marketing Drawing

2.5.7.1 The Demographics within the Three Circles: Urban

On fair submission, Internet access has so far been a reserve of affluent areas. These are privileged areas that have access to high infrastructure networks, reliable broadband and electrical power (Chen *et al.*, 2011). Majority of households in these areas are subject to high income and better literacy levels (Stats SA, 2012b). On the basis of their capabilities, ICT users in affluent areas have access to complex devices such as smartphones and computers (Interactions, 2013).

Peri-urban

These constitute mostly townships that are within the proximity of affluent areas, suburbs or cities. Similar to the suburban areas, peri-urban areas have, to a certain degree, better levels of literacy, financial capacity, and have at their disposal better telecommunication and electricity infrastructure (MDG, 2010).

Rural

These are areas where the majority of households are subjected to living below the poverty line of US\$2.50 a day. Furthermore, as the bottom-of-the-pyramid people (BoP) they have higher user participation in less expensive ICT devices such as mobile phones, not Internet enabling smartphones (Research ICT Africa & Intelcon, 2012). On contrary, Internet content is mostly delivered in official languages such as English, Spanish or French in developing African countries, at the exclusion of indigenous African languages. This text-based electronic medium is not conducive for “ICT-unsupported languages” such as those predominantly used by indigenous people in rural areas (Boyera, 2009, p. 16). Rural communities fall within the threshold of 64.8% of South African households that are denied access to the Internet and Figure 2-6 below draws a clear picture of this plight (Stats SA, 2012b). Essentially, households in rural areas are at the receiving end of the “digital divide” (Venkat, 2002). Relentlessly, illiteracy, low income and poor

infrastructure are the order of the day in rural areas as is the case with ECP (Chetty *et al.*, 2006). Undisputedly, unemployment and poverty are rife in rural areas of South Africa, hence dominance of low-income earners in rural areas (Research ICT Africa & Intelcon, 2012). For instance, farming and unemployment are some of the economic realities that feature in ECP (Stats SA, 2012b).

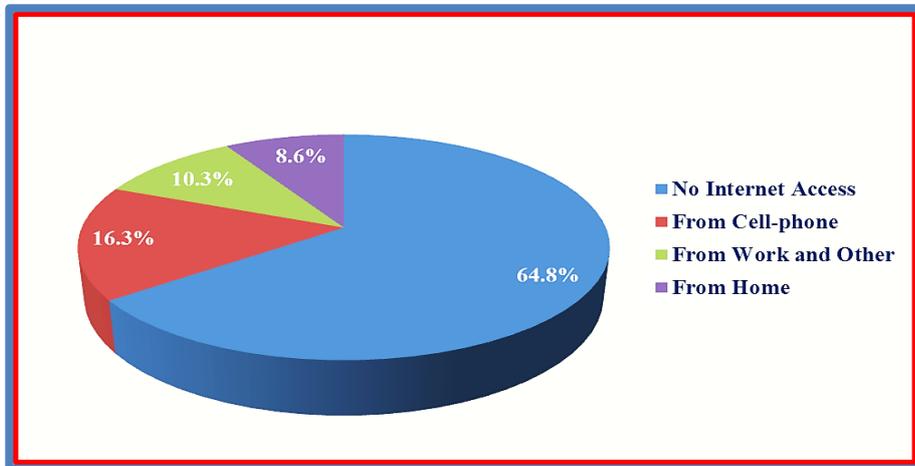


Figure 2-6: Pie Chart on Internet Penetration in South Africa (Stats SA, 2012b)

2.5.7.2 Areas at the Intersections:

Area Marked A

Based on Figure 2-5, one can deduce that the area marked A depicts an exclusive scenario where people from urban and peri-urban communities converge at the exclusion of rural communities. At their proximities, these are areas with advanced ICT devices, adequate telecoms and electrical infrastructure networks, and users have to be computer savvy with unlimited financial resources at their disposal (Chetty *et al.*, 2006).

Areas Marked B and C

These are users who would migrate from rural areas to urban or peri-urban areas for work, relocation or business purposes, but are still prohibited from participating in the main ICT services due to being technology incapacitated (Dhanesha *et al.*, 2010). In the same vein, this is a scenario where there is a continuous integration and communication between urban, peri-urban, and the underprivileged rural communities via Voice Telephony Applications (White *et al.*, 2012).

Area Marked D

In the words of IBM (2010, p. 4), the ideal area marked D in Figure 2-5 denotes a convergence “one gate knowledge-hub” that has been opened through telephony application platforms for a seamless exchange of information and services between relevant parties. This voice user interaction (VUI) platform promotes an all-inclusive interaction between communities from urban to peri-urban and rural areas. This research project would like to submit that this is an ideal platform for both IT

competent and non-IT competent communities (Kumar *et al.*, 2007b). Contrary to areas marked A, B and C, there is little or no form of discrimination in the area marked D. Users do not necessarily have to use text to communicate in this platform as voice is the universal form of communication regardless of one's financial and literacy capabilities (Kumar *et al.*, 2008). Consequently, Voice Telephony Applications such as the Spoken Web can be accessible through low-end mobile phones. These mobile devices are relatively less expensive to own compared to PC-based Internet, and they are accessible to people living in both urban and rural areas although subject to a network signal (Agarwal *et al.*, 2007).

It should be affirmed that areas marked A, B and C fall beyond the scope of this research project, hence more light will be shed on the area marked as D. Areas marked as A, B and C have only been incorporated to bring a balanced argument and clarity between varying ICT platforms, and communities. As illustrated above, one can see that a dual-party relationship in the area marked as A (only urban and peri-urban users converge) is replaced with a tri-party relationship: an area marked D (which inclusively infuses the rural households too). Therefore, new voice-based interfaces as denoted by the area marked D replaces the discriminatory text-based interface area, marked as A, which excludes underprivileged rural people, particularly those who have limited financial resources and cannot read or write. Agarwal *et al.* (2010b) validate this assertion by mentioning that there are also Voice Telephony Applications such as *MobiED* and *AudioWiki* which are suitable for illiterate users in India where users were afforded an alternative platform to PC-oriented systems. An interactive and convergence marketing platform that caters to both computer savvy, and non-computer savvy users has been opened through Spoken Web (Kumar *et al.*, 2007b).

Therefore farmers and buyers do not merely become opinion seekers and givers, but also transmitters of information just like in e-WOM (Chu & Kim, 2011). In noble terms, people in rural communities do not only become consumers of the digital services, but also providers of such services (Interactions, 2010). Brands from rural local farmers in this manner get the voice platform to be marketed to a broader community, even from people who command greater purchasing power from urban areas (Cloete & Doens, 2008). To a greater extent, users or buyers adopt the "tell a friend" mantra about the product or service (Interactions, 2008). In the words of Chu *et al.* (2011) and Litvin *et al.* (2008), e-WOM takes its precedence on the telephony application environment. VoiceSites of the Spoken Web applications such as *Avaaj Otalo* have long been used for farming related advertisements and exchange of expert advice by communities within the rural villages of India through low-end mobile phones (Patel *et al.*, 2010). In more concise terms, a digital divide or information gap that existed for years within underprivileged communities will be eliminated (Interactions, 2010). As less expensive, "ubiquitous and socially acceptable" devices, low-end

mobile phones can enable Voice Telephony Applications to let users access information in various indigenous languages in South Africa (Van Zijl, 2012). If Voice Telephony Applications can be used as universal voice platforms by urban, peri-urban and rural people (Kumar *et al.*, 2007a; Kumar *et al.*, 2007b), then it means that these VUI platforms live to the ideals of non-discriminating ICT services (Research ICT Africa & Intelecon, 2012). This claim will be expounded upon below.

2.5.8 A Non-discriminatory Platform that Encourages Active Participation

Findings within the ICT research fraternity submit that the Internet has so far not been fully embraced by users who are less literate, lack access to adequate electricity and those who earn low incomes or fall within the low income bracket (Chen *et al.*, 2011). The verdict by Chen *et al.* (2011) further reads that this text-based technology continues to be a reserve of people from affluent areas. Thus, as advised by Chetty *et al.* (2006), this research project states that the underprivileged households from ECP are not immune from this quandary. One would imagine the magnitude of damage underprivileged rural SMME farmers would be submerged due to their levels of literacy and purchasing power. It should be acknowledged that the farmers are the majority party that ought to realise the full benefits and might of Voice Telephony Applications, as shown in Figure 2-7 below.

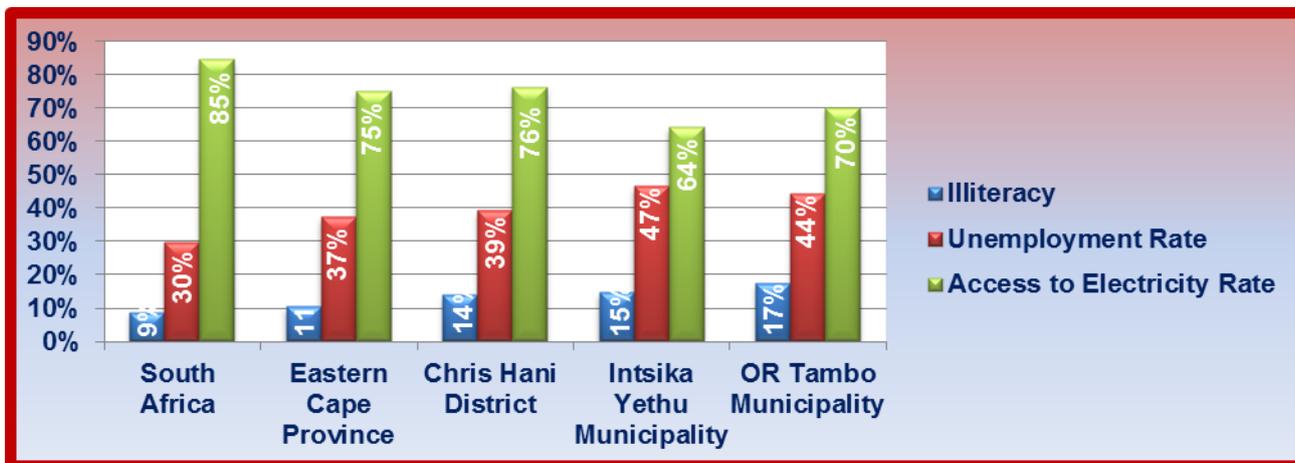


Figure 2-7: Multi Bar Chart Showing Percentages on Various Socio-economic Spreads (Stats SA, 2012a)

Figure 2-7 above gives an acute picture on the demographic spreads of South Africa, around ECP and some of its municipalities. For example, Buffalo City Metropolitan seems to paint a better picture with its low unemployment, low illiteracy, and higher access to electricity rates as compared to Chris Hani, OR Tambo and Intsika Yethu Municipalities (Stats SA, 2012a). Statistics that report on the rates of illiteracy, unemployment, income and access to electricity bear testimony. For example those who are illiterate, as shown in Figure 2-7 above from ECP's rural municipalities, can feel excluded from the Internet platform. This quagmire is further exacerbated by the incapability to comprehend text written messages in this electronic platform (Van Zijl, 2012). The most basic step

to letting people learn to use an application is by giving them an opportunity to play with it because this continuous interaction boosts their confidence and ability to use the technology independently (Interactions, 2008).

2.5.8.1 Play Interactions

In the context of underserved areas it is important to note that the Internet platform is devoid of the crucial ingredient called “play”. Play is the sixth element that has been added into the market mix after product, price, place, promotion and position; which is the latest addition (Interactions, 2008). This is in line with the ideals of Boyera (2009) and Kumar *et al.* (2007b) who have always been proponents of ICT services that do not discriminate users from underprivileged communities. This stems from the fact that rural farmers are kept at bay from personally using the complex Internet applications as one would need the assistance of a third party due to either being blind or illiterate (Mahelaqua *et al.*, 2013; Kumar *et al.*, 2008). Being active digital citizenry, rural farmers can benefit through seamlessly marketing their service offerings to their target audience (Interactions, 2008; Communications of the ACM (2008). Voice Telephony Applications promote play by virtue of letting people from underprivileged rural communities to use them independently to access and post information relating to farming activities (Patel *et al.*, 2010; Agarwal *et al.*, 2009; Kumar *et al.*, 2008; Kumar *et al.*, 2007a).

It is now public knowledge that Voice Telephony Applications such as the Spoken Web can, from within the digital space, be easily usable and accessible by people with limited financial resources and those who are visually impaired and less literate (Kumar & Agarwal, 2012). To rephrase from the extracts of Mahelaqua *et al.* (2013), Agarwal *et al.* (2010a), and Agarwal *et al.* (2010b) from India, this research project wishes to submit that for users to market farming related products through Voice Telephony Applications in ECP, they ought to independently play the active role. This is also proposed by Interactions (2008).

Sometimes personification of information through Voice Telephony Applications such as the Spoken Web can manage to grab the attention of the farmers and buyers. Farmers in India view VoiceSite data as being more colloquial and personal rather than being standardised like in PC-Internet (Mahelaqua *et al.*, 2013). Therefore the most common elements such as ownership, openness, social status and trust can enhance this play activity. In this regard, Voice Telephony Applications indirectly build a much stronger brand identity on rural households; this includes digital technology users, farmers and buyers. Through play there is a greater propensity of increased user participation in Voice Telephony Applications such as the Spoken Web. The fact that rural farming communities can use Voice Telephony Applications even though they cannot access the Internet implies that through marketing their service lines, they are afforded an opportunity to

improve the status quo of their social, economic and technological significance (Dhanesha *et al.*, 2010).

2.5.8.2 There are Social, Economic and Technological Benefits

Agarwal *et al.* (2010b) state that ICT users who are unable to read or write on the Internet can use the Spoken Web to personally make their selections. The rural farmers, buyers and the entire farming community feel a sense of ownership and identity with this Voice Telephony Application or with business services they interact with. This is all possible regardless of their cultural orientation and demographic structure (Mahelaqua *et al.*, 2013; Kumar & Agarwal, 2012). *Maslow's Hierarchy of Needs Model* asserts that it is human nature to strive to attain a higher social level (Maslow, 1970). This social accomplishment can stem from acquiring an immaterial or material benefit (Cook, 1977), as outlined below:

- The benefit in this context as articulated by Agarwal *et al.* (2010b) is that there is a sense of achievement, emanating from competency and independent use of Voice Telephony Applications through user oriented language and technical capability.
- Mahelaqua *et al.* (2013), Agarwal *et al.* (2010b) and Prasad (2008) commonly share in the opinion that farmers who are illiterate, financially constrained and visually challenged can build their business profiles through publishing their business information on user VoiceSites of the Spoken Web.
- Spoken Web application is not based on the literacy level, visual capability and financial capacity of the user (Prasad, 2008). Therefore through the use of Voice Telephony Applications such as the Spoken Web, rural farmers can become empowered about the intrinsic needs, values and dynamics of the ICT4D business (Dhanesha, et al., 2010).
- On labour market issues, Spoken Web can be used to match demanded jobs with the required skills in the job market. Employers can meet with employees for the relevant job opportunities (White *et al.*, 2012). In this context, VoiceSites can be used to advertise job offers.
- Voice Telephony Applications add value through improving the livelihoods of rural people by virtue of embodying ICT tools for exchanging information, thereby rural development is enhanced. In simple terms, this Voice Telephony Application plays a crucial role within boosting the socio-economic trajectory (IBM, 2010). To this regard, information pertaining to seasonal farming production can be also shared (Agarwal, et al., 2010b).

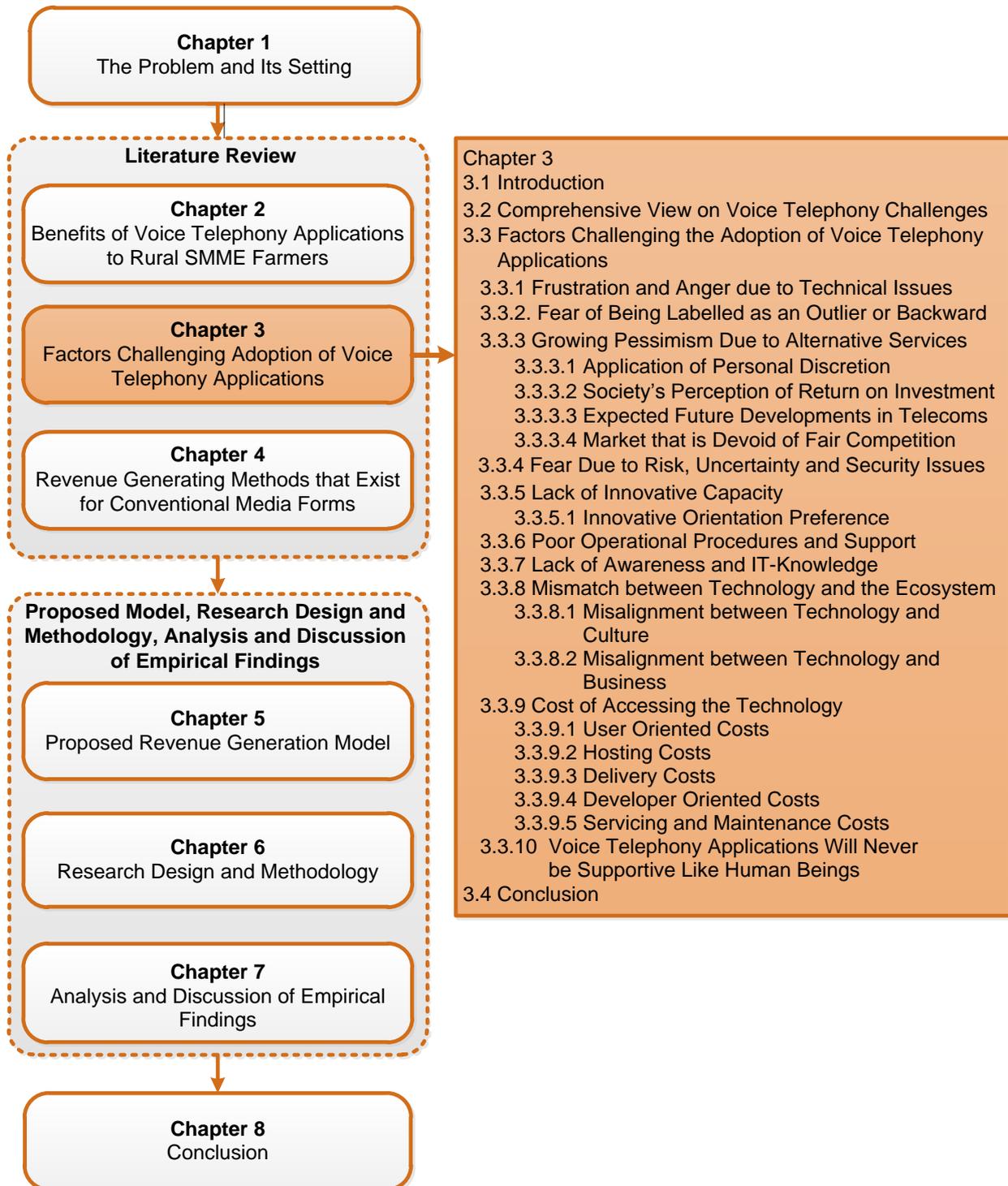
In line with the claims by Agarwal *et al.* (2010c) on Voice Telephony Applications, farmers and buyers become the integral part of the ICT farming community, and in this sense no one is left at bay or periphery of the information and technology space. Benefits can range from improved ICT knowledge, increased sales, growth in market share and better income, and this will eventually lead

to a new growth trajectory. In a nutshell, developmental contribution of ICT services within the social dimension is underpinned by three activities such as prosperous economy, responsible ICT environment and techno-social equity (Interactions, 2010). However, all these material and non-material benefits identified in the *Social Exchange Theory* by Cook (1977) will remain a pipe dream if regulations and policies are too hostile to a telecommunication service (Calandro & Moyo, 2012; Boyera, 2009). Atop it all, further increase of prices in telephone services supporting an ICT service and decrease of prices in competing technologies can work against the optimum use of these noble applications (Isabirye *et al.*, 2013; Research ICT & Intelecon, 2012). Having abundantly critiqued the benefits that can accrue through Voice Telephony Applications, a conclusion can be drawn.

2.6 Conclusion

This chapter did not fall short of highlighting the most intricate and crucial benefits of using Voice Telephony Applications by rural farming communities. Logically from these spinoffs, the greater majority of households will be motivated to take advantage of Voice Telephony Applications, particularly the underprivileged ones in ECP. The distinct feature of Voice Telephony Applications such as the Spoken Web is that even less literate members of the society can become active digital citizenry of the ICT world. Objectively, this is a far cry from being unfairly discriminated against their will by the text-based applications such as the Internet. In these Voice Telephony Applications the community is brought closer into one knowledge gateway hub where information about service offerings in the market is shared. This aggregated marketing will lead to aggressive marketing by rural SMME farmers regardless of one's language orientation, level of literacy and financial capacity in ECP. This in turn will contribute towards the GDP of this province and will trickle down to improvement in the livelihoods of the greater majority of impoverished and underserved communities. The most invaluable advantage and contribution through realising these benefits of Voice Telephony Applications by underprivileged rural communities of ECP that operate within the agro-business sector would be the creation of a new exponential growth trajectory in the future. This socio-economic contribution is the function of certainty in using new Voice Telephony Applications such as the Spoken Web, and this will transcend into brand loyalty.

3. Factors Challenging the Adoption of Voice Telephony Applications



3.1 Introduction

The benefits mentioned in the previous chapter can never be fully realised until the shortcomings posed by the impeding factors mentioned in this chapter are fully addressed. This chapter analyses challenges such as voice call costs that would face the utilisation of Voice Telephony Applications by rural SMME farmers; in the event that they use these telephony applications to market their livestock, as fully discussed in Chapter 2 above. Diagrams and tables have been incorporated to give a better organised presentation of secondary data gathered from relevant studies. The *Diffusion of Innovations Theory* by Rogers (2003) is an underlying theory for this chapter. To kick-start this chapter one will be taken through a comprehensive view on voice-telephony challenges, of which this section presents factors challenging Voice Telephony Applications and takes a cue from studies by ICT experts in general. Lastly, a conclusion is drawn to summarise the findings relating to these challenges from the entire secondary data.

3.2 A Comprehensive View on Voice Telephony Challenges

Communications of the ACM (2008, p. 45) cautions that “If the costs are too prohibitive, it won’t happen for small businesses unless accessibility features in technology are the standard, not something separate or different”, lest the underprivileged communities remain at the periphery of ICT domain. Late adopters of any technology see cost as one discouraging factor; a prominent issue identified by Rogers (2003) in the innovations theory. In the context of ICT, a challenge is defined as the difficult or new task that tests somebody’s capability and skill when using technology or device to perform a certain task. One of the main challenges that continue to discourage users from fully utilising ICTs in underprivileged communities for doing their business activities is the cost of using the technology. This cost can emanate from various aspects such as user call costs, time and effort employed to access the technology (Kenny, 2002). IBM (2010) cautions that, costs for accessing information and services through ICT platforms should not be higher than making a simple local telephone call. In support of this assertion, voice call costs have been identified as a key inhibiting factor to the adoption of voice-telephony services in rural areas (Agarwal *et al.*, 2009). In a nutshell, the use of any ICT service or product is underpinned by factors such as availability, affordability, accessibility and reliability amongst others (Tan, Chong, Lin, & Eze, 2010). This is the same view that is held by Kumar and Agarwal (2012) and Boyera (2009) in their studies. Ideally, accessibility has to be the key factor when developing ICT services (Communications of the ACM, 2008). Noteworthy though is that telecommunications in general can incorporate, and harness voice and data applications of which Spoken Web forms an integral part of Voice Telephony Applications. Throughout, extensive study by Agarwal *et al.* (2009) on mobile telephony applications discovered that these services can help in bridging the information

gap that exists in rural areas. As a Voice Telephony Application, Spoken Web is one of the best tools that underprivileged people can use to communicate through their lower end mobile phones (Botha, Calteaux, Herselman, & Grover, 2012). Botha *et al.* (2012) assert that users from developing countries who have been excluded from conventional ICT platforms are given a new window of opportunity to communicate regardless of their literacy and income levels. In simple terms, for underprivileged households the Voice Telephony Applications such as the Spoken Web are the best alternative to web enabled applications such as the Internet. It should be noted that Voice Telephony Applications are not solely the reserve of mobile phone operators (Agarwal *et al.*, 2010c). Fixed-line telephone services such as Neotel and Telkom can also access these applications (Gillwald, 2013). Voice channels in general are simulated with data atop Internet Protocol (IP) network by means of Voice-over-Internet Protocol (VoIP) applications (Kumar & Agarwal, 2012). Boyera (2009) opines that on the other hand, data service enabled technologies gather applications found on the Internet, particularly those that depend on IP channels.

Much has been developed to close the communication gap, but there is still a lot that needs to be done to improve the status quo, especially if disadvantaged communities have to be taken aboard the mainstream use of ICT4D (Warden & N'getich, 2010). Warden and N'getich (2010) write that accessibility of ICT4D services is beyond the financial capacity of many communities, particularly low income earners. As a means to reduce the cost of accessing the technology, cell-phones are increasingly becoming the most adopted devices due to their duality purpose as they act as both data and voice transmission devices. Cellphones, especially low-end ones, are configured to offer less computer capability support services (Mahelaqua *et al.*, 2013). However, even though these basic mobile telephony devices are viewed to be user friendly and affordable to underprivileged rural users, Voice Telephony Applications are not fully utilised by the rural farming communities (White *et al.*, 2012). The section below will discuss these factors that continue to challenge the adoption of Voice Telephony Applications in rural communities.

3.3 Factors Challenging the Adoption of Voice Telephony Applications

This study has discovered that the usability, usefulness of Voice Telephony Applications and their alignment with existing processes do play a significant part in encouraging the rural SMME farmers to adopt these VUI applications (Isabirye *et al.*, 2013). As stated in Chapter One, user cost is one of the factors challenging the adoption of Voice Telephony Applications (Botha *et al.*, 2012). The second section of this chapter, as shown by a network diagram in Figure 3-1 below, features the main challenging factors. These factors start off with negative displays by users as a result of discontent with technical issues until one discusses the perceptions of rural farming communities on Voice Telephony Applications.

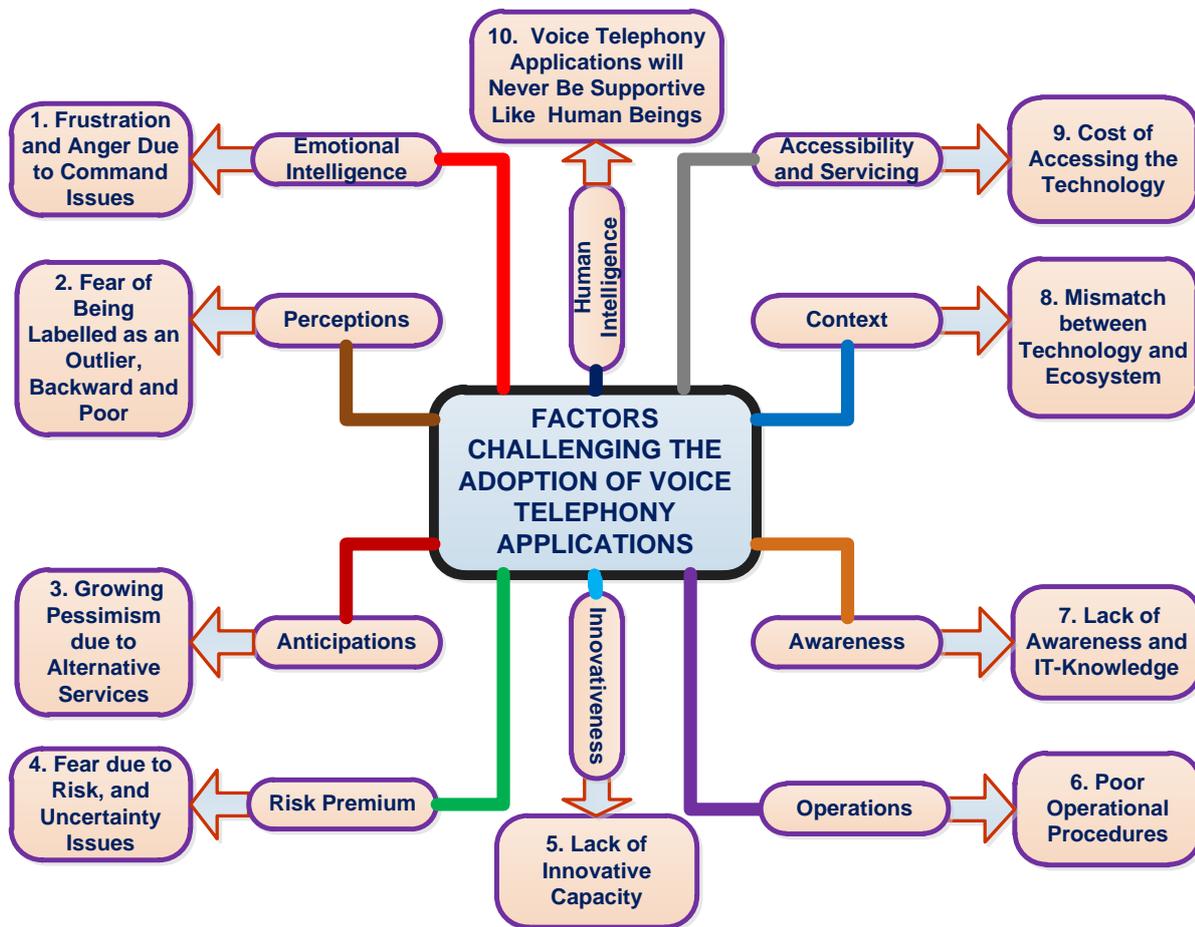


Figure 3-1: Network Diagram Showing Challenges to Voice Telephony Applications

Challenges in ICT vary, much as in the same way Voice Telephony Applications vary. Emotional displays and their sources will be discussed in the following sub-section.

3.3.1 Frustration, Anger and Disillusionment due to Technical or Command Issues

History proves that in nature, Voice Telephony Applications are perceived to be tedious systems with an array of voice commands. One can think of the challenges the user is subjected to in IVR systems, partly due to laborious voice commands that the user has to adhere to. A caller is bound to interact with pre-coded voice messages or commands when making a call to a telephony system (Bouزيد & Ma, 2010). Bouزيد and Ma (2010) assure that the probability of being angry, annoyed, confused, disgusted, frustrated and irritated within IVR environments is high. In more explicit terms, some of this irritation and frustration is a function of technical errors such as poor voice recognition by the telephony system, and others are just authentication requirements. To a greater extent, anger and frustration result from a malfunctioning telephony system (Isabirye *et al.*, 2013). Irritation, anger and frustration are emotional issues that can deter late adopters from using new technology; a diffusion of innovations concept (Grantham & Tsekouras, 2005; Rogers, 2003; Agarwal & Prasad, 1998). These negative emotions expressed or displayed by users to ICT services are very counter-effective towards the adequate and optimum use of Voice Telephony Applications

by communities (Gebremicheal, 2011). Gebremicheal (2011) asserts that users are likely to lose their airtime when they commit on unproductive activities, a behaviour that is not commended regardless of what transpired.

Anger, frustration, and stress during interactions between users and Voice Telephony Applications can lead to non-completion of tasks (Ward *et al.*, 2005). Ward *et al.* (2005) caution that at times there will be deafening silence as users are expecting the telephony system to respond or both the user and the system talk simultaneously, wasting conversation time. Inadequate use of a telephony system or failure to comply with voice instructions in Voice Telephony Applications can manifest into incomplete transactions and a negative attitude towards the telephony system. If it is such a daunting task to search, scan, and index audio content, then it would be a very ambitious idea to expect rural farmers who have low visual capacity, low levels of literacy and have less buying power to advocate for innovative ideas (Ananthaswamy, 2008). Imagine if the user had to experience longer time-outs from the telephony system, meaning that the system has longer fixed waiting intervals between making and ending a request (Ward *et al.*, 2005). In this case, a user would wait longer after making an online request before the telephony system makes another voice prompt due to the system's technical design, user error, or poor sound quality (Bouزيد & Ma, 2010).

Generally, it might be a costly exercise to comprehend and implement actions that are too tedious to apply, let alone doing constant improvements on Voice Telephony Applications. On this note, studies on telephony systems by Bouزيد and Ma (2010), Ward *et al.* (2005) and Wolcott *et al.* (2008) commonly share that frustration, anger, longer waiting periods, slow response speed, and personal experience are some of the compounding factors to the growth of ICT apathy. What is noteworthy is that users can on the backdrop of these mounting challenges develop loss of interest into learning and complying with the new Voice Telephony Applications. Anything that tests society's patience must be taken into cognisance in ICT (Wolcott *et al.* 2008; Ward *et al.*, 2005). Therefore, one should be mindful that we are dealing with rural farming communities who already have apathy towards ICT services and this waiting can further compromise their waning patience. Coupled with this fear of using Voice Telephony Applications due to technical issues, underprivileged rural farmers may be discouraged from using these applications for marketing activities due to fear of feeling left out and poor by society, as discussed next.

3.3.2 Fear of Being Labelled as an Outlier, Backward and Poor by Society

One cannot discount the role of views shared by “fellowman”, as referrals from colleagues or neighbours have an effect on the adoption of Voice Telephony Applications such as the Spoken Web (Agarwal *et al.*, 2010b) However, past experiences have proven that backing from influential

people has an impact on the adoption of the technology (Warden & N'getich, 2010). Warden and N'getich (2010) admit that influential people like community chiefs and leadership can exert pressure on the local community members as it can in all likelihood affect the decision making process of the local community members. Therefore, the power of “influential influence” can never be discounted in electronic platforms as this power prescribes that the norms, beliefs, knowledge and ideas shared through word of mouth shape the decisions of the entire community (Shu-Chuang & Kim, 2011). In essence people prefer to conform or be associated with a particular grouping, even for business related activities. The views held by famous individuals, influential people, leaders, parties and experts in a concerned community on issues pertaining adoption of ICT services cannot be overlooked (Shu-Chuang & Kim, 2011; Boyera, 2009). Vodacom and MTN as the dominant mobile networks in South Africa are likely to influence the decisions of digital communities, that is both the users and the leadership, due to their market power (Research ICT Africa, 2012). Currently, Vodacom commands about 44% of the mobile network market, whilst MTN is the second biggest mobile operator with 37%, as the pie chart in Figure 3-2 below corroborates (Gillwald, 2013). Rogers (2003) notes that influential power cannot be overlooked within the context of diffusing a technology within a predefined community, particularly on popular and influential members.

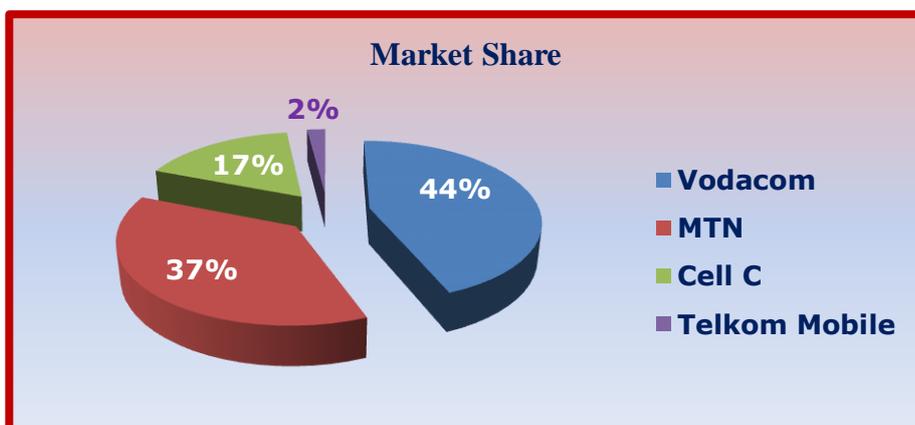


Figure 3-2: Pie Chart Mobile Telecoms Market in South Africa (Gillwald, 2013)

The personal interest and exposure to Voice Telephony Applications will determine whether local authorities, telecom operators, and other influential parties should support or promote services such as the Spoken Web in rural areas (Boyera, 2009). As this is a new technology, it is therefore subject to an array of factors as previously discussed. In a nutshell, if there is no buy-in from the local authorities and other influential members of the community, farmers are less likely to commit to using the Spoken Web from its infancy stage (Mahelaqua *et al.*, 2013; Kumar & Agarwal, 2012; Boyera, 2009). Diffusion of any technology is a function of an innovative culture, one that is defined by experience, exposure, and a need to bravely do trials with the new technology

(Grantham & Tsekouras, 2005; Rogers, 2003). On the backdrop of this novelty as prescribed by the diffusion theory from Rogers (2003), Warden and N’getich (2010) advise that these Voice Telephony Applications can only be supported unless there is evidence that they will prove successful just like the mobile phones. These mobile cellular telephones were subjected to various challenges in South Africa when they were introduced in the mid-90s as users started committing to them after their successive record, just like the Internet penetration. Warden and N’getich (2010) assert that Information Technology studies reveal that mobile phone-based SMSs had to prove to South African rural farmers that they were viable, feasible and acknowledged tools to do electronic marketing. Fortunately, cellphones gained prestigious claims. *Firstly*, through their continued growth; *secondly*, through their pervasive nature and permeation or acceptance of cellphones by the broader societies, and *thirdly*, by the recent adoption of cellphones as ideal platforms to do cellphone banking by major banks. These sounding reasons added to the credibility and cost-value of using cellphones as they gradually became ideal devices to virtually do m-commerce or other related personal activities.

Any negative sentiments expressed by those who command influential power in the local community will work against the adequate adoption of Voice Telephony Applications by the greater majority of people in the concerned region (Mahelaqua *et al.*, 2013; Kumar & Agarwal, 2012; Boyera, 2009). People by nature have a propensity and desire to gain recognition in their places. This recognition can come through fulfilling various social needs, a concept called a *Hierarchy of Needs Model* (Maslow, 1970). Then as prescribed by this “hierarchy of human needs” model, Shoher (2010, p. 131) deduces that people will find comfort in belonging to or being associated with a certain grouping. No one wants to be looked down upon or ostracised in whatever form. One should bear in mind that this technology is meant for underprivileged rural people, as noted by Kumar *et al.* (2007a). Therefore, there is an attached stigma to the Spoken Web which labels it as an application designed for people who are at the bottom of the pyramid table. As “laggards”, these are people who by nature are influenced by the success of the technology, peers and influential individuals, hence they become the last adopters of the technology (Grantham & Tsekouras, 2005). Therefore, it is in the nature of societies to take into consideration capabilities and comfort they derive from the technology they are used to, thus it would be a mammoth task to convince them to utilise the services of a new technology (Grantham & Tsekouras, 2005; Rogers, 2003).

3.3.3 Growing Pessimism Due to Alternative Services

Diffusion of innovation in general is influenced by many personal choices and intentions, as will be discussed in the mini sub-sections below.

3.3.3.1 Application of Personal Discretion

The decision chain of users in Voice Telephony Applications can be a function of various factors such as convenience, past experience, choice of communication and the language that users are most comfortable communicating with at the time of the transaction (Agarwal *et al.*, 2009; Agarwal *et al.*, 2010b; Boyera, 2009). Based on these factors, users will weigh their options before they use the technology in terms of the value they will derive from the application against costs (Agarwal & Prasad, 1998). The study by Agarwal and Prasad (1998) further indicates that it is public knowledge that the relative advantage that users will derive from using the technology is another key factor as this speaks on the ease of use and accessibility. One should bear in mind that this is a new technology, of which individual innovativeness varies according to being an early or late adopter, not to mention being a laggard as stated by the *Diffusion of Innovations Theory* (Rogers, 2003). In this instance; uncertainty, effort, risks and voice call costs inform the decision chain of the underprivileged user as one will be charged whether to utilise the services of Voice Telephony Applications against alternative technologies. These costs can be compared to the value derived from substitute or new technologies found within the telecom sector. In the words of Calandro and Moyo (2012) and IBM (2010), any enhancements or developments beyond capabilities of existing services, and devices supporting and competing with Voice Telephony Applications can shift demand. This shift will ultimately increase user costs to the detriment of Voice Telephony Applications such as the Spoken Web. If in this instance after some time, rural farmers find that they are comfortable in sending text, be it that it is faster, consumes less time and easily understood compared to Voice Telephony Applications, they are more than likely to opt for the text-based Internet to avoid costs in the future (Agarwal *et al.*, 2010c).

According to the study by Tan *et al.* (2010), if farmers in rural areas find it easy to use other communication alternatives such as radio or electronic mail than Voice Telephony Applications, they will opt for the former. This preference option is due to affordability, ease of use, and comfort derived from previous exposure. In the same token, those whose financial capacity improves over time can bargain for the best ICT application, and this will indirectly make the long-term use of this emerging Spoken Web application a costly exercise. Therefore, the use of any technology is a function of convenience and economic value, as explored below.

3.3.3.2 Society's Comprehensive Perception of the Return on Investment

In business savvy terms, return on investment (RoI) is the main incentive for using information technology service by the community. This socio-techno undertaking entails improvement in the way of life or the way of doing business, with access costs being considered as the secondary inhibitor by the society. The usage cost and anticipated attributes of this society cost must be

weighed against the RoI as the return is usage-cost dependant (Boyera, 2009). Any enterprise that invests in the telecommunications sector envisages return for the investment and without which, venturing into that particular technology or activity might curtail the idea (Calandro & Moyo, 2012). This assertion is informed by the modalities of the *Social Exchange Theory* which states that for any service shared there must be an inherent return realised through that exchange which can be material or non-material in nature (Cook, 1977). Community perceptions are informed by anticipations in innovation, as discussed next.

3.3.3.3 Expected Future Developments within the Telcecoms Market

There is widespread information (from various publications and studies) within the telecom sector that is making rounds which poses a threat to emerging technologies such as the Spoken Web from competition and supporting services, as outlined below.

Innovations in Information: Information technology evolves with time as better and more affordable products, and services are developed that may be accessible to the greater majority of people (MyBroadband, 2013). Therefore, with these innovations:

- There are applications with better capabilities.
- Less expensive means and modes of communication come into the fore.
- Existing services compete with new entrants in the limited telecom space which eventually shifts user costs. This change has been prevalent in the mobile phone space (Lynch, 2012; Oz & Jones, 2008).

Free Wi-Fi Accessibility Points: Anticipated telecommunication developments regarding installation of Internet Wi-Fi hotspots around townships are likely to pose a threat to Voice Telephony Applications. This stems from the fact that numerous projects are designed to offer access to wireless Internet services within underprivileged communities of Tshwane and Cape Town Municipalities (TechCentral, 2013). The access to this limited wireless technology includes the erection of Wi-Fi hotspots around townships such as Mamelodi, Atteridgeville, Soshanguve, Khayelitsha and Mitchell's Plain (Project Isizwe, 2013).

Underground Sea Cables: Underground fiber-optic network cables that are expected to connect Africa to the rest of the world without going via United Kingdom are some of the undertakings and initiatives that will bring a reduction to Internet broadband and telecommunication fares in general (Calandro & Moyo, 2012). Furthermore, the discoveries by Calandro and Moyo (2012) further claim that the rapid increase of fibre-optic cables servicing South Africa will bring competition prospects in the telecommunications industry. In the end, this competition will eventually work towards the reduction of cost on telecommunication services such as the Internet and telephones, and to a greater extent to services supporting Voice Telephony Applications (Isabirye *et al.*, 2013).

Monopoly: The domination of the telecom market by one telecom company that is granted a licence to provide fixed-line Internet broadband continues to increase user costs and be a price setter. As instructed by ICASA, Telkom has the mandate to carry this network connection with Neotel as the second landline network operator. Mobile operators such as Vodacom, MTN and Cell C so far continue to be the major players in the mobile telecom market, and in the end do determine the cost of voice and data services (Gillwald, 2013; Research Africa ICT, 2012).

Predatory Pricing Mechanism: Broadband Infraco, a state owned telecom company tasked to provide infrastructure rollout of Internet broadband, is accused of introducing a predatory pricing mechanism to stifle private companies. This mechanism is done solely because even if Broadband Infraco were to charge lower prices, government would subsidise the entity as the major shareholder (Calandro & Moyo, 2012). According to Calandro and Moyo (2012), this move may in turn unfairly prove to be a disincentive to competitors such as private companies that want financial return in order to invest more in the broadband rollout. This competition can be exacerbated by the factors mentioned in the mini sub-section below.

3.3.3.4 Market that is Devoid of Fair Competition

Mohr and Fourie (2007) posit that it is common knowledge that the presence of competition in any industry helps in bringing prices on services and commodities down, and this can be an influence of various factors, as mentioned below.

Number of Service Providers: The higher the number of firms that offer the same service or commodity in a particular competitive industry, the higher the chances that the access costs on those services or commodities on consumers will be reduced. Markets dictate the prices as firms have less power to affect prices they want to charge buyers (Mohr & Fourie, 2007). The existence of a symbiotic relationship between demand and supply cannot be underestimated as prices are determined by the nature of this relationship. The higher the demand for a commodity, application or service and the lesser the supply, the higher is its accessibility price. Should the number of service providers increase then the likelihood is a reduction in price. However as a new technology, Spoken Web must prove itself in the eyes of the telecom sector in order to gain market acceptability. In simple terms, affordability of any application and/or service is shown by its consumption volume (Research ICT Africa & Intelecon, 2012). Dominance of the mobile telecoms market by four network operators such as Vodacom, MTN, Cell C and Telkom Mobile in Figure 3-2 above will never yield the positive results in this scenario (Gillwald, 2013).

Ineffective Policies and Failure to Fully Apply Regulations: The bleak picture on numerous “reform efforts” of trying to make South Africa a highly competitive market with a strong institutional setting on telecommunications has been haphazardly distorted by failed policies and regulations. These have proved to be really ineffective (Research ICT Africa & Intelecon, 2012).

Research ICT and Intelecon (2012) out-rightly assert that this negative story about the South African ICT landscape has tarnished the image of the local telecoms environment, with services and applications included. Many factors such as dearth of fair competitive practices, presence of monopoly, backlog on policy frameworks, and anti-competition taxation structures continue to inhibit a reduction of cost prices in ICT services (Calandro & Moyo, 2012; Boyera, 2009).

Telecom Industry that is Devoid of Transparency: Independent Communications Authority of South Africa (ICASA) as the regulatory telecommunications organ, ought to see to it that there is market transparency. This regulatory body has the mandate to promote a clear cut communication of telecom prices and services, and this implies bringing in requisite mechanisms as deemed fit by the legislative powers of Electronic Communications Act (Bowman Gilfillan, 2012). The inappropriately drafted act lacks a proper document to substantiate the new ICT policies, and to this effect the very same regulatory body, ICASA, is not fully capacitated with requisite expertise and resources to swiftly attend to its daily demands (Research ICT Africa & Intelecon, 2012). This quagmire has resulted in bottlenecks in terms of regulatory functions. On the contrary, the regulatory organ has proved to be its own major hurdle. ICASA continues to be defeating the same objectives of creating enabling fair competitive market behaviour in telecommunications (Mail & Guardian, 2012). This further puts more strain on retail and wholesale prices, and in the end compromises the adequate usage of new ICT services by the rural communities (Bowman Gilfillan, 2012; Calandro & Moyo, 2012; Mail & Guardian, 2012; Research ICT Africa & Intelecon, 2012). The telecom market borne challenges and exposure to such culminate into instilling fear in rural farmers which is discussed further in the next sub-section.

3.3.4 Fear Due to Risk, Uncertainty and Security Issues

Privacy and security is one area of information integrity or confidentiality that one can never turn a blind eye on (Boyera, 2009). Therefore, it is fundamentally crucial to acknowledge that there is a correlation between the manner in which identity is validated, provided and the form of technology utilised or incorporated by disadvantaged rural SMME farmers. Contrary to what Boyera (2009) cautioned against, Warden and N’getich (2010) are proposing a “small scale rollout” as the best mechanism of introducing Voice Telephony Applications in rural areas. Time will tell if this may yield better results in the future, but Warden and N’getich (2010) advise to adopt a “Triability” concept; this is opined by Rogers (2003) in the diffusion theory.

Tan *et al.* (2010) claim that: (a) uncertainty on issues pertaining to legal matters; (b) barriers to ICT infrastructure, and (c) fears on security concerns would compromise the successful adoption of the ICT application concerned. As a means to close this gap then, putting in place effective mechanisms such as drafting guidelines, and standards on accessibility would add value to the efficient and

effective use of Voice Telephony Applications (Watanabe, 2012). Boyera (2009) ascribes more credibility to the ideas shared by Tan *et al.* (2010) that the digital community should define, and set in place adequate practices, guidelines, methods and methodologies that promote user interfaces for illiterate people in Voice Telephony Applications. This is the mandate of the amended ICT ECA of 2005, as required by the South African law (Department of Communications, 2012). Recent studies by Isabirye *et al.* (2013), Williams (2011) and IBM (2010) have indicated that Voice Telephony Applications such as the Spoken Web are still hosted by IBM in India and anyone who wants to own the service must purchase the license rights from IBM India. Holistic and technical support for the development of Spoken Web is still the sole reserve of the technicians in India. Thus to a greater extent, this implies that developers in India must take into cognisance issues pertaining to information security. This should be done within the ambit of the statutory laws of South Africa such as the ECA of 2005, as mandated by the Department of Communications (2012). This is the same challenge that was encountered in the ECP's Albertinia case study on aloe farming where the Spoken Web application had to be configured, converted and routed through a telecommunication gateway from India (Isabirye *et al.*, 2013). Fear instilled by perceptions surrounding Voice Telephony Applications can lead into discouraging the propensity to be innovative, as will be discussed below.

3.3.5 Lack of Innovative Capacity

Rogers (2003) has done extensive research on the *Diffusion of Innovations Theory*. In the similar context as a follow-up to this theory one can submit that “innovation orientation” plays a crucial role towards the adoption of ICTs by the community. Innovation orientation is coined as the propensity and capability to “introduce new concepts or ideas”. This refers to a propensity to open up to new means of production, concepts, services and activities as the fundamental element of the community-corporate culture. The role of an ecosystem can never be taken for granted as the cost of mobile technologies, mobile devices, data and voice services is affected by “wider ICT ecosystem” (Barba-Sanchez, Martinez-Ruiz, & Jimenez-Zarco, 2007). In return, this could also be influenced by the manner in which ICT applications and services develop, and evolve with time (Research ICT Africa & Intelecon, 2012).

In most cases people from rural communities are sluggish in embracing the use of ICT or are unwilling to fully commit themselves in using the technology to carry out their daily business activities (Wolcott, Kamal, & Qureshi, 2008). There must be an inherent need and will on the part of rural businesses or users to use ICT services in carrying out their daily activities without any undue pressure or influence from initiators (Barba-Sanchez *et al.*, 2007). Coupled with these, Barba-Sanchez *et al.* (2007) further add that the level of education, exposure to Information

Technology and the economic power of the society have a major influence on the adoption of ICT. Therefore, ability and need to adopt new mobile technology is defined by the innovative nature of the individual concerned as some are early adopters, whilst others are late adopters (Grantham & Tsekouras, 2005). This sub-section has one mini sub-section that looks at orientation preference in order to discuss the elements that can compromise innovation in ICT, as discussed below.

3.3.5.1 Innovative Orientation Preference

“Innovation orientation preference” can be compromised by the incapability and unwillingness of individuals (Barba-Sanchez *et al.*, 2007), particularly the rural farmers in this case to develop the voice application so as to adequately apply the set tools (Qiang *et al.*, 2012). Apathy from technology users usually curtails them from experimenting with the technology (Wolcott *et al.*, 2008). This continuous disengagement, unwillingness to be innovative and blatant ignorance by rural SMME farmers is against the ideals of play which promotes independent use, active participation, and play principles as advocated by Interactions (2008). If barriers like call cost and attitude are not adequately addressed, then Voice Telephony Applications will continue being another pipedream in ICT space particularly in ECP, a mostly rural region. This innovation orientation can be jeopardized by an array of misconceptions which will later lead to failure to fully adopt Voice Telephony Applications by the farming community of ECP in this juncture. A farmer in Alfred Nzo, Amathole, Chris Hani and OR Tambo District Municipalities of ECP can be a subject of the challenges explained below.

Communications Channels: The majority of individuals base their judgements on the subjective report that is relayed to them by peers or colleagues and if poorly communicated or the channel has a poor reputation, this can pose a challenge to the new communication channel (Rogers, 2003). In this scenario, this applies to Voice Telephony Applications. Both Bouzid and Ma (2010) and Ward *et al.* (2005) affirm that negative information about past experience with IVR systems such as loss of airtime due to unclear voice commands, lack of human touch and slow processing of information would work against Voice Telephony Applications.

Compatibility: The magnitude of negative behaviour or attitude levelled against the technology as a function of previous exposure, knowledge, cultural values, perceptions, and expectations by prospective adopters or users put effective and efficient use of the technology into jeopardy (Rogers, 2003). Rural communities do acknowledge the existence of a technology that fully recognises and fits in with their cultural values. Clearly from this assertion then, underprivileged communities will adopt the application and put it to good use; however, the opposite is true if the technology clashes with the business or community values (Interactions, 2010). On record, technical compatibility between the ecosystem and the new technology is one feature that cannot be discounted (Agarwal & Prasad, 1998).

Complexity: There is a general assumption that perceptions on the difficulty and risks associated with the new ICT, and feasibility regarding its diffusion by the cyber community can be used as a litmus test to gauge its rate of growth in a particular market (Warden & N'getich, 2010). Agarwal and Prasad (1998) have long affirmed that technical complexity defines the nature of adopting the new technology. Tan *et al.* (2010) have similar views to Warden and N'getich (2010) and Agarwal and Prasad (1998). But nonetheless, in more assertive terms Tobin and Bidoli (2006) articulate that substitute ICT channels such as text-based technologies, e-mail, radio and telephones might be the preferred choices if users find that inconvenience, increased risk premium, and more usage costs are associated with using Voice Telephony Applications.

Observability: This is the manner in which the results of an innovation or technology can be observed by others. At times it can be a challenge to make complete judgements on the technology that has never been fully tested, or put to use in a particular market (Rogers, 2003). Therefore, the fact that Voice Telephony Applications have been used and applied in India does not fully justify the relevance of their success in the context of South Africa with rural ECP in particular. One cannot dispute the idea that both India and South Africa have different markets geographically and demographically. Trialability proposed by Warden and N'getich (2010) would be another option that could be deployed to gauge the success of the Spoken Web in rural areas of ECP.

Relative Advantage: These are perceptions towards the practical application of the technology as the ICT community is made to believe that the technology will add more value than the view around it holds (Rogers, 2003; Agarwal & Prasad, 1998). Failure to prove these claims true will put the effective use of Voice Telephony Applications within underprivileged communities in jeopardy.

Social Systems: This is a group of homogenously related units that are tasked to jointly solve a problem in order to reach the same goal. The diffusion of innovative or latest ideas in the community is a function of its demographic structure (Rogers, 2003). Any lack of ambience between the technology and its entire ecosystem will lead to poor adoption of the new technology (Boyera, 2009). In the Albertinia aloe farming community for instance, alignment between Voice Telephony Applications and rural aloe farmers has led to the increased interest towards the adoption of these VUI applications within the Albertinia aloe farming community (Isabirye *et al.*, 2013).

Time: Time is the most crucial element in diffusion of innovation as this can be the function of each individual's innovativeness ability, his/her decision chain on innovation and the need for adopting the new technology at the concerned period (Warden & N'getich, 2010). Rogers (2003) better sums it as that, time is a crucial element that will affect the adoption of the new technology as Effy and Jones (2008) articulated that the relevency of information technology at a particular period is key in its use.

Trialability: This is referred to as the amount of experimenting with an innovation during a defined-set of time (Warden & N'getich, 2010). This noble and well informed exercise does take into consideration past experience pertaining to a certain technology as the closest predictor on the future assimilation of identical technologies. Those who have never done trials on the new Voice Telephony Applications will continue casting doubts on them due to pre-conceived ideas relating the operational support the voice-telephony services will afford them, as discussed below.

3.3.6 Poor Operational Procedures and Support

Poor operational procedures and lack of support can bring complexity and difficulty in the use of a new technology by individuals, thus leading to its inadequate use in a long run (Grantham & Tsekouras, 2005; Agarwal & Prasad, 1998). This assertion lends credence to the views expressed by Rogers (2003) in the *Diffusion of Innovation Theory*. Having clear guidelines, policies and standards in place calls for ways to refine and maintain these grand tasks by closing any loopholes that may take precedence in the seamless adoption of Voice Telephony Applications. To avoid any unanticipated market shocks in rural communities in future, enough support and assurance should be given to the rural ICT communities in South Africa on adequate technology use, and adoption (Van Zijl, 2012; Cloete & Doens, 2008). In light of this view, Tan *et al.* (2010) and Wolcott *et al.* (2008) caution that information technology products and applications that lack adequate ICT support service are susceptible to a myriad of challenges in the future. These challenges include amongst others: (a) security risks to information; (b) poor back up or recovery system, (c) lack of help desk support on configuring or setting up the applications as per user requirement.

There is a general perception on ICT services which holds that micro and small enterprises feel that there is no need for them to hire a consultant or IT personnel as they do not command too much customer base, are still small, and growing with little resources (Wolcott *et al.*, 2008). Fundamentally, it is a legitimate concern to gauge the potential of Voice Telephony Applications in terms of reducing adequate expertise necessary for accessing, searching and finding new services (Agarwal *et al.*, 2010c). One should take into account dimensions such as accessing latest services, discovering and installing latest services, the manner in which the provider of content develops and deploys an application, and the handset requirements (Boyera, 2009). One of the most critical factors that may jeopardise the optimum adoption and operation of a mobile application is the poor technical capability of the user, that is, a user's incapability to run the application (Qiang *et al.*, 2012). Boyera (2009) cautions that it is crucial to know the entire ecosystem which could lead to aesthetic appeal of various services to afford users the latitude in accessing, deploying and developing the voice content with ease.

With regard to Voice Telephony Applications such as the Spoken Web, Boyera (2009) states that it is necessary to note that these telephony applications are devoid of widely available user guidelines. These usability guidelines usually enable the potential development of an application by the relevant author. On the same note, there are new voice application frameworks that exist for the development of Spoken Web. The examples of various Spoken Web applications that have clear set-in guidelines to enable a user-friendly creation of applications are:

VoiServ: Through voice, emerging economies can create and deliver converged services.

VoiKiosk: Rural users can create content and disseminate for them.

Folksomaps: Developing regions are enabled access to intelligent community driven maps.

One should note that Section 2(b) of the *Electronic Communications Act* calls for the development, promotion and facilitation of easily operated telecommunication systems (Department of Communications, 2012). This recommendation supports the notion of a less complex technology whose assimilation is driven by its appeal to the local communities; a diffusion driver for varying adopters as opined by Rogers (2003) and Agarwal and Prasad (1998) on new technology. Inadequate operation of Voice Telephony Applications such as the Spoken Web in ECP could be the function of the aspects listed below:

- As a technology that is owned and developed by IBM in India, Spoken Web has to appeal to the needs and aspirations of people with many diverse cultures (like India) (Watanabe, 2012). This can be the failure to tailor suit functional use of the technology according to the South African telecom market, particularly for small rural farmers of ECP.
- The development of the technology must not be informed by the type of mobile technologies developers encounter in their daily use as was the case with *Mxit*. *Mxit*, developed by those from middle to high income brackets, is an application intended for users who are young and who are at the lower end of the social pyramid (Research ICT Africa & Intelecon, 2012).
- Developers should avoid using complex terms, metaphors and idioms that can kill the meaning of the pre-coded command which can inadvertently lead to confusing the caller (Boyera, 2009). This is informed by the idea that Xhosas in general have many tribes such as Tembus, Pondos, Pandomises and Gcalekas who command varying dialects and interpretations (MDG, 2010).
- Overburdening the user with cumbersome instructions and messages can result in longer waiting periods, and low response speed (Ward *et al.*, 2005). Failure to adequately use operation tools in Voice Telephony Applications can be informed by lack of awareness and knowledge which will be addressed next.

3.3.7 Lack of Awareness and IT-Knowledge

Little information about any technology can work against the ideals of innovation diffusion as Rogers (2003) and Agarwal and Prasad (1998) posit that this can lead to uncertainty towards the

assimilation of the technology by communities, particularly late adopters. This challenging factor was also identified by Grantham and Tsekouras (2005) in their own studies. Lack of information about business needs, business support services and IT services also pose as a constraint to ICT use. This is mostly the function of information gaps that exist due to little exposure to inherent dynamics of knowledge-economy (Tan *et al.*, 2010). This lack of awareness and knowledge of ICT facets in the ECP can be exacerbated by the factors listed below.

Insufficient Knowledge and Exposure to Technical Solutions: Any insufficient knowledge and exposure to technical solutions that may help in solving certain technology problems will limit the rural agro-businesses from using ICT services to tap into other markets or opportunities. This assertion has been adopted and customised as presented according to the knowledge of Wolcott *et al.* (2008).

A Need to Inculcate an Education and Training Culture: Qiang *et al.* (2012) and Barba-Sanchez *et al.* (2007) opine that entrepreneurs must inculcate an education and training culture to bolster their awareness on the intricate features, and areas of ICT. This includes having a much deeper and broader knowledge on the fundamental tools of information and communication. It is the best rule of thumb to get awareness across the board; from regulatory bodies to end-users. It is public knowledge that few people are fully aware of the potential ICT benefits that can be derived from mobile phones and the challenges that exist in the cyber space. Even with ECP's Albertinia aloe farming, farmers had to be trained and provided with user manuals for the general use of Voice Telephony Applications (Isabirye *et al.*, 2013).

Poor Awareness on Mobile Applications: Another major hurdle is awareness on mobile phone applications in general, let alone Internet illiteracy in developing regions. Corroborative evidence suggests that even though individuals have Internet access they do not understand it and amongst those who barely use it, more than 86% of them cannot really decipher its defined purpose (Research ICT Africa & Intelecon, 2012). On the mobile phone front, it is claimed that users have yet to apprehend and comprehend the information processing capability of these mobile phones (Isabirye *et al.*, 2013).

Information Lag on Policies and Procedures: Little is known about the impact of policies, regulations, practices, and procedures on the pervasive nature of mobile phone material and services (Boyera, 2009). Both Tan *et al.* (2010) and Boyera (2009) concur that there is little knowledge on m-commerce dynamics, particularly on the development of Voice Telephony Applications such as the Spoken Web. Arguably, there is greater proliferation of mobile phones since the beginning of the 90s, and equally so there is an understanding of the indirect role of these mobile devices on

shaping the economic and social landscape. However, Boyera (2009) affirms that there is still little awareness on two key dimensions: “what is possible” and “what others are doing”.

Scant Information on Voice Telephony Applications: To sell business services through emerging Voice Telephony Applications would not be an easy task as Spoken Web is an emerging technology for now. There is scant information on Voice Telephony Applications within rural farming communities (Kumar & Agarwal, 2012). To expect disadvantaged communities to use telephony applications or business processes is not an easy task in South Africa as information lag is rampant (Van Zijl, 2012; Warden & N’getich, 2010; Cloete & Doens, 2008). Voice Telephony Applications might be here, but not enough information reaches the underprivileged rural communities.

Naivety on Technology Capabilities: There is a misconception that is making rounds within rural communities which holds that the general society still believes that mobile phones are closed systems. These mobile telecom devices are viewed as similar to television sets, where the operation and development of content is still the preserve of the handset producer or network provider. Little is known that one does not basically need to have a contract with the mobile phone operator or needs his consent to create a VoiceSite, develop a mobile web application, or to send an SMS. This lack of awareness will continue to stifle innovation in Voice Telephony Applications (Boyera, 2009). To top it all, there is little knowledge on the processing prowess of the mobile phones (Isabirye *et al.*, 2013). Misalignment between Voice Telephony Applications and rural aloe farmers in Albertinia would have led to the development of more apathy in the future if the factors discussed below were never taken into cognisance.

3.3.8 Mismatch between Technology and the Ecosystem

The entire ecosystem where the information technology is introduced in ECP can never be ignored and this applies to Voice Telephony Applications too, as the two mini sub-sections below discuss.

3.3.8.1 Misalignment between Technology and Cultural Values

The psychological standing of society, societal values and cultural beliefs usually inform perceptions towards the adoption of an ICT application or service (Qiang *et al.*, 2012). Wolcott *et al.* (2008) further gives credence to this assertion by stating that the age of the users, their cultural backgrounds, demographics, academic profiles, geographical dispensation and business environment all contribute towards adoption of the technology. This assertion is further shared by Tan *et al.* (2010) and Barba-Sanchez *et al.* (2007) too. *Firstly*, people wilfully use an information technology device or application on the basis of their personal traits, character, knowledge, trust and goals. *Secondly*, through information technology people can communicate effectively in the context of their culture, ethnicity and professional background. *Thirdly*, business owners and users feel that

any compounding mismatch between the information technology service and its intended business or environment adds little value to its full adoption (Wolcott *et al.*, 2008).

India and South Africa are cultural oriented countries and this is more visible in rural areas of ECP. Mahelaqua *et al.* (2013) and Agarwal *et al.* (2010b) submit that Voice Telephony Applications are virtually designed around the cultural values, norms, and beliefs of their immediate community. From this understanding then, any mistrust, aberration, dislike or clash with these cultural values could jeopardise the early adoption and success of Voice Telephony Applications by the local farming communities. Any fallout between the farmers, customers, community and technology in ECP will lead to mistrust which can manifest into procrastinations on the early adoption of Voice Telephony Applications, and loss of business income and prestige or value in the future. To build trust, culture must also be the area of focus as this research project is looking at rural communities, particularly black African communities; whose bedrock of behaviour is built on cultural values. There is a perception amongst mobile phone users in rural communities that mobile applications such as *Mxit* can wreak havoc to their phones. On top of that, these individuals believe that these mobile applications would lead them into corrupt societies that could rebel against their moral values and ethics (Research ICT Africa & Intelecon, 2012). Having discussed issues pertaining to the farming community, it is appropriate to also take into cognisance the relationship between Voice Telephony Applications, and the business units that intend to adopt and promote them; as discussed in the mini sub-section below.

3.3.8.2 Misalignment between Technology and Business Units

A concept referred to as a “trans-functional component” has been developed which entails inter-organisational support as different players and units in an organisation work as a collective whole to achieve one goal without focusing on separate goals (Wolcott *et al.*, 2008). As advised by Wolcott *et al.* (2008), similar to promoting a viable inter-ecosystem agenda, any clash between Voice Telephony Applications, local business practices and its immediate farming community values is tantamount to an environment that is devoid of this trans-functional component. This is a practical case of an ICT application that would fall short of achieving its primary goals as envisaged by Watanabe (2012), Tan *et al.* (2010) and ITU (2009). In reference to the affirmations of Tan *et al.* (2010), this research project wishes to assert that this misalignment between the technology and its stakeholders can exacerbate the rejection of Voice Telephony Applications by the farming community in rural areas. In a nutshell, this can contribute to creating more barriers towards the efficient and effective adoption of these ICT services. The case study on ECP’s Albertinia region by Isabirye *et al.* (2013) is the living example of these claims as the CEO and the entire aloë farming community were willing to adopt Voice Telephony Applications on the basis of these prospects:

- Apparently there was growing confidence on the technology as contentment was bolstered further as Voice Telephony Applications continued to augment the livelihoods of the aloe farming community.
- Voice Telephony Applications were aligned with the existing business practices and processes; so the concerned units and functions within the aloe farming business both dove-tailed each other.

3.3.9 Cost of Accessing the Technology

Ethically, one cannot look at the relationship between culture and ICT within an ecosystem without comprehensively looking at the magnitude of cost within its immediate environment in the ECP. In general, cost is the price that one has to pay in exchange for the consumption of a certain service (Correia, Flynn, Uliana, & Wormald, 2007). Rogers (2003) indirectly affirms in his *Diffusion of Innovations Theory* that lower cost is one of the factors that motivate users to utilise the services of the technology. This is the same cost that users are subjected for making a voice call, but unfortunately users have to pay higher costs for making these telephonic calls in South Africa as compared to other countries. Looking at Figure 3-3 below, one would likely comment that comparing South Africa to Bangladesh and Pakistan, users are more than likely to use more airtime units to make a voice call in South Africa. Users in South Africa will have to spend US\$0.259 per minute to make a mobile phone call, which is relatively more expensive than US\$0.042 and US\$0.135 in Bangladesh and Pakistan respectively (Skype, 2013).

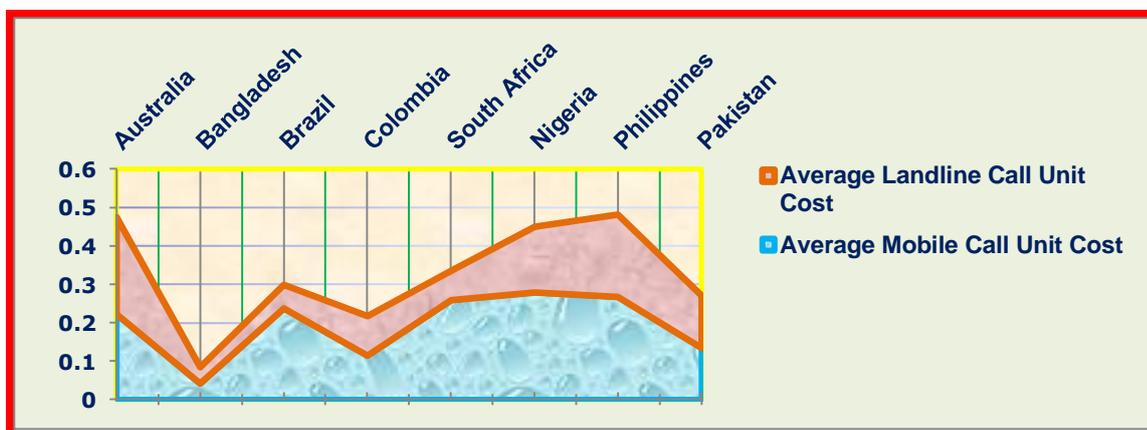


Figure 3-3: Graph with Average Costs in First and Second World Countries (Skype, 2013)

In the same context, users would spend about US\$0.07 to make a 4 minute call in India which is relatively less expensive in comparison to both Bangladesh and Pakistan's voice call costs (Agarwal *et al.*, 2010c). The latter two call rates are reasonably affordable to local communities as compared to South African rates. In the same token another picture is drawn between South Africa and other African countries, as in Figure 3-4 below. In this diagram, it is clear that compared to its neighbours, South Africa fares worse when compared to Namibia and Botswana. To top it all,

countries such as Mauritius, Ethiopia, Kenya and Rwanda have the most affordable ICT services compared to the rest of Africa (Research ICT Africa, 2012).

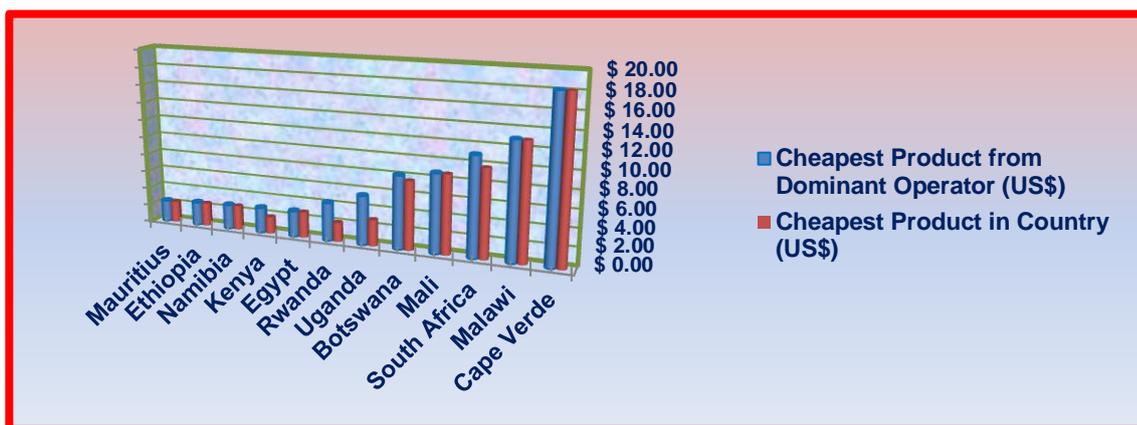


Figure 3-4: Graph with Telecom Tariffs in Africa (Research ICT Africa, 2012)

In order to absolve themselves from the high voice call costs in South Africa, users will have to choose the most affordable between various expensive mobile phone network company services such as 8ta (US\$12.05), MTN (US\$20.40), Vodacom (US\$18.14), Cell C (US\$18.72) and Virgin Mobile (US\$18.70). The rates are displayed in Table 3-1 below (MyBroadband, 2013). By comparison from the data contained in this table, 8ta is the least expensive for its subscribers. Warden and N’getich (2010) would never refute the claim that if it costs more to make voice calls, users are more than likely to use the Internet services their phones provide than Voice Telephony Applications such as the Spoken Web.

Table 3-1: Average Mobile Telecom Call Rates in South Africa (My Broadband, 2013)

Operator	Product	Call Rate
8ta	Prepaid Voice	ZAR1.22 (US\$12.05)
MTN South Africa	Call Per Second Peak	ZAR1.99 (US\$20.40)
Vodacom South Africa	All-Day Per Second	ZAR1.77 (US\$18.14)
Cell C	Easy Chat Per Second	ZAR1.82 (US\$18.70)
Virgin Mobile	Prepay	ZAR1.49 (US\$15.27)

Having been familiar with the telecom costs in South Africa, one should acknowledge that voice call cost is influenced by various input costs, as outlined in the five mini sub-sections below.

3.3.9.1 User Oriented Costs

In nature, VoiceXML enabled applications such as the Spoken Web command higher user costs than conventional SMSs. It should be noted that a single SMS unit can have the duration of ten to thirty seconds, similar to a voice call, be it a national number that is “intra/inter network” based (Boyera, 2009). In South Africa for instance, a text-based technology known as *WhatsApp* is renowned for being easily accessible to people at the lower end of the pyramid structure. Users

claim that with ZAR2.00 one can chat for up to a week or beyond, a completely different experience to voice services and SMSs where the users will be cut off from the system with that amount of money (Research ICT Africa & Intelcon, 2012). Thus, this is not a far-fetched reality as a rural farmer would be obliged to spend between ZAR1.22 and ZAR1.99 to make a voice call utilising either the services of 8ta and MTN network companies, respectively. The data in Table 3-1 above bears testimony to this story (MyBroadband, 2013). This can be influenced by the hosting company too, as outlined below.

3.3.9.2 Hosting Costs

The main infrastructure of the Spoken Web is usually hosted and owned by the service provider, of which for now India still provides the hosting service; hence international rates are indirectly imposed on voice call costs (Williams, 2011). In addition, other interested stakeholders are liable for remittance charges on running their voice applications even though they do not have to administer and make huge infrastructural investments (Kumar & Agarwal, 2012). Kumar and Agarwal (2012) further state that the cloud based model is also enabled by the Spoken Web. There are very limited hosting platforms available for voice-telephony services and the onus is on the service providers to make provision for a 24 hour infrastructure which puts a financial strain on people who live below US\$2 a day mostly in rural areas. Rural people live in areas where there is low average income and higher average poverty rates (Boyera, 2009; Kenny, 2002). Initiatives such as free and open source are very limited in rural areas; this puts a burden on TTS and ASR as they can only offer support to very limited functionalities. Thus, at the end of the day the digital community has an additional cost for TTS and ASR modules (Boyera, 2009). These are the same hosting costs that were encountered in the Albertinia case study which revealed that hosting Voice Telephony Applications was a challenge as several pleas and requests were made with relevant telecom companies (Isabirye *et al.*, 2013). One can not dispute that a service provider that hosts the Spoken Web application will likely increase voice call costs, but for the voice message to be sent someone must take the responsibility, of which another cost will follow suit as may be deemed fit, as explored below.

3.3.9.3 Delivery Costs

In Spoken Web the delivery cost is the sole discretion of the service provider concerned. Delivery cost is borne by the initiator of the call during a transaction from the service provider to the caller making the call. Therefore, the initiator between both parties is liable for the delivery cost, and each mobile network has its own price and cost structure in Table 3-1 above. However, the bearer of the cost is at the sole discretion of the mobile network service-provider as each network has its own price policies and regulations (Boyera, 2009). For this application to see the light of day to deliver

messages and to be used, surely someone must develop it at an agreed cost price as discussed below.

3.3.9.4 Developer Oriented Costs

The profound intention of creating and developing an ICT application or content for use or consumption by the bottom-of-the-pyramid people (BoP) is the monetary or non-monetary incentive that is derived from using ICT services for business purposes (Research ICT Africa & Intelcon, 2012). However, Research ICT and Intelcon (2012) argue that unfortunately, growing skepticism on the degree of financial and non-financial prospects from mobile applications such as *Mxit* dampens the risk appetite to build them. Similar to hosting service costs, it is not an easy task to organise, set-up and manage an infrastructure that can be available for free if the “infrastructure/hosting service” is the sole responsibility of a third party. Even the call-back service can only be delivered if the hosting services of a third party are fully implemented, compliant and compatible (Boyera, 2009).

In South Africa, for now the Spoken Web is hosted by IBM in India (Williams, 2011), of which software updates and development of this Voice Telephony Application in general is still a proprietary right of IBM technicians in India (IBM, 2010). One would associate this with technical complexity (Agarwal & Prasad, 1998), another inhibiting factor to ease the upgrading of the technology by South African developers. The same concept has been adopted in an Albertinia case study by Isabirye *et al.* (2013) where the university research team together with the developers felt that for the purpose and significance of the project, the Spoken Web application would be developed in India. This was done purely to encourage use of Voice Telephony Applications for marketing by the entire aloe farming community in Albertinia. The entire infrastructure that will be utilised for hosting and delivering the developed Spoken Web application must be maintained in order to service the target market, as expounded upon in the mini sub-section below.

3.3.9.5 Servicing and Maintenance Costs

There is a general perception that it is a costly exercise to maintain network infrastructure in rural areas. At times this challenge can be exacerbated by lack of accessibility roads and topography. Hauling large equipment over rough terrains can come at a high cost. Theft and vandalism of the telecommunication components add to this quandary (Chetty *et al.*, 2006). To provide a service in these underserved communities can never be fraught successfully. The service or content provider will have to charge a high servicing cost on communities who have a very minimal propensity to pay for the service rendered to them (Jain, 2012). On top of everything else, IBM (2010) states that the servicing and maintenance of infrastructure is still a mandatory role of IBM India. The amount of effort and energy used in accessing the Spoken Web further casts doubts in the minds of people

as they compare its intelligence support to that of human beings. This will be critically discussed in the sub-section below.

3.3.10 Voice Telephony Applications Will Never Be Supportive Like Human Beings

In the precepts of diffusion of innovations by Rogers (2003), the intelligence and cognitive role of human beings in the technology can never be overlooked; as this will have an impact on the nature and value derived from interacting with the technology by users (Bouzid & Ma, 2010). Bouzid and Ma (2010) caution that so far no voice-telephony services are designed to anticipate the needs of the user, and expected to give an efficient and timely response. Voice Telephony Applications could never have the intelligence of a human being as they only relay recorded messages. Resistance to open up to new technologies in ECP is caused by negative past experiences with other communication technologies. Frankly, the impact of a bad encounter while using previous technological devices or applications cannot be blatantly discounted. This is usually the case with IVR systems as users view the lack of personal assistance or absence of human beings in these communication tools a major contributing factor to frustration, anger and in-accurate feedback as telephony systems are not intelligent systems in their nature (Bouzid & Ma, 2010). Lack of confidence due to the user spending longer periods of time in trying to decipher or obtain feedback from the system, is one major factor that can dampen the confidence and trust from the digital community. With this perception in mind, users might resist adopting the technology (Ward *et al.*, 2005). Bouzid and Ma (2010) further state that this negative expression of emotion by users makes them despise telephony systems. This can lead to loss of trust in Voice Telephony Applications. In summary, Voice Telephony Applications cannot decipher on behalf of the user as they are not intelligent systems that can best guess what the user wants from them. On this note it transpired that unlike human beings, Voice Telephony Applications are subject to the challenges discovered by The Economist (2009), Zhang *et al.* (2009) and Kumar *et al.* (2007c):

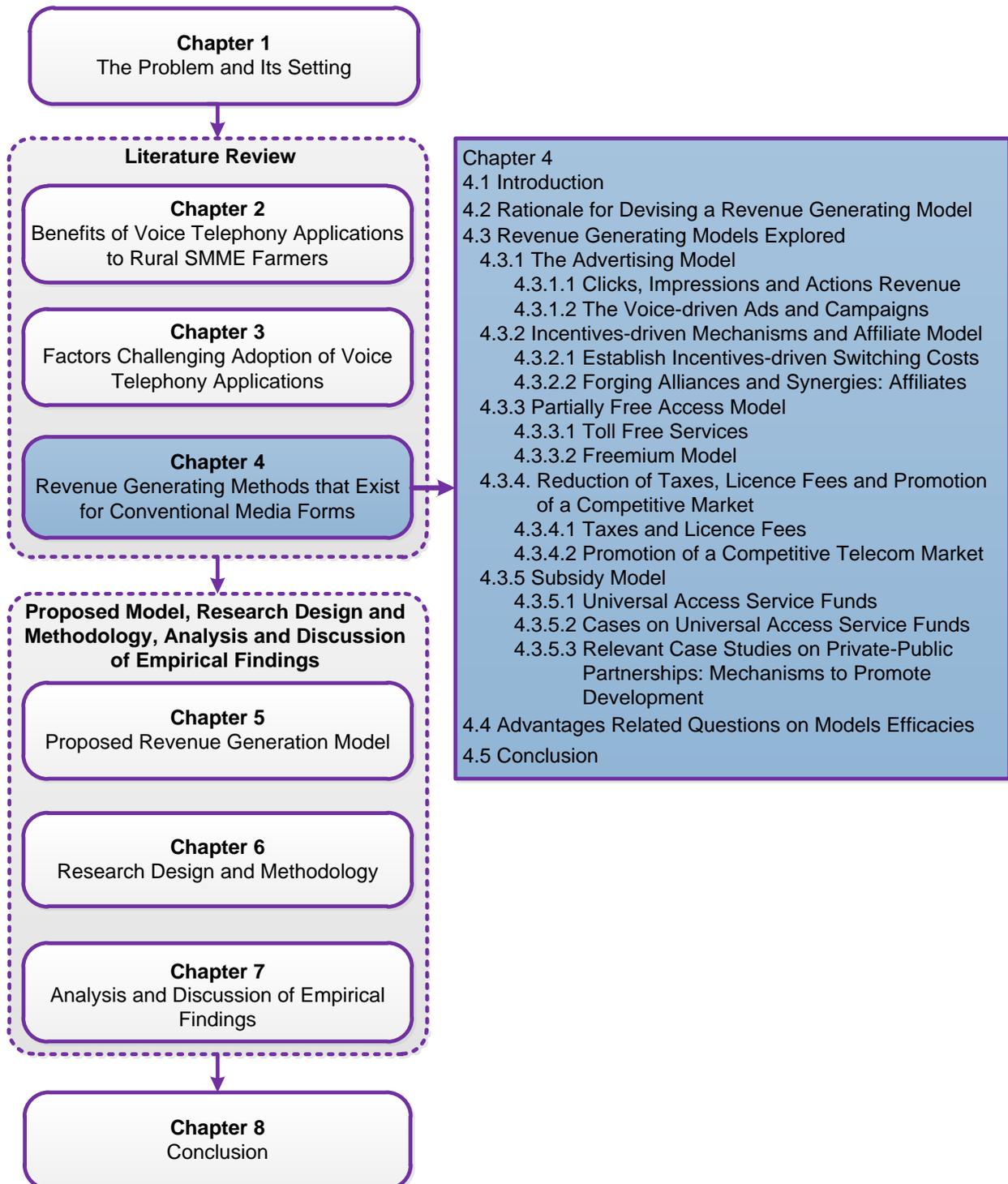
- Voice Telephony Applications are mostly designed for transaction activities that are frequent, simple and standardised such as paying accounts, making orders and lodging account enquiries. Therefore, customers cannot provide peripheral information as they are only bound to attend to a set of requests.
- Voice Telephony Applications can only replay the recorded messages when the user is making a query.
- Voice Telephony Applications can at times fail to pick-up the audio/voice due to a technical error or poor audio/voice quality.
- The poor audio quality can at times result from echo and the physical surroundings.
- It can be really frustrating to the user when the Voice Telephony Application malfunctions.

Now that the factors challenging the adoption of Voice Telephony Applications are laid bare, a summary of these findings with the necessary recommendations must be submitted, as seen below.

3.4 Conclusion

This chapter has managed to pin-point some of the factors that can challenge the adoption of Voice Telephony Applications such as the Spoken Web by the underprivileged rural farming communities. Factors challenging the seamless adoption of Voice Telephony Applications vary in nature as they cut across areas such as economic, social and technological dynamics. Even though the Spoken Web is an ideal technology for underprivileged communities, diffusion of any technology is subject to its compatibility with the ecosystem, its value proposal, user expectations, innovativeness capacity of the end-users, awareness issues and user knowledge. On top of this, advancements on services and devices that support and/or compete with Voice Telephony Applications will have an impact on their demand, and user costs. Therefore, Rogers (2003) posits that any factors challenging certainty and loyalty towards information technology services will compromise their diffusion in the future. Fortunately, this research project has evaluated various revenue generation models as a means to curb these challenges, as seen in the upcoming chapter.

4. Revenue Generation Methods that Exist for Conventional Media Forms



4.1 Introduction

Even though Voice Telephony Applications such as the Spoken Web are primarily designed to suit the needs of underprivileged households, they all contain their own challenges. The Spoken Web is marred by challenges such as high voice call costs etc (Isabirye *et al.*, 2013; Botha *et al.*, 2012). This is one of many factors that prohibit both rural farmers and the underprivileged rural community at large from participating into these Voice Telephony Applications (Ward *et al.*, 2005). In order to make Voice Telephony Applications economic viable tools for bottom-of-the-pyramid users, an appropriate funding model has to be devised. To augment the reduction of voice call costs; incentives through airtime usage and payments for accessing the Spoken Web have to be realised (IBM, 2010). This chapter has incorporated the elements of *Diffusion of Innovations* (Rogers, 2003) and *Social Exchange* (Cook, 1977) theories as its theoretical background since they are both underpinned by the concept of accrued incentives. This chapter will critically evaluate five models that have been discovered for revenue generation as it looks for the contributor, incentives and efficacy of each model. The discussion on the revenue generation models is preceded by the rationale for devising the models as the first part of this chapter. Having drawn out a clear picture on various revenue generation models, this chapter then gives more detailed and concise answers to the questions relating these models.

4.2 Rationale for Devising a Revenue Generation Model

According to Jonnalagedda (2011), the role of revenue generation models can never be overlooked as the sustenance of ICT services and businesses interdependently rely on these funding models. The advent of handheld ICT gadgets such as low-end mobile phones has really changed the manner in which consumers select their service preferences as these telecommunication tools augment voice marketing by underserved rural areas (Kumar *et al.*, 2010). This has been made possible by robust business models, of which without such support the majority of sound ICT innovations would have never made it to see the light of the day. Advocating for access to ICT services, especially through the reduction of user costs amongst others, has four competitive advantages (TechCentral, 2013). According to TechCentral (2013), accessibility of ICT services can: (a) help as a stimulant to economic development; (b) enhance the delivery of basic services; (c) be a factor in improved collection of revenue, and (d) help in bridging the information technology gap that exists in rural communities. Access to ICT services such as the Internet will bring the equitable benefits of contemporary Information Technology to underserved communities (News 24, 2013). Table 4-1 below shows that rural households from Chris Hani District Municipality are more disadvantaged than their counterparts in Buffalo City Metropolitan in terms of resources, even though the former municipality has higher rates of civics compared to the latter (Stats SA, 2012a).

Table 4-1: Distribution of Socio-economic Realities of Eastern Cape (Stats SA, 2012a)

Regional Level	Illiteracy Rate (%)	Unemployment Rate (%)	Access to Electricity Rate (%)	Black African Rate (%)	Average Income (Rands)
Eastern Cape Province	10.5	37.4	75.1	86.3	64 550
Chris Hani District	13.9	39.2	76.3	93.6	48 183
Buffalo City Metropolitan	4.9	34.8	80.9	85.3	97 554

In the event of the inability to utilise text-based Internet services, underprivileged communities are urged to opt for the Spoken Web as it is known as the “telephone Internet” of VUI services where the user “can just call the net” (Economist, 2009). Rationally, the Spoken Web is meant to bring a voice Internet to people who are less literate and financially constrained as these are people who live beyond the poverty line of US\$2 a day (Boyera, 2009). Now that a rationale for revenue generation has been provided, then it is prudent that this research project embarks upon evaluating the revenue generation models, starting with the pictorial structure in Figure 4-1 below.

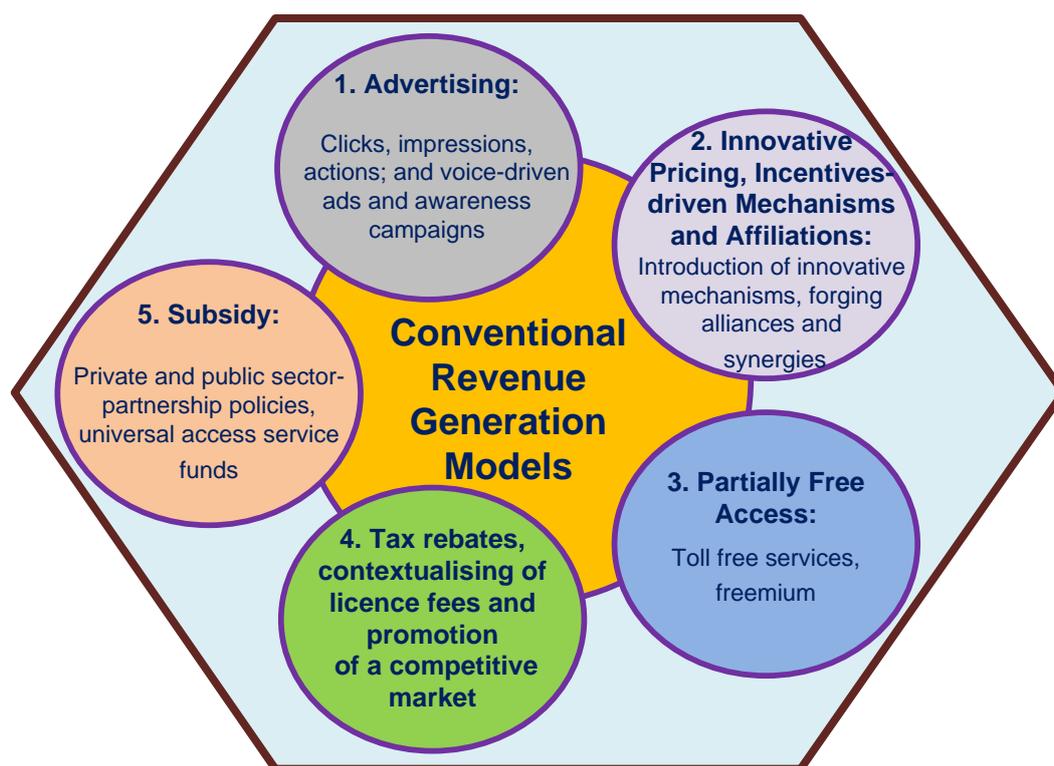


Figure 4-1: Revenue Generation Models Evaluated

4.3 Revenue Generation Models Explored

The first model that this research project will evaluate is the advertisement model that Jonnalagedda (2011) claims has been the most successful revenue generation model and still continues to be the major draw card in the digital marketing domain. This stems from the fact that more than 85% of

business revenue streams have always been attributed to advertisements (Singh, Roychowdhury, Gunadhi, & Rezaei, 2008). On top of its realised benefits, Singh *et al.* (2008) claim that one cannot dispute the fact that the buoyancy in electronic advertising was attributed to annual growths of 30%. The telecoms and other farming-related content providers that are agro-retail businesses will be reimbursed for creating an enabling environment that is conducive for improved user participation through the funding model which will be discussed in the upcoming sub-section below.

4.3.1 The Advertising Model

Naturally, consumers perceive activities, products or services according to the value they derive or perception they have on that activity, product or service (Shober, 2010). Benefits interpretation can be twofold as they can be either “intrinsically or extrinsically” rewarding. The former of the two being informed by the moral values of the consumer or user; the latter being associated with prestige, status or social recognition attached to that service or product consumed (Chandon, Wansik, & Laurent, 2000). The cornerstone to attracting consumption through modern advertising is about introducing electronic advertising. This is an intelligent method that enables businesses to be fully acquainted with the behaviour patterns of a wider target audience. This innovative method of critical mass advertising is the most effective and efficient means of tapping into a wider audience. This is one of the competitive advantages of viral marketing (Jonnalagedda, 2011), which in this case refers to advertising in rural farming communities. The most overlooked added advantage with viral marketplaces such as the Spoken Web is that they serve as an integrated market for converged business activities as the consumer, producer and community have a common single place to interact (Kumar *et al.*, 2007b). This increase in the market footprint can inherently lead to increased sales or revenue from these “one stop shop” avenues (Koekemoer, 2013). The same approach and concept takes precedence in Voice Telephony Applications as various farming communities can interact in these electronic word of mouth channels (Dhanesha *et al.*, 2010; Agarwal *et al.*, 2009).

Every enterprise wishes to grab the attention of the consumer; hence in viral marketing the advertiser must win the heart of every member visiting the digital space for increased customer sales (Koekemoer, 2013). This inherent power of viral marketing has also been given credence to by Singh *et al.* (2008) who have always advocated for the adoption of digital marketplaces in order to increase sales. This is a consequence of mass participation. In a nutshell, advertising on electronic or voice platforms implies that well-resourced advertisers will fund the model through paying subscription or commission fees in the rural Eastern Cape Province (ECP). This is according to the words of Lynch (2012) and Chong *et al.* (2010) who hold the view that, businesses utilise e-marketplaces to: (a) get recognition; (b) increase market footprint; (c) gain customer retention, and

(d) rake in on anticipated revenue-sales from niche consumer markets. This is the same concept that can be adopted by government and established agricultural businesses to advertise through the VoiceSites of underprivileged rural farmers in order to tap into marginalised target audiences (Kumar *et al.*, 2007b; Mahelaqua *et al.*, 2013; Patel *et al.*, 2010).

Rural retailers pay a premium for the airtime usage of Spoken Web channels (IBM, 2010). In other words, well-resourced agro-businesses that are involved in activities such as producing farming equipment, pesticides, insecticides, wool, milk, meat and animal fodder will pay a premium for using Voice Telephony Applications to market their service offerings to niche consumer markets in underprivileged rural communities. To a greater extent labour market issues can also be advertised in these VoiceSites, particularly on required skills or job offers by established farmers, of which the latter are liable for paying a certain fee (White *et al.*, 2012; Patel *et al.*, 2010). Various portals such as *AvaajOtalo* and *MobileBazaar* have proved to support this initiative in India (Kumar & Agarwal, 2012). A simple voice marketing process is illustrated in Figure 4-2 below.

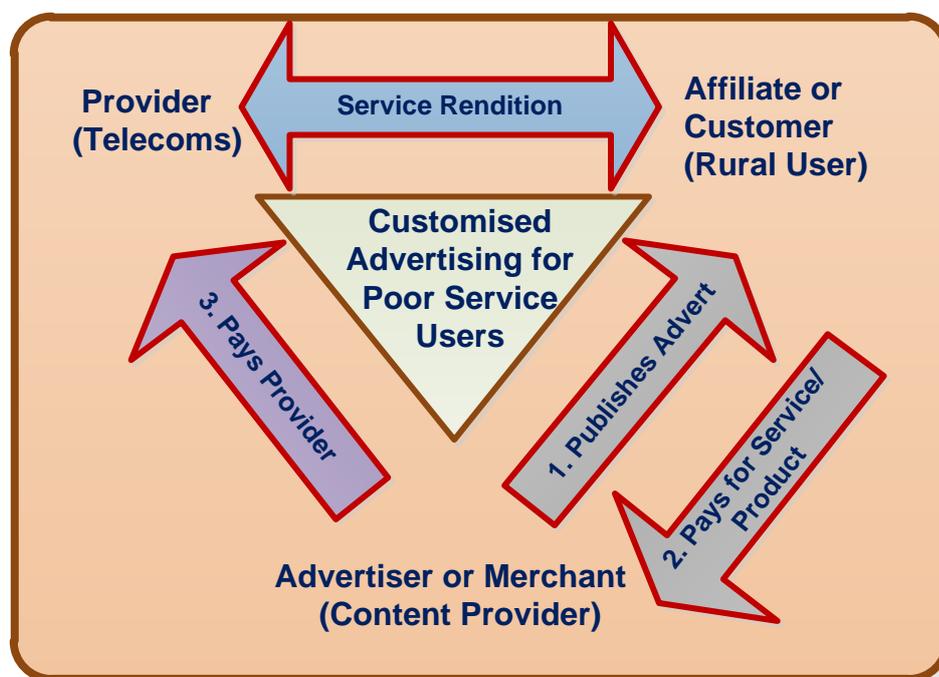


Figure 4-2: Typical Advertisement Model

From the advertisement activity in Figure 4-2 above one can see the following processes:

1. Advertiser, merchant or content provider who happens to be an established business sends an advert to the underprivileged farmer.
2. The underprivileged user or rural SMME farmer pays for acquiring the service, or acts as an affiliate who would refer the service offered to the relevant party and get a commission for that offer.
3. The advertiser or merchant who happens to be a content provider is liable for paying a certain fee to the telecom provider.

As the extension of “two sided platforms” or hybrids, renowned as “two value-delivery systems” that have been in existence for years like the Internet (Baden-Fuller & Haefliger, 2013), voice-enabled fee-advertising can bring revenues for advertisers or merchants, as discussed below.

4.3.1.1 Clicks, Impressions and Actions Revenues

Advertising is a result of many activities such as clicks, impressions and actions (Oz & Jones, 2008). According to Nusbaum (2008), parties will be motivated by a monetary incentive; a propensity to earn a status or prestige in return for their generous support. Therefore on that basis, agro-businesses would kindly offer to display or refer others to an item or sites affiliated to the identified advertisement. This is a transaction that is usually set between an *affiliate* (customer, visitor, user or referrer) and a *merchant* (advertiser, business, or content provider). The merchant is an established agro-business or institution that will recoup financial or non-financial rewards through increased sales or reputation and compensate the affiliate for its referral gesture. This includes the contribution of funds to the underprivileged SMME farmer in ECP, as shown in the varying activities below.

Cost per Click and Pay per Click: Every time the user clicks an advertisement related to an advertiser or merchant, then that relevant advertiser is liable to compensate the affiliate or publisher according to the specified fee structure. This activity is referred to as *pay per click*. This means that whenever the visitor, customer or user clicks on the hyperlink to a particular merchant’s or advertiser’s site from an *affiliate*, then the *merchant* compensates the *affiliate* or *publisher* (Nusbaum, 2008). By the same token, every time a user or customer clicks an advertisement related to a certain merchant or business, the merchant is liable to compensate the affiliate or publisher according to the specified fee (Singh *et al.*, 2008).

Cost per Impression and Pay per Impression: The advertiser compensates the affiliate for promotions and referral activity. Advertisers would, for instance, charge ten dollars per one thousand impressions made by each advertisement banner (Singh *et al.*, 2008; Duggan, 2002).

Cost per Action and Pay per Action: According to Singh *et al.* (2008), cost per action implies a completed transaction at the site of the business that is advertising its service offerings. In the same breath, Nusbaum (2008) describes *pay per action* as a transaction involving reimbursement of the affiliate by the merchant or advertiser. Apparently, this stems from a recorded purchase that emanates from the customer who has been referred by a third party.

Singh *et al.* (2008) further notes that there are companies who offer these services such as *AdPepper*, *LeadClick Media*, *Oversee.net* and *ValueClick*. It is fit to state that these companies have raked-in revenues in excess of \$1.5 billion in 2007 from electronic advertising. In the same token, enterprises would arrange to promote each other’s services and this indirectly boosts sales through their websites (Oz & Jones, 2008). In this case, this would refer to VoiceSites. VoiceLinks would be

created to establish this electronic revenue and sales concept between the merchant, and affiliate (Kumar *et al.*, 2007c). In broader terms, VoiceSites can be used to make purchases as is the case with conventional Spoken Web's voice-based platforms and portals. These voice portals include amongst others telecom platforms such as *AvaajOtalo* and *MobileBazaar* who have proved to support this initiative in India (Kumar & Agarwal, 2012). Telecom networks in general do not only generate revenues through granting users an ability to make phone calls, adverts and awareness campaigns are also carried through Voice Telephony Applications, as articulated in the next mini sub-section below.

4.3.1.2 The Voice-driven Ads and Awareness Campaigns

There is a general assumption that applications from voice portals could generate revenues as more customers would access company products and services on relatively less expensive access costs. Electronic material from numerous sources would be aggregated into single based telephony services (Duggan, 2002). In this form of revenue generation, content providers in the ECP will be liable for a payment fee to the telecom provider as services below attest.

Commission-driven Income: Duggan (2002) further posits that firms that publish products on the voice channels will get commission from the companies whose products and services are being advertised on their behalf. Telemarketing is another form of advertising through telephones.

Mobile Phone Message Services: It should be affirmed in this instance that even mobile telephony mechanisms such as free call backs, short message service (SMS), and multi medium service (MMS) mechanisms do promote various products and services. These, at times, might relate to mobile telephony services and applications (The Economist, 2009). The cell-phone user can receive a "call me service" message that is attached with promotional adverts on various products (Boyera, 2009). In other words commercialised portions of these *Please Call Me* messages are sold to advertisers and in South Africa a Vodacom cell-phone subscriber has a limit of ten free call me messages per day (Vodacom SA, 2013b). The same concept can take centre stage in ECP through Voice Telephony Applications as content providers will pay a fee for advertising through the Spoken Web platforms (Patel *et al.*, 2010; Kumar *et al.*, 2007b).

A Channel to Publish and Access Labour Market Issues: Among other benefits Voice Telephony Applications can be used for is that of matching labour demand with the labour supply. A voice-telephony-configured-classified VoiceSite can be reserved for needed and available job skills within immediate communities. This implies that established farmers can use Voice Telephony Applications such as the Spoken Web to advertise job offers to the rural community members of whom they will be liable to pay a certain fee for the their adverts (White *et al.*, 2012).

A Channel to Advertise Livestock Line: In return for using the VoiceSites to advertise their service offerings from livestock to agricultural tools and other capital stocks, these established agro-

businesses will pay a commission for using the Spoken Web as illiteracy, and poor income cripples the success of conventional text-driven electronic market spaces (Patel *et al.*, 2010). In summary content providers, that is those with vested interest such as government and established agro-retail businesses will pay for the Advertising Model through paying a premium fee (IBM, 2010). Despite this as posited by Kumar *et al.* (2007b), Boyera (2009) and Duggan (2002), this research project challenges the practicality of expecting advert fees (a benefit by Cook, 1977) from businesses that have low buying power in rural areas. Furthermore, purely focusing on sourcing funding from content providers without stimulating an inherent incentive to draw more user participation would be an indictment to this research project, as brought to the fore below.

4.3.2 Innovative Pricing, Incentives-driven Mechanisms and Affiliate Model

A culture of “corporate vision” that sees underprivileged markets as avenues of additional revenues must not only be shared by content providers, but telecommunication operators must live to this ideal too (Malebanye, 2007). A new paradigm shift across the board within the digital world has to be applied where consumers are not just viewed as the “necessity, but an opportunity” that is embedded on increased “average revenue per user” in rural markets. With more user participation, content providers and telecom operators will reap maximum profits than offering their services to very limited markets (Malebanye, 2007, pp. 31-49). This is the rationale for innovative pricing and affiliation model which is expounded upon in the upcoming two mini sub-sections of this type of business model.

4.3.2.1 Introduction of Innovative Pricing and Incentives-driven Mechanisms

Various features distinctly stand out as a means to draw users to this model, as outlined below.

Contributor: In ECP for instance, content providers such as suppliers of farming services, government institutions and research institutions will pay for the portion of the voice call cost as a means to encourage more user participation. Organisations support this application because of vested interest (The Economist, 2009; Duggan, 2002). Promotions through offering customers discounts on airtime and agro-services are key draw-cards in this type of business model.

Discounted Services and Loyalty Points: Offering small businesses telecommunication services on discounted airtime packages at varying time zones from network firms such as MTN, Vodacom, 8ta, and Cell C is one such noble initiative (Gillwald, 2013; MTN, 2013; Telkom SA, 2013; Research ICT Africa, 2012). Malebanye (2007) advocates that loyalty points should be offered to frequent airtime users and may at the discretion of the content provider or telecommunication operator be redeemable for discounted airtime. The innovative pricing model with discounts can be introduced as a means to encourage, and compensate the digital rural farming community in ECP

through reduced electronic marketing costs and promotions on Voice Telephony Applications. Amongst the benefits of this model is that users are accustomed to being granted limited services on discounts in order to encourage their participation. This assertion is attributed to IT Web (2013) and of which Rogers (2003) distinctly emphasized in his technology diffusion statements. However according to Jonnalagedda (2011), the rural ECP's SMME farmers would find it very difficult to move to other costly electronic marketing platforms, particularly those offered through the PC-based Internet such as G-mail. Perhaps as a consequence of this understanding then, loyalty would develop between users and Voice Telephony Applications.

Cost Effectiveness: This is achieved through the user's perceived need and his/her independent possibility of performance (Grantham & Tsekouras, 2005; Rogers, 2003). *Firstly*, the cost can be implicit (the proportionate costs refer to time, effort and money that one has to spend in adjusting to the new and user-friendly voice service from text-based ones). *Secondly*, be explicit (the challenges one experiences when using a difficult technology that he/she cannot access and use due to not being computer savvy and financially constrained). Logically, technical complexity becomes a deciding factor in this regard as rural communities would opt for technologies that are easier accessible and less complicated to use (Agarwal & Prasad, 1998). As inscribed by Oz and Jones (2008), rural communities can be psyched to believe that they will reap better benefits by using a voice over a text-based interface. Clearly by virtue of novelty, one would opt for user friendly technologies.

A Tool to Bringing Businesses Closer to Their Target Markets: Established businesses, particularly those who sell agricultural products, can be lured into the less complex Voice Telephony Applications on the pretext of being brought closer to a niche rural market (Qiang *et al.*, 2012; Patel *et al.*, 2010). In this context, Voice Telephony Applications would serve as appropriate tools for the provision of low-cost services by telecom operators and content providers to the underprivileged rural communities. Therefore, this business model will lead to better profits and viability of Voice Telephony Applications (Malebanye, 2007). Malebanye (2007) further suggests that mobile marketing services have greater support than traditional forms of marketing in rural communities of South Africa due to affordability and accessibility issues.

Trade-offs: The underprivileged rural ECP's SMME farmers must know, and acknowledge the value and loss derived from switching between voice-based and text-based technologies. Therefore, rural farming communities must be empowered into knowing the trade-offs on switching between Voice Telephony Applications and PC-based Internet applications for communicating. Having a clear understanding about the benefits of utilising amongst others the Spoken Web, these underprivileged rural SMME farmers will opt for Voice Telephony Applications. This is informed by the fact that many are illiterate and poor (Kumar *et al.*, 2008). So, it would be a costly exercise to

opt for the Internet, a text-based form of communication that requires one to be computer savvy and be financially resourceful (Mahelaqua *et al.*, 2013; Kumar & Agarwal, 2012; Boyera, 2009). One should note that as bottom-of-the-pyramid (BoP) individuals, the rural communities will then choose the Voice Telephony Applications. This stems from the fact that these individuals are less literate with very limited financial resources at their disposal (Research ICT Africa & Intelecon, 2012). The trade-offs between text-based and voice-based interfaces will convince the user to utilize the services of Spoken Web (Kumar *et al.*, 2007c). Additionally, there would be an inherent demand by niche rural consumer markets on services offered by telecom operators and content providers. In future, increased sales and revenues on services offered by these telecom operators, and content providers will push them towards realising supernormal profits (Malebanye, 2007). This is something similar to forging alliances as discussed below.

4.3.2.2 Forging Alliances and Synergies: Affiliate Programmes

One of the mechanisms that businesses in rural parts of ECP can adopt for increased sales is through forging alliances and synergies between relevant content providers and local leading brands than functioning as separate silos. Businesses and communities that work together win together (Malebanye, 2007). To a greater extent, even those that combine their service functions gain a competitive advantage as interested parties find this model of doing business very attractive and less expensive than acquiring the services as separate units (Oz & Jones, 2008). In order to build a very strong brand presence and identity, many businesses commit themselves to marketing alliances—something similar to bundling (Jonnalagedda, 2011). In the words of Jonnalagedda (2011), the travel and hotel industry has long been touted as the most aggressive, and visible case-study for the adoption of this business strategy. Collaborations between mobile operators, content providers, and rural ICT users on promotions and offerings would lead to increased brand loyalty strengths in future within the relevant markets (Malebanye, 2007).

It can go without saying that partnerships forged between farmers, agro-business retailers and government in rural areas of ECP can help these parties to reap better profits and rewards as a result of conducting cross-selling mechanisms through Voice Telephony Applications. For using the services of the businesses within the alliance family, customers get vouchers or reward points that can be redeemed through purchasing or utilising the services of the members within the alliance as a token of appreciation (Oz & Jones, 2008). On the local front, a similar story is that of *eBucks* from FNB where customers earn reward points and discount vouchers for any FNB-related bank transaction within organisations affiliated to the *eBucks* family. The family list includes various retail companies such as *Incredible Connection*, *Internet Express*, *Hi-Fi Corporation*, *Nashua Mobile*, *Checkers*, and *Shoprite Usave* (FNB, 2013). Furthermore, content providers in ECP can

partner to cross-sell each other’s agro-product through customers who use the Voice Telephony Applications. Thus as a kind gesture, the established affiliate partners will pay a portion of the user call cost as this will enable more user participation in Voice Telephony Applications within rural areas. More user participation can lead to more sales; as affirmed by Lynch (2012), Oz and Jones (2008) and Duggan (2002).

Affiliate partners can range from the Department of Agriculture, suppliers of agricultural equipment or commodities and research institutions. In conventional web-site platforms, business enterprises would arrange to promote each other’s service which indirectly boosts their sales through their websites (Oz & Jones, 2008). In this case, this would refer to VoiceSites. There would be VoiceLinks created to establish this online revenue sales concept between the affiliate partners (White *et al.*, 2012; Patel *et al.*, 2010; Kumar *et al.*, 2007a). This is the same concept that has long been adopted by co-ops as they partner to do cross-selling in farming. In this cross-selling relationship underprivileged rural farmers promote each other’s service offerings by referring callers to the VoiceSites of farmers that offer the required services within the alliance family for more market share. However, a symbiotic relationship between the established businesses and the underprivileged SMME farmers demands that discount vouchers, loyalty points and commissions flow to the customers, and the referrers, as drawn out in Figure 4-3 below.

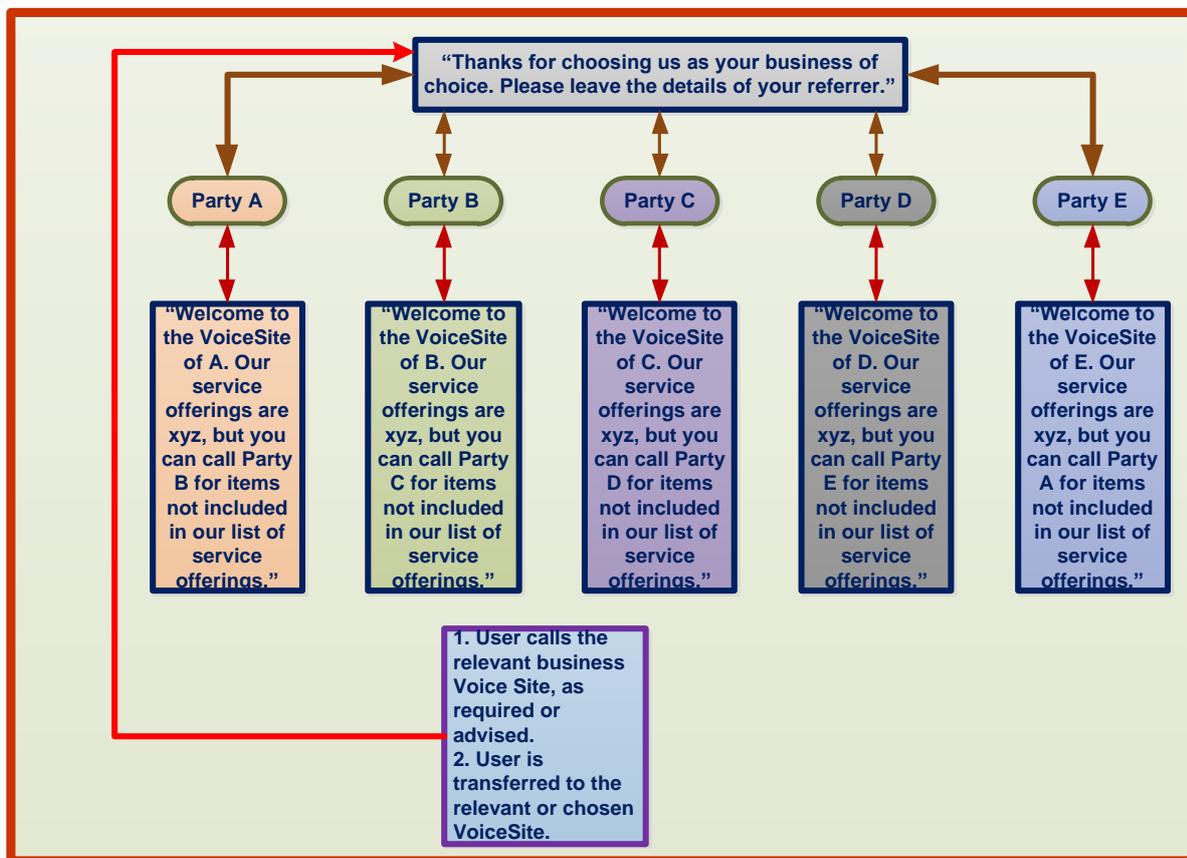


Figure 4-3: Affiliation and Alliance Relationship Process

According to White *et al.* (2012), Patel *et al.* (2010) and Kumar *et al.* (2007a), established or well-resourced businesses can use the VoiceSites of underprivileged rural SMME farmers for marketing. In the event that someone calls the VoiceSite of the farmer, the caller or customer is automatically given information pertaining to other services offered by affiliate businesses within the alliance family. In this mutual activity the established retail businesses compensate the rural ECP SMME farmers for referring callers or customers to their VoiceSites, and will offer better rewards for purchases made due to this mutual activity. A simple referral and conversion process can be explained as outlined below, of which these pointers relate to Figure 4-3 above which gives a pictorial view of this referral and conversion processes.

1. The users or customers call the concerned business and are subsequently referred to or given details of another should the affiliate partner not offer the required services.
2. The business thanks the users or customers for doing business with them and if referred to the VoiceSites by the affiliate partner will be requested to leave the details of the referrer.
3. The business that referred the users or customers will be reimbursed for the courtesy; else the customers get discount vouchers.

It would have been much easier to convince the entire rural farming communities in the ECP to support the Voice Telephony Applications if they were partly free as the sub-section below attests.

4.3.3 Partially Free Access Model

There is a perception that businesses that offer customers their services for free usually let these customers to extend their will, and wish to experiment with the services and applications the businesses are offering (Jonnalagedda, 2011). However in the context of this research project, letting the rural SMME farmers in ECP to utilise Voice Telephony Applications at a very low cost is key, even if it means affording the users access to the services for free. Assertively, this understanding from Jonnalagedda (2011) does not end there as it further states that means have to be devised atop that to incentivise the content providers or network operators as a measure to lower the transaction call costs. In this model, agro-businesses and service operators can be reimbursed by users such as farmers through various means as the discussions below will motivate further. This research project is not suggesting that communities who use mobile commerce services must be given these services for free. However in order for content providers to increase their market share, prestige and reputation amongst others, content providers can lure customers (rural users) through free ancillary mobile services. This is under the guise for more revenue pulling services in future (IT Web, 2013; News 24, 2013; MyBroadband, 2012; Boyera, 2009). This economic sound initiative is in line with the exchange theory, as discovered by Cook (1977).

Giving products to consumers or users for free is becoming a new phenomenon in the information technology service industry and is an essential exercise to let services tap into niche consumer markets. Competition rivalry, intention to conduct brand awareness and the mechanism to assess the industry prospects are cited as some of the reasons for giving away products for free (IT Web, 2013). The impact of introducing this service to underprivileged rural farming communities of ECP will be enormous. Thus, this model is comprised of two sub-sections: Toll Free Services and Freemium Model, which will be discussed in the next mini sub-sections.

4.3.3.1 Toll Free Services

There is financially sound advice that comes from the telecom world which cautions that businesses can adopt the policy of toll-free numbers provided that the toll-free service will literally lure more customers. In addition, there is a higher probability that sales will also be bolstered (VoIPAbout.Com, 2013). On the basis of this advice, Duggan (2002) proposes a model where customers are allowed to make a free telephone call. Furthermore, customers can have access to a toll-free landline customer sales help desk centre for queries relating any HP product that they come across with or want to purchase (HP Shop, 2013). In another latest story published by VoIPAbout.Com (2013), it emerged that any institution or business that owns or to whom the toll-free number has been issued under its name by the telephony service operator is liable for a fee of US\$5 in America each month to the service operator. The call cost bearer, that is the enterprise, will be rewarded with free minutes each month for subscribing to the concerned telephony operator. Following which, a flat rate of 5 cents is charged for each minute of the phone call.

The fact that there is less need for human resources or for someone to micro-manage a huge number of employees and attending to customer queries implies that the company using automation can employ less people. This leads to increased customer service at less costs, hence increased economies of scale (Oz & Jones, 2008). One can deduce from the studies by Duggan (2002) on *Office Depot Inc* and VoIPAbout.Com (2013) that when affording customers toll-free services with reduced transaction costs on making voice call requests, businesses would reimburse or compensate themselves through increased future revenues and sales realised from the Voice Telephony Applications. Thus against this backdrop, IT Web (2013) advises that rural farming community and network operators who host less expensive Voice Telephony Applications should adopt the same approach for increased user participation. In this context, established retail businesses and the Department of Agriculture can pay for the toll-free service costs in return for better sales and social imperatives. To kick-off this sub-section, one will be taken through the nature of toll-free services that organisations can offer as a means to lure customers by offering a free-customer telephone

service for their queries. Another story from MTN Ghana, a country whose demographic spread is similar to South Africa, will be included as the example below posits.

MTN Toll Free Service: Lesson from Ghana

MTN Ghana is giving its subscribers, that is rural businesses, an opportunity to be in constant touch with their customers through the *MTN Toll Free Service* in Ghana. This service is tailored to cater for the needs of the clientele whose businesses belong to MTN family, that is those who subscribe to MTN mobile telecommunication services (MTN Ghana, 2012). If for instance an established farmer or agro-business in the ECP subscribes to MTN, then in this context the concerned farmer can let his/her customers obtain information pertaining to the farmer's business without being charged through a 5 digit "toll free number". MTN Ghana (2012) elaborates that the business enterprise will have to own a less expensive *Tellular handset* to enable this "toll-free number service", where through a caller ID, each customer can be easily identified. Each 5 digit toll-free number is configured to simultaneously receive a limit of 5 incoming calls by using a *Fixed Cellular Terminal* (FCT). One can imagine the impact this service will have on disadvantaged rural farming communities of the ECP for the purposes of buying and selling. The impact of the mutual relationship between telecom companies who will host Voice Telephony Applications and retail businesses or other organisations that will utilise these telephony applications can never be overlooked. Content providers pay for the services as they enable them an opportunity to have a much broader consumer market. To this effect, research institutions pay for the services for academic interests by giving users limited airtime vouchers as has been the case with rural aloe farmers in Albertinia (Isabirye *et al.*, 2013).

Similar to advertising model, firms would create voice portals where customers can freely access services integrated into a single converged telephone channel through a free telephone number (Duggan, 2002). Views from various sources suggest that it would be wise to link the paid advertisements to the free service; a concept almost similar to advertising model above. MTN introduced *MTN Zone* products whose price levels are determined by the zone and hourly-time-intervals as users get mobile voice call discounts accordingly (Research ICT Africa, 2012). Research ICT Africa (2012) discovered that these mobile products significantly contributed about 70% of retail prices in MTN, affording users dynamic prices compared to the market consumption of other MTN products such as MTN's *Call per Second* airtime package. This empirical evidence suggests that there was more user participation as a consequence of these discounted prices (MTN SA, 2013).

IT Web (2013) and IT Web Internet (2013) both advise that it is shrewdly justifiable for mobile telephone operators to charge customers reasonable rates when using mobile services, with other

services being given for free. Through experience and internalised knowledge, buyers are easily lured to places or electronic markets where there is an incentive bonus of an interconnected-single source channel. The perception that an integrated-single-shop-platform offers convenient shopping is an acknowledged benefit to the buyers (Koekemoer, 2013; News 24, 2013; Zainudeen *et al.*, 2011; Kumar *et al.*, 2007b). This view holds true to voice marketing through Voice Telephony Applications that as distances will be cut short, there will be low transaction costs, improved customer service and processing for rural Eastern Cape farmers. These are the same benefits that will be attained through the Freemium Model, as will be explained in the mini sub-section below.

4.3.3.2 Freemium Model

IT Web (2013) posits that the most effective way to increase mobile phone service access, based on rationality would likely be the adoption of the *Freemium Model*. The rationale for the adoption of the Freemium Model is premised on the understanding that freemium implies that the subscriber will be liable for a zero rated service fee on basic transactions. However, once a user's frequency of using the service for business purposes increases, then the user will be subjected to a payment fee immediately. This model is premised on a free transaction customer m-commerce service called *M-pesa* which is primarily developed to help people to transfer electronic money through mobile communication networks such as Vodacom from their cell-phones. This mobile transaction initiative is borne out of the partnership between *Vodacom SA* and *Nedbank Group Limited*, its principal bearers in South Africa. A lesson can be learned from IT Web (2013) who cautioned that IT businesses that offer transfer of mobile money ought to desist from charging users for these electronic transactions. In contrary, imposing charge fees in this mobile money activity is "self-defeating", and this is cited as the major contributing factor to the demise of *M-pesa* in numerous African states. Content providers can give this "mobile money transfer" transaction for free, lest they forfeit better profits from associated charged services (IT Web, 2013).

It should be noted that *M-pesa* users do not only utilise the service to transfer money, but they also buy airtime for themselves and other people, meaning that they consume more revenue pulling resources such as airtime. Then given a chance, underprivileged rural farmers would also buy airtime and through word of mouth influence others to consume Vodacom services in future (Vodacom SA, 2013a; Chu *et al.*, 2011). The most distinct benefit that can be realised through giving a service to consumers for free is that the consumers do not automatically get stimulated to put the service through a trial stage until the best one is selected from the available lot, even from competitors (Jonnalagedda, 2011; Boyera, 2009). According to Rogers (2003), the fact that Spoken Web is a new e-marketing technology implies that early adopters inherently have a first mover advantage as perceived by Lynch (2012), in this niche market against the late adopters. Thus, the

freemium model can bring potential results, if the sales of other revenue-added services can cross-subsidise the operating expenses of associated products as determined by the market scope (Baden-Fuller & Haefliger, 2013). A practical story below from Zimbabwe will be incorporated to compare the role of mobile transactions in rural African countries.

Related Story from Zimbabwe

South Africa has *M-pesa*, a partnership between *Nedbank* and *Vodacom*, which enables mobile banking service for doing electronic payments, and transfers to people who do not have bank accounts. Zimbabwe, on the other hand, has *EcoCash* as the information technology service where people can transfer airtime and electronic cash through mobile telecoms such as *EconetWireless*, *NetOne* and *Telecel* by linking their bank accounts (EcoNet, 2013). One should note that both *M-pesa* and *EcoCash* are mobile money transfer applications for underprivileged users, hence the comparison below.

Comparing EcoCash of Zimbabwe to M-pesa of South Africa

EcoCash and *M-pesa* solutions are subject to the following transaction costs:

- An *EcoCash* transaction charge of 3% is a minimum fee that will be deducted from the user's e-wallet based on the amount that is being withdrawn or cashed-out (EcoNet, 2013). A user in South Africa for *M-pesa* is liable for an amount of R6.00 for cash withdrawals between R10.00 and R1000.00 from his/her electronic money account (Vodacom SA, 2013a).
- To date there is no cost fee for transferring money from the personal bank account into the *EcoCash* account or electronic wallet.
- The customer or holder of an *EcoCash* wallet account is not obliged to any payment for balance enquiries and transaction history (EcoNet, 2013). This is the total opposite with *M-pesa* in South Africa as any transfer done through *Vodacom* network to a registered customer for amounts ranging from R10.00 to R1000.00 commits the user to a transaction fee of ZAR2.45 (Vodacom SA, 2013a). Vodacom SA (2013a) also adds that if the recipient of the transferred electronic money is not a *Vodacom* registered customer then a transaction charge of R10.00 has to be borne by the sender.

One can learn from this story that affording users an opportunity to do mobile money transfer transactions at reasonable low rates is a perfect recipe for a successful service, increased revenue sales and increased user participation- a total contrast from South Africa's demised *M-pesa*. One can imagine the effect this concept of free mobile transactions can have on the rural farming community of ECP should it be applied in Voice Telephony Applications. The crux of the matter is that content providers pay a portion of the transaction costs. Introducing free-transaction services is a great idea, but one must take into consideration the role of taxes, licence fees and competition in

order to promote the adoption of these emerging Voice Telephony Applications in rural areas of ECP, as further explained below.

4.3.4 Reduction of Taxes, Licence Fees, Promotion of a Competitive Market

The road towards introducing affordable telecommunication services across the board in South Africa, particularly in rural communities, is marred by various challenges. This refers to challenges such as high consumption taxes, spectrum fees, licence duties, uncompetitive market behaviour and poorly monitored call cost termination rates (Calandro & Moyo, 2012; GSM Association, 2007). These challenges significantly contribute towards increased user costs in ICT. This research project will delve into measures that can be adopted in order to promote an enabling environment for the reduction of voice call costs and promotion of user participation in Voice Telephony Applications by rural users. This is done in line with policies introduced by various African countries which are similar to South Africa in their economy standing, as the discussion compares below.

4.3.4.1 Taxes and Licence Fees

Giving tax incentives such as tax breaks, tax rebates or cuts to businesses, research institutions and mobile telecom operators that commit their resources to the provision of affordable ICT services is a key initiative. This will put great impetus towards increased economic activity within underprivileged communities in future (IT Web Internet, 2013; Calandro & Moyo, 2012). GSM Association (2007) further advises that consumption taxes have to be reduced as a means to promote the adoption of mobile technologies in rural areas, which in this context entails licence and spectrum fees on Voice Telephony Applications. For instance, India, a country with the similar economic, and technology dynamics like South Africa found itself in this quandary of high user costs due to unreasonable taxes and licence fees, even though this country fares better to voice call costs. Operators in India have to contribute about 1.5% towards the access deficit cost fees on top of which there are 5 to 10% spectrum and licence fees as determined by adjustments on their total revenues.

In order to promote mobile phone penetration in rural areas that have mobile phone network coverage but with poor mobile service use, it is advised that custom duties and sales taxes should be reduced on mobile technology services, and devices. This initiative can be made possible by national government to augment affordability and penetration of mobile telephone services in poor communities by as much as 20% as India currently stands. Uganda in its own right has so far recorded great progress in mobile phone penetration due to adopting this model (GSM Association, 2007). Should South Africa keep up to the ideals of this model, it will fare better as a nation in promoting the adoption of affordable Voice Telephony Applications just like Asian countries who

command very reasonable call rates. In future through awareness campaigns and access to information, there will be increased user participation in Voice Telephony Applications for marketing purposes, a tilt of scales in rural ECP farming communities.

As affirmed by both Correia *et al.* (2007) and Mohr and Fourie (2007), GSM Association (2007) submits that high duty, and regulatory fees infused with reduced prices implies that established agro-businesses and mobile telephone operating firms will have little cash reserves. This will completely work against incentivising businesses in order to reduce end-user costs, which is to the detriment of the underprivileged societies. Failure to reduce call costs charges means that the farming community in ECP must live with high marketing costs. This will draw a gloomy picture as underprivileged rural households will continue to be unfairly subjected to ICT services from the dominant mobile network companies such as MTN, Vodacom, Cell C, Virgin Mobile and 8ta (Gillwald, 2013; MyBroadband, 2013). Whether the notion is to comprehend the past or shape the future, it would be disingenuous to disregard the role of competitive telecom market dynamics (Baden-Fuller & Haefliger, 2013). One should affirm that a competitive market is a perfect environment that enables the reduction of consumption prices on services, as the next mini subsection below explains.

4.3.4.2 Promotion of a Competitive Telecom Market

Noble initiatives can be put in place to reduce telecommunication costs, but if South Africa is marred by unfair competitive behaviour, it would be a far-fetched dream to expect the reduction of user costs. It is public knowledge that dominating players in the telecommunication industry can influence price levels to their advantage and this they do to the detriment of small players (Gillwald, 2013). These are the responsibilities of ICASA as prescribed by the ECA, of which it has dismally failed as the information and communication regulator to act likewise in this regard (MyBroadband, 2013; Bowman Gilfillan, 2012; Research ICT Africa, 2012). The sooner more telecom organisations are granted licence to operate in the telecom sector by ICASA, the better for the market growth in rural areas (Gillwald, 2013; Calandro & Moyo, 2012; Mail & Guardian, 2012). One should be mindful that these are the potential telecom firms that will support and host Voice Telephony Applications in future. Therefore, with a competitive telecom market behaviour the telecommunications industry will recoup huge economic returns in future. This noble idea has been amplified by Research ICT Africa (2012, p. 3) who asserts that “the net effect of fairer competition is lower cost of communication, better services and more equitable returns on investments for all operators”. One should imagine the effect of reduced voice call costs due to a competitive telecom industry as more service providers enter the market. The model is discussed in the following subsection.

4.3.5 Subsidy Model

This model has been introduced at the end as Jonnalagedda (2011) advised that this should be adopted as the “last resort”. There has to be a shift of mind-set from ICT service providers and government institutions. It should be engraved in their minds that similar to electricity and water, access to the Internet must be treated more as a basic human rights factor in order to achieve the goals of closing the digital divide (Project Isizwe, 2013). One of the most basic and sustainable tools that can be adopted by nations for affordability of telecommunication services is the introduction of government subsidies and provision of private-public sector partnerships (GSM Association, 2007). IBM (2010) advises that an independent facilitation funding that can enable the reduction of voice call costs for Voice Telephony Applications such as the Spoken Web can be sourced from the national government through established non-governmental organisations (NGOs). This is a new Voice Telephony Application that is likely to be highly in demand in disadvantaged rural communities due to its use by illiterate and less economic viable communities (Agarwal *et al.*, 2010b; Agarwal *et al.*, 2009; Boyera, 2009). Therefore, increase in voice call costs can be subsidised by government through funds collected from private-public sector partnerships, as will be discussed in the upcoming three mini sub-sections.

4.3.5.1 Universal Access Service Funds

There are many initiatives that have been introduced as a means to boost growth and development of telecommunications infrastructure in developing countries. These initiatives have been made possible through policies such as the universal service funds which were predominantly fixed-line infrastructure funding models (Calandro & Moyo, 2012; Jain, 2012; GSM Association, 2007). The funds collected from private telecommunication service providers were mainly reserved for the provision of a developmental telecommunication environment in rural areas (Calandro & Moyo, 2012; Jain, 2012). This research project cautions that mobile phone operators would be willing to extend their services to the 450 million members who are located in rural areas. This will be motivated by the efficient use of the cash reserves of US\$4.4 billion worth of levies from universal service funds sourced through the mobile phone industry (GSM Association, 2007). GSM Association (2007) further cautions that with this objective in mind, an estimated figure of US\$3.8 billion that is still forecasted to be collected will make a huge contribution in the viability and affordability of mobile telecommunication services going forward. On top of this, through universal funding, in three and a half years there is a possibility of 100% coverage of mobile networks in rural areas. To substantiate this assertion further, Uganda has managed to commit 100% of its universal access fund resources towards the promotion of mobile phone technology services. The story further claims that as a consequence of this undertaking, there is increased tele-market penetration of mobile phones in Uganda. To put this universal funding model into perspective,

various cases are incorporated to validate the role of access funds, as mentioned in the up-coming mini sub-section.

4.3.5.2 Cases on Universal Access Service Funds from Africa and Asia

Similar case studies from the universal service funds can be drawn from various developing countries in South America, Africa and Asia, as articulated below.

Chile, Ghana, India and Malaysia

In trying to live up to the economic growth objectives of MDG (2010) and ITU (2009) that can be forged through harnessing penetration of telecommunication services in rural areas, countries such as Chile, Ghana, India and Malaysia adopted the *Universal Obligation Services Fund* policy (Jain, 2012). To this effect, Jain (2012) confirms that so far India has a telecommunication ecosystem that is conducive for the adoption of mobile phone services which can be attributed to its *Telegraphic Act of 2003*. This act prescribes that a 5% levy has to be imposed on adjusted total revenue collected by firms operating as service providers within the telecommunication sector at the exclusion of genuine value imbued service suppliers such as email, Internet and voice mail service providers (Jain, 2012). India, for instance, as an Asian country has also been experiencing a 35% growth in mobile phone subscription over the past decade (Dhage & Prasad, 2013). Besides being a developing nation, India is the custodian and developer of Voice Telephony Applications such as the Spoken Web, the centre theme of this research project. Thus, one can see the disparities between Asian and African countries, as heavily drawn out in Chapter 3.

Kenya, South Africa and Uganda

Kenya, South Africa, and Uganda have also put legal measures in place to support this universal fund initiative through the adoption of *Universal Access and Service Fund* (UASF). In South Africa this fund is criticised for being too supply-driven than demand-driven. The contestation presented is that the realities of telecommunications show a lot of demand and penetration for mobile technology services than fixed-line services and Internet (Calandro & Moyo, 2012). GSM Association (2007) holds the same view that one of the main hurdles that stifle the funds from contributing towards the growth and affordability of mobile phone services in underprivileged consumer markets is their inefficient use. These funds are invested in less-demanded-fixed-line networks rather than the high-demand-driven mobile phone services industry in rural areas (GSM Association, 2007). It is against this backdrop that one should be mindful that Voice Telephony Applications are accessible through mobile phones.

From the economics point of view, the voice call costs can be subsidised through funding from government (The Economist, 2009). The public sector must do a paradigm shift and intervene if they objectively see the ideals of giving access of the web to residents who can barely access

advanced ADSL or 3G network technologies (Project Isizwe, 2013). The lessons from other developing countries mentioned by Dhage and Prasad (2013), Calandro and Moyo (2012), Jain (2012) and GSM Association (2007) above can be used as reference cases for the adoption of public-private partnership policies. This will boost the use of Voice Telephony Applications such as the Spoken Web, by underprivileged rural ECP SMME farmers.

It should be acknowledged that in India, mobile phone penetration in disadvantaged communities is attributed to public policies that were conducive to the improved growth of ICT markets (Dhage & Prasad, 2013). On this note GSM Association (2007) recommends that universal service funds and similar public policies should feature as “last resort” methods. These methods should mainly play a role in communities that are not economically viable, that need an extension of network coverage where erection of telecommunication infrastructure will be impossible without subsidy and ultimately intend to increase user participation. Complementing the universal funds intervention with the reduction of consumption related usage-tax in mobile services will not only stimulate network connectivity, but will also be a catalyst in enhancing mobile telecommunication depth and usage in the rural areas. In Uganda for instance, even though this country has high mobile network coverage, penetration levels in mobile telephones are below 8% due to consumption tax. To accredit the previous assertion by GSM Association (2007), Jain (2012) reiterates that universal obligation funds in India do subsidise telecom operators who commit their resources into serving deprived rural markets. This is another means to pave way for an inclusive growth ICT trajectory; hence giving incentives to such brave telecom operators or businesses. The data presented in Chapter 3 comprehensively identifies disparities in the cost of ICT services, and this can be indirectly attributed to the role of subsidy funds. One can note that South Africa has higher ICT prices compared to Kenya, Uganda and Rwanda. In the same vein Asian countries fare better in this regard compared to South Africa.

4.3.5.3 Relevant Case Studies on Private-Public Partnerships: Mechanisms to Promote Development

Various case studies have drawn the attention of this research project as they have similar interests and objectives as this research project in varying ways from the rest of the African continent, as discussed below.

Lessons from North West Province in South Africa

In also trying to boost the impact of ICT in closing the digital divide, certain projects have been undertaken throughout the entire African continent by TechnoServe in partnership with small and large corporations in the local regions to create robust economic activities. For instance in the North West Province, TechnoServe (2013) reports on its website that it is doing everything in its capacity

to help about 15 Bojanala farming enterprises to commit themselves to a business development project and marketing through ICT services.

Lessons from India

What is noteworthy in this instance, are partnerships between IBM, SAP and AMUL (farming processing technology), and India's biggest marketing organisation on food products known as Gujarat Cooperative Milk Marketing Federation (GCMMF). These initiatives have really brought efficiency in marketing products to customers in underserviced rural areas. This has been possible through affiliations of 13,000 villages to form cooperatives under the banner of the District Milk Union whose membership is from 13 districts in Gujarat, India (M2PressWIRE, 2009).

Lessons from Rwanda

The Ministry of Youth and ICT (MYICT), City of Kigali, Rwanda Development Board (RDB), Rwanda Utilities and Regulatory Agency (RURA), Rwanda Hotel and Restaurant Association, and private telecoms operators have committed a portion of their resources for ICT investments (AllAfrica, 2013). Rwanda is an ideal case study for this research project as its economic and technology standing is analogous to the South African perspective; both countries are developing nations with small enterprises and lower gross national income per capita too (Donnar, 2008). The Minister of Youth and ICT in Rwanda further requests the private technology operator firms to continue investing in rural areas in ICT frontier. The partnership between the public and private sector has so far proved itself to live according to the stakeholder objectives and goals as this seems to be a perfect case study to reckon with in promoting Internet access (AllAfrica, 2013).

Lessons from Tanzania and Kenya

TechnoServe (2013) claims on its website that it has also partnered with one of Tanzania's most dominating mobile network company, *Tigo*, in *mFarmer* programme for the dissemination of farming related information. In this project, *TechnoServe* and *Tigo* through the development of an information technology application called *Tigo Kilimo*, local farmers in Tanzania will see their lives improving for the better due to accessing "actionable information" from their mobile phones. *Tigo Kilimo* will help in disseminating crucial information that is of highest quality to various farmers. In addition, these initiatives will aid in accelerating growth and community development. This research project has also learned that through this *TechnoServe*, *Tigo* and *mFarmer* partnership, Kenya has managed to assist thousands of "smallholder" farmers in livestock and horticulture production. Empirical evidence confirms that these small farmers were able to be connected to wider markets; as it is claimed that 200 thousand dairy farmers, 12 thousand poultry and 37 thousand fruit farmers benefited through this programme. To top it all, through this partnership the farmers realised a significant boost in their incomes (TechnoServe, 2013). The moral of these

partnerships between suppliers of agricultural stock, telecom operators, government and other established businesses is to highlight the value they can add to underdeveloped regions. It is important to note that low cost areas are given access to free basic or limited units of water and electricity, of which government subsidises these free units as the household is liable for the remainder of the consumed units (IT Web Internet, 2013). The Economist (2009) proposes that a small percentage on profit margins realised by the commercial sites through some of the telephony transactions can be used to compensate these telecommunication service operators.

Case studies above seek to affirm that without such comprehensive interventions, exclusion of rural communities from the digital information era would lead to a “double digital divide” (Fong, Wellman, Kew, & Wilkes, 2001). Fong *et al.* (2001) argue that a double digital divide phenomenon is the worst hurdle to addressing the ICT challenge confronting underprivileged households. This phenomenon explains that even though households in underserved areas have access to the information technology, they are still denied utilising the technology due to being physically incapable, less literate and financially constrained (Venkat, 2002). A new paradigm shift has to be adopted to close the communication gap by viewing underprivileged rural communities as “innovative entrepreneurs” with huge support bases; hence new income opportunities can emerge (Interactions, 2010). These are the marginalised communities that this research project is aiming to encourage to participate in Voice Telephony Applications. Studies by GSM Association (2007) affirm that there is a correlation between high penetration of low cost technologies, economic growth and social rewards within underprivileged communities.

Ultimately, evaluation of the five revenue generation models that have been incorporated in this research project has been fundamentally conducted within the confines of addressing four basic questions that look at advantages of each model. What is noteworthy though is an argument which can question the rationale for a government subsidy to an application that has been given for free as advised by IT Web (2013) and/or at a discount as noted by Gillwald (2013), in its early stages. This is a typical conflict of cost and benefit issues identified by Cook (1977) and Rogers (2005). The questions precede Table 4-2 below which answers them. This table pinpoints the most outstanding features and factors that have already been discussed in this chapter.

4.4 Advantages-related Questions on Models’ Efficacies

1. How relatively less expensive can the model be adopted by rural communities in order to reduce voice call costs?
2. Who is liable for funding this model?
3. What incentive schemes can the model bring to the funding party?
4. Will this model help in bringing improved user participation in future?

Table 4-2: Related Answers to Questions for Measuring Model Efficacy

Model	Answers to the Respective 4 Questions
Advertising	<ol style="list-style-type: none"> 1. Advertising will enable Voice Telephony Applications to self-sustain themselves through generating profits, hence acknowledged as the potent model. 2. Fees collected from adverts by content providers such as government and established retail businesses will fund this model. 3. Greater efficiency is a potential benefit. The businesses that utilise these accessible Voice Telephony Applications will gain increased market exposure. Electronic marketing is every market. 4. Mobile telephony services that are available, affordable, acceptable and beneficial to the underprivileged rural users with increased user awareness usually lead to increased market penetration in future.
Innovative Mechanisms, Affiliations	<ol style="list-style-type: none"> 1. Dynamic pricing schemes appeal to underprivileged rural users, discount prices and loyalty points will make this a feasible model. 2. Content providers and affiliate partners will indirectly fund this model, including established retail businesses. 3. Improved customer loyalty, collaborations and cross-selling are inherent benefits. Services such as e-Bucks, cross selling and bundling will bring unanticipated average revenues per user. 4. Through word of mouth there will be increased user participation and guaranteed revenues. There is already an existing relationship or goodwill with the identified market that is being serviced.
Toll Free Services	<ol style="list-style-type: none"> 1. Like M-pesa, EcoCash and Toll-free services, users will be given limited airtime units for a trial period. 2. Content providers will contribute to the funding, with users liable for future transactions. 3. Effective target marketing is the major benefit. Services are offered to the communities where there is a higher probability of purchasing. 4. Through trialability this model can to a greater extent help in increasing participation from users who are at the bottom-end-of-the-pyramid.
Tax Incentives, Licensing, Competition	<ol style="list-style-type: none"> 1. Fair competition and introduction of tax breaks will encourage support from telecom and content providers. 2. Through tax breaks content providers will indirectly contribute towards funding the model for awareness and sales issues. 3. Tax incentives and tax rebates are some of the benefits. Licensing contributes towards a regulated market. Fairer competition can lead to lower communication costs, improved services and equitable revenues as service providers are not price takers, but setters. 4. A competitive telecom industry with tax incentives will bring more service providers and encourage more user participation in future as the voice telecom market is an epitome of a good corporate governance ecosystem.
Subsidy	<ol style="list-style-type: none"> 1. This can be a fairly less expensive model to implement as it is subsidised through contributions from lucrative telecom businesses. 2. Government subsidises the model through private-public universal service access funds. 3. National recognition and tax exemption are the benefits. Naming the funders through the telephony environment bolsters potent brand awareness initiatives. Contributors get tax rebates. Major imperatives are social, economic and technological values. 4. Organisations that participate in this initiative are likely to bolster their brand equity within the relevant community, later leading to increased user participation and buy-in.

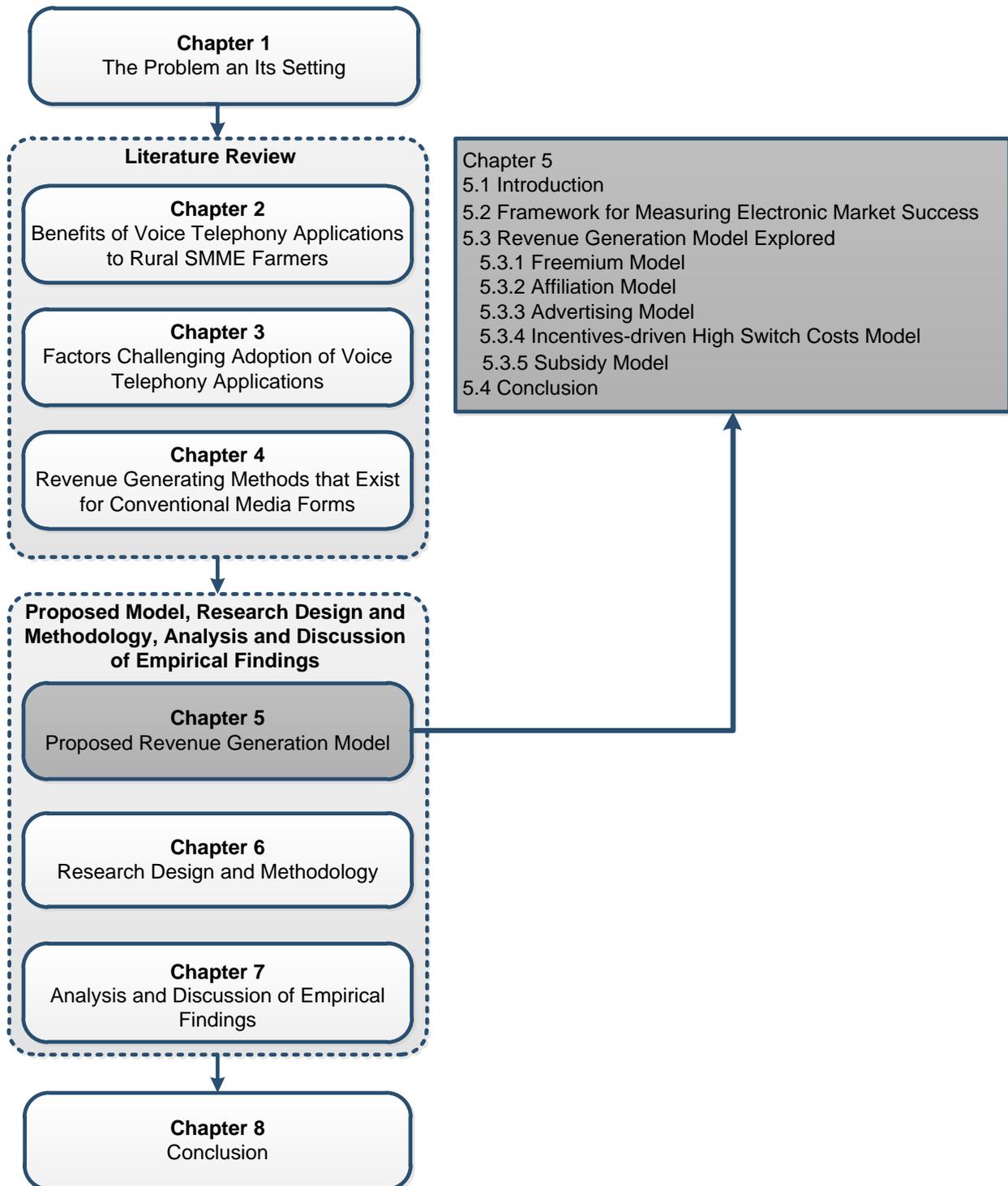
4.5 Conclusion

In its attempt to close the “double digital divide” identified by Fong *et al.* (2001), this chapter has fairly played its part by evaluating various revenue generation models that will enable the reduction of voice call costs within the context of the rural Eastern Cape farming community. Central to this objective is a model that reimburses content providers for supporting the initiatives of revenue generation in ECP. The advertising model seems to be the most potent of the five models as it brings higher revenues to advertisers who would be content providers through minimal resources as electronic marketing is viral marketing by virtue. An incentives-driven model would definitely feature as businesses that use Voice Telephony Applications get tax breaks and tax rebates as a means to encourage more support for these telephony applications by telecom operators and content providers. Frankly, through contributions and guaranteed rewards, Voice Telephony Applications will garner more support in rural Eastern Cape farming communities for less literate and financially strapped communities.

Forging partnerships through co-operatives and affiliations are the most predominant and resilient means of revenue generations in underprivileged areas where there are very limited resources. Affiliate partners can cross-sell and cross subsidise each other’s services and products through this business network with points and rewards given to the affiliate parties for their generous support. The freemium model seems to promote trialability of Voice Telephony Applications by underprivileged rural communities. Through this exercise farmers will be given an opportunity to experiment with Voice Telephony Applications such as the Spoken Web for a limited trial period as the content providers will contribute funding until rural users exhaust the free limit transactions.

In trying to live up with the words of Project Isizwe (2013) on treating accessibility to Internet as a basic human rights issue, this chapter proposes the subsidy model. Funding for this model will be made by government through revenue collections from various telecommunication operators for socio-economic imperatives; hence introducing this model as the last resort, as advised by Jonnalagedda (2011). This research project has come to the conclusion that content providers, particularly established agro-businesses and government will contribute funding to these models with improved profit, increased market share, and awareness being the major incentives. Therefore, by incorporating these revenue generation models a new growth trajectory will emerge in future; which will be defined by improvements in social, economic and technological facets within rural ECP farming communities. Elements or some of the revenue models that prove to yield optimum results through encouraging a reduction in voice call costs will be reincorporated in the next chapter for a Proposed Revenue Generation Model.

5. Proposed Revenue Generation Model



5.1 Introduction

This chapter is poised to develop an appropriate revenue generation model that will enhance the adoption of Voice Telephony Applications in disadvantaged farming communities of ECP through extracting the elements from the ones evaluated in Chapter 4. This idea of revenue generation has long been advocated by Jonnalagedda (2011). IBM (2010) asserts that in this regard an appropriate funding model has to be devised to circumvent poor adoption of Voice Telephony Applications by rural communities as user costs seem to be a deterrent factor. This research project came up with models such as Freemium, Affiliation, Advertising, Incentives-driven High Switch Costs and Subsidy models, as illustrated in Figure 5-3 below. These models are applied within each product development life-cycle stage. It should be noted that the channel and new technology interchangeably refer to Voice Telephony Applications in certain instances within this chapter. Firstly, as a means to address this research problem, an electronic marketing framework has been used as an essential blueprint. The conclusion ends the chapter, but is preceded by concise discussion on these models.

5.2 Framework for Measuring Electronic Market Success

Key to measuring the effect of an e-marketing tool is its ability to live by the framework which is underpinned by five elements such as *channel promotion*, *channel behaviour*, *channel satisfaction*, *channel outcomes* and *channel profitability* from Elliot (2005), as shown in Figure 5-1 below.

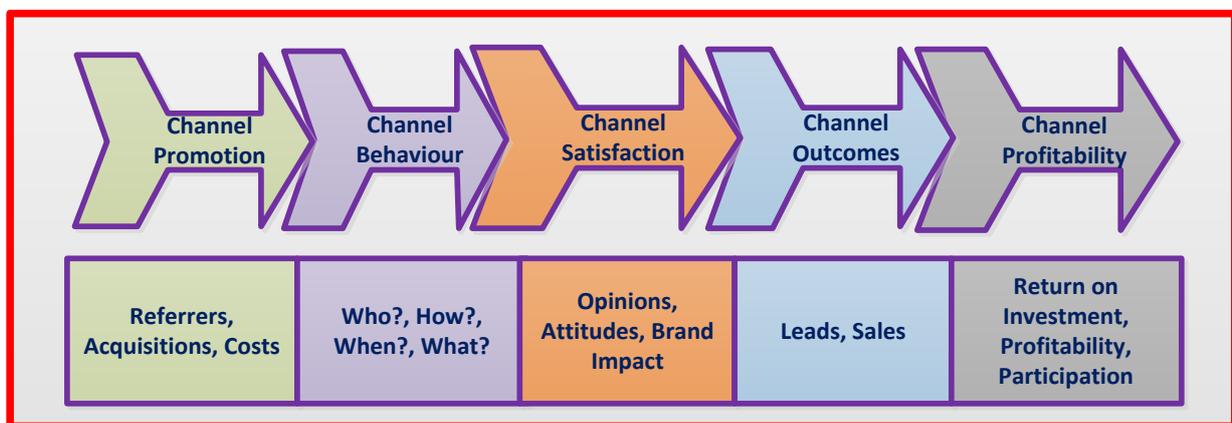


Figure 5-1: Framework for Measuring Electronic Market Success (Elliot, 2005)

The logic behind this framework is that rural SMME farmers in ECP will be better positioned as they will gain market intelligence and a competitive advantage on marginalised communities as envisaged by both Amul (2009) and M2PressWire (2009). Those that were at the periphery of e-marketing, communities who cannot read or write, can use Voice Telephony Applications to plan and decide on the best strategy to attract and retain customers (Stratigea, 2011). This research

project will not delve much in this framework, but will discuss these five elements, as they follow below.

Channel Promotion: This activity is fully achieved if the electronic site becomes an effective and efficient tool that promotes target audience participation (Anderson & Zeithaml, 1984). This can be a quantitative or qualitative aspect. The former of the two refers to customer traffic in the electronic channel, and the latter of the two critically reveals whether the business is selling to the relevant market through the electronic media channel and whether this leads to purchasing (Elliot, 2005). The efficacy of the channel can be measured by its success of converting browsers into buyers and its ability to convert referred users into acquirers (Palmer & Koenig-Lewis, 2009). If the channel succeeds in collecting and sending information to its target audiences with minimum effort and reduced cost, then it has fulfilled its marketing role.

Channel Behaviour: The manner in which visitors or buyers conduct themselves within the electronic channel significantly determines the success of the channel; in this scenario Voice Telephony Applications. In this regard, the business ought to be able to answer the following channel behavioural questions. *Firstly*, who is its target audience and the nature of the voice platform? *Secondly*, how is the channel perceived by the community? *Thirdly*, when is the right time to sell the product through the channel? *Lastly*, what do the users or customers expect or need from the channel? (Elliot, 2005). In a study by Walcott *et al.* (2008) it has been identified that attitude is the major challenge facing ICT services. In the convictions of Gebremicheal (2011), Grantham and Tsekouras (2005), Rogers (2003) and Agarwal and Prasad (1998), technical compatibility between the voice channel and the rural end-users, and innovativeness of the users are key factors in gauging this behavioural component.

Channel Satisfaction: It is public knowledge that retaining purchasers is informed by user satisfaction. In order to satisfy their customers, businesses must be able to assess whether the new channel meets the user needs and expectations as defined by the customer opinions, attitudinal behaviour, and brand identity (Elliot, 2005). Users will be motivated to use the platform to do their daily business activities should the channel live up to the customer value proposition (Chong *et al.*, 2010). According to Agarwal and Prasad (1998), relative advantage and ease of use derived from interacting with the new channel are measured against other forms of communication as these are underprivileged users. These factors will eventually feed into increased brand loyalty and improved user participation as these speak on the channel outcomes.

Channel Outcomes: Leads, sales, conversion rates and customer acquisitions are measured against other marketing platforms such as direct traditional marketing platforms which refer to

“brick and mortar” (Palmer & Koenig-Lewis, 2009). Therefore, in this regard one has to measure whether Voice Telephony Applications live up to outcomes such as increased revenue sales or leads. An incentive that would inherently flow to content providers will be a motivating factor, with channel profitability being an ultimate incentive.

Channel Profitability: This element shows the role of electronic marketing which identifies whether the channel will contribute towards better profits or overall profitability of the enterprise (Business2000, 2013; MoreBusiness.Com, 2011). This means that there has to be a return on investment with profits realised after a certain pay-back period (Elliot, 2005). Profits can be either material or non-material as defined by the *Social Exchange Theory* (Cook, 1977). One has to gauge whether if Voice Telephony Applications lead to rewards such as *approval, status, reputation, flexibility* and *trust* which can enhance adoption in future. If so, the Voice Telephony Applications can lead to increased adoption through revenue generation models that follow below, and then it means this framework has been fully complied with.

5.3 Proposed Revenue Generation Model Explored

In this section the *Diffusion of Innovations Theory* is used as an underlying theory to depict the stages of adoption that determine each individual’s innovativeness attributes. This individual innovativeness entails attributes such as *innovators, early adopters, early majority, late majority* and *laggards*, as illustrated in Figure 5-2 below. Later, the rationale for choosing each model in each of the five stages is discussed after Figure 5-3 below, which is a proposed model.

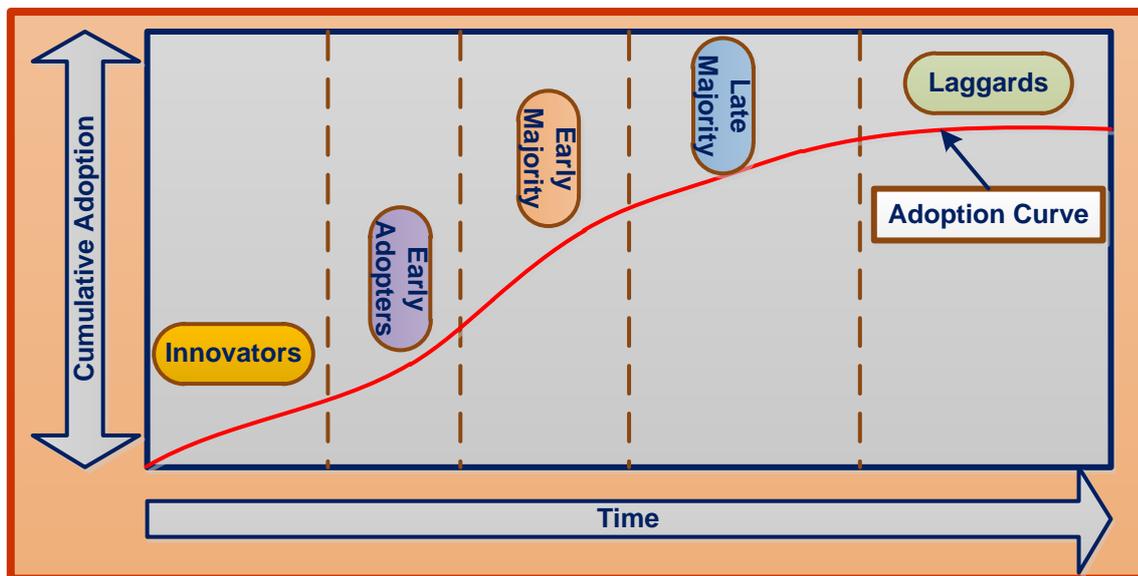


Figure 5-2: Individual Innovativeness (Adapted from Grantham & Tsekouras, 2005)

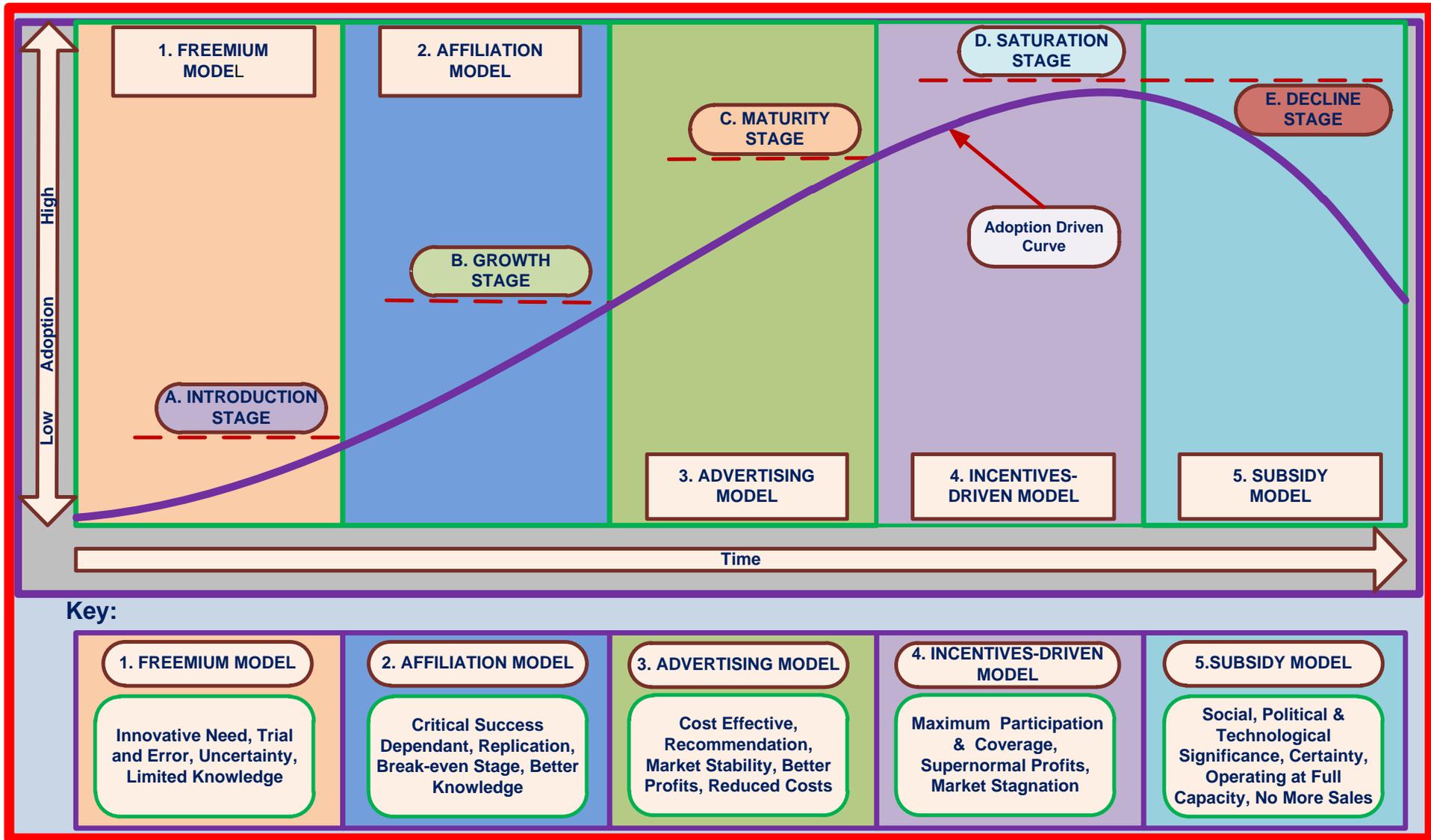


Figure 5-3: Proposed Revenue Generation Model

5.3.1 Freemium Model

Voice Telephony Application is still at its infancy; hence this research project is proposing that an affordable *Freemium Model* discovered by IT Web (2013) should be incorporated at this stage. This is done in order to induce more user participation and consumption of the application in future (University of Twente, 2011). By definition, the Freemium Model has been proven to be the most effective way to increase access to mobile phone services as the subscribers are liable for zero to little transaction costs. The content providers pay for these limited free transaction costs as is the case with *M-pesa* and *Eco-Cash* (IT Web, 2013 & EcoNet, 2013). This model is adopted at the introduction stage which is characterised by factors such as innovative need, limited knowledge, uncertainty, and trial and error; as discussed below.

Introduction Stage

Similar to Voice Telephony Applications, this is the initial stage as there is still chaos as no proper processes are in place and prospective users are not familiar with the new service (Anderson & Zeithaml, 1984). Even though the service is still new, one has to plan and create operation procedures (Le Buhan, 2013). This is an initial stage where a relationship must be established between Voice Telephony Applications and the electronic community. In this stage there is a slow growth of sales and adoption; this is a new technology that is still trying to build its customer base and brand loyalty (Business2000, 2013).

Innovative Need: There is a more radical appetite and approach to innovations that come mostly from very limited stakeholders in the introduction stage (Le Buhan, 2013). Those who will adopt Voice Telephony Applications, as shown in Figure 5-3 above are likely those who feel the innovative need. Therefore as defined by the diffusion theory, these are digital people who want to get recognition, are famous people in the relevant community and are venturesome by nature. Thus, any perceived advantage realised through the technology will induce them (Rogers, 2003). Then, as inscribed by Lynch (2012), early adopters of this technology will have a first mover advantage against their peers or late movers. It is part of human nature for certain individuals to feel the need to be innovative as this feeds into their “look cool” effect (Gebremicheal, 2011). The perceived knowledge that the emerging telephony applications can be the most cost efficient and effective communication channels for underprivileged rural communities is a self-motivating factor (Warden & N'getich, 2010).

Trial and Error: Low cost transactions such as the *Freemium Model* as discovered by IT Web (2013) can be applied in Voice Telephony Applications to encourage the trialability concept as proposed by Boyera (2009). This innovative element will bring a marginal increase in revenues

and sales in the future for content providers. This marginal increase is due to a new limited number of digital voice participants as peer influence plays its part in electronic word of mouth platforms; something similar to the snowball effect (Warden & N'getich, 2010).

Uncertainty: Uncertainty is one aspect that emanates from fear, safety, risk perception, perceived knowledge, perceived advantage and technical complexity about the new technology (Agarwal & Prasad, 1998). This uncertainty can affect the use of Information Technology applications and services (University of Twente, 2011; Rogers, 2003). Bad experiences with the Internet cause users to doubt this new technology; this technology must prove itself to be a better alternative for its intended audience in order to get continued support (Tan *et al.*, 2010). Frankly, uncertainty due to little information regarding the new technology acts against more user participation and improved market share (Wolcott *et al.*, 2008; Tan *et al.*, 2010; Lynch, 2012).

Lack of Knowledge: Lack of knowledge pertaining to Voice Telephony Applications will further exacerbate the unwillingness of the majority of users as this feeds into skepticism and uncertainty about the emerging technology (Rogers, 2003). The Voice Telephony Applications might be here, but little information reaches households within disadvantaged rural communities (Van Zijl, 2012; Warden N'getich, 2010; Cloete & Doens, 2008). Should Voice Telephony Applications prove to generate income and increase customer participation, then content providers and rural farmers would be willing to form alliances at this stage, as discussed below.

5.3.2 Affiliation Model

As identified by Jonnalagedda (2011) and Oz and Jones (2008), partnerships can be forged between relevant content providers, buyers and leading brands to cross-sell each other's service offerings to the target market. These are likely possible on condition that should relationships forged between networks, and content providers prove profitable in the initial stage due to increase in revenues and sales (Qiang *et al.*, 2012; Malebanye, 2007).

Growth Stage

Growth stage is where this model is adopted as in this stage there is a propensity to introduce more effective and efficient marketing processes. Clearly now, an adequate platform has been created for the new service or product (Anderson & Zeithaml, 1984). There is a marginal increase in market share, recognition and improved profits in the growth stage, moreso than in the initial stage (Business2000, 2013). This stage is defined by resolve in uncertainties relating to commercial and technical issues, and coupled with that there is an increment in innovations (Le Buhan, 2013). Partnerships between IBM, SAP and AMUL (farming processing technology) proved that

partnerships between content providers and rural farmers who form co-operatives really bear fruit in future (M2PressWIRE, 2009). This stage is defined by factors such as critical success dependent, replication, break-even and better knowledge; as discussed below.

Critical Success Dependent: The fact that the environment is optimised and there is an increasing adoption for the service as shown by the model suggests that the affiliation program can be introduced in this stage (Business2000, 2013; More Business.Com, 2011). Similar to the affiliation program, success of the freemium model can influence the former of the two models as uncertainty, adoption and sales track records attest.

Replication: Similar to the success dependency, successes attained in the previous phase or activities will be repeated in this second stage of the service development lifecycle to bring more stability through efficient production and marketing means (Le Buhan, 2013; More Business.Com, 2011; Anderson & Zeithaml, 1984). Therefore, due to capability improvements within affiliates there is a replication, re-introduction, recombination and redeployment of services, a function of affective and cognitive understanding by users (Helfat & Peteraf, 2003).

Break-even Point: Break-even point is achieved when profits are equal to the losses; an equilibrant state (Correia *et al.*, 2007; Mohr & Fourie, 2007). The business affiliates have through the new technology broken off from the negative profits mould. The affiliates are better attuned now to balance profits with losses as they continue to grow by showing improvement in sales (More Business.Com, 2011).

Better Knowledge: As the adoption of the new technology grows more knowledge is shared by the digital community, even within the alliance partners; this is a typical electronic word of mouth benefit in e-marketplaces (Chu & Kim, 2011; Jonnalagedda, 2011; Palmer & Koenig, 2009; Litvin *et al.*, 2008). Making information available through each affiliate's VoiceSite adds tangible and intangible value to affiliate members (Qiang *et al.*, 2012; White *et al.*, 2012). Dairy farmers can be empowered about the benefits of using the new technology such as knowing logistics and subsidy programmes with updated information (Amul, 2012). Should Voice Telephony Applications prove successful now that they are gaining more user participation, content providers can use them for advertising as articulated below.

5.3.3 Advertising Model

Mobile networks such as Vodacom can be used by various content providers to market their products directly to their target audience through call me messages (Vodacom SA, 2013b). The same approach can be adapted to suit South Africa as practised in India. The latter has been advocating for the utilisation of Spoken Web applications such as *Avaaj Otalo*, *Mobile Bazaar* and

VoiKiosk to disseminate farming information to its digital voice rural community through VoiceSites (Agarwal *et al.*, 2010b; Agarwal *et al.*, 2010c; Patel *et al.*, 2010; Agarwal *et al.*, 2009). Therefore, content providers can pay a certain fee for advertising in this matured telecom market (Patel *et al.*, 2010; Boyera, 2009; Kumar *et al.*, 2007b) Still, there are better prospects due to an increasing target market or growing market share, hence incorporating advertising in this stage.

Maturity Stage

One should note that in this stage unlike in the introduction and growth stages, prescriptions are based on improved efficiency, improved quality, improved market or product differentiation. Now, the adoption of the new technology is really starting to gain momentum growth (Anderson & Zeithaml, 1984). Similar to the affiliation program, in this stage advertising features as an ideal concept. So, it will be easier to learn and improve through successes and failures of the former model (Le Buhan, 2013; More Business.Com, 2011; Anderson & Zeithaml, 1984). There is a radical consumption of the new technology as this is shown by increase at an escalating rate in the Adoption Driven Curve (Le Buhan, 2013). This stage is comprised of cost effective, recommendation, market stability, better profits and reduced costs; as explained below.

Cost Effective: An application or tool can be classified as cost effective if it can achieve the expected results, profits or benefits at much more reasonable rate than the money, energy and effort invested in its design, production, development, and operation. Spoken Web is an ideal “cost effective ecosystem” that would let users to build an economic viable marketing platform for the local community (Kumar *et al.*, 2007a).

Recommendation: Due to its success stories, early adopters can make recommendations to peers (Grantham & Tsekouras, 2005) about the intricate benefits realised through using the services of new Voice Telephony Applications such as *Avaaj Otalo* (Patel *et al.*, 2010). Referrals that emanate from fellow members do pose an effective influence on peers with regards to business offerings (Agarwal *et al.*, 2010b).

Market Stability: At the third stage of the development lifecycle there is surely stability in the telecommunication market as more adoption is realised. Businesses that handle their brands well through the new technology at this phase of development are more than likely to see indefinite growth and survival against competition (Business2000, 2013; Le Buhan, 2013; More Business.Com, 2011). The fact that a larger audience of innovators, early adopters and early majority significantly feature in this stage tells a promising story about the diffusion and assimilation of the new technology (Grantham & Tsekouras, 2005; Rogers, 2003). It is clear that

the new technology is bearing signs of being successful as there is more awareness and communities are realising the relative advantage of the service (Agarwal & Prasad, 1998).

Better Profits and Reduced Costs: Brand extension and sales promotion are possible at this stage as there is inherent market stability to firms that do well, lest the firm or its service fails in the market it is operating in (Business2000, 2013). The fact that there is increasing demand for services from a larger client base affirms that there will be increase in revenues and sales respectively (More Business.Com, 2011). Trade-offs will be weighed against other technologies, of which this is a breeding ground for the switch cost or incentives model below.

5.3.4 Innovative Pricing and Incentives-driven Model

Basically, this model is underpinned by incentives and relative advantages that accrue to anyone using or supporting Voice Telephony Applications as prescribed by Agarwal and Prasad (1998). According to Malebanye (2007), through offering promotions on discounts and earning loyalty points when utilising Voice Telephony Applications, underprivileged rural farmers are made to realise the opportunity costs of using text-based technologies instead of voice-based services. Still, these are very illiterate and poor farmers. Based on their “affective and cognitive” understanding, disadvantaged rural SMME farmers for instance would opt for Voice Telephony Applications such as the Spoken Web based on the value they will derive from consuming this technology. This user friendly telephony application will eventually make the farmers appreciate its value (Kumar *et al.*, 2010). Education lessons, rewards and discounts should be given to those who are loyal to Voice Telephony Applications to build brand loyalty (Singh *et al.*, 2008; FNB, 2013). On top of this, established content providers, agro-retail businesses and telecom operators should be incentivised through tax cuts or rebates for supporting the emerging Voice Telephony Applications for continued adoption, as alluded to by Calandro and Moyo (2012).

Saturation Stage

This is a stage in the product development lifecycle where there is an increase at an escalating rate on adoption. Equally after some time, increase at a decreasing rate takes centre stage on revenues, sales or adoption of the service concerned as also seen in the Adoption Driven Curve within the model. Simply put, the market becomes saturated with the concerned service; hence competition imposes an increase at the decreasing rate of the service offered in the market after some time (Business2000, 2013; Le Buhan, 2013). Competition that exists within content providers is a primary determinant to service prices, adoption and user costs; as any business that offers a much better service would attract a chunk of the consumer market. Those businesses that fail to be innovative or fail to offer incentives to their target market would suffer at their own peril. Product

differentiation, and continuous improvement is a key aspect to attract and retain a growth of the customer base; an increased market share (Oz & Jones, 2008). This stage is denoted by factors such as maximum participation and coverage, supernormal profits, and market stagnation as illustrated by the model.

Maximum Participation and Coverage: This is the stage where potential users of the service are fully familiar about its pros and cons (Anderson & Zeithaml, 1984). There is empirical evidence which seeks to suggest that mobile phone penetration in district municipalities of ECP has reached more than 80% of households compared to radio, Internet and computers (Statistics SA, 2012a). In this context by default, due to the compatibility of Voice Telephony Applications such as the Spoken Web with mobile phones as prescribed by Kumar *et al.* (2010), this telephony application is moving towards reaching its peak point in rural areas before it drops at this stage. This is the case as illustrated in Figure 5-3 above, with adoption over a given time period on the consumption of Voice Telephony Applications.

Supernormal Profits: Profits accrue due to increase in “average revenue per user” over time on products or services that have reached the highest sales or consumption phase; this is due to effective marketing over competition in a given time (Malebanye, 2007, p. 49). The highest point in the Adoption Driven Curve bears testimony to this assertion. In the event that after some time in the expansion phase the growth of the product slows, the business may still survive as these supernormal profits can buffer against a shrinking market share. Even if the profits in due course take a dive it might be a “temporary slide” (More Business.Com, 2011) and even though there is a decrease in the number of new consumers, this decrease is very marginal. Businesses can maximise profits at minimised costs and lowered tax obligations (University of Twente, 2011). Through incentivising mobile operators and content providers through tax breaks, giving discounts, and loyalty points to customers, businesses can earn higher profits (Malebanye, 2007).

Market Stagnation: This phase is marked by the market stagnation before the drop in market share and revenues as the Adoption Driven Curve shows. The innovation bug now has encouraged *innovators*, *early adopters* and *early majority* to embrace and participate in Voice Telephony Applications after a certain period. Equally so, the greatest majority including late majority comes to embrace the new technologies too (Grantham & Tsekouras, 2005). This is the point in the market where every business or individual is utilising Voice Telephony Applications to market, sell and buy products and services, a term coined as “customisation” (Anderson & Zeithaml, 1984). Due to a decrease in adoption, revenues and sales, there is a high possibility that after some time profits can decline at this stage as there is no more room for growth (Business2000, 2013),

5.3.5 Subsidy Model

Any technology device that does not discriminate people by their physical capability, literacy level and purchasing power is more than likely to be supported. This is especially so, if its main users are people at the lower end of the food chain (Department of Communications, 2012; Qiang *et al.*, 2012; Research ICT Africa & Intelecon, 2012; Van Zijl, 2012). This will add value towards the economic development of the agro-businesses in disadvantaged rural communities in ECP (ECDC, 2013). On the backdrop of these noble assertions then, government as a laggard can subsidise user costs on Voice Telephony Applications through funding collected from universal access service funds and also give tax breaks as proposed by Calandro and Moyo (2012). The same concept has been practised in emerging Asian countries through the collection of 5% of revenue funds from profits earned by telephony firms (Dhage & Prasad, 2013; Jain, 2012). This stage is defined by the decline on adoption of Voice Telephony Applications due to advancements to capabilities of existing technologies, hence advocating for subsidies on the basis of social imperatives.

Decline Stage

This is the stage in the product development lifecycle where agro-businesses rationally feel that there is no need to use all their capital and financial resources to support Voice Telephony Applications as naturally their lifecycle can start afresh. Businesses reckon this as the perfect time to support up-and-coming services or technologies (Business2000, 2013). As the last stage this is a point where both the starting and existing business might fail (More Business.Com, 2011). In this stage, content providers acknowledge that due to competition there is a decrease at an increasing rate towards the consumption and adoption of their service offerings (Business2000, 2013; Le Buhan, 2013). This also refers to a drop in the consumption of Voice Telephony Applications. This stage is denoted by factors such as social, political and technological significance, certainty, operation at full capacity, and no more sales; hence explored below.

Social, Political and Technological Significance: It is public knowledge that societies can be transformed socially, politically and economically through Voice Telephony Applications. For instance, the Spoken Web seems to be an economic viable tool for bottom-of-the-pyramid people. To this effect the livelihoods of the rural communities will change for the better; something that was deficient in text-based interfaces such as the Internet (IBM, 2010). IBM (2010) further posits that underprivileged rural users will conveniently utilise the Spoken Web daily without the need of being computer savvy or literate, but merely to electronically exchange crucial information. Similar to other e-commerce technologies, government and the general citizenry can use these

technologies for accessing government services for citizen to government (C2G), and business to government (B2G) activities (Stratigea, 2011).

Certainty: There is greater certainty that Voice Telephony Applications are fully utilised by the greatest majority of rural farming communities, established agro-businesses and government institutions at this stage of development. The trajectory reflected by the Adoption Driven Curve in Figure 5-3 above bears testimony to this assertion as by implication, the underserved telecom market is fully saturated with Voice Telephony Applications. This depiction seems to be in line with the submissions of Agarwal and Prasad (1998) who assert that successful adoption of information systems is informed by various factors. These refer to improved technical compatibility, realisation of relative advantage in meeting the perceived need and the reduction of technical complexity as now farmers are at liberty to easily use Voice Telephony Applications.

Operating at Full Capacity: The agro-businesses at this stage of development are operating at their full capacity. Voice Telephony Applications have lost their market relevance due to their inability to innovate with time. Now, better and more affordable ICT services are offered by the competitors (MyBroadband, 2012). Rollouts on free Wi-Fi services within underprivileged communities of South Africa (Project Isizwe, 2013; TechCentral, 2013) and on fixed broadband fibre optic cable networks are some of the anticipated developments that will shape ICT costs in future (Calandro & Moyo, 2012). This means businesses now have lost interest in investing into more relevant technologies as a means to keep abreast of their peers (Le Buhan, 2013). Contending and supporting services impose market forces or shifts.

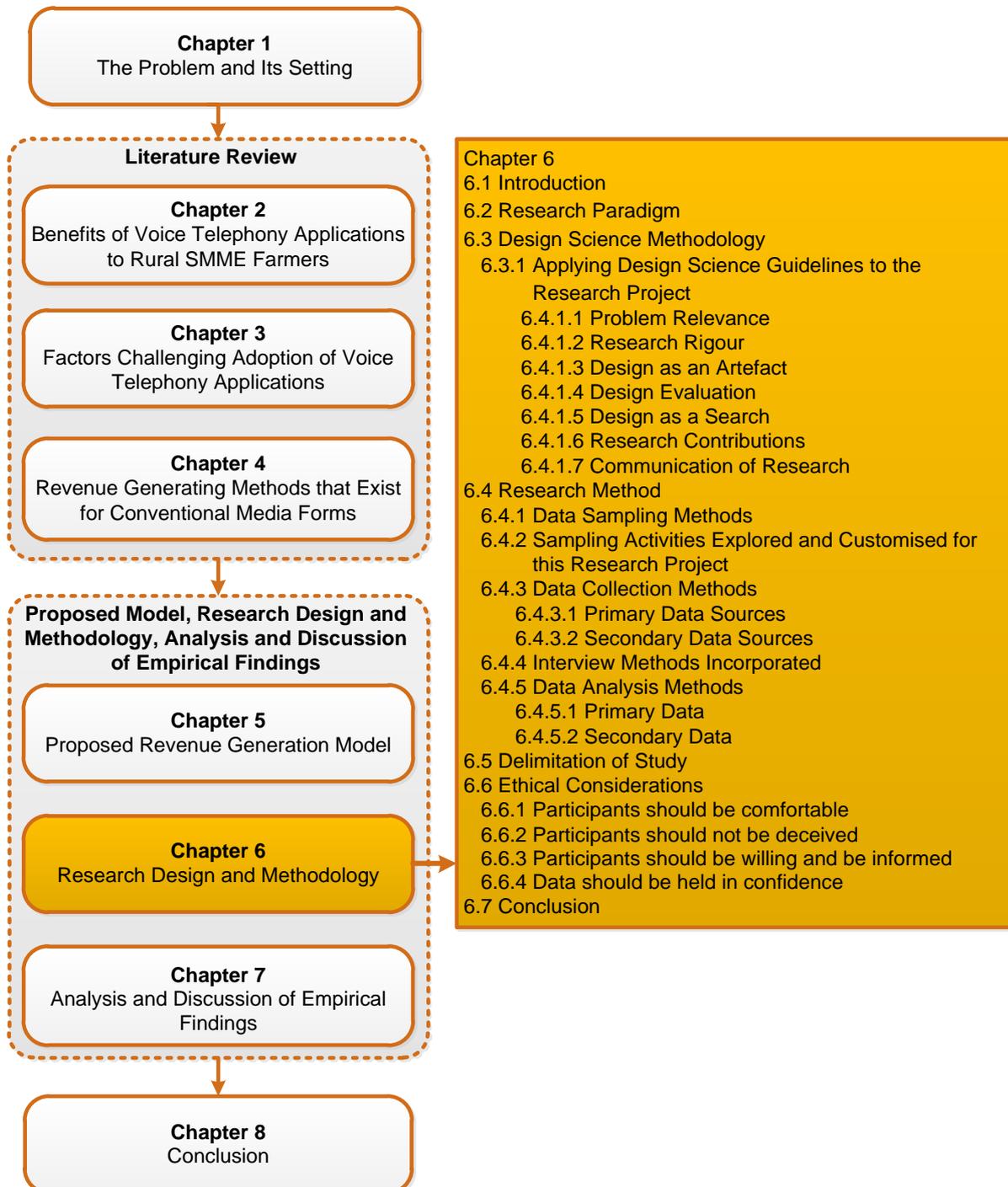
No More Sales: This is denoted by the crippling relationship between the content providers and their customers. As a consequence of this falling out, there is a decline in the telecom market demand through this emerging technology (Anderson & Zeithaml, 1984). To this effect sales and revenues drop dramatically and profits take a plunge (Business2000, 2013). The drop in sales and profits on Voice Telephony Applications forces these businesses to avoid any further losses in future; those that view themselves as a weak competition will exit the telecom market (More Business.Com, 2011; Anderson & Zeithaml, 1984). The manner in which the Adoption Driven Curve decreases at an increasing rate in Figure 5-3 illustrates this quandary.

5.4 Conclusion

This chapter has managed to critique and discuss various revenue generation models within each stage of the product lifecycle. One should take into cognisance that in this context, each of the five revenue generation models has somewhat tried to show its potency of reducing voice call costs within each stage. Now the onus is on the rural SMME farmers in ECP to reap the benefits earned

through using Voice Telephony Applications. The Freemium, Affiliation, Advertising, Incentives-driven and Subsidy models prove to be indispensable in their design as incorporated in each relevant stage. Should the proposed Revenue Generation Model with time enable Voice Telephony Applications to live up to the expectations of the Framework for Measuring Electronic Market Success, then by virtue this implies that the model has passed its litmus test. Hypothetically, through a given period innovative appetite, better profits, technology awareness, certainty, reduced costs and better profits will in future lead to a new exponential growth trajectory. Moreover, the validation and verification on the efficacy of this proposed revenue model is at the behest of the upcoming methodology chapter.

6. Research Design and Methodology



6.1 Introduction

Peffer *et al.* (2008, p. 49) state that methodology is “a system of principles, practices, and procedures applied to a specific branch of knowledge”. On that note, this chapter begins by discussing the type of paradigm adopted by this research project, mainly from a qualitative data point of view. This is followed by a discussion on the design science framework to show how this methodology was used as a blueprint for developing the Proposed Revenue Generation Model in Chapter 5. Then after, a research method is presented as means to show the types of data sampling, collection, interview and analysis methods implemented by this research project. The research method and the delimitation of the research sections feature as well before outlining the ethical considerations of this research project. This is followed by the conclusion which gives the summary of the entire methodology chapter. Each of these sections is better defined and explained accordingly in this chapter so as to reflect the application of each in this research project.

6.2 Research Paradigm

The paradigm is defined as a collection of beliefs about the nature of reality within a study. This process informs the scope and context of the study, and the manner in which the research will be carried out until one interprets the findings. As the starting point of any research, this is a framework that serves as the blueprint on the manner in which the research will be conducted based on philosophical assumptions (Saunders *et al.*, 2009). Collis and Hussey (2009) further opine that a paradigm is defined in many forms. *Firstly*, epistemology which contains assumptions that relate to accepting valid knowledge. *Secondly*, ontology as it embodies assumptions about the nature of reality. *Lastly*, there is a methodology which by definition refers to the research process. The researcher had to be frank about a research paradigm that will work towards achieving the desired outcome; otherwise it will be a costly exercise to embark on a research project without a clear cut plan.

This research project has incorporated the elements of Interpretivism as its chosen paradigm as already discussed in the proposal chapter of this research project. Maxwell (2005) confirms that a paradigm results from scientific beliefs and assumptions about the world as viewed by the researcher within his/her area of study. As part of an interpretive study that is very subjective by nature, a research should incorporate ideas from journals, case studies, dissertations and grounded theory work (Blaxter *et al.*, 2010); this research project has followed suit. As a subjective study, the researcher has done everything to evaluate revenue generation mechanisms that can be applied to reduce voice call costs in order to enhance the adoption of Voice Telephony Applications. There

are three research paradigms a research project can choose to employ, but for the purpose of this research project, only two will be described, as also listed in Table 6-1 below:

- **Positivism:** This philosophical type of research is predominantly about the tangible things an eye can see, i.e. material items that are physical in nature (Saunders *et al.*, 2009). This type of research is predominantly about inferential statistics where interpolations or extrapolations are based on statistical data. In the same breath, the researcher has to also conduct hypothesis testing which entails rejecting or accepting a certain claim (Oates, 2006). Positivism is usually quantitative and deductive in nature as one has to arrive at research deductions (Collis & Hussey, 2009). This research paradigm is underpinned by objectivity as positivists believe that reality is independent of people because conducting an investigation on social reality does not affect that particular reality (Collis & Hussey, 2009; Oates, 2006). Doing mathematical analysis and experimental observations on both control and experiment participants inform this philosophy (Oates, 2006).
- **Interpretivism:** As an adopted approach in this research project, interpretivism focuses on views expressed by other people in reference to their own reality as numerical measurements are discarded and replaced by the social phenomenon (Collis & Hussey, 2009). In Interpretivism, meaning and knowledge is viewed as the function of interpreting experiences, motivations and values of the participants in the study, who in this research project are the rural SMME farmers and telecommunication experts. The researcher can utilise qualitative methods to acquire a descriptive knowledge on the researched values (Le Roux, 2005). Therefore as an interpretive study, this research project is qualitative and inductive in nature.

Table 6-1: Varying Research Paradigms (Collis & Hussey, 2009; Blanchet *et al.*, 2007; Oats, 2006)

	Positivism	Interpretivism
Epistemology	Objective	Subjective
Ontology	Informed by law or theory	Informed by action and human behaviour
Methodology	Quantitative	Qualitative

Saunders *et al.* (2009) posit that the philosophical perspective that the research holds is determined by the orientation of its epistemology and ontology. Much as these orientations are the primary determinants for the research methodology or strategy; their distinctions are illustrated in Table 6-

1 above as both Collis and Hussey (2009) and Oates (2006) noted. In this research project, literature from academic sources such as dissertations, case studies and journals have identified that voice call cost is a critical challenge barring accessibility of Voice Telephony Applications by underprivileged users (Isabirye *et al.*, 2013; Botha *et al.*, 2012; Williams, 2011; IBM, 2010; Boyera, 2009). Even though the solution to this research problem has been identified, time will tell if this artefact, the proposed Revenue Generation Model, will yield the expected outcome in the future, particularly increased user participation. Having extensively drawn a picture of its research paradigm, this research project will now discuss its research design science methodology.

6.3 Design Science Methodology

Design Science as an embodiment of seven guidelines has been adopted as an appropriate framework to this research project as shown in Table 6-2 below. This design template is attributed to being the fundamental basis for effective contributions that will add value to the body of knowledge. In other words, one is better informed about the most scientific approach to devising the research artefact (Hevner *et al.*, 2004). Objectively, Design Science does help in creating and evaluating models solely developed for the purpose of solving an identified research problem (Peffers *et al.*, 2008). In this context then, a broader and most precise approach is afforded to the researcher as there is a higher degree of eliminating a tunnel-visioned approach.

As seen from Table 6-2 below, Hevner *et al.* (2004) articulate that Design Science guidelines serve as blueprint for funnelling crucial information to the relevant artefact. This will ultimately save the researcher time and effort that will be wasted by collecting and analysing unnecessary data, without following the rigorous verification, validation, and evaluation methods. This can compromise the essence, authenticity and accuracy of the final results. Therefore a research is valued by amongst other things, its originality and vigour (Cleven *et al.*, 2009; Hevner *et al.*, 2004). The logic behind Design Science is to come up with a model that is specifically customised to assist businesses into fully meeting their business objectives and needs (Collis & Hussey, 2009). Therefore in this research project, through rigour the problem that this research has identified will be fully addressed by the artefact. Through the rational application of academic sound theories and methodologies then, there is a high probability that this research project will live to the expected outcome (Cleven *et al.*, 2009). One should take into cognisance that this research project wants to come up with a potent model that can be adopted in order to minimise voice call cost on Voice Telephony Applications and to later encourage user participation by underprivileged rural farming communities. The guidelines have been customised to suit this objective.

Table 6-2: Design Science Guidelines (Adapted from Hevner *et al.*, 2004)

Guideline	Description and Relevance to the Study
Guideline 1: Problem Relevance	The objective of design-science research is to develop technology-based solutions to important and relevant business problems.
Guideline 2: Research Rigour	Design-science research relies upon the application of rigorous methods in both the construction and evaluation of the design artefact.
Guideline 3: Design as an Artefact	Design-science research must produce a viable artefact in the form of a construct, a model, a method, or an instantiation.
Guideline 4: Design Evaluation	The utility, quality and efficacy of a design artefact must be rigorously demonstrated via well-executed evaluation methods.
Guideline 5: Design as a Search	The search for an effective artefact requires utilizing available means to reach desired ends while satisfying laws in the problem environment.
Guideline 6: Research Contributions	Effective design-science research must provide clear and verifiable contributions in the areas of the design artefact, design foundations and/or design methodologies.
Guideline 7: Communication of Research	Design-science research must be presented effectively both to technology-oriented as well as management-oriented audiences.

Design Science entails a “rigorous process” intended to develop artefacts that can solve identified problems, make research contributions and evaluate the designed artefact. The objective is to communicate the results to the appropriate IT audience (Peffer *et al.*, 2008). This is the primary focus of this research project, as all expounded upon in the upcoming section below.

6.3.1 Applying Design Science Guidelines to the Research Project

To give a pictorial view of the scope of this research project as presented by the Design Science Framework discussed below, the drawing in Figure 6-1 below illustrates a mind-map that this

research project has adopted in order to gather, measure and analyse its data according to these guidelines.

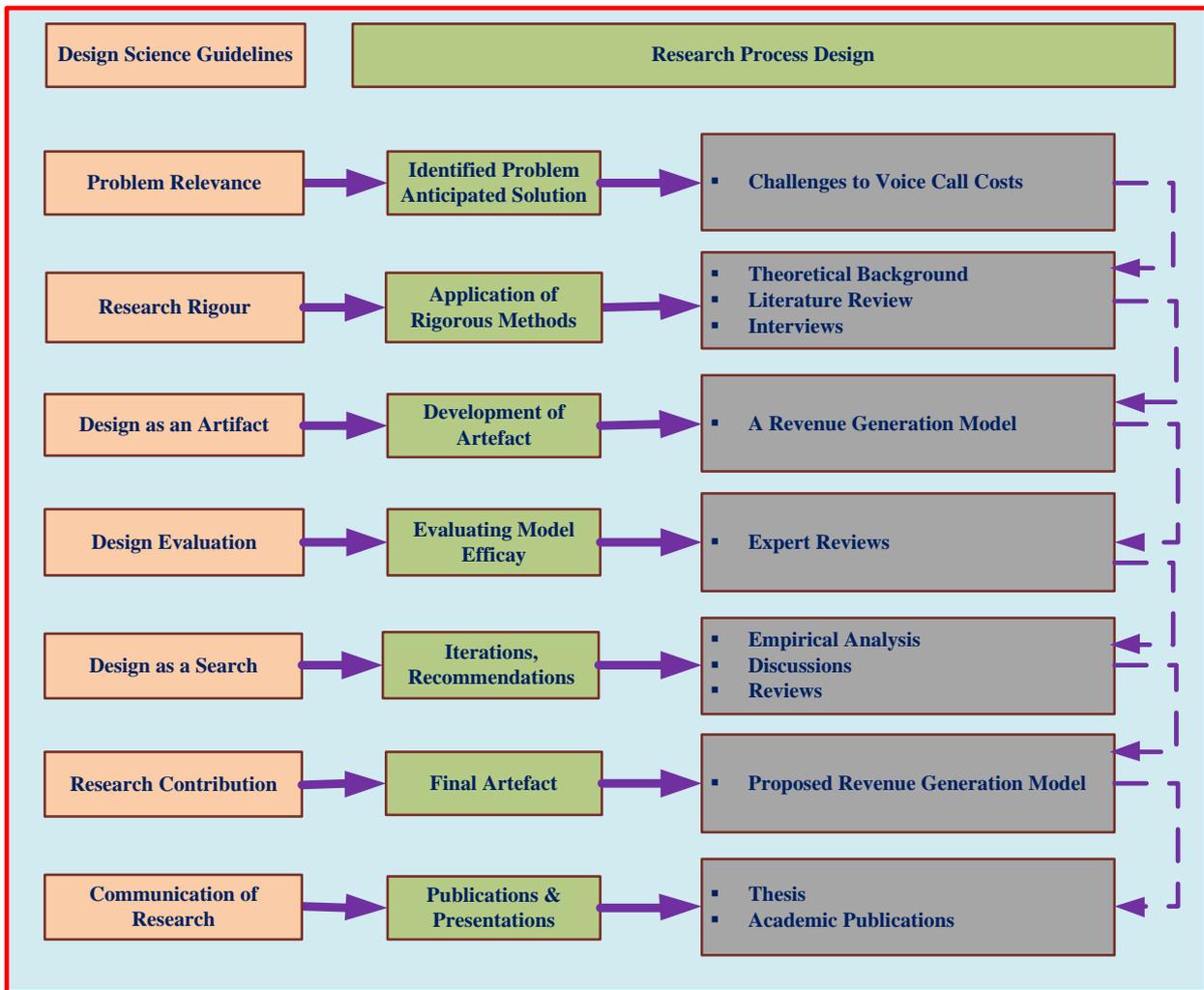


Figure 6-1: Research Process Design

For one to have a fully detailed version of how this research project made the practical application of the Design Science guidelines, the mini sub-section that follows below discusses these expectations as advised by Hevner *et al.* (2004).

6.3.1.1 Problem Relevance

As advised by this guideline the Design Science enabled this study to devise an IT-based solution that can help in minimising voice call costs to disadvantaged rural households. The problem that has been identified within the information systems space can be resolved by devising the most possible and effective solution (Peffer *et al.*, 2008). This proposed solution is developed through critically applying findings and recommendations presented on secondary literature, case studies and expertise as long as this information is relevant to the problem at hand (Hevner *et al.*, 2004). Furthermore, Peffer *et al.* (2008) advise that the information systems community must find the

most applicable solution to the identified problem, implement and monitor the solution for improved efficacy, and eliminate any possible errors that may loom on the horizon.

Studies by Isabirye *et al.* (2013), Williams (2011), IBM (2010), Boyera (2009) and Ward *et al.* (2005) indicate that the cost of voice calls is one mounting hurdle that has to be overcome in order to make Voice Telephony Applications accessible to rural communities. In addressing the research problem, various steps such as identifying the problem; finding the most possible solution to the identified problem; implementation of the suitable solution, and monitoring and evaluating the solution have been adhered to as proposed by Gerber-Nel *et al.* (2003). Thus by devising an effective artefact that can address factors contributing towards the adoption of Voice Telephony Applications, is a living testimony to the teachings of Hevner *et al.* (2004) who emphasised the problem. Then, appropriate methods have to be implemented as control measures to guide towards the development of an artefact (Peppers *et al.*, 2008), the epitome of research rigour below.

6.3.1.2 Research Rigour

As this guideline affirms, the researcher had a sole responsibility of utilising all possible infrastructure means and ends, and to a greater degree to specify all costs and benefit constants when devising an artefact as the problem guides. In taking a cue from Collis and Hussey (2009); Peppers *et al.* (2008) and Hevner *et al.* (2004), this research project effectively used accredited theory base and academically sound knowledge that came from the relevant experts in order to rigorously validate its final product; the desired artefact. This also entails a repertoire of technical prowess that has been displayed by the researcher in his/her academic capability as this is informed by selecting appropriate methods that will fully serve the research purpose. As Peppers *et al.* (2008) cautioned, rigour was applied throughout the development and evaluation of the artefact. Two theories from various sources have been incorporated as a point of reference so as to enable this research project to select and interpret a literature base that is relevant to the identified research problem. These two theories are the *Diffusion of Innovations* and *Social Exchange* as they have been fully expanded and incorporated to in previous chapters of this research project so as to illustrate their application, and reasons thereof. As informed by the convictions held by Collis and Hussey (2009), Peppers *et al.* (2008) and Hevner *et al.* (2004), this research project has extensively applied knowledge and insight gathered from experts, case studies, journals, dissertations, theories, and reports that relate to the cost of voice calls. Therefore, the ideal artefact to address this voice call costs problem is measured by its ability to work (Le Roux, 2005). However, using theoretic affirmations to find out why the artefact works or to prove the authenticity of its performance falls

beyond the scope of research rigour as this research project has created a model, an artefact explored below.

6.3.1.3 Design as an Artefact

This research project ought to produce a potent artefact that can either be a construct or a model for Voice Telephony Applications as discovered by Peffers *et al.* (2008) and Hevner *et al.* (2004). Efficacy of the developed Revenue Generation Model would be measured by its ability to reduce voice call costs and user participation, not how its performance is delivered. Sometimes the artefact design usually assumes the title of being described as the “core subject matter” of Information Technology where theory informs the design method and the artefact that is designed (Hevner *et al.*, 2004). In this effect, constructs from *Diffusion of Innovations* and *Social Exchange* theories have been incorporated to guide this research towards the development of a Revenue Generation Model, as prescribed by Collis and Hussey (2009).

Therefore, when creating “constructs, models, and methods” under organisational and social domain, it is noteworthy that these artefacts will interdependently coexist with people so as to enable them to realise their objectives and goals (Hevner *et al.*, 2004). Underprivileged SMME farmers, established agro-businesses and government institutions in rural areas will be afforded an opportunity to use Voice Telephony Applications for marketing their business-service offerings. However, artefacts developed in Design Science are barely fully-developed information systems that can be applied into business practice. Rather they are a perfect definition of innovative ideas, normal activities, services and capabilities of technical nature. Artefacts can see to it that analysing, designing, implementing, and utilising Information Technology is achieved in the most effective and efficient manner (Hevner *et al.*, 2004). The manner in which the revenue model was devised epitomises the ideals of Peffers *et al.* (2008) who purport that the research must produce an artefact that can fully address the research problem; a Revenue Generation Model (refer to Section 5.3) that has to be evaluated, as advised below.

6.3.1.4 Design Evaluation

Merely designing an IT model or prototype can never be justified as a complete and legitimate process until the development of the proposed artefact has been fully evaluated through valuable input from experts in the related field (Shelly *et al.*, 2008; Bentley & Whitten, 2007). Peffers *et al.* (2008) and Hevner *et al.* (2004) posit that the evaluation of efficacy, quality and utility of the design artefact ought to be informed by rigour. One has to measure the manner in which the artefact condones the anticipated solution to the identified problem. Evaluation can to a degree

refer to any empirical or logical evidence that is appropriately relevant to the research statement (Peffer *et al.*, 2008). Reviews received through interviews conducted with a sample of six ICT experts have helped towards rigorously validating the development of the Revenue Generation Model, a viable artefact this research project is suggesting. On a practical note, twelve rural SMME farmers around four district municipalities of Eastern Cape Province (ECP) were also part of the interview process which enables this research project to gauge their interpretation as the end-users of Voice Telephony Applications. The researcher intended to obtain substantial feedback from the underprivileged users as negating the user interest and ideas at times would be an indictment towards the seamless adoption of the new technology by the bottom-of-the-pyramid end-users, its bona-fide beneficiaries (Research ICT Africa & Intelecon, 2012).

In this research project both the secondary, and primary data have been collected and analysed on the backdrop of the *Diffusion of Innovations* and *Social Exchange* theories which have been the axial components of this research project. Design evaluation is a process of an artefact that inculcates various methodologies that exist within the “knowledge base”, but descriptive method informed this research project, as seen in Table 6-3 below.

Table 6-3: Research Evaluation Methods (Hevner *et al.*, 2004)

Design Evaluation Method	
Descriptive	Informed Argument: Use information from the knowledge base (e.g., relevant research) to build a convincing argument for the artefact’s utility

In this research project a descriptive method has been incorporated throughout for the creation of a Revenue Generation Model that can effectively enable the reduction of voice call costs in Voice Telephony Applications. This selection is informed by the novelties of Hevner *et al.* (2004) who posit that descriptive method can be incorporated for models where the chances of devising alternative feasible evaluation forms are very slim. Therefore, developing the artefact as informed by ideas shared by the experts can boost the efficacy of the designed artefact. These experts come from the mobile telecommunication industry and academia. The reviews with ICT experts have immensely contributed towards the next guideline.

6.3.1.5 Design as a Search

The efficacy of this artefact is the function of iterative developments, and continuous feedback between the researcher and the expert sample as the latter were sent interview questionnaires through electronic mail. Peffer *et al.* (2008) stress that during the search activity the instantiation of the proposed artefact ought to be informed by grounded theories and relevant expertise as this

research project has done. The laws that guide ethical means of doing investigative research have been abided to in order to reach ideal end results. This entails developing, and implementing an effective artefact that will be arrived at through intensive and appropriate search processes. This artefact is a Revenue Generation Model, an ideal solution that is proposed to mitigate this call cost problem (Hevner *et al.*, 2004). In a nutshell, as advised by both Le Roux (2005) and Hevner *et al.* (2004), the research design process in this research project involves iteratively building the model through soliciting information from a purposive sample of telecommunication experts. A “pre-defined” team of ICT experts were part of an expert review panel. It is crucial to note that this is a qualitative research and therefore on this juncture it is fit to state that interviews were conducted with rural SMME farmers in ECP communities. This insight would help towards supporting and verifying the legitimacy of the secondary data, and nothing else in this regard. The data used in this research project is qualitative, and then subjectively the opinions, perceptions, experiences of people in case studies, models and theories within the context of their social environments have been incorporated. This enables validation of reached conclusions (Le Roux, 2005; Hevner *et al.*, 2004). Le Roux (2005) posits that the “interpretive character” of qualitative data or study stands out as its prominent feature as the researcher has to interpret meanings of various events from the collected primary and secondary data. The second last guideline that has been followed throughout this research project is the research contribution discussed below.

6.3.1.6 Research Contributions

In order for the research project that is informed by Design Science methodology to make a significant contribution, its design artefact must be defined by generality, novelty and significance. This research project came up with a revenue model that is innovative which will enhance the adoption of Voice Telephony Applications in underprivileged rural farming communities of ECP as envisaged by Hevner *et al.* (2004). The features of this contributory study are as follows:

- **Design Artefact:** It is very important that the artefact is fully enabled to address the identified problem. In this case the efficacy of the proposed Revenue Generation Model is judged by its potency to reduce voice call costs and its contribution to a body of knowledge. This assertion to a larger degree implies the application of knowledge that is in existence to innovative methods (Hevner *et al.*, 2004).
- **Foundations:** In order to add value to the minefield of knowledge, it is essential that creativity and an innovative approach are applied when building adequately assessed artefacts. These designed models must be novel as a means to shape, improvise and extend knowledge foundations that have been in existence within the Design Science paradigm (Hevner *et al.*,

2004). Simply put, developed artefacts such as the Revenue Generation Model must make a significant contribution to the body of knowledge from academia to the telecommunication companies.

- **Methodology:** It is a fact that the descriptive evaluation method is entrenched in “informed argument” and critical analysis, so this has been employed in this research project. Academically, this is cited as a vehicle of making contributions to the knowledge base which by default implies that Design Science methodology has been applied (Hevner *et al.*, 2004). The quantifiable variables of the model such as cost and revenue accentuate that measure. Therefore on this juncture, evaluation metrics and measures have been adopted in developing the proposed model that will be communicated, as discussed below.

6.3.1.7 Communication of Research

Collis and Hussey (2009) and Peffers *et al.* (2008) emphasise that Design Science study is incomplete without presenting the research findings and recommendations to the management and technology-based audiences. For the purpose of informed knowledge and future research, the findings, and recommendations of this research project will be presented in the following forms:

- The dissertation and the proposed Revenue Generation Model or findings and any concluding remarks will be presented as published papers on academic ICT journals, conferences and through online media platforms such as the Internet.
- IBM, Nedbank, and Momentum will have access to the results and recommendations of this research project.
- Completed dissertation copies of this research project will be sent to the exams, the library and the Information Systems Department of the University of Fort Hare.

On this note then, it is fit to explain the research method utilised throughout this research methodology process, as the upcoming section explains.

6.4 Research Method

A research study can take one of three forms of research methods; quantitative, qualitative and a combination of both qualitative, and quantitative to come up with mixed methods which all add value into the study that is being conducted (Collis & Hussey, 2009). Depending on the nature of the study that is being carried, Collis and Hussey (2009) acknowledge that sometimes a researcher is forced to incorporate three forms of research in a process called methodological triangulation. However, for the purpose of this research project as defined by its interpretivism paradigm, and design, it is therefore recommended that due to time and costs the researcher should only use the qualitative methodology. This emanates from the fact that it becomes a time consuming, costly and

tedious exercise to analyse and collect data in triangulation methodology. This data is collected by multiple researchers, utilises varying research methods and is from numerous data sources. Therefore, collecting and analysing subjective data can never be a cheap effort to engage in, as subsections below explore.

6.4.1 Data Sampling Methods

As this research project seeks to gather information from people with enough expertise in mobile telecommunication, particularly electronic marketing, a panel consisting of six ICT experts has been chosen to review the proposed model. In addition, twelve rural SMME farmers in ECP have been purposefully selected as the intended beneficiaries of Spoken Web to gauge their experience with this technology, not for Expert Review Method. Saunders *et al.* (2009) posit that the purpose for sampling is to identify a certain population that will answer the questions relating to the research project. Thus as a “subjective judgement” that informs interpretive studies, non-probability sampling has been chosen as one ideal for this research project. Even though the probability of obtaining the best results is higher in larger samples, the cost of running bigger samples is the major hurdle (Gerber-Nel *et al.*, 2003). Purposive sampling will be used for a qualitative study such as this one as a means to answer the research questions through collecting primary data (Saunders *et al.*, 2009), as explored in the upcoming section below.

6.4.2 Sampling Activities Explored and Customised for the Research Project

As one of the tools that organisations can use to collect primary data for research project purposes, Gerber-Nel *et al.* (2003) state that the sampling process has five steps, as illustrated in Figure 6-2 below which briefly outlines the advantages for data sampling.

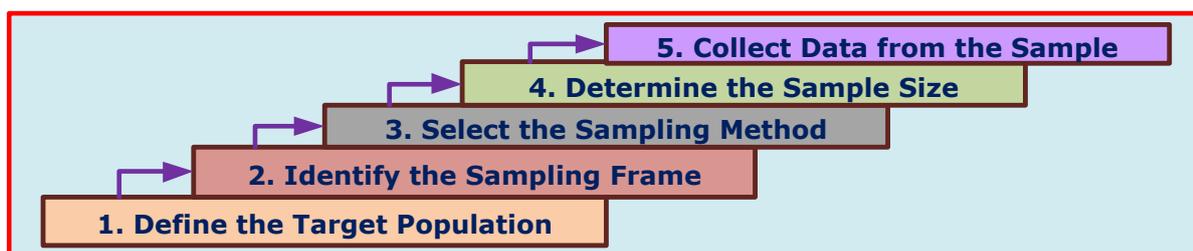


Figure 6-2: Steps for the Sampling Process (Adapted from Gerber-Nel *et al.*, 2003)

Step 1: Define Target Population

As an initial step, Saunders *et al.* (2009) and Gerber-Nel *et al.* (2003) refer to this process as an activity where elements or objects pertaining to information that relate to solving the research problem are collected. This process can relate to views expressed by underprivileged rural SMME

farmers in ECP and ICT experts within this research project. The underprivileged rural farmers in this context represent the views of ICT users in rural communities; hence targeting farmers who have very limited financial resources and are less literate as the Voice Telephony Applications such as the Spoken Web are intended for such people. These are the ambits within which the sampling will be conducted as they refer to the audience that will immensely benefit when the research is completed for business purposes. This is the research project context in simple terms (Collis & Hussey, 2009). The findings from this research project have been reviewed through the views shared by a team of six ICT experts who participated in this research project. Having defined its target population, the research project can identify the sampling frame, as discussed below.

Step 2: Identify the Sampling Frame

The second step before one commits to doing sampling is to identify the parties or individuals that will be of great value in solving the problem at hand or meet the objectives and purpose of the information the researcher is looking for. This is the population of interest as defined by the research problem (Saunders *et al.*, 2009; Gerber-Nel *et al.*, 2003). In this context, this sample has two sample groups. To this effect the *first* group of respondents consists of twelve SMME farmers from four rural district municipalities of ECP who have been interviewed to validate and verify the legitimacy of the literature survey. These rural SMME farmers were chosen because they have low literacy levels with limited financial resources at their disposal. The *second* group of respondents is a sample of six ICT experts who were selected on the basis of their varying ICT backgrounds, as briefly outlined below:

- An academic professor who has immensely contributed to ICT research projects, publications, workshops, and conferences within and outside the borders of South Africa.
- An academic professor who has done extensive work through writing research papers on the role of electronic marketing for the development of SMMEs in South Africa.
- An accredited researcher who in her own right has been at the forefront of ICT for Development (ICT4D). This dedicated academic has also gone to great lengths to conduct academic research in ICT4D with various academic universities.
- A senior office bearer who is tasked with leading the Information Technology division of one of the leading banks in South Africa. This ICT expert has a mandate to discharge his daily responsibilities through his immense knowledge and experience in ICT as he has a repertoire of ICT skills. Furthermore, he has also contributed to a number of journals, magazines, and conferences on issues pertaining to the impact and role of ICT services.

- ICT experts who have done extensive research projects on Voice Telephony Applications and by no underestimation, Spoken Web application is their brainchild.
- A marketing expert from a leading South African financial service provider with an abundance of expertise on issues pertaining to the role of mobile telecommunications on electronic marketing activities for the benefit of businesses operating within the SMME sector.

Objectively as is the case in this research, experts should have an abundance of experience within an identified field and at least a master’s degree qualification that is commensurate to the requirements of the reviewed subject line (Olson, 2010), before adopting a sample.

Step 3: Select Sampling Method

Setting the sampling frame leads to selecting the best method appropriate to the research objectives as defined by the budget constraints, time schedules and purpose of the research. The nature of the design of the research and philosophy informs the type of tools that enable the collection of the necessary primary data (Collis & Hussey, 2009; Blanche *et al.*, 2007). Collis and Hussey (2009) and Saunders *et al.* (2009) have discovered that sampling has various methods, as the diagram below in Figure 6-3 illustrates in its tree-design structure. For the purpose of this research project, areas highlighted dark grey in Figure 6-3 below are the ones that define the sampling method of this research project.

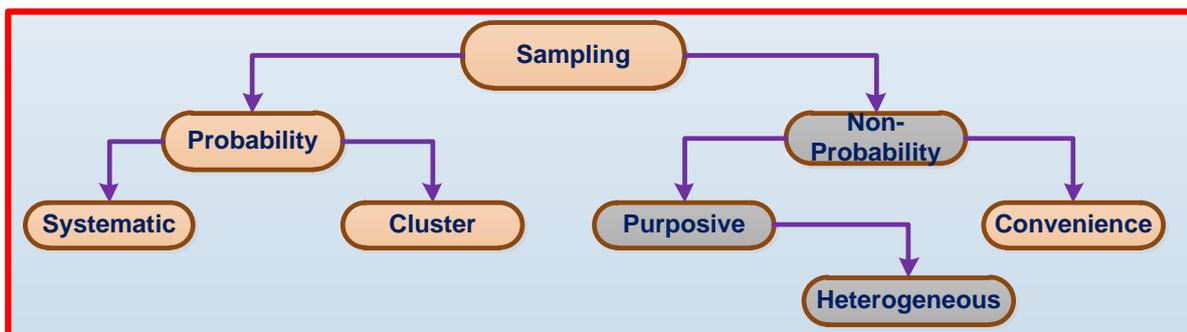


Figure 6-3: Sampling Methods Incorporated (Adapted from Saunders *et al.*, 2009)

Blaxter *et al.* (2010) posit that interpretive research is defined by qualitative data and its outcome usually depends on the interpretation of the researcher as is the case with this research project. Moreover, interviews and interview questionnaires have been incorporated as its instruments for collecting primary data from experts and rural farming communities, as advised by Saunders *et al.* (2009). This is the reason why non-probability sampling has been used, as highlighted in Figure 6-3 above. The fact that this research project has identified its research questions, research objectives and research strategy suggests that non-probability sampling is the best choice. Other than this claim, theoretical grounding and insight from ICT experts have been continuously used to

iteratively come up with the best model. As described and advocated by Saunders *et al.* (2009), this research project used purposive or judgemental sampling. This type of sampling affords the researcher an opportunity to apply his/her personal judgment in selecting parties that ideally enable him/her to answer the research questions and achieve research objectives (Collis & Hussey, 2009; Saunders *et al.*, 2009; Gerber-Nel *et al.*, 2003). The repertoire of twelve rural SMME farmers around ECP's municipalities and six ICT experts achieved this objective.

Collis and Hussey (2009) assure that non-probability sampling is most suitable for small samples, and its argument line is built on the underlying theory. This research project is an epitome of these characteristics. In accentuating this assertion further, Gerber-Nel *et al.* (2003) concur that non-probability sampling is suitable for small sample sizes. Furthermore, non-probability sampling has the propensity to save costs and most of all; the chosen sample is usually representative of the entire sample population. Initially this research project would have used convenience sampling, but Gerber-Nel *et al.* (2003) caution that descriptive research projects should not employ convenience sampling as it is subject to selection bias. Thus in this regard, varying ICT experts from academia and related fields were selected regardless of their gender or creed. The same applies to the underprivileged rural farming SMMEs in ECP's Amathole, Alfred Nzo, Chris Hani and OR Tambo District Municipalities.

Step 4: Determine the Sample Size

Having selected the sampling method, it is fit that a cardinal number of participants that will be invited to participate in a particular research is determined as research parameters demand. The nature of resources at disposal and rules of thumb are key features that usually define the size of the sampling population under study (Gerber-Nel *et al.*, 2003). This research project has an identified sample of six ICT experts and twelve rural SMME farmers, even though one would view this sample size as small. Collis and Hussey (2009) state that small samples are easily managed as they have little content or reasonable data to work with. Therefore, small samples can add to the reduction of research costs through quickly addressing the research problem and meeting the research objectives with limited resources. Thus with sample sizes of six experts and twelve underprivileged rural farmers, this sampling process is acceptable.

As a qualitative study that will incorporate judgemental sampling, this research project has three academic experts from the University of Fort Hare, one ICT expert from Nedbank, two Spoken Web experts who worked as one team from IBM India and the last one who works as an electronic marketing expert for Momentum. Skulmoski *et al.* (2007, p. 5) state in this regard that "the sample size varies in studies from 4 to 171 experts...that the method is modified to suit the circumstances

and the research problem.” On top of this, twelve rural SMME farmers who are less literate will be interviewed, as the research demands.

Step 5: Execute the Sampling Process

The sampling process of the research can be executed by collecting the necessary primary data as part of fieldwork through following the proper sampling plan and schedule as the sample size is set (Gerber- Nel *et al.*, 2003). As this is an academic research project whose fieldwork is the sole responsibility of the researcher then, unlike other studies that depend on a troop of fieldworkers to collect primary data, the researcher has been the sole fieldworker in this research project. Interview questionnaires were sent electronically to the identified panel of six ICT experts and necessary arrangements were made to personally visit those who were physically accessible. Interview questionnaires were used to solicit views from twelve rural SMME farmers as interviews were conducted with them at the appropriate times. Insight from the experts will be used to refine the proposed model.

6.4.3 Data Collection Methods

Having identified its sampling method, this research project ought to take into cognisance its data collection methods. This part of research usually entails instruments that will be physically utilised by the researcher to collect both the primary or secondary data (Saunders *et al.*, 2009). In order to be able to make valid conclusions for this research project, there had to be academically sound data available to the researcher. This would aid him/her to be better positioned to critique, analyse and interpret the data that is at his/her disposal; for the benefit of the research project. This data should unequivocally attract the meaning of what the researcher is anticipating through his/her investigative intentions (Blanche *et al.*, 2007). Blanche *et al.* (2007) further opine that interpretive research projects such as this one are advised to adopt the inductive approach, as has been the case in this research project, so as to be able to commit to a well informative data collection method. As a qualitative study, it utilised the benefits of data that is reliable and valid. Qualitative studies view validity as an extent to which the researcher can produce results and recommendations that are true to himself/herself, and the people who will be reading or receiving the results. This assertion better reaffirms that interpretive and qualitative study is very subjective as the interpreter of the results brings to the fore his/her own personal interpretation of events as they fall within the context of study (Cleven *et al.*, 2009; Collis & Hussey, 2009; Oates, 2006). This research project has been informed by the collection of both the primary and secondary data, as affirmed by Hofstee (2010) and further discussed below.

6.4.3.1 Primary Data Sources

This is the data that can be collected through fieldwork by the researcher. For the purpose of an academic sound research project (Hofstee, 2010), interviews were conducted with twelve rural SMME farmers and six ICT experts. The ICT experts were sent interview questionnaires through electronic mail where they gave insight into a developed model. This process involves an Expert Review technique where ICT experts reviewed the proposed Revenue Generation Model; an artefact for this research project. The physical interviews conducted with rural SMME farmers did add value into this research project as one had to look for rural farmers in ECP with very limited financial resources and above all have low literacy. This research project has identified both quantitative and qualitative sources of data. So, to keep inline with its research design and paradigm, interviews have been conducted as they yield reliable and valid results for qualitative studies such as this one (Collis & Hussey, 2009; Blanche *et al.*, 2007), as seen in Table 6-4 below.

Table 6-4: Primary Data Sources (Saunders *et al.*, 2009; Gerber-Nel *et al.*, 2003)

	Quantitative	Qualitative
Methods	Survey Observation Experiment	Interviews  Project Techniques Focus Groups

The data sources above are usually used for collecting secondary data that has to be analysed for further refinement of the research model (Hofstee, 2010). However, amongst these primary data sources, this research project has used interviews and questionnaires as advised by Saunders *et al.* (2009), and also noted in Table 6-4 above.

6.4.3.2 Secondary Data Sources

Besides the primary data above, a study inculcates an existing form of data called secondary data as a means to bring a solution to an identified research problem (Saunders *at al.*, 2009). In a comparative analysis between primary and secondary data by Saunders *et al.* (2009) and Gerber-Nel *et al.* (2003), this research project also identified the following advantages to secondary data:

- Even though this data has been collected for other research objectives and goals, it added value in solving the current research problem. The onus was on the researcher to verify whether the collected data falls within the concerned study as this research project followed suit.
- It should be affirmed that amongst other advantages, secondary data is easily available, needs little time to collect than primary data, and the researcher collected the data with little cost and with little effort compared to primary data.

- As stored data, secondary data is very accurate in comparison to primary data.

Secondary Data Sources Incorporated Within the Study

It should be acknowledged that the collection, analysis and interpretation of the results of this research project is not only the function of primary data, secondary data in this regard has also been extensively used. This analysis exercise was executed in accordance with the constructs of the underlying theories within as advised by Peffers *et al.* (2008). A cue was taken from various secondary data sources that were discovered in a study by Gerber-Nel *et al.* (2003); hence the need to list the utilised secondary data sources in this research project, as Table 6-5 below outlines.

Table 6-5: Utilised Secondary Data Sources (Gerber-Nel *et al.*, 2003)

Published Data (Electronic and Printed)	Syndicate Sources	External Databases
Libraries, Media Sources, Government Sources, Universities, Newspapers, Books, Reports, Journals, Case Studies	Store Audits, Consumer, Indexes	Computerised Databases, Internet, Numeric Database, Bibliographic Database

The interpretivist paradigm argues that qualitative data methods afford researchers an opportunity to meticulously have access to fully detailed data. In the end, this leads to an informative analysis that is premised on a deeper understanding of events as they relate to the study at hand within the realm of emerging phenomena (Blanche *et al.*, 2007). This research project followed suit and even conducted interviews to solicit primary data, as discussed in the upcoming section below.

6.4.4 Interview Methods Incorporated

This research utilised the methods highlighted in dark grey, as illustrated in Figure 6-4 below.

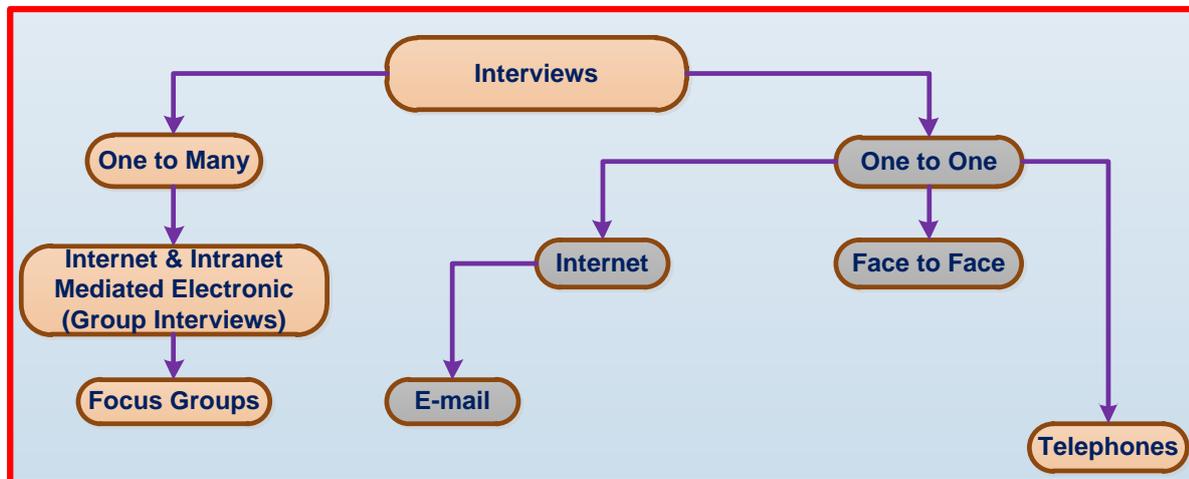


Figure 6-4: Interview Methods (Adapted from Collis & Hussey, 2009)

As opined by Collis and Hussey (2009), one can explicitly state that Internet and e-mail as interview methods have been utilised by this research project to collect primary data. Interview questionnaires with the developed model were sent to the six ICT experts as insights gained from their feedback helped in refining the proposed Revenue Generation Model. In this case, reviews from the ICT experts added value in refining this Revenue Generation Model as advised by Le Roux (2005). The logic behind using electronic mails for qualitative studies such as this one stems from the claim by Collis and Hussey (2009), Saunders *et al.* (2009), Blanche *et al.* (2007) and Gerber-Nel *et al.* (2003) which states the following: *Firstly*, this method of collecting primary data is ideally suitable for parties that are physically dispersed. *Secondly*, unlike telephone conversations and personal visits, the interviewees or ICT experts in this case are afforded enough time to attend and honestly respond to the questionnaire at their own convenience. *Thirdly*, as the interview questionnaire is enclosed with both closed and open-ended questions, the researcher will get detailed information. *Fourth*, this method saves time, costs and resources that may be required by other data collection methods. *Fifth*, the researcher can retrieve the information any time even if there is a need for a much clearer understanding of the subject matter. *Lastly*, more than anything, anonymity, independency and privacy between interviewees is maintained to avoid conflict of interest and collusion between experts (Olson, 2010; Punch, 2006).

Besides sending e-mails, the researcher was at liberty to conduct personal interviews with twelve rural SMME farmers and had to do face-to-face conversations with six ICT experts on an ad hoc basis. In this manner, the researcher physically interacted with the respondents to garner more information. In a nutshell, the quicker and easier it is for the researcher to collect, analyse and interpret his/her results, the less it costs to complete the entire research project (Collis & Hussey, 2009; Saunders *et al.*, 2009; Gerber-Nel *et al.*, 2003).

6.4.5 Data Analysis Methods

As outlined and discussed above, this research project has collected both the primary and secondary data, therefore it is crucial that the researcher displays his/her analytical skills in interpreting the data gathered from these data sources. As a matter of reliability and validity, scrupulous methods have been extensively utilised into analysing and interpreting both the primary and secondary data, as advised by Hevner *et al.* (2004). This research project would in its analysis for clarity and presentation sake attend to the analysis as it applies to each type of data as outlined below.

6.4.5.1 Primary Data

Data analysis and interpretation was done through reviewing data presented by Microsoft Excel application. This research project has interviewed both the underprivileged twelve rural SMME farmers and six ICT experts to garner enough information for this research project, as detailed below.

Data from Underprivileged Rural SMME Farmers

This research project adopted the phases in Figure 6-5 below to analyse its qualitative data.

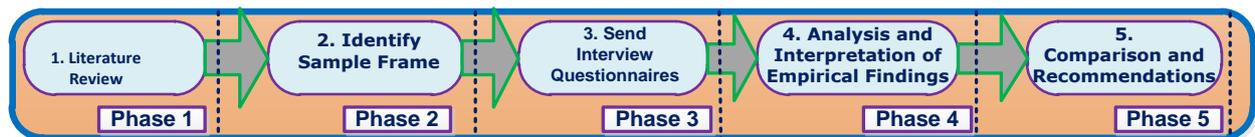


Figure 6-5: Data Analysis and Recommendation Process

In the first stage, as an interpretive study with qualitative data, a literature review was done on data collected from various case studies, journals and dissertations. A purposive sampling with twelve identified underprivileged rural SMME farmers was conducted in the second stage. This will serve the purposes of eliciting their views on the perceived benefits, challenges and revenue models within the context of Voice Telephony Applications. Three respondents were chosen from each of the four rural municipal districts of Chris Hani, Amathole, OR Tambo and Alfred Nzo. The main objective for choosing three respondents in each of the four municipal districts of ECP was to get an equal distribution of data as this will inform a balanced data analysis at the end. This maintains a close representation of the entire sample (Saunders *et al.*, 2009; Gerber-Nel *et al.*, 2003). These were less literate users with limited financial resources. In this research project, interview questionnaires with open and closed-ended questions were given to the respondents in the third stage. In the fourth stage, this research project had to analyse and interpret its empirical findings. The fifth stage entails comparing, and interpreting findings from both the literature survey and empirical results within the context of the underpinning theory to come up with the best recommendations, as advised by Hofstee (2010) and Collis and Hussey (2009).

Data from Expert Review

Frankly, this research adopted the process in Figure 6-6 below to validate its artefact.



Figure 6-6: Data Analysis and Validation Process

According to Le Roux (2003), this sort of data is received from a team of six ICT experts, as Expert Review method is the least expensive and most adopted technique for eliciting information from the interview panel as it gives quick results (Olson, 2010). In its initial phase as a study that has adopted an interpretive paradigm this research project has managed to do a literature survey from qualitative data collected from various secondary data sources such as published journals, dissertations and relevant case studies. In the second phase findings from the literature survey were used to develop an ideal model. Further to this undertaking, in the third phase data collection tools such as interview questionnaires were used to elicit views from six ICT experts. In this research project a purposive sample of six ICT experts has been chosen as interview questionnaires with open and closed-ended questions were also given to the experts. In the fourth phase of this research project, both primary and secondary data have been analysed and interpreted accordingly for a better informed evaluation and validation process. In the fifth phase, the proposed Revenue Generation Model (artefact) of this research project has been evaluated through analysing and interpreting feedback from interview questionnaires that were electronically mailed to six ICT experts. Face-to-face conversations at times were done as the researcher was at liberty to personally visit some of the experts. MS Excel was used in this analysis and interpretation.

6.4.5.2 Secondary Data

As an inductive study this research project is premised on weighing its findings with the theories applied in it. A deductive study is set to test a certain theory and by virtue of its definition this implies doing a hypothesis testing. However, unlike deductive study, inductive method refers to the manner in which a theory is used as the basis for evaluating the legitimacy of the literature study, particularly a qualitative one (Saunders *et al.*, 2009). In simple terms, this research project can attest that the deductive method implies moving from general to a theory, whilst the inductive method implies moving from theory to general (Collis & Hussey, 2009; Blanche *et al.*, 2007). As this research project has done extensive work in its literature review, a theory base has been used to come up with the conclusions. It should be acknowledged that this research project has incorporated an inductive method. Therefore according to Collis and Hussey (2009) and Blanche *et al.* (2007), the researcher utilised his/her thought process to critically evaluate data and views shared by various authors from published, syndicated and external databases as outlined below:

- A strong argument line has been brought to the fore by the researcher from various sources such as dissertations, reports, company sources, journals and reputable media sources. This collected, analysed and interpreted data has been informed by the constructs of theoretical

framework used in this research project, as affirmed by Collis and Hussey (2009), Peffers *et al.* (2008) and Blanche *et al.* (2007).

- As an interpretivist, the researcher has critically put his/her subjective thinking into interpreting the results of the literature review (Cleven *et al.*, 2009; Oats, 2006; Hevner *et al.*, 2004). The analysis of the data was done within the delimitations that follow below.

6.5 Delimitation of Research

The context of this research project has been used as the fundamental basis for setting parameters on the scope and schedule of this research project as advised by Hofstee (2010). In more explicit terms then, as informed by the research problem more emphasis was put on the reduction of voice call costs on Voice Telephony Applications as this will increase their adoption by rural communities. As informed by the theoretical background, in order to increase the use of Voice Telephony Applications, any benefits that can be earned through these telephony applications should be contextualised such that parties involved have to realise the benefits that can accrue from using them, as listed below:

- People who come from low income groups, are less literate and/or visually blind must be enabled to use the application regardless of their demographic standing.
- Content providers such as agro-businesses must be reimbursed for offering the voice services at reasonable rates through VUI platforms.
- Through their involvement, the public and private sector must see that there are social, economic, and technological rewards that can be earned through Voice Telephony Applications before they fully commit to investing their resources into them.
- This research project has to evaluate if increased penetration of mobile telephony services tallies with increased user participation in rural areas. It should be acknowledge that increased network coverage does not imply increased user participation.

As defined by the research problem, challenges such as the high voice call costs continue to bar underprivileged rural communities from using Voice Telephony Applications for marketing their service offerings and the nature of costs has to be applied within the following context:

- If one is to take attitude on board as another impediment that can drive user costs, then this research project has to investigate the attitudinal impact of users and developers of Voice Telephony Applications as informed by the *Diffusion of Innovations Theory*.
- This research project has to thoroughly investigate the role of culture, operational procedures, practices, and policies that exist and the manner in which processes and systems can be reconfigured to acclimitise with the emerging Voice Telephony Applications.

- The role of costs and rewards should be weighed against access to telecommunication infrastructure, and market behaviour.
- This research project is not obligated to investigate the user cost structure of various mobile network operators, nor is it tasked to develop ways to bring income to these mobile networks.

This research project is tasked to investigate and compare other revenue generation methods that exist on the basis of the following pointer:

- The researcher has to analyse and assess various revenue generation models such as advertising through the Internet, mobile telephone services such as call-backs or call-mes, and adopt elements discovered in these models in the context of Voice Telephony Applications.

6.6 Ethical Considerations

Now that the scope of this research project has been clearly outlined it is fit at this section to set out the ethical considerations as advised by Saunders *et al.* (2009) and Punch (2006). Gerber-Nel *et al.* (2003, p. 11) opine that ethical considerations refer to “the body of moral principles or values governing or distinctive of a particular organisation”. To this effect, the Ethical Clearance Guidelines for conducting research as advised by the University of Fort Hare’s Govern Mbeki Research and Development Centre (GMRDC) have been complied with, as presented in the four sub-sections below.

6.6.1 Participants should be comfortable

- The participants have the right to attend to the research questions at any time they feel confident and able to conveniently do so without any undue pressure.
- The researcher wishes to assure the participants that no one will receive reminder messages during the weekends or holidays unless proper arrangements have been made beforehand.
- There is no right or wrong answer to the questions in the interview questionnaire as long as the answers given by the participants reflect their personal capacity on the subject matter.

6.6.2 Participants should not be deceived

- It is common knowledge that professionalism and ethics live in close proximity. To expand this assertion further, professionalism has to be maintained throughout this research project.
- The participants and all interested parties, especially respondents should never be deceived about the research objectives, aims and about the time it will take to attend to interviews.
- Risks that may put on the life and reputation of the participants into danger have to be clearly stated upfront. The researcher is not aware of any risks that might harm the participants during the course of this research project.

6.6.3 Participants should be willing and be informed

- Participants in this research project should be informed beforehand about the research problem, objectives and the amount of time they will need to spend in attending to the interview questionnaires.
- The participants have the prerogative to voluntarily participate and withdraw their participation in this research project as deemed fit by the reasons they hold.
- The researcher has to inform the participants about the personal and contact details of the principal researcher, the purpose of the research, and the duration of answering interview questions.

6.6.4 Data should be held in confidence

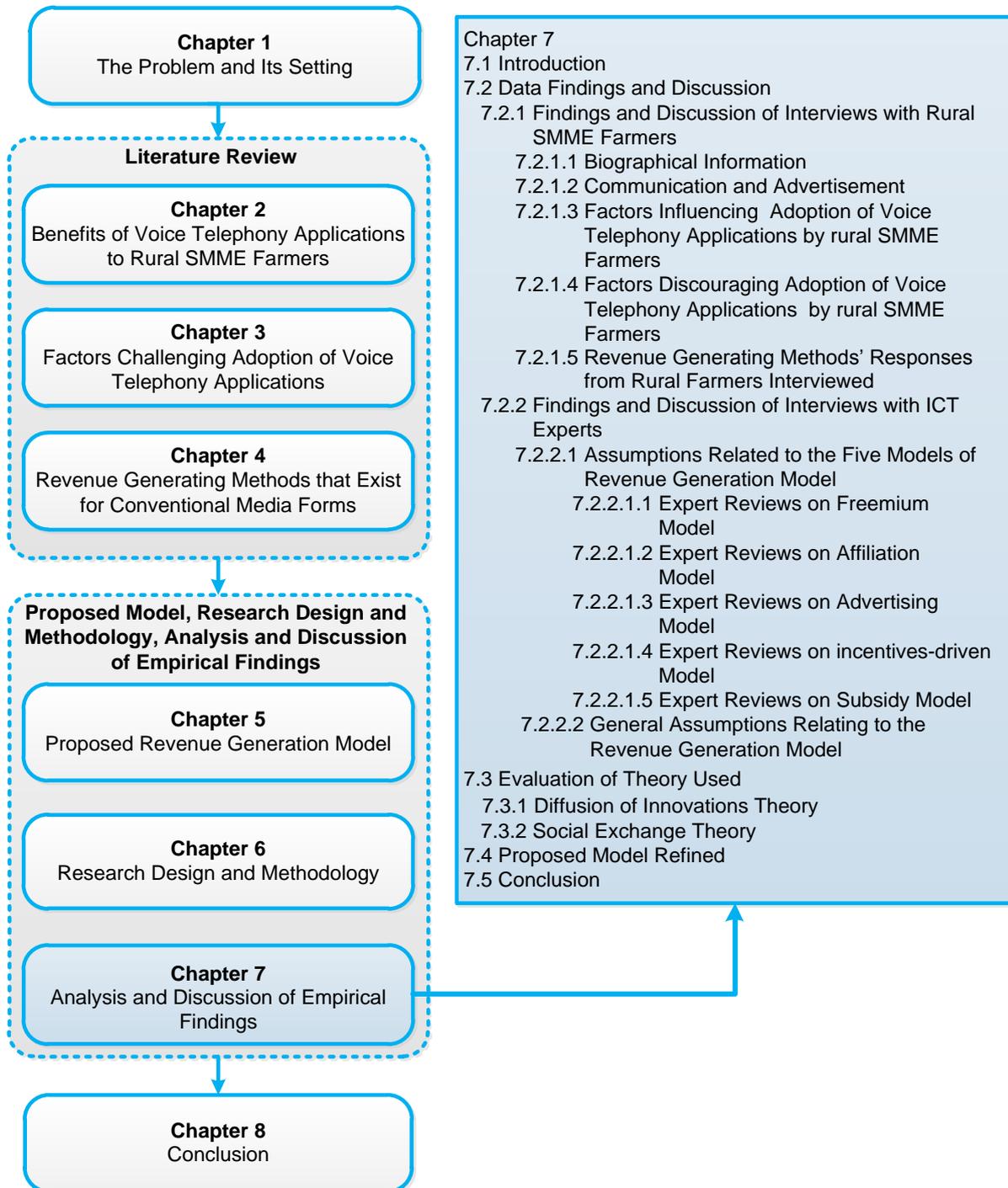
- Anonymity between participants has to be maintained in order to avoid any conflict of interest or collusions that may influence their opinions about the proposed Revenue Generation Model.
- Any information shared by the participants will be only utilised for the purpose of this research project, and other than that the confidentiality and privacy of the people participating in this research project will be upheld.

Now that extensive groundwork is covered on the ethical considerations of this research, this research project can make a concluding summary of its entire methodology.

6.7 Conclusion

This chapter includes the manner in which the collection, analyses, and interpretation of both the primary and secondary data that is qualitative in nature has been conducted in this research project. According to Peffers *et al.* (2008) and Hevner *et al.* (2004), this research project has chosen an interpretive philosophy after meticulously comparing and explaining other philosophical paradigms such as positivism. Design Science guidelines helped in instantiating and rigorously evaluating the proposed Revenue Generation Model, which is the IT-artefact of this research project. A non-probability sampling method of twelve rural SMME farmers and six ICT experts was chosen with interviews, expert reviews, and interview questionnaires being selected as the appropriate data collection methods for this research project. Le Roux (2005) and Gerber-Nel *et al.* (2003) attest that these are the most relevant tools that can be utilised for inductive studies; ones that are at the behest of qualitative research. Primary data was analysed through Microsoft Excel and also manually. The delimitations and ethical guidelines have been fully set to put this study into context, and to maintain an acceptable decorum as advised by Punch (2006). The next chapter vehemently focuses on the analysis and discussion of the empirical findings, as informed by the research methodology.

7. Analysis and Discussion of Empirical Findings



7.1 Introduction

This chapter gives an in-depth analysis and interpretation of the primary data that has been collected. This analysis and interpretation is an epitome of results from the interviews, and face-to-face conversations. Comparatively, conclusions will be drawn on similarities and/or differences that exist between the previous studies on Voice Telephony Applications. Moreover, as an inductive method, this informed exercise extends to evaluating theories, models and literature studies against primary data. Furthermore, this will ultimately help in refining the Revenue Generation Model which is a proposed artefact of this research project. In applying the knowledge of Hofstee (2010), this chapter will compare the benefits and factors challenging Voice Telephony Applications and/or IVR systems in general, as presented by the literature survey against responses received from interviews. These are interviews conducted with the rural SMME farmers in the Eastern Cape Province (ECP).

In addition, views shared by these rural SMME farmers and ICT experts on revenue generation models will be compared with the literature findings within the same context of funding models. Evaluations on applied theories and models will be dealt with as they follow each other accordingly, and this precedes the concluding remarks of the chapter. As advised by Gerber-Nel *et al.* (2003), tick boxes, likert scales, and text boxes have been incorporated within the closed and open-ended questions of the interview questionnaires to elicit the most appropriate and substantiated responses from the respondents. Microsoft Excel spreadsheet will be extensively incorporated throughout this chapter to present collected data which will be analysed, and interpreted, as presented in tables and charts within the upcoming section.

7.2 Data Findings and Discussion

Bentley and Whitten (2007, p. 21) define data as “raw facts about people, places, events, and things that are of importance. Each fact is by itself, relatively meaningless”. It is fundamentally correct to state that data elicited for any purpose is analysed to derive information that can be easily interpreted in order to create more useful knowledge or expertise. The knowledge is the refined version of information that is comprised of beliefs, experiences, facts, judgements and truths relating to a particular study (Bentley & Whitten, 2007). Hofstee (2010) lends credence to this statement by reiterating that raw data on its own has no meaning unless it is transformed into information that can be used as evidence to substantiate an argument, claim or hypothesis before a study arrives at a certain conclusion. As has been the case in this research project, empirical data on ideas shared by underprivileged rural SMME farmers during interviews in ECP and ICT experts will form part of this analysis process. The contradictions and favoured interpretations

from the empirical data received during the interviews bolster a well-balanced discussion. This discussion should be defined by credible evidence and not by fallacious or unintellectual opinions (Hofstee, 2010).

As Shelly *et al.* (2008) purports interviews conducted with underprivileged rural SMME farmers of ECP have been configured to promote “engaged listening”. This leads to honesty, open-mindedness and voluntary divulging of peripheral information that will add value to the research. This stems from a rapport that was created between the respondents and the interviewer. By virtue of being part of an interview process, the former were made to feel comfortable and appreciated by asking questions on unclear matters which made them to feel at ease during the course of the interviews. Inspired by Shelly *et al.* (2008), this research project would like to put on record that not only verbal expressions were taken into consideration during the interviews, but also non-verbal communication informed this elicitation stage. One should bear in mind that the interview questionnaire has both closed and open-ended questions so as to garner more information pertaining to the point of view of the interviewee, and his/her attitudinal standing towards Voice Telephony Applications and/or IVR systems in general. As articulated by Hofstee (2010), now that this research project has received primary data it can have an informed and valid empirical data analysis from the feedback obtained from the interviews conducted with rural SMME farmers in ECP and the ICT experts. The information that has been presented in charts and tables gives a clearer view of the responses garnered during the interviews. So, qualitative data has been expediently quantified within the context of a richer qualitative data analysis as Oates (2006) attests that numerical values at times are more apprehendable, as expounded upon below.

7.2.1 Findings and Discussion of Interviews with Rural SMME Farmers

This section has five mini sub-sections that are part and parcel of the interview questionnaire designed for rural SMME farmers (refer to Appendix A-1 in Appendices). The first part relates to the biographical information of the rural farmers, and the second part looks at the communication and advertisement methods used by rural farmers. The last sections are more concerned about farmers’ experiences with regards to the encountered benefits, factors challenging Voice Telephony Applications, IVR systems and revenue generation models in general.

7.2.1.1 Biographical Information (refer to Section 1 in Appendix A-1 below)

Type of Livestock Farming Business: Of the twelve rural SMME farmers interviewed, six confirmed that they sell sheep, goats and cattle, whilst the other six state that they sell sheep and goats mostly for clients who want to conduct traditional occasions.

Employee Support Categories: For managing their livestock and doing other menial jobs, four of the farming businesses have three employees, four have five employees, two have eight employees, and the last two have ten employees.

Educational Qualifications: As per sampling frame and target population of this research project, ten of the farmers interviewed have primary education qualifications, whilst only two of those interviewed have formal trade training experience as they facilitated farming related meetings and activities within the local communities.

7.2.1.2 Communication and Advertisement Methods

Noteworthy, one can make inferences from the data illustrated in Figure 7-1 below as it precedes its written interpretations accordingly (refer to Section 2 and 3 in Appendix A-1 below).

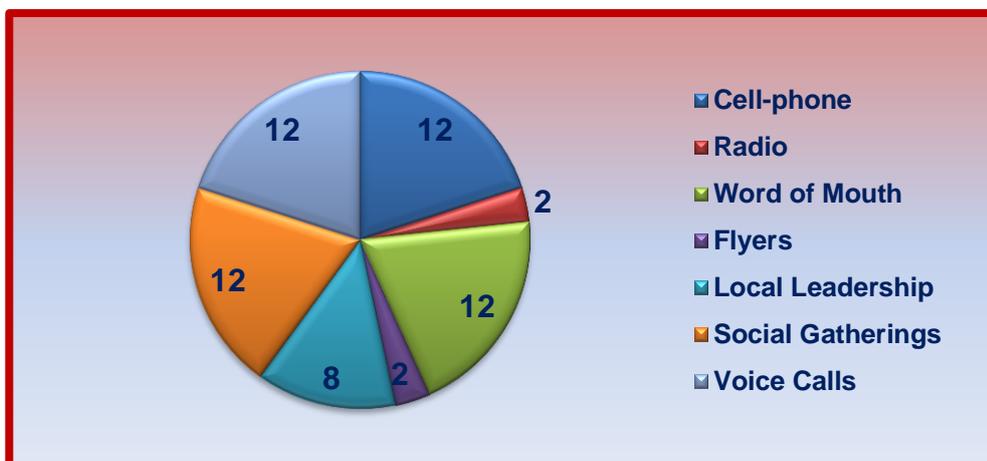


Figure 7-1: Pie Chart with Marketing Methods Used by Rural SMME Farmers in ECP

Apparently from Figure 7-1 above, all twelve rural SMME farmers noted one or two forms of communication they used for marketing their services to their target audience.

Cell-phone, Word of Mouth, Social Gatherings and Voice Calls: On the basis of their educational qualifications, all twelve of the rural SMME farmers interviewed confirmed that they use these methods to advertise or communicate farming related services. This then bodes well with the context and findings of this research project. Advanced IVR systems such as Voice Telephony Applications are ideally suitable for illiterate users, as the majority of farmers interviewed chose these user friendly methods that need no skill to utilise. This is one of the benefits that have been identified about Voice Telephony Applications, as incorporated and illustrated in Section 7.2.1.3 below.

Local Leadership: The majority of respondents (eight of the twelve interviewed) from the rural areas so far have utilised the influence of local leadership for advertising their business service offerings. The role of influential people or institutions such as local leadership can never be

overlooked in rural areas as the respondents and the literature frankly state the impact of this influence, as outlined in Section 7.2.1.4 below.

Flyers: A small minority of two rural farmers interviewed (two out of twelve) confirmed that they use flyers for marketing purposes.

Mobile Apps, SMS, Mixit and Whatsapp: These mobile communication applications are discarded from this pie chart above as none of the respondents have so far used these mobile application services. By their own admission, the respondents cited lack of innovative appetite, their inability and unwillingness to send or read text messages. Ability to speak than to write is ideally suitable for illiterate people or those who are not computer savvy; a competitive advantage of using Voice Telephony Applications, as written in Section 7.2.1.3 below.

Internet, Gumtree and OLX: Similar to the mobile phone services above, rural SMME farmers reiterated that they are not even interested in trying or using text-based Internet enabled services such as Gumtree and OLX. This apathy towards these text-based Internet services is attributed to fear of trying new ICT services, lack of exposure to them and the comfort of making voice calls. The farmers even distanced themselves from using social network sites such as Facebook and Twitter. In concise terms these text-based services are not suitable for less literate users; this is the opportunity cost of not using Voice Telephony Applications, as discussed in Section 7.2.1.3 below. Nonetheless, it is fit that this research project draws a picture of the benefits realised through Voice Telephony Applications, as discussed below.

7.2.1.3 Factors that can influence rural SMME farmers for the efficient adoption of Voice Telephony Applications (refer to Section 4 in Appendix A-1 below)

This mini sub-section together with Table 7-1 below shows views on anticipated benefits of IVRs from twelve rural SMME farmers interviewed in comparison to the literature findings.

Table 7-1: Ratings on Responses from Anticipated Telephony Application Benefits

Benefit Factor	Likert Scale Score			
	Very High	High	Low	Very Low
A. Accessibility to less literate users	11	1	0	0
B. Caters to the language needs of its target users	12	0	0	0
C. Relevant e-WOM tool for effective marketing	11	1	0	0
D. Accessible anytime and anywhere	11	1	0	0
E. Improved customer service and processing	10	2	0	0
F. An Ideal Tool for promotion of local content	12	0	0	0
G. Promotes a one stop shop for the digital users	12	0	0	0
H. A non-discriminatory platform that promotes play	12	0	0	0

Just to digress, one should bear in mind that the data and views presented in Section 7.2.1, which is the current section, are by no means meant to review the proposed model. The intention is solely to substantiate issues nitpicked by the literature survey on benefit factors, challenges and revenue generation models within the realm of Voice Telephony Applications. So with that being said, the responses on benefits of Voice Telephony Applications which are presented in Table 7-1 above give a summarised version of the same Microsoft Excel results on responses from interviews conducted in ECP. These responses are from rural SMME farmers around Alfred Nzo, Amathole, Chris Hani and OR Tambo District Municipalities of ECP. The numbers given in tables' cells depict the number of participants who rated each factor. Rural SMME farmers were also required to rate the level of influence that each of the identified factors below would have towards the anticipated long-term use of Voice Telephony Applications. The four point Likert Scale consists of four scores from which the respondent had to either choose "Very High", "High", "Low", or "Very Low", as demonstrated in Table 7-1 above.

- **Accessibility to less literate users**

Some of the rural SMME farmers have confirmed in the interviews that since their upbringing they have used cellphones and telephones to make voice calls, nothing else, as even writing letters was a challenge to them; as Table A-1 below attests. The rural farmers have admitted that their level of literacy is one factor that drives them away from conventional Internet borne services. Thus, rural SMME farmers confirmed that Voice Telephony Applications and general IVR systems seem to be easier accessible to less literate people and need no special skill. This confirmation is illustrated in Table 7-1 above as it confirms that out of the twelve, eleven chose very high with only one of the twelve respondents who selected high. Therefore, this research can deduce from the submissions made by the literature survey and also shared by the greatest majority of respondents, and confirm that Voice Telephony Applications are perfectly suitable for illiterate users.

- **Caters to the language needs of its target audience**

All twelve of the respondents in the sample unanimously admitted that they make phone calls to one another in the language of their choice to communicate, as illustrated in Table 7-1 above. By their own admission, the rural SMME farmers valued this benefit to be very high. The respondents stated that they expect Voice Telephony Applications like making voice calls to promote communication in IsiXhosa, as shown in Table A-1 below. Therefore, the findings from the literature survey and submissions by the majority of respondents affirm that orientation of Voice Telephony Applications according to the language needs of the target audience is the key ingredient to their adequate adoption.

- **Relevant e-WOM tool for effective marketing**

Table 7-1 above confirms this benefit as illustrated that, eleven out of the twelve respondents rated this benefit as very high with one respondent who rated this benefit as high respectively. Table 7-1 assures that all the respondents viewed this as the major influential factor. In their views from Table A-1, respondents say that they cannot wait until Voice Telephony Applications become available to share information relating to the markets and information relating even to crime, theft, and health issues. Therefore, judging by the confirmations from the literature findings and responses from the interviews, this research project would confirm that effective marketing through Voice Telephony Applications is one such benefit that can never be overlooked.

- **Application is accessible anytime and anywhere**

As displayed in Table A-1, the respondents have fully confirmed that Voice Telephony Applications would be ideal platforms to communicate, and access market related information anytime and anywhere. On this note the rural SMME farmers assured that for people of their capabilities, low-end mobile phones enable this around-the-clock information accessibility through telephony applications. It is clear from Table 7-1 that out of the twelve respondents; eleven rated this benefit as very high with only one respondent rating this benefit as high. From these inferences, this research project can fully confirm that all the respondents unanimously viewed this as a major influential factor, as the literature survey would advise likewise.

- **There is improved customer services and just-in-time processing**

A number of respondents personally affirmed in Table A-1 that Voice Telephony Applications promise to shorten marketing cycles, streamline marketing services and they cannot wait to see them tomorrow. On top of these positive remarks, their experiences with voice calls have taught them that with conventional IVR systems their privacy is not invaded and the information is up-to-date. This proclamation is presented in Table 7-1 as ten of the twelve respondents rated improved customer service and just-in-time processing as very high, whilst two respondents rated it as high. Thus, based on these confirmations from both the majority of rural SMME farmers interviewed and literature survey, Voice Telephony Applications can benefit rural farming communities.

An ideal tool for the promotion of local content

Some of the respondents have attested in Table A-1 that through Voice Telephony Applications they anticipate to sell wool, milk and livestock through their own mother tongues to their target market. To top it all, people can communicate in whatever language on their cell-phones. It is clear that all twelve respondents wholeheartedly rated this benefit as very high, as illustrated in Table 7-

1. Therefore, the wholehearted support from the interview responses and the literature survey affirms that Voice Telephony Applications do promote local content.

▪ **Promotes one stop shop platform for the entire digital users**

Table A-1 accentuates this understanding as the interviewed respondents articulated that just like word of mouth; through Voice Telephony Applications they anticipate an active interaction with experts, farmers and government officials from the Department of Agriculture on important issues. Thus from Table 7-1, it can be plainly seen that all the respondents unequivocally rated this benefit as very high. One can concede from these submissions that Voice Telephony Applications such as the Spoken Web should be fully adopted, for in the words of IBM (2010, p. 4), they denote a “one gate knowledge-hub” which enhances a seamless exchange of information and services between relevant parties.

▪ **A non-discriminatory platform that promotes active participation**

Conclusively, this research project declares that all the respondents from rural areas rated this benefit as very high in their scores (as Table 7-1 confirms). Literature survey from Interactions (2008) reveals that Internet borne platforms, and complex devices such as smartphones lack promoting the “sixth market-mix element” called “play” as most non-computer savvy users cannot play with these devices and services. The respondents in Table A-1 expressed the same view by mentioning that they can independently use phones to make voice calls without external help, and this would boost their confidence and usability prowess. Since the majority of respondents assured that through low-end mobile phones they are afforded an opportunity to independently make voice calls, underprivileged farmers can effectively market their service offerings through telephony applications. This then, consolidates the view by the literature survey which claims that play is promoted in Voice Telephony Applications such as the Spoken Web.

7.2.1.4 Factors that can discourage rural SMME farmers for the effective adoption of Voice Telephony Applications (refer to Section 4 in Appendix A-1 below)

Having drawn an in-depth analysis on views shared by rural users on anticipated benefits pertaining to Voice Telephony Applications, this research project would like to do likewise on the factors expected to challenge the emerging Voice Telephony Applications. These factors will be discussed later in this mini sub-section. This mini sub-section also looks at responses on factors that can discourage rural SMME farmers in ECP from using Voice Telephony Applications. These

are presented below in Table 7-2 with their rated values on responses from interviews conducted in Alfred Nzo, Amathole, Chris Hani and OR Tambo District Municipalities of ECP.

Table 7-2: Ratings on Responses from Anticipated Telephony Application Challenges

Challenge Factor	Likert Scale Score			
	Strongly Agree	Agree	Disagree	Strongly Disagree
A. Frustration, anger and disillusionment	10	0	2	0
B. Fear of being labelled as an outlier, backward	9	3	0	0
C. Growing pessimism due to alternatives	9	0	0	3
D. Fear due to risk, uncertainty and security	9	0	0	3
E. Lack of innovative capacity	10	2	0	0
F. Poor operational procedures and support	10	0	2	0
G. Lack of awareness and IT knowledge	11	1	0	0
H. Mismatch between technology and ecosystem	10	0	2	0
I. Cost of accessing and using the technology	12	0	0	0
J. Applications never be supportive like humans	10	0	2	0

The numbers provided in the table’s cells portray the number of respondents who rated each factor. Rural SMME farmers were also required to rate the level of concession that each of the identified factors below would have towards the long-term use of Voice Telephony Applications. The respondents had to choose either “Strongly Agree”, “Agree”, “Disagree” or “Strongly Disagree” from a four point Likert Scale; as demonstrated in Table 7-2 above.

▪ **Frustration, anger and disillusionment due to command issues**

Rural users conceded in Table A-1 that there will be not enough time to go back if they miss any voice instruction or message due to echo and technical issues. As shown in Table 7-2 above, ten rural SMME farmers interviewed strongly agreed, whilst two disagreed that this factor will drive them away from using Voice Telephony Applications. From this analysis, this research project can confirm that the articulations by the literature survey and majority of rural users interviewed vindicates that this growing apathy can develop from frustration due to tedious voice instructions or malfunctioning Voice Telephony Applications.

▪ **Fear of being labelled as an outlier, backward and poor**

As outlined in Table A-1 below, respondents conceded that they will not use Voice Telephony Applications if they will be despised or ostracised by leaders and peers. This factor is validated by concessions in Table 7-2 where nine out of twelve respondents strongly agreed. On top of that, only three of rural SMME farmers interviewed merely agreed that this factor will discourage them

from using Voice Telephony Applications. Therefore on the basis of these confirmations, rural SMME farmers can be discouraged from using Voice Telephony Applications for marketing purposes as the majority of respondents assured.

▪ **Growing pessimism due to alternative services**

Table A-1 cautions that users will not use telephony applications if they fare worse compared to convenience gained on alternatives. Data presented in Table 7-2, confirms that nine of the twelve respondents strongly agreed. This is against three respondents who strongly disagreed that growing pessimism due to alternatives will discourage them from using these applications. Therefore if the majority of rural users interviewed strongly agreed with the literature survey that pessimism is the determinant factor, then Voice Telephony Applications will not be seamlessly adopted if this challenge is not fully addressed.

▪ **Fear due to risk, uncertainty and security issues**

As displayed in Table A-1 below, respondents conceded that feeling insecure, misled for ulterior motives will kill confidence in Voice Telephony Applications and this will appear like a scam to them. Table 7-2 confirms that nine out of twelve respondents strongly agreed. In the same vein three respondents asserted that fear due to uncertainty and security issues would discourage them from using Voice Telephony Applications for marketing. Clearly, the literature findings, and a majority of rural SMME farmers interviewed confirm that fear due to risk and security will discourage them from using Voice Telephony Applications such as the Spoken Web for farming purposes. Therefore on the basis of these submissions, Voice Telephony Applications will not see the light of the day unless fear is allayed.

▪ **Lack of innovative capacity**

As affirmed by the *Diffusion of Innovations Theory* within the literature review, Grantham and Tsekouras (2005) and Rogers (2003) opine that individual innovativeness has varying categories from earliest to latest adopters. Rural SMME farmers conceded in Table A-1 with others stating that they have poor interest when it comes to learning new technologies and this is informed by perceived benefits. As shown in Table 7-2, out of the twelve respondents ten of them strongly agreed. This view is against two respondents who just agreed that lack of innovative capacity will drive them away from using Voice Telephony Applications such as the Spoken Web. From this analysis it is clear that the majority of rural SMME farmers interviewed share the same sentiments with the literature survey, as they confirm that lack of innovative capacity can discourage them from using Voice Telephony Applications.

▪ **Poor operational procedures and support**

Taking a cue from Watanabe (2012) then, IBM India has to assure that the development and deployment of Voice Telephony Applications will appeal to the needs and aspirations of communities with diverse cultures like those of India. It can be inferred from Table 7-2 that ten out of twelve respondents strongly agreed that poor operational procedures and support can discourage them from using Voice Telephony Applications. Two of the twelve respondents disagreed that this would curtail them from using Voice Telephony Applications. Respondents from Table A-1 validate this analysis with rural farmers interviewed personally stating that they hope Indian languages will not be used as some technologies developed overseas use English, the language of its developers. Clearly, as the majority of rural farmers interviewed confirmed that poor procedures and support can discourage them from using Voice Telephony Applications, then these applications will never see the light of day if this challenge is not taken into cognisance.

▪ **Lack of awareness and IT knowledge**

In line with this factor, some of the respondents interviewed have in Table A-1 confirmed that Voice Telephony Applications seem to be a great idea for underprivileged communities. Data presented in Table 7-2 confirms that eleven of the twelve rural farmers interviewed, which is the greatest majority of respondents, strongly agreed that lack of awareness and IT knowledge is the determinant factor for the adoption of Voice Telephony Applications. The interviews further confirm that only one of the twelve respondents who agreed with this claim. By virtue of both the literature survey and the majority of respondents confirming that they will be curtailed from using Voice Telephony Applications, then this research project wishes to submit that this technology will be hindered by lack of knowledge from its consumer audience.

▪ **Mismatch between technology and the ecosystem**

As shown in Table A-1, some respondents reiterated that they will be discouraged from using Voice Telephony Applications if they are in conflict with the entire ecosystem. Majority of respondents as shown in Table 7-2, strongly agreed that they will be disillusioned if there is a mismatch between Voice Telephony Applications and the ecosystem. Ten of the twelve respondents strongly share this sentiment against two respondents who just disagreed that mismatch can discourage them from using Voice Telephony Applications. Mismatch between Voice Telephony Applications and the entire ecosystem can discredit their use by rural farming communities as the majority of interviewed rural SMME farmers share the same sentiment.

▪ **Cost of accessing and using the technology**

Based on Table 7-2, all the respondents strongly agreed that cost of accessing and using Voice Telephony Applications will play a role in discouraging users from adopting them in future. To put this analysis in perspective, as written in Table A-1, some of the users have articulated that high “user cost is tantamount to day light robbery” and this is the nature of conventional telecom firms. As the main factor of this research project, user costs must be taken into consideration as they are likely to hinder the adoption of Voice Telephony Applications by underprivileged rural farmers; this featured from the overwhelming majority of respondents and the literature survey.

▪ **The telephony applications will never be supportive like human beings**

Table 7-2 shows that ten of the twelve respondents strongly agreed that Voice Telephony Applications will never offer them the same support like the human beings. However, two of the twelve respondents disagreed with this view. Thus, the majority of respondents agreed that no telephony application can substitute the utmost value of human support in communication. Some of the respondents in Table A-1 have in their own words articulated that “the warmth, support and intelligence of a human being are unparalleled skills”, and to them this seems like empty promises from politicians. Therefore based on the views shared by the majority of respondents and the literature survey, this research project asserts that lack of human intelligence poses a threat to Voice Telephony Applications.

7.2.1.5 Revenue Generating Methods’ Responses from Rural Farmers Interviewed

Having made critical analysis on factors challenging Voice Telephony Applications, this research project will do likewise on responses received from rural SMME farmers on revenue generation models as explored in this mini subsection and illustrated in Figure 7-2 below.

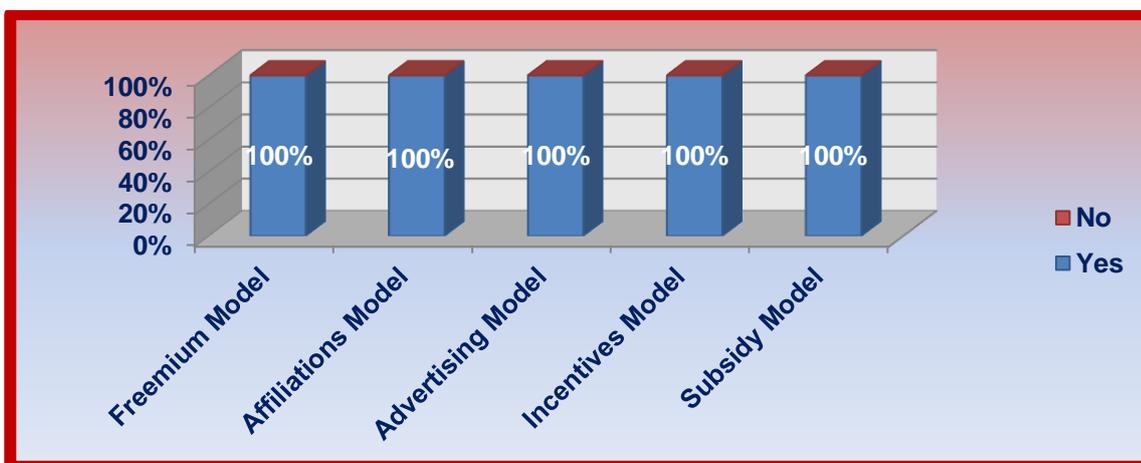


Figure 7-2: Stacked Cumulative Graph with Responses on Revenue Generation Models

The inclusion of rural SMME farmers stems from the fact that these are expected end-users of Voice Telephony Applications where a commercially viable model has to be developed for its sustenance. The interviews conducted with these rural SMME farmers have five models where the respondent had to either choose “Yes” or “No” and further support his/her view, as illustrated in Figure 7-2 above and discussed below, accordingly (refer to Section 5 in Appendix A-1).

▪ **Freemium Model**

As contained in Table A-1, rural SMME farmers have reiterated that as users with low literacy levels and limited resources they will support the Freemium Model on the basis of the following claims: (a) during the trial period the users will be afforded the opportunity to familiarise themselves with Voice Telephony Applications; (b) user will not be obliged to pay for initial costs during the trial period; (c) farmers will use Voice Telephony Applications in this trial period to complement their current marketing techniques and learn the dynamics of the telecom market they are operating within, and (d) the Freemium Model will help them to increase their support base. Figure 7-2 above reaffirms this claim by illustrating that all (or 100%) of the rural SMME farmers unanimously agree that they will support the initiative; hence this research project advises likewise due to the supporting literature review and views shared by all the respondents.

▪ **Affiliation Model**

Respondents stated in Table A-1 that forming alliances will bring the following benefits to the farming communities and agro businesses: (a) co-opting will promote the sharing of resources and expertise; (b) both small and established businesses will cross sell each other’s service offerings; (c) partners will bring their following to the alliance, and (d) the Department of Agriculture and small farmers will earmark grant days as appropriate days for the sharing of information between alliance partners. These views were shared by all the rural SMME farmers interviewed as illustrated in Figure 7-2 above. Only one who asserted that his/her support for this model is subject to a certain fear. The reason being cited for this fear is the “lack of confidence on potential partners”, as contained in Table A-1. Therefore, on the basis of the supporting literature survey and views shared by the majority of respondents during the interviews, affiliations will be ideal for the rural farming communities.

▪ **Advertising Model**

Objectively, as contained in Table A-1, the rural SMME farmers have expressed that they anticipate the following benefits through Voice Telephony Applications: (a) agro-businesses can easily interact with their target markets and this promotes effective advertising; (b) as a telephony

application that is accessible anytime and anywhere, there is likely to be continuous market growth and business support; (c) a service that is accessible through cellphones will help in reducing transport costs that are associated with marketing, and (d) as a less computer-aided communication platform, underprivileged rural farmers will find it less complicated to operate; hence complementing it with other forms of advertising for increased sales volumes. Figure 7-2 confirms that all twelve rural SMME farmers interviewed conceded that they will support advertising mechanisms in Voice Telephony Applications. It has come to the attention of this research project that as the majority of respondents and supporting literature concur, advertising on farming would work on Voice Telephony Applications as advertisers would get increased sales through tapping into niche consumer markets.

▪ **Innovating Pricing and Incentives-driven Model**

As articulated in Table A-1, a common feature that comes from the interviews conducted with rural SMME farmers is that, these underprivileged farmers are looking to support this model. This would afford them an opportunity to utilise user friendly means that need no skill and above all associated telephony calling promotions, accrued incentives or perks and airtime discounts offered to them on Voice Telephony Applications would be a cherry on top. All twelve rural SMME farmers unanimously confirmed that they will opt for Voice Telephony Applications on the basis of anticipated benefits, as illustrated in Figure 7-2. Ideally, as commonly shared by both the majority of respondents and supporting literature, innovating pricing and incentives-driven schemes would encourage more rural farming community members to use Voice Telephony Applications for electronic marketing.

▪ **Subsidy Model**

Rural SMME farmers interviewed have articulated in Table A-1 that they will amongst others mix their methods to supplement any Voice Telephony Application shortfalls. The benefits received from conventional IVR systems, anticipated accessibility of Voice Telephony Applications and the fact that they are customised to underprivileged users makes them ideal tools over their competitors in years to come. This is illustrated in Figure 7-2. All the rural SMME farmers interviewed unanimously confirmed that they will support Voice Telephony Applications even if they were to be introduced next month. Therefore, subsidies should be adopted as the literature survey concurs with the majority of rural SMME farmers interviewed who confirmed that they would promote use of Voice Telephony Applications. The ICT experts make their own submissions on models as written in the next sub-section below.

7.2.2 Findings and Discussion of Interviews with ICT Experts

This sub-section will critically analyse and interpret the results from the Expert Review Method against applied theories and models within the two sub-sections that follow below. Clearly, data from the interviews conducted with rural SMME farmers (the intended beneficiaries of Voice Telephony Applications) has been analysed and interpreted in Section 7.2.1 above. At this juncture, it is also fitting to do likewise on reviews shared by ICT experts on revenue generation models (refer to Part 1 in Appendix A-2 below). This is illustrated in Figure 7-3 below and discussed in the next five mini sub-sections that are preceded by the chart below.

7.2.2.1 Assumptions Related to the Five Models of the Revenue Generation Model

In this mini sub-section each of the bar charts represents the seven Revenue Generation Assumptions as written in the interview questionnaire from A1 to A7 in Figure 7-3 below.

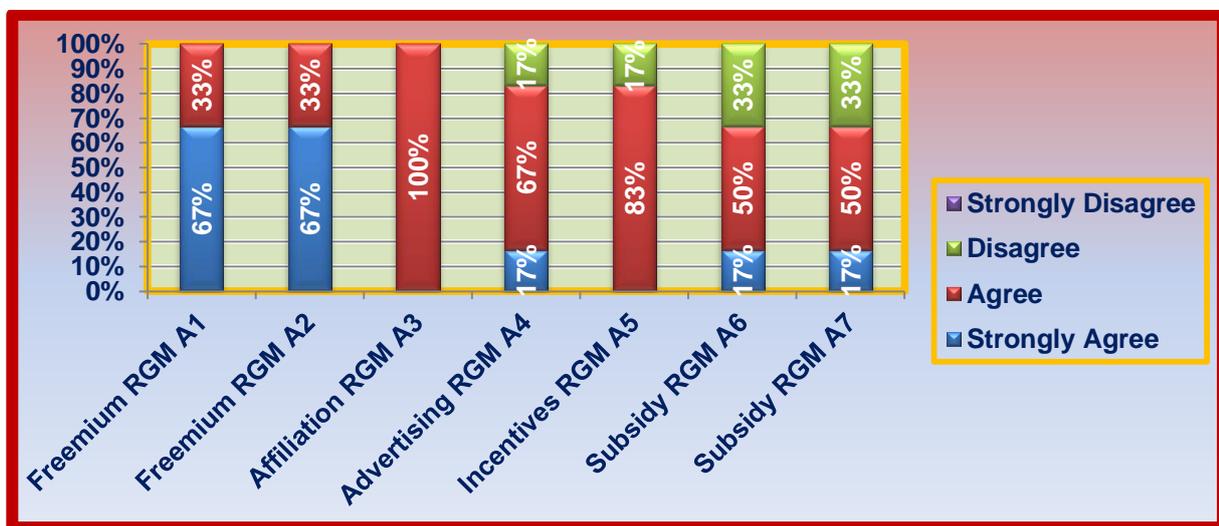


Figure 7-3: Cumulative Bar Graph on Expert Reviews from Revenue Models

7.2.2.1.1 Expert Reviews on Freemium Model

This model has two assumptions as contained in Part One of the interview questionnaire:

- **Review on Assumption One (Freemium RGM A1)**

Figure 7-3 above infers that the greater majority of four out of six expert reviewers (67% of them) strongly agreed that the Freemium Model should be incorporated in the Introduction Stage. Two of the six expert reviewers (33% of them) also agreed to this view as explored by the first reviewer. As noted in Table A-2, the second reviewer cautioned that competition and commercial viability must be taken on board as this is one aspect that we cannot turn a blind eye on as Voice Telephony Applications are an emerging technology. However, anticipated advantages presented by this emerging technology give it leverage against its competition. There is nothing sinister about

competition as the Research ICT Africa (2012, p. 3) posits that “the net effect of fairer competition is lower cost of communication, better services, and more equitable returns on investments for all operators”. Gillwald (2013) and Calandro and Moyo (2012) caution in this regard that ICASA as a regulatory body has a mandate to promote a healthy competitive telecom market in South Africa. Uncertainty at this stage of introduction cannot be discounted as Rogers (2003) and Agarwal and Prasad (1998) noted that every technology that is introduced in the telecoms market is subject to rival competition.

Anderson and Zeithaml (1984) attest that this developmental stage is defined by chaos as there are no proper procedures and processes in place, but with time it will build its brand loyalty and more consumer base. On this note third, fifth and sixth expert reviewers as contained in Table A-2, raised the following concerns: (a) the user is absolved from consuming and paying for the voice-telephony service, and (b) Voice Telephony Applications are intended for rural SMME farmers who have very limited resources, then content providers must contribute funding to sustain this technology. Similarly to the views shared by the majority of ICT experts interviewed and the fact that limited free transactions such as *M-pesa* (IT Web, 2013) and *EcoCash* (EcoNet, 2013) managed to get traction in the underprivileged telecom market, this research project advises likewise for the Freemium Model at the Introduction Stage.

▪ **Review on Assumption Two (Freemium RGM A2)**

As illustrated in Figure 7-3 above, this assumption had the similar ratings as assumption one above, with four out of six expert reviewers (67% of them) strongly agreeing that they support this view with only two of the total six expert reviewers (33% of them) just merely agreeing. In this regard as noted in Table A-2 below, the second expert reviewer concurred with the third expert reviewer as the latter submitted that “trialability has advantages for both the developers and the users. The developers are able to use the feedback to improve the system. For users, it encouraged use of the tool as they are more comfortable; adoption will thus not be a problem.” To allay any ambiguity as noted by the sixth expert reviewer in Table A-2, whose concern is about accessibility of the technology and anticipated benefits; the literature survey addresses such ambiguity. In this context, EcoNet (2013) and IT Web (2013) confirm that through the Freemium Model users will be afforded limited calls to put the new ICT service into practice as this will improve familiarity with the service. This in the long run will lead to a wider market, improved sales and better profits in the future for content providers (University of Twente, 2011). Rogers (2003) notes in his *Diffusion of Innovations Theory* that early adoption is a function of varying innovativeness attributes of individual users.

Therefore on the basis of these two assumptions, reviews shared by the majority of expert reviewers in conjunction with the views contained within the literature survey confirm that if adequately adopted, the Freemium Model can be an ideal funding mechanism. This could eventually lead to the optimum use of Voice Telephony Applications by the rural SMME farmers in ECP.

7.2.2.1.2 Expert Reviews on Affiliation Model

Now that the Freemium Model has been reviewed, the same should be done on the Affiliation Model. Obviously, the review of the latter model has one assumption as stipulated below.

▪ Review on Assumption Three (Affiliation RGM A3)

Unanimously as shown in Figure 7-3, all six (or 100%) of the expert reviewers confirmed that they do agree that during the Growth Stage affiliate partners should contribute to the call costs. This in turn can afford content providers an opportunity to exploit cross-selling opportunities in the Affiliation Model. Malebanye (2007) posits that local leading brands, rural communities, telecom operators, and government departments can form alliances to co-opt and cross-sell each other. The resultant effect of which will be improved market share, better sales and increased profits. Even the rural SMME farmers articulated in Section 7.2.1.5 that the same concept takes place in their rural communities as resources and information are easily shared amongst alliance partners. The multiplier effect of the spoken word, through e-WOM platform benefits mentioned in Section 7.2.1.3, can take precedence in Affiliation Model.

Therefore compared to the Initial Stage, since the telecom market is familiar with Voice Telephony Applications, the following milestones can be achieved: (a) increased market share; (b) better replication on previous success factors; (c) a propensity for better sales and revenues, and (d) improvement on profit margins. Thus affiliations can set in at this stage of lifecycle development (Business2000, 2013). This stage is defined by resolve in uncertainties relating to commercial and technical issues, and coupled with that there is an increment in innovations (Le Buhan, 2013). It should be stated that this is part of the early adopters (represented by 92% of rural farmers interviewed in Section 7.2.1.5) that will eventually utilise the services of the new Voice Telephony Applications. This assertion is contained in Figure 5-2 of Section 5.3, as also noted by the *Diffusion of Innovations Theory* from Rogers (2003). Affiliations between IBM, SAP and AMUL (farming processing technology) proved that partnerships forged between content providers and rural farmers who form cooperatives really bear fruit in future (M2PressWIRE, 2009). This is the same reason that prompted the sixth expert reviewer in Table A-2 to state that “Client centricity

needs to be at the heart of what we do, to keep the ‘Adoption Driven Curve’ high, for a longer period of time”. Therefore, on the basis of the support by the literature survey and reviews shared by the greatest majority of the ICT experts interviewed, then ideally the Affiliation Model should be introduced at the Growth Stage for better revenues or profits for content providers.

7.2.2.1.3 Expert Reviews on Advertising Model

Now that this research project has done extensive work on the Affiliation Model, it is also fitting to lay bare expert reviews on the Advertising Model. This latter model has one assumption as contained in Part One of the interview questionnaire as addressed below.

▪ Review on Assumption Four (Advertising RGM A4)

The demand for Voice Telephony Applications has now fully stabilised during the Maturity Stage. This market stability is indicated by the increase at an increasing rate in the adoption curve. So far, prospects for radical consumption are gaining momentum due to increase in consumer market base (Anderson & Zeithaml, 1984). On the backdrop of reduced input costs for marketing in return for increased sales and revenues, better profits would be realised through voice marketing. This by definition implies that content providers would have an incentive for contributing towards the reduction of voice call costs.

The second expert reviewer in Table A-2 cautioned that users should be educated not to waste their hard earned cash listening to a litany of irrelevant adverts in the process. In the same breath, the fourth expert reviewer lamented that “commercial drivers” of advertising should not run rampant at the peril of merely continuing the service. Furthermore, the sixth expert reviewer warned that in the whole process it would very disingenuous to discount the role of local authority members like chiefs. On this note, Grantham and Tsekouras (2005) and Rogers (2003) posit that influential people and early adopters can make recommendations about the new technology to peers and the greater community at large as the early majority has now bought into the idea, as shown in Figure 5-2 of Section 5.3 (refer to Chapter 5).

As illustrated in Figure 7-3, one should note that only one (or 17%) of the six expert reviewers strongly agreed that advertising is an ideal funding model for Voice Telephony Applications, a view also supported by four (or 67%) of the six expert reviewers. This review is against a mere minority of one expert reviewer (or 17% of them) who somewhat object to this view. In spite of this objection, the fifth reviewer asserts that Advertising Model “would be more suitable in this stage” of development. For argument’s sake, rural SMME farmers interviewed have stated that

adverts sent through Voice Telephony Applications would help to cut distances and selling times for underprivileged people like them, as expressed in Section 7.2.1.5.

Therefore from the reviews merely shared by the expert reviewers and supporting literature, it would be fit that advertising should be introduced as another funding model for users of Voice Telephony Applications at this Maturity Stage. This assertion owes to the fact that the demand for Voice Telephony Applications has now stabilised. This view is supported by the majority of expert reviewers who confirm their consent to the understanding that content providers would fund the model through adverts. Moreover, the power of e-WOM mentioned in Section 7.2.1.3 can also take precedence in advertising as they would in innovative and incentives schemes mentioned below.

7.2.2.1.4 Expert Reviews on Innovative Pricing and Incentives Model

Clearly, it is within the confines of the social exchange relationship that both parties in a relationship mutually expect some kind of material or non-material reward as an incentive to part ways with their respective resource. This can be *money, prestige, profit or reputation* as defined by the *Social Exchange Relationship Theory* (Cook, 1977). This is the same theory that can motivate telecom operators, government, and content providers in general to support promotional discounts and tax breaks for the Innovative Pricing and Incentives Model. Essentially, the review of this model has one assumption as contained in Part One of the interview questionnaire, as stipulated below.

▪ Review on Assumption Five (Incentives Model RGM A5)

As presented in Figure 7-3, five (or 83%) of the six expert reviewers agreed that incentives come in all forms in Information Technology. Evidently, offering voice-telephony services that do not need text-interfacing and this is one such incentive for the rural SMME farmers who are not computer savvy. This review as illustrated in Figure 7-3 above is against one (or 17%) of the six expert reviewers. This dissent view comes from the fifth expert reviewer who objects that text cannot be compared to voice as these are less literate users who surely cannot read text as Table A-2 shows. In the same vein, the sixth expert reviewer cautioned that unlike text-based interfaces, voice-based ones are much preferable for illiterate users who cannot read and write; the technology can be customised according to the preferential language of the user.

One of the means of encouraging support for the new technology from rural users is through offering them promotional discounts on consumed airtime. In this regard, the telecom operators and other interested content providers such as government and established relevant businesses

would bear the brunt. By the same token as the kind gesture to such initiatives, the Treasury can give tax rebates or breaks to institutions or enterprises that make such offer to the end-users as a means to reduce voice call costs. This would lead to more revenues for these enterprises, which would trickle down to more revenue base collection for the Treasury Department in future (Malebanye, 2007). This is the developmental stage where the technology has reached its saturation point (Anderson & Zeithaml, 1984). Moreover, Grantham and Tsekouras (2005) and Roger (2003) confirm that the greatest majority has also grown into fully embracing the new technology as the innovation bug has now gained momentum (refer to Figure 5-2 in Section 5.3). As advised by the sixth expert reviewer then, the rural SMME farmers interviewed pronounced that they too would support Voice Telephony Applications. This would be a function of funding by this incentive-driven model on the basis of being user friendly to their language of preferences, and being granted promotional discounts, as discussed in Section 7.2.1.5.

Therefore, on the backdrop of the critical argument presented above from the literature survey and reviews shared by ICT experts, rural SMME farmers will prefer this model at this developmental stage. Technically for the sake of commercial viability, content providers would contribute part of the funding as the greatest majority of them have confirmed their support for this model, before employing the upcoming model below.

7.2.2.1.5 Expert Reviews on Subsidy Model

Simply put, Subsidy Model is a scheme where government partly pays for the remainder of the consumption costs as has been the case within the telecoms sector in emerging Asian countries (Dhage & Prasad, 2013; Jain, 2012). This model has two assumptions as contained in Part One of the interview questionnaire as stipulated below.

▪ Review on Assumption Six (Subsidy RGM A6)

Based on Figure 7-3, one (or 17%) of the six expert reviewers strongly agreed that the Subsidy Model can be introduced as the funding scheme for the sustenance of Voice Telephony Applications in the Decline Stage. As illustrated in Figure 7-3, this view is also shared by three (or 50%) of the six expert reviewers. However, two (or 33%) of the six expert reviewers disagreed with this view. Dissent from the opposing experts as articulated in Table A-2 is purely on the basis that rationally there is no government institution that can “prop up a scheme with taxpayers’ money” on a technology that is at the brink of its demise or obsolescence. Fundamentally as the last stage of lifecycle development, the existing technology service has lost its relevance in this Decline Stage. This loss is due to being less innovative compared to existing competition, hence a

drop in sales or consumption (Anderson & Zeithaml, 1984). However with that being said, the fourth and sixth expert reviewers do attest in Table A-2 that government may come on board to support the model based on the following submissions: (a) government has a vision to increase access to ICT services particularly on underprivileged communities; (b) through wisdom and proper planning from government this telephony application will be marketed quicker; (c) government can through its “buy-in pull in potential sponsors quickly”, and (d) with new and more services coming into the telecom market, service costs will drop- an inherent ability of competition. The success stories of Voice Telephony Applications and the understanding that for now it is the best alternative for less computer-savvy users, would give it an edge over other technologies in underprivileged communities. In addition, GSM Association (2007) cautions that it is better to introduce subsidy schemes such as the universal access service fund after the market has stabilised to ensure efficiency and effectiveness of the technology in emerging markets.

Therefore, on the premise of the supporting view from the literature survey and those held by the greatest majority of the concurring ICT experts, government will be more than likely to prop up subsidy for Voice Telephony Applications. This is due to sustaining more rural user ICT participation in future. One should note that at the Decline Stage, even if the consumption of Voice Telephony Applications may drop, and no longer command an aggressive marketing approach, this does not imply that there is an inherent reduction in market share. As economic viable tools for bottom-of-the-pyramid users thus far, continued efficiency of Voice Telephony Applications should be premised on innovation.

▪ **Review on Assumption Seven (Subsidy RGM A7)**

One cannot dispute the fact that Voice Telephony Applications such as the Spoken Web so far are the best economically viable ICT tools that can add value in transforming the livelihoods of the majority of underprivileged rural farming communities for the better. These underprivileged communities can use these tools for marketing activities. This is a void that has been left by the Internet, a text-based technology which requires the user to be computer savvy (IBM, 2010). Atop it all, government, business fraternity, and society at large can use Voice Telephony Applications for accessing and distributing government services through C2G and B2G activities (Stratigea, 2011). Surely then, the laggard adopters have also come into the party. Government cannot blatantly ignore the plight of the rural farming communities in ECP as there is certainty that the Spoken Web to this end proves to be a feasible tool of communication as the Adoption Driven Curve attests in Figure 5-3 in Section 5.3. Furthermore, the *Diffusion of Innovations Theory* from Rogers (2003) validates this view.

In addition, Figure 5-2 from Grantham and Tsekouras (2005) in Section 5.3 acknowledges that everyone has now bought into the idea of using Voice Telephony Applications. In this juncture, Agarwal and Prasad (1998) also affirm their support for this view in their personal capacity. On this note, Figure 7-3 attests that one (or 17%) of the six expert reviewers strongly agreed to these claims together with three (50%) of the six expert reviewers even though two of them held a different view. This contestation as presented in Table A-2 is shared by the first and second expert reviewers who contest that it would not be economically sensible to fund a project that is in decline. Nonetheless, the fourth expert reviewer has put it on record that “It is unlikely to see a decline due to the demand for knowledge in the current information age.” Furthermore, the sixth expert reviewer states that “Potential sponsors may pull out during the life cycle of this initiative. But nonetheless, if it is aligned to the values and the intent of various government departments, it may slow down the decline stage of this initiative.”

Credibly so then, one would submit that the supporting literature and reviews shared by the greatest majority of the entire ICT experts interviewed confirms their support for the Subsidy Model in the Decline Stage. Rationally, this would be for social, political, technological and economic imperatives as it would be prudent for government to fund this noble initiative through subsidy funds.

7.2.2.2 General Assumptions Relating to the Revenue Generation Model

(refer to Part 1 in Appendix A-2)

Having attended to the first part of the interview questionnaire, it is also fit at this mini sub-section to analyse the second part of the ICT expert responses as presented in Table 7-3 below. Each ICT expert had to choose either “Yes” or “No”, as Table 7-3 below attests.

Table 7-3: Responses from ICT Experts on General Assumptions Concerning the Model

General Assumptions	Boolean Scores	
	Yes	No
1. Do you think this is an appropriate model that can be introduced to encourage user participation, and to also address the costs facing rural SMME farmers and content providers?	6	0
2. Do you think the <i>Diffusion of Innovations Theory</i> is an appropriate underlying theory to the proposed model?	6	0
3. Going through the model, are there any omissions or submissions you would suggest?	0	6

1. In reference to Table 7-3 above, all six ICT experts interviewed unanimously concur that the proposed Revenue Generation Model (presented in Figure 5-3) is an appropriate model that

can be introduced to encourage user participation, as views in Table A-3 attest. This model can also address the costs facing rural users and content providers. The second expert reviewer in this regard argued that not only must users benefit, but content providers must get incentives too. There must be an innate “win-win” for all parties to enhance “commercial viability”. The sixth expert reviewer held the same view as she added that input and expectations from government departments, network providers, and general advertising sponsors “have to be incorporated for more context and meat”. The fifth expert reviewer reiterated that to his knowledge there is no other decent approach to generate revenues other than the proposed Revenue Generation Model in this research project.

2. Same as the statement above, all six ICT experts as shown in Table 7-3 above submit that the *Diffusion of Innovations Theory* by Rogers (2003) (refer to Sections 1.7.1 and 5.3) is a suitable fit, as also outlined by views in Table A-3. The six experts add that this theory can be introduced as the underlying theory to the proposed Revenue Generation Model presented in Figure 5-3 in Chapter 5. Both the fifth and sixth expert reviewers concur that to their knowledge this theory seems to be an appropriate fit for the adoption of Voice Telephony Applications given the nature of their target market.
3. Unanimously as presented in Table 7-3 above, all six experts concurred that they do not have any omissions or submissions to suggest for the model thus far, views of which are expressed in Table A-3. However, they shared a few remarks that will add value to the proposed model. In this regard, the second expert reviewer poignantly articulated that “there must be reliable and consistent income stream for commercial viability even though this is a great model for developmental context”. The fifth expert reviewer cautions that one needs to check the relevance of comparing voice to text-based services given the context of the target users. The sixth expert reviewer advises that this research project should explicitly put it up-front that it is targeting underprivileged rural SMME farmers in ECP as it has been its primary intention. Against this backdrop, underprivileged context was clearly articulated throughout the research. In addition, the expert reviewers may have been oblivious to this description due to the limited background that was communicated during the interviews. Atop it all, the research project should incorporate practical examples in each model stage so as to avoid any element of ambiguity. Moreover, the sixth expert reviewer warns that a risk management strategy on Saturation Stage and a marketing tactic can be introduced throughout growth stages to tie in their relevance with the *Diffusion of Innovations Theory*. This theory and others are better evaluated in the upcoming section below to establish any relation with the empirical data.

7.3 Evaluation of Theory Used

This section is premised on making a comparison between the findings from the primary data collected during interviews from the rural SMME farmers and ICT experts against the literature that has been reviewed within this research project. Inductively, the researcher has to establish whether there is a logical relationship between the theoretical background and the results of the research project (Collis & Hussey, 2009; Saunders *et al.*, 2009). This in turn will evaluate whether these results endorse or reject the incorporated theories. On this note, this research project saw it fit that the *Diffusion of Innovations Theory* by Rogers (2003) and *Social Exchange Theory* by Cook (1977) are the most appropriate ones for the research problem.

7.3.1 Diffusion of Innovations Theory

Key to the adoption and infusion of information technology is to understand that users vary in their degrees of understanding the value that can be realised through utilising the services of the new application (Agarwal & Prasad, 1998). In line with this claim, it should be noted that Table 7-4 below outlines the five characteristics of each individual's innovativeness as noted by Rogers (2003) in his *Diffusion of Innovations Theory*. These are the same adoption attributes that would determine the diffusion of Voice Telephony Applications during the five stages of the lifecycle development as within each stage a revenue model is incorporated (refer to Figure 5-3 in Section 5.3). Accordingly, the incorporated models in each of the five stages of development are Freemium, Affiliation, Advertising, Innovative Pricing and Subsidy.

Table 7-4: Categories of Individual Innovativeness (Rogers, 2003)

Users	Characteristic
Innovators	Venturesome, educated, multi-info sources
Early Adopters	Social leaders, popular, educated
Early Majority	Deliberate, many informal social contacts
Late Majority	Skeptical, traditional, lower socio-economic status
Laggards	Neighbours and friends are main sources of info, fear of debt

On top of the three factors identified by Agarwal and Prasad (1998) such as *technical compatibility* and *relative advantage*, Rogers (2003) confirms that *complexity*, *observability* and *trialability* come into the fore as well.

Complexity and Observability: Costs

In future other categories of adopters such as *early adopters*, *early majority*, *late majority* and *laggards* will follow suit from *innovators*. This can take precedence once there is market knowledge, certainty and the realisation of the perceived benefits through using the new technology (Rogers, 2003). Inferences from primary data confirm that all twelve rural SMME farmers interviewed have put it on record that cost of using Voice Telephony Applications and lack of IT-knowledge will strongly influence their innovativeness propensity towards using them. In the same vein, ten of these twelve rural SMME farmers have never been shy to admit that frustration, anger, disillusionment, lack of innovative capacity, poor operational procedures, lack of human intelligence and clash with the immediate ecosystem will strongly discourage them from using Voice Telephony Applications in future. This strong view is illustrated in Table 7-2 and reiterated in Table A-1. The fact that successful implementation of Voice Telephony Applications will be put into jeopardy by the aforesaid challenges is a legitimate corroboration to the claims presented by Agarwal and Prasad (1998) on issues of *technical complexity*.

Trialability: Certainty and Loyalty

One should be mindful that through giving innovative people a chance to put Voice Telephony Applications to trial until their adoption gets momentum will really work towards a broader market adoption with time (Agarwal & Prasad, 1998). This is the same view that has been supported by the majority of rural SMME farmers and expert reviewers. This view holds that affording users the opportunity to put Voice Telephony Applications into practice would help farmers to better understand the complexities and technicalities concerning usability of these ICT services. Unequivocally as illustrated in Table 7-1 above, all twelve rural SMME farmers interviewed have unanimously confirmed that with telephony applications they are afforded a non-discriminatory platform that promotes play. This is also articulated by the literature review (refer to Section 2.4.8 of Chapter 2). The Freemium Model is the most practical case to this trialability concept as all twelve rural SMME farmers (refer to Figure 7-2) and all six ICT experts (as seen in Figure 7-3) unanimously agree. Therefore, all ICT experts interviewed agree that they support this trial and error model as it will afford users limited free transactions, as content providers will contribute funding (refer to Sections 7.2.1.5 and 7.2.2.1.1).

The benefits that can accrue through this type of revenue model include that as the users put the technology into practice its familiarity and popularity grows as prescribed by the *Diffusion of Innovations Theory* from Rogers (2003). This is the same view shared by all six ICT experts (see Table A-2) as all of them unanimously agree that with the Freemium Model users must be given

limited services for free to reduce uncertainty, as Figure 7-3 attests. Interactions (2008) opine that through encouraging the fifth element of the market mix called play to ICT tools, then users would independently use it without expecting help from a third person. In this context the information technology service gets a wider market appeal due to bolstered confidence from its end-users. Furthermore, this ability to independently use the technology for marketing purposes can trickle down to increased revenue, sales and profits in future for the concerned party.

7.3.2 Social Exchange Theory

Having done evaluation on *Diffusion of Innovations Theory* above, this research project must do likewise on the *Social Exchange Theory* as both have been incorporated as the theoretical background. According to Cook (1977), the *Social Exchange Theory* represented with its constructs in Figure 7-4 below claims that service or content providers in this context are bound to make the call costs relatively less expensive if the factors following this drawing below are the resultant effects (Cook, 1977). Section 1.7.2 has elaborated on these elements to great lengths too.

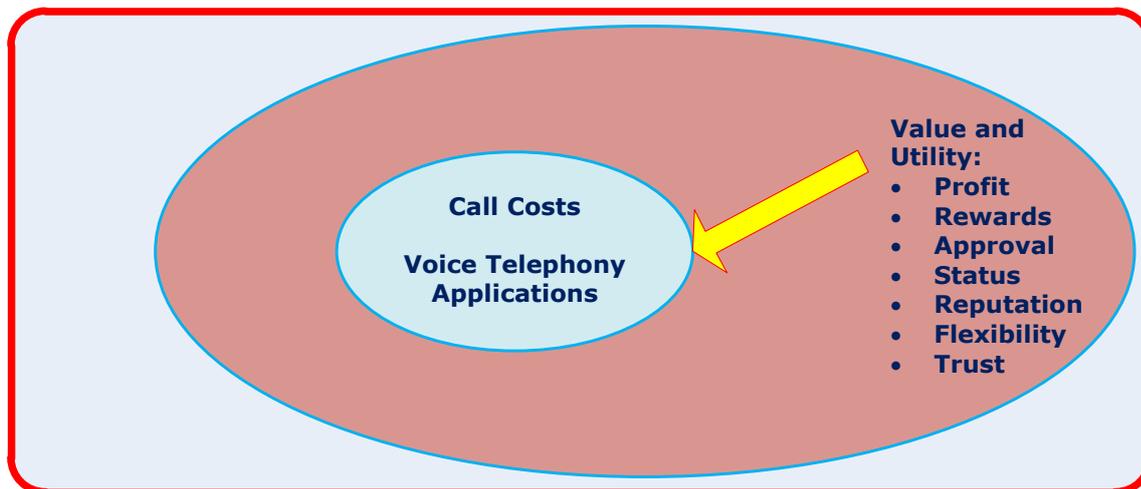


Figure 7-4: Social Exchange Elements Diagram

Value: Rewards and Recognition

From the words of Cook (1977), rewards in either material or non-material format flow due to a social exchange relationship that exists. This can lead to benefit-constructs such as *profit*, *rewards*, *approval*, *status*, *reputation*, *flexibility* and *trust* of the concerned service or entity; as illustrated in Figure 7-4 above. Therefore, through putting Voice Telephony Applications into practice, there are increased sales and revenues through revenue schemes such as forging partnerships, advertising, promotions, offering discounts, and subsidising the user costs on Voice Telephony Applications. The Adoption Driven Curve in Figure 5-3 of Section 5.3 attests to this claim with time. Through the proposed Revenue Generation Model, rewards will flow between the exchanging parties such as buyers and sellers in ECP farming. This assertion implies that Voice Telephony Applications

are ideal enablers for such social exchange transactions in underprivileged rural farming communities. The views shared by both the greatest majority of rural SMME farmers interviewed have in tandem with the overwhelming majority of experts highlighted this view, as contained in Table A-1 and Table A-2. Consensually, all the twelve rural SMME farmers interviewed have expressed that they would support Freemium, Affiliations, Advertising, Incentives, and Subsidy Model, as illustrated in Figure 7-2. Furthermore, this is the same understanding that all the six ICT experts had towards Affiliation and Freemium model, with five of them for the Advertising and Incentives models, and with four of them for the Subsidy Model. These experts all agreed that rewards realised through these models are the main incentives that would drive content providers to support them.

Utility: Partnerships and Exponential Market Growth

Provided that new relationships are forged; loyalty, trust and business confidence is further consolidated between rural farmers, established agro-businesses, customers and content providers. This can particularly work to the advantage of the Freemium, Affiliation, Advertising and Incentives models as explored upon by rural SMME farmers and ICT experts interviewed. In addition, Sections 7.2.1.5 and 7.2.2.1 confirm this submission (refer to Table A-1 and A-2 for additional responses) and Figure 7-2 and Figure 7-3 fully accentuate this claim. Most definitely, this is on condition that there is increased market exposure which could lead to increased sales or demand due to accessibility and affordability of Voice Telephony Applications by underprivileged rural farming communities.

In summary, it is evident that through the above two theories, users would be able to exchange crucial information with expected rewards from these Voice Telephony Applications. This by default implies that Voice Telephony Applications such as the Spoken Web have lived to realise the five elements of the Framework for Measuring Electronic Market Success as shared to by Elliot (2005). Therefore as advised by this framework, Voice Telephony Applications will be measured by succeeding through elements such as *channel promotion*, *channel behaviour*, *channel satisfaction*, *channel outcomes* and *channel profitability*. In de facto principles, the proposed Revenue Generation Model is the enabler of such elements. In tele-market principles, if Voice Telephony Applications through the revenue model would adhere to the market success framework, then there: (a) would be a reduction in costs; (b) increase in benefits; (c) enhanced certainty, and (e) a fostered brand loyalty in future. Clearly, the resultant effect of this telecom success story will be a new exponential growth trajectory. The views from the ICT experts have been incorporated throughout to refine the model, as the upcoming section below briefly outlines.

7.4 Proposed Model Refined

Experts expressed their views pertaining to the Revenue Generation Model and the drawing in Figure 7-5 below seeks to comprehensively depict those reviews as presented by the Expert Review method. The reasons shared by the ICT experts were that the Advertising Model should be ideally suitable for the Maturity Stage of the Revenue Generation Model as the telecom market is gaining market growth and the Incentives (Switch) Model would perfectly fit in the Saturation Stage. Technically, the slope of the model is not the critical area for this qualitative study; hence choosing not to incorporate the concern of one expert reviewer.

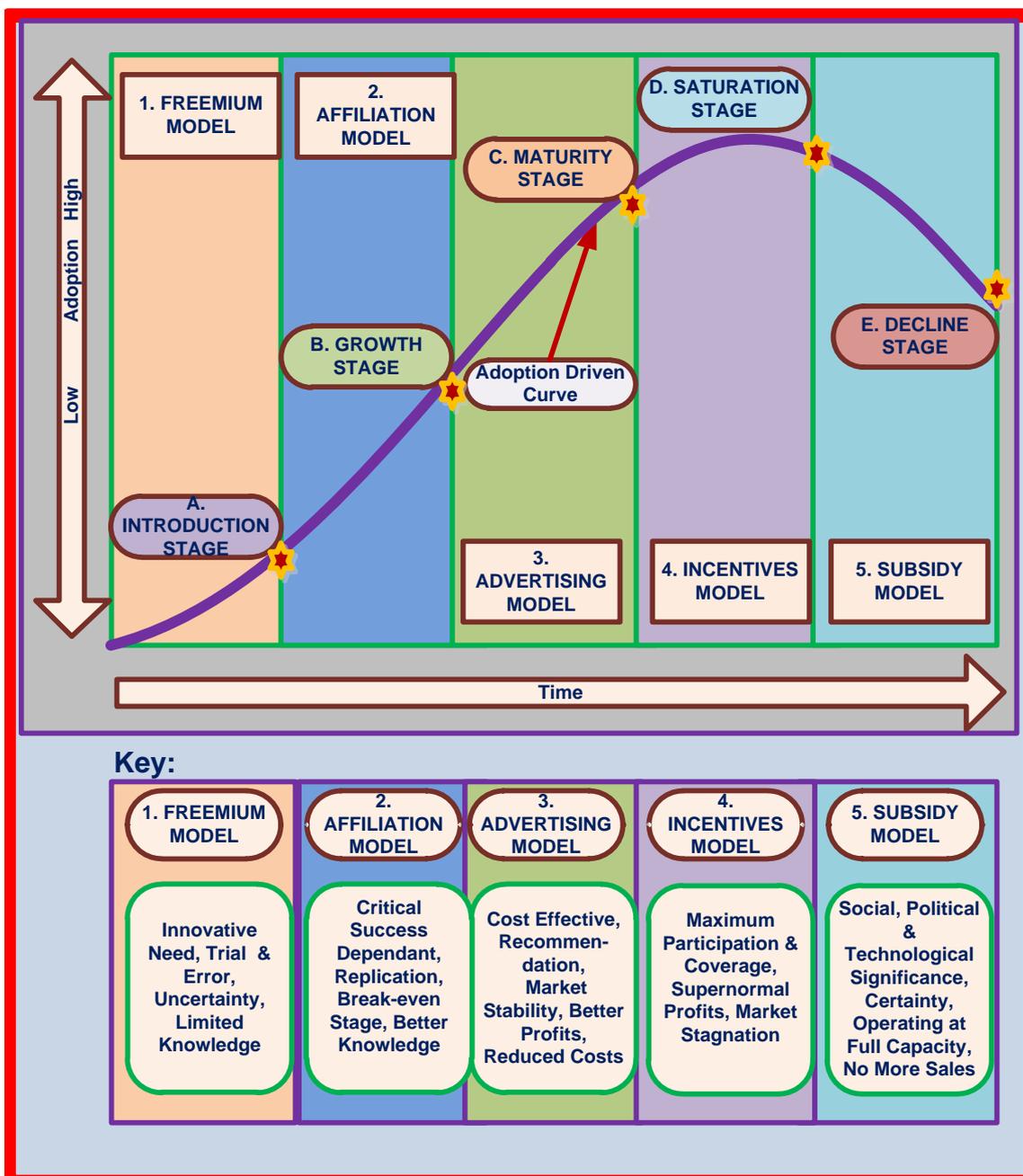


Figure 7-5: Refined Revenue Generation Model

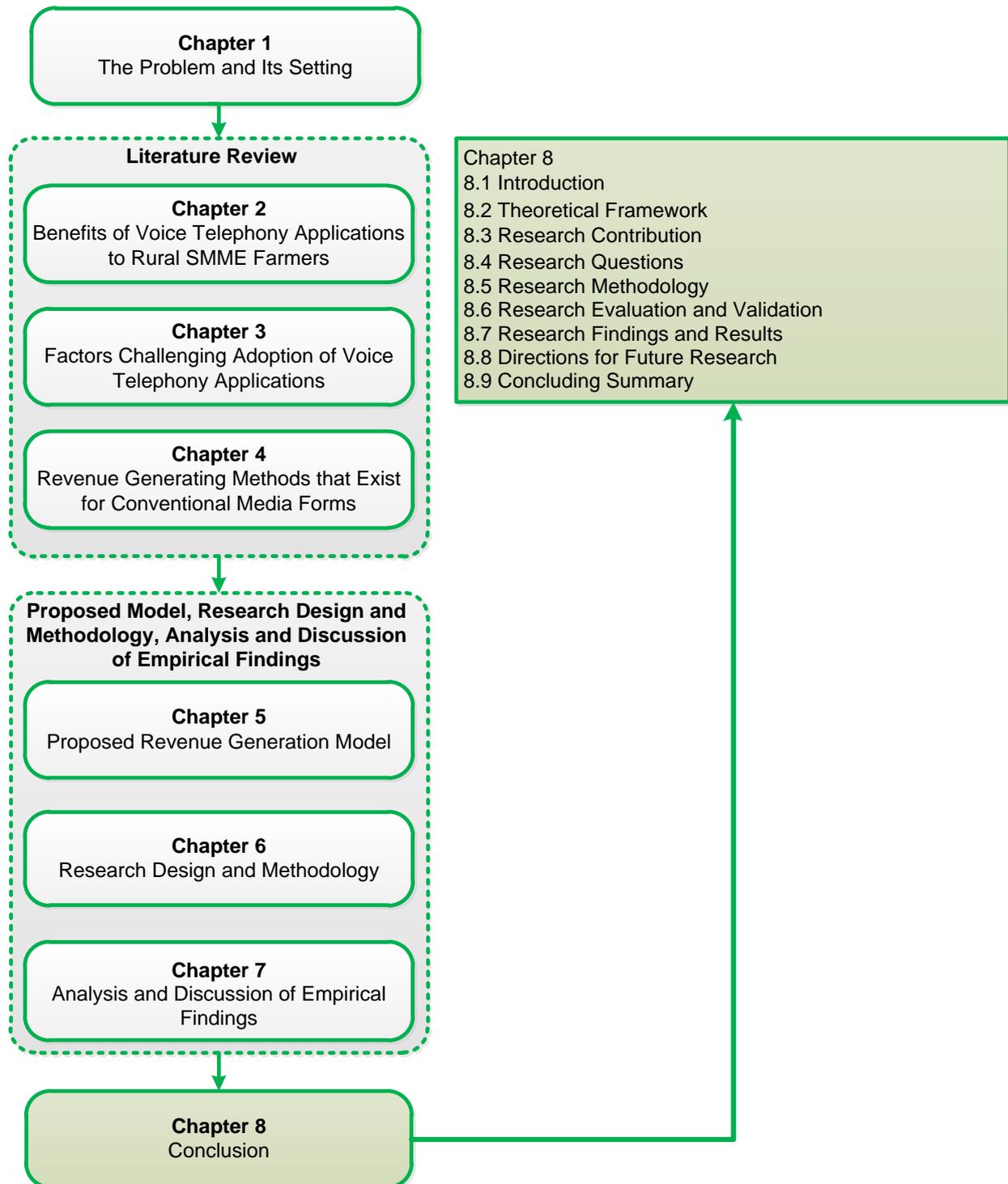
7.5 Conclusion

This chapter has managed to analyse, and interpret the findings from semi-structured interviews, face-to-face conversations and online interview questionnaires as required. Therefore, on the understanding of fully embarking on data analysis and interpretation in the above section, it is credibly essential that this research chapter should embark upon making conclusive remarks from these findings as summarised here-in. The fact that this research project has fully compared the views shared by the rural SMME farmers and ICT experts against the literature findings implies that the views presented in the literature review are legitimate. This on its own shows that these ideas were not just thumb sucked from less credible sources. Furthermore, the ability of this research chapter to analyse and interpret its results against the backdrop of a theoretical background, models, primary, and secondary data implies that this research project has fully lived up to its mandate of critically analysing and interpreting credible data.

Candidly, from the first section the majority of rural SMME farmers have put it on record that they do not use exclusive technologies such as mobile applications, Internet, Gumtree and OLX. This stems from the fact that because as less literate individuals, it is very difficult for these farmers to utilise such complex text-based technologies. However, despite their exclusion from these ICT services, majority of these rural SMME farmers use cellphones, word of mouth, social gatherings and voice calls to exchange crucial information. The second section discovered that the literature survey and empirical evidence from inferences made from primary data collected from interviews conducted with rural SMME farmers in ECP equally confirms that there are benefits that can be earned through the adequate use of Voice Telephony Applications. However, Voice Telephony Applications are not without challenges. Unfortunately as discussed in the third section, without proper support such as reliable revenue generation models, Voice Telephony Applications will still remain a distant dream for some of the majority of households in this rural province of South Africa. This too, is due to high voice call costs.

Based on the ideas and advice shared by the ICT experts who participated in this research project, it would be in the best interest of this research endeavour that these models are fully employed as expected through Voice Telephony Applications. This at the end will support the efficacy of the proposed Revenue Generation Model in future as the next chapter through its submissions further makes conclusions from the entire research project. Now that the critical analysis and interpretation of both the primary and secondary data has been done through the application of theoretical grounding; this research project can embark upon making a summary and recommendations.

8. Conclusion



8.1 Introduction

This chapter comprises a summary of the entire research project. First to be discussed is the theoretical framework which has been the chosen axis for the identified problem in this research project as contribution and research questions precede the methodology, accordingly. Following that, the findings and results of this research project have been scrutinised, through reliable and credible evaluation and validation methods, respectively. Remarks on issues of future concern precede the concluding summary of this chapter.

8.2 Theoretical Framework

The introduction above gives a synopsis on how this research problem has been addressed throughout this research project and issues that need future attention. Essentially, the rural farming community in the ECP would not fully realise the benefits of the Spoken Web if challenges confronting this technology are not fully addressed as contextually discovered in Sections 3.3 and 7.2.2. The factors challenging the full adoption of Voice Telephony Applications include many aspects. These are factors such as high voice-call costs, emotional intelligence, perceptions, anticipations, risk premium, lack of innovative capacity, operational procedures, awareness issues, cultural context, accessibility and servicing elements. Voice Telephony Applications are ideal tools for users who amongst others have limited financial resources, are less literate and visually impaired. However, even though Voice Telephony Applications are a breakthrough for users who cannot read text-based messages or those who are not computer savvy; rural SMME farmers in ECP would fall short of realising the benefits of using Voice Telephony Applications due to voice call costs. In addressing this problem, this research project has immensely used the elements of the *Diffusion of Innovations* and *Social Exchange* as its theoretical background.

According to Grantham and Tsekouras (2005) and Rogers (2003), *Diffusion of Innovations Theory* postulates that certainty and capacity to use information technology as a tool to gather information is highly influenced by the innovativeness capacity of each concerned individual (this factor is laid bare in Section 3.3.5). Rogers (2003) affirms that diffusion of innovation by individuals within a certain community is presumed to be fairly “distributed over time”. Significantly, individuals have varying innovativeness appetites, such as being *innovators*, *early adopters*, *early majority*, *late majority* and *laggards* (Grantham & Tsekouras, 2005; Rogers, 2003). The adoption of Voice Telephony Applications by underprivileged rural ECP’s farmers will be influenced by the benefits derived from their use. These are benefits such as accessibility to less literate users, trialability concepts, the compatibility between Voice Telephony Applications and low-end mobile phones; as perceived by the underprivileged users (refer to Sections 2.5 and 7.2.1). Accessibility by

underprivileged users, a tool customised to each market demographic, over the clock accessibility, and non-exclusiveness are some of the competitive advantages of Voice Telephony Applications found in Sections 2.5 and 7.2.1. Time will tell if early adopters and late adopters (farmers in this instance) will incorporate Voice Telephony Applications into their daily activities at the expense of alternatives to do agro-marketing as defined by each individual's innovativeness attributes.

Social Exchange Theory as another theory affirms that during a social exchange relationship both parties involved expect a performance of satisfaction that should flow as a consequence of exchanging goods or services. This entails the transfer of either or both the material and non-material good during this mutual transaction which can be a *profit, income, prestige, accomplishment, reputation* and *status* (Cook, 1977). An intensive pondering and evaluation of existing revenue generation models within the literature chapter (as referred to in Section 4.3) have enabled this research project to devise its proposed Revenue Generation Model (as fully presented in Section 5.3). Scientifically, this is an artefact to enhance the adoption of Voice Telephony Applications by the underprivileged rural SMME farmers in ECP.

The proposed Revenue Generation Model came up with five models that can be incorporated in each of the five stages of development as prescribed by the individual innovativeness capacity, from *innovators* to *laggards*, accordingly (refer to Section 5.3). The first of these five models is the Freemium Model (applied at the Introduction Stage), Affiliation Model (applied at the Growth Stage), Advertising Model (applied at the Maturity Stage), Incentives-driven Costs Model (applied at the Saturation Stage) and the Subsidy Model (applied at the Decline Stage). Should this developed Revenue Generation Model be used as a de facto solution to enhance the adoption of Voice Telephony Applications by rural SMME farmers in ECP then, the benefits identified in Section 2.5 would technically be fully realised. According to Rogers (2003) and Cook (1977), realising these benefits assures agro-businesses, telecom operators and government institutions that there is certainty in using Voice Telephony Applications; hence the development of loyalty in future. Effectively and efficiently, by virtue of using Voice Telephony Applications, a new exponential growth trajectory will emerge due to the flow of material and non-material benefits between users, agro-businesses, government institutions, and telecoms. The benefits range from flow of financial rewards, established reputation, increased brand loyalty and increased market share or exponential market growth amongst others as the contribution below explores further.

8.3 Research Contribution

Figure 8-1 and the discussion below are a summarised version of the contribution this research project wishes to add to the body of knowledge through the adoption of Voice Telephony Applications by rural SMME farmers in ECP. This drawing and discussion is informed by the *Diffusion of Innovations* and *Social Exchange* theories, the theoretical basis of this research project. The reviewed literature from Chapters 2, 3 and 4; revenue generation models in both Chapters 4 and 5, together with the Electronic Market Success Framework that is meticulously presented in Section 5.2 and research methodology in Chapter 6 have contributed towards the formation of the drawing below. Metric values are discarded as this is a qualitative study.

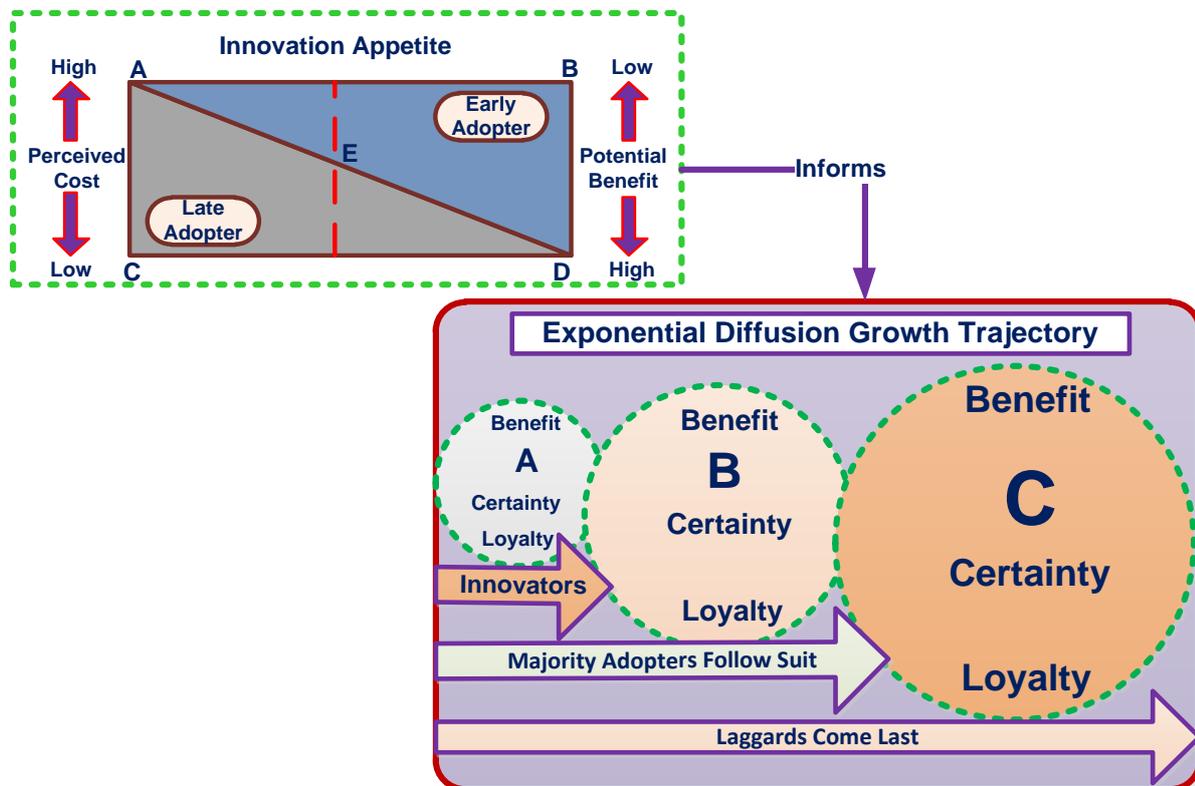


Figure 8-1: Exponential Diffusion Growth Trajectory

Through making inferences from the social exchange and diffusion theories, this research project has discovered that benefits and innovation live in close proximity (Grantham & Tsekouras, 2005). This concept is better given credence by Agarwal and Prasad (1998) who pronounced that people would use innovative means such as Information Technology to meet their perceived needs, and succeeding in fulfilling these needs by virtue implies that the user has benefited through innovation. The findings from the investigations conducted on benefits that can be attained from using Voice Telephony Applications by rural farming communities attest to this assertion. However, previous studies by Isabirye *et al.* (2013), Williams (2011) and IBM (2010) confirm that

attaining these benefits is always fraught with challenges such as high voice call costs that continue to bar underprivileged users from effectively and efficiently adopting Voice Telephony Applications. Thus, a Revenue Generation Model has been developed as a potent artefact that is potentially expected to solve this problem (refer to Section 5.3); the contributions of which can lead to the pictorial pinnacle unpacked below. Furthermore, looking at Figure 8-1 above, this research project has discovered that the adoption of Voice Telephony Applications is subject to the perceptions and interests held by each of the rural farmers. An individual can on the basis of his/her innovativeness capacity be, either an early adopter or late adopter, as articulated below.

Innovation Appetite Drawing

The Early Adopter: The early adopter's (as the most innovative one) innovation appetite increases as he/she moves from A to D due to decrease in costs and increase in benefits down the appetite continuum, of which to him/her attaining the benefit is the ultimate incentive.

The Late Adopter: The late adopter's (as the least innovative one) innovation appetite decreases as he/she moves from D to A. This move is due to increase in costs and decrease in benefits up the appetite continuum, of which he/she would opt to move towards D as he/she perceives cost as the primary inhibitor. Reduction in costs and increase in benefits through the adequate application of the proposed Revenue Generation model, as illustrated in Figure 8-1 above would inform and encourage more user participation within the rural farming industry. This positive influence can lead to exponential growth in future within Eastern Cape farming communities, as expanded upon below.

Exponential Diffusion Growth Trajectory Drawing

In the words of Agarwal and Prasad (1998), successful adoption of any new technology by an individual is informed by the ideals such as *accessibility*, *perceived need* and *technical compatibility* of technology. Subsequent to this claim, this research project has identified benefits, certainty and loyalty as the stimulants for rural farming community participation within Voice Telephony Applications as circles A, B and C from Figure 8-1 above are further expounded upon below.

Benefits: As prescribed by Cook (1997), benefits refer to rewards such as *profits*, *prestige*, *reputation*, *status*, *accomplishment*, and full incorporation of Voice Telephony Applications for the efficient and effective marketing purposes by the critical mass. This surely refers to an ability to exchange any crucial information by agro-businesses, government institutions and the entire rural farming community, particularly within the underserved areas of ECP (as presented in Section 2.5).

Certainty: According to Grantham and Tsekouras (2005), Rogers (2003), and Agarwal and Prasad (1998), certainty can be achieved if Voice Telephony Applications are accessible and affordable to their consumer market through the efficacy of the developed Revenue Generation Model. As discovered by Interactions (2008) then, key to realising benefits that can accrue through using an ICT service is the fundamental ability to certainly “play” with it. Play is a sixth element of the market mix which will eliminate ignorance on Voice Telephony Applications such as the Spoken Web through independent use by the user. Spoken Web throughout this research project has been found to be compatible to low-end mobile phones that are affordable and user friendly to underprivileged farmers (Kumar *et al.*, 2010). This compatibility with low-end mobile phones further amplifies the certainty of using ICT services such as Spoken Web by underprivileged rural farmers. Certainly then, the ICT disconnect that continued to exist between rural and urban communities, and to a greater extent within underprivileged rural communities has been eliminated through Voice Telephony Applications (Kumar *et al.*, 2007b). This assertion implies that the communication gap has been eliminated (Venkat, 2002).

Loyalty: As presented by the literature, loyalty will be enhanced through awareness, experience and the relative advantage that can be earned through Voice Telephony Applications. If through Voice Telephony Applications rural SMME farmers can effectively, and efficiently market their service offerings such as livestock to their customers in the language orientation of the local community, then trust will develop between the technology, farmers and their customers. This symbiotic relationship between rural farmers, their target audience and Voice Telephony Applications will indirectly transcend into increased loyalty in future (Agarwal *et al.*, 2010b). This trust is due to the fact that content can be contextualised to suit the market demographics and needs of local communities (Patel *et al.*, 2010; Agarwal *et al.*, 2009; Kumar *et al.*, 2007a). In the words of Chong *et al.* (2010), this summarily means that through Voice Telephony Applications the rural SMME farmers will have a formidable relationship with their customers. This relationship with customers is underpinned by five activities known as attracting, engaging, retaining, learning and relating to the consumer market. This is meticulously articulated in Section 2.5.5 and distinctly outlined by the area marked D in Section 2.5.7.

Exponential Growth: Accordingly, this continuous economic growth relationship assures that Voice Telephony Applications such as the Spoken Web become efficient and effective marketing tools. As a consequence of this relationship, a robust economic viability will ensue due to seamless adoption and propagation of Voice Telephony Applications in rural district municipalities of ECP. By virtue of being non-discriminatory ICT tools, IBM (2010, p. 4) affirms that Voice Telephony

Applications such as the Spoken Web become “one gate knowledge hubs” that transform, and encourage both the rural, peri-urban and urban users into becoming the active citizenry of the digital world. One should note that through the Spoken Web, underprivileged rural farmers would be offered a non-exclusive equity on ICT services as they too will be afforded a voice in the digital consumer dialogue. In layman’s terms, this affirms that there will be continuous interaction across the board; and with time an innate ability to aggressively tap into niche consumer markets and open up to new service lines will develop within rural communities (IBM, 2010). This implies that the majority of individuals within the underprivileged rural farming community, from early adopters to late adopters, will follow suit and adopt Voice Telephony Applications; hence swellings in circles A, B and C in Figure 8-1 above. For instance; as written in Section 2.5.3, a Spoken Web application known as *VioKiosk* in Andhra Pradesh of India proved to be a success story on its pilot study in this rural village. This application had a mere 50 village members who spoke local Telegu language at the beginning, and its support base grew to 976 villagers who made 20499 voice calls within a space of four months, and by year end expanded to 6500 village members (Agarwal *et al.*, 2009, pp. 8-9).

In a nutshell, through increased market share, sales from rural SMME farmers in ECP will increase, and this will ultimately lead to improved incomes and better profits in future. Eventually as part of an economic and technological discourse, this in future will contribute towards improved livelihoods. As reiterated by IBM (2010), this is a fundamental rationale for long-term governmental support as underprivileged communities will not be left at the periphery of the ICT sector. The crux of the matter is that this positive contribution by Voice Telephony Applications on the livelihoods of rural farming communities in ECP will transcend into an expansion of the social, technological and economic trajectory (refer to Section 2.5.8). This research project would have never been spot on into making an academic contribution to the body of knowledge as opined by Hevner *et al.* (2004) if the research questions below were not succinctly drafted and addressed.

8.4 Research Questions

The main objective of this research project has been to devise a Revenue Generation Model as a means to enhance the adoption of Voice Telephony Applications by underprivileged rural SMME farming communities in ECP. To address this research problem a main research question with its subordinate questions follows below.

Main Research Question: **How can revenue generating models be applied to reduce call costs to users of Voice Telephony Applications in order to enhance their adoption?**

1. How can Voice Telephony Applications be utilised to benefit rural farming communities?

The main aim of this sub-question is to bring to the fore benefits that can be realised by rural SMME farming communities in ECP on the backdrop of their exposure to IVRs in general. One should bear in mind that on average more than eleven rural farming SMMEs interviewed in ECP's four district municipalities have shown their enthusiasm for Voice Telephony Applications as their interest was stimulated. On this backdrop, farmers discovered that use of Voice Telephony Applications is similar to making phone calls and use of other conventional IVRs (refer to Section 7.2.1). Both the literature in Chapter 2 and interviews conducted with rural SMME farmers of ECP's district municipalities concur that through adequate use, and accessibility to Voice Telephony Applications, the upcoming benefits will be realised:

- Unlike the Internet, Voice Telephony Applications such as the Spoken Web appeal across the spectrum as they do not discriminate against farmers on the basis of their literacy level, income level, visual capability, language orientation and cultural background.
- To their credit, compatibility of Voice Telephony Applications with wireless devices such as mobile phones makes them accessible anytime and anywhere. In addition, by virtue of being low-end mobile phone accessible applications, these Voice Telephony Applications are viewed to be economically viable for bottom-of-the-pyramid users.
- To top it all, users from urban and rural areas are brought together into a "single stop shop" platform or "one gate-knowledge hub", and with time this can lead to improved customer service, just-in-time processing, increased market share and better profits.

2. What are the main factors challenging the adoption of Voice Telephony Applications?

The aim of this sub-question is to bring forth factors challenging the adoption of Voice Telephony Applications by underprivileged rural farming communities. Majority of farming SMMEs (ten of the twelve) interviewed (refer to Section 7.2.1) and findings in Chapter 3 have a common understanding that even though Voice Telephony Applications seem to be relatively less complex and contain inexpensive applications, the following factors cannot be blatantly discounted:

- There is growing fear and pessimism due to being labelled as an outlier, backward, and poor; there is lack of human intelligence in Voice Telephony Applications; there is lack of innovative capacity and high voice call costs add to this quandary.
- These factors and others such as existence of poor operational procedures; mismatch between technology and ecosystem; frustration and anger due to incomplete voice commands will all lead to uncertainty relating to Voice Telephony Applications. In

addition, there is little knowledge and awareness about Voice Telephony Applications so far in ECP.

It should be acknowledged that all twelve rural SMME farmers interviewed have expressed that they will fully adopt Voice Telephony Applications. The farmers cited that they will not fully use Voice Telephony Applications if they are costly, and difficult to use compared to WOM, making voice calls and making announcements via social gatherings (refer to Section 7.2.1).

3. What revenue generating methods exist for conventional media forms such as the telecom sector and the Internet?

Objectively, as discussed in Chapter 4, conventional revenue generation models that exist within the telecom sector were intensively evaluated as some of these models informed the Revenue Generation Model in Chapter 5. Findings from both the secondary and primary data agree that adequate use and support of various revenue generation models by content providers can help in sustaining Voice Telephony Applications. It should be noted that a majority of farmers interviewed supported this notion. These models range from the ones outlined below.

Advertising Model: The literature claims that advertising will enable Voice Telephony Applications to be self-sustained through profits as content providers will pay for advertising.

Locking Incentives and Affiliations Model: Content providers and affiliate partners will indirectly fund this model as improved customer loyalty, collaborations, and cross-selling opportunities will bring better awareness, more revenue sales and profits in future.

Free Access Services: Content providers will contribute to the funding, with users liable for future transactions. Through trialability this model can to a greater extent help in increasing user participation from the users who are at the bottom end of the pyramid.

Tax Incentives and Fair Competition: Fair competition and introduction of tax breaks will encourage support from the telecoms and content providers. Through tax breaks content providers will indirectly contribute towards funding the model for awareness and sales issues.

Subsidy Model: Government subsidises the model through private-public universal service access funds due to social, economic and technological imperatives. National recognition and tax exemption are the main benefits to telecom operators.

On top of the findings from Chapter 4, all twelve rural farming SMMEs interviewed reiterated that they will use Voice Telephony Applications to complement other methods of advertising. In the same breath, forging partnerships implies that through cooperatives farmers will get expertise from a wide range of people. Also, trialability with Voice Telephony Applications will help farmers to

be familiar with this technology. Therefore on the backdrop of these claims, businesses would definitely support the revenue generation models (refer to Sections 7.2.1.5 and 7.2.2). These research questions formed the basis for the adopted methodology crisply articulated below.

8.5 Research Methodology

Objectively so, the entire methodology employed by this research project is viewed as identified below:

- As extensively articulated to in Chapter 6, this research project took an interpretive approach; hence it views reality as a social construct. Furthermore, inductive approach has been the preferred choice as the theoretical framework informs the basis for analysing and interpreting qualitative data (Saunders *et al.*, 2009). This data is vigorously evaluated through Design Science Methodology in order to come up with a final artefact (Cleven *et al.*, 2009).
- Primary data for building and refining the Revenue Generation Model (an artefact) has been collected through methods such as an Expert Review, questionnaires that have closed and open-ended questions, and interviews. These methods further bring much broader, clearer and deeper insight on issues that are vague or inadvertently omitted on the interview questionnaires (Shelly *et al.*, 2008; Bentley & Whitten, 2007; Le Roux, 2005).
- A non-probability sampling of six ICT experts and twelve rural farming SMMEs were part of an interview for primary data collection. The non-probability and purposive sampling have been chosen, as Gerber-Nel *et al.* (2003) asserts that the former is ideal for small sample sizes, whilst the latter is ideal for studies with qualitative data. It should be affirmed that twelve rural SMME farmers were invited for the interview in order to get a broader view from the end-users' perspective even though they did not review the built artefact.

8.6 Research Evaluation and Validation

Evaluation can to a degree refer to any empirical or logical evidence that is appropriately relevant to the research statement as guided by the chosen methodology above (Peffer *et al.*, 2008). In the words of Hofstee (2010), Oats (2009) and Hevner *et al.* (2004), evaluation and validation of data collected for the purposes of doing research is one of the basic requirements that are needed, and any deficiency of such will lead to a study that cannot be fully accredited by the body of knowledge. The evaluation of collected data is in line with the Design Science framework by Hevner *et al.* (2004) and the criterion for interpretive research such as this one is borrowed from Oats (2009) ideas, as expanded upon below.

Trustworthiness: Data collected by this research project has been evaluated through rigorous theory framework, journals, dissertations and reports that relate to the cost of voice calls as informed by Collis and Hussey (2009), Peffers *et al.* (2008) and Hevner *et al.* (2004). Therefore, the model developed by this research project as informed by seven Design Science guidelines, has been developed based on the feedback received from interviews conducted with the rural farming SMMEs. The evaluation and validation process has been informed by the feedback received from the Expert Review method, and this all helped to get an in-depth view of revenue generation models.

Conformability: The primary data for refining the proposed artefact has been collected from the interviews held with underprivileged rural SMME farmers in ECP, whilst mobile ICT experts shared their insight for reviewing the final artefact. This data has been attuned to be inline with the theory background, existing models and the Electronic Market Success Framework which has been further explored in Section 5.2. These sound undertakings have all informed the Revenue Generation Model that this research project developed as the final artefact.

Dependability: The questions for the interview questionnaires have been developed as informed by the *Diffusion of Innovations* and *Social Exchange* theories and on this regard accredited academic publications added value without any under-expectations.

Credibility: This research project has collected its data from rural SMME farming communities through face-to-face conversations and the Expert Review method has been used to collect data from ICT experts. Le Roux (2005) asserts that as instructed by the research rigour, Expert Review method validates the legitimacy of the Revenue Generation Model; an artefact that this research project has developed. In other words the same results will be attained even if one were to conduct this survey with different data collection tools or on a different occasion (Saunders *et al.*, 2009).

Transferability: This research is transferable as the developed model can be applied to other underprivileged communities and industries in South Africa, not only on Eastern Cape farming SMMEs. Provinces such as Limpopo, Mpumalanga, Northern Cape and North West who have the similar settings, and market demographics like the Eastern Cape Province (as assured by Stats SA, 2012 a, b), can reap the same benefits that can be realised through Voice Telephony Applications by adequately applying this proposed Revenue Generation Model.

8.7 Research Findings and Results

Thorough evaluations and validations of data, this research project contributed towards coming up with a de facto solution, an appropriate model for enhancing the adoption of Voice Telephony

Applications by underprivileged rural SMME farmers in ECP. The Revenue Generation Models presented in Sections 5.3 and 7.4 are a function of the findings and results of this research project. The artefacts are an embodiment of the five models for generating revenue. These five models are incorporated in each of the five stages of the development lifecycle as advocated by Anderson and Zeithaml (1984) (refer to Section 5.3). The models have been incorporated as follows below:

1. **Freemium Model (applied during the Introduction Stage):**

As a new technology, Voice Telephony Applications will be received amongst farming community with uncertainty and farmers must be incentivised in order to participate. In this Freemium Model, SMME farmers should be given free transactions paid for by content providers, and services should be delivered via toll free calls for a limited time.

2. **Affiliation Model (applied during the Growth Stage):** In this model, affiliate partners should contribute to the call costs and in turn exploit cross-selling opportunities through forming partnerships. This Affiliation Model is applicable at this stage on the basis that there is better knowledge and exposure on the benefits and opportunities that Voice Telephony Applications would present, and the environment would by now acclimatise for alliances.

3. **Advertising Model (applied during the Maturity Stage):** This is a model where industry stakeholders or content providers can publish paid adverts through Voice Telephony Applications to their target audience. By virtue of reaching a maturity stage, Voice Telephony Applications will gain increased market footprint; hence speculation on prospective users and buyers. In this context, sales are anticipated to grow stronger. On this backdrop, this research project finds that the Advertising Model is most applicable into the maturity stage.

4. **Incentives-driven Costs Model (applied during the Saturation Stage):** This is a model where users prefer the best tool based on trade-offs against alternatives. During the saturation stage, it is anticipated that new competitors would reach the market. Content providers must therefore find innovative ways to incentivise customers through discounts and promotions. Government can also give established businesses tax-breaks to encourage drop in call costs.

5. **Subsidy Model (applied during the Decline Stage):** This is a stage where user interest is declining or external factors are negatively influencing participation by the underprivileged rural SMME farmers. If the socio-economic benefits are aligned with the objectives of government and supporting businesses, the Subsidy Model can be used to sustain participation.

Should the revenue generation model through being adequately applied help in addressing voice call costs, and be a profitable mechanism as recommended by expert reviewers then, interested parties such as rural SMME farmers and content providers will reap the expected benefits in

future. Any achievement of this goal implies that by virtue Voice Telephony Applications have managed to live by the expectations of the Electronic Market Success Framework discovered by Elliot (2005). These expectations speak on the ability of this voice channel to: (a) promote services; (b) be in line with the user behaviour; (c) satisfy the customer value proposition; (d) achieve outcomes such as increased revenue sales, and (e) make profits for advertisers (refer to Section 5.2). This assertion is in line with the *Diffusion of Innovations Theory* which clearly states that each individual's innovativeness capacity is a function of certainty and ability to realise anticipated benefits through the new technology (Rogers, 2003). These research findings and results informed the basis for identifying any gaps that may need to be addressed in future.

8.8 Directions for Future Research

The proposed Revenue Generation Model has to go through rigorous pilot studies in order to pass its test as the best tool for reducing voice call costs. From here onwards, awareness initiatives have to be conveyed or piloted through government institutions, telecom operators, business fraternity and communities. These undertakings are to promote within underprivileged rural communities the comprehensive benefits of using Voice Telephony Applications, not just for marketing as this will establish more buy-in. Putting resources for this model through piloting will help into allaying any fears, doubts, redundancies and loop-holes that may loom in the near future. Most ICT business models such as M-pesa failed to make a success story owing to lagging support from the interested parties as it is not easy to service rural areas and there is a lower propensity to pay by rural communities.

One cannot turn a blind eye on the threat, competition, and contention that can be posed by alternative devices and services that support or compete with Voice Telephony Applications. Any shifts in access costs and/or innovations beyond the capabilities of incumbent devices and services, is likely to pose a threat to Voice Telephony Applications. Furthermore, issues of security protocols such as controls and standards, licensing regulations, user guidelines, application procedures, and payment controls need to be contextualised to accommodate Voice Telephony Applications. Researching on factors such as lack of human intelligence, perceptions, risks, and operational issues around Spoken Web that cannot be fully addressed by the proposed model is imperative.

8.9 Concluding Summary

Logically, as the direction for future research has been put into context, it is fit that at this juncture this chapter makes a concluding remark. Initially, a research problem with appropriate research

questions was formulated as informed by the research objective and significance. In line with a legitimate theory background, an extensive literature study was carried through on existing models in order to get a profound knowledge on issues and assumptions pertaining to solving the identified research problem. This literature survey enabled this research project to devise an appropriate model for revenue generation. The proposed model has been rigorously validated through following an accredited Design Science methodology as experts and concerned rural users were invited for interviews, accordingly. Through the proposed Revenue Generation Model, a new exponential growth trajectory in rural communities is seen to be the fundamental feature that will immensely contribute to the body of knowledge as advised by Hevner *et al.* (2004). On submission, judging by the gravity of positive responses received from the majority of ICT experts and rural SMME farmers interviewed, the proposed Revenue Generation Model would yield better results in terms of its efficacy for reducing voice call costs.

In summary, there ought to be certainty that through Voice Telephony Applications, underprivileged rural SMME farmers, the affected agro-businesses, telecom operators and government institutions will yield the expected benefits. This in future will transcend into loyalty towards Voice Telephony Applications, particularly through the success of the proposed Revenue Generation Model. In simple terms, Voice Telephony Applications such as the Spoken Web should not only be viewed as relatively less expensive applications. Moreover, through the adoption of the Revenue Generation Model, Voice Telephony Applications graduate to being potentially future-rich marketing services that have huge socio-economic growth prospects.

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List of Acronyms

Abbreviation	Full Name
ADSL	Asymmetric Digital Service Line
ASR	Automatic Speech Recognition
B2G	Business to Government
C2G	Citizen to Government
E-commerce	Electronic Commerce
ECA	Electronic Communications Act
ECP	Eastern Cape Province
E-mail	Electronic Mail
FCT	Fixed Cellular Terminal
GI	Gestural Interaction
GUI	Graphical User Interface
HSTP	Hyper Speech Transfer Protocol
HTML	Hyper Text Mark-Up Language
HTTP	Hyper Text Transfer Protocol
ICASA	Independent Communications Authority of South Africa
ICT	Information and Communication Technology
ICT4D	Information and Communication Technology for Development
IEF	International Eye Foundation
IP	Internet Protocol
ISDN	Integrated Single Digital Network
IVR	Interactive Voice Response
MMS	Multi Media Services
NGO	Non-governmental Organisation
RoI	Return on Investment
SMME	Small Medium Micro Enterprises
SMS	Short Message Service
2G	Second Generation
3G	Third Generation
TTS	Text To Speech
US\$	United States of America's Dollar
V-commerce	Voice Commerce
VoIP	Voice-over-Internet Protocol
VXML	Voice Extensible Mark-Up Language
Wi-Fi	Wireless Fidelity
WWTW	World Wide Telecom Web
WWW	World Wide Web
ZAR	South African Rand

Appendices

Appendix A-1: Rural SMME Farmer Interview Process

Informed Consent Letter for Rural SMME Farmers



Research Study Title: A Revenue Generation Model for Adoption of Voice Telephony Applications

Dear Respondent

I am a Masters student in the Department of Information Systems at the University of Fort Hare. I am currently undertaking a study on cost related mechanisms to enhance the adoption of Voice Telephony Applications such as the Spoken Web amongst rural farmers of Eastern Cape, a province of South Africa. These Voice Telephony Applications are analogous to other mobile and voice commerce applications available, but their inherent competitive advantage is that they are ideally suitable for users with low levels of literacy and very limited financial resources at their disposal.

Study Procedure

It is paramount that you understand the aims and objectives of this study. You are therefore as a prospective or current user of Information and Communication Technology services sincerely requested to participate in this research project which will take approximately 20-30 minutes of your time. The interview session will be conducted at a time and place that is most suitable to you and this is done to protect your privacy.

Ethical Consideration

Anything that you choose to voluntarily share in this study will be highly treated as confidential. Should the results of the study be published, your name will not be used. Should you have any questions or concerns about this study, please contact the researcher, Mr Lusanda Mazwi at cell: 073 8018 428, email: wesleylusanda@yahoo.com, or the research supervisor, Ms Naomi Isabirye at work: 043 7047 066, email: nisabirye@ufh.ac.za.

Consent

By virtue of signing this consent form, I seek to affirm and confirm that I have read the information about this study and have been given an opportunity to ask questions, and these were answered to my contentment. Therefore, on this backdrop I wish to fully submit that my involvement in this study is voluntary in nature and I am at liberty to resign participating at this study in any time, and that will not have any negative implications on my reputation.

Accepted and Agreed to:

.....
Printed Name

.....
Signature

.....
Date

Interview Questionnaire

Section 1: Biographical Information

1.1. What type of livestock farming business do you provide? Mark with X

Cattle Goats Sheep

1.2 How many employees does your business have?

1.3 What are your educational qualifications? Mark with X

Primary Education Matric Formal Trade

If other then, Specify

Section 2: Communication and Advertisement Methods

2.1 Which communication methods do you use to communicate and advertise your business? Mark with X.

Cell-phone Radio Word of Mouth Flyers Local Leadership

Presentations in Social Gatherings i.e. Grant, Church and Community Meetings

2.2 If cell-phone, which method do you use your cell-phone for? Mark with X

SMS Voice Calls Whatsapp Mixit Internet OLX

Gumtree Mobile Apps

2.3 Explain why you chose the method above?

Section 3: Exposure to Voice Telephony Applications or IVR Systems

Similar to an Internet, one can create a VoiceSite to upload and download information pertaining to an individual by dialling an allocated telephone number. The following example takes us through a conventional MTN IVR system. *“Welcome to MTN customer services helpline. Main Menu: For MTN voicemail, SMS, CLI, MTN Loaded, MTN Banking, and other services press 2. To change your language, press 6, and select 5 for Xhosa”*.

3.1 Have you ever used an IVR before through a cellphone for any business or personal activity? Mark with X.

Yes No

3.2 Explain why you use your cellphone for the method you have chosen?

Section 4: Anticipated Benefits and Challenges on Voice Telephony Applications or IVR Systems

4.1 To what extent would the following factors influence your decision to use Voice Telephony Applications or IVR systems?

Factor	Very High	High	Low	Very Low
It has low implementation and transaction costs				
It is easy to use and needs no special skill				
It is an ideal platform for users with low visibility				
It caters to the language needs of its target users				
It is a relevant e-WOM tool for effective marketing				
It is accessible anytime and anywhere				
It offers improved customer service and quick on-time processing				
It is an ideal tool for promotion of local content				
It promotes a one-stop shop for digital users				
It is a non-discriminatory platform that promotes play				

4.2 Are there any other factors that are not included here that may influence your use of Voice Telephony Applications or IVR systems? If there are any, please list them below:

4.3 To what extent would the following factors discourage you from using Voice Telephony Applications or IVR systems?

Factor	Strongly Agree	Agree	Disagree	Strongly Disagree
Frustration, anger and disillusionment due to tedious voice commands				
Fear of being labelled as poor and backward by society				
There is growing pessimism due to				
Fear due to risk, uncertainty and security issues				
Lack of innovative capacity				
Poor operational procedures and support				
Lack of awareness and IT knowledge				
Mismatch between the technology and the ecosystem				
Cost of accessing and using the technology				
The technology will never offer the same support like a human being				

4.4 Are there any factors that would discourage you from using Voice Telephony Applications or IVR systems? If there are please list them below:

Section 5: Model Driven Information

5.1 Tell me, if Voice Telephony Applications or IVR systems were offered free for a limited trial period would you use them for marketing? Mark with X and briefly explain on the text box that follows

Yes No

5.2 Tell me, if local farmers and retail farming businesses can forge partnerships such as co-ops from livestock, fodder, seeds, medication, equipment and other farming related services for the purpose of cross selling would you partake? Mark with X and explain on the text box

Yes No

5.3 Given increased market penetration, would you use Voice Telephony Applications or IVR systems to advertise your business? Mark with X and briefly explain on the text box that follows

Voice-based Interfaces Text-based Interfaces

5.4 Looking at your ICT competency and income levels, would incentives gained through telephony applications motivate your use? Mark with X and briefly explain on the text box

Yes No

5.5 In the event that efficient and effective technologies come into the electronic market space, would you still rally behind the use of Voice Telephony Applications? Mark with X and briefly explain on the text box that follows

Yes No

Table A-1: Open-ended Responses from Rural SMME Farmers

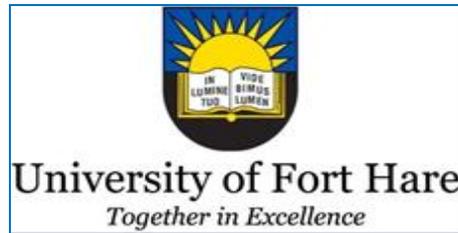
Respondent (Farmers)	Explain why you use your cellphone for the method you have chosen?	List any other factors that may influence your use of telephony applications?	List any other factors that may discourage you from using telephony applications?	If Voice Telephony Applications were offered free for a limited trial period would you use them for marketing?	If local agro-businesses can forge partnerships for the purpose of cross selling would you partake?	Given increased market penetration, would you use Voice Telephony Applications for advertising?	Looking at your ICT competency and income levels, would you use Voice Telephony Applications?	If better alternatives emerge in the telecoms market, would you still rally behind use of telephony apps?
First	I do not need to own complex devices or pay for expensive landlines	The fact that it is less dependent on complex and expensive devices and networks	There is not enough time to go back if I miss any voice instruction or message	The fact that I will not be liable for the initial costs is a real incentive for trial and error	Voice services can be used to cross-sell, similar to co-opting with local agro-businesses on grant days and	The new application would be supported if it is easily accessible to use even next year if that is so and will be recommended to peers	My level of education, financial status, incentives and benefits accrued say a lot about this voice service	Surely, success stories from the technology would give it competitive edge just like access to water and electricity
Second	I have grown to calling through phones than write letters	The reason that I'm using it is because of my level of education	I won't use it if I will be despised, or ostracised by leaders and peers.	One would freely use the system to get a better market audience in the initial stage	There is a better chance on sharing of resources and market info which leads to mutual benefits accruing	This is a marvellous and appropriate tool for someone like me and I'll recommend it too	Any incentives and benefits that come with the perk are all that could motivate an illiterate user	Authenticity of the voice would prove to be the competitive advantage for illiterate users
Third	As an African I feel confident talking in varying dialects	The fact that I can use it to varying language communities that are African based	I won't use it if it fares worse compared to convenience on alternatives.	Making trials with the telephony application will give me more exposure to the functionality of the tool	As an appropriate tool it would work easier like word of mouth as each alliance partner will bring his following too	This is a the best tool for advertising to my target market and more so for the less educated people like me	Voice service would work better for someone who is illiterate and poor like me especially if granted discounts and wider market	I would use it if the benefits of voice technology far outweigh the existing or current ones
Fourth	What you hear is what you get, caller authenticity is promoted as one cannot be conned or spoofed	If it would be available tomorrow I would use it to share information on market, crime and health issues	Feeling unsecured, misled for ulterior motives will kill my confidence, but can't wait to see the technology	Other technologies proved themselves successful after sometime and managed to get support, so will this telephony application	This mutual relationship forged through co-ops would definitely enable cross selling opportunities to a wider audience within the alliance partners	The bigger the number of people accessing my services the better. This tool will expose me to a huge market audience and would definitely recommend it too	Most of my business dealings and interactions are purely informed by my ability to communicate successfully as it is likely here in the voice-borne platform	The benefits that I gained through using Voice Telephony Applications have and will convince me to support them even if they were to be used next month

Respondent (Farmers)	Explain why you use your cellphone for the method you have chosen?	List any other factors that may influence your use of telephony applications?	List any other factors that may discourage you from using telephony applications?	If Voice Telephony Applications were offered free for a limited trial period would you use them for marketing?	If local agro-businesses can forge partnerships for the purpose of cross selling would you partake?	Given increased market penetration, would you use Voice Telephony Applications for advertising?	Looking at your ICT competency and income levels, would you use Voice Telephony Applications?	If better alternatives emerge in the telecoms market, would you still rally behind use of telephony apps?
Fifth	Because it would be an option that is available to people anytime and anywhere	Most accessible and convenient technology for someone with my capabilities	I have a poor interest when it comes to learning new technologies due to perceived benefits	The type of business I am involved in demands support, so getting free trials would contribute	This is the same method that is supported by Agricultural officers through agro meetings and grant days for local farmers	This voice technology is accessible anytime and anywhere. This implies more market growth in future	Similar to voice mails I am really comfortable communicating on Voice Telephony Applications and more so getting airtime discounts	This technology seems to have better prospects and this would be an added bonus to underprivileged communities
Sixth	Voice services do not invade your privacy and the information you receive is up to date	This promises to shorten marketing cycle, streamline services, cannot wait to see it tomorrow	I hope Indian language will not be used as some ICTs developed overseas use English, the language of its developers	One would really put the new telephony application to test for effective marketing before fully committing limited resources	Partnerships with wool growers, big farmers, agro-retail businesses on equipment, medication, livestock fodder exist. Small rural farmers can bring their following	It is assumed to be an easy technology that is applicable, accessible to the greater rural community members so far and is one of a kind	There is a lesser chance of being robbed by bogus messages as language is according to the user's preference. Promotions incorporated will be a big bonus	My experience on benefits realised from IVRs in general far outweigh costs and challenges I have been exposed to on text-based ones
Seventh	African languages are promoted, tolerated and presented	Serves varying language and cultural dynamics	It's a great idea for us, but, it is not popular and there's little exposure to ICT at large	Anything that makes my life easier through being afforded free/or reduced costs makes my day	Partnerships through co-ops and alliances will help in increasing market penetration on grant days	In my knowledge advertising is the vital backbone for the sustenance of businesses, revenue-sales	This Voice Telephony Application is ideally suitable for the user's preferential language	Simply because it will be easily accessible just like water and electricity to us
Eighth	Voice services work like word of mouth	Active interaction between experts, officials and farmers	If there is no conflict with the telephony application and the entire ecosystem	Trialability and limited free transactions is a milestone for rural farmers	This initiative is practiced locally to sell agro-services as big agro-businesses give discounts	Definitely so, because it will cut costs on travelling, shorter time spent on selling	It is easier to talk in one's preferred language than to write for someone who is illiterate	The fact that I am comfortable making a voice call suits my attitude to be less innovative
Ninth	Voice calls are better for illiterate, poor	You spend less time in voice services than	Increase to user costs is tantamount to	It would definitely bring familiarity on this technology	There are greater co-ops intended in the pipeline due to	Talking needs less effort than texting for someone less educated as me	This is an appropriate tool for less educated people, especially	I cannot wait to see this user friendly technology for

	and blind users	computers	day light robbery		available land and support		people like me	people like me
Respondent (Farmers)	Explain why you use your cellphone for the method you have chosen?	List any other factors that may influence your use of telephony applications?	List any other factors that may discourage you from using telephony applications?	If Voice Telephony Applications were offered free for a limited trial period would you use them for marketing?	If local agro-businesses can forge partnerships for the purpose of cross selling would you partake?	Given increased market penetration, would you use Voice Telephony Applications for advertising?	Looking at your ICT competency and income levels, would you use Voice Telephony Applications?	If better alternatives emerge in the telecoms market, would you still rally behind use of telephony apps?
Tenth	I can make phone calls without help now	Independent use boosts confidence and usability	Warmth, support and intelligence of humans is unparalleled	Practice would give me time to familiarise myself without charge costs	It is beneficial when other businesses host and sell you. I'll do likewise too	Easy accessibility of cellphones and their ubiquity says volume for easy advertising	Unfortunately I am not able to write and texting needs complex and expensive means	Anytime this technology is launched I would support it as benefits attest
Eleventh	More accessible and convenient	User friendly and one is able to reach target market	Not just an empty promise from politicians	I would really use the telephony application during this golden trial	Mix of expertise on co-ops would make farming interesting	Simply because it would make advertising easier for people like me	In a nutshell it is really time saving, as I will not need to stress much on text	I would mix my methods to supplement any IVR shortfalls
Twelfth	Easier to use for me personally	There seems to be lower transaction costs in future	Not a hoax scam from fraudsters	Through trial and error I would use the telephony application to add to my existing methods of marketing	I have fear to this type of business practice due to lack of confidence in potential partners	I would use it because it is simple to use and would really add it to other existing means of advertising	Voice calls made in one's language of preference are less prone to interpretation	Experience has taught me that compared to existing technologies this seems to be ideal

Appendix A-2: Expert Review Process

Expert Review Informed Consent Letter



Research Study Title: A Revenue Generation Model for Adoption of Voice Telephony Applications

To whom it may concern

I am a Masters student in the Department of Information Systems at the University of Fort Hare. I am currently undertaking a study on cost related mechanisms to enhance the adoption of Voice Telephony Applications such as the Spoken Web amongst rural farmers of Eastern Cape, a province of South Africa. This technology is analogous to other mobile and voice commerce applications available, but its inherent competitive advantage is that it is ideally suitable for users with low levels of literacy and very limited financial resources at their disposal.

You are sincerely requested to respond to an expert interview questionnaire which will help in addressing the research problem.

Please note that:

- Participation is voluntary and will take 10-20 minutes of your time
- Confidentiality on disclosed information will be maintained
- All responses will remain anonymous , and any reports will exclude the names and institutions of the respondents

Should you have any questions or concerns about this study, please contact the researcher, Mr Lusanda Mazwi at cell: 073 8018 428, e-mail: wesleylusanda@yahoo.com or the research supervisor, Ms Naomi Isabirye at work: 043 7047 066, e-mail: nisabirye@ufh.ac.za.

Wish to thank-you in advance for your participation

Best Regards,

Lusanda Mazwi

Interview Questionnaire

This is a two parts interview questionnaire with Part 1 and Part 2 written below accordingly

Part 1

This part of the interview questionnaire has seven assumptions (starting from 1 to 7) that are informed by underlying theories on adoption of information technology. The respondent is requested to rate these assumptions on the basis of his/her expertise and may give the necessary comments in the text boxes accordingly. The four ratings incorporated on each of the seven assumptions are a) “Strongly disagree”, b) “Disagree”, c) “Agree”, and d) “Strongly agree”.

1.1 Due to uncertainty during the Introduction Stage, Voice Telephony Applications should be offered to the target users at the expense of content providers to encourage user participation under conditions of uncertainty.

Strongly disagree

Disagree

Agree

Strongly agree

1.2 Trialability should be applied during the Introduction Stage to encourage the users to experiment with the telephony applications in order to get more user participation in future.

Strongly disagree

Disagree

Agree

Strongly agree

1.3 During the Growth Stage, affiliate partners should contribute to the call costs so that in turn they can exploit cross-selling opportunities.

Strongly disagree

Disagree

Agree

Strongly agree

1.4 During the Maturity Stage part of the costs will be funded by advertisers or content providers as mass participation will lead to increased revenue-sales for them.

Strongly disagree

Disagree

Agree

Strongly agree

1.5 During the Saturation Stage the users will have preference of voice over text.

Strongly disagree

Disagree

Agree

Strongly agree

1.6 During the Decline Stage, if the interest of government is to sustain user participation in Voice Telephony Applications, then subsidies may be offered.

Strongly disagree

Disagree

Agree

Strongly agree

1.7 During the Decline Stage, government may support this initiative for social, economic, political and technological imperatives.

Strongly disagree

Disagree

Agree

Strongly agree

Part 2

The respondent is requested to choose either “Yes” or “No”, but not both, on the three questions below, and may add comments on the relevant text box to substantiate the selection made.

2.1 Do you think this is an appropriate model that can be introduced to encourage user participation and to also address the costs facing rural users and content providers?

Yes

No

2.2 Do you think the *Diffusion of Innovations Theory* is an appropriate underlying theory to the proposed model?

Yes

No

2.3 Going through the model, are there any omissions or submissions you would suggest?

Yes

No

Table A-2: Open-ended Responses from Expert Review Method Part 1

Expert Review Statements		First Expert Reviewer	Second Expert Reviewer	Third Expert Reviewer	Fourth Expert Reviewer	Fifth Expert Reviewer	Sixth Expert Reviewer
1	Due to uncertainty during the Introduction Stage, Voice Telephony Applications should be offered to the target users at the expense of content providers to encourage user participation		However, having said that I agree, one needs to keep in mind the realities of competition and commerce.	This helps as the user might not feel obliged to use the tool if there is payment involved.		Either at the expense of content providers or the voice application hosting provider. Any stakeholder but the end-user.	I strongly agree, especially given the rural target base offering mentioned in the background of this project.
2	Trialability should be applied during the Introduction Stage to encourage the users to experiment with the voice application in order to get more user participation in future		I agree, if I understand trialability correctly?	Trialability has advantages for both the developers and the users. The developers are able to use the feedback to improve the system. For users, it encouraged use of the tool as they are more comfortable-adoption will thus not be a problem.			The word ‘trialability’ is quite broad. Does this point allude to the free toll – free number, mentioned in the background of this paper? I’m still not sure how you would get rural – based farmers to engage with this telephone number. What would get them to try it in the 1 st place? What would the service providers offer i.e. how does the consumer benefit?
3	During the Growth Stage, affiliate partners should						I agree. But you can only get so many affiliates on such a telephonic platform.

	contribute to the call costs so that in turn they can exploit cross-selling opportunities						Foresight therefore needs to be applied, and a sustainable advertising model, where the affiliates continued acceptance on the platform, is reviewed against the vision of this project, and the benefits afforded to these rural farmers, every quarter (i.e. Client centricity needs to be at the heart of what we do, to keep the 'adoption drive curve' high, for a longer period of time)
	Expert Review Statements	First Expert Reviewer	Second Expert Reviewer	Third Expert Reviewer	Fourth Expert Reviewer	Fifth Expert Reviewer	Sixth Expert Reviewer
4	During the Maturity Stage part of the costs will be funded by advertisers as mass participation will lead to increased sales for them		Provided one does not have to listen to a whole lot of advertisements as this will be costly.		The commercial drivers of advertising should not be allowed to run rampant at the expense of continuing the service offering.	Advertising would be more suitable in this stage.	I agree, but mass participation with this potentially uneducated audience, may take some time. And will require buy – in from the chief and/or other respected members of the community – to assist with any type of adoption or use.
5	During the Saturation Stage the users will have preference of voice over text		Can the users all do text messages? If so, is the voice option required or just a mobi site?			Well, our initial premise was that these users cannot access text-based Internet services due to unavailability of infrastructure and issues of language/literacy. Do we need to compare voice and text here?	I agree with this statement, because some rural farmers may not be able to read. And in the event that they are forced to read, they would like the language of the text to be simplified and succinct (These are busy people who work the land for long hours, and use their remaining time for their families) In the event that you use voice as a means to communicate - consider the language of choice of the farmer (i.e. client preferences)
6	During the Decline Stage, if the interest of government is to sustain user participation in telephony applications, then	No one can in their rational sense bet on a dying horse	This is contrary to market forces and thus only a short term measure as it is		Government with the new broadband policy is targeting growth and the right	Could not understand this. Sorry, if I got it wrong – please help explain it	I agree that subsidies may come about from the government. But, instead of only hoping for potential advertisers to initially sponsor the above initiative, there may be some

	subsidies may be offered		unsustainable. I am not aware of too many governments that will be prepared to use tax payers' money to prop up this scheme.		for everyone to have access to the Internet. With new technologies, costs will come down as well as various services to be offered. This is a key component going forward.		wisdom in getting the relevant government departments involved, from the start of the business case. You might leverage an initiative already planned by the government, which would make time to market quicker. Government's buy – in, may pull in potential sponsors quicker.
	Expert Review Statements	First Expert Reviewer	Second Expert Reviewer	Third Expert Reviewer	Fourth Expert Reviewer	Fifth Expert Reviewer	Sixth Expert Reviewer
7	During the Decline Stage, government may support this initiative for social, economic, political and technological imperatives		I think it will be terminated as an unsustainable project – no one will continue to fund a project if it is clearly in decline. This does not make economic sense.		It is unlikely to see a decline due to the demand for knowledge in the current information age.		I strongly agree. Potential sponsors may pull out during the life cycle of this initiative. But if it is aligned to the values & the intent of various government departments, it may slow down the decline stage of this initiative. Perhaps, government in partnership with a few network providers, may even give these rural farmers smartphones to better enable them to engage with this programme. However, this immediately implies training and change management efforts - as it starts to fundamentally change how a community engages within <u>and</u> off the above voice/text platform (Smart phones may enable them to send money to their loved ones on the mines, or make and receive payments from suppliers i.e. credit notes via PDF)

Table A-3: Open-ended Responses from Expert Review Method Part 2

Expert Review Statements	1	2	3
Respondents (Experts)	Do you think this is an appropriate model that can be introduced to encourage user participation and to also address the costs facing rural users and content providers?	Do you think the Diffusion of Innovations Theory is an appropriate underlying theory to the proposed model?	Going through the model, are there any omissions or submissions you would suggest?
First Expert Reviewer		.	
Second Expert Reviewer	As presented it appears all the advantages are for the user. One has to ensure that there are enough advantages for the context providers as well for this to work. Commercial viability needs to be considered i.e. win win for all parties.		For the project to be sustainable one needs to ensure it is not going to only exist while the grant money is available for a year or two. One must ensure that there is a reliable and consistent income stream and in your case it appears to be advertising. One then needs to ensure that the practicalities are worked out. From a developmental context, great
Third Expert Reviewer			I do feel though that the model is too flat, like there is very slow constant growth. As a result of this when I initially looked at it, I have questions about the position of Maturity and Saturation, but I realised that it's the way your diagram is- try to lift it up a bit.
Fourth Expert Reviewer			
Fifth Expert Reviewer	I am not very familiar with the other models out there, but this seems to be a decent approach.	Sorry, I am not very familiar with this theory (or other innovation theories) but seems to be a good fit based on what I read	Yes, it might be good to check whether we really need to compare with text-based services at all (given the population we are targeting). Do keep advertising model in the maturity stage and switch model in the saturation stage.
Sixth Expert Reviewer	I do think it's an appropriate model. I just think that the benefits of such a programme, and some ideas around potential government departments, network providers and general advertising sponsors - needs to be incorporated in the document, to give it more context & meat (i.e. make it more real)	I am personally not aware of any other model. But, the above model is simple enough to be understood. And seems usable, given the voice/text adoption strategy needed for this rural target market.	In the introduction stage, the reader would appreciate some kind of context, in terms of the types of rural farmers out there. The word rural is open to interpretation, so a quick synopsis of the target market would help the person filling out the survey - become more confident as they fill in their various perspectives. An example of a marketing tactic to demonstrate the 'Growth stage' of the diffusion model would be great (Perhaps this should be true of all stages represented above). And lastly, it would be great if we could have a few thought starters on how we can manage the high switch costs during the maturity stage of the project (i.e. a risk management strategy) All of the above points need not be elongated paragraphs. But where 2 additional lines or where an example can be given to make the stage being addressed more tangible

Appendix A-3: Ethical Clearance Certificate



University of Fort Hare
Together in Excellence

ETHICAL CLEARANCE CERTIFICATE

Certificate Reference Number: ISA011SMAS01

Project Title: **A revenue generation model for adoption of voice applications**

Nature of Project: Masters

Principal Researcher: Sekelo Mazwi

Supervisor: Ms N. Isabirye

Co-supervisor:

On behalf of the University of Fort Hare's Research Ethics Committee (UREC) I hereby give ethical approval in respect of the undertakings contained in the above- mentioned project and research instrument(s). Should any other instruments be used, these require separate authorization. The Researcher may therefore commence with the research as from the date of this certificate, using the reference number indicated above.

Please note that the UREC must be informed immediately of

- Any material change in the conditions or undertakings mentioned in the document
- Any material breaches of ethical undertakings or events that impact upon the ethical conduct of the research

The Principal Researcher must report to the UREC in the prescribed format, where applicable, annually, and at the end of the project, in respect of ethical compliance.

Special conditions: Research that includes children as per the official regulations of the act must take the following into account:

Note: The UREC is aware of the provisions of s71 of the National Health Act 61 of 2003 and that matters pertaining to obtaining the Minister's consent are under discussion and remain unresolved. Nonetheless, as was decided at a meeting between the National Health Research Ethics Committee and stakeholders on 6 June 2013, university ethics committees may continue to grant ethical clearance for research involving children without the Minister's consent, provided that the prescripts of the previous rules have been met. This certificate is granted in terms of this agreement.

The UREC retains the right to

- Withdraw or amend this Ethical Clearance Certificate if
 - Any unethical principal or practices are revealed or suspected
 - Relevant information has been withheld or misrepresented
 - Regulatory changes of whatsoever nature so require
 - The conditions contained in the Certificate have not been adhered to
- Request access to any information or data at any time during the course or after completion of the project.
- In addition to the need to comply with the highest level of ethical conduct principle investigators must report back annually as an evaluation and monitoring mechanism on the progress being made by the research. Such a report must be sent to the Dean of Research's office.

The Ethics Committee wished you well in your research.

Yours sincerely

Professor Gideon de Wet
Dean of Research

09 December 2013