

**AN ANALYSIS OF SOUTH AFRICA'S READINESS FOR ANALOGUE TO  
DIGITAL TERRESTRIAL TELEVISION MIGRATION BY JULY, 2020**

**BY**

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In accordance with rule g5.6.3, I hereby declare that the above-mentioned treatise is my own work and that it has not previously been submitted for assessment to another university or for another qualification.

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06/04/20

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## **ABSTRACT**

The 2006 International Telecommunication Union (ITU) Radio World Conference treaty concluded that all countries should migrate from analogue to digital terrestrial television by June 2015, starting with region one countries, comprising Africa, Europe, the Middle East and the Republic of Iran (Agona & Otim, 2012). South Africa, as part of region one, developed a migration policy, Digital Terrestrial Television (DTT) regulations, and initiated a process of migrating from Analogue Terrestrial Television (ATT) to Digital Terrestrial Television (DTT) to meet the deadline. South Africa, however, missed the June 2015 deadline due to a number of challenges, including a lack of infrastructure readiness, South African citizens' unawareness and government politics, and the deadline has since been extended by ITU to July, 2020 (African Telecommunications Union, 2018).

The purpose of this research is to explore the technology adoption model (TAM) to address challenges associated with digital terrestrial television migration, and analyse the readiness of South Africa to migrate. TAM is a model used by researchers to understand the behavior and perception of users in new technology adoption (Fayad & Paper, 2015). Quantitative research is conducted to determine the relationship between dependent and independent variables. The research was undertaken through the use of an online questionnaire with a sample of South African citizen's. A sample of 60 -150 citizens, comprising middle and senior managers of the broadcasting industry was used for the purpose of this research.

Digital television offers many benefits for broadcasters, network operators, spectrum regulators, and consumers. In most countries, the transition was slower than expected, even though most European countries managed to migrate. The digital migration is not an easy transition and analogue switch-off can also be much more difficult. Studies have shown that analogue switch off (ASO) needs to be carefully planned and well budgeted for, and it also needs a good publicity campaign which must involve all relevant stakeholders, such as broadcasters, viewers, manufacturers, network operators, manufacturers and retailers. Even though studies conducted previously identified obstacles of digital migration to include; a) lack of awareness b) lack of information, c) influence of politics and d) influence of corruption.

Lack of information and influence of corruption seem to have strong correlation with DTT migration, so these are areas that need additional attention. Studies have shown that the African continent is struggling with meeting the digital migration deadline and is progressing very slowly. It is therefore advisable for the African continent to do a thorough analysis of how other countries managed to migrate successfully.

Most African countries are struggling with the migration of television broadcasting from analogue terrestrial television to digital terrestrial television. This is caused mainly by lack of information and lack of awareness. Even though most South African people have heard about digital terrestrial television, they are not equipped for the migration. To sensitise viewers, as major stakeholders of digital migration, will play an important role. It is important that the South African Government should get a buy in from all relevant stakeholders as soon as possible. Broadcasters, including the national signal broadcaster (SABC), community broadcaster, commercial broadcasters, Sentech LTD and government should coordinate in establishing vigorous DTT awareness campaigns to educate viewers. These will encourage buy in from viewers and, as a result, drive dual illumination costs down, saving the county money.

South Africa need to fast-track the implementation of digital migration to prevent incurring financial losses due to supporting two terrestrial television networks. Even though studies show that most challenges associated with digital migration are common throughout the world. It would, therefore, be logical for South Africa to take the best practices from developed countries that have successfully migrated and are already broadcasting in digital.

Lastly, digital terrestrial television migration is dependent on set-up box approval, manufacturing and affordability. In order to ensure that set-up box prices are affordable for South African consumers, it is recommended that these boxes must be 100% manufactured in South Africa. This will drive costs down and ensure good, total quality assurance. It will also mean that the required skills are developed and maintained locally to position South Africa better for future technology developments. Successful digital television migration would be a great milestone for South Africa.

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## LIST OF ABBREVIATIONS

<b>Abbreviations</b>	<b>Synonyms</b>
DTT	Digital Terrestrial Television
ATT	Analogue Terrestrial Television
ICASA	Independent Communications Authority of South Africa
TAM	Technology Adoption Model
TV	Television
ITU	International Telecommunication Union
OVHD	Open View High Definition
SABC	South African Broadcasting Council
DBAB	Digital Broadcasting Advisory Board
ASO	Analogue Switch-off
FTA	Free to Air
NRI	Networked Readiness Index
RIA	Research ICT Africa
DoC	Department of Communications
NBC	National Broadcasting Commission



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## CHAPTER 1- INTRODUCTION AND BACKGROUND

### 1.1 INTRODUCTION

Digital terrestrial television migration is a process by which analogue television (TV) signals are distributed digitally to address the efficient use of frequency spectrum, a clearer picture and good sound quality, amongst other things (Agona & Otim, 2012). The 2006 International Telecommunication Union (ITU) Radio World Conference Treaty concluded that all countries should migrate from analogue to digital terrestrial television by June 2015, starting with Region one countries, comprising Africa, Europe, the Middle East and the Republic of Iran (Agona & Otim, 2012). South Africa, as part of Region one, developed a migration policy, Digital Terrestrial Television (DTT) regulations, and initiated a process of migrating from analogue terrestrial television (ATT) to DTT to meet the deadline. However, South Africa missed the June 2015 deadline due to several challenges, including:

- Lack of infrastructure readiness;
- Corruption;
- South African citizens' DTT unawareness, and
- Government politics.

The deadline for analogue switch-off (ASO) has since been extended by ITU to July, 2020 (African Telecommunications Union, 2018). However, some of the region one countries have already migrated from analogue to digital terrestrial television. In the history of terrestrial television broadcasting, the DTT migration is a significant technological change since the inception of television in South Africa in the early 1970's.

The Diffusion of Innovations theory, which states that product, or service, goes through five categories, namely innovators, early adopters, early majority, late majority and laggards, indicates that the adoption of product or service is dependent on the interest of consumers. Diffusion of innovations theory further postulates that the development and application of technology can resolve human physical problems with the diffusion of communications (Mbatha & Lesame, 2014). Diffusion, in this essence, is defined as a process by which new ideas are communicated to members of a social group.

Whereas most people may think that digital television means just a new digital form of signal representation, not necessarily affecting the information content of what one has always been called TV, the truth is that digital television becomes multiple-channel data broadcasting (Mbatha & Lesame, 2014). Digital television offers a wider variety of possibilities and opportunities to enhance the viewing experience for the intended market. The digital terrestrial television technology benefits include:

- Frequency spectrum efficiency;
- Clear picture;
- Good quality sound;
- Additional channels;
- Business growth opportunities, and
- Operations efficiency opportunities.

South Africa's TV households were estimated to be over 14 million in 2018, with an estimate of 6.2 million TV households only consuming digital TV via Pay-Tv of Multichoice and OVHD, which is growing rapidly ("SABC Presentation on the ICASA Discussion Document : Inquiry into Subscription Television Broadcasting Services," 2018). That leaves roughly another 7.8 million TV households using analogue free to air terrestrial signal, which consists of SABC1, SABC 2, SABC, ETV and, in some metropolitan areas, community TV stations. It is these 7.8 million homes that need to be enticed to migrate from analogue to digital terrestrial television.

For the first time in the history of television in South Africa, the country plans to provide 100% geographical and population television coverage (ICASA, 2015). SENTECH LTD is a South African state-owned signal distributor that was awarded the project to roll out infrastructure solutions for the digital terrestrial television. SENTECH LTD has since completed the deployment of a digital terrestrial television DVB-T2 standard infrastructure, which means the country is DTT ready.

## 1.2 PROBLEM STATEMENT

The developments in digital transmission in South Africa are very slow, and closely intertwined with politics, as government, under the Department of Communications, is the custodian of the DTT migration (Berger & Masala, 2012).

Research has proven that, among other challenges, both broadcasters and consumers do not have the basic knowledge required to achieve the set deadline (Mbatha & Lesame, 2014). This research is based on the fact that most television sets in South Africa are not digitally compatible. This means that these television sets would have to be replaced with digitally compatible television sets, or by purchasing an analogue-to-digital converter, called a set-top box (STB) decoder (Paschal & Uwaoma, 2012).

Set-top boxes are therefore important for the DTT migration in South Africa, as they are configuration prerequisites (Armstrong & Collins, 2015). As noted above, it has been estimated that 7.8 million TV households will need DTT STBs to receive and decode digital terrestrial television. If a viewer does not have a STB, the viewer will no longer be able to watch television transmitted through terrestrial platform once the dual illumination period is over.

The other challenge with the migration of DTT is that much of the South African population is very poor. The employment rate in South Africa for people between 16 and 64 years of age was reported to be roughly 27 percent in 2019 (StatsSA, 2019), leaving about percent of the population unemployed. It is therefore important to note STB affordability as one of the challenges of DTT migration. To mitigate the STB affordability challenge faced by South Africans, the South African government has committed to subsidize up to 66% of the DTT STB price, (Suid-Afrika, 2014). The commercialization of the digital terrestrial television is dependent on the approval of the set-up box by the government. Due to the delay in STB approval by the South African government, digital terrestrial television network is mostly not yet commercialized (Gillwald, Moyo, & Stork, 2012), leaving the South African government supporting two terrestrial television networks.

The failure to address digital terrestrial television through the technology adoption model in South Africa has led to a huge financial loss for the South African government, and ultimately, its citizens, as billions of Rands have been allocated for the project rollout. To upgrade the infrastructure, from DVB to DVB-2T standard one billion Rand was allocated by the government in 2007 (Armstrong & Collins, 2015). The DTT migration project is one of the biggest and most expensive public infrastructure rollout projects ever undertaken in South Africa.

It is believed that the DTT rollout cost the country over R8,5 billion in 2015, and was projected to cost the country an additional R929 million in 2018 (Gedye, 2015). The projected figures are expected to continue to rise throughout the dual illumination process until analogue terrestrial television is completely switched off.

SENTECH LTD was allocated a budget of R1.94 billion for DTT infrastructure rollout, and a further 330 million was allocated for dual illumination (Gedye, 2015). Dual illumination is the process of supporting two transmission networks, namely ATV and DTT, while complete ASO process is underway. The other budget was allocated to other stakeholders for various projects such as, a set-up box subsidy and capacity building scheme, the Department of Communications DTT awareness campaigns, and the public broadcaster was also allocated budget for various DTT related projects (Gedye, 2015).

South Africa faces the risk of exposure from signal interference as the analogue television frequency bands will no longer be protected after the deadline of the analogue switch-off (ICASA, 2015). Bands V and IV, which are used for the analogue signal distribution, will no longer be protected from interference, which will then pose a serious threat to all stakeholders (Demanding Urgency Descriptive, n.d.). For the South African government to stop supporting both the analogue and digital terrestrial television networks, the country needs to migrate from analogue to digital terrestrial television.

### **1.3 MAIN OBJECTIVES OF THE STUDY**

**The research aim is to investigate challenges associated with adopting new technology adoption model in South Africa to mitigate the risks associated with delay of analogue switch-off (ASO).**

#### **1.3.1 Secondary objectives of the study**

- To investigate the impact that lack of awareness has on the new technology adoption model in South Africa;
- To investigate the impact lack of information for consumers to adopt the new technology has on the new technology adoption model in South Africa;
- To investigate the impact corruption has on the new technology adoption model in South Africa, and
- What impact political influence has on the new technology adoption model in South Africa?

### **1.4 RESEARCH QUESTIONS**

The study seeks to address the following research questions:

- What impact does lack of awareness have on new technology adoption model in South Africa?
- What impact does lack of information for consumers to adopt the new technology have on the new technology adoption model in South Africa?
- What impact does corruption have on the new technology adoption model in South Africa?
- What impact does political influence have on the new technology adoption model in South Africa have on DTT migration?

### **1.5 HYPOTHESES**

Studies show that when the problem has been identified, the problem can be analysed using hypothesis. Scientific hypothesis can be defined as a statement of empirical relationship between a set of variables, (Aliyu, 2017).



As mentioned in the beginning of this chapter, South Africa is struggling with digital terrestrial television switch-on, and this is due to a number of challenges. To set up criteria for comparing results of this study, two types of hypothesis, namely null hypothesis that is symbolised by  $H_0$ , and alternative hypothesis, symbolised by  $H_1$ , are to be established as follows:

### ***Hypothesis one***

$H_0$ , lack of DTT awareness for South African consumers, **does not** affect DTT migration.

$H_1$ , lack of DTT awareness for South African consumers, **does** affect DTT migration.

### ***Hypothesis two***

$H_0$ , lack of information for consumers to adopt new technology, **does not** affect DTT migration

$H_1$ , lack of information for consumers for to adopt new technology, **does** affect DTT migration

### ***Hypothesis three***

$H_0$ , corruption **does not** have an influence on DTT migration

$H_1$ , corruption **does** have an influence on DTT migration

### ***Hypothesis four***

$H_0$ , lack of government commitment **does not** affect DTT migration

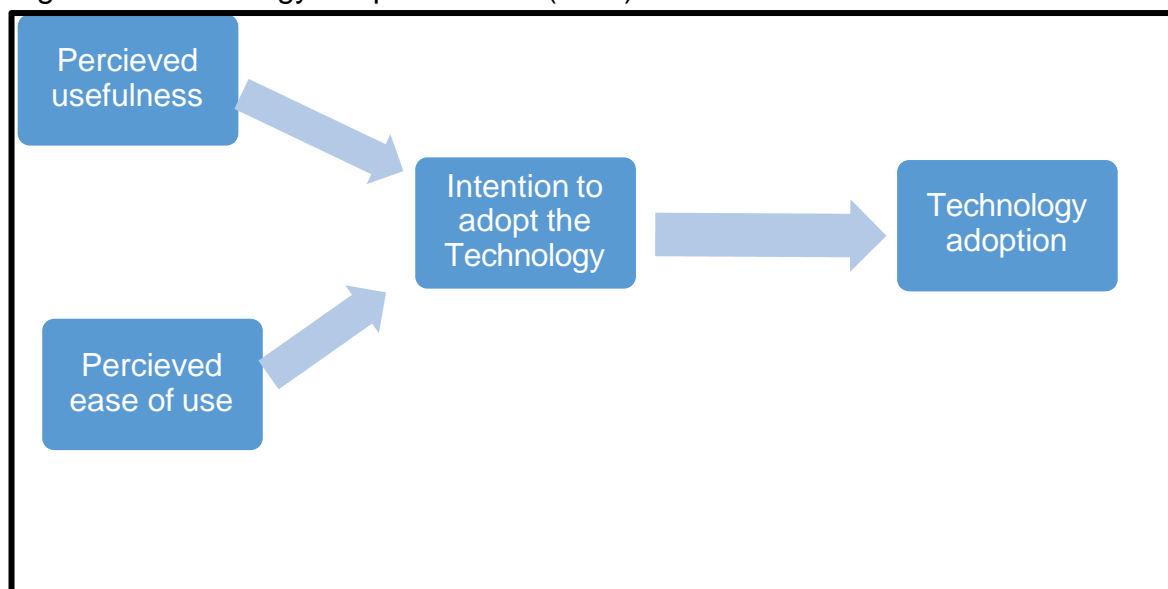
$H_1$ , lack of government commitment **does** affect DTT migration

## **1.6 PURPOSE OF THE STUDY**

Research has proven that there are number of benefits for South Africa to migrate from analogue to digital television (Mbatha & Lesame, 2014).

The world is going digital; therefore, South Africa should also comply. South Africa's applauded plan states that going digital will enhance the lives of South Africans (Mbatha, 2012). Digital migrations' aim is to bridge the gap between technology inclined people with effective access to technology solutions, and those people with limited access to technology solutions. Most research conducted is about the benefits of the DTT migration, and not much about the cause of the delay. It is also understood that the existing resistance from South Africans is due to a lack of knowledge and availability of information. This could also be caused by the understanding of new technology adoption model, illustrated in Figure 1 below (Fayad & Paper, 2015).

Figure 1: Technology adoption model (TAM)

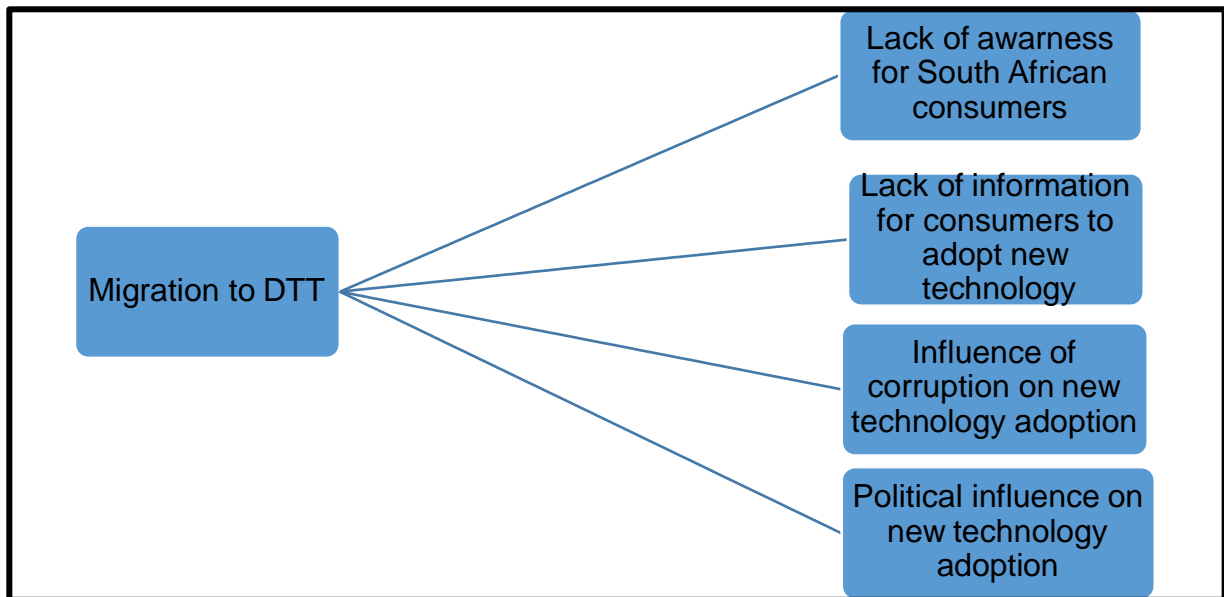


Source: Researcher's construction

## 1.7 CONCEPTUAL MODEL

Figure 2 below illustrates the conceptual model proposed for the study. This research will explore the challenges associated with new technology adoption in South Africa, and propose possible strategies to address them. This will be done by collecting primary data using an online questionnaire, and literature review as secondary data. This data will be analysed for gaps in the literature. The intent will be to investigate the variables that are perceived to have a negative effect on the successful adoption of DTT migration. Figure 2, below, depicts the relationship between the dependent and independent variables that will be tested.

Figure 2: Digital Television migration proposition



Source: Researcher's construction

According to Mbatha and Lesame (2014), digital terrestrial television migration in South Africa has been delayed due the following reasons:

- Lack of awareness for South African consumers;
- Lack of information for consumers to adopt the new technology;
- Corruption, and
- Lack of commitment from the South African government.

The success of digital terrestrial television migration will address a number of stakeholders' interests, such as government, broadcasters, viewers and the Broadcasting Regulator. It is therefore prudent to note that DTT migration will yield benefits for all relevant stakeholders. Paschal and Uwaoma (2012) further argue the following about each stakeholder's interests:

- Government's interests  
These will be addressed, as the spectrum will be freed up resulting in more frequency spectrum being available for additional television stations in South Africa.
- Broadcaster's interests

Digital signal broadcasting is flexible and faster than analogue broadcasting. Broadcasters will be able to operate more efficiently as digital transmission allows up to four channels on one frequency. Consequently, more revenue will be generated, as well as an improved employment rate due to additional stations being established.

- Viewer's interests

The viewer will have more channels to choose from as a result of better frequency spectrum utilization, a clearer picture, and good sound quality.

- Broadcasting Regulator's interests

The Regulator, in this case, NBC, will acquire increased revenue that will accrue from additional licenses.

There are several benefits from the introduction and adoption of digital terrestrial television, as listed below:

- Efficient utilization of the frequency spectrum. South Africa is faced with the challenge of a congested frequency spectrum (ICASA, 2015).
- Digital terrestrial television will also improve communications between government and South African citizens as more informative services can be introduced.
- Broadcasters can add more channels which will then enable them to generate more revenue and increase job creation (Adam, 2012).
- Citizens of South Africa will have access to a clearer picture and an improved sound quality signal.
- In addition, digital terrestrial television brings added value to the country as more educational channels and affordable internet services will be possible.

## **1.8 OVERVIEW OF RESEARCH METHODOLOGY**

For the purpose of this study, a quantitative research is conducted to distinguish the relationship between the independent and dependent variables.

The goal of quantitative methods is to determine whether the predictive generalisations of a theory hold true, or not, and to address the predetermined hypotheses, (Aliyu, 2017). The research was undertaken through use of an electronic questionnaire with a sample of South African citizen's. A sample of 60 -150 citizens, comprised of middle and senior management signal broadcaster workers was used for this research.

### **1.8.1 Research paradigm**

The research process has three major dimensions, namely, ontology, epistemology and axiology (Aliyu, 2017). These dimensions' address three key questions: What do we believe about the nature of reality? How do we know what we know? What do we believe is true? The term "paradigm", originated from the Greek word *paradeigma*, and is described as shared beliefs and values in a discipline that guides how problems are resolved (Chilisa & Kawulich, 2015). A paradigm implies the pattern, structure, values, and framework of the study, which is then called the "methodology". The methodology summarizes how the research will proceed. It is where assumptions about the nature of reliability and knowledge are found, and where values for a topic are put together (Chilisa & Kawulich, 2015). There are two main approaches used for research purposes, namely: qualitative and quantitative research. It is important to choose an appropriate research approach for a research study as it influences the questions asked, the methods chosen, and the final results of the research (Kilani & Kobziev, 2016).

### **1.8.2 Quantitative research method**

Quantitative research is an inquiry into an identified problem, based on testing a theory, measured with numbers and analysed using statistical techniques. There are three general types of quantitative research approaches: experiments, quasi experiments and surveys (Kilani & Kobziev, 2016). The current study utilises this research paradigm and an online survey research approach. In a quantitative research, reliability and validity are two factors which the researcher should be concerned about when designing a study, collecting and analysing data, as well as when selecting the targeted population, (Aliyu, 2017). To ensure reliability in a study, trustworthiness is important.

### **1.8.3 Qualitative research method**

The qualitative research process is an inquiry into an identified problem to gain an understanding of a social or human problem from multiple perspectives. Qualitative research is conducted in a natural setting, and involves a process of building a complex and holistic picture of the phenomenon of interest. The three general types of approaches in qualitative research are: case studies, ethnographic studies and phenomenological studies (Kilani & Kobziev, 2016).

### **1.8.4 Data collection method**

Data is collected using an online Question-Pro questionnaire that will be closely examined by the researcher to avoid inconsistencies. Validity and reliability is taken into consideration.

### **1.8.5 Scope of study**

The study is focusing on the analysis of South Africa's readiness for analogue to digital terrestrial television migration, and the challenges of technology adoption within South Africa, with the main focus being on the Western Cape, Eastern Cape and Gauteng Provinces. It will not explore any other countries beyond South Africa's borders.

### **1.8.6 Sample population**

The research study is targeting signal broadcasters' middle to senior management employees. Signal broadcasters, for the purpose of this study, will be defined as television and radio signal licenced broadcasters' employees, including South Africa's national signal broadcaster SABC, commercial broadcasters, community broadcasters and Sentech LTD.

Middle and senior management workers' definition, for the study, is any person permanently employed within the borders of South Africa, ("A reconsideration of what and who is middle class in South Africa Development Southern Africa Vol 30, No 2\_797224," n.d.). The sample population is chosen in such a way that diversity, sensitivity to technological changes and likelihood of having internet access are considered.

Most signal broadcasters, middle and senior management workers, are always on the go and using digital platforms for news updates, sports updates etc. Diversity of targeted population's background is also deemed critical for this study. Therefore, a simple random sampling of signal broadcasters' industry, middle to senior management workers, will be selected. This sampling method is used when an extremely large population exists for sampling purposes, (Nagar & May, 2014) The advantage of simple random sampling is that everyone in the population has the same probability of being chosen for the study, which reduces the chances of being biased (Khaldi, 2017).

The sample is randomly selected to assemble 60 to 150 individuals who are representative of the entire population. The optimal number of the population sample size depend on the variables under study. For example, the rarity or the expected differences in the outcome of the population (Practice, 1996). Therefore; the sample size utilized for this study is deemed adequate, as there is a probability of getting similar results when using different sample while testing same variable.

#### **1.8.7 Data collection**

The study makes use of both primary and secondary data. The primary data is collected using a structured online questionnaire distributed via Question Pro to the 60 -150 respondents decided upon. The questionnaires have closed-ended questions to ensure consistency. The secondary data is collected using online research, journals, books and magazines.

#### **1.8.9 Data analysis**

For this study, Statistica software (Version 13, 2018) is used for the analysis of the online collected data. Statistica is an advanced data analysis software developed by Statsoft. The study will include both nominal and ordinal scales to test the ease of use, and usefulness, of digital terrestrial television and interval scale, in determining the level of knowledge about the technology. The managed response of the questionnaires collected will go through quantitative data analysis process.

Regression and correlation analysis will also be done to measure the relationship between dependent and independent variables. The mean, standard deviation, and other variables will be computed to better understand the data.

#### **1.8.10 Ethical considerations**

All ethical clearance issues were considered and due to the sample population chosen, a full ethical clearance is required to comply with Nelson Mandela University ethics clearance process, and the required documentation is attached as appendices.

Full ethics application is process where the researcher is required to submit documentation, as follows, to the Ethics Committee for approval:

- Methodology summary (see attached appendix A);
- Ethics application form (see attached appendix B);
- Gatekeeper letter (see attached appendix C);
- Informed consent form (see attached appendix D), and
- Research questionnaire (see attached appendix E).

Ethics approval for this study was granted by the Ethics Committee and approval letter is attached as appendix F.

### **1.9 OUTLINE OF THE STUDY**

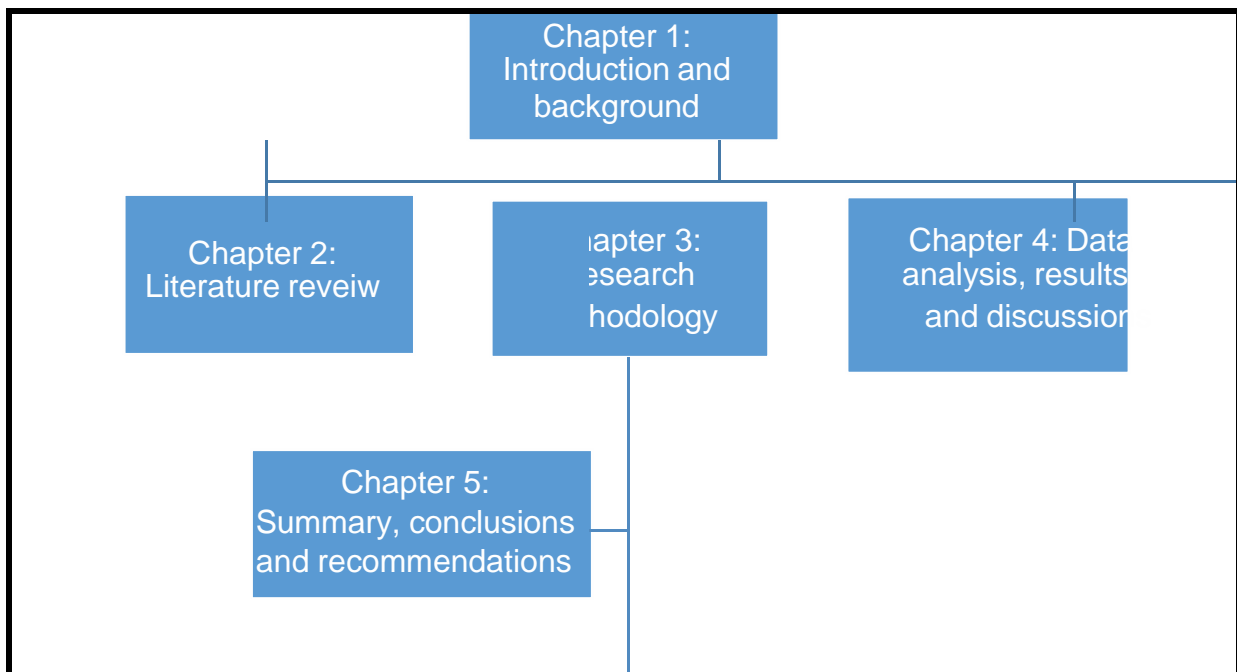
This study consists of five main chapters covering the following content - see Figure 3 below:

- Chapter 1: This is an introductory chapter which gives an overview of the study with background, purpose of the study, aims, objectives, research questions, hypotheses and preliminary research methodology.
- Chapter 2: The literature review gives a summary of literature related to the technology adoption model, and South Africa's readiness for the migration from analogue to digital terrestrial television. It also explains digital terrestrial television migration projects in other countries, and the benefits and challenges associated with digital terrestrial television.



- Chapter 3: Research methodology explains the methodology used in this study, the approach used to collect and analyse data, as well as ethical issues.
- Chapter 4: The data analysis results and discussions reflect on the empirical results obtained from the collected data. It includes organising and analysing the collected data.
- Chapter 5: A summary, and the conclusions and recommendations drawn from the results, are included in this final chapter of the study.

Figure 3: Chapter outline



Source: Researcher's construction.

## 1.10 SUMMARY

This chapter gave an understanding of this study as it outlines the background, the purpose, the objectives, hypotheses, research questions and preliminary research methodology of the study. It explained the importance of the study and related theories. Adoption of digital terrestrial television is critical for South Africa as it has a number of benefits such as efficient use of spectrum, additional information channels, job creation and clearer picture and sound quality. The delay of DTT migration impacts South African government deliverables negatively, as their mandate under the umbrella of the Department of Communications (DoC), is to provide reliable, affordable and current information to all South Africans.

It was also discussed that analogue transmission equipment is obsolete and needs replacement, so it is therefore recommended that the obsolete equipment be replaced with digital transmission equipment to meet migration requirements. It was also noted that the digital broadcasting infrastructure is ready even though most South Africans are unaware of it, and this then leaves South Africa with two live transmission networks. The above-mentioned lack of information has a negative impact on South African citizens, as this alone require funding from the South African government to support the digital terrestrial television network.

A preliminary research methodology that will be used to analyse the collected data was discussed in this chapter. An overview of related literature review including technology adoption model and how it affects the adoption of digital terrestrial television in South Africa will be discussed in the next chapter.

The following chapters will also be looking at the methodology in detail, the online questionnaire will be sent to the population. The collected feedback will be organised and interpreted. The final chapter will provide recommendations and conclusions of the study.

## **CHAPTER 2 - LITERATURE REVIEW**

### **2.1 INTRODUCTION**

This chapter seeks to present a discussion and overview of studies that have been undertaken by other researches, the gaps in the literature and the views of different experts, and other sources of information regarding digital terrestrial television migration. Firstly, an overview of the European countries' perspective is discussed in order to understand Europe's digital terrestrial television status, and how the countries managed to overcome the challenges associated with the transition from analogue terrestrial television to digital terrestrial television.

Secondly, the African perspective is explored by looking at the African countries' digital terrestrial television migration status, and challenges associated with the transition, plus an overview of African countries digital television benefits. The Ugandan digital terrestrial television migration progress, and status, is also discussed in this chapter to give some perspective of African countries that has migrated to digital successfully.

Thirdly, the South African perspective is discussed, together with the status and challenges associated with digital terrestrial television migration. Lastly, gaps from previous research are identified, and the conclusions drawn up based on the literature covered by this study.

#### **2.1.1 What is digital terrestrial migration?**

Digital terrestrial television migration is defined as the technological evolution of television broadcasting from the analogue signal distribution to the digital television signal distribution, resulting in higher quality pictures, more channels and much more frequency spectrum available for use by other users (Lawal & Chatwin, 2013). In the history of terrestrial television broadcasting, the DTT migration is a quantum technological change since the inception of television in SA in the early 70's. The DTT technology is spectrum efficient, provides business growth opportunities, and operations efficiency opportunities (Agona & Otim, 2012).

## 2.2 THEORETICAL FRAMEWORK

The world has gone digital, robotics and artificial intelligence are taking over, resulting in an effective and efficient way of doing things. It must be pointed out that radio and television signals in South Africa, specifically are currently broadcasted in analogue format, (Mbatha, 2012). Some global countries have started migrating from analogue terrestrial television to digital terrestrial television. According to Mbatha & Lesame (2014), digital terrestrial television is an advanced broadcasting technology that has enhanced television viewers' experience.

Government needs to provide a strategic policy framework for the adoption of digital terrestrial television migration, (Ejiaku, 2014). This policy framework will guide adopters on the impact of the new technology. In developing countries, such as South Africa development of digital platforms has been lagging because of poor policies and insufficient investments on digital platforms, (Ejiaku, 2014). The ineffectiveness of the policies in developing countries causes delays in the adoption of the new technology. Some countries have completed their DTT migration and the list of these countries is given in table 1 below, ("Status of the transition to Digital Terrestrial Television Countries.aspx," n.d.).

Table 1: DTT migration status

<b>Name</b>	<b>DTT migration status</b>
Algeria	Completed
Andorra	Completed
Australia	Completed
Austria	Completed
Azerbaijan	Completed
Belgium	Completed
Bulgaria	Completed
Canada	Completed
Colombia	Completed
Cote d'Ivoire	Completed
Croatia	Completed

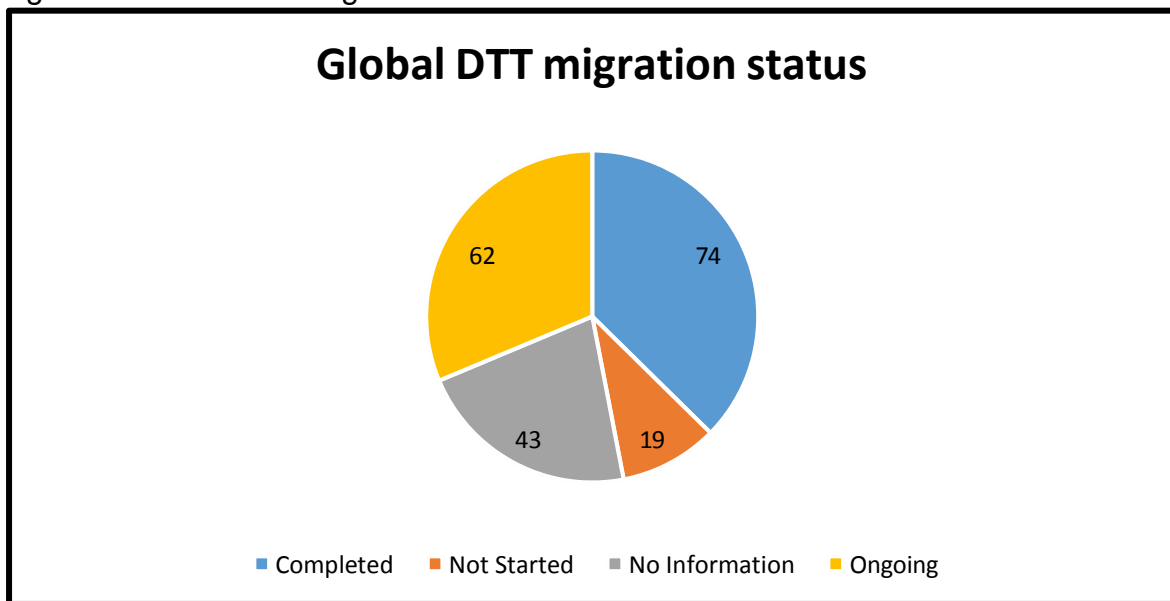
Cyprus	Completed
Czech Rep.	Completed
Denmark	Completed
Estonia	Completed
Eswatini	Completed
Finland	Completed
France	Completed
Gabon	Completed
Gambia	Completed
Georgia	Completed
Germany	Completed
Greece	Completed
Guinea-Bissau	Completed
Hungary	Completed
Iceland	Completed
Ireland	Completed
Israel	Completed
Italy	Completed
Japan	Completed
Kenya	Completed
Korea	Completed
Kyrgyzstan	Completed
Latvia	Completed
Lesotho	Completed
Liberia	Completed
Lithuania	Completed
Luxembourg	Completed
Malawi	Completed
Malta	Completed
Marshall Island	Completed
Mauritius	Completed
Mexico	Completed

Monaco	Completed
Mangolia	Completed
Montenegro	Completed
Morocco	Completed
Netherlands	Completed
New Zealand	Completed
Norway	Completed
Poland	Completed
Portugal	Completed
Qatar	Completed
Republic of North Macedonia	Completed
Rwanda	Completed
San Marino	Completed
Saudi Arabia	Completed
Serbia	Completed
Slovak Republic	Completed
Slovenia	Completed
Somalia	Completed
Spain	Completed
Sweden	Completed
Switzerland	Completed
Tanzania	Completed
Uganda	Completed
United Arab Emirates	Completed
United Kingdom	Completed
United States	Completed
Vertica	Completed
Zambia	Completed

Source: (“Status of the transition to Digital Terrestrial Television Countries.aspx,” n.d.)

Even though the above-mentioned countries have adopted different systems such as DVB and DVB-2T, they should have a developed and approved policy framework in place. Figure 4 below illustrates the updated status of global digital terrestrial television migration, (“Status of the transition to Digital Terrestrial Television Countries\_aspx,” n.d.). About 74 countries have completed the migration, 62 countries are ongoing, 43 countries are with no information available and only 19 countries have not started the digital terrestrial television migration globally.

Figure 4: Global DTT migration status



Source: (“Status of the transition to Digital Terrestrial Television Countries\_aspx,” n.d.).

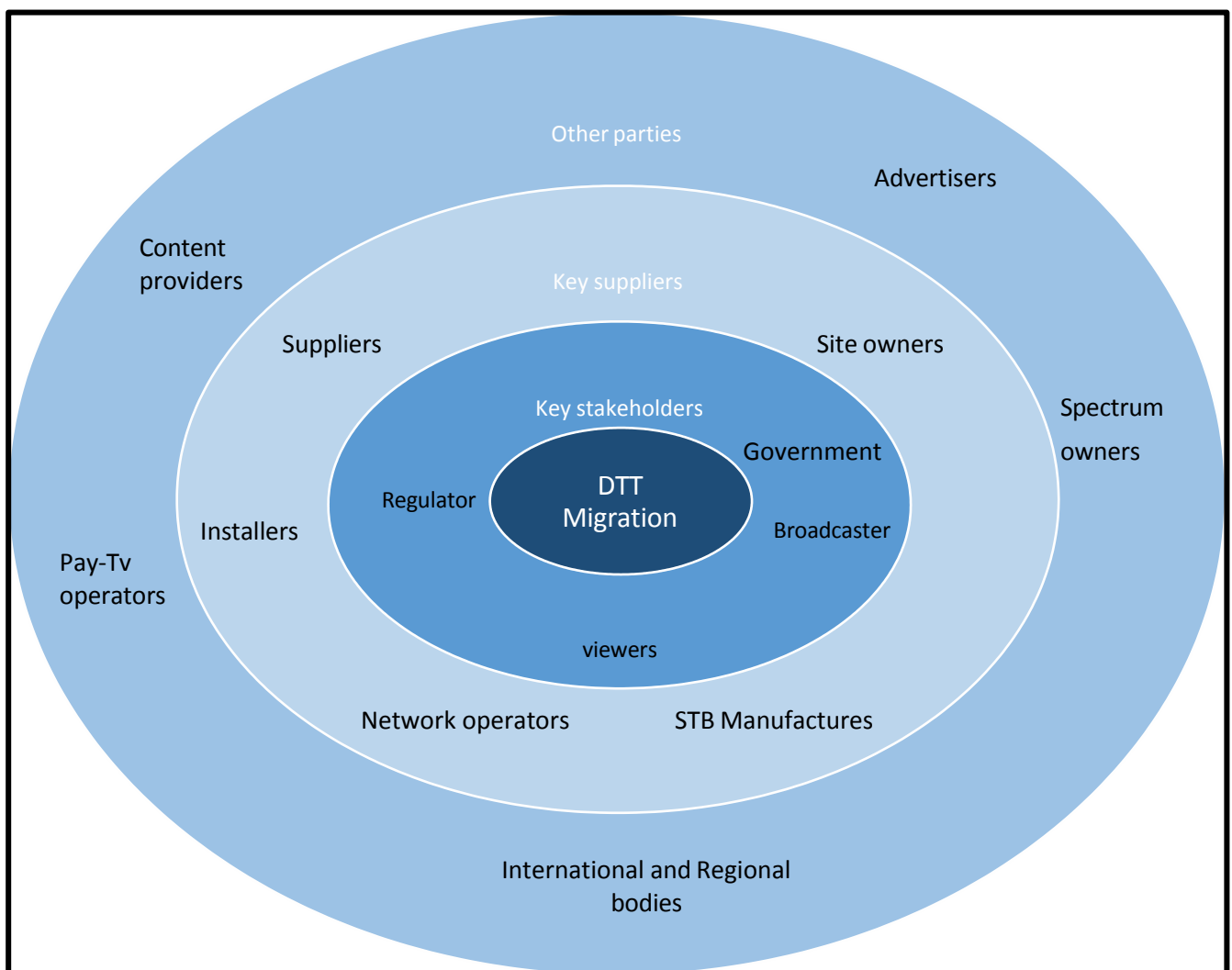
### 2.3 DIGITAL MIGRATION KEY STAKEHOLDERS

In order for DTT migration to be successful, one should not just focus on identification of stakeholders and their interests, but should also build on their standard operating procedures, which is a concern for creating and adding value for stakeholders. These processes and procedures include establishment of governance structures, policies, objectives key performance indicators, management systems, and risk management processes (Oze, Orekyeh, & Ezeanwu, 2017). Digital terrestrial television migration key stakeholders include Government, Broadcasters, Viewers and the Broadcasting Regulator, of which each has a vital role to play.

The transition between analogue to digital terrestrial television is currently a global initiative that has not been financially, or politically proven (Mcgonagle, 2010). Key suppliers, such as suppliers, site owners, network operators, and STB manufacturers contribute by providing a good platform for key stakeholder's interests in order to achieve the transition.

Other parties, such as content providers, advertisers, spectrum owners, Pay-Tv operators international and regional bodies do not have a direct influence, but are more of external stakeholders. For a successful migration of analogue terrestrial television to digital terrestrial television, it is important that all stakeholders, both internal and external, play their roles.

Figure 5: DTT migration stakeholders



Source: Researcher's construction



## **2.4 GLOBAL COUNTRIES DIGITAL TERRESTRIAL TELEVISION MIGRATION PERSPECTIVE**

### **2.4.1 An overview of digital terrestrial television migration in Europe**

Globally, terrestrial broadcasting is still the dominant primary platform for the delivery of public services. The terrestrial broadcasting platform in European countries serves the public service broadcasters, the commercial broadcaster, as well as other players (Position & Geneva, 2010). In France, Greece, Italy, Spain, Portugal and the UK, the majority of households receive television exclusively through the terrestrial signal broadcasting.

Research also states that the terrestrial television broadcasting platform is globally known for its unique combination of characteristics such as technical excellence and efficiency, favourable coverage and support of services, flexibility, market success and wide acceptance by industry, as well as by the public in most European countries (Position & Geneva, 2010). Position & Geneva and Mcgonagale (2010) also agree that the importance of terrestrial television in the world is to be noted, as this is the most used platform for public services broadcasting.

### **2.4.2 A status of digital terrestrial television migration in Europe**

The European Commission proposed the beginning of 2012 as the deadline for analogue switch-off throughout the European Union. Europe is comprised of 28 EU countries, with a population of about 508.2 million (European Union, 2019). About 23 of the 28 EU member states achieved ASO by the set deadline, 3 EU countries comprising of Bulgaria, Hungary, and Poland, completed ASO in 2013, Greece in 2014 and Romania is ongoing. Table 2 indicates 96% of the 28 EU countries that have successfully migrated from analogue terrestrial television to digital terrestrial television ("Status of the transition to Digital Terrestrial Television Countries\_aspx," n.d.). Although analogue switch-off (ASO) has been achieved by almost all EU countries, most African countries seem to be struggling.

Table 2: ASO status of 28 EU countries

<b>Country</b>	<b>ASO date</b>	<b>Completion date</b>
Austria	Completed	2011
Belgium	Completed	2010
Bulgaria	Completed	2013
Croatia	Completed	2010
Cyprus	Completed	2011
Czechia	Completed	2012
Denmark	Completed	2009
Estonia	Completed	2010
Finland	Completed	2007
France	Completed	2011
Germany	Completed	2012
Greece	Completed	2014
Hungary	Completed	2013
Ireland	Completed	2012
Italy	Completed	2012
Latvia	Completed	2010
Lithuania	Completed	2012
Luxemburg	Completed	2006
Matla	Completed	2011
Netherlands	Completed	2011
Poland	Completed	2013
Portugal	Completed	2009
Romania	Ongoing	
Slovakia	Completed	2012
Slovenia	Completed	2011
Spain	Completed	2010
Sweden	Completed	2007
United kingdom	Completed	2012

Source: (“Status of the transition to Digital Terrestrial Television Countries\_aspx,” n.d.).

### **2.4.3 Television coverage and DTT migration in Europe**

According to Campos-Freire (2013), Pay-Tv is the most dominant TV distribution in European major and most populated urban cities. It is therefore evident that Pay-Tv is mostly dependent on affordability. Campos-Freire (2013) also state that almost half of the European population utilises Pay-Tv. It is therefore, critical to note that the gap left by Pay-Tv is covered by the terrestrial television platform. The rollout of digital terrestrial television infrastructure in poor EU countries such as Italy and Greece was very slow, and the adoption of digital terrestrial television was also very slow in some other countries such as Spain, France and the UK (Campos-Freire, 2013).

On the other hand, in Germany and the United States (US), terrestrial broadcasting is a niche market. Since most German households currently subscribe to Pay-Tv, the switch-off of the analogue terrestrial signal only had an impact on 3 million households out of a total of 34 million TV households receiving television signals (Campos-Freire, 2013). In other countries, local governments have played a major role in building Pay-Tv networks. As with any other country, the European Union (EU) developed audio-visual policies, which apply to all the Member States to regulate advancement of the sector, but these policies are influenced by the effects of the country's economic crisis, the digital technology convergence, and competition from other global digital platforms of direct distribution and provision of the content such as Google, Yahoo, Amazon, and YouTube.

### **2.4.4 Germany, Italy and the US**

Germany was one of the first jurisdiction to switch off analogue terrestrial signal in 200 (Campos-Freire, 2013). Before the digital terrestrial switch on, however, majority of the 1.8 million TV households switched to Pay-Tv leaving only around 160 000 household relying on analogue terrestrial television signal. This minority had a choice of migrating to digital terrestrial television by purchasing STBs, or switch to Pay-Tv. According to Freirre (2013), the migration was coordinated by the country's media authority to ensure a smooth transition. In Italy, the three free to air (FTA) channels are provided by the government-owned entity RAI, and the other three channels are provided by the private group Media set (Campos-Freire, 2013).

Italy switched off analogue terrestrial television in 2013, and the majority of the population migrated to digital terrestrial television, Pay-Tv penetration in Italy is limited. The government allocated €130 million in 2004 to support the digital terrestrial migration and adoption by subsidizing the purchase of the STBs.

The US is a special case where, unlike other countries, the government has only limited involvement in television broadcasting. Out of the 321 million United States population statistics, European Union (2019), only 10 million TV households currently receive the free to air terrestrial television. It is also important to note that the transition of analogue to digital television was difficult both socially and politically. However, the United States completed the analogue terrestrial television switch-off in 2009 (“Status of the transition to Digital Terrestrial Television Countries\_.aspx,” n.d.).

#### **2.4.5 DTT challenges affecting European countries**

The spectrum frequency scarcity is a common challenge in all countries for the universal basic services. Free to air is also decreasing as digital terrestrial television is taking over. In EU countries, radio spectrum is being reduced and reorganised to make space for mobile network service providers. Financial and political influence were reported as major challenges for European countries' digital migration, especially for the Romanian digital migration.

Romanian authorities postponed ASO to release citizens from buying new TV devices during the economic crisis (Mcgonagle, 2010). Manufacturing of DTT equipment was also a challenge in Romania, state Mcgonagle (2010), which resulted in Romanian authorities delaying ASO in order to ensure that operators were given a reasonable amount of time to comply with the technical requirements of equipment manufacturing, such as STBs.

## 2.5 AFRICAN COUNTRIES DIGITAL MIGRATION PERSPECTIVE

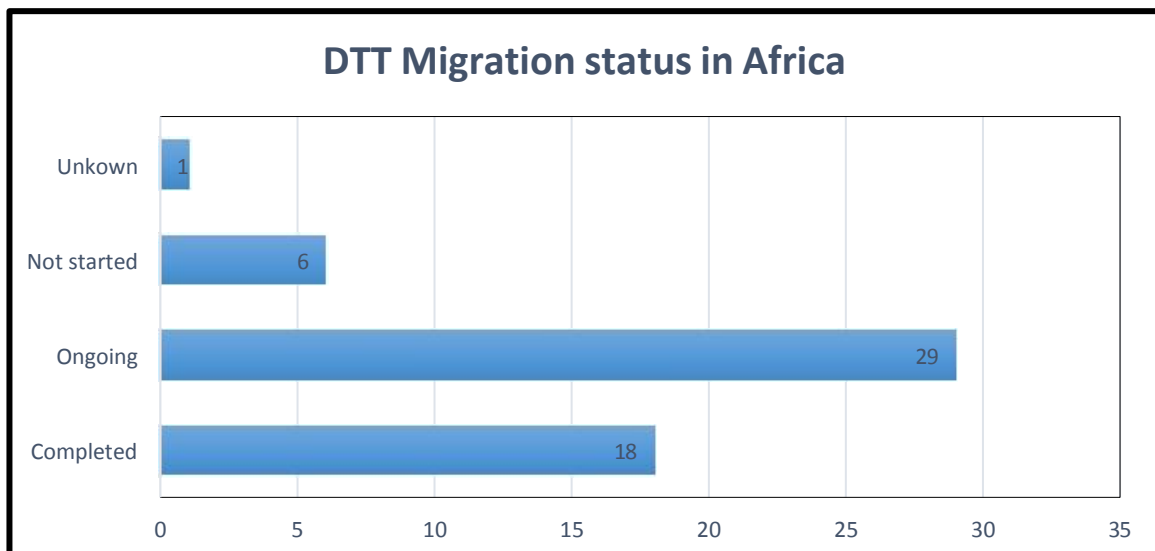
### 2.5.1 An overview of digital terrestrial television migration in Africa

The 2006 Regional radio communication conference of the ITU resolved that all countries of Europe, Africa, the Middle East and the Islamic Republic of Iran should migrate from analogue terrestrial television to digital terrestrial television by 2015 (“Digital-Migration-Policy.pdf,” n.d.). In some African countries, ASO has started, even though in most countries, progress is very slow.

### 2.5.2 A status of ASO in Africa

Out of the 54 African countries, Figure 6 below, shows digital terrestrial television migration status for all the countries. According to (“Status of the transition to Digital Terrestrial Television Countries\_aspx,” n.d.) the Ethiopian status is unknown, six 6 countries, namely Mauritania, the Central African Republic, Eretria, Burundi, Comoros, and Libya have not yet started with ASO. Only 33 percent of African countries have completed ASO, and 54 percent are ongoing. This indicates that most African countries are struggling with digital terrestrial television migration.

Figure 6: DTT migration status in Africa



Source: “Status of the transition to Digital Terrestrial Television Countries\_aspx,” n.d.

### **2.5.3 DTT challenges affecting African countries**

According to Agona & Otim (2012), some of the major challenges associated with ASO in Africa are as follows:

- lack of public awareness;
- lack of information strategy
- lack of commitment from government and
- switching costs associated with DTT receivers

### **2.5.4 A status of digital migration in Uganda**

Uganda, like any country that is a signatory to the International Telecommunication Union, initiated the process of analogue to digital terrestrial migration. According to Ndiwalana & Tusubira (2012), terrestrial television in Uganda remains a valuable device for public services, as in most countries. Uganda completed their digital migration and analogue switch-off in 2015, despite their Networked Readiness Index (NRI) score of being the second poorest of the countries that participated in the 2012 Research ICT Africa (RIA) survey (Ndiwalana & Tusubira, 2012).

Research conducted by Agona & Otim (2012), made recommendations to government and consumers regarding the migration. The major recommendation was on set up boxes (STB) standard definition, availability and pricing. Viewers also need to ensure that they purchase receivers to ensure that they are not left with blank screens on analogue switch-off. Uganda is comprised of a population of 37.7 million people (Uganda Bureau of Statistics et al., 2017). Out of the population of roughly 38 million people, only 12.9 percent of households are reported to be own TV's (Ndiwalana & Tusubira, 2012). It is evident that the adoption of digital terrestrial television is directly impacted by the affordability of the purchase of new equipment, such as STB's.

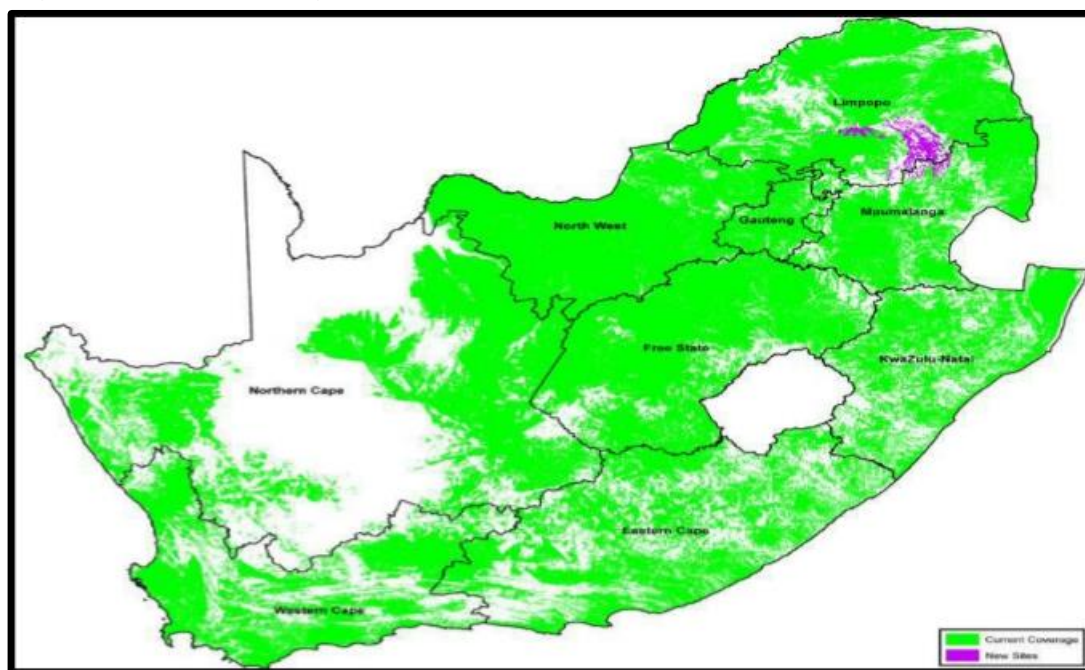
## **2.6 SOUTH AFRICAN DIGITAL MIGRATION PERSPECTIVE**

### **2.6.1 An overview of digital terrestrial television migration in South Africa**

According to Gillwald et al., (2012), digital migration in South Africa was originally planned for completion in November 2011, but has been delayed due to a number of

reasons, including the development of relevant policies, corruption, lack of awareness and approval of set up boxes. To align with the 2006 International Telecommunications Union (ITU) Treaty, and the global Digital Terrestrial Television (DTT) migration process, digital network was deployed throughout the country, (“Corporate plan 2018/21,” 2018). This process enabled South Africa to commence with ASO in alignment with the approved ASO plan. Concerning the current status of digital migration in South Africa, it has taken a lengthy number of years from 2007 to present for the process of digital migration to be implemented, and yet analogue has not yet been completely switched off.

Figure 7: DTT coverage map of South Africa



Source: (“Corporate plan 2018/21,” 2018)

According to the recent research conducted by Mbatha (2012) to identify obstacles to in the adoption of digital television in South Africa, he argued that South Africans are bound to have challenges resulting from their income levels.

Mbatha (2012) states that research established and proved that one of the biggest challenges that South Africans could face concerning digital terrestrial television migration, is the lack of funds to buy STBs. Figure 7 indicates DTT coverage map of South Africa.

## **2.6.2 Rationale for South Africa's digital migration**

According to the Geneva 1989 (GE 89) agreement, South African analogue terrestrial television broadcasting services are offered in VHF and UHF (174-230 MHz and 470-862 MHz) frequency bands. Geneva 1989 (GE89) protects licensed broadcasters internationally against any interference from other users of the frequency spectrum. These frequency bands will no longer be protected post analogue switch-off (ASO). According to Paschal and Uwaoma (2012), analogue transmission equipment in South Africa is obsolete and due for replacement, it is therefore recommended to fast track the digital terrestrial television migration.

## **2.6.3 Obstacles in implementation of digital terrestrial television migration in South Africa**

### **2.6.3.1 Technology adoption/acceptance model**

There is now a global increase in digital migration due to industry evolution, government initiatives and private efforts, (Ejiaku, 2014). The technology acceptance/adoption model framework introduced by Davis in 1989 will be explored for this research. Davis believes that there are two elements of the technology acceptance model, perceived usefulness and perceived ease of use (Fayad & Paper, 2015). According to Fayad & Paper (2015), perceived usefulness is defined as the degree to which people believe that the use of the new technology would enhance their way of doing things. Fayad & Paper (2015) also state that perceived ease of use is defined as the degree to which people believe that the new technology would be easy to use. For people to accept and adopt new technology, they need to know the value the technology will bring for them, and it must also be free of effort. Digital technology plays a vital role in leveraging productivity and efficiency, therefore the intention to adopt new technology needs to be evaluated before implementation, (Ejiaku, 2014). (DIGITAG & Analysys Mason, 2014) argue that some factors affecting technology adoption are socio-economic factors such as below:

- DTT penetration is influenced by the number of TV households and the population. DTT migration in big countries will result in a large number of households to be



migrating, which is likely to require time and investment. In small countries, on the other hand, DTT migration is likely to go faster.

- Value add services on DTT, as people will not easily adopt new technology if there are no added benefits for them.
- Economic impact on viewers, any technology migration and adoption also depends on the purchasing power of buyers. The new technology should be better and more efficient than the old one.
- Take-up of connected TVs: The higher the penetration of connected TV sets, the more important it is for terrestrial TV to develop non-core DTT services, such as on-demand TV

#### 2.6.3.2 Lack of awareness

Awareness about digital terrestrial television is very low in developing countries such as South Africa, (Mbatha & Lesame, 2014). The digital terrestrial television requires setup, or configuration changes, on the receiver's side. Therefore, the perceived ease of use is affected. Lack of awareness drives viewers to believe that the new digital technology is complex compared to analogue technology. According to Mbatha & Lesame (2014), the low level of awareness does not only affect the general public or viewers, it also affects the broadcasters.

#### 2.6.3.3 Corruption

Government officials in many developing countries do not think about uplifting the communities which results in delays on crucial projects, (Mbatha & Lesame, 2014). South African government supports the idea of analogue to digital terrestrial television migration, (Armstrong & Collins, 2004). According to Armstrong & Collins (2004), the Minister of Communications established a Digital Broadcasting Advisory Board in 2001 to facilitate the implementation of the migration.

South Africa started the DTT migration plans and to date have not completed the migration. or ASO. This is due to a number of challenges. one being the delay in the approval of Set-Top Boxes by the South African government, (Paschal & Uwaoma, 2012).

The approval of STB by the government should form part of each country's policy framework, as it would provide a clear indication of conditional access and free to air channels. STB is used at the receiver side to decode the DTT signal.

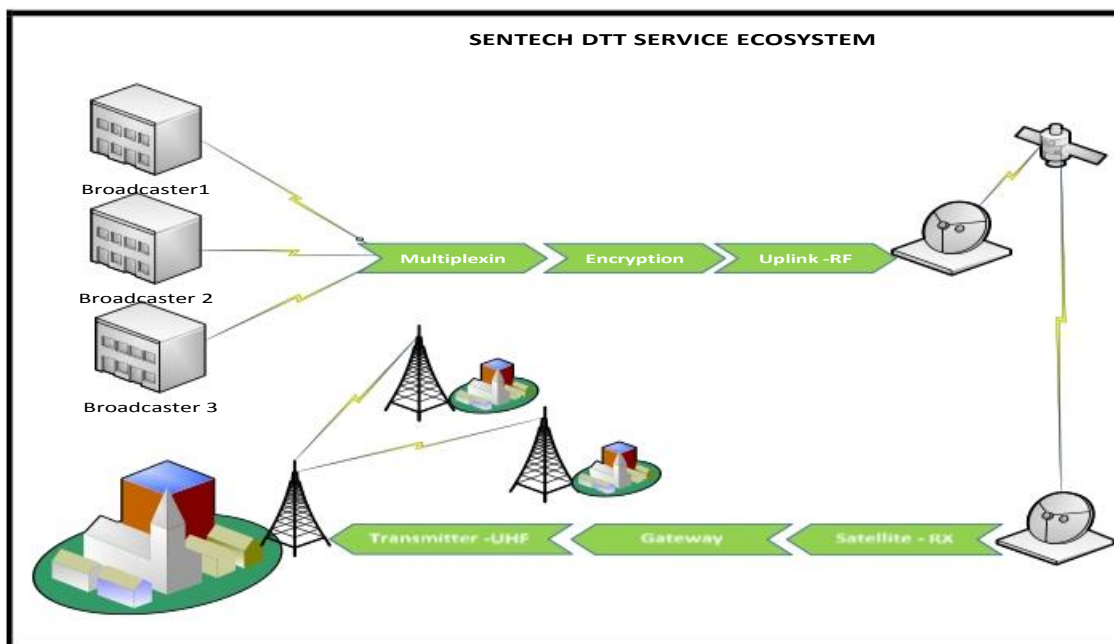
#### 2.6.3.4 Switching costs

The migration of terrestrial television for the viewer includes payment of switching costs. There are two switching costs associated with the transition:

- Psychological costs: inconvenience and time required for the migration, and
- Physical costs: purchase of new equipment, such as STB, needed to receive the signal

#### 2.6.4 Digital terrestrial television ecosystem in South Africa

Figure 8: DTT service ecosystem



Source: ("Corporate plan 2018/21," 2018)

The Figure 5, above, is a basic illustration of how a digital signal from different broadcasters gets to viewer's receivers. The signal, through different types of linking platforms such as fiber link, Telkom line, etc., is distributed from each broadcaster's studios. The signal gets to a head-end system where it is multiplexed, encrypted and uplinked to the satellite. The signal is then downlinked and received via satellite

receivers at the transmitter site. The signal is then decoded and transmitted terrestrially. This is the signal the viewers can receive using an antenna and Set up box. It is important to also to note that most new television sets have a built-in set-up box, which will then eliminate the use of an external Set up box. Digital terrestrial television uses an integrated operations system model that maximizes network support and management capabilities, to exploit business competitive advantage.

Below are some of the key elements of the digital terrestrial television operating model in South Africa:

- Improve network automation and redundancy to reduce human intervention;
- Improving systems and human capabilities to reduce restorations time;
- Strategic placement and levelling of human resource utilizations;
- Centralizing network management to reduce personnel standby hours;
- Strategically position Network Operation centres/response capabilities to improve restoration times;
- Improve assets security and third- party service management capability, and
- Standardize network solutions to reduce spares inventory.

### **2.6.5 Impact of analogue switch-off in South Africa**

The changeover from analogue terrestrial television to digital terrestrial television requires investment on the transmission equipment, as well as on the receiving equipment, (Paschal & Uwaoma, 2012). The financial impact affects both the broadcasters and viewers. The broadcasters need to upgrade their equipment to digital compatible equipment. The viewers also have to upgrade their receiving equipment to DTT compatible receivers, and also upgrade their configuration, (Lawal & Chatwin, 2013).

In order for a country to realize the inherent benefits of DTT and ASO, the migration must be fully-fledged across the value chain and accepted by all relevant stakeholders including the public, regulators, governments, and manufacturers. Laws and regulations, policies and standards should also be well established and approved, including appropriate modifications of the GE-06 digital plan for digital dividends, (Lawal & Chatwin, 2013).

## **2.7 BENEFITS OF DIGITAL TERRESTRIAL TELEVISION**

Research has proven that one of the major benefits of digital broadcasting is that it utilises the scarce national radio frequency spectrum more efficiently (Mbatha, 2012). Agona & Otim (2012) agree that the migration of television from analogue to terrestrial will improve the efficient use of the scarce frequency spectrum. This means that current broadcasting services can be provided using less radio frequency spectrum. The advantage of this is that additional broadcasting services can be added. Gillwald et al., (2012), also argue that the migration to digital terrestrial television will result in additional TV channels, and thus increased television services. In analogue terrestrial signal broadcasting, each broadcaster, or service, is utilising its frequency. For example, for SABC 1, SABC 2 and SABC 3, there will be three frequencies allocated, and with digital terrestrial television broadcasting, more than three channels can be added on one frequency.

The additional channels can be used for information sharing for government or political updates, e-government, health, education, sport, the opportunities to be developing skills and job creation, and new investment policies (Mbatha, 2012). The 'spectrum dividend', radiofrequency spectrum freed up through digital terrestrial television can be utilized by other users, such as mobile network operators and internet service providers (Agona & Otim, 2012).

South Africa's television infrastructure is aging and becoming obsolete, so digital terrestrial television would also provide an opportunity to upgrade the obsolete infrastructure, (Mbatha, 2012). Most people in countries that have migrated were happy because of the clear picture and additional channels (DIGITAG & Analysys Mason, 2014). The UK had four to five analogue terrestrial television channels, but now has 70 terrestrial television channels.

Local manufacturing and installation of STB would improve the country's electronics skills and development, (Mbatha, 2012). The local installers would require training in order to do installations, so this would improve job creation in the country.

## **2.8 OPERATION OF SET UP BOX**

As mentioned above, in order to decode the digital terrestrial television signal received, a set-up box is required. For the viewer, this means there are switching costs involved if the current television set does not have a built-in decoder. This is a once-off payment of fixed switching costs, for the purchase of the set-up box. Some countries, including South Africa, have government support providing subsidized set-up boxes for poor people.

## **2.9 SUMMARY**

Digital television offers many benefits for broadcasters, network operators, spectrum regulators, and consumers. Most people were happy with the process, because digital television gave them better quality and more content. In most countries, the transition was slower than expected, even though most European countries managed to migrate. The digital migration is not an easy transition and analogue switch-off can also be much more difficult. Studies have shown that ASO needs to be carefully planned and well budgeted for, and it also needs a good publicity campaign which must involve all relevant stakeholders, such as broadcasters, viewers, manufacturers, network operators, manufacturers and retailers.

In the EU countries, DTT rollout has been successful. Terrestrial television networks enable free to air reception, or conditional access services, depending on the preference of the broadcasters. There are, however, numerous challenges that were experienced by European countries during the digital terrestrial television migration. It is also evident that there are benefits associated with digital terrestrial television for broadcasters and viewers. These benefits include; a clearer picture, good quality sound and additional channels, amongst others.

## **CHAPTER 3 - RESEARCH METHODOLOGY**

### **3.1 INTRODUCTION**

Research methodology is a pattern, structure, values, and framework of the study. Research methodology summarizes how the research will be conducted. It is where assumptions about the nature of reliability and knowledge are found, and where values for a topic are put together logically, and in a structured manner (Chilisa & Kawulich, 2015). The vital keys of any research work is the collection and analysis of the data. These must be appropriate to test hypotheses or answer the research questions. This chapter describes the research methodology used for data collection and analysis of this study. The research approach and sampling methods are also discussed, and finally at the end of this chapter, the conclusions are drawn. This research methodology is to address the primary research objective of analysing South Africa's readiness for migration from Analogue Terrestrial Television to Digital Terrestrial Television in South Africa by, 2020.

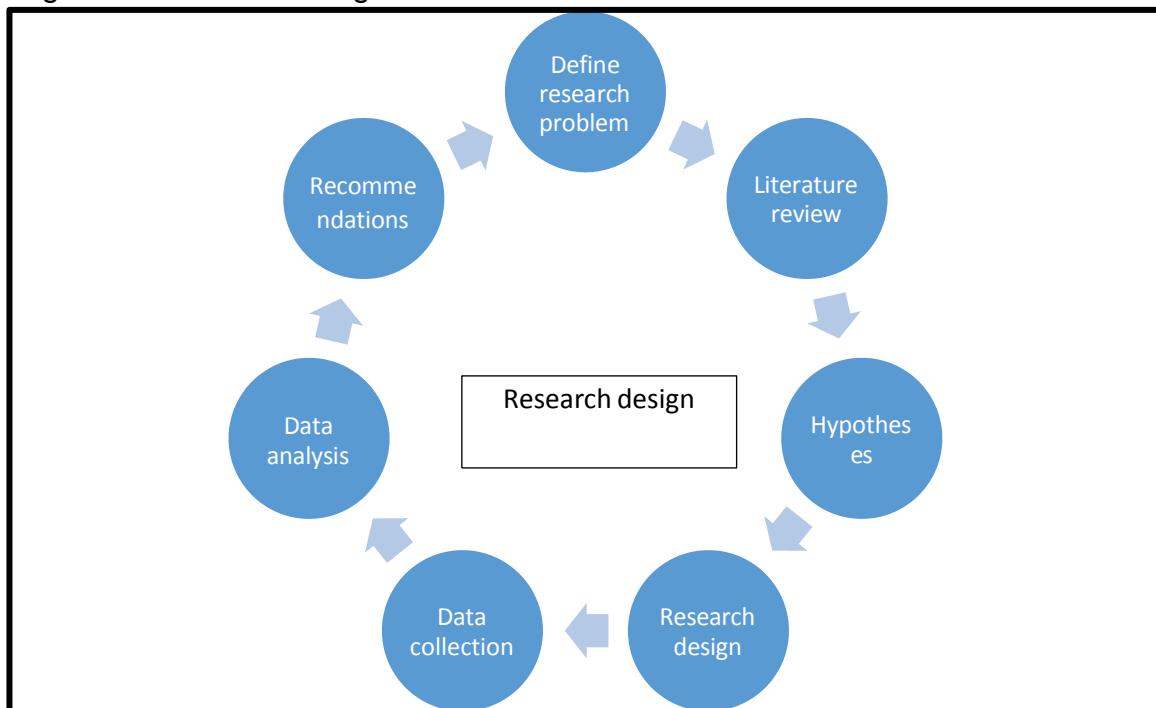
This study investigated the new technology adoption model in South Africa to mitigate the risks associated with the delay of analogue switch-off (ASO). To achieve this, an online survey via QuestionPro was distributed to a target population of 60 to 150 respondents, comprised of signal broadcasters, middle and senior management workers. A quantitative research method was deployed to analyse the readiness of South Africa for analogue to digital terrestrial television migration by July, 2020.

### **3.2 RESEARCH DESIGN**

One of the most important steps of research is defining the unit of analysis and variables under study. Unit of analysis for this study is the readiness of South Africa to migrate from analogue terrestrial television to digital terrestrial television by July, 2020. The variables under test consist of one independent variable, and four dependent variables. The dependent variable is migration to DTT, and dependent variables are lack of awareness, lack of information, lack of corruption and lack of commitment from government.

Kothari (2004) defines research as a scientific and systematic search for pertinent, specific information on a specific topic. Also, research design is defined as a plan for a study, providing the overall framework of data collection (Lee, 2009). According to Clifford Woody, research is comprised of defining and redefining problems, formulating hypothesis, or suggested solutions; collecting, organising and evaluating data; making deductions and reaching conclusions; and, at last, carefully testing the conclusions to determine whether they fit the formulating hypothesis (Kothari, 2004, p. 1). Figure 9, below, depicts how all these factors are linked together in a research design. Moreover, there are three major research designs namely, qualitative research, quantitative research and mixed research (Khaldi, 2017), and these are explained in detail later in this chapter.

Figure 9: Research design



Source: Kothari, 2004

### 3.3 RESEARCH APPROACH

To analyse the readiness of South Africa for analogue to digital terrestrial television by July 2020, quantitative research was chosen for the current study. An online research design was used where a structured questionnaire was sent to the targeted population via QuestionPro.

The online questionnaire was subdivided into two sections as follows:

- Demographics, and
- Awareness of digital migration

The first section of the questionnaire included demographics of the respondents. The demographics gave the general information of the respondents such as age, gender, qualification, province, years of experience etc. This information was deemed important, as it allowed the researcher to localise the problem and the issues associated with digital terrestrial television migration in South Africa. According to Golden and Golden (2013), good quality research should include at least the two following elements: validity and reliability.

### **3.3.1 Validity**

In quantitative research, validity refers to an extent to which the measuring instrument is measuring what it is intended to measure. It therefore, refers to how accurate the data collection and analysis is (Golden & Golden, 2013). In research. Validity has two essential parts: a) credibility, and b), transferability. Credibility indicates whether the results of the study are legitimate, and if they can be replicated. Sampling, data collection and data analysis are very important for good credibility. It is therefore; critical for the researcher to ask the right questions in order so as to prompt for accurate and adequate findings. According to (Lefowa, 2016), validity is generally described as the degree to which a particular research instrument measures what it needs to measure. Transferability, on the other hand, indicates whether the results are transferable to other groups of common interest.

### **3.3.2 Reliability**

According to Mehmood (2013), and Golden & Golden (2013), reliability refers to a measurement that gives consistent results with equal values. Reliability measures consistency, duplication, precision, unbiased and trustworthiness of the study, (Mehmood, 2013). In quantitative research, reliability is used to test stability of measures administered at different times to the same individuals, and the equivalence of sets of items from the same tests.



It indicates to what extent the research is without bias (error free) by ensuring consistency in results over time. The questionnaire consists of about 36 questions, which took respondents roughly 45 minutes to complete. The questions are multiple choice questions, where only one option can be chosen to evaluate the respondents' perception and understanding.

The second section of the questionnaire included the awareness of digital migration. In order to analyse the readiness of South Africa for the migration from analogue terrestrial television to digital terrestrial television, it is important to understand the respondents perceived understanding of digital terrestrial migration. In order to determine the respondents' level of understanding, and to prove the predetermined hypotheses, respondents were requested to answer the following questions tested, amongst others:

- Do you know what digital terrestrial television (DTT) migration is?
- Do you know DTT migration cut-off date?
- How much information do you have about digital terrestrial television (DTT) migration?
- Do you know the importance of digital terrestrial television (DTT) migration?

Respondents were expected to respond by indicating with Yes, or No, in each of the above questions. The above questions are important as they grant the researcher enough information to determine the perceived respondent's views on the overall new technology adoption. This has an impact on digital migration, as it is new technology in South Africa.

### **3.3.3 Research paradigms**

There are two major research paradigms namely: quantitative research, and qualitative research. The quantitative approach is to test a predetermined hypothesis and produce holistic results. It is also to provide an understanding of complex psychological issues, and in answering the 'how' (Khaldi, 2017).

Khaldi (2017) also state that the qualitative approach is designed to assist researchers to understand the behaviours of people, and the social and cultural

context within which they live. The comparison between quantitative and qualitative research is illustrated in Table 3 below. The research paradigm that is selected for the purpose of this study is a quantitative research. This is due to fact because this study was conducted to prove predetermined hypotheses related to DTT migration.

Table 3: Qualitative vs Quantitative

Qualitative research	Quantitative research
Focus groups	Surveys
Interviews	Questionnaires
Audio/video recordings	Cards

Source: Kivunja & Kuyini, 2017

### 3.3.4 Descriptive vs Analytical

Descriptive vs. Analytical: Descriptive research includes surveys and fact-finding inquiries of different kinds. The major purpose of descriptive research is a description of the 'state of affairs' as it exists at present. In social science and business research, we quite often use the term 'Ex post facto research' for descriptive research studies. The main characteristic of this method is that the researcher has no control over the variables; he can only report what has happened, or what is happening. In analytical *research*, on the other hand, the researcher has to use facts, or information, already available, and analyse these to make a critical evaluation of the material (Kothari, 2004, p. 12).

To reach the target population, an online survey where a questionnaire was distributed via QuestionPro, was utilized. An online questionnaire is a form that is filled electronically by respondents alone, without any external assistance. Therefore, it requires a certain level of literacy. The advantages of an online survey include: flexibility, global reach, ease of data entry and analysis, controlled population, low cost, convenience, efficiency and ease of follow up amongst others.

The advantages and disadvantages of online surveys are listed in Table 3 below, (Evans & Mathur, 2005). There are other options that can be utilized for data collection in quantitative research such as:

- Interviews;
- Observations;
- Pictures and photographs;
- Diaries, and
- Documents.

Due to the complexity and diversity of this study, which spread mainly over three provinces, the most cost effective and efficient method was an online survey. The respondents can respond on the questionnaire while sitting at home, or at the office. The advantages and disadvantages of online surveys are shown in table 4 below.

Table 4: Advantages and disadvantages of online survey

Advantages	Disadvantages
Convenience	Technological variances
Low cost	Unclear answering instructions
Flexibility	Impersonal
Speed and timelines	Privacy issues
Ease of follow up	
Control of answer order	

Source: Kothari, 2004

### 3.4 SAMPLING METHOD

Sampling refers to the selection of a subset of persons, or things from the larger population, with the intention of representing the entire population. The accuracy of the findings largely is dependent on the way the sample is selected.

The basic objective of any sampling design is to minimise, within the limitation of cost, the gap between the values obtained from the sample and those prevalent in the study population (Kumar, 2011, p. 42). The target population for this study will consist of 60 -150 middle to senior managers of the broadcasting industry. Determining population size for a study is important, and it is not so easy.

It is important because it can affect the accuracy results. It is therefore critical that the researcher must always make sure that the selected population size is adequate for that specific study. The following equation was used to determine the minimum sample size of this study:

$$= \frac{4}{z^2}$$

Since there is no data currently available on the proposition of this study, the worst-case scenario was utilized and set  $p = 0.5$ , and  $q (1 - 0.5) = 0.5$ . This is based on the theory that says, if the population proportion is unknown, use a 50/50 split (Spinks & Canhoto, 2015). The error margin of  $\pm 10\%$  is deemed acceptable for this study, as it is a preliminary study. The minimum sample size is shown below using the above formula:

$$= \frac{4 \cdot 0.5 \cdot (1 - 0.5)}{0.1^2}$$
$$= 100$$

The minimum required sample size for this study is 100. The higher margin of error is accepted for this study; thus the selected sample population is between 60 and 150 respondents.

According to (Golden & Golden, 2013), there are two types of sampling methods in quantitative research, and they are the following:

- Random sampling and
- Non-random sampling

There are five types of random sampling, namely (Nagar & May, 2014):

- Simple random sampling;
- Stratified random sampling;
- Systematic sampling;
- Sequential sampling, and
- Multi- stage sampling.

Simple random sampling is used for the purpose of this study to give each element an equal probability of being selected. This type of sampling is commonly used when the population is big. This sampling method is selected based on its advantages which include the following:

- Simplicity;
- Bias free;
- Bigger population, and
- Ease of error detection.

The use of the sampling method chosen, is based on the importance of ensuring accurate, unbiased and fair results.

The reason for selecting middle to senior managers from SABC, commercial radio broadcasters, community radio broadcasters and Sentech LTD, are as follows:

- The sampling target is in the signal broadcasting industry, and
- The sampling target is most likely to have access to internet

### **3.5 DATA COLLECTION METHOD**

In this study, both data collection research methods, namely: primary and secondary data collection, were utilized to gather relevant and adequate information to draw conclusions and recommendations. Primary data was collected using online surveys via QuestionPro. A structured number of questions were prepared by the researcher. The prepared questionnaire was sent to the target population comprised of 60 to 150 participants. The researcher also needed to ensure that the data collection method utilized would meet NMU ethics requirements.

The participants were required to complete the survey online without identifying themselves for privacy and security reasons. To collect secondary data, websites, journals, magazines, and books were utilized. Khaldi (2017) argues the following key assumptions on research:

- Absolute truth can never be found, thus researchers state that they do not approve a hypothesis; instead; they indicate a failure to reject hypothesis;

- Research is about making claims, and then refining, or abandoning some of these claims, to take on more valid claims;
- The collected data shape knowledge;
- Research seeks to develop more current, true and relevant statements that serve to explain behaviour, or a situation, and
- Researchers must be objective and ensure results are without bias.

### **3.5.1 Questionnaire approach**

The questionnaire approach was the most important data collection method used for primary data collection. For this study the following steps were followed:

- Predetermined hypotheses;
- Clearly defined research questions;
- Structured questionnaire with suitable measurement scales to address hypotheses and research questions;
- Completion of the draft questionnaire and Pre-testing;
- Final draft of the questionnaire and
- Distribution of questionnaire to the selected population.

### **3.6 DATA ANALYSIS METHOD**

The coded, collected data, was organised and analysed by the researcher. Statistica data analysis software (Version 13, 2018) developed by Statsoft was utilized to analyse the collected data. Standard deviation, mean, correlation and regression analysis were looked at in order to answer the hypothesis and research questions. Interpretation and recommendations were done.

### **3.7 FULL ETHICS APPLICATION PROCESS**

Research ethics form a very critical part of any research. The researcher is expected to be honest, to do a proper citation and acknowledgement of other writer's work. Identification of harm, or gain of the research, needs to be highlighted upfront to mitigate any possible risks.

A full ethics application process is a precise, extensive and stringent process. This process requires that information be captured accurately and precisely.

This is to ensure that all relevant anonymity requirements are met, and the sample population is protected. The researcher is expected to disclose all research methodology terms and conditions prior to approval.

- Methodology summary

The researcher is expected to provide the overview of the study, including the purpose of the study, primary and secondary objectives, research questions, sampling method, data collection methods and data analysis methods. This is to ensure that the research methodology is free from manipulation and does not expose the identity of respondents.

- Ethics application form

The ethics application form provides details of the researcher, and of the supervisors. It gives a summary of the research project title, research methodology, privacy and anonymity.

- Gatekeeper letter

The researcher is required to submit the gatekeeper letter to request access of the sample population from the gatekeepers, such as the school principal, the HR manager etc. In the case of this study, the SABC manager, community radio broadcaster manager, community broadcaster manager, and the Sentech LTD HR manager are the gatekeepers. Prior to sending the questionnaire to the targeted population, the researcher, must request access to the email address list of the entities from the gatekeepers.

- Informed consent letter

This letter is a questionnaire cover letter to give respondents a short background of the study, the researcher's contact details and the respondent's choice to participate.

- Questionnaire

The questionnaire provides a list of questions that will be sent to the group of respondents. This is submitted to the Ethics committee for approval to ensure that the questions meet NMU values, that there is no discrimination, and no violation of the respondents' rights.

Full ethics clearance was granted with reference number **H19-BES-BUS-098**, and approval letter is attached as appendix G.

### **3.8 SUMMARY**

This chapter covers the methodology used for data collection, analysis, sampling method, research design and research approached. The study utilized a quantitative research method to analyse the readiness of South Africa for analogue to digital terrestrial television migration by, July 2020. The primary data is collected using an online survey via QuestionPro software. The study used a simple random sampling method to select 60 - 150 respondents.

The sampled population consists of middle and senior managers of SABC, commercial broadcasters and community broadcasters. The collected data is analysed using the statistica software (Version 13, 2018) the data and presented through graphs, standard deviation, means, percentages and frequencies. Regression and correlation analysis are used to show the relationship among the variables.



## **CHAPTER 4 - DATA ANALYSIS, RESULTS AND DISCUSSIONS**

### **4.1 INTRODUCTION**

This chapter presents the findings of the study, data analysis and results of the study as stipulated in the research methodology. The main research objective was to investigate challenges associated with adopting new technology adoption model in South Africa to mitigate the risks associated with delay of analogue switch-off (ASO). The research was conducted in the broadcasting industry, comprising a sample of middle to senior management. The study targeted Eastern Cape, Western Cape and Gauteng provinces.

For the purpose of the study 60 - 150 respondents were targeted. The online questionnaire was sent to 150 respondents. All 150 respondents viewed the questionnaire, 100 of them started the survey, and only 62 respondents completed the survey. This indicated a response rate of 62 percent of respondents who completed the survey. This response rate was sufficient, as it met the minimum requirement of 60 respondents. For the purpose of the study, only those respondents who completed the survey were considered for data analysis.

### **4.2 DESCRIPTIVE DATA ANALYSIS**

Data was analysed with the assistance of a NMU statistician using a computer software called Statistica (Version 13, 2018). The questionnaire was divided into two main subjects namely:

- Demographics and
- Awareness of digital migration

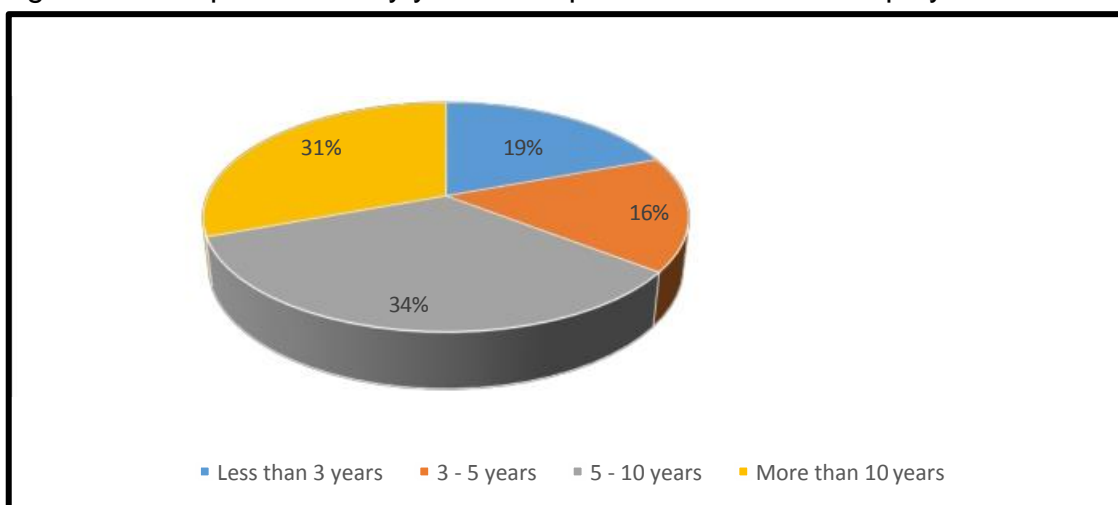
#### **4.2.1 Descriptive demographics analysis**

The demographics of the respondents were collected by looking at nine (9) variables, namely: gender, citizenship, qualification, stakeholder category, employment status, occupation, field of operation, years of experience and the province of residence.

The total number of respondents who completed the survey were n= 62, of which 50 percent of them were male, and 50 percent of them were female. Ninety-seven percent of these respondents were South African citizens, and 3 percent were not.

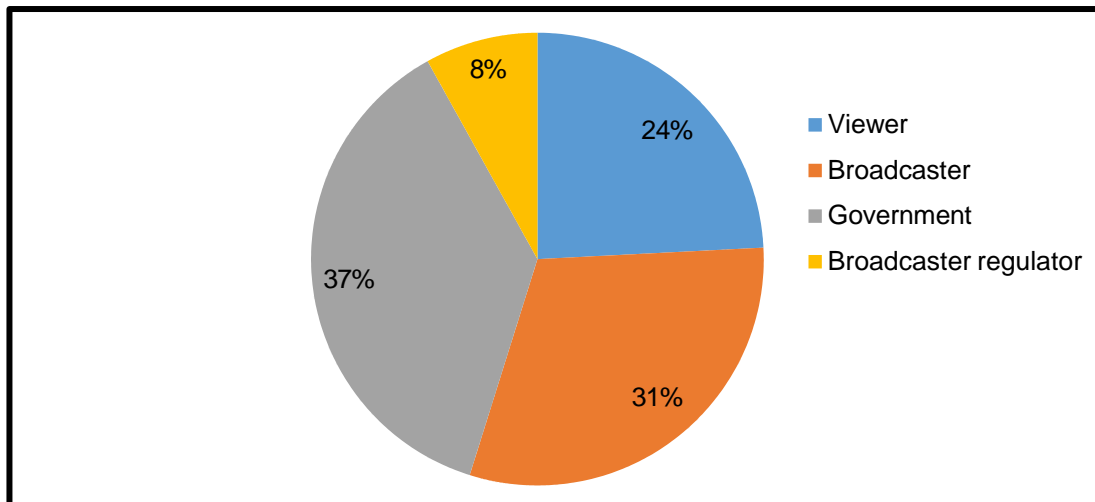
The highest qualifications of the respondents varied, with respondents having higher/national diploma, representing 34 percent, followed by 27 percent of respondents with honours degree/postgraduate diplomas, while the remaining 39 percent spread across the remaining categories. In terms of the province where respondents reside, the Eastern Cape had a contribution 44 percent, of respondents followed by 25 percent in the Western Cape, while Gauteng contributed 21 percent. The experience in current employment of respondents varied, from less than 3 years, to more than 10 years. About 65 percent of respondents had experience between 5 years, and more than 10 years, in current employment, while the remaining respondents less than 3 years of experience in the current position contributed 19 percent.

Figure 10: Response rate by years of experience in current employment



Source: Researcher's construction from statistical data

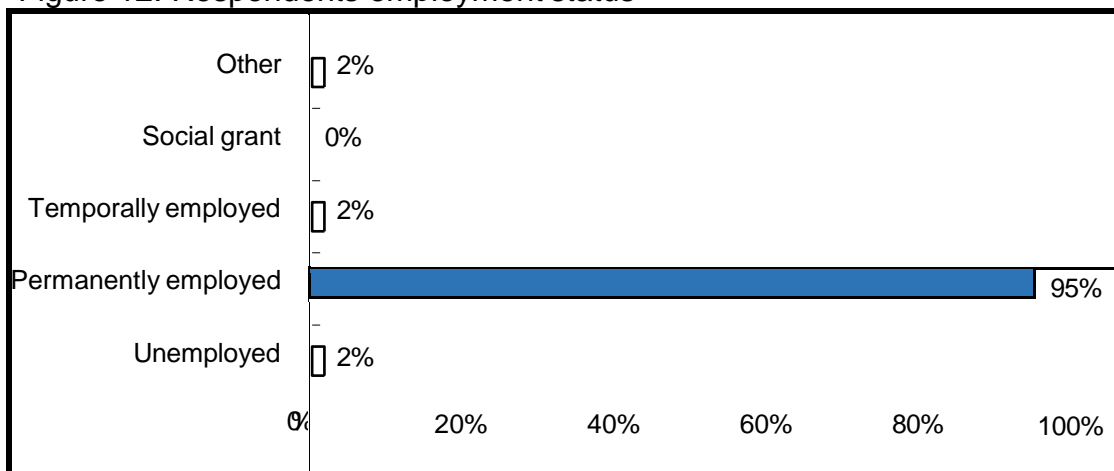
Figure 11: Response by stakeholder category



Source: Researcher's construction from statistical data

Figure 11 above shows that government stakeholder contributed 37 percent of the responses, followed by 31 percent of broadcasters, and only 8 percent contribution was from the broadcaster regulator.

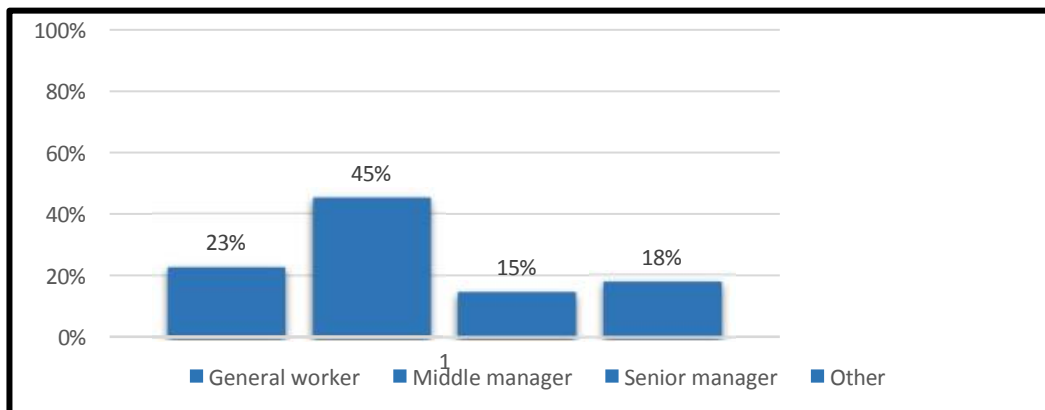
Figure 12: Respondents employment status



Source: Researcher's construction from statistical data

The above Figure 12, above, indicates that 95 percent of respondents were permanently employed. This is deemed important for the adoption technology. Research stated that there are switching costs involved in digital migration, therefore this variable is very critical to determine if there is any correlation between employment status and digital migration in South Africa.

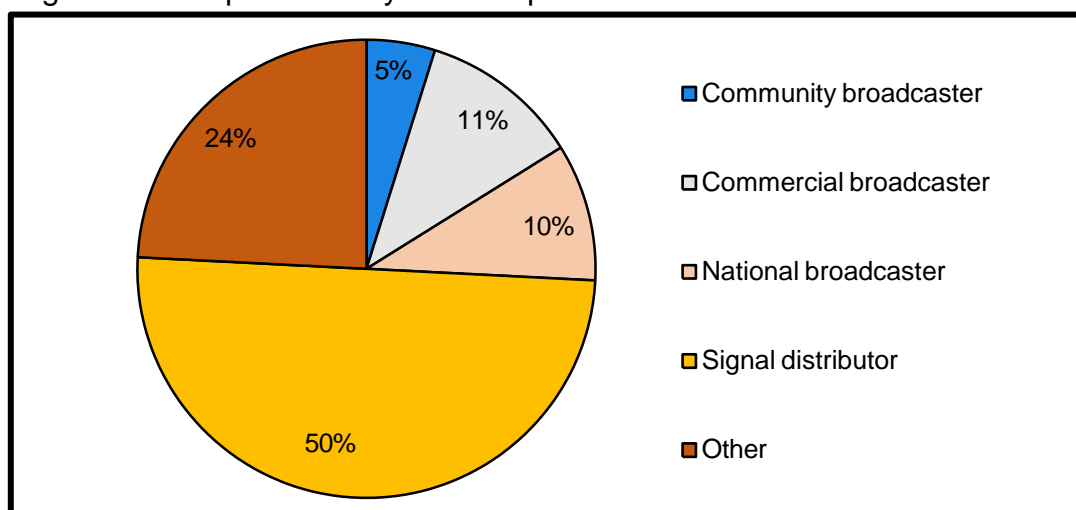
Figure 13: Response by respondent's occupation



Source: Researcher's construction from statistical data

Figure 13, above, stipulates that 45 percent of respondents were middle managers, while 15 percent were senior managers. The research methodology of this research highlighted middle and senior management employees as the main targeted population. This is because this category of people is always on the go and believed to be using digital platforms regularly.

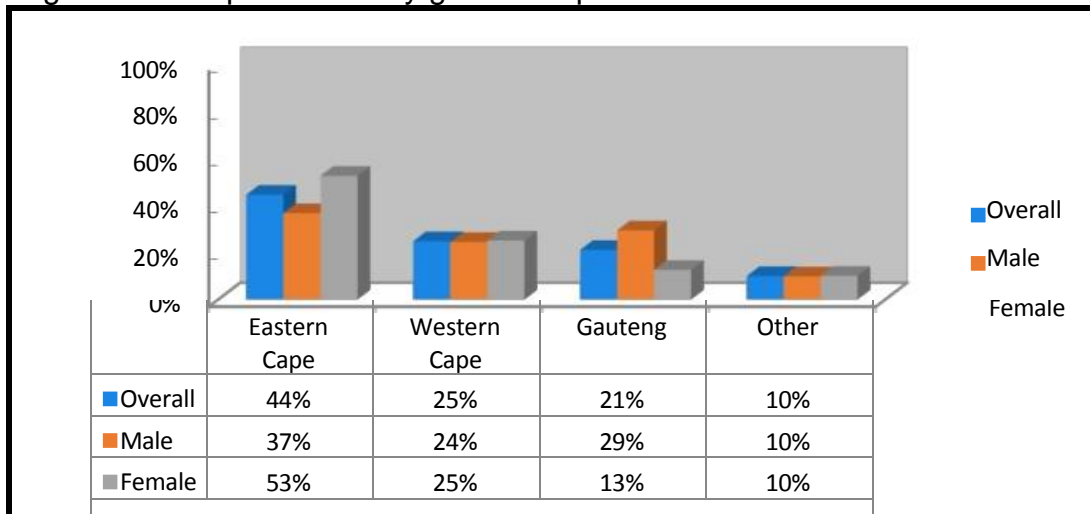
Figure 14: Respondents by field of operation



Source: Researcher's construction from statistical data

Figure 14 illustrates that half the respondents were from the signal distributor, which is Sentech LTD in this case, 24 percent was contributed by others, while only 5 percent % was contributed by the community broadcaster. The participation of the above-mentioned categories is deemed important, as they contribute towards digital migration.

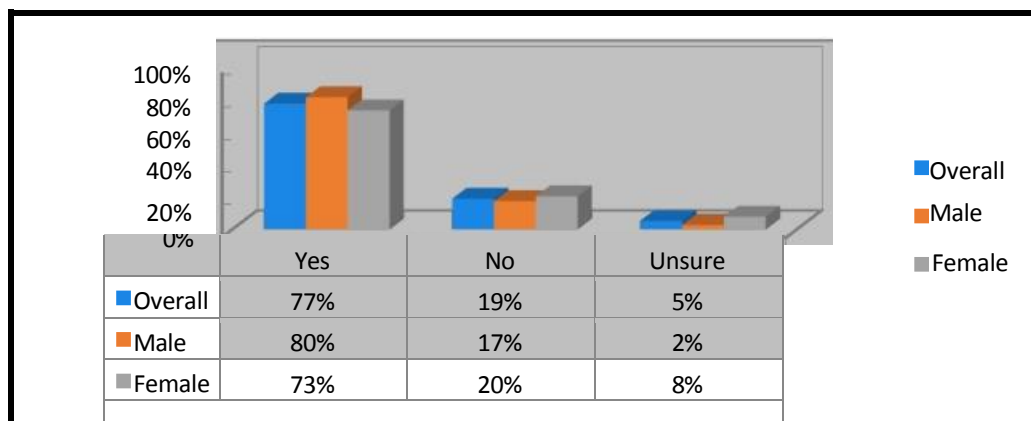
Figure 15: Response rate by gender vs province



Source: Researcher’s construction from statistical data

The highest overall percentage of 44 percent of respondents reside in the Eastern Cape, while 21 percent indicated that they were in Gauteng province, with 25 percent in the Western Cape, and only 10 percent elsewhere. Fifty-three percent of respondents in the Eastern Cape were female, while in the Gauteng province, the majority of respondents were male.

Figure 16: Response rate by gender vs digital migration process knowledge



Source: Researcher’s construction from statistical data

There was no major significance between genders and digital migration knowledge, as 80 percent of the males, and 73 percent of the females, agreed that they do have knowledge of digital migration process.

### 4.3 DESCRIPTIVE ANALYSIS ON AWARENESS OF DIGITAL MIGRATION

#### 4.3.1 Lack of awareness for South African consumers

Table 5 summarises the frequency distributions, mean scores and standard deviation for each question on measuring lack of awareness on digital migration from the respondents.

Table 5: Descriptive statistics on lack of awareness

Code			Yes	No	Unsure	Mean	Standard deviation
QQ1	Do you know what digital terrestrial television (DTT) migration is?	Count	51,00	8,00	3,00	1,23	0.525
		Percent	82,26	12,90	4,84		
QQ3	Do you know the importance of digital terrestrial television (DTT) migration?	Count	44,00	18,00		1,29	0.458
		Percent	70,97	29,03			
QQ8	Have you heard about any workshops designed to offer education on digital terrestrial television (DTT) migration process?	Count	26,00	36,00		1,58	0.497
		Percent	41,94	58,06			
QQ9	Have you attended them?	Count	21,00	5,00		1,19	0.402
		Percent	80,77	19,23			
QQ10	Are you prepared for the switch from Analogue	Count	43,00	8,00	11,00	1,48	0.784
		Percent	69,35	12,90	17,74		

	terrestrial television (ATT) to Digital terrestrial television (DTT)?						
QQ11	Would you say that you are ready to comply with the change in broadcasting?	Count	44,00	10,00	8,00	1,42	0.714
		Percent	70,97	16,13	12,90		
QQ14	Are you aware of the advantages of the migration to digital terrestrial television?	Count	47,00	11,00	4,00	1,30	0.586
		Percent	75,81	17,74	6,45		
<b>Average mean</b>						<b>1,35</b>	

Source: Researcher's construction from statistical data

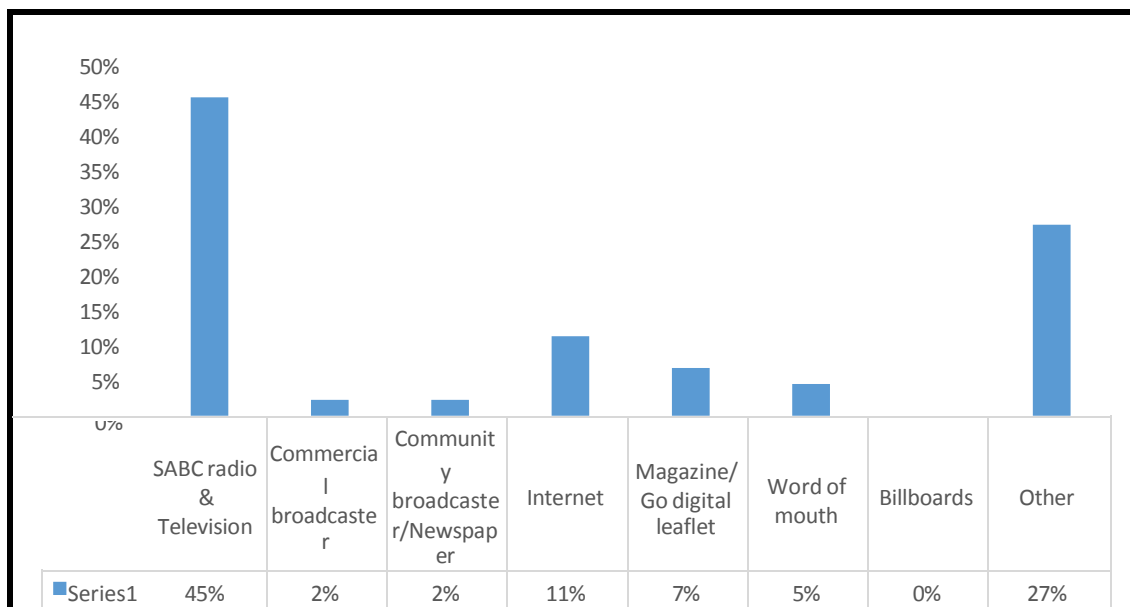
### Interpretation

Out of the respondents who completed the survey when they were asked about their knowledge of DTT migration, 82 percent said 'Yes', to having knowledge about digital migration, while 13 percent of them said 'No', and 5 percent did not understand what that meant (QQ1). The medium access that is used the most, is Pay-TV, as 65 percent of respondents indicated that they mostly used this platform, while only 19 percent indicated that they are using free to air channels, and 15 percent of respondents indicated that they are using a streaming platform.

Seventy-one percent of respondents indicated that they do know the importance of digital migration, while 19 percent of the respondents did not know its importance (QQ3). Almost half of the respondents had heard about workshops designed to offer education on digital terrestrial television (DTT) migration process, while the other half had never heard about these workshops (QQ8). Most respondents indicated that they had heard about digital migration from SABC radio and television, while 27 percent indicated that they had heard about digital migration from other platforms.

When respondents were asked how often they had heard about digital migration, 19 percent indicated that they had never heard about it, while only 31 percent had heard about it daily, and the remaining 50 percent was shared between weekly and monthly. When respondents were asked about how much information do they have about digital terrestrial television, 58 percent indicated that they have enough information, and 42 percent varied from less information, to no information. Forty-four percent of respondents said that they would like to receive information about digital migration from the media platforms, while 27 percent preferred Imbizo's, and only 5 percent would prefer door to door visits.

Figure 17: Response rate by popularity of medium



Source: Researcher's construction from statistical data

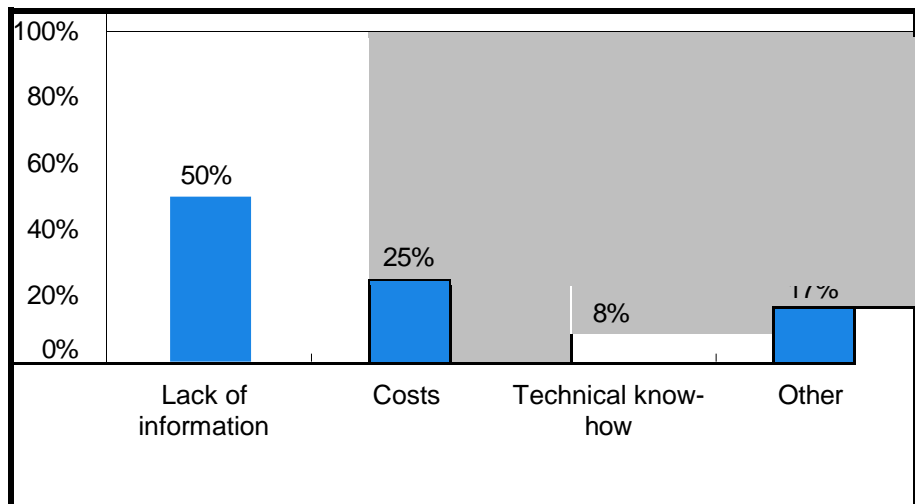
### Interpretation

About 58 percent of respondents indicated that they had not heard about any workshops designed to offer education on digital terrestrial television migration process, while 42 percent indicated that they had heard about the workshops. Of the 42 percent who had heard about the digital television migration process workshops, 81 percent have attended the workshops, while the remaining 19 percent have not attended them. The readiness and willingness of respondents for the switch from analogue terrestrial television to digital terrestrial television was also considered.



When respondents were asked if they are prepared for the switch, from analogue to digital terrestrial television 69 percent said 'Yes', while 13 percent said 'No'. Seventy-one percent also indicated that they were ready to comply with the change in broadcasting, while 16 percent indicated that they were not ready to comply, with change in broadcasting and only 13 percent were unsure if they are ready or not to comply.

Figure 18: Respondents response of reason for hesitation

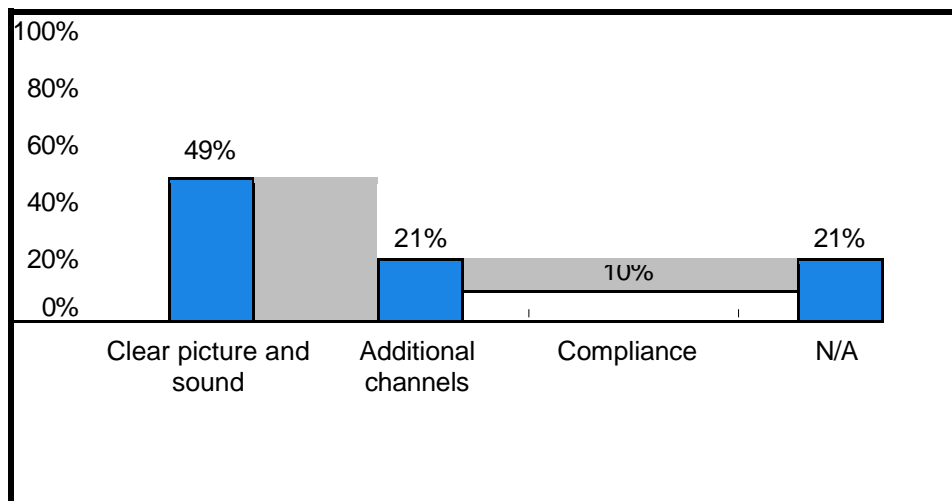


Source: Researcher's construction from statistical data

### Interpretation

Lack of information contributed 50 percent of the reason for hesitation, while 25 percent was the cost associated with the migration, from analogue to digital terrestrial television and the other 25 percent was split between technical know-how and other reasons.

Figure 19: Respondents response on reason for acceptance



Source: Researcher’s construction from statistical data

### Interpretation

The reasons for acceptance were also considered. When respondents were asked, what is their reason for acceptance of digital migration, 49 percent indicated that the clear picture and sound is was their main reason, while 21 percent said it is was for additional channels. It is also important to note that 10 percent indicated that they would migrate for compliance while 21 percent of respondents indicated that they do not have any specific reasons. Most respondents were aware of the advantages of the migration, from analogue to digital with 76 percent indicating ‘Yes’ when they were asked if they were aware of the advantages associated with the migration, leaving only 17 percent that said ‘No’ they are not aware.

When respondents were asked about their opinion on the set-up box price, close to half respondents were unsure, while 22 percent thought the set- up boxes were expensive. Seventy-six percent of respondents also indicated that they were aware of the government subsidy of set-up boxes for qualifying households.

### 4.3.2 Lack of information for consumers to adopt new technology

Table 6: Statistics on lack of information

Code	Question				Mean	Standard deviation	
		Yes	No	Unsure			
QQ15	Are the advantages to your satisfaction?	Count	41,00	4,00	6,00	1,32	0.673
		Percent	80,39	7,84	11,76		
QQ16	Are you aware that there is a deadline that has been set for the analogue signal to be switched off?	Count	39,00	18,00	5,00	1,47	0.666
		Percent	62,90	29,03	8,06		
QQ17	Have you been keeping track of the deadline?	Count	26,00	13,00	5,00	1,52	0.691
		Percent	59,09	29,55	11,36		
QQ18	What is your opinion on the various postponements of the switch-off deadline?	Count	16,00	29,00	17,00	2,03	0.734
		Percent	25,81	46,77	27,42		
QQ19	Are the deadlines that have been set, feasible to you?	Count	23,00	20,00	19,00	1,94	0.814
		Percent	37,10	32,26	30,65		
QQ20	Do you know what a Set-top box is?	Count	49,00	9,00	4,00	1,27	0.570
		Percent	79,03	14,52	6,45		
QQ21	Do you know how it works?	Count	43,00	6,00	4,00	1,29	0.629
		Percent	81,13	11,32	7,55		
QQ22	Do you know how much it costs?	Count	20,00	19,00	14,00	1,87	0.795
		Percent	37,74	35,85	26,42		

QQ23	What is your opinion of the prices?	Count	14,00	11,00	28,00	2,24	0.860
		Percent	26,42	20,75	52,83		
QQ24	Do you know government subsidies Set-top Boxes for qualifying households?	Count	40,00	9,00	4,00	1,31	0.605
		Percent	75,47	16,98	7,55		
<b>Average mean</b>						<b>1,63</b>	

Source: Researcher's construction from statistical data

### Interpretation

In order to test hypothesis two (H2), respondents were asked if the advantages of digital migration were to their satisfaction. Seventy-nine percent of respondents indicated that the advantages of the migration were satisfactory, while 9 percent indicated that they were not. Respondents were asked if they were aware that there is a deadline that has been set for analogue switch off (ASO). Sixty-three percent indicated that they were aware, while 37 percent were either not aware, or unsure.

For those respondents who indicated that they were aware of the deadline, 59 percent of them have been keeping track of the deadline, while 30 percent were not. Keeping track of the set deadline. Forty-seven percent felt that the various postponements of the switch off deadline were not reasonable, 25 percent felt they were reasonable, while 28 percent were unsure. When respondents were asked if the deadlines that have been set were feasible to them, 36 percent said 'Yes', 34 percent said 'No', while 30 percent said they were unsure. Most respondents know what a set-up box is, as 80 percent indicated 'Yes' when asked, if they know what a set-up box is, and only 14 percent indicated that they did not know. All those respondents who indicated that they know what the setup box was, also knew how it works, as 80 percent of respondents indicated that they know how set-up box it operates, and only 9 percent were unsure. Thirty-six percent of respondent did not know how much the set-up box cost, while 38 percent knew how much, it costs, and the remaining 25 percent were unsure.

### 4.3.3 Influence of corruption

Table 7: Statistics on influence of corruption

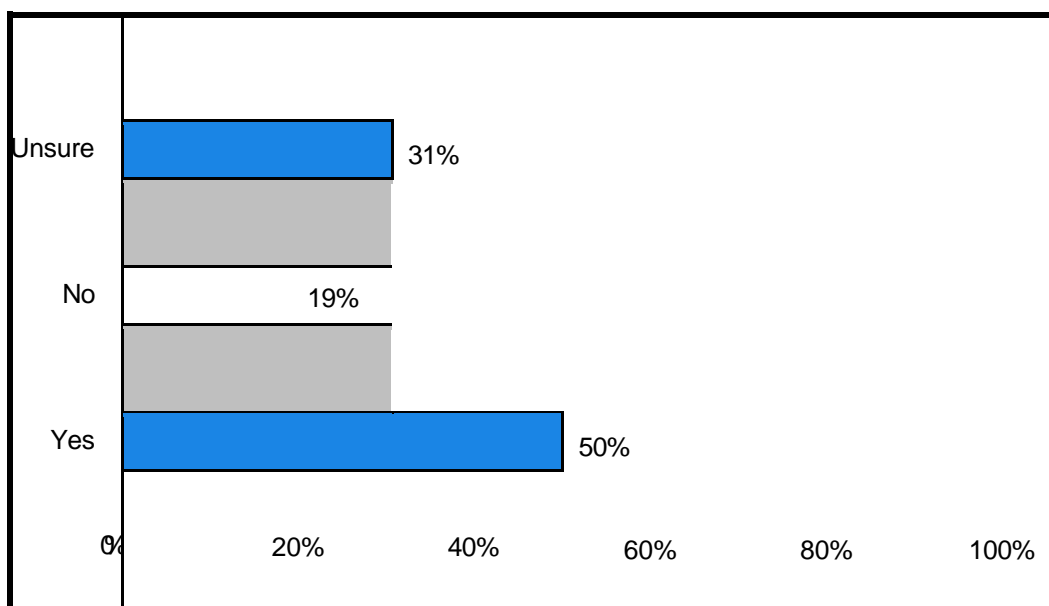
Code	Question					Mean	Standard deviation
		Yes	No	Unsure			
QQ33	Do you think corruption has an influence on DTT migration?	Count	31,00	12,00	19,00	1,81	0,88
		Percent	50,00	19,35	30,65		
QQ34	Do you think corruption has an influence on switch-off deadline postponements?	Count	30,00	15,00	17,00	1,79	0,85
		Percent	48,39	24,19	27,42		
QQ35	Do you think corruption has influence on STB manufacturing?	Count	34,00	12,00	16,00	1,71	0,86
		Percent	54,84	19,35	25,81		
QQ36	Do you think corruption has an influence on STB standards approval?	Count	31,00	15,00	16,00	1,76	0,84
		Percent	50,00	24,19	25,81		
QQ37	Do you think corruption has an influence on STB pricing?	Count	34,00	13,00	15,00	1,69	0,84
		Percent	54,84	20,97	24,19		
<b>Average mean score</b>						<b>1,75</b>	

Source: Researcher's construction from statistical data

## Interpretation

To determine whether digital migration is influenced by corruption, respondents were required to respond to few questions relating to the possibility of corruption influence on digital migration. Respondents were required to indicate if they think corruption has an influence on digital migration. Half of the respondents said 'Yes' and only 19 percent said 'No'. See Figure 14 below. When respondents were asked if they think corruption has an influence on switch off deadline postponements, 48 percent of respondents said 'Yes', while 24 percent said 'No', and 27 percent indicated that they were unsure.

Figure 20: Corruption vs switch off deadline postponements

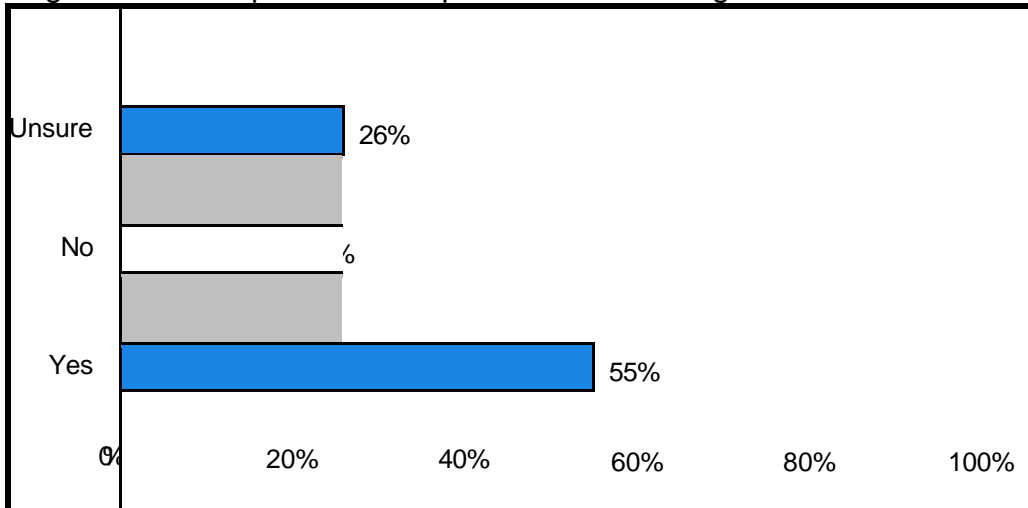


Source: Researcher's construction from statistical data

## Interpretation

According to Figure 15 below, 55 percent of respondents think that corruption has an influence on set-up box manufacturing, while only 19 percent think corruption has no influence.

Figure 21: Corruption vs set-up box manufacturing

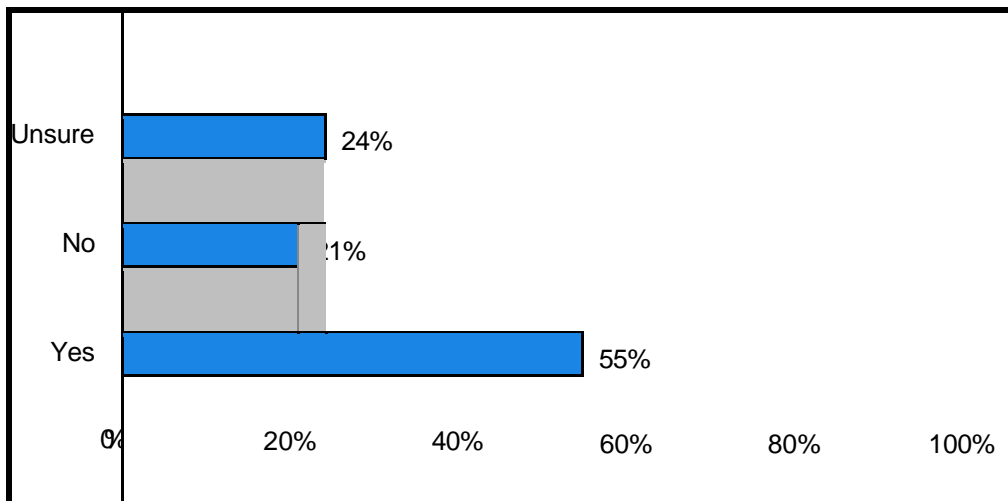


Source: Researcher’s construction from statistical data

**Interpretation**

The received data also indicates that 50 percent of respondents think that corruption has an influence on set-up box standards approval, while 24 percent think corruption has no influence. of set-up box standards approval. Lastly, the below Figure 16, below, indicates that 55 percent of respondents think that corruption has an influence on set-up box prices, while 21 percent think that corruption has no influence, on the set-up box prices and 24 percent were unsure.

Figure 22: Corruption vs set-up box prices



Source: Researcher’s construction from statistical data

### 4.3.4 Influence of politics

Table 8: Statistics on influence of politics

Code	Question		Yes	No	Unsure	Mean	Standard deviation
QQ25	Do you think DTT migration is affected by politics?	Count	44,00	5,00	13,00	1,53	0.835
		Percent	70,97	8,06	20,97		
QQ26	What is your opinion of politics influence on DTT migration	Count	6,00	34,00	17,00	2,19	0.611
		Percent	10,53	59,65	29,82		
QQ27	Do you think the switch-off deadline postponement is driven by politics?	Count	39,00	8,00	15,00	1,62	0.851
		Percent	62,90	12,90	24,19		
QQ28	What is your opinion of politics on DTT switch off deadline postponement?	Count	2,00	36,00	15,00	2,25	0.515
		Percent	3,77	67,92	28,30		
QQ29	Do you think politics has an influence on STB manufacturing?	Count	35,00	11,00	16,00	1,69	0.861
		Percent	56,45	17,74	25,81		
QQ30	What is your opinion of politics influence on STB manufacturing?	Count	3,00	34,00	14,00	2,22	0.541
		Percent	5,88	66,67	27,45		
QQ31	Do you think politics has an	Count	34,00	12,00	16,00	1,71	0.857
		Percent	54,84	19,35	25,81		



	influence on STB standards approval?						
QQ32	Do you think politics has an influence on STB pricing?	Count	38,00	8,00	16,00	1,65	0.870
		Percent	61,29	12,90	25,81		
	<b>Average mean score</b>					<b>1,86</b>	

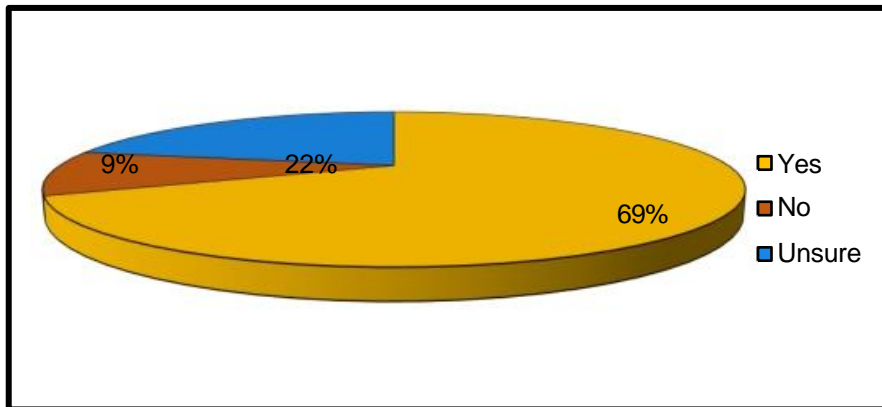
Source: Researcher’s construction from statistical data

### Interpretation

In order to determine the influence politics has on digital migration, respondents were asked few questions relating to this (QQ25). Respondents were asked if they think politics has an influence on DTT migration. Seventy-one percent said ‘Yes’, while only 8 percent said ‘No’. It is therefore evident that politics do play a role in the digital migration in South Africa.

Almost 60 percent indicated that they think that politics has a bad influence on DTT migration, while 30 percent were unsure (QQ26). Sixty-two percent of respondents also indicated that they think analogue switch off (ASO) is delayed due to political reasons, while only 12 percent said the switch off is not influenced by politics (QQ27). While most respondents indicated that the influence of politics on deadline postponements was bad, roughly 4 percent thought the political influence on switch off deadline was good, even though 28 percent of respondents were unsure.

Figure 23: Respondents response on "Do you think politics has an influence on DTT migration?"

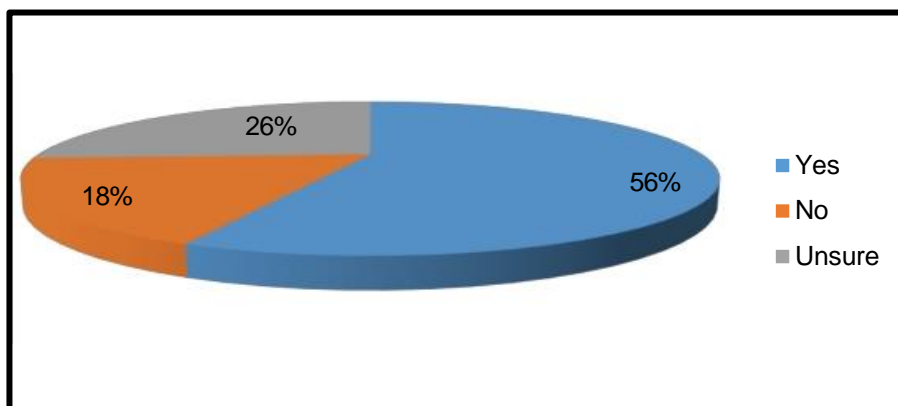


Source: Researcher's construction from statistical data

### Interpretation

Fifty-six percent of respondents thought that politics has an influence on set up box manufacturing, while 26 percent of respondents were unsure (QQ29). Respondents also indicated that the influence of politics on set up box manufacturing was bad. Only 6 percent of respondents indicated that political influence on set up box manufacturing was good, while 27 percent were unsure.

Figure 24: Respondents response on "Do you think politics has an influence on Set-up Box manufacturing?"



Source: Researcher's construction from statistical data

### Interpretation

When respondents were asked if they think politics has an influence on STB standards approval, 54 percent said 'Yes', while 19 percent said 'No'.

Sixty-one percent also indicated that they think that politics does have influence on STB pricing, while 12 percent indicated that they think politics does not have an influence. On STB pricing. There is therefore a high probability that politics does have an influence on STB prices.

#### 4.4 RELIABILITY AND VALIDITY

Reliability and validity are considered very critical in a quantitative study. Reliability is defined as an the extent to which results are consistent over time (Khaldi, 2017). Good reliability means results are repeatable. High measuring instrument stability indicates the high reliability of the results. Validity is an extent to which the research truly measures what it was intended to measure (Khaldi, 2017). Validity is commonly measured by asking questions and by doing literature review.

Cronbach’s alpha is commonly used to measure internal consistency of the measuring instrument, and was introduced in 1978 by JC Nunnally (Nunnally, 1978). It normally ranges from 0 to 1 as shown in table 10 below. Internal consistency measures the extent to which variables in a test measure the same concept (Tavakol & Dennick, 2011).

Table 9: Interpretation intervals for Cronbach's alpha

Unacceptable	< 0.50
Acceptable	0.50 - 0.69
Good	0.70 - 0.79
Excellent	0.80 +

Source: Nunnally (1978)

Table 10: Cronbach's alpha of lack of information

		<b>Summary for scale: Mean=14,8537 Std.Dv.=3,69162 Valid N:41 (Data) Cronbach alpha: ,779418 Standardized alpha: ,813520 Average inter-item corr.: ,316424</b>		
<b>variable</b>	<b>Question</b>	<b>Mean (deleted)</b>	<b>ifStDv. (deleted)</b>	<b>ifAlpha (deleted)</b>
QQ15	Are the advantages to your satisfaction?	13,658540	3,41167	0,77070
QQ16	Are you aware that there is a deadline that has been set for the analogue signal to be switched off?	13,658540	3,26556	0,74343
QQ17	Have you been keeping track of the deadline?	13,365850	3,30378	0,76177
QQ18	What is your opinion on the various postponements of the switch-off deadline?	12,951220	3,31259	0,76212
QQ19	Are the deadlines that have been set, feasible to you?	13,170730	3,29006	0,76542
QQ20	Do you know what a Set-top box is?	13,804880	3,45154	0,75918
QQ21	Do you know how it works?	13,682930	3,32352	0,74511
QQ22	Do you know how much it costs?	13,024390	3,25717	0,77603
QQ23	What is your opinion of the prices?	12,682930	3,18869	0,76628
QQ24	Do you know government subsidies Set-top Boxes for qualifying households?	13,682930	3,40329	0,75797
<b>Cronbach's alpha</b>				<b>0,78</b>

Source: Researcher's construction from statistical data

Table 10 above illustrates the Cronbach's alpha coefficient of the variable lack of information for DTT migration in South Africa. Cronbach's alpha of between 0.7 - 0.79 is considered good. The Cronbach's alpha of the variable lack of information is 0.78, which is between 0.7 and 0.79, therefore this variable has a good reliability. There will be no significant improvement if any of the variables is deleted, and therefore 0.78 is considered as the best Cronbach's alpha coefficient for this variable.

Table 11: Cronbach's alpha of influence of corruption

		Summary for scale: Mean=8,75806 Std.Dv.=4,02323 Valid N:62 (Data) Cronbach alpha: ,967337 Standardized alpha: ,967682 Average inter-item corr.: ,874778			
variable	Question	Mean if (deleted)	Var. if (deleted)	StDv. if (deleted)	Alpha if (deleted)
QQ33	Do you think corruption has an influence on DTT migration?	6,951613	10,43314	3,230037	0,971383
QQ34	Do you think corruption has an influence on switch-off deadline postponements?	6,967742	10,35380	3,217732	0,961541
QQ35	Do you think corruption has influence on STB manufacturing?	7,048387	10,14282	3,184779	0,954868
QQ36	Do you think corruption has an influence on STB standards approval?	7,000000	10,22581	3,197782	0,954988
QQ37	Do you think corruption has an influence on STB pricing?	7,064516	10,22164	3,197131	0,954427

<b>Cronbach's alpha</b>	<b>0.967</b>
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Source: Researcher's construction from statistical data

### Interpretation

Table 11 above demonstrates the Cronbach's alpha coefficient of the variable influence of corruption on DTT migration in South Africa. Cronbach's alpha of more than 0.8 is excellent. The Cronbach's alpha of the variable influence of corruption on DTT migration is 0.967, therefore this variable has an excellent reliability. The question QQ33 could be deleted to improve the Cronbach's alpha coefficient of this variable to 0.971. There will be no significant improvement if QQ33 is deleted, as the coefficient will be improved from 0.976 to 0.971. However, no variable was omitted for analysis because the measurement instrument's reliability is already considered excellent, and an improvement of 0.005 will be insignificant.

Table 12: Cronbach's alpha of lack of information

variable	Question	Summary for scale: Mean=11,5652 Std.Dv.=4,16148 Valid N:46 (Data) Cronbach alpha: ,962665 Standardized alpha: ,976708 Average inter-item corr.: ,885137			
		Mean if (deleted)	Var. if (deleted)	StDv. if (deleted)	Alpha if (deleted)
QQ26	What is your opinion of politics influence on DTT migration	9,369565	12,798200	3,57746	0,95934
QQ27	Do you think the switch-off deadline postponement is driven by politics?	10,000000	10,565220	3,25042	0,94952

QQ28	What is your opinion of politics on DTT switch off deadline postponement?	9,304348	13,342150	3,65269	0,95822
QQ29	Do you think politics has an influence on STB manufacturing?	9,956522	10,476370	3,23672	0,95126
QQ30	What is your opinion of politics influence on STB manufacturing?	9,282609	13,463610	3,66928	0,96177
QQ31	Do you think politics has an influence on STB standards approval?	9,913043	10,470700	3,23585	0,94974
<b>Cronbach's alpha</b>					<b>0.962</b>

Source: Researcher's construction from statistical data

Table 12 above demonstrates the Cronbach's alpha coefficient of the variable influence of politics on DTT migration in South Africa. Cronbach's alpha of more than 0.8 is excellent. The Cronbach's alpha of the variable influence of politics on DTT migration is 0.962, therefore this variable has an excellent reliability. There is no question that can be deleted in order to improve the current Cronbach's alpha coefficient, as the 0.962 is the best coefficient.

## 4.5 INFERENTIAL DATA ANALYSIS

### 4.5.1 Correlation analysis

Correlation is the term used to denote association or relationship between two variables (Gogtay & Thatte, 2017). Correlation is deemed vital in a theoretical framework, as variables influence one another. In quantitative study, the relationship between variables is very important in order to determine how variables influence one another.

Correlation range is between  $-1 < r < 1$ , which varies from strong negative correlation to strong positive correlation, respectively (Gogtay & Thatte, 2017). According to Gogtay and Thatte (2017), when both dependent, and independent variables, increase or decrease together, that results to in positive correlation. Whereas, negative correlation is reflected by inverse proportion. That is when dependent variable increase independent variable decrease and vice versa.

Table 13: Correlation interpretation of relationship strength

Correlation coefficient (r)	Relationship strength interpretation
0.00-0.19	Very weak
0.20-0.39	Weak
0.40-0.59	Moderate
0.60-0.79	Strong
0.80-1.00	Very strong

Source: Mehmood (2013)

Table 14: Correlation analysis results

Variable	Correlations (Data)				
	Marked correlations are significant at $p < ,05000$ N=62 (Case wise deletion of missing data)				
	DTT Migration	LA	LI	IP	IC
DTT Migration	-	0,722	0,790	0,726	0,645
LA (lack of awareness)	0,722	-	0,818	0,482	0,385
LI (lack of information)	0,790	0,818	-	0,550	0,502
IP (influence of politics)	0,726	0,482	0,550	-	0,713
IC (influence of corruption)	0,645	0,385	0,502	0,713	-

Source: Researcher's construction from statistical data



Table 14 indicates the correlation between four (4) independent variables, namely lack awareness, lack of information, influence of corruption and influence of politics on dependent variable, namely DTT migration. According to the results, DTT migration reported a strong positive correlation with LA ( $r=0.722$ ), LI ( $r=0.79$ ), IP ( $r=0.726$ ) with an exception of IC ( $r=0.645$ ), which is a positive moderate correlation. Furthermore, it is important to note most variables had moderate to strong positive correlation, with an exception of correlation between IC and LA ( $r=0.385$ ), which had a weak positive correlation.

#### 4.5.2 Multiple regression

Regression is a statistical procedure that assists the researcher to estimate the linear relationship between two or more variables. This linear relationship will indicate the amount of change from one variable to another. This will also help to see if the change of one variable is not caused by the change in the other.

Table 15: Multiple regression with four (4) independent variables vs DTT migration

	<b>Beta coefficient</b>	<b>Std. Error</b>	<b>B Coefficient</b>	<b>Std. Error</b>	<b>t value</b>	<b>p-value</b>
<b>Intercept</b>			-0,386473	0,160068	-2,41444	0,018992
<b>Awareness</b>	0,211300	0,111725	0,302690	0,160047	1,89126	0,063675
<b>Information</b>	0,366994	0,119056	0,444386	0,144163	3,08252	0,003160
<b>Politics</b>	0,307919	0,096446	0,317964	0,099592	3,19265	0,002296
<b>Corruption</b>	0,160048	0,093016	0,128532	0,074699	1,72065	0,090739
<b>Multiple R</b>	<b>0,88</b>					
<b>Multiple R<sup>2</sup></b>	<b>0,77</b>					
<b>Adjusted R<sup>2</sup></b>	<b>0,75</b>					
<b>F(4,57)</b>	<b>47,44</b>					
<b>p</b>	<b>0,00</b>					
<b>Std.Err. of Estimate</b>	<b>0,32</b>					

Source: Researcher's construction from statistical data

## **Interpretation**

Table 15 shows the multiple regression of four variables namely: lack of awareness of DTT migration, lack of information, influence of politics and influence of corruption vs DTT migration. Among the four variables, lack of awareness (Awareness;  $b=0.211$ ) has positive influence on DTT migration. Lack of information (Information;  $b=0.367$ ) has the strongest positive influence, on DTT migration while influence of corruption (Corruption;  $b= 0.16$ ) has the weakest positive influence. This study found two variables with significant relationship to DTT migration ( $p<0.05$ ), namely: Information ( $p= 0,0031600$ ), Politics ( $p=0,002296$ ) while the other two independent variables, namely: Awareness ( $p= 0,063675$ ) and Corruption ( $p=0,090739$ ), had no significant relationship ( $p>0.05$ ). Table 15 shows multiple regression of  $R = 0.88$  which indicates that there is a strong relationship between the four independent variables and DTT migration.

### **4.5.3 Tested hypotheses**

In this session, the formulated hypotheses for digital migration is tested. This is done by using multiple linear regression analysis. A null hypothesis that is symbolised by  $H_0$ , and an alternative hypothesis that is symbolised by  $H_1$ , is compiled for each variable, and is either rejected, or accepted, based on the linear regression p-values.

#### ***Hypothesis one***

The first hypothesis states that lack of awareness (Awareness) for South African consumers influences DTT migration. Thus, null and alternative hypothesis are stated as below:

$H_0$ , lack of DTT awareness for South African consumers **does not** affect DTT migration.

$H_1$ , lack of DTT awareness for South African consumers **does** affect DTT migration.

According to the statistical analysis, Awareness has a p-value of 0.064 ( $p > 0.05$ ), which means that the variable is not statistically significant in influencing digital migration. The evidence fails to reject the null hypothesis. Therefore, lack of DTT awareness for South Africa consumers has no influence on DTT migration on this study.

### ***Hypothesis two***

The second hypothesis states that lack of information (Information) for consumers to adopt new technology influences DTT migration. Thus, null and alternative hypothesis are stated as below:

H<sub>0</sub>, lack of information for consumers to adopt new technology **does not** affect DTT migration

H<sub>1</sub>, lack of information for consumers to adopt new technology **does** affect DTT migration

According to the statistical analysis, Information has a p-value of 0.003 ( $p < 0.05$ ), which means that the variable is statistically significant in influencing digital migration. The null hypothesis is rejected, and the alternative hypothesis is accepted. Therefore, lack of information has a significant influence on DTT migration on this study.

### ***Hypothesis three***

The third hypothesis tested states that corruption (Corruption) influences DTT migration. Thus, null and alternative hypothesis are stated as below:

H<sub>0</sub>, Corruption **does not** have influence on DTT migration

H<sub>1</sub>, Corruption **does** have an influence on DTT migration

The statistical analysis report of this study indicates that corruption has a p-value of 0.002 ( $p < 0.05$ ), which means that the variable is statistically significant in influencing DTT migration. The null hypothesis is therefore rejected, and the alternative hypothesis is accepted. Therefore, corruption has a significant influence on DTT migration.

### ***Hypothesis four***

The fourth hypothesis tested states that lack of government commitment (Politics) influence DTT migration. Thus, null and alternative hypothesis are stated as below:

Ho, lack of government commitment **does not** affect DTT migration

H1, lack of government commitment **does** affect DTT migration

Statistical evidence indicates that politics has a p-value of 0.09 ( $p > 0.05$ ), which means that the variable is not statistically significant in influencing digital migration. The evidence fails to reject the null hypothesis and therefore supports the null, which states that politics has no influence on DTT migration on this study.

### **4.6 SUMMARY**

In this chapter, the empirical results of the results were discussed. The data was collected from 62 respondents consisting of 50 percent males and 50 percent females. It was collected from different stakeholders of which Government employees contributed 37 percent, followed by broadcasters at 31 percent. Ninety-five percent of respondents were permanent employees. Middle and senior management employees contributed 65 percent of the respondents. Most respondents indicated that they heard about digital migration from SABC radio and television.

There were four independent variables that were identified in research methodology namely: lack of awareness, lack of information, influence of politics and influence of corruption. In terms of lack of awareness, the majority of respondents indicated that they are aware of the digital migration, even though 70 percent of respondents indicated that they were not ready for the migration. The main contributor for hesitation to migrate was highlighted by 50 percent of respondents to be lack of information.

The lack of information variable was also tested, and respondents felt that the information about the switch off deadline postponement, and the set-up box manufacturing and pricing, was not enough. Respondents also indicated that they were not aware of the new DTT migration date.

Seventy-one percent of respondents indicated that they think DTT migration is influenced by politics and therefore, the DTT migration deadline postponements were not feasible to them. They indicated that politics influenced set up box standard approval, set up box manufacturing and set up box prices. The majority of respondents also indicated that they think DTT migration is influenced by corruption, and therefore corruption has an influence on set up box standard approval, set up box manufacturing and set up box pricing.

Correlation results were also presented, and they indicated that there is moderate to strong correlation between DTT migration (dependent variable) and the four (4) independent variables namely: lack of awareness, lack of information, influence of politics and influence of corruption. The Cronbach alpha and multiple regression analysis were also presented. The following chapter will conclude the study, draw up conclusions, and make recommendations.

## **CHAPTER 5 - SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 INTRODUCTION**

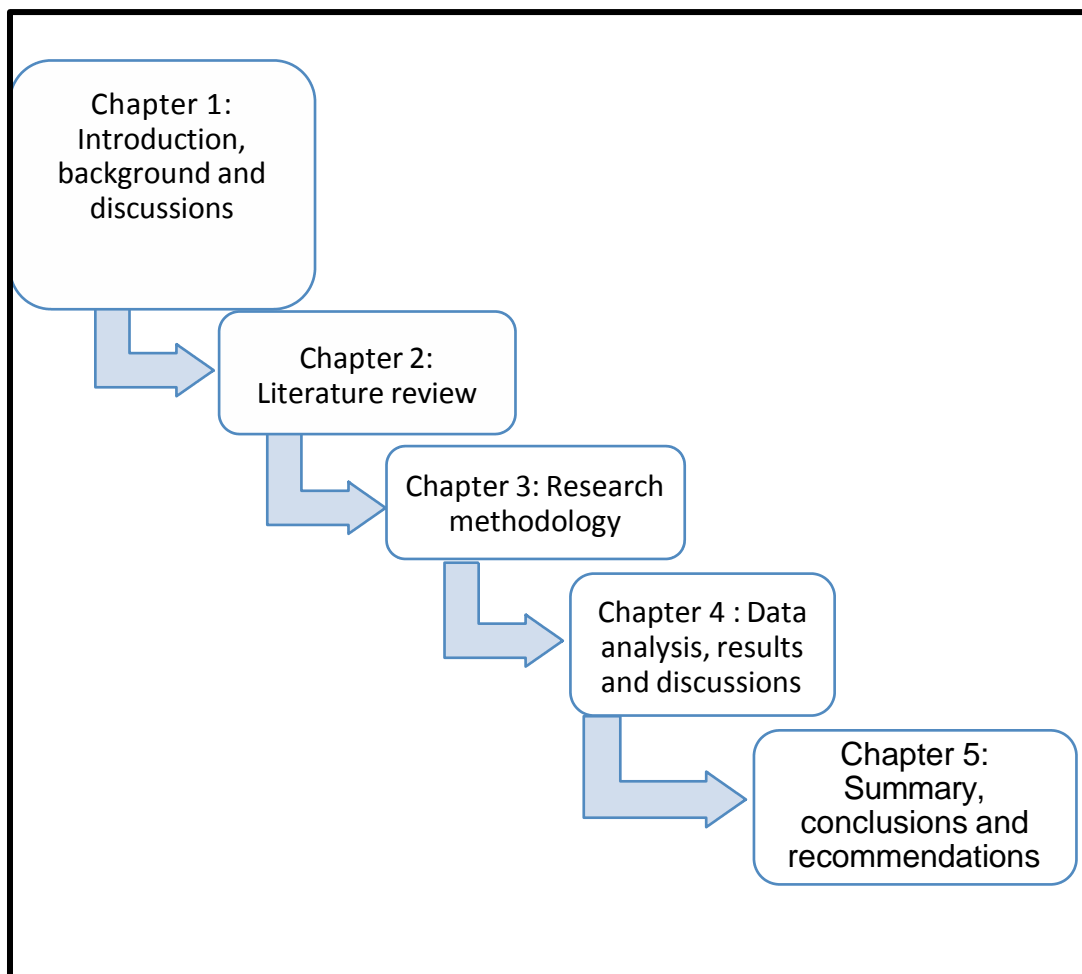
This chapter presents a summary of the study by highlighting specific factors that affect digital terrestrial migration in South Africa. The conclusions are discussed based on the literature review covered, and the empirical findings related to the analysis of South Africa's readiness for migration from analogue terrestrial television to digital terrestrial television by July, 2020. It further offers an overview of the primary objective of the study and research questions. The chapter will conclude by providing recommendations for future research, as well brief discussions of the limitations of the study.

### **5.2. SUMMARY OF RESEARCH DESIGN AND OBJECTIVES**

This research was designed to have five chapters comprised of the following: introduction and background; literature review; research methodology, data analysis, results and discussion, as well as summary, conclusions and recommendations. The summary of the first four (4) chapters and their relevance to the study is discussed below. The main objective of this research was to investigate challenges associated with adopting the new technology adoption model in South Africa to mitigate the risks associated with the delay of analogue switch-off (ASO). Migration of terrestrial television from analogue to digital is a worldwide initiative aimed at better utilization of frequency spectrum as the key outcome. Region one countries, comprised of Africa, Europe, the Middle East and the Republic of Iran were identified as the first countries to migrate from analogue terrestrial television to digital terrestrial television. This was the 2006 International Telecommunication Union (ITU) Radio World Conference Treaty (Agona & Otim, 2012).

Figure 25, below, provides the current study design, and the summary of each chapter:

Figure 25: Key chapter objectives



Source: Researcher's construction from statistical data

Each chapter had a specific key objective and expected outcomes, the summary of chapter one to chapter four is provided below:

Chapter 1: In this chapter the basic understanding of analogue to digital terrestrial television was explained. In chapter one it was stated that the 2006 International Telecommunication Union (ITU) Radio World Conference Treaty concluded that all countries should migrate from analogue to digital terrestrial television by June 2015. South Africa, as part of region 1 countries, initiated the process of migrating from analogue to digital terrestrial television. South Africa, however, did not meet the set deadline. The deadline for analogue switch off was then moved to July 2020.

The purpose of this study was to analyse the readiness of South Africa for analogue terrestrial television to digital terrestrial television migration by July, 2020. It was stated that the world is moving digital, and South Africa should therefore also comply. The primary objectives of the study were clearly defined: to investigate the challenges associated with adopting the new technology adoption model in South Africa, and to mitigate the risks associated with the delay of analogue switch-off (ASO). The benefits of digital terrestrial migration were discussed, which, amongst others, the following benefits were highlighted: clear picture, clear sound, additional channels which would, in return, result in job creation and efficient use of frequency spectrum. The research questions were computed to ensure that the main objective of the study are met, and these will be discussed later in this chapter.

Chapter 2: A literature review was conducted to understand the status of DTT migration in Europe, Africa and South Africa. This was meant to gain more in-depth knowledge on the topic, and to get a holistic overview of digital terrestrial migration in other countries. Digital terrestrial television migration was defined as the technological evolution of television broadcasting from the analogue signal distribution to the digital television signal distribution, resulting in higher quality pictures, more channels and more frequency spectrum available for use by other users (Lawal & Chatwin, 2013).

It was revealed that the EU countries are at completion stage with DTT migration, while the African continent is struggling immensely with the migration. During the duration of the study, only one country was outstanding in the EU countries for digital migration, which was also ongoing. The benefits of digital terrestrial migration were again emphasised by literature review where countries such as the US had 7 television channels before the digital terrestrial television, and ended up with about 70 television channels.

Chapter 3: In this chapter, research methodology was discussed. The research paradigm that was selected for the purpose of this study was a quantitative research. This was due to fact that this study was conducted to prove predetermined hypotheses related to the transition from analogue terrestrial television to digital terrestrial television. The sampling method used was simple random sampling, which is mostly used when population is big.



The use of this chosen sampling method was based on the importance of ensuring accurate, unbiased and fair input. A sampling of between 60 and 150 respondents was expected, from which 62 responses were received.

Chapter 4: Data analysis, results and discussions were discussed in this chapter. It was highlighted that out of the four independent variables, namely: lack of awareness, lack of information, influence of corruption and influence of politics, only two have a significant importance on digital migration. This was proved by using correlation and multiple regression analysis. The two variables that had a significant importance are the following: lack of information and the influence of corruption, while the other variables, namely: lack of awareness and influence of politics, showed no significant importance on digital migration.

### **5.3 RESEARCH FINDINGS BASED ON RESEARCH QUESTIONS**

#### **5.3.1 What impact does lack of awareness have on new technology adoption model in South Africa?**

The empirical findings indicated that lack awareness on new technology adoption in South Africa has no significant impact on DTT migration. This was proved by the use of correlation analysis, as well as the linear regression analysis. Even though most respondents indicated that they were aware of digital terrestrial migration in South Africa, the results indicated that most people were using Pay-TV more than the terrestrial platform. This is alluding to the fact that digital migration in South Africa has been delayed for such a long time, and most people have moved to Pay-TV due to uncertainties around the digital migration.

Literature review revealed that most African countries are struggling with digital migration, and one of the contributing factors is digital migration awareness. For the purpose of this research, lack of awareness was tested to identify whether it does, or does not, affect digital migration in South Africa. The results indicated that this variable does not have a significant importance on digital migration. Overall, lack of awareness is regarded, as it has no impact on new technology adoption model in South Africa.

### **5.3.2 What impact does lack of information for consumers to adopt the new technology have on the new technology adoption model in South Africa?**

Lack of information, has a significant importance on DTT migration. This was tested by the use of correlation and linear regression analysis. Digital terrestrial television migration requires configuration changes on the viewer side, and it is for this reason that information is important. Viewers are expected to set up a set-up box, or purchase a television set with a built in set up box. More than half of respondents indicated that they have not heard about any workshops designed to educate people, while 50 percent of respondents highlighted lack of information as the main contributor for their hesitation to migrate from analogue terrestrial television to digital terrestrial television. Furthermore, literature review also revealed lack of information as a main contributor on DTT migration delays. In principle, lack of information has a negative impact on DTT migration, as the majority of respondents indicated that they were not ready for the change in broadcasting.

### **5.3.3 What impact does corruption have on the new technology adoption model in South Africa?**

The impact of corruption on the new technology adoption in South Africa was tested using correlation and regression analysis. Both these results indicated that this variable has a significant importance on DTT migration. DTT migration is one of the biggest projects that South Africa has undertaken. It is therefore critical to acquire the citizen's perspective. The digital migration in South Africa was planned to be completed by 2015, but, due to a number of challenges, including the set-up box standards, set up box manufacturing, amongst other things, this migration is still ongoing. The South African government is still supporting two terrestrial television networks which is costing the country money.

The project has been postponed numerous times, and the general feeling of respondents is that these postponements are not feasible. The influence of corruption on DTT migration is, however, not special in South Africa, as literature also indicated that corruption has an influence on the migration.

### **5.3.4 What impact does political influence have on the new technology adoption model in South Africa have on DTT migration?**

Even though other countries have highlighted the influence of politics as an issue for DTT migration, this was proved not to be the case for South Africa. The tests were conducted to test this hypothesis through correlation and regression analysis. It was, however, proven that the influence of politics has no significant importance on DTT migration. A study conducted by Mbatha and Lesame (2014), examined the potential challenges to the adoption of digital television, and identified obstacles to include poverty, lack of skilled manpower, lack of government commitment and corruption. It is therefore believed that government focus has shifted before the time of the previous research, and now.

## **5.4 RECOMMENDATIONS**

### **5.4.1 Digital migration awareness**

Most African countries are struggling with the migration of television broadcasting from analogue terrestrial television to digital terrestrial television. This is caused mainly by lack of information and lack of awareness. Most people have heard about digital terrestrial television, but they are not equipped for the migration. To sensitise viewers, as major stakeholders of digital migration, will play an important role. It is important that the South African Government should get a buy in from all relevant stakeholders as soon as possible. Broadcasters, including the national signal broadcaster (SABC), community broadcaster, commercial broadcasters, Sentech LTD and government should coordinate in establishing vigorous DTT awareness campaigns to educate viewers. These will encourage buy in from viewers and, as a result, drive dual illumination costs down, saving the county money.

These campaigns can be communicated via the available platforms in the form of radio and television advertisements. The idea is to capture the attention of the viewers and inform them of the technological transition. It is recommended that all stakeholders should work together to communicate this transition.

### **5.4.2 Digital migration policies**

This study found that even though digital migration progress has been made, more effort is required on drafting digital migration policies and regulatory framework (Oze et al., 2017). The committee to draft and approve these policies must include all relevant stakeholders. Digital migration policy needs to be clear, and needs to be communicated to all relevant stakeholders regularly. Amendments on these policies need to follow a structured change management process. The objectives of the migration, and benefits thereof, must be clearly stipulated.

### **5.4.3 Technology adoption model implementation**

Africa seems to be resistant to technological change as it is behind other countries with digital migration. Most respondents indicated that they have heard about the educational workshops, but have not attended them, resulting in most people saying that they are not ready for the broadcasting change. It was estimated at the end of 2009 that more than 730 channels were broadcasted over DTT network in the EU countries (Position & Geneva, 2010). There is therefore an urgent need to educate all stakeholder on the benefits of digital migration for South Africa to benefit from DTT migration. South Africa is believed to be underprepared and not taking advantage of fourth industrial revolution opportunities (Michalos et al., 2014). It is important to equip South Africans to function and embrace the new digital world. Technology, in the fourth industrial revolution, is expected to evolve at a very fast pace, therefore making quick adaptation a requirement. For South Africa to survive in the fourth industrial resolution era, which is believed to be full of volatility, uncertainty, complexity and ambiguity, technology adoption model is key, and its adaptation thereof.

## **5.5 ACCEPTANCE OR REJECTION OF THE HYPOTHESES**

In chapter one (1), four hypotheses were formulated. Based on the findings of the study, this section reveals whether these hypotheses are accepted or rejected.

### ***Hypothesis 1 (H1)***

H1: There is a positive relationship between digital migration and lack of awareness (Awareness) for South African consumers.

The results revealed that lack of awareness for South African consumers is not significantly related to digital migration. The hypothesis can, therefore, not be accepted.

### ***Hypothesis 2 (H2)***

H2: There is a positive relationship between digital migration and lack of communication for consumers to adopt new technology.

The results revealed that lack of communication for consumers to adopt new technology is positively and significantly related to digital migration. The hypothesis can, therefore, be accepted.

### ***Hypothesis 3 (H3)***

H3: There is a relationship between digital migration and corruption.

The results revealed that corruption is not significantly related to digital migration. The hypothesis can, therefore, not be accepted.

### ***Hypothesis 4 (H4)***

H4: There is a positive relationship between digital migration and lack of government commitment.

The results revealed that lack of government commitment (politics) is positively and significantly related to digital migration. The hypothesis can, therefore, be accepted.

## 5.6 LIMITATIONS OF THE STUDY

Limitations of the study are defined as potential weaknesses of the study that are, most of the time, out of the researchers control (Simon, 2011). The known limitations should be clearly stipulated so as not affect the outcome of the study. This study should be interpreted with the following limitations considered:

- Sample size – the response rate of n= 62 could have influenced the outcome of the study results, as well as limiting the generalisation of the findings to the study.
- Geographical aspect – the study only focused on digital migration in South Africa and not beyond South African borders. Literature was used to make comparisons between other countries and South Africa.
- Coverage area - The study focused mainly on three provinces Western Cape, eastern Cape and Gauteng province, which might generally not be a national perspective, but a provisional perspective.
- Questionnaire development – questionnaire was developed based on face validity.
- Measuring instrument – validity of measuring instrument could not be tested as the sample was too small. It is therefore recommended that another test could be done with a reduced sample on each individual variable. Moreover, validity of the measuring instrument was not proven specifically for this study, but rather the principle of instrument validity was applied, and it was assumed that the instrument validity from literature was valid.
- Data analysis – Only completed surveys were considered during data analysis, and incomplete surveys were discarded. Furthermore, factor analysis was not done for the purpose of this study, and could also be done in the future.

## 5.7 SUGGESTIONS FOR FUTURE

South Africa needs to fast-track the implementation of digital migration to prevent incurring financial losses due to supporting two terrestrial television networks. Even though studies conducted previously identified obstacles of digital migration to include; a) lack of awareness b) lack of information, c) influence of politics and d) influence of

corruption. Lack of information and influence of corruption seem to have strong correlation with DTT migration, so these are areas that need additional attention.

It is evident that the African continent is struggling with meeting the digital migration deadline, and is progressing very slowly. It is therefore advisable for the African continent to do a thorough analysis of how other countries managed to migrate successfully.

Studies also show that most challenges associated with digital migration are common throughout the world. It would, therefore, be logical for South Africa to take the best practices from developed countries that have successfully migrated and are broadcasting in digital.

Lastly, in order to ensure that set-up box prices are affordable for South African consumers, these boxes must be 100% manufactured in South Africa. This will drive costs down and ensure good, total quality assurance. It will also mean that the required skills are developed and maintained locally to position South Africa better for future technology developments. Successful digital television migration would be a great milestone for South Africa.

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# ANNEXTURES

# **ANNEXURE A: METHODOLOGY SUMMARY**

## RESEARCH OBJECTIVES

### Primary research objective

To analyse South Africa's readiness for migration from analogue terrestrial television to digital terrestrial television.

### Secondary research objective

To analyse the technology adoption model and make recommendations on how to address the identified challenges.

## OVERVIEW OF RESEARCH METHODOLOGY

### Research approach

Data will be collected using an online Question-Pro questionnaire that will be closely examined by the researcher to avoid inconsistencies. Validity and reliability will be taken into consideration.

### Scope of study

The study will focus strictly on the analysis of South Africa's readiness for the migration from analogue to digital terrestrial television and the challenges of technology adoption within South Africa, with the main focus being in the Western Cape, Eastern Cape and Gauteng Provinces. It will not explore any countries beyond South Africa's borders.

### Sample population

The research study will target signal broadcasters' middle to senior management employees. Signal broadcasters for the purpose of this study will be defined as television and radio signal licenced broadcasters' employees, including South Africa's national signal broadcaster, the SABC, commercial and community broadcasters.

Middle and senior management workers are defined in this study as people permanently employed within the borders of South Africa (A reconsideration of what and who is middle class in South Africa, Development Southern Africa Vol 30, No 2\_797224, n.d.). This is because of the population's diversity and its sensitivity to technological changes and also because they are more likely to have internet access. Most signal broadcasters who are middle and senior management workers use digital platforms for news updates, sport updates, etc.

Diversity of background is also deemed critical for this study. Therefore, a simple random sampling of signal broadcasters and middle and senior management workers will be selected. This sampling method is used when an extremely large population exists for sampling purposes. The advantage of simple random sampling is that everyone in the population has the same probability of being chosen for the study which reduces the chances of being biased.

Simple random sampling will be used for the study with a sample of 60 to 150 respondents consisting of signal broadcasters who are middle and senior management workers. The sample will be randomly selected to assemble 60 to 150 individuals who are representative of the entire population.

#### Data collection

This study will use both primary and secondary data, collected using a structured online questionnaire distributed via QuestionPro to the 60 – 150 respondents consisting of signal broadcasters who are middle and senior management workers. The questionnaire will have both closed and open-ended questions in order to probe for more information while still ensuring consistency. The managed responses of the collected questionnaires will go through a quantitative data analysis process, and regression and correlation analysis will also be done to measure the relationship between dependent and independent variables.

#### Data analysis

Statistical data analysis software will be used for the analysis of the collected data. The study will include both nominal and ordinal scales to test the ease of use and usefulness of digital terrestrial television. An interval scale will be used for determining the level of knowledge about the technology. The mean, standard deviation and other variables will be computed to analyse the data. Regression and correlation analysis in the study will be assessed to check the relationships between variables in the study.

**ANNEXURE B: ETHICS APPLICATION  
FORM**



**NELSON MANDELA**  
UNIVERSITY

**APPLICATION FOR APPROVAL**  
**NELSON MANDELA UNIVERSITY RESEARCH ETHICS COMMITTEE**  
**(HUMAN)**

<b>SECTION A: (To be filled in by a representative from the Faculty Postgraduate Studies Committee (FPGSC))</b>					
Application reference code:	<b>H</b> HUMAN	..... YEAR	..... FACULTY	..... DEPARTMENT	..... NUMBER
Resolution of FPGSC Committee:	<input type="checkbox"/> Ethics approval given (for noting by the REC-H) <input type="checkbox"/> Referred to REC-H for consideration (if referred to REC-H, electronic copy of application documents to be emailed to <a href="mailto:Imtiaz.Khan@mandela.ac.za">Imtiaz.Khan@mandela.ac.za</a> )				
Resolution date:					
FPGSC representative signature:					

<b>1. GENERAL PARTICULARS</b>	
<b>TITLE OF STUDY</b>	
a) Concise descriptive title of study (must contain key words that best describe the study): <b>An analysis of South Africa's readiness for Analogue to Digital Terrestrial Television migration by July,2020.</b>	
<b>PRIMARY RESPONSIBLE PERSON (PRP)</b>	
b) Name of PRP (must be member of permanent staff. Usually the supervisor in the case of students): <b>Mr L Mahlangabeza, Nelson Mandela University Business School, Port Elizabeth</b>	
c) Contact number/s of PRP: <b>(0)41 504 3795</b>	
d) Affiliation of PRP: Faculty <b>Business and Economic Sciences</b> Department (or equivalent): Graduate School	
<b>PRINCIPLE INVESTIGATORS AND CO-WORKERS</b>	
e) Name and affiliation of principal investigator (PI) / researcher (may be same as PRP): <b>Qaqamba Jikela Gender: Female</b>	
f) Name(s) and affiliation(s) of all co workers (e.g. co-investigator/assistant researchers/supervisor/co-supervisor/promoter/co-promoter). If names are not yet known, state the affiliations of the groups they will be drawn from, e.g. Interns/M-students, etc. and the number of persons involved: <b>Mr Luyolo Mahlangabeza and Dr Ankit Kotradia</b>	
<b>STUDY DETAILS</b>	
g) Scope of study: <b>National</b>	h) If for degree purposes: <b>Master's</b>

i) Funding : <b>Privately funded</b> Additional information (e.g. source of funds or how combined funding is split) <b>Not applicable</b>
j) Are there any restrictions or conditions attached to publication and/or presentation of the study results? <b>No</b> If YES, elaborate (Any restrictions or conditions contained in contracts must be made available to the Committee): <b>Not applicable</b>
k) Date of commencement of data collection: <b>2019/08/31</b> Anticipated date of completion of study: <b>2019/10/30</b>
l) Objectives of the study (the major objective(s) / Grand Tour questions are to be stated briefly and clearly): <b>The purpose of this study is to explore challenges associated with the adoption of new technology in South Africa and propose possible strategies to address these challenges.</b>
m) Rationale for this study: briefly (300 words or less) describe the background to this study i.e. why are you doing this particular piece of work. A few (no more than 5) key scientific references may be included: <b>The 2006 ITU Radio World Conference Treaty concluded that all countries should migrate from analogue to digital terrestrial television by June, 2015, starting with Region 1 countries (Agona &amp; Otim, 2012). South Africa, as part of Region 1, developed a migration policy, Digital Terrestrial Television (DTT) regulations and initiated a process of migrating from analogue terrestrial television (ATT) to digital terrestrial television (DTT) to meet this deadline. However, South Africa missed the June, 2015 deadline due to a number of challenges, including the lack of infrastructure readiness, South African citizens' unawareness and government politics. The deadline has since been extended to July, 2020(Agona &amp; Otim, 2012). In the history of terrestrial television broadcasting, the digital terrestrial television (DTT) migration is a significant technological change since the inception of television in South Africa in the early 1970s (Roca &amp; Cited, 2006).</b>
<b>METHODOLOGY</b>
n) Briefly state the methodology (specifically the procedure in which human subjects will be participating) (the full protocol is to be included as <i>Appendix 1</i> ): <b>This study will use both primary and secondary data, collected using a structured online questionnaire distributed via QuestionPro to the 60 –150 respondents consisting of signal broadcasters who are middle and senior management workers. The questionnaire will have both closed and open-ended questions in order to probe for more information while still ensuring consistency. The managed responses of the collected questionnaires will go through a quantitative data analysis process, and regression and correlation analysis will also be done to measure the relationship between dependent and independent variables. (see appendix 1)</b>
o) State the minimum and maximum number of participants involved (Minimum number should reflect the number of participants necessary to make the study viable) Min: <b>60</b> Max: <b>150</b>

## 2. RISKS AND BENEFITS OF THIS STUDY

a) Is there any risk of harm, embarrassment or offence, however slight or temporary, to the participant, third parties or to the community at large? <b>No</b> If YES, state each risk, and for each risk state i) whether the risk is reversible, ii) whether there are alternative procedures available and iii) whether there are remedial measures available. <b>Not applicable</b>
b) Has the person administering the project previous experience with the particular risk factors involved? <b>No</b> If YES, please specify: <b>Not applicable</b>
c) Are any benefits expected to accrue to the participant (e.g. improved health, mental state, financial etc.)? <b>No</b> If YES, please specify the benefits: <b>Not applicable</b>

- d) Will you be using equipment of any sort? **Yes**  
If YES, please specify: **An online questionnaire will be sent using the QuestionPro survey tool to respondents**
- e) Will any article of property, personal or cultural be collected in the course of the project? **No**  
If YES, please specify: **Not applicable**

### 3. TARGET PARTICIPANT GROUP

- a) If particular characteristics of any kind are required in the target group (e.g. age, cultural derivation, background, physical characteristics, disease status etc.) please specify: **Respondents should be signal broadcasting middle to senior management employees, including South Africa's national signal broadcaster SABC, commercial broadcasters and community broadcasters.**
- b) Are participants drawn from NMMU students? **No**
- c) If participants are drawn from specific groups of NMMU students, please specify: **Not applicable**
- d) Are participants drawn from a school population? **No**  
If YES, please specify: **Not applicable**
- e) If participants are drawn from an institutional population (e.g. hospital, prison, mental institution), please specify: **No**
- f) If any records will be consulted for information, please specify the source of records: **Not applicable**
- g) Will each individual participant know his/her records are being consulted? **Not applicable**  
If YES, state how these records will be obtained: **Not applicable**
- h) Are all participants over 18 years of age? **Yes**  
If NO, state justification for inclusion of minors in study: **Not applicable**

### 4. CONSENT OF PARTICIPANTS

- a) Is consent to be given in writing? **Yes**  
If YES, include the consent form with this application [Appendix 2].  
If NO, state reasons why written consent is not appropriate in this study. **The survey conducted will be on a voluntary basis and the questionnaire will be sent via an online survey. The participants' consent will be obtained prior to them accessing the online survey ( see Appendix 2).**
- b) Are any participant(s) subject to legal restrictions preventing them from giving effective informed consent? **No**  
If YES, please justify: **Not applicable**
- c) Do any participant(s) operate in an institutional environment, which may cast doubt on the voluntary aspect of consent? **No**  
If YES, state what special precautions will be taken to obtain a legally effective informed consent: **Not applicable**
- d) Will participants receive remuneration for their participation? **No**  
If YES, justify and state on what basis the remuneration is calculated, and how the veracity of the information can be guaranteed. **Not applicable**
- e) Which gatekeeper will be approached for initial permission to gain access to the target group? (e.g. principal, nursing manager, chairperson of school governing body) **SABC manager, commercial broadcaster manager and community broadcaster manager**
- f) Do you require consent of an institutional authority for this study? (e.g. Department of Education, Department of Health) **No**  
If YES, specify: **Not applicable**

## 5. INFORMATION TO PARTICIPANTS

- a) What information will be offered to the participant before he/she consents to participate? (Attach written information given as [Appendix 3] and any oral information given as [Appendix 4])
- b) Who will provide this information to the participant? (Give name and role)  
**Qaqamba Jikela MBA Student – Principle Investigator**
- c) Will the information provided be complete and accurate? **Yes**  
 If NO, describe the nature and extent of the deception involved and explain the rationale for the necessity of this deception: **Not applicable**

## 6. PRIVACY, ANONYMITY AND CONFIDENTIALITY OF DATA

- a) Will the participant be identified by name in your research? **No**  
 If YES, justify: **Online survey will be conducted where respondents will not be requested to identify themselves. Their response will also be captured online and data will be coded by the researcher which will prevent any of the respondents being personally identified.**
- b) Are provisions made to protect participant's rights to privacy and anonymity and to preserve confidentiality with respect to data? **Yes**  
 If NO, justify. If YES, specify: **Online survey method will be used which will guarantee privacy, anonymity and confidentiality. No identifying details will be requested of participant such as name, address or contact details.**
- c) If mechanical methods of observation be are to be used (e.g. one-way mirrors, recordings, videos etc.), will participant's consent to such methods be obtained? **No**  
 If NO, justify: **Not applicable**
- d) Will data collected be stored in any way? **Yes**  
 If YES, please specify: (i) By whom? (ii) How many copies? (iii) For how long? (iv) For what reasons? (v) How will participant's anonymity be protected? **(i) Data will be stored by PRP (ii) Five (5) copies (iii) Data must be stored for five (5) years (iv) For data analysis and verification (v) 1. The participant will not be responding directly to the researcher as the questionnaire will be online using the QuestionPro survey tool 2. Data will be coded 3. Responses will be anonymous as no names will be requested 4. Data will be protected by a password**
- e) Will stored data be made available for re-use? **No**  
 If YES, how will participant's consent be obtained for such re-usage? **Not applicable**
- f) Will any part of the project be conducted on private property (including shopping centres)? **Yes**  
 If YES, specify and state how consent of property owner is to be obtained: **The project will require participants who are employed in SABC, community broadcasters and commercial broadcasters to respond. Written permission has been obtained from the Station Manager of SABC, commercial broadcasters and community broadcasters targeted (See appendix 5).**
- g) Are there any contractual secrecy or confidentiality constraints on this data? **No**  
 If YES, specify: **Not applicable**

## 7. FEEDBACK

- a) Will feedback be given to participants? **Yes**  
 If YES, specify whether feedback will be written, oral or by other means and describe how this is to be given (e.g. to each individual immediately after participation, to each participant after the entire project is completed, to all participants in a group setting, etc.): **A copy of the reaserch will be made available on request to participants.**

- b) If you are working in a school or other institutional setting, will you be providing teachers, school authorities or equivalent a copy of your results? **No**  
If YES, specify, if NO, motivate: **A copy of the research will be made available on request**

## 8. ETHICAL AND LEGAL ASPECTS

The Declaration of Helsinki (2000) or the Belmont Report will be included in the references: **Yes**

If NO, motivate: **Not applicable**

(A copy of the Belmont Report is available at the following link for reference purposes: <http://www.nmmu.ac.za/documents/rcd/The%20Belmont%20Report.pdf>)

- a) I would like the REC-H to take note of the following additional information:  
**None**

## 9. DECLARATION

If any changes are made to the above arrangements or procedures, I will bring these to the attention of the Research Ethics Committee (Human). I have read, understood and will comply with the *Guidelines for Ethical Conduct in Research and Education at the Nelson Mandela Metropolitan University* and have taken cognisance of the availability (on-line) of the Medical Research Council Guidelines on Ethics for Research (<http://www.sahealthinfo.org/ethics/>). All participants are aware of any potential health hazards or risks associated with this study.

**I am not aware of potential conflict(s) of interest which should be considered by the Committee.**

If affirmative, specify: **Type response here or select "Not applicable"**

28 November 2019

SIGNATURE: **Luyolo Mahlangabeza** (Primary Responsible Person)

Date

28 November 2019

SIGNATURE: **Qaqamba Jikela** (Principal Investigator/Researcher)

Date

## 10. SCRUTINY BY FACULTY AND INTRA-FACULTY ACADEMIC UNIT

This study has been discussed, and is supported, at Faculty and Departmental (or equivalent) level. This is attested to by the signature below of a Faculty (e.g. RTI) and Departmental (e.g. HoD) representative, neither of whom may be a previous signator.

NAME and CAPACITY (e.g. HoD)

SIGNATURE

Date

NAME and CAPACITY (e.g. Chair:FacRTI)

SIGNATURE

Date

## 11. APPENDICES

In order to expedite the processing of this application, please ensure that all the required information, as specified below, is attached to your application. Examples of some of these documents can be found on the Research Ethics webpage (<http://www.nmmu.ac.za/default.asp?id=4619&bhcp=1>). You are not compelled to use the documents which have been provided as examples – they are made available as a convenience to those who do not already have them available.

**APPENDIX 1: Research methodology**

Attach the full protocol and methodology to this application, as "Appendix 1" and include the data collection instrument e.g. questionnaire if applicable.

**APPENDIX 2: Informed consent form**

If no written consent is required, motivate at 4a). The intention is that you make sure you have covered all the aspects of informed consent as applicable to your work.

**APPENDIX 3: Written information given to participant prior to participation**

Attach as "Appendix 3". The intention is that you make sure you have covered all the aspects of written information to be supplied to participants, as applicable to your work.

**APPENDIX 4: Oral information given to participant prior to participation**

If applicable, attach the required information to your application, as "Appendix 4".

**APPENDIX 5, 6, 7: Institutional permissions**

Attach any institutional permissions required to carry out the research e.g. Department of Education permission for research carried out in schools.

# **ANNEXURE C: GATEKEEPER LETTER**

**CONSENT LETTER**

The undersigning of this consent letter does not relate to the waiving of your legal rights, the release of investigators, or involving institutions from the legal and professional responsibilities.

The research study pertaining to the topic: "***An analysis of South Africa's readiness for analogue to digital terrestrial television migration by July, 2020***". In order to address this, a primary research objective was set with the aim to investigate new technology adoption model in South Africa in order to mitigate the risks associated with delay of analogue switch off (ASO). To answer the research objectives and achieve the primary research objective, a questionnaire will be constructed to gather information and/or data from 60 to 150 participants. The respondents should be middle and senior management in the broadcasting industry.

By signing this letter you acknowledge that the information presented within about the study being conducted by Qaqamba Jikela in the Faculty of Business and Economic Sciences, at the Nelson Mandela University, under the supervision of Dr Ankit Katrodia, Co-supervised by Luyolo Mahlangabeza. You also acknowledge that you have had an opportunity to ask any questions related to this research study; covering additional details that you wanted more clarity on.

You are also aware that the information that you provide in the questionnaire may be used and included in research outputs stemming from this research study, as a whole, while taking into account all relevant ethical considerations (i.e. anonymity of respondents and confidentiality of sensitive information).

Lastly, you confirm that you were duly informed that you may withdraw from the participation of this research study at any point in time, without any consequences, by informing the relevant researcher and/or supervisor.



With full knowledge of the above, I:

agree, out of my own free will, to participate in this research study.

disagree, out of my own free will, to participate in this research study.

---

Date: \_\_\_\_\_

Dear Sir / Madam

**RE: Consent to undertake Research at the Sentech LTD**

My name is ***Qaqamba Jikela***, I am doing an MBA at the Nelson Mandela University (NMU). I am conducting research under the supervision of Dr Ankit Katrodia and Mr Luyolo Mahlangabeza.

I am requesting your permission to undertake a research through distribution of online questionnaires to the middle and senior managers within your company, which will assist in understanding risks associated with delay of analogue switch off (ASO) in South Africa.

All information collected with regards to the online survey will be kept confidential. Your participation is completely voluntary. You are not in any way obliged to participate. The survey is strictly confidential and the respondents will remain anonymous.

The information provided in this form remains confidential and anonymous and is only for purposes of this study, so information such as the name of the organisation and the department will not be required.

There are no legal or other restrictions preventing the respondents from participating in this research, and you give consent to this research and that you will also give access to the respondent's emails through your IT unit for the distribution of the questionnaires.

---

HR Manager

---

Signature

---

Date

**ANNEXURE D: INFORMED CONSENT  
FORM**

Private Bag X06  
Honeydew  
2040  
Tel: (011) 471 4496  
Enquiries:  
[Motlhabik@sentech.co.za](mailto:Motlhabik@sentech.co.za)

Dear: Ms Qaqamba Jikela

Re: Letter of authorisation to permit conducting an academic research in Sentech.

Qaqamba Jikela, as a MBA student at Nelson Mandela University; has been accepted to complete a research project under the supervision of Mr Luyolo Mahlangabeza and Co-supervised by Dr Ankit Katrodia.

She has been granted permission to gather data from SENTECH, which will be used in her research study titled: '**An analysis of South Africa's readiness for analogue to digital terrestrial television migration by July, 2020**'. In order to address this, a primary research objective was set with the aim to investigate new technology adoption model in South Africa in order to mitigate the risks associated with delay of analogue switch off (ASO). To answer the research objectives and achieve the primary research objective, a questionnaire will be constructed to gather information and/or data from 60 to 150 participants. The respondents should be middle and senior management in the broadcasting industry.

The data will be collected through a questionnaire and participants should consent to the process. These will be coordinated and scheduled by the employee. Confidentiality of all the data collected and details of participants shall be maintained, SENTECH's name will not be reflected in her research paper; findings of the research will be shared with the Research and innovation Divisional head in SENTECH. As a whole, while taking into account all relevant ethical considerations (i.e. anonymity of respondents and confidentiality of sensitive information).

---

**Directors** : Mr. Magatho Mello (Chairperson), Mr. Mlamli Booi (CEO), Mr. Siphamandla Mthethwa CA (SA) (CFO), Mr. Tebogo Leshope (COO), Mr. Lumko Mtimde, Dr Sandile Malinga, Ms Tebogo Malaka, Ms Precious Sibiyi CA (SA), Ms. Maureen Manyama CA (SA). **Company Secretary**: Adv. Selaelo Matsane

Wishing you all the best.



Kereng Motlhabi  
Chief Human Resources Officer

# **ANNEXURE E: RESEARCH QUESTIONNAIRE**

# Treatise Q.Jikela

Dear Respondent

You are invited to participate in our survey "Analysis of South Africa's readiness for Analogue to Digital Terrestrial Television migration by July,2020". In this survey, approximately 60 -150 people will be asked to complete this survey. It will take approximately 30 minutes to complete the questionnaire.

Your participation in this study is completely voluntary. There are no foreseeable risks associated with this project. However, if you feel uncomfortable answering any questions, you can withdraw from the survey at any point. It is very important for us to learn your opinions.

Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded and will remain confidential. If you have questions at any time about the survey or the procedures, you may contact Qaqamba Jikela at 073 091 3447 or by email at [jikelaq@gmail.com](mailto:jikelaq@gmail.com).

Thank you very much for your time and support. Please start with the survey now by clicking on the **Next** button below.

\* What is your gender

- Male
- Female

\* Are you a South African citizen?

- Yes
- No

\* What is your highest qualification?

- Lower than grade 12
- Grade 12/ Senior Certificate/Matric

- National Higher Certificate/Higher Certificate/National Certificate
- Higher Diploma/National Diploma
- Bachelor's Degree/Advanced Degree
- Honours Degree/Postgraduate diploma
- Master's degree
- Doctoral degree
- Post-Doctoral degree

\* Which field of these stakeholders are you likely to fit into?

- Viewer
- Broadcaster
- Government
- Broadcaster regulator

\* What is your employment status?

- Unemployed
- Permanently employed
- Temporally employed
- Social grant
- Other

\* What is your occupation?

- General worker
- Middle manager
- Senior manager
- Other

\* What is your field of operation?

- Community broadcaster



- Commercial broadcaster
- National broadcaster
- Signal distributor
- Other

\* How long have you been in this position?

- Less than 3 years
- 3 - 5 years
- 5 - 10 years
- More than 10 years

\* Which Province do you reside in?

- Eastern Cape
- Western Cape
- Gauteng
- Other

\* Do you know what digital terrestrial television (DTT) migration is?

- Yes
- No
- Unsure

\* Which media access do you use the most?

- Pay -Tv (DSTV)
- Free-to-air channels
- Streaming
- Other

\* Do you know the importance of digital terrestrial television (DTT) migration?

- Yes
- No

\* Which medium have you heard it from?

- SABC radio & Television
- Commercial broadcaster
- Community broadcaster/Newspaper
- Internet
- Magazine/ Go digital leaflet
- Word of mouth
- Billboards
- Other

\* How often have you heard about digital terrestrial television (DTT) migration?

- Daily
- Weekly
- Monthly
- Never

\* How much information do you have about digital terrestrial television (DTT) migration?

- Less information
- Enough information
- None

\* How would you like to receive information about digital terrestrial television (DTT) migration?

- Imbizos
- Workshops

- Media
- Door to door visits
- Other

Have you heard about any workshops designed to offer education on digital terrestrial television (DTT) migration process?

- Yes
- No

\* Have you attended them?

- Yes
- No

\* Are you prepared for the switch from Analogue terrestrial television (ATT) to Digital terrestrial television (DTT)?

- Yes
- No
- Unsure

\* Would you say that you are ready to comply with the change in broadcasting?

- Yes
- No
- Unsure

\* What is the reason for your hesitation?

- Lack of information
- Costs
- Technical know-how
- Other

\* What is the reason for your acceptance?

- Clear picture and sound
- Additional channels
- Compliance
- N/A

\* Are you aware of the advantages of the migration to digital terrestrial television?

- Yes
- No
- Unsure

\* Are the advantages to your satisfaction?

- Yes
- No
- Unsure

\* Are you aware that there is a deadline that has been set for the analogue signal to be switched off?

- Yes
- No
- Unsure

\* Have you been keeping track of the deadline?

- Yes
- No
- N/A

\* What is your opinion on the various postponements of the switch off deadline?

- Reasonable
- Not reasonable
- Unsure

\* Are the deadlines that have been set, feasible to you?

- Yes
- No
- Unsure

\* Do you know what a Set-up Box is?

- Yes
- No
- Unsure

\* Do you know how it works?

- Yes
- No
- Unsure

\* Do you know how much a Set-up Box costs?

- Yes
- No
- Unsr

\* What is your opinion of the Set-up Box price?

- Affordable

Expensive

Unsure

\* Do you know Government subsidies Set-up Boxes for qualifying households?

Yes

No

Unsure

\* Do you think DTT migration is affected by politics?

Yes

No

Unsure

\* What is your opinion on the influence politics has on DTT migration?

Good

Bad

Unsure

\* Do you think the switch-off deadline is affected by politics?

Yes

No

Unsure

\* What is your opinion of politics on DTT switch off deadline postponement?

Good

Bad

Unsure

\* Do you think politics has an influence on Set-up Box manufacturing?

- Yes
- No
- Unsure

\* What is your opinion of politics influence on Set-up Box manufacturing?

- Good
- Bad
- Unsure

\* Do you think politics has an influence on Set-up box standards approval?

- Yes
- No
- Unsure

\* Do you think politics has an influence Set-up box prices?

- Yes
- No
- Unsure

\* Do you think corruption has an influence on DTT migration?

- Yes
- No
- Unsure

\* Do you think corruption has an influence on switch-off deadline postponements?

- Yes

- No
- Unsure

\* Do you think corruption has an influence on Set up Box manufacturing?

- Yes
- No
- Unsure

\* Do you think corruption has an influence on Set up Box standards approval?

- Yes
- No
- Unsure

\* Do you think corruption has an influence on Set up box prices?

- Yes
- No
- Unsure



# **ANNEXURE F: ETHICS APPROVAL**

# NELSON MANDELA UNIVERSITY

PO Box 77000, Nelson Mandela University, Port Elizabeth, 6001, South Africa [mandela@u.ac.za](mailto:mandela@u.ac.za)

Chairperson: Faculty Research Ethics Committee (Human)  
Tel: +27 (0)41 504 2504

Ref: [H19-BES-BUS-098] / Approval]

6 September 2019

Mr L Mahlangabeza  
Department: Graduate School

Dear Mr Mahlangabeza,

## **TITLE OF STUDY: AN ANALYSIS OF SOUTH AFRICA'S READINESS FOR ANALOGUE TO DIGITAL TERRESTRIAL TELEVISION MIGRATION BY JULY 2020 (MBA)**

PRP: Mr L Mahlangabeza  
PI: Q Jikela

Your above-entitled application served at the *Faculty Ethics Committee of the Faculty of Business and Economic Science, (19 July 2019)* for approval. The study is classified as a negligible/low risk study. The ethics clearance reference number is **H19-BES-BUS-098** and approval is subject to the following conditions:

1. The immediate completion and return of the attached acknowledgement to [Lindie@mandela.ac.za](mailto:Lindie@mandela.ac.za), the date of receipt of such returned acknowledgement determining the final date of approval for the study where after data collection may commence.
2. Approval for data collection is for 1 calendar year from date of receipt of above mentioned acknowledgement.
3. The submission of an annual progress report by the PRP on the data collection activities of the study (form RECH-004 to be made available shortly on Research Ethics Committee (Human) portal) by 15 December this year for studies approved/extended in the period October of the previous year up to and including September of this year, or 15 December next year for studies approved/extended after September this year.
4. In the event of a requirement to extend the period of data collection (i.e. for a period in excess of 1 calendar year from date of approval), completion of an extension request is required (form RECH-005 to be made available shortly on Research Ethics Committee (Human) portal)
5. In the event of any changes made to the study (excluding extension of the study), completion of an amendments form is required (form RECH-006 to be made available shortly on Research Ethics Committee (Human) portal).
6. Immediate submission (and possible discontinuation of the study in the case of serious events) of the relevant report to RECH (form RECH-007 to be made available shortly on Research Ethics Committee (Human) portal) in the event of any unanticipated problems, serious incidents or adverse events observed during the course of the study.
7. Immediate submission of a Study Termination Report to RECH (form RECH-008 to be made available shortly on Research Ethics Committee (Human) portal) upon unexpected closure/termination of study.
8. Immediate submission of a Study Exception Report of RECH (form RECH-009 to be made available shortly on Research Ethics Committee (Human) portal) in the event of any study deviations, violations and/or exceptions.
9. Acknowledgement that the study could be subjected to passive and/or active monitoring without prior notice at the discretion of Research Ethics Committee (Human).

Please quote the ethics clearance reference number in all correspondence and enquiries related to the study. For speedy processing of email queries (to be directed to [Lindie@mandela.ac.za](mailto:Lindie@mandela.ac.za)), it is recommended that the ethics clearance reference number together with an indication of the query appear in the subject line of the email.

We wish you well with the study.

Yours sincerely

A handwritten signature in black ink, appearing to read 'PP' followed by a stylized signature and 'bo'.

**Prof M van Eyk**


Cc: Department of Research Capacity Development  
Faculty Research Co-ordinator: Lindie van Rensburg

**ACKNOWLEDGEMENT OF CONDITIONS FOR ETHICS APPROVAL**

I, Mr L Mahlangabeza (PRP) of the study entitled **AN ANALYSIS OF SOUTH AFRICA'S READINESS FOR ANALOGUE TO DIGITAL TERRESTRIAL TELEVISION MIGRATION BY JULY 2020 (H19-BES-BUS-098)**, do hereby agree to the following approval conditions:

1. The submission of an annual progress report by myself on the data collection activities of the study by 15 December this year for studies approved in the period October of the previous year up to and including September of this year, or 15 December next year for studies approved after September this year. It is noted that there will be no call for the submission thereof. The onus for submission of the annual report by the stipulated date rests on myself.
2. Submission of the relevant request to Faculty RECH in the event of any amendments to the study for approval by Faculty RECH prior to any partial or full implementation thereof.
3. Submission of the relevant request to Faculty RECH in the event of any extension to the study for approval by Faculty RECH prior to the implementation thereof.
4. Immediate submission of the relevant report to Faculty RECH in the event of any unanticipated problems, serious incidents or adverse events.
5. Immediate discontinuation of the study in the event of any serious unanticipated problems, serious incidents or serious adverse events.
6. Immediate submission of the relevant report to Faculty RECH in the event of the unexpected closure/discontinuation of the study (for example, de-registration of the PI).
7. Immediate submission of the relevant report to Faculty RECH in the event of study deviations, violations and/or exceptions.
8. Acknowledgement that the study could be subjected to passive and/or active monitoring without prior notice at the discretion of Faculty RECH.

Signed: \_\_\_\_\_



Date: \_\_\_\_\_

09/09 / 2019

My courses > Academic Degree Programme > MBA > MBA Year 2 > MBR5TR > Turnitin > MBA Treatise Submission

My Submissions

Part 1					
Title	Start Date	Due Date	Post Date	Marks Available	
MBA Treatise Submission - Part 1	16 Jul 2019 - 13:12	23 Jul 2022 - 13:12	23 Jul 2022 - 13:12	100	
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November 2019						
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NELSON MANDELA  
UNIVERSITY

PERMISSION TO SUBMIT FINAL COPIES  
OF TREATISE/DISSERTATION/THESIS TO THE EXAMINATION OFFICE

*Please type or complete in black ink*

FACULTY: Business and economic sciences

SCHOOL/DEPARTMENT: Graduate school

I, (surname and initials of supervisor) Mr Mahlangabeza L.

and (surname and initials of co-supervisor) Dr Kotradia A.

the supervisor and co-supervisor respectively for (surname and initials of  
candidate) Jikela Q.

(student number) 217856209 a candidate for the (full description of qualification)  
Master's in Business administration

with a treatise/dissertation/thesis entitled (full title of treatise/dissertation/thesis):

An analysis of South Africa's readiness for analogue to digital terrestrial television  
migration by July, 2020

It is hereby certified that the proposed amendments to the treatise/dissertation/thesis have been effected and that **permission is granted to the candidate to submit** the final bound copies of his/her treatise/dissertation/thesis to the examination office.

\_\_\_\_\_  
SUPERVISOR

\_\_\_\_\_  
DATE

*And*

\_\_\_\_\_  
*Dr. Ankit Katrodia Ankit. J. Katrodia*

\_\_\_\_\_  
18 March 2020

CO-SUPERVISOR

DATE

**PERMISSION TO SUBMIT FINAL COPIES OF TREATISE TO THE  
EXAMINATION OFFICE**

*Please type or complete in black ink*

FACULTY: Business and Economic Sciences

SCHOOL/DEPARTMENT: Graduate school

I, (surname and initials of supervisor) Mr Mahlangabeza L. and (surname and initials of co-supervisor) Dr Kotradia A. the supervisor and co-supervisor respectively for (surname and initials of candidate) Jikela Q. (student number) 217856209 a candidate for the (full description of qualification) Master's in Business administration with a treatise/dissertation/thesis entitled (full title of treatise/dissertation/thesis): **An analysis of South Africa's readiness for analogue to digital terrestrial television migration by July, 2020**

It is hereby certified that the proposed amendments to the treatise/dissertation/thesis have been affected and that **permission is granted to the candidate to submit** the final bound copies of his/her treatise/dissertation/thesis to the examination office.



18 March 2020

\_\_\_\_\_  
SUPERVISOR

\_\_\_\_\_  
DATE

*And*

\_\_\_\_\_  
CO-SUPERVISOR

\_\_\_\_\_  
DATE