FACTORS CONTRIBUTING TOWARDS USER RESISTANCE ON E-HEALTH IN LIMPOPO PUBLIC HEALTHCARE

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DECLARATION

I hereby declare that this dissertation entitled ‘Factors contributing towards user resistance in Limpopo public hospitals’, which I have submitted at the Tshwane University of Technology, is my own original work and that it has not be previously submitted to any other institution or for another qualification. All sources used and quoted are indicated and acknowledged by means of a comprehensive list of reference.

Moloti Howard Nkune 14 August 2018
DEDICATION

This study is a dedication to my uncle, Nicodemus Tlašego Phaswane and his wife Annah Matsangwane Phaswane, for having provided a foundation for my academic achievements and the tenacious support and guidance they continue to give me.

KE A LEOGA BANARENG. “KGOMO”!
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- My friends and family, who supported me throughout this study, without you guys, I would not be where I am today.
- The Department of Health: Limpopo Provincial Government, Office of the Sekhukhune Health District Executive Manager and participating hospitals (Philadelphia and ST Rita's) and their staff, who have been of assistance to me, for the immense support and contribution they afforded me before and during data collection.
- Above all, I give praise to the Omnipotent God for protection, love, strength and wisdom He provided me during this study.

I can do all things through Christ who strengthens me. Philippians 4:13
ABSTRACT

Improved healthcare delivery is one of the key priorities for South Africa’s socio-economic development. ICT’s have been identified as some of the platforms which can be used to improve delivery of healthcare services. In healthcare, the usage of ICT’s to deliver and support healthcare is referred to as e-health. Despite the introduction of e-health solutions to improve healthcare services delivery, implementation of such e-health solutions is faced with certain challenges which include, amongst others, user resistance. The study aimed to investigate factors contributing towards user resistance on e-health in Limpopo public healthcare, and to develop strategies which can be used to counter these resistance behaviours in public hospitals. To achieve this purpose, the study applied qualitative method of research using case study with questionnaire and interviews as data collection tools. Data was collected from two public hospitals in Limpopo Province. The User Resistance Model was adapted as the underpinning theory that guided the study and an Interpretivism philosophy was adopted for the research. The study identified factors contributing towards user resistance in public hospitals. Furthermore, strategies which can be used to counter the resistance were developed.

Keywords: ICT in health, e-health, user resistance, e-health in South Africa
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LIST OF ABBREVIATIONS

CEO : Chief Executive Officer
CBD : Central Business District
cf : See or Refer to
DHIS : District Health Information System
E-health : Electronic health
EHR : Electronic Health Record
HIS : Health Information Systems
HR : Human Resources
ICT : Information Communication Technology
M-health : Mobile health
NDoH : National Department of Health
PHR : Personal Health Record
PMHC : Polokwane Mankweng Hospital Complex
SITA : State Information Technology Agency
STATSSA : Statistics South Africa
TUT : Tshwane University of Technology
URM : User Resistance Model
URT : User Resistance Theory
UTAUT : Unified Theory of Acceptance and Use of Technology
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1 CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 RESEARCH BACKGROUND

Information systems implementation projects have historically been plagued by failures for which user resistance has consistently been identified as a salient reason (Kim & Kankanhalli, 2009). Kim and Kankanhalli (2009) further indicate that user resistances is the first-ranked challenge for implementation of large-scale systems which is caused by multiple reasons. Ali, Zhou, Miller, and Ieromonachou (2016), indicate that user resistance is a complex phenomenon long viewed as a major constraint in successful information technology implementation.

According to the National Development Plan (2012), South Africa’s health challenges are more than medical. The National Development Plan (2012) further indicates that South Africa like many other countries in Africa is faced with poor healthcare delivery challenges, as a result of shortage of skilled healthcare professionals, increased costs, poor patient care and medical errors due to inaccurate information, and poor clinical decision, prevention and use of appropriate technology amongst others.

Effective monitoring of healthcare service delivery and overall performance of the health systems requires function health information systems capable of producing real time information for decision making (E-health Strategy South Africa, 2012). Furthermore, the E-health Strategy South Africa (2012) indicates that Information and Communication Technology (ICT) has emerged globally as a critical enabling mechanism for improvement of healthcare sector.

In an attempt to deal with some of these healthcare delivery problems, various means were adopted and one promising approach was the adoption of Information and Communications Technologies (ICTs). According to Asangansi, Adejoro, Farri et al. (2006), the revolution of ICT has greatly affected the healthcare sector by providing solutions that can enhance information access, storage, retrieval and analysis, and dissemination of accurate medial history. Various ICT’s implemented in the health sector are called e-Health.

Research in information systems shows that Information Technology (IT) has a potential to significantly improve access to and service delivery on healthcare by lowering costs, and
streamlining operational efficiencies in the health sector (Cline & Luiz, 2013). Health strategies in other countries show that most countries are moving towards e-Health (Kleynhans, 2011); and e-Health has become an important tool for healthcare service delivery (Sim, 2001; Tang & Lansky, 2005).

The Millennium Development Goals (2015) indicate that Information and Communication Technology (ICT) can play an important role both in the delivery of health-care services to disadvantaged areas, and in improving quality of research and monitoring and evaluation of community healthcare services. The South African setting of health-care services, as per the Millennium Development Goals (2015), public healthcare institutions are the only available healthcare service providers in rural areas.

E-Health, as defined by the eHealth Strategy South Africa (2012) is a broad domain which includes mobile Health, telemedicine, health information system, and all information communication technologies (ICTs) used to promote, support and strengthen healthcare. According to Ruxwana (2010), implementation of e-Health solutions usually occurs in developed countries with a limited scope of implementation in developing countries. Furthermore, Ruxwana (2010) argues that literature informs that this is due to challenges linked to the resource constraints.

E-Health implementation promises to bring about benefits to the healthcare sector. According to the World Health Organisation (2006), Electronic Health Records may include a whole range of data in comprehensive or in summary form, including demographics, medical history, medication and allergies, immunization status, laboratory test results, radiology images, and billing information. Telemedicine is being used in some parts of the world and has a potential to increase care accessibility, improve care quality, reduce costs, and enhance patient and provider satisfaction (Kvedar, Coye, & Everett, 2014).

Despite the promise of e-Health to improve delivery of services in the health sector, the introduction of e-Health faces multiple challenges that might lead to a total failure of the project. According to literature, as identified and summarised by Cherry, Ford and Peterson (2005) costs, resistance by medical professional, disruption of current clinical routine, and lack of documentation standards are some of the primary barriers to e-Health implementation.

Rossouw and Alexandra (2015) argue that most researchers adopting every perspective of implementing Information Systems (IS) identify issues and factors related to people as being
fundamental and user resistance has been identified as a major obstacle to the success of systems implementations. Borman and Jansen (2013) mention that as part of these efforts, the major challenges, related factors, constructs, and determinants that leading to user resistance to IT systems need to be identified to enable IS and other managers to introduce change as effectively as possible.

According to literature, World Health Organisation (2006), the list of observed above implementation of IT systems mostly fail because of resistance by targeted users. This presents a challenge that could result in project failure. The problem of failing projects has been a challenging issue to IT professionals for quite some time. Despite the developments in ICT’s to enhance the manner in which business and sectors conduct their businesses, an average of 29% of IT projects were successful globally in 2004 (Standish Group, 2004) compared to only 16.2% for in 2014 (Standish Group, 2014).

Many different points of view exist in introducing and implementing Information Systems Lawson-Body, Mukankusi, Willoughby and Logossah (2011). Nuss (2004) defines IT project failure as any project, initiated or implemented in order to enable or support the operations of an organisation by making use of IT methods, processes and structures, which within reasonable margins they fail to deliver the intended results of the originally allocated financial resource at that particular time and for certain specification.

Borman and Jansen (2013) propose that individual issues should be considered as being separate from process issues, project issues, and other universal issues, but all these views contribute to the factors that are critical for individuals choosing to accept or resist the implementation of technology systems. The problem identified in this study is that although prior research on e-Health use is predominantly focused on acceptance of the systems and readiness, existing knowledge about healthcare professionals' resistance to e-Health is scanty. Anderson (2010) states that South African hospitals spent huge budgets on procurement and implementation of e-Health systems but the healthcare professionals do not use them. Due to the fact that the decision of whether to use or resist usage of technology systems is the decision of the targeted system users (Brailer & Terasawa, 2003), understanding factors that influence their choice to resist usage of such systems is therefore fundamental.

In addition, the major investments of ICT’s in organisations, the effect of e-Health on healthcare sector, the importance of understanding factors influencing user resistance to e-
Health, and the importance of medical professionals in the success of e-Health implementation, have a major influence on the study.

The study is expected to contribute to the information systems body of knowledge on factors contributing towards user resistance on e-health in Limpopo public healthcare. The key concepts used in the study are reflected below as preliminary review of existing literature. A comprehensive literature on this study is presented in Chapter 2. This study adapted the User Resistance Model as proposed by Lin (1994) further refined by Klaus and Blanton (2010), which has a goal to investigate the direct impact of contextual factors on user resistance, and explore the indirect impact of these factors through the intermediate variables on user resistance. Klaus and Blanton (2010) identified contextual factors such as technical, organisational, user, job threat, and user involvement as having a direct impact on user resistance for information systems projects.
1.2 PROBLEM STATEMENT

South African hospitals spent huge budgets on procurement and implementation of e-Health systems but the healthcare professionals do not use them (Anderson, 2010). Due to the fact that the decision of whether to use or resist usage of technology is the decision of the targeted system users (Brailer & Terasawa, 2003), understanding factors that influence their choice to resist usage of such systems is therefore fundamental.

The problem identified in this study is that although prior research on e-Health use is predominantly focused on acceptance of the systems and readiness, existing knowledge about healthcare professionals’ resistance to e-Health is scant. Due to the fact that people are fundamental and have been identified as a major obstacle to the success of information systems implementations, especially resistance by healthcare professionals on e-Health implementation (Rossouw & Alexandra, 2015); as part of the efforts to understand this problem, the major challenges, related factors, constructs, and determinants that leading to user resistance to e-health need to be identified to enable e-health practitioners and other managers to introduce change as effectively as possible (Borman & Jansen, 2013). Therefore, it is important to identify the major factors, constructs, and determinants influencing healthcare professionals’ resistance to e-health.

1.3 OBJECTIVES OF THE STUDY

The main objective of the study is to identify the factors contributing towards user resistance to e-health in Limpopo public hospitals.

To achieve the main objective, the following sub-objectives were identified for the study:

i. To establish user resistance behaviours on e-health in the hospitals.
ii. To determine the contextual factors contributing to these user resistance behaviours on e-health in the hospitals.
iii. To establish the strategies that can be used to counter the user resistance on e-health in public hospitals.
1.4 RESEARCH QUESTION

The primary research question for the study is: **What are the factors contributing towards user resistance on e-health in Limpopo public hospitals?**

In order to focus the research and guide the research, and to ensure that the primary research question is answered, the research sub-questions required for answering are:

- What are the existing user resistance behaviours on e-health in the hospitals?
- What are the contextual factors contributing to user resistance behaviour on e-health in the hospitals?
- What strategies can be used to counter the user resistance on e-health in public hospitals?

1.5 SIGNIFICANCE OF THE STUDY

Leedy and Ormord (2013) state that for every study conducted the researcher, must know and understand the practical value the study will add to the Body of Knowledge (BoK). The subject addressing factors influencing user acceptance to information systems is well covered in literature. However, there’s limited literature on user resistance aspects on e-health which is a gap found in literature. This study is contributing by extending the existing body of knowledge on resistance behaviours by presenting factors contributing towards user resistance towards e-health in Limpopo public hospitals.

Understanding such factors could assist in addressing those key challenges for current and future projects on information systems implementation. In addition, understanding what leads to resistance is essential in order to that such issues are addressed and that the situation is transformed from the negative to the positive state, that is minimising or eliminating resistance which could sometimes lead to acceptance.

Firstly, the study contributes to literature and to the body of knowledge on user resistance towards e-health in public hospitals. That would be projected by drawing attention of the stakeholders in e-health implementation projects about the impact that user resistance could present and the challenges that could surface as a result of it implementing e-health systems. The industry that the study is targeting, together with the geographical area of focus justify an investigation on why resistance could be a reality on e-health implementation.
Secondly, this study contributes to the general literature by identifying and addressing factors contributing towards user resistance in public hospitals. This would be done by developing a framework which can be adopted and used as concept that would lead to easily minimising or eliminating resistance to e-health in public hospitals.

1.6 LIMITATION OF THE STUDY

According to Leedy and Ormord (2013), it is important to know what the researcher does not intend to do or cover in the study, and this should be stated in the delimitations section of the study. This study only focused on two (2) public hospitals in the Limpopo province of South Africa. The study did not consider private hospitals and clinics.

Furthermore, the study did not consider any other factors; such as project management methodology, network and system problems (the IT platform), or budget overruns; that could cause failure to e-health. The focus of the study was only on the user resistance as a critical factor to cause failure to IT systems being introduced or implemented.

1.7 DEFINITION OF KEY TERMS

The following key terms are used in this study:

- **E-health**: This is an emerging system used in the healthcare sector which combines the medical profession and Information and Communication Technology (ICT). E-Health, as defined by the eHealth Strategy South Africa (2012: 6) is a broad domain which includes mobile Health, telemedicine, health information system, and all information communication technologies (ICTs) used to promote, support and strengthen healthcare.

- **Public Healthcare**: This is healthcare system that includes government health institutions such as clinic and hospitals.

- **User Resistance**: This is the core of the study in terms of measuring the key factors that contribute towards IT systems failing. The study focused on the resistance aspect of the users which is a serious contributory factor which the study sought to identify such contributory factors of resistance leading to IT systems failure.

- **User Resistance Model**: This study adapted the User Resistance Model as proposed by Lin (1994) further refined by Klaus and Blanton (2010), which has a goal to investigate the direct impact of contextual factors on user resistance, and explore the
indirect impact of these factors through the intermediate variables on user resistance. Klaus and Blanton (2010) identified contextual factors such as technical, organisational, user, job threat, and user involvement as having a direct impact on user resistance for information systems projects.

1.8 RESEARCH METHODOLOGY

Research can be conducted in three different methods; qualitative, quantitative or mixed methods (Leedy & Ormord, 2005). Creswell (2007) mentions that quantitative research, which focuses on data in numbers, is the first kind of research; and the second kind is qualitative research, which seeks to understand the real life setting. In order to achieve the objectives of the study, Qualitative research was employed as it studies things in their natural settings, attempting to make sense of, or interpret phenomena in terms of the meanings people bring to them (Denzin and Lincoln, 2011). The qualitative research approach was adopted within a case study design strategy.

Case studies are defined as empirical investigations that consider recent phenomena within its unique context (Creswell, 2007). Yin (2011) also agrees and states that case studies focus on the generation of ‘rich, in-depth descriptions of complex issues by using multiple sources of evidence, as opposed to other research strategies’. Yin (2011) indicates that case studies can be single or multiple-case. For this study, a multi case study approach was employed for an in-depth understanding of user resistance behaviour in eHealth implementation in Limpopo hospitals.

The study used a case study with structured questionnaire and unstructured interviews as data collection instruments. Creswell (2007) argues that the sample must be a generalizable representative of the greater population. For this study, the focus was on public hospitals in Limpopo Province of South Africa. Considering the nature of the problem, the study employed purposive sampling which involved the selection of the units to be observed on the basis of own judgment about which ones will be the most useful or representative (Babbie, 2005). For a detailed discussion on research methodology, refer to cf Chapter 3: Research Methodology.
1.9 ETHICAL CONSIDERATIONS

It is prescribed in literature that designing a research project needs to include serious considerations of the ethical dimension (Babbie, 2011). Ethics in research refers to norms and standards of behaviours that guide moral choices about our behaviours and our relationships with others (Cooper & Schindler, 2006; Babbie, 2011). Prior participants granting them access to conduct research, researchers have to obtain formal Research Ethics Committee approval for their research proposal together with data collection methods (Saunders, Lewis & Thornhill, 2009).

For this study, a study questionnaire (cf Appendix A), ethical clearance forms from the participants, Tshwane University of Technology Faculty Research Ethics Committee (cf Appendix C), the Department of Health of the Limpopo Provincial government (cf Appendix D), Department of Health of the Sekhukhune District municipality (cf Appendix E), and sampled hospitals (cf Appendix F & G) consent were obtained prior to collection of study data. All aspects relating to ethical considerations are provided in the Research Methodologies Chapter (cf Chapter 3) and study conclusion chapter (cf Chapter 5).
1.10 CHAPTER OUTLINE

The study is divided into 5 chapters that relate to the phases of this study (cf figure 1). The chapter layout is illustrated on the Figure 1 below.

![Chapter Outline Diagram]

Figure 1: Chapter Outline

A detailed description of the chapters is given below:

**Chapter 1**: This provides the introduction, provides an overview of the research including the study scope and limitations, research objectives and questions, and study ethics.
Chapter 2: This gives an overview of e-health and its related solutions and their impact in South African is provided. The User Resistance Model, its constructs, and relevance to the study is discussed in this chapter.

Chapter 3: Describes the Research Methodology, contains a description of the research methods and design, used during the research, including the study approach, data-gathering instruments and sample size.

Chapter 4: The chapter presents the Demographic Research Setting, introduces the hospitals selected for the study and projects information about the province, and district where the hospitals are located.

Chapter 5: Presents the discussion of the findings of the study and recommendations. The three study questions are also projected. Applicability of the User Resistance Model is described and presented in this chapter. Applicability of the User Resistance Model is described and presented in this chapter. Summary and conclusion, the contribution of the dissertation from the perspective of the research questions is discussed. The chapter concludes with a summary of the findings of this research, including the recommendations to the participating hospitals, an overview of its contribution and, finally, guides on avenues for possible research that were identified during the study.

1.11 CHAPTER SUMMARY

The study was introduced in this chapter by giving a clear background and introducing the key area of focus, e-health, the background about it and its challenges. The chapter further introduced the problem focus which makes the topic of e-health relevant for the study. Objectives and questions of the study were introduced to give more meaning and understanding.

The importance and limitations of the study summarily discussed including what was covered and why was it necessary that such was covered. The research methodology of the study was summarised to give a clearer understanding of how the researcher conducted the study. Furthermore, the summary of the ethics observed during the study were highlighted. Finally, the chapter gives a summary of how the report is structured.
2 CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

The previous chapter made a broader introduction of the study, where the study background, problem statement, the research questions and objectives where outlined. The chapter further covered the scope and gave the outline and presented the implemented methods which were used in this study to enable the achievement of the objectives and answering the questions of the study. This chapter presents a literature review for this study. Webster and Watson (2002) assert that a review of prior, relevant literature is an essential feature of any academic project as it creates a firm foundation for advancing knowledge; and facilitates theory development, closes areas where a plethora of research exists, and uncovers areas where research is needed. A literature review is an analysis and synthesis of research sources to generate a picture of what is already known about a particular phenomenon or situation and identifying the knowledge gaps that exist in that situation (Burns and Grove, 2003). According to Hart (1998) the literature review needs to answer critical questions to ensure that the relevant information related to the study has been reviewed.

In this chapter, critical analysis of literature on studies which were carried out in the fields of e-health and user resistance is reviewed. The purpose of this study is to identify the factors contributing towards user resistance to e-health in Limpopo public hospitals. The study identified a research problem which indicates that prior research on e-Health use is predominantly focused on acceptance of the systems and readiness, thus existing knowledge about healthcare professionals’ resistance to e-Health is scant.

The chapter introduces the definition of e-health, its technologies, advantages and notions, and discusses how these can be used to give advantage to modern day businesses. Furthermore; the terms such as e-health, m-health, telemedicine, and Health Information System; and their advantages towards provision of healthcare services in public hospitals were identified and discussed. Lastly, the chapter introduces the underpinning theory/model of the study, the user resistance model and discusses each of the constructs of the model. The South African healthcare sector is structured as follows:

- National Department of Health
- Provincial Department of Health
- District
The public health sector in South Africa

The South African public healthcare is categorized into four levels:

- Primary/Level 1 – basic health services. This level includes clinics.
- Secondary/Level 2 – specialization in certain areas. This level includes District Hospitals
- Tertiary/Level 3 – specialists and sub-specialists). This level includes Academic Hospitals
- Quaternary/Level 4 – highly-specialized and sub-specialized

2.2 ICT IN HEALTHCARE

E-health Strategy South Africa (2012) indicates that its aim is to support the strategic objectives of the Department of Health in a way that is comprehensive, pragmatic, and innovative as its definition of e-health is a broad domain which includes m-health, telemedicine, and all Information and Communication Technologies (ICT’s) used to promote, support and strengthen healthcare.

According to Asangansi et al (2006), the revolution of ICT has greatly affected the healthcare sector by providing solutions that can enhance information access, storage, retrieval and analysis, and dissemination of accurate medical history.

Research in information systems shows that IT has a great potential to significantly improve access to service delivery on healthcare by lowering costs, and streamlining operational efficiencies in the health sector (Cline & Luiz, 2013). Health strategies in many countries show that most countries are moving towards e-Health (Kleynhans, 2011); and e-Health has become an important tool for healthcare service delivery (Tang & Lansky, 2005).

2.2.1 ICT Applications

The eHealth Strategy South Africa (2012), defines e-health, a broad domain which includes mobile health (m-health), telemedicine, health information system (HIS), and all information communication technologies (ICTs) used to promote, support and strengthen healthcare. Some of the commonly known e-health types are explained below:
2.2.1.1 **Electronic Health Record (EHR)**

Hoerbst and Ammenwerth (2010) describes EHR as the concept of a comprehensive, cross-in-situational, and longitudinal collection of a patient’s health and healthcare data which includes not only particular data relevant to a particular subject’s medical treatment, but also to a subject’s health in general.

2.2.1.2 **Health Information Systems (HIS)**

refers to the integrated systems for data collection, processing, reporting, and use of information necessary for improving health services effectiveness and efficiency, though better management at all levels of health services (Lippeveld, Sauerbron & Bodart, 2000). According to Sebetci (2018), the principal aims of HIS in academic research hospitals include enhancing personnel efficiency and patient care quality, eliminating iterate and unnecessary procedures, utilising computers in a variety of operations, producing information more efficiently through statistical and data mining techniques, creating hospitals with modern work methods, improving systems and standards, maintaining data communications among hospitals and medical centres, and improving overall public health.

2.2.1.3 **Mobile Health, also known as m-health**

Refers to the use of mobile technologies such as cell phones and wearables, to support public health and clinical care, which offers the ability to provide healthcare services and data through such devices (Kahn, Yang & Kahn, 2010). According to the National Development Plan (2012), mobile phones (m-health systems) can improve community-based data collection by professional teams, including community health workers, and make reliable data instantly available; and can assist with focusing access to digital information on web-based and mobile data entry and retrieval, linked to the existing district health information systems, which should be continuously and incrementally modernised.

2.2.1.4 **Personal Health Record (PHR)**

Is defined as “a set of computer-tools that allow people to access and coordinate their long health information and make appropriate parts available to those who need it”.

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• PHR refers to a repository of Personal Health Information (PHI) to be managed and accessed by a patient and others authorised by the patient (Kim & Kim 2010). Furthermore, Kim and Kim (2010) indicate that although PHR nowadays implies electronics, its original forms can either be paper-based or computerised.

2.2.1.5 Telemedicine

Jamal, Hussain, Zafar, and Malik (2007) define the term telemedicine as the use of electronic information and communication technologies to provide and support healthcare when distance separates the participants.

Based on the above definitions, it can be clearly concluded that technologies such as telemedicine, HIS, and mobile health; stores, retrieves and process EHR and personal health records (PHR). The e-health types can better be explained by the projection on Table 1 below:

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PURPOSE</th>
<th>ACCESS</th>
<th>ACCESSED BY:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIS</td>
<td>Capturing, storage and processing of EHR’s and PHR’s; and Reporting</td>
<td>Computers &amp; Laptops</td>
<td>Doctors, Nurses, Patients, Hospital Management, Department of Health, Pharmaceutical Department, Researchers</td>
</tr>
<tr>
<td>M-Health</td>
<td>Processing and display of EHR’s and PHR’s</td>
<td>Tablets &amp; Smartphones</td>
<td>Doctors, Nurses, Patients</td>
</tr>
<tr>
<td>Telemedicine</td>
<td>To facilitate and enable remote communication on HER’s and PHR’s between Doctors, Nurses, Patients and other stakeholders</td>
<td>E-mail, Fax, Telephone, Cell phone &amp; Fax</td>
<td>Doctors, Nurses, Patients, Pharmaceutical Department</td>
</tr>
</tbody>
</table>

Table 1: E-Health Types and Access

2.2.2 E-health Implementation in Public Hospitals

Kiberu (2016) indicates that Uganda has trialled several e-health solutions which were mostly donor funded, operated in silos and lacked sustainability. Furthermore, Kiberu (2016) argues that although conducting e-readiness assessment for an e-health system before implementation may save time, money and energy, there is no evidence of in the literature of a holistic e-Health Readiness Assessment having taken place in any of the existing projects prior to implementation.
The National Development Plan (2012) provision for Goal 6 towards Vision 2030 which focuses on access to infrastructure backlogs, including making more use of information communication technology (ICT).

According to the Auditor-General South Africa (2013), the department of health of Limpopo provincial government embarked on a multi-year programme to implement Provincial Health Information Systems (PHIS) in hospital across Limpopo since 1997 with considerable amounts of money already spent on the project. The Auditor-General South Africa (2013), further highlights multiple challenges of implementing the PHIS which includes insufficient planning and lack of skills, capacity; and adequate budget for infrastructure upgrades, amongst others.

According to Ruxwana, Herselman, and Conradie (2010), more effective use of ICT’s as part of e-health initiatives at the rural healthcare centres was seen to be distinctly possible, but only if perceived shortcomings with regards to structural variables such as better access to more facilities, more health-related information made available via ICT’s, ongoing ICT skills training programs and policies for improved technology maintenance and support, were addressed.

2.3 E-HEALTH CONCEPTS / NOTIONS

E-health is the general term used to subsume the use of modern communication infrastructures and systems in medicine and the ubiquitous provision of health care services. Eysenbach (2001) defines e-health as an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. The term characterises not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve healthcare locally, regionally, and worldwide by using information and communication technology (Eysenbach, 2001).

E-Health, as defined by the eHealth Strategy South Africa (2012) is a broad domain which, as seen above, includes mobile Health, telemedicine, health information system, and all information communication technologies (ICTs) used to promote, support and strengthen healthcare. According to Ruxwana (2010), implementation of e-Health solutions usually occurs in developed countries with a limited scope of implementation in developing countries.
Furthermore, Ruxwana (2010) argues that literature informs that this is due to challenges linked to the digital divide. Figure 2 projects the e-health components model.

![Figure 2: Model of e-health components (Source: Adebesin, Foster & van Greunen, 2013)](image)

Ruxwana (2010), is of the view that it is evident the key elements of e-health are to bridge the digital divide, to facilitate costs reduction and an enhanced quality of healthcare and to improve service delivery through appropriate use of ICT.

Considering the e-health components model as projected in Figure 3 above, it is visibly clear that success in the implementation of e-health requires coordination and buy-in by all key stakeholders. Accordingly, this research study adopts the definition of e-health which characterises e-health as the use of ICT’s to support, enhance and enable healthcare services by improving the quality of services in the sector, reduction of costs and improving the communication channels with patients to enable an inclusive decision making.

### 2.3.1 Definitions of E-health

The “e” in e-health does not only stand for “electronic”, but implies a number of other “e’s” such as efficiency, enhancing quality, evidence-based, empowerment, encouragement, education, enabling, extending, ethics and equity, which together perhaps best characterise what e-health is all about (Eysenbach, 2001).

E-Health implementation promises to bring about benefits to the healthcare sector. According to the World Health Organisation (2006), Electronic Health Records may include a whole range of data in comprehensive or in summary form, including demographics, medical history, medication and allergies, immunization status, laboratory test results, radiology images, and billing information. E-Health is being used in some parts of the world and has a potential to
increase care accessibility, improve care quality, reduce costs, and enhance patient and provider satisfaction (Kvedar, Coye, & Everett, 2014).

Adebesin, Foster and Van Greunen (2013) declare that e-health offers many benefits to healthcare consumers by facilitating access to quality healthcare services especially in rural areas, and to healthcare providers by supporting informed decision making through availability of more accurate health information and access to medical knowledge databases and best practices. This will also assist managers and policy makers to have access to more accurate and reliable information upon which healthcare decisions are made.

Having observed from the above, various ICT’s implemented in the health sector are called e-Health. SAHR et al. (2011) indicate that South Africa has made many improvements in instituting an application of health information systems after 1994. The e-health Strategy South Africa (2012) outlines ten strategic priorities, which should be addressed to support health transformation in South Africa, for successful application of e-health, which should be implemented by 2017. The priorities are outlines as follows:

- Strategy and leadership
- Stakeholder engagement
- Standards and interoperability
- Governance and legislation
- Investments, affordability and sustainability
- Benefits realisation
- Capacity and workforce
- E-health foundations
- Applications and tools to ensure the healthcare delivery, and
- Monitoring and evaluation of the e-health strategy

Many different points of view exist in introducing and implementing Information Systems. Lawson-Body et al. (2011). Nuss (2004) defines IT project failure as any project, initiated or implemented in order to enable or support the operations of an organisation by making use of IT methods, processes and structures, which within reasonable margins they fail to deliver the intended results of the originally allocated financial resource at that particular time and for certain specification.

Despite the promise of e-Health to improve delivery of services in the health sector, its introduction faces multiple challenges that might lead to a total failure of the project. According
to literature, as identified and summarised by Cherry, Ford and Peterson (2005); costs, resistance by medical professional, disruption of current clinical routine, and lack of documentation standards are some of the primary barriers to e-Health implementation.

Rossouw and Alexandra (2015) argue that most researchers adopting every perspective of implementing Information Systems identify issues and factors related to people as being fundamental and user resistance has been identified as a major obstacle to the success of systems implementations. Borman and Jansen (2013) mention that as part of these efforts, the major challenges, related factors, constructs, and determinants that lead to user resistance to IT systems need to be identified to enable IS and other managers to introduce change as effectively as possible.

According to literature, World Health Organisation (2006), the list of observed above implementation of IT systems mostly fail because of resistance by targeted users. This presents a challenge that could result in the project failing. The problem of projects failing has been a challenging issue to IT professionals for quite some time. Despite the developments in ICTs to enhance the manner in which business and sectors conduct their businesses, an average of 29% of IT projects were successful globally in 2004 (Standish Group, 2004) compared to only 16.2% for in 2014 (Standish Group, 2014).

Borman and Jansen (2013) propose that individual issues should be considered as being separate from process issues, project issues, and other universal issues, but all these views contribute to the factors that are critical for individuals choosing to accept or resist the implementation of technology systems. The problem identified in this study is that although prior research on e-Health use is predominantly focused on acceptance of the systems and readiness, existing knowledge about healthcare professionals’ resistance to e-Health is scant. Anderson (2010) states that South African hospitals spent huge budgets on procurement and implementation of e-Health systems but the healthcare professionals do not use them. Due to the fact that the decision of whether to use or resist usage of technology systems is of the targeted system users (Brailer & Terasawa, 2003), understanding factors that influence their choice to resist usage of such systems is therefore fundamental.

In addition, the major investments of ICT’s in organisations, the effect of e-Health on healthcare sector, the importance of understanding factors influencing user resistance to e-Health, and the importance of medical professionals in the success of e-Health implementation, have a major influence on the study.
2.4 USER RESISTANCE

To understand resistance one needs to consider the phase beyond initial acceptance and consider factors influencing post-adoption behaviour, including resistance (Jasperson, Carter & Zmud, 2005; and Pollard, 2003). According to Rosen (2005), a common research assumption is that the same variables that help explain acceptance will also explain rejection. However, Rosen (2005) argues that factors that cause resistance and rejection are not simply the negative side of the factors that lead to acceptance. Rosen (2005) found that many factors for resistance fell outside the scope of the Unified Theory of Acceptance and Use of Technology (UTAUT) model, which is widely used to measure user acceptance.

Rosen (2005) argues that since the reasons for resistance are often different from the reasons from acceptance, it is short-sighted for managers to only focus on the usefulness and ease-of-use of any system. People are fundamental and have been identified as a major obstacle to the success of information systems implementations, especially resistance by healthcare professionals on e-Health implementation (Rossouw & Alexandra, 2015). As part of the efforts to understand this problem, the major challenges, related factors, constructs, and determinants that lead to user resistance to e-health need to be identified to enable e-health practitioners and other managers to introduce change as effectively as possible (Borman & Jansen, 2013). Therefore, it is important to identify the major factors, constructs, and determinants influencing healthcare professionals’ resistance to e-health.

Interaction between humans and computers is affected by quite a number of human factors and characteristics, and as a result studies have come up with theories and models to investigate factors that influence humans to use computers and its applications (Whitley, 1997). The design, development and acceptance of information technologies have received substantial attention in the past few decades. Many theoretical models have been proposed to give explanations to end users’ resistance behaviour towards information systems.

One such model that needs to be considered when dealing with introduction of information systems, is the User Resistance Theory that seeks to understand the behaviour of people resisting change. The issue of user resistance in Information Systems is legendary (Hirschheim and Newman, 1998). Markus (1983) identifies that the three perspectives of examining user resistance are system-oriented, people-oriented and interaction-oriented. Because user resistance theory/model (URT/M) was used in this study, several studies looking
at its use in systems implementation are considered. Lin (1994) also argues that the user problems may be caused by a variety of factors including ease-of-use and previous system experience. The author further indicates that factors affecting organisational dimension include culture and power, while job threatening dimension includes issues such as loss of status, loss of power and change in job status.

This study adapted the User Resistance Model as adapted by Lin (1994) further refined by Klaus and Blanton (2010), which has a goal to investigate the direct impact of contextual factors on user resistance, and explore the indirect impact of these factors through the intermediate variables on user resistance. Klaus and Blanton (2010) identified contextual factors such as technical, organisational, user, job threat, and user involvement as having a direct impact on user resistance for information systems projects.

Literature indicates that the system-oriented approach suggests that resistance by users occurs because of technology related factors which include interface, security and ease of use (Jiang, Muhanna & Klein, 2000). Hirschheim and Newman (1998) argue that organisation factors are increasing as causes of user resistance to information systems. The basic form of the User Resistance Model is depicted on Figure 3: User Resistance Model (cf Figure 3, p.20).

2.4.1 Resistance Oriented Challenges on E-Health

Due to the fact that the decision of whether to use or resist usage of technology is the decision of the targeted users of the information systems (Brailer and Terasawa, 2003), understanding factors that influence their choice to resist usage of such systems is therefore fundamental. Due to the fact that people are fundamental and have been identified as a major obstacle to the success of information systems implementations, especially resistance by healthcare professionals on e-Health implementation (Rossouw & Alexandra, 2015); as part of the efforts to understand this problem, the major challenges, related factors, constructs, and determinants leading to user resistance to e-health need to be identified to enable e-health practitioners and other managers to introduce change as effectively as possible (Borman & Jansen, 2013).

According to literature, as identified and summarised by Cherry, Ford and Peterson (2009); costs, resistance by medical professionals, disruption of current clinical routine, and lack of documentation standards are some of the primary barriers to e-Health implementation.
Rossouw and Alexandra (2015) argue that most researchers adopting every perspective of implementing Information Systems identify issues and factors related to people as being fundamental and user resistance has been identified as a major obstacle to the success of systems implementations. Borman and Jansen (2013) mention that as part of these efforts, the major challenges, related factors, constructs, and determinants that lead to user resistance to IT systems need to be identified to enable IS and other managers to introduce change as effectively as possible.

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2.4.2 User Resistance Model (URM)

Mostly, literature presents much information on acceptance of systems based on the perceived ease-of-use and perceived usefulness. The main purpose of the URM is to investigate the direct impact of contextual factors on user resistance, and explore the indirect impact of these factors through the intermediate variables on user resistance. This section of the study depicts the research model supported by the Theoretical Framework as found in literature. In order to analyse the impact of this model to the study, only relevant constructs of the model are discussed in this section. Figure 3 presents the User Acceptance Model of research and describes the relation of key constructs in terms of usage intention and behaviour.

![Diagram of User Resistance Model (Source: Klaus & Blantom, 2010)](image)

2.4.2.1 Technical Factors

Markus (1983), asserts that system oriented approach could cause resistance when technology related factors such as user interface performance, security, and ease of user are overlooked when implementing the system. In addition, Markus (1983) indicates that if the system reacts two slowly, crashes frequently, is unavailable at critical times, has data quality issues, or the quality of output information is not valid, such could generate negative attitude towards new technology, which in turn can lower usability. Klaus and Blanton (2010) seem to agree with Markus in that they indicate that system issues such as bugs in the system, features that do not work right, system which is difficult to access, poorly designed user interface or interface that lacks logic or intuition all lead to user resisting the system.
2.4.2.2 Organisational Factors

Klaus and Blanton (2010) indicate that organisational factors such as organisational culture which is not conducive to change, problems in communication channels with users, and training which does not meet organisational needs, are greatest contributors to user resistance. Furthermore, apart from its direct effect, organisational support for change may indirectly lower user resistance by lowering the perception of switching costs (Kim & Kankanhalli, 2009).

2.4.2.3 Users’ Factors

People oriented approach suggest that user resistance occurs because of individual or group factors such as background, traits, attitudes and experience towards technology (Markus, 1983). This further suggests that, individual's level of interaction with new IT systems is based on internal and external factors, which in turn directly impact the level of IT usage. According to Ali et al. (2016), users frequently become accustomed to the system they have been using for years and do not understand the business needs of new advanced systems and therefore resist them. Ali et al. (2016) further indicate that people oriented factors also relate to the required skills a user must have to qualify for the job and the changes introduced by new technology. This suggests that people always worry about change brought by new systems and processes. Accordingly, Klaus and Blanton (2010), are of the opinion that users’ factors contributing towards resistance occur when users are uncertain about the new system, feel not skilled enough to use the system, lack confidence using the new system, feel threatened that the system will replace them, or lack do not understand how the system will assist them perform their duties.

2.4.2.4 Job Threatening Factors

Klaus and Blanton (2010), are of the view that IT-enable change that requires new process that change the jobs of employees often require new skills and such is change influence the psychological contract. However, and if the change is not what is expected by the users, they may consider such a change as a control breach (Klaus & Blanton, 2010). In addition, Klaus and Blanton (2010), mention that workload or lack of fitness to operate the new system may facilitate user resistance the system.
2.4.2.5 User Involvement Factors

Klaus and Blanton (2010) maintain that when users are of the view that their opinions regarding the system are not considered, then such will lead into them not using the system.

2.5 CHAPTER SUMMARY

Extensive literature discussing user resistance was discussed in this chapter. The chapter introduced the topic of e-health, by focusing its definition and projecting related constructs to enable further understanding of the concept. In addition, examples of e-health were given in this chapter. This chapter discussed some of the factors contributing towards IT systems failure and highlighted user resistance as one of those factors. Lastly, the chapter presented the user resistance model and discussed the factors of the model. Next chapter presents the methodology used in the study.
3 CHAPTER 3: RESEARCH METHODOLOGY

3.1 INTRODUCTION

The previous chapter, Chapter 2, discussed literature around the issues of user resistance, particularly on e-health in the world. The user resistance model was also introduced in Chapter 2. This chapter discusses the design and methodology which were adopted to investigate the contributing towards user resistance on e-health in Limpopo public hospitals as outlined in Chapter 1. A review exercise on existing literature for this study was conducted to establish the extent which the topic of user resistance on e-health was discussed and published in academic literature in contribution to the existing body of knowledge. Although focus was more on Limpopo public healthcare, literature covering the topic internationally and nationally was observed.

This chapter discusses and outlines the research the methodology, philosophy, approach, comparison between qualitative and quantitative research method, research strategy, data collection instruments, research paradigm, target population and data analysis.

Several research methods applied in conducting scientific research exists. Relevant methodologies are developed in order to assist in investigating the levels of user resistance on e-health in public healthcare. The research methodology was used as an instrumental when answering study questions as stated in Chapter 1. The selected research methodology should be appropriate in incorporating the systematic and theoretical hypothesis. Yin (2009) mentions that systematic and theoretical hypothesis direct the study and also influence reliable methods employed in investigating a problem.

The research onion is ideal for identifying the systematic and theoretical hypothesis of the study (Saunders, Lewis & Thornhill, 2009). According to Saunders, Lewis and Thornhill (2009), the layers of the onion could assist the researcher by guiding how concluding components (the inner part of research onion) could be applied in relation to other design components (the out layers of the research onion).

Adopting the model by Saunders, Lewis and Thornhill (2009) Figure 4 below illustrates contents of the research onion layers for this study.
Saunders and Thornhill (2012) define research methodology as a scientific process by which an individual's knowledge in a particular field is expanded. Research is conducted by exploring a phenomenon to increase knowledge (Kumar, Cheng, & Mcgibbney, 2010).

### 3.1.1 Philosophy

Burton and Bartlett (2009) points out that research philosophy is sustained by the application of paradigms in setting the purpose of the study, and the expectations for the research study. Yin (2009) defines research paradigm as a comprehensive acceptance system or structure that guides the research and practice in a certain way. Yin (2009) also states that positivism, Interpretivism and pragmatism are different paradigms which exist in research. In information systems research, the most common research paradigms used are Positivism and Interpretivism (Creswell, 2007).

For the purpose of this study an Interpretivism paradigm was applied. Interpretivism asserts that only through the subjective interpretation of an intervention in reality can that reality be fully understood. In this study the Interpretivism paradigm was used to identify the user resistance of healthcare professionals on e-health solutions and to identify the factors that contribute to the resistance behaviour. As a result, the research approach for this study is a qualitative approach.
3.1.2 Approach

Research can be conducted through three different methods; qualitative, quantitative or mixed methods (Leedy & Ormord, 2005). Creswell (2007) mentions that quantitative research, which focuses on data in numbers, is the first kind of research; and the second kind is qualitative research, which seeks to understand the real life setting. Qualitative research was adopted as it studies things in their natural settings, attempting to make sense of, or interpret phenomena in terms of the meanings people attach to them (Denzin and Lincoln, 2011).

Kumar, Cheng, and Mcgibbney (2010) state that a methodology is required in order to gather facts and results methodically to an enquiry which is undertaken within a framework of a set of philosophies or approaches. Only 2 research methods, qualitative and quantitative, are identifiable and recognised in literature. In this study, the researcher used qualitative method of research.

The main reason for using qualitative research methodology is that it explores information in the form of quality, such as explanations, descriptions and narratives (Fidel, 2008 and Gorman & Clayton, 1997). During data collection, the qualitative research method presents participants with opportunities to give their thoughts, interpretations and understand by describing and explaining the situation in their environment.

By design, a qualitative research study does not lead the researcher to statistical results or procedure but the findings related rather to lives, experience, behaviour, emotions and feelings organisational functioning and social movement, and still some of the information would be used for statistical purposes bases on census and background (Strauss and Corbin 1998). Creswell 1994 states that the qualitative method is easy to use in order to view the experience of the participants about the condition or problem being studied to explore the reasons for their kind of responses to the situation.

3.1.3 Strategy

For this study, qualitative research approach was adopted; within a case study design strategy. Case studies are defined as empirical investigations that consider recent phenomena within its unique context (Creswell, 2007). Yin (2009) also agrees and states that case studies focus on the generation of rich, in-depth descriptions of complex issues by using multiple sources of evidence, as opposed to other research strategies. Yin (2009) indicates that case
studies can be single or multiple-case. For this study, a multi case study approach was employed for an in-depth understanding the user resistance behaviour in e-Health implementation in Limpopo hospitals. The multi case study was chosen as it allowed the researcher to analyse the data within each situation and across different situations. Multiple cases were studied to understand similarities and differences between the two cases independently.

According to Babbie (2005), in order to develop a full understanding of a phenomenon, field research observes the phenomenon being studied in its natural environment, as completely as possible, in a participatory fashion and over a period of time. This study adopted a strategy which would make it possible to achieve the goals of this study. During this study, data was collected from multiple research settings to make sense of the participant’s view on the factors contributing towards user resistance.

3.1.4 Time Horizon

The time horizon for this study was cross-sectional. This means data was collected in multiple locations at one time. Cross-sectional studies require data to be collection in multiple settings at a same period without making any follow ups. The cross-sectional time horizon was employed in the study by visiting the participating hospitals in difference dates and times.

3.1.5 Data Collection Methods

Data collection is the precise and systematic gathering of the particular information needed to address a research problem. Literature guides that the method used for data collection must be relevant to the research purpose in order to address specific objectives and answer specific questions (Burns & Grove, 2005; Pilot et al., 2001). Having considered the literature above, data collection can therefore be classified as a critical process of gathering data and information from various sources to answer the research question.

The objective of this study is to identify factors contributing towards user resistance on e-health in Limpopo public hospitals. The study adapted the User Resistance Theory/Model (URT/M). The study used structured questionnaire as a tool for collecting data and information to be investigated. In addition to the questionnaire, semi-structured interviews were used to validate some of the constructs in the interviews and get a context to which some questions of the questionnaire were answered.
3.1.5.1 Questionnaire

According to Oliver (2004), a questionnaire is a technique that is used to collect data and follows a list of structured questions expected to be completed by participants. Oates (2008) defines a questionnaire as a set of predefined questions assembled in a specific order. A questionnaire was used in this study to provide evidence of patterns amongst larger sample to aid content analysis in line with the research model. The questionnaires were hand delivered and collected from the participants by the researcher.

The Questionnaire (cf. Appendix A) consisted of main topics, which were designed to obtain information about the manner in which user resistance on e-health is measured during acquisition and usage at the two public hospitals in the rural Limpopo province that had agreed to participate in the study. The topics were grouped into four sections (Section A – D) based on their categorisation and relationship. The topics are summarised as the table below (cf. Table 2).

<table>
<thead>
<tr>
<th>SECTION</th>
<th>TOPIC NO.</th>
<th>TOPIC NAME</th>
<th>OBJECTIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>Computer and e-health knowledge and experience</td>
<td>Computer and e-health knowledge and experience</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Technical Factors</td>
<td>Establish the level of resistance caused / influenced by technical issues within the system</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Organisational Factors</td>
<td>establish the level of organisational and political factors towards user resistance</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>User’s Factors</td>
<td>establish the level of resistance influence / caused by user’s problems</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Job Threatening Factors</td>
<td>establish job related factors that would cause the user to resist the new system</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>User Involvement Factors</td>
<td>establish the level of user resistance caused by the degree of participation in the systems development process or involvement in the decision making process</td>
</tr>
<tr>
<td>B</td>
<td>7</td>
<td>Overall usage and effectiveness of e-health</td>
<td>Measures participant’s rating on the level of resistance on e-health in the hospital they work in.</td>
</tr>
<tr>
<td>C</td>
<td>8</td>
<td>Participants demographics</td>
<td>Understand the roles of the participants and their demographic information.</td>
</tr>
</tbody>
</table>

Table 2: Summary of Questionnaire Topics
3.1.5.2 Interviews

Literature defines interview as a data collection technique that includes gathering information through verbal communication (Moule & Goodman, 2014). Furthermore, Moule and Goodman (2014) mention that interviews can be managed in a one-to-one situation, or groups over a face-to-face or telephone setting.

Semi-structured interviews were used to elicit the various user resistance behaviours and the respective factors that contribute to it as indicated by the User Resistance Theory which is underpinning this study as priori-themes as shown in the research model. The semi-structured interviews afford the researcher an opportunity to make follow up questions depending on the interviewee responses (Cooper and Schindler, 2006). The interviews were face-to-face scheduled for about 30 minutes conducted in the respective hospital boardrooms and offices. Five (5) participants were selected from each hospital, thus a total of 10 participants were interviewed. During the interview process, the researcher interviewed participants who meet the criteria for sampling, who were willing and accessible to be interviewed to avoid any form of underrepresentation of a particular group.

3.2 SAMPLE IDENTIFICATION AND SELECTION

3.2.1 Sample Design

When conducting research, it is important that you identify a sample population group. The population group is a collection of all elements, either known or unknown from which a sample is drawn. Gilliam (2000) argues that if the number of respondents or population is large, running into hundreds or even thousands, the only practicable way is to take a sample.

The main aim of a sample, as found in literature, is to construct a sub-set of the population (unit of analysis) which is a full representative of the whole population in the main areas of interest (Smith, Thorpe & Lowe, 1996). Creswell (2009) argues that the sample must be a generalizable representative of the greater population. For this study, the focus was on public hospitals in Limpopo Province of South Africa. Considering the nature of the problem, the study employed purposive sampling which involves the selection of the units to be observed on the basis of the researcher’s own judgment about which ones will be the most useful or representative (Babbie, 2005). The judgement was based on the role that involves the use of e-health in the job function and will include healthcare professionals such as doctors, nurses.
and administrative staff members from the two hospitals that have already implemented e-health solution.

3.2.2 Participants

The researcher set parameters in order to limit the target population through inclusion or eligibility criteria, which included gender, age, work experience, experience using computers, and department. According to Burns and Grove (2005), the notion of inclusion criteria refers to the characteristics that a participant must possess to be included in the sample. The inclusion criteria for participants in this study were:

- Two public hospitals in the Sekhukhune District municipality of the Limpopo Provincial Government were selected.
- Medical Officials – this included Nurses and Doctors
- Pharmaceutical staff
- Management and
- Administration Staff working on the admission desk for receiving all patients and opening patient files.

The total of 30 (N=15) participants were sampled for completion of the questionnaires and about 10 (N=5) participants were interviewed from the selected hospitals.

A total of 31 participants were sampled based on availability for this study as follows:

<table>
<thead>
<tr>
<th>Institution</th>
<th>Questionnaires</th>
<th>Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital 1</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>Hospital 2</td>
<td>17</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 3: Sampling of Participants

3.3 DATA ANALYSIS

This study applied qualitative data analysis, where Content Analysis was used. Content Analysis was applied to analyse qualitative data collected on interviews and questionnaires as one set. Content analysis examines the words and phrases within a wide range of texts, including interviews and informal conversations (Babbie & Mouton, 2001). This implied that, after the data is coded, themes, patterns, relationships and connections within and between categories were identified through the dimensions of the underpinning theory. The data analysis followed the approach as depicted on Figure 5 below:
3.4 LIMITATIONS OF METHODOLOGY

In order to fulfil the objectives of the study, the selection of the hospitals in Limpopo province was based on factors such as availability of e-health systems, location of the hospital, and approvals from all protocol as observed in this study. The questionnaire and interviews were used to get a clearer picture of the situation in terms of the resistance level according to the user resistance theory/model. The data analysis was aimed at identifying such factors contributing towards user resistance on e-health in the selected hospitals and did not evaluate a similar situation in another setting.

According to Leedy and Ormord (2013), it is important to know what the researcher does not intend to do or cover with the study, and this should be stated in the delimitations section of the study. This study only focused on two (2) public hospitals in the Limpopo province of South Africa. The study did not consider private hospitals and clinics. The study was designed to only focus on user resistance as a critical factor to cause failure to e-health systems being introduced or implemented.

3.5 ETHICAL CONSIDERATIONS

It is prescribed in literature that designing a research project needs to include serious considerations of the ethical dimension (Babbie, 2011). Ethics in research refer to norms and standards of behaviours that guide moral choices about peoples' behaviours and their relationships with others (Cooper & Schindler, 2006; Babbie, 2011). Prior to commencement of study data collection, ethical clearances and approvals were obtained from the Tshwane University of Technology Faculty Research Ethics and Innovations Committee (cf Appendix B and cf Appendix C); the Limpopo Provincial Government Department of Health (cf Appendix
D); Sekhukhune District Department of Health (cf Appendix E); and the two district hospitals, Philadelphia (cf Appendix F) and ST Rita's (cf Appendix G).

The ethical issues below, as identified in literature (Barbie, 2011) were considered and observed at all times during data collection. All participants were accordingly informed that:

- Participation in the study is voluntary and participants reserve the right to withdraw at any time.
- No harm, either intended or unintended, will be sustained by the participants, their families, or their homes.
- The collected data will be treated with confidentiality and the identity of the participating individuals will be anonymous.
- Consent of all participants is required prior to completion of the questionnaire and interviews.

Ethics in the health sector is an issue that is taken very serious. Stylianidis, Smagas and Andreou (2010) mention that limited attention is given to internationally accepted standardised codes of ethics and accepted rules of conduct regarding the acquisition, storage and handling of sensitive information such as personal medical data and digital images.

Prior to responding to the questionnaire, participants were advised to familiarise themselves with the information consent form in order to understand the ethics around it and decide whether to participate on the study or not. Participants were further asked to sign the consent form prior to completing the questionnaire or being interviewed. The participants who did not return and/or sign the questionnaire were perceived to refuse giving consent and were therefore not sampled for both the questionnaire and the interview.

Tamariz, Palacio, Robert, and Marcus (2013) encourage that researchers must obtain formal Research Ethics Committee consent for their proposed research; which must include data collection methods prior to institutions granting them access to conduct research.
3.6 CHAPTER SUMMARY

This chapter discussed the methodologies and research design used in this study and highlighted the process of eliciting appropriate information for fulfilling the goals of this study and answering all the research questions. This chapter further revealed that a qualitative method, using multiple cases was used during study data collection. Furthermore, this chapter discussed specific measures which were put in place to ensure that the research data were collected and interpreted accurately to improve reliability and validity of the study.

The chapter also discussed the project evolution where participants' confidential information, and unethical issues were avoided and the research conducted in such a manner that these issues were prevented from arising. Furthermore, this chapter provided a clear guideline showing how the analysis of the data was conducted, as discussed in cf Chapter 5. Lastly, this chapter gives a clear foundation for the conclusions and recommendations of the study, which are discussed in Chapter 5.
4 CHAPTER 4: RESEARCH FINDINGS

4.1 INTRODUCTION

The precious chapter introduced the research methods adopted for this study. This chapter projects the settings of the study where data was collected by giving an overview of the province, the district and the two hospitals which were sampled. Lastly, this chapter projects the demographic information or the subjects who participated in this study.

This chapter presents the findings, an analysis and interpretation of the data obtained by means of data collection instruments (questionnaires, interviews, and literature review) during this study. The data were analysed and interpreted to address the three research sub-questions (cf chapter 1), which assisted in answering the main research questions, resulting in establishing the strategies that can be used to counter the user resistance factors on e-health in Limpopo public hospitals.

4.2 OVERVIEW OF THE STUDY SETTINGS

4.2.1 Limpopo Province

Limpopo is the far northern inland province of the Republic of South Africa. By design, Limpopo, before the renaming, was called Northern Province. The province borders three (3) neighbouring countries of South Africa, namely: Mozambique to the east of the province, Zimbabwe to the north of the province and Botswana to the west of Limpopo. Within the borders of South African, Limpopo also borders three other provinces of the Republic of South Africa namely; North-west, Gauteng and Mpumalanga. By far, Limpopo is the most mountainous rural province of the country, with its capital city Polokwane.
Limpopo boosts an estimated population of 5.405 million according to the official 2011 Statistics South Africa (STATSSA) report. It is a province that spans about 125.754m² of land. Limpopo is a home for tourists’ attractions such as Kruger National Park, Madikwe Game Reserve, Mapungubwe Game Reserve, Bela-Bela and many others. Limpopo municipal districts are Vhembe, Capricorn, Waterberg, Mopani, and Sekhukhune.

The province’s economic climate has a lot of mining activities for platinum and chrome, amongst others. Limpopo currently has 3 universities (University of Limpopo, University of Venda and Tshwane University of Technology – Polokwane campus) within its borders.
4.2.2 Sekhukhune District Municipality

The Sekhukhune district municipality, where data was collected, is the southern municipal district of the province as projected on the figure 8.

Public hospitals were adopted as research locations for investigating factors contributing towards user resistance on e-health in the rural parts of Limpopo province of South Africa. The study selected public hospitals located under Sekhukhune district. The study focused on public hospitals in Limpopo province and selected hospitals from the Sekhukhune district. A total of 2 hospitals were sampled and a brief overview of each hospital is provided below. Figure 9 (cf p. 38) indicates the distance between ST Rita’s and Philadelphia hospitals as the hospitals sampled for this study in the Sekhukhune district municipality.
Figure 9: Distance between the 2 institutions (Source: Google)

4.2.3 Philadelphia Hospital

Figure 10: Services offered at the hospital

Philadelphia hospital is situated in the small town of Dennilton. Dennilton is a small town situated in Limpopo right on the border of Mpumalanga. The hospital is situated 2.6KM's
outside the Dennilton town CBD in Limpopo. Figure 11 indicates the distance between Dennilton town and Philadelphia hospital.

![Map showing the distance between Dennilton and Philadelphia hospitals](image)

**Figure 11: Distance from Dennilton CBD to Philadelphia Hospital (Source: Google)**

Philadelphia hospital serves the communities around the Dennilton area in Limpopo, including those of surrounding villages in Mpumalanga. For procedures that require high specialisation, the hospital refers its patients to Polokwane Mankweng Hospital Complex (PMHC) which is a Tertiary hospital in the province. The PMHC serves as a referral centre and provides services to all Level 1 (District) and Level 2 (Regional) Hospitals in the Limpopo Province. In return, the PMHC would refer patients requiring further specialisation to Dr George Mukhari Quaternary Hospital in Ga-Rankuwa. Ga-Rankuwa is located between the borders of Gauteng and North-west.

According to the information collected at the hospital during questionnaire distribution and interviews, the hospital uses:

- District Health Information System (DHIS) used for collection of patients’ information and reporting to the District and Provincial Health Departments. This system is used by the Information Officer.
- e-his, introduced in 2006, for admission and registration of patients
- e-ba, links to e-his with file number, for billing of patients.
Paper based forms are completed by Doctors refer to patients to another hospital. It is understood that e-his systems in different hospitals maintain a patient ID for transfer of information, however, when a patient is transferred, the patient information is recaptured at the receiving hospital. This requires that a new patient ID is generated by the e-his of the receiving hospital. A new health record and file is then created and stored in a paper format. For returning patients, information such as ID number, name and surname is required for capturing into e-his. The e-his system will then point to the paper file location for retrieval. Paper based prescriptions sheets are completed by Doctors and send to the Pharmacy. The Pharmacy receives the prescription paper and captures the details of the patient and medication into the PDSX system. Medication is then dispensed and the manual prescription is then filed in the pharmacy. The CEO and Clinical Manager are not using any kind of e-health system. Medical staff, Doctors and Nurses are not using any kind of e-health system on the wards.

The hospital data network is connected to the department of health in the district through SITA network. The connection is for internet and e-mail which are used by management and support functions such as HR, IT, CEO, etc. The information Officer uses paper based data collection tools to get information from e-his and e-ba. Such information is captured into DHIS to produce reports which are submitted to the District, Province and National Departments of Health. A new web-based DHIS is being implemented nationally. Other provinces are currently implementing the new DHIS, however, Limpopo province is lacking behind on the adoption of the web-based DHIS due to training that is yet to be provided and old computer technology within the province, amongst other reasons. Most computers in the hospital run on the old Microsoft Windows XP and 7 Operating systems, which were both discontinued by Microsoft. It is envisaged that a refresh of the computers in the hospital is required before adoption of the web-based DHIS.

In conclusion, the e-health systems used in the hospital, e-his, DHIS, e-ba, and PDSX are operating in silos. The information sharing between such systems does not assist administration in creating a user experience that improves service delivery. The automated processes are duplicated by paper-based processes. Key operations of the hospital do not have any kind of e-health which means their processes are paper-based. The implication of this being duplication of processes resulting in compromise to service delivery.
4.2.4 ST Rita’s Hospital

ST Rita’s hospital is situated at the Glen Cowie village next to Jane Furse town in Limpopo. ST Rita’s is located 97.3 KM’s on the eastern side of Philadelphia hospital. The hospital serves villages and communities surrounding Jane Furse town. Figure 13 indicates the distance between Jane Furse town and ST Rita’s hospital in Glen Cowie village.

Figure 12: Service offered at ST Rita’s Hospital

Figure 13: Distance from Jane Furse CBD to ST Rita’s Hospital
Just like in the case of Philadelphia hospital, for procedures which require high specialisation, the ST Rita’s hospital refers its patients to Polokwane Mankweng Hospital Complex (PMHC) which is Tertiary hospital in the province. The PMHC serves as a referral centre and provides services to all Level 1 (District) and Level 2 (Regional) Hospitals in the Limpopo Province. In return, the PMHC refers patients requiring further specialisation to Dr George Mukhari Quaternary Hospital in Ga-Rankuwa. Ga-Rankuwa is located between the borders of Gauteng and North-west.

The hospital boasts of a staff compliment of 744 with core function of 481 staff and support function of 263. Core staff includes Dentists, Doctors, Nurses, Psychologists, and Therapists. The hospitals e-health systems are as follows:

- e-his used for patients’ admissions together with ward clerks to maintain and update patients’ information
- RX system used by Pharmacists for maintenance of medication
- DHIS used by IT officials for reporting. The officials print manual reports from e-his and manually capture into DHIS to create stats and reports. Due to poor system performance and lack of support, the e-his system is only used by Administration staff for admission of patients. Furthermore, ward clerks also use the system for patients’ admissions into specific wards and discharge of patients, and transfer of patients to the other department of the hospital. The hospital has a network which connects to the SITA network for e-mails and internet connectivity with limited bandwidth.

Filing patient’s records is done manually through paper-based files. Retrieval of patients files requires signing for the specific file, which the records management officer will retrieve and handover. Admin Clerks have unlimited access into the filing area for patients’ files. Average waiting time for returning patients is one (1) hour as retrieval of files could take up to 30 minutes. A web-based DHIS is being rolled out. However, training has only been attended by the IT official. It is not known whether the system will include automation processes in other departments or it will only take the current DHIS functionality and make it available through the web.

In conclusion, usage of e-health in ST Rita’s hospital is limited to certain departments. The core functions of the hospital remain highly manual. The systems are also not assisting the hospital in ensuring that the processes of transferring patients to other hospitals are improved.
4.3 DEMOGRAPHICS OF PARTICIPANTS

The approved questionnaire for this study, which was distributed to participants for data collection, had four sections, with Section A analysing computer and e-health knowledge and experience of each participant; Section B analysing perception and feeling of each participant about user resistance focusing on the evaluation of technical, organisational, users’, job threatening, and user involvement factors; Section C analysing participant’s analysis of overall usage and effectiveness of e-health at the institution; and Section D projecting demographics of the participants.

As indicated above, the demographics section of the questionnaire was the very last to be answered because it only deals with secondary data which was used to aggregate the collected data from each participant. The profile of the demographics is discussed in this section of the report. Out of a total of 31 participants sampled for the study, gender figures presented more females at 61% than males at 39% (See figure 14 below):

![Figure 14: Representation of Participants by Gender](image)

Furthermore, most of the staff is between 21 and 30 at 48%, followed by 29% of age group of 31 and 40 years, 13% percent of the sampled population was between the ages 41 – 50, whereas only 10% was above 50 years old. None of the sampled population was below 20. Combined, 77% of the sampled population was between 21 & 40 years of age indicating a vast majority of the workforce in the sampled hospitals is young (See figure 15 below).
In addition to the age of the workforce, the majority of the workforce has not been working for a long time (cf figure 16). 48% of the sampled workforce has not been working for more than 5 years. This percentage is the same as the workforce for ages between 21 and 30. The similar comparison goes for workforce with a working experience of between 6 and 10 years at 29%. Combined, the 2 categories account to a total of 77%. These are followed by the category of between 16 and 20 years at 16%, 11 and 15 at 7% and above 20 years’ experience at 3%.

A large number of the study participants work in the core medical department of the hospitals at 55% (cf figure 17). Medical department includes Nurses and Doctors. This was follows by the Administration department at 19%, Pharmaceutical at 16% and Management at 10%.
This chapter provided the overview of the study settings and thus gave a foundation for the study findings discussion and analysis as presented in Chapter 5.

4.4 ADDRESSING THE RESEARCH QUESTION

The main research question addressed during the study is as follows:

What are the factors contributing towards user resistance to e-health in Limpopo public hospitals?

In order for the collection instruments to be effective, the main research question was broken down into sub-questions and different measuring instruments were applied. As discussed in Research Methodology (*cf* chapter 3), the study took a form of a case study which was chosen because it allows an in-depth research on the subject. Table 4 gives the synopsis of the sub-questions and the data collection instruments used to answer the sub-questions.
What are the existing user resistance behaviours on e-health in the hospitals?

What are the contextual factors contributing to user resistance behaviour on e-health in the hospitals?

What strategies can be used to counter the user resistance on e-health in public hospitals?

**Table 4: Data Collection instruments used to answer study sub-questions**

The following section discusses the study findings obtained by means of the data collection instruments used, namely the questionnaire, interviews, and literature reviews.

**4.5 RESEARCH FINDINGS**

The following sub-sections discusses the study findings in relations to the study sub-questions.

**4.5.1 First Research Question**

The purpose of this study sub-question is to investigate the existence of user resistance behaviours and in the participating organisations (public hospitals).

The data collection method used to answer this sub-question was the questionnaire (*cf* Appendix A) as per the above table (*cf* Table 4). A detailed discussion of the findings relating to the first study sub-question is provided below, by analysing the data collected through questionnaires.
The study questionnaire (cf Appendix A) was completed by 31 participants, which are the total participants of the study. Section 3.2.1.5 provides an overview of the questionnaire structure. In this section, feedback is given on specific sections of the questionnaire which answer the first research sub-question. The detailed study questionnaire is available in Appendix A. The questionnaire (cf Appendix A) consisted of 8 main topics, designed to obtain information about the existing user resistance behaviours on e-health acquisitions and usage at the two selected hospitals in the rural Limpopo Province which were chosen for the study. The topics were grouped into four sections (Section A – D) based on their categorisation and relationship.

The results of Section C (cf Section 3.2.1.5, cf Topic 7) reveal that the level of usage and effectiveness of e-health in the institutions is minimum; i.e. there is really low resistance from different employee categories at the hospitals. Topic 7 results are project on Figure 18 below.

![Figure 18: e-health usage and effectiveness](image)

4.5.1.1 Questionnaire Design

Section B of the questionnaire on technical factors, organisational factors, user’s factors, job threatening factors, and user involvement factors (topics 2 – 6) were used to answer the first study sub-question. The overall feedback on overall usage and effectiveness of e-health (topic 7) will be discussed later on. The following tables (Table 5 – 9) present questions asked
relating to technical factors, organisational factors, user’s factors, job threatening factors, and user involvement factors (topics 2 – 6).

<table>
<thead>
<tr>
<th>Statement no.</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The system is unfriendly and difficult to use</td>
</tr>
<tr>
<td>2</td>
<td>When a system is not delivered on time and within budget, I develop negative feelings about it</td>
</tr>
<tr>
<td>3</td>
<td>I develop dissatisfaction about the system when it reacts too slow, crashes and unavailable when I need to use it</td>
</tr>
<tr>
<td>4</td>
<td>My bad experience with previous systems makes me have negative attitude towards the system</td>
</tr>
<tr>
<td>5</td>
<td>The inaccurate or incomplete data in the system makes me not to use the system</td>
</tr>
<tr>
<td>6</td>
<td>The quality of information produced by the system drives my appetite to use the system</td>
</tr>
<tr>
<td>7</td>
<td>The quality of service and support provided by IT is a major factor contributing towards my willingness to use the system</td>
</tr>
</tbody>
</table>

**Table 5: Technical Factors Questions**

<table>
<thead>
<tr>
<th>Statement no.</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The hospital climate is hostile and makes it difficult for me to accept the change of implementing the e-health system</td>
</tr>
<tr>
<td>2</td>
<td>The hospital is willing to accommodate changes and ensure the e-health system is successful</td>
</tr>
<tr>
<td>3</td>
<td>The e-health system will result in redistribution or organisational power, control and introduce role changes</td>
</tr>
<tr>
<td>4</td>
<td>The system sometimes creates conflicts among each division’s goals and interests</td>
</tr>
</tbody>
</table>

**Table 6: Organisational Factors Questions**
<table>
<thead>
<tr>
<th>Statement no.</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Younger users understand the system and use it more than older users</td>
</tr>
<tr>
<td>2</td>
<td>Highly educated users are willing to accept the e-health system</td>
</tr>
<tr>
<td>3</td>
<td>I use the system successfully because I see a need for it</td>
</tr>
<tr>
<td>4</td>
<td>The hospital has more effective communication channels that lead to greater user acceptance of the system</td>
</tr>
<tr>
<td>5</td>
<td>The hospital has provided me adequate training to give me more comfort and easily accept the system</td>
</tr>
<tr>
<td>6</td>
<td>I believe that the system will contribute towards improving my performance</td>
</tr>
<tr>
<td>7</td>
<td>I am encouraged to accept and use the system because my performance reward is related to how I optimally use the system</td>
</tr>
<tr>
<td>8</td>
<td>I believe that I have control over the change to implement the system</td>
</tr>
</tbody>
</table>

**Table 7: Users’ Factors Questions**

<table>
<thead>
<tr>
<th>Statement no.</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The e-health system will make me loose status</td>
</tr>
<tr>
<td>2</td>
<td>The e-health system will create economic insecurity</td>
</tr>
<tr>
<td>3</td>
<td>The e-health system will alter interpersonal relationships</td>
</tr>
<tr>
<td>4</td>
<td>The e-health system will change my job content</td>
</tr>
<tr>
<td>5</td>
<td>The e-health system will make me loose power</td>
</tr>
<tr>
<td>6</td>
<td>The e-health system will create a change in the decision making approach</td>
</tr>
<tr>
<td>7</td>
<td>The e-health system will create uncertainty and unfamiliarity</td>
</tr>
</tbody>
</table>

**Table 8: Job Threatening Factors Questions**
<table>
<thead>
<tr>
<th>Statement no.</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I can fully accept the system is it meets mu requirements and expectations</td>
</tr>
<tr>
<td>2</td>
<td>I was involved during system implementation and gave inputs of my requirements</td>
</tr>
<tr>
<td>3</td>
<td>My input was requested but ignored</td>
</tr>
<tr>
<td>4</td>
<td>I had sign-off responsibilities at each stage in the system development stages</td>
</tr>
<tr>
<td>5</td>
<td>I was a design member of the system development group</td>
</tr>
</tbody>
</table>

Table 9: User Involvement Factors Questions

4.5.1.2 Questionnaire Findings

In this study, neutral is regarded as disagree. However, this could sometimes be as a result of users not having practical knowledge of the issues at hand as a result on them not using the system. Furthermore, any negative result beyond 60% was regarded as a major contributory factor which was further followed up through interviews for further understanding and to source the participants’ preferred solution.

<table>
<thead>
<tr>
<th>TOPIC NO.</th>
<th>TOPIC NAME</th>
<th>FINDINGS SUMMARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Technical Factors</td>
<td>The findings of the study indicate that the system is unfriendly and difficult to use (42% agree, 10% disagree while 48% neither agreed nor disagreed). This could be as a result of the users who are not using the system. The participants indicated that they do not worry much whether or not the system is delivered on time and within budget. 48% agree, 16% disagree, while 36% disagree. The majority of the participants, 87% indicated that they develop dissatisfaction towards a system when it reacts two slow, crashes and unavailable when needed; while only 7% strongly disagree and 6% neither agree nor disagree. Previous bad systems experiences do not seem to be a challenge to most participants. Hence 29% agree, while 39% disagree and 32% neither agree nor disagree.</td>
</tr>
</tbody>
</table>
Most participants seem not to worry about the accuracy and completeness of the data in making them not to use the system (42% agree) and 26% disagree, whereas 32% were neutral.

However, most participants indicated that the quality of the information produced by the system drives their appetite to use it. Hence 74% agree, only 6% disagree, whereas, 20% neither agree nor disagree. This is in contrast with the responses on inaccurate and incomplete information whereas the two are similar.

It became very clear from the participants that the quality of service and support provided by IT is a major factor for their willingness to use the system. 74% agree, only 10% disagree while 16% are neutral.

### Organisational Factors

Although it seems that the hospitals climates are not hostile and making it difficult for participants to accept the change of implementing the e-health system, the margin for this does not stand out. Hence 42% agree, 39% disagree, while 19% neither agree nor disagree.

However, there are more participants who feel that the hospitals are willing to accommodate changes and ensure the e-health system is successful. 62% agree whereas 19% disagree and 6% strongly disagree while 13% are neutral.

It is a general understanding between participants that the e-health system will result in redistributing of organisational power and control, and introduce role changes. Hence 58% agree, whereas 13% disagree, while only 29% are neutral.

The participants do not think the system could sometimes create conflicts amongst each division's goals and interest. Hence only 29% agree, 45% disagree, while 26% neither agree nor disagree).

### Users’ Factors

A vast majority of the participants (79% agree) agree that younger users understand the system and use it more than older users. Only 7% disagree and 14% neither agree nor disagree.

Although there seems to be an understanding amongst participants (65% agree, 17% disagree, while 18% are neutral) that highly educated users are willing to accept the e-health system; a vast majority of the
participants (82% agree) use the system successfully because they see a need for it. Only 6% disagree while 10 neither agree nor disagree.

There seems to be a strong descending view of the hospitals having more effective communication channels that lead to greater user acceptance of the system; 32% agree, 32% disagree while 36% neither agree nor disagree. Accordingly, similar views exist on the provision of adequate training to give users more comfort and easily accept the system. Hence 36% agree whereas 46% disagree. 18% neither agree nor disagree.

Although there’s a believe amongst participants (82% agree, 11% disagree and only 7% neither agree nor disagree) that the system will contribute towards improving their performance at work; however, over half of the participants believe that they are encouraged to accept and use the system because their performance rewards is related to how they optimally use the system. Hence 54% agree, 21% disagree while 25% neither agree nor disagree.

In addition, there are more participants who believe that they have control over the change to implement the system. Hence 58% agree while 23% disagree. 19% of the participants couldn’t agree or disagree.

<table>
<thead>
<tr>
<th>5</th>
<th>Job Threatening Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Almost all the participants are against the view that the e-health system will make them lose their status. Hence only 6% agree, 91% disagree, while 3% of the participants could not agree or disagree.</td>
</tr>
</tbody>
</table>

Although a large group of the participants do not view the e-health system being able to create economic insecurity (only 13% agree, 77% disagree, and 10% could not agree or disagree); however, most participants disagree that the e-health system will alter interpersonal relationships. Hence 20% agree, 67% disagree, while 13% could not agree or disagree.

Although more than half of the participants do not think the system will change their job content (42% agree, 52% disagree, while 6% could not agree or disagree); the majority of the participants disagree that the system will make them lose power. Hence only 6% agree, 84% disagree, whereas 10% could not agree or disagree.
Although the participants indicated that the system does not have the ability to change the decision making approach, the certainty in this does not stand out. Hence 45% agree, and 36% disagree, while 19% could neither agree nor disagree. However, the majority of the participants do not think the system will create uncertainty and unfamiliarity. Hence, only 16% agree, 68% disagree, while 16% where unsure as they could not agree or disagree. However, the majority of the participants do not think the system will create uncertainly and unfamiliarity. Hence, only 16% agree, 68% disagree, while 16% where unsure as they could not agree or disagree.

Although the majority of the participants agree that they can full accept the system if it meets their requirements and expectations. Hence 86% agree, 7% disagree, whereas 7% are unsure as they could neither agree nor disagree. However, most participants disagree that they were involved during systems implementation and gave inputs of their requirements. Hence 15% agree, 64% disagree, while 21% were unsure as they could not agree or disagree. However, most participants disagree that they were involved during systems implementation and gave inputs of their requirements. Hence 15% agree, 64% disagree, while 21% were unsure as they could not agree or disagree.

Although a large number of the participants disagree that their input was requested but ignored (7% agree, 39% disagree, while 54% could not agree or disagree); the majority of the participants did not agree that they had sign off responsibilities at each of the system development stages. Hence 10% agree, 61% disagree, while 29% could neither agree nor disagree.

The majority of the participants disagree that they were members of the systems development group. Hence 10% agree, 67% disagree, while 23% are not sure.

<table>
<thead>
<tr>
<th>TOPIC NAME</th>
<th>AGREE</th>
<th>DISAGREE</th>
<th>CONTRIBUTING THEMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Factors</td>
<td>57%</td>
<td>43%</td>
<td>Positive:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Negative:</td>
</tr>
</tbody>
</table>

Table 10: Discussion of Questionnaire Findings

The findings of the questionnaire further reveal as follows:

The table below (Table 11) gives aggregate percentages for each of the factors of the adopted model, user resistance model. The themes with average of sixty percent (%) or higher were considered as key boosters/contributors of the factor. These key themes are indicated on Table 11 below.
<table>
<thead>
<tr>
<th>Category</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organisational Factors</strong></td>
<td>- System reacts slow, crashes and not available when needed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Quality of information produced by the system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Quality of service provided by IT</td>
<td></td>
</tr>
<tr>
<td>48%</td>
<td>Positive: Willingness to accommodate changes and ensure the e-health system is successful</td>
<td></td>
</tr>
<tr>
<td>52%</td>
<td>Negative: None</td>
<td></td>
</tr>
<tr>
<td><strong>Users' Factors</strong></td>
<td>Positive:</td>
<td></td>
</tr>
<tr>
<td>61%</td>
<td>- Younger users understand system and use it more than older users</td>
<td></td>
</tr>
<tr>
<td>29%</td>
<td>- Highly educated users are willing to accept the e-health system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Use the system because they see a need for it</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- System will contribute towards improving performance at work</td>
<td></td>
</tr>
<tr>
<td><strong>Job Threatening Factors</strong></td>
<td>Positive:</td>
<td></td>
</tr>
<tr>
<td>20%</td>
<td>- System will make users lose their status</td>
<td></td>
</tr>
<tr>
<td>80%</td>
<td>- System will create economic insecurity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- System will alter interpersonal relationships</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- System will make them loose their power</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- System will create uncertainty and unfamiliarity</td>
<td></td>
</tr>
<tr>
<td><strong>User Involvement Factors</strong></td>
<td>Positive:</td>
<td></td>
</tr>
<tr>
<td>25%</td>
<td>- Users can full accept the system if it meets their requirements and expectations</td>
<td></td>
</tr>
<tr>
<td>75%</td>
<td>Negative: None</td>
<td></td>
</tr>
</tbody>
</table>
4.5.1.3 Summary of Sub-Question 1

The findings of the questionnaire reveal that technical factors will affect the e-health system if not adequately addressed in the organisations where e-health is being implemented in rural areas. It is also evident that organisational factors are a problem in the organisations during systems implementation which could increase resistance towards e-health in the hospitals. However, some factors such as users' and job threatening are well controlled and not affecting or contributing towards user resistance in the institutions, although training and opening communication channels could be more beneficial of these hospitals. The institutions however suffer from user involvement during systems implementation. A serious improvement in this area is required.

4.5.2 Second Research Question

The purpose of this sub-question is to determine the contextual factors contributing towards these user resistance behaviours on e-health in the hospitals.

What are the contextual factors contributing towards user resistance behaviours on e-health in the hospitals?

The data collection method used to answer this sub-question was the questionnaire (cf Appendix A) and interviews. A consideration was made for contextual themes from the questionnaire summary of the findings discussions (cf Table 11). A detailed discussion of the findings relating to this sub-question is provided below, starting with the findings obtained from the questionnaire.
4.5.2.1 Questionnaire Findings

The questionnaire was completed by thirty-one (31) participants as indicated in the Research Methodology chapter (cf Chapter 3, cf Section 3.2.5.1). To answer this question, the negative responses from the questionnaire, which were above sixty percent (60%), were selected as projected on the above table (cf Table 11) with their themes and summarised on Table 12 below.

<table>
<thead>
<tr>
<th>Topic Name</th>
<th>Contributing Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Factors</td>
<td>• System reacts slow, crashes and not available when needed</td>
</tr>
<tr>
<td></td>
<td>• Quality of information produced by the system</td>
</tr>
<tr>
<td></td>
<td>• Quality of service provided by IT</td>
</tr>
<tr>
<td>Users’ Factors</td>
<td>• More effective communication channels that lead to greater user acceptance of the system</td>
</tr>
<tr>
<td></td>
<td>• Provision of adequate training to give users more comfort and easily accept the system</td>
</tr>
<tr>
<td>User Involvement Factors</td>
<td>• Users were involved during implementation and have their inputs</td>
</tr>
<tr>
<td></td>
<td>• Users’ inputs were requested but ignored</td>
</tr>
<tr>
<td></td>
<td>• Users had sign off responsibilities at each of the system development phase</td>
</tr>
<tr>
<td></td>
<td>• Users were members of the systems development group</td>
</tr>
</tbody>
</table>

Table 12: Contextual Resistance Factors from Questionnaire Findings

4.5.2.2 Interview Findings

The findings of the interviews generally showed the existence of factors which could lead towards resistance on e-health by the users in the hospitals. These are supported by the findings of the questionnaires, which made it clear; through adapting the user resistance theory/model; that issues such as technical factors, organisational factors and user involvement factors are factors which could increase user resistance to e-health in the hospitals. The extracts from the interviews provided show a few of the responses that are relevant and appropriate to this question.

To find out the users’ perceptions, several sub-questions, as projected in Table 5 – 10 were asked. The participants were probed with regards to elements of contextual factors which contributing towards user resistance behaviours on e-health in the hospitals. The purpose of the interviews was to establish, from the user’s point of view, the contextual factors
contributing to user resistance. The interview questions relating to this sub-question are summarised in Table 13 below.

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Interview answers</th>
</tr>
</thead>
</table>
| Do you see a need for e-health improving your work compared to legacy paper processes? | Respondent 1: Yes, it will reduce duplications and errors while improving efficiency  
Respondent 2: Most definitely. Us the younger generation will embrace it even more.  
Respondent 3: Yes, I used it when I was working at one of the biggest hospitals in another province, we were very efficient and it really improved the hospital performance.  
Respondent 4: No, what will I do if they implement the system? It will replace me.  
Respondent 5: Each and everything has its advantages and disadvantages. |
| What do you think is the main reason why e-health is not fully utilised throughout in the hospital? | Respondent 1: We were never about systems changing. We only heard from other people that they have started using a system of some sort.  
Respondent 2: I never received training on the system. I’m scared I might crash it.  
Respondent 3: Hospital computers are very old. They may require improvement.  
Respondent 4: Some users are not computer literate; basic computer skills are required.  
Respondent 5: The current DHIS system is not user friendly, we are waiting for the web-based DHIS. |
| How do you think the system will directly affect how people and change how they are doing their work? | Respondent 1: It is going to improve the process flow from patient admission at the front desk to their wards. |
Respondent 2:
The pharmacy will get prescription through the system.

Respondent 3:
No long queues if the patients could book their appointments.

Responded 4:
Diagnosis will be precise and will also improve the skills of the necessary and doctors in training.

Respondent 5:
Management reports will be easily accessible and reporting to the department and province will be easier.

What do you think should be done to improve usage and effectiveness of e-health?

Respondent 1:
Hospital management should lead and use the system then they will be able to encourage us as the health practitioners.

Respondent 2:
Training must be offered to all of us.

Respondent 3:
They must just tell us that they no longer need paper in the wards.

Responded 4:
We must be informed in time before the system can be used in order to know what is coming.

Respondent 5:
Involvement from the higher level; including the national department, provincial department and district must be involved in the workings to introduce the system.

Table 13: Interview Questions and Responses

The interview responses as projected on Table 13 reveal that the participants have a positive perception of the importance of e-health and what it can do for them and the hospitals. However, certain improvements were suggested for reducing the level of resistance on e-health solution implementation and usage. These improvements include management interventions, training and involvement of the users through many interventions. These interventions will also assist those who feel the system will replace them.
4.5.2.3 Summary of Sub-Question 2

The findings discussed relating to study sub-question 2 reveal existing contextual factors contributing to user resistance behaviours on e-health in public hospitals. The findings collected using various instruments show similarities that although e-health brings about positive change in hospitals there are challenges in the areas of technical factors, organisational and user involvement.

4.5.3 Third Research Question

The purpose of this study sub-question was to establish strategies that can be used to counter the user resistance behaviours on e-health in public hospitals.

What strategies can be used to counter user resistance on e-health in public hospitals?

The previous section (cf. Section 4.3.2) determined and articulated contextual factors contributing towards user resistance behaviours on e-health in public hospitals. A summary of the identified contextual factors is projected on Table 4.11 below.

4.5.3.1 Strategies to Counter Resistances

According to the findings of the study as projected under the section above (cf. Section research question 2,) the strategies to counter resistance are summarised as projected on Table 14 below.

<table>
<thead>
<tr>
<th>Factor Category</th>
<th>Factor Description</th>
<th>Identified through</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Questionnaire</td>
<td>Interviews</td>
</tr>
<tr>
<td>Technical</td>
<td>System reacts slow</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor quality of information</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor quality of service and support by IT</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor IT infrastructure</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Users’</td>
<td>Effective Communication channels</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Lack of adequate Training</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>User Involvement</td>
<td>User involvement during project implementation</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>User input</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Table 14: Summary of Contextual Factors of Resistance
The symbol “X” was used to indicate which data collection identified the factor. In developing counter strategies that can be used to limit user resistance. A consideration on the factors was made as articulated on Table 14 above.

This section establishes recommended strategies that can be used to counter user resistance behaviours on e-health in the hospitals. These were developed through understanding mitigation plans by considering the ideal situation for each of the factors. The proposed counter strategies are projected on Table 15 below.

<table>
<thead>
<tr>
<th>Identified Factor</th>
<th>Counter Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>System reacts slow</td>
<td>IT infrastructure Master Plan for e-health</td>
</tr>
<tr>
<td>Poor quality of information</td>
<td>Data management strategy</td>
</tr>
<tr>
<td>Poor quality of service and support by IT</td>
<td>IT Support Strategy</td>
</tr>
<tr>
<td>Poor IT infrastructure</td>
<td>IT infrastructure Master Plan for e-health</td>
</tr>
<tr>
<td>Effective Communication channels</td>
<td>E-health stakeholder management strategy</td>
</tr>
<tr>
<td>Lack of adequate Training</td>
<td>E-health user training strategy</td>
</tr>
<tr>
<td>User involvement during project implementation</td>
<td>E-health stakeholder management strategy</td>
</tr>
<tr>
<td>User input</td>
<td>E-health stakeholder management strategy</td>
</tr>
</tbody>
</table>

Table 15: User Resistance Factors with Proposed Counter Strategies

Strategies that can be used to counter the factors contributing towards user resistances on e-health in hospitals were established as indicated on Table 5 – 12 above. Therefore, the overall strategies that can be used to counter the factors contributing towards user resistance on e-health can be summarised as follows:

- IT infrastructure Master Plan
- Data Management strategy
- IT Support strategy
- End-user Training strategy
- Stakeholder Engagement strategy.

Development of all these strategies should be implemented specifically for e-health taking into considerations the different challenges faced by public hospitals in different locations.
4.6 FINDINGS SUMMARY

4.6.1 Consolidated Findings

The factors contributing towards resistance of e-health in hospitals, as identified in this study, are addressed by the user resistance model. All data collection instruments used have highlighted similar challenges which, if not resolved, would contribute immensely to resistance on e-health in public hospitals. The factors contributing towards user resistance on e-health in Limpopo public hospitals, as identified in this study, relate mostly to Technical, Users’ and User Involvement. Table 16 below outlines the key research findings relating to user resistance as outlined in this chapter.

<table>
<thead>
<tr>
<th>RESISTANCE FACTORS</th>
<th>SUMMARY OF RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT infrastructure</td>
<td>The IT infrastructure in the hospitals is quite old, and unreliable, thus crashing from time to time. This could lead to services delivery being hampered and users falling back to legacy paper systems. These issues could be achieved through the development and implementation of an IT Infrastructure Master Plan, which must define minimum IT infrastructure standards for each hospital adopting e-health.</td>
</tr>
<tr>
<td>Quality of information</td>
<td>The quality of the information produced by e-health systems was evaluated and identified as a concern by the end-users. When a system is producing unreliable or undesirable information, such could be a major problem in the medical sector. A clearly defined data management strategy should be considered.</td>
</tr>
<tr>
<td>IT Support and service</td>
<td>This was found to be an area of concern. Care should be taken to ensure that IT functions are adequately capacitated to support the e-health system. This could be achieved through the development of an IT support strategy.</td>
</tr>
<tr>
<td>Communication channels</td>
<td>It was found that the communication channels between the drivers of e-health implementation and the end-users lack effectiveness. This can be improved by developing and implementing a Stakeholder Engagement Strategy which would clearly define how engagements with the key stakeholders of the system, the end-users are to be handled before, during and after implementation.</td>
</tr>
<tr>
<td>Training</td>
<td>It was found that the users of the systems were not adequately trained. E-health training for users in the hospitals is important to ensure that accurate information is maintained at all times. The e-health user training strategy and manual would ensure that the users are adequately capacitated to users the system.</td>
</tr>
</tbody>
</table>
This area was found to be lacking and needed serious attention. Involving users during requirements definition phase and acceptance testing phase could improve their understanding of the system before it is delivered for utilisation. A stakeholder engagement strategy could be used to improve the level of understanding of how users ought to be involved.

Table 16: Summary of Research Findings

4.6.2 Document Analysis

Ozbek, Alniacik, Koc, Akkilic, and Kas (2014) highlight that individual differences in terms of personality traits may influence technology acceptance of systems by users as individuals with a high level of knowledge and skill have a high propensity to perceive technology as more useful, while those who have lack of adequate skill or training may perceive new technology as less useful.

Kim and Kankanhalli (2009) indicate that perceived value and organisational support for change are found to reduce user resistance.

Ives and Olson (1984) highlight that determining when and how much, or even if, user involvement is appropriate is important before a project starts.

Ali, Zhou, Miller, et al. (2016) suggests that incorporating user training of new technologies / systems may assist in reducing / minimising resistance as users’ job content might have been altered by the introduction of new technology which could underpin resistance. Ali, Zhou, Miller, et al. (2016) further indicate that users frequently become accustomed to the system they are using for years and that special attention should be given to users to reduce their anxiety through special training programs which will give users a sense of participation and feeling of “vested interest” leading to reduction in negative attitudes towards new IT systems.

According to Ali, Zhou, Miller, et al. (2016), a participative approach is the best technique / method of handling resistance which could be adopted to involves users of the system through vision sharing, taking part in the system development process, establishing communication and feedback channels, open information sharing about the new system.

According to Ali, Zhou, Miller, et al. (2016), a participative approach is the best technique / method of handling resistance which could be adopted to involves users of the system through
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Ruxwana, Herselman, and Conradie (2010), indicates that ongoing ICT skills training programs could improve more effective use of ICT’s as part of e-health initiatives at the rural healthcare centres.

4.7 RECOMMENDATIONS IN TERMS OF THE FINDINGS

This study presents existing contextual factors contributing towards user resistance on e-health in Limpopo public hospitals. Having consideration on the findings, this study develops strategies which can be used to counter user resistance behaviours on e-health in the public hospitals. Based on the findings discussed in this chapter, the following recommendations can be made:

4.7.1 Technical Factors

The hospitals, working together with the District, Province and National Departments of health should place more focus on the following key technical issues, before and during implementation, to counter against user resistance factors on e-health.

- IT infrastructure is critical for every system to be accessible and available when needed. Unreliable IT infrastructure running e-health will not only frustrate the users but the patients, which could also be dire to their lives. This can be achieved through the development and implementation of an IT Infrastructure Master Plan to avoid incompatibility.
- The old computer technology term of Garbage-In Garbage-Out (GIGO) is real and exists. All efforts should be placed on ensuring that the data and information maintained and processes though the e-health systems are free from errors as such could create serious challenges for the hospitals including government. This is especially the case in the beginning when data is migrated from legacy paper to e-health systems. This is achieved through clear Data Management Strategies.
- IT has transformed from being a normal support function to an enabler of the business. The move by the government to automate its healthcare services requires a shift in the mind to recognise IT as key to e-health success. This is achieved through proper IT governance compliance which includes strategies and policies, amongst others. IT
Support Strategies, which allow support at the convenience of the user of e-health, could remain a catalyst to counter resistance behaviours. A support centre which gives solution support to the end users should be in existence.

### 4.7.2 Users’ Factors

The e-health implementation drivers (NDoH, Limpopo provincial health department, and the hospitals) should place more focus on the following aspects to ensure that users’ factors are not affecting the system:

- Communication channels between the implementers and the users require streamlining to ensure effectiveness. Although not everyone is guaranteed to accept disruptive changes at a go, users must be prepared in advance to understand what is coming and how it is going to affect them. The identification of the users must happen during planning stages before implementation commences.
- Communication must happen through implementation and even after to monitor the level of comfort which users are operating the system. A Stakeholder Engagement strategy, defining each stakeholder’s expectation and contribution, could positively improve this issue.
- Training should be provided to the users. The level of training should be broadened to ensure that it addresses the entire system value chain and the each of the users is training for their required usage. The training provided should also cater for both illiterate and those who are illiterate.
- Users should also be made aware of the confidentiality of their logon credentials and be careful not to expose such to other users.

### 4.7.3 User Involvement Factors

Lastly, a consideration on the level of involvement of users is essential to be defined in the beginning and revised throughout as follows:

- Although e-health systems are mostly packaged applications, it is essential that users get involved in ensuring that these are fit for purpose and fit for use.
- Users of the e-health systems are identified in the hospitals and involved from the beginning of the project lifecycle.
- Testing levels of the users are broadened to ensure that all aspects of the system are reviewed, tested and approved before preparing for use in the live environment.
• Stakeholder Engagement strategy is in place to ensure frequent and structured communication between all stakeholders during implementation. This control will ensure that miscommunication is avoided.
• National department of health, provincial, district and hospital management are involved in developing accountability, and roles and responsibility matrix, and plans for sustainability of the system exist.
5 CHAPTER 5: SUMMARY AND CONCLUSIONS

5.1 INTRODUCTION

This study discussed the research philosophy which was supported by the Interpretivism approach that resulted in the identification of factors contributing towards user resistance on e-health in Limpopo public hospitals. Subsequently, the study developed strategies which can be used to counter user resistance behaviours on e-health in public hospitals.

The study was motivated by the researcher’s interest in healthcare based on experience on slow delivery of services in rural hospitals. The study was triggered by the e-health strategy which sets ambitious targets, that was approved in 2012 and the researcher wanted to understand the state of readiness for the province (Limpopo) in implementing this strategy. Considering the infrastructure and service delivery challenges of rural Limpopo province, it was interesting to note the implementation of e-health and how the users would react to such e-health solutions in public hospitals.

This study is of the opinion that e-health has a potential to improve healthcare delivery in the public hospitals of rural Limpopo Province, considering that e-health as an IT system and that IT systems implementation are challenged by many factors which could result in such systems failing. A factor which if fundamental, though sometimes overlooked due to lack of knowledge or understanding, is user resistance. Considering the challenges presented by user resistance which could further lead to systems failing, the study aimed at identifying such of user resistance. therefore, the main purpose of this study was to identify factors contributing towards user resistance on e-health in Limpopo public hospitals to assist in total elimination of user resistance or reduction in such. However, ensuring that strategies to counter user resistance on e-health in public hospitals are put in place became very critical. This led to the research question:

What are the factors contributing towards user resistance on e-health in Limpopo public hospitals?

A clearer understanding of the key factors contributing towards user resistance on e-health in Limpopo public hospitals to develop strategies which can be used to counter these resistance behaviours to eliminate resistance or reduce its impact were important for this study.
This chapter presents the discussions on answering the research questions, the study contributions to the existing body of knowledge, the research presentation, study limitations, recommendations, and further research options. This chapter provides the conclusion of the research dissertation.

5.2 REVIEW OF THE STUDY IN ANSWERING THE RESEARCH QUESTION

Based on the understanding of a research dissertation, this study was planned and executed in guided settings with various participants from various hospitals. This formed the context which combined to answer the research question to identify user resistance factors and to develop strategies for mitigation.

Literature reviews were conducted on ICT, healthcare and e-health to create the basis for the study (cf Chapter 2 and Chapter 3). As part of the study, a total of 31 participants were selected from 2 different hospitals, to form case studies. In the second phase, data was collected. This collection was preceded by receiving consent from the Department of Health of Limpopo Province, office of the District Executive Manager, and the participating hospitals. Following the consents, appointments were made with the hospitals for collection data. Although there were issues about availability of participants, this did not negatively impact the study data collection as such instances were addressed. This study did not have issues of refusal of or non-response.

As stated in chapter one, the study was broken into sub-questions to elicit data that would aid to answer the main question. In order to focus the study, it was necessary to define e-health for a better understanding of what the study covers and what it does not cover. It was necessary to develop a research objective which was broken into sub-objectives for a better understanding. As a result, the study sub-questions were used to elicit data above those objectives.

Although different entrustments were used to collect data, this was controlled to ensure that they are administered with relevant participants to enable collection of reliable data. The questionnaires, which were used to answer sub-question 1 and 2 were administered to 31 participants, while the semi-structured interviews were conducted with 10 participants. It was necessary that the questionnaire and interviews be translated to the language that participants would understand.
Chapter 4 provides a detailed account of the study findings. It is evident from the findings of the study that user resistance behaviours exist, this is due to challenges related to technical, users’ and user involvement factors. Unreliable IT infrastructure, quality of the information produced by the systems and the quality of IT support and services were some of the technical factors identified, whereas users were also worried about lack of effective communication channels together with the level of training offered. However, user involvement during implementation and soliciting user inputs were found to be non-existent.

Strategies to address stakeholder relations, IT support, IT Infrastructure Master Plans, and Data Management were identified as a key to counter against user resistance in public hospitals. As a result, these strategies were recommended for implementation in this study in order to counter user resistance on e-health in public hospitals.

5.3 RESEARCH CONTRIBUTIONS

This research study contribution to the existing Body of Knowledge (BoK) is twofold, theoretical and practical.

5.3.1 Theoretical Contribution

The research study adds value by the contribution to the exiting BoK in the fields of Information and Communications Technology (ICT), user resistance, and e-health.

In the current literature, a gap on factors contributing towards user resistance on health e-health in Limpopo public hospitals exists due to limited or no information available. Although the issue of resistance has been studied for quite some time, confusion between resistance and acceptance still exists.

5.3.2 Practical Contribution

The study has identified and developed important strategies that are important to effectively counter user resistance behaviours on e-health implementation in public hospitals. Consideration was made to the constructs which differentiate acceptance from resistance. The study has further contributed to the BoK by developing strategies proposed to counter user resistance behaviours on e-health in public hospitals. These strategies would assist the implementers of e-health systems to make the right decisions and follow proper processes
which, if they do not entirely eliminate resistance by end users, they will reduce it drastically. In addition, the strategies will ensure that e-health system implementations are used successfully and fully.

5.4 RESEARCH PRESENTATION

This research report is structured as follows:

The first chapter of the study, Chapter 1, introduced the research. Chapter 2 focused on the discussion of literature, defining the terms, and the underpinning philosophy of the study. Chapter 3 discussed the adopted research methodology. Chapter 4 introduces the research demographic settings, which is followed by Chapter 5, where the study findings were presented and discussed. Lastly, this final chapter, Chapter 5, gives a reflection of the study in a summary form and conclusions made.

5.5 RESEARCH DELIMITATIONS AND LIMITATIONS

Below are the limitations of this study (as in addition to the study discussed cf Chapter 1 and cf Chapter 3):

- The sample was relatively small.
- The study model was not tested in operational setting.

The first limitation of this study relates to the fact that only two hospitals were selected for the study. In addition, only 31 participants were sampled. The sample size was relatively small, with only two hospitals selected in one province and the 31 subjects fully participating in this study. Future studies in this field should be conducted with larger samples covering different settings. Due to the nature of the study (mini-dissertation for a Master’s Degree), the study selected only two hospitals in one province although in real life setting. Replications need to be conducted in different settings to improve generalisability. This concern was, however, mitigated by selecting hospitals in different geographical locations. Finally, this study was conducted in a cross-section setting. Longitudinal studies, to measure participants’ attitude towards e-health resistance over time, should be considered for future studies.

The second limitation of this study is that it was conducted in a theoretical setting without observing participants’ reaction towards e-health on a real life setting. No practical testing of the theoretical findings was made to further validate the facts. However, the research question
and objective were able to support the research design for the pragmatic scrutiny of the research model adopted for this study. This is due to the complexities of the healthcare sector such as ethical challenges and that information on patients is strictly confidential. The researcher, as an outsider, could not be allowed to have access for observation as such would require presence during consultations between Doctors and Nurses, and their patients using e-health. The only observations made were at the admissions and pharmaceutical side of the value chain which systems operated in silos and lacked integration with the core functions of the hospitals.

Even though establishing the factors contributing towards user resistance on e-health in a live setting would improve its validity, the model was tested through answering questionnaire and conducting interviews. Such findings were further verified with prior studies in the field, for applicability.

5.6 FUTURE RESEARCH

Future research could be undertaken to explore the following:

Firstly, a study to validate the findings in a larger setting involving a larger number of participants across a diverse nature is required. This can be achieved by using the strategies to counter user resistance behaviours on e-health in public hospitals which can be tested during solution implementation and after such implementation in the Limpopo Province. This will further test the ‘generic’ value of strategies, whereby the same strategies are applied to test e-health resistance in another rural context of Limpopo province. Most importantly, the strategies, value, and their validity can be further tested when they are applied to counter resistance during and after implementation of e-health at other hospitals to determine the degree to which the strategies can counter resistance behaviours on e-health.

Several potential areas exist for future studies on user resistance from diverse perspectives such as technical, organisational, users’, job threatening, and user involvement factors. This suggests that user resistance related research must be careful of drawing conclusions on one or few aspects. Another aspect that can be explored for future research studies is the evaluation of the developed strategies in a real live setting where possible. This would greatly contribute towards understanding the validity and applicability of the developed strategies to counter resistance on e-health, which would have been observed in a live environment.
5.7 CONCLUSIONS

This chapter presented the importance of this research study. It presented an overview of the study background and motivation, the discussion on the success of this research the research questions, and indicated the study contributions to the body of knowledge and reflects on the study limitations.

The purpose of this study was to identify factors contributing towards user resistance on e-health in Limpopo public hospitals and further to develop strategies that can be used to counter resistance behaviours on e-health in public hospitals to eliminate or reduce the levels of resistance.
6 REFERENCES


KAHN, J.G., YANG, S.Y., & KAHN, J.S. 2010. 'Mobile” Health Needs and Opportunities in Developing Countries.


KLEYNHANS. A.M. 2011. Is SA ready for a national Electronic Health Record (HER)?


LEEDY, P. D. & ORMROD, J. E. Practical Research Planning and Design. 10th ed. New
Jersey: Pearson Education.


OATES.B.J.2008.*Researching in Information System.*


ROSEN, P. 2005. *Acceptance and Rejection: Two Sides of the Same Coin, or Two Different Coins?*

RUXWANA, N. 2010. The Adoption of Quality Assurance in e-Health Acquisition in the Eastern Cape Province.


STYLIANIDIS, E. SMAGAS, K. & ANDREOU, C. 2010. Ethical Implications of Digitised Medical and Biometric Data.


7 APPENDICES

7.1 APPENDIX A: STUDY QUESTIONNAIRE

SECTION A: COMPUTER AND E-HEALTH KNOWLEDGE AND EXPERIENCE
(In this questionnaire, e-health broad domain which includes mobile health, telemedicine, health information system, and all Information and Communication Technologies (ICT’s) used to promote support and strengthen healthcare.)

PLEASE MAKE A CROSS (X) IN THE BOX CORRESPONDING TO THE ANSWER THAT MATCHES YOUR CHOICE OF THE QUESTION

1. Did you study any computer courses?
   YES   NO

2. How long have you been using a computer?
   NEVER   1 – 3 YEARS   4 – 5 YEARS   5 YEARS +

3. How would you describe your general computer knowledge?
   Very Poor   Poor   Average   Good   Very Good

4. How often do you use a computer at work?
   [ ] I do not use
   [ ] Once a week
   [ ] 2 – 3 days a week
   [ ] Every day
   [ ] All the time

5. How often do you use the e-health system at work?
   [ ] I do not use
   [ ] Once a week
   [ ] 2 – 3 days a week
   [ ] Every day
   [ ] All the time
SECTION B:

THIS SECTION EXAMINES YOUR PERCEPTION OR FEELING ABOUT USER RESISTANCE. EXAMINES USER RESISTANCE, EVALUATES THE TECHNICAL, ORGANISATIONAL, USERS’, JOB THREATENING, AND USER INVOLVEMENT FACTORS / DIMENSIONS.

(Using a rating of 1 to 5, please make a cross in a cell that indicates your level of disagreement / agreement with the following statements)

User Resistance Factors / Dimensions

<table>
<thead>
<tr>
<th>i). Technical Factors</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>(measures establish the level of resistance caused / influenced by technical issues within the system)</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>6. The system is unfriendly and difficult to use</td>
<td></td>
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<tr>
<td>7. When a system is not delivered on time and within budget, I develop negative feelings about it</td>
<td></td>
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<tr>
<td>8. I develop dissatisfaction about the system when it reacts too slow, crashes and unavailable when I need to use it</td>
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<tr>
<td>9. My bad experience with previous systems makes me have negative attitude towards the system</td>
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<tr>
<td>10. The inaccurate or incomplete data in the system makes me not to use the system</td>
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<td></td>
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<tr>
<td>11. The quality of information produced by the system drives my appetite to use the system</td>
<td></td>
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<tr>
<td>12. The quality of service and support provided by IT is a major factor contributing towards my willingness to use the system</td>
<td></td>
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<tr>
<td></td>
<td>ii). Organisational Factors (measures establish the level of organisational and political factors towards user resistance)</td>
<td></td>
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<tr>
<td>13.</td>
<td>The hospital climate is hostile and makes it difficult for me to accept the change of implementing the e-health system</td>
<td></td>
<td></td>
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<tr>
<td>14.</td>
<td>The hospital is willing to accommodate changes and ensure the e-health system is successful</td>
<td></td>
<td></td>
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<tr>
<td>15.</td>
<td>The e-health system will result in redistribution or organisational power, control and introduce role changes</td>
<td></td>
<td></td>
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<tr>
<td>16.</td>
<td>The system sometimes creates conflicts among each division’s goals and interests</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
### iii). Users’ Factors (measures establish the level of resistance influence / caused by user’s problems)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>1</th>
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<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.</td>
<td>Younger users understand the system and use it more than older users</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>18.</td>
<td>Highly educated users are willing to accept the e-health system</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>19.</td>
<td>I use the system successfully because I see a need for it</td>
<td></td>
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<td></td>
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<tr>
<td>20.</td>
<td>The hospital has more effective communication channels that lead to greater user acceptance of the system</td>
<td></td>
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<tr>
<td>21.</td>
<td>The hospital has provided me adequate training to give me more comfort and easily accept the system</td>
<td></td>
<td></td>
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<tr>
<td>22.</td>
<td>I believe that the system will contribute towards improving my performance</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>23.</td>
<td>I am encouraged to accept and use the system because my performance reward is related to how I optimally use the system</td>
<td></td>
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<tr>
<td>24.</td>
<td>I believe that I have control over the change to implement the system</td>
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</tbody>
</table>
### iv.) Job Threatening Factors

*measures establish job related factors that would cause the user to resist the new system*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.</td>
<td>The e-health system will make me loose status</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>26.</td>
<td>The e-health system will create economic insecurity</td>
<td></td>
<td></td>
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<tr>
<td>27.</td>
<td>The e-health system will alter interpersonal relationships</td>
<td></td>
<td></td>
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<tr>
<td>28.</td>
<td>The e-health system will change my job content</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>29.</td>
<td>The e-health system will make me loose power</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>30.</td>
<td>The e-health system will create a change in the decision making approach</td>
<td></td>
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<tr>
<td>31.</td>
<td>The e-health system will create uncertainty and unfamiliarity</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

### v). User Involvement Factors

*measures establish the level of user resistance caused by the degree of participation in the systems development process or involvement in the decision making process*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
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<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>32.</td>
<td>I can full accept the system if it meets my requirements and expectations</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>33.</td>
<td>I was involved during system implementation and gave inputs of my requirements</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>34.</td>
<td>My input was requested but ignored</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>35.</td>
<td>I had sign-off responsibilities at each stage in the system development stages</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>36.</td>
<td>I was a design member of the system development group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SECTION C: OVERALL USAGE AND EFFECTIVENESS OF E-HEALTH
(FROM YOUR EXPERIENCE, OBSERVATION, HOW CAN YOU RATE THE LEVEL OF RESISTANCE OF E-HEALTH IN YOUR HOSPITAL?)

<table>
<thead>
<tr>
<th>Resistance of e-health</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>37. By Administration personnel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38. By Medical Officers</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>39. Pharmaceutical</td>
<td></td>
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</tr>
<tr>
<td>40. By Management</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

SECTION D: PARTICIPANTS DEMOGRAPHICS
(Please make a cross (X) in the box corresponding to an answer that you fill suitable for the question)

41. What is you gender?
   - [ ] Female
   - [ ] Male

42. What is your age group?
   - [ ] Below 20
   - [ ] 21 – 30
   - [ ] 31 – 40
   - [ ] 41 – 50
   - [ ] Above 50

43. How many years of experience do you have?
   - [ ] Below 5
   - [ ] 6 – 10
   - [ ] 11 – 15
   - [ ] 16 – 20
   - [ ] Above 20
7.2 APPENDIX B: TUT Ethics Clearance

INFORMATION LEAFLET AND INFORMED CONSENT

PROJECT TITLE: FACTORS CONTRIBUTING TOWARDS USER RESISTANCE ON E-HEALTH IN LIMPOPO PUBLIC HEALTHCARE

Primary investigator: Mr MH Nkune, Candidate for M Tech (Business Information Systems)
Study leader: Prof. N. Ruxwana, PhD, Department of Informatics, Tshwane University of Technology

Dear Potential research participant,
You are invited to participate in a research study that forms part of my formal Master's Degree research at Tshwane University of Technology. This information leaflet will help you to decide if you would like to participate. Before you agree to take part, you should fully understand what is involved. You should not agree to take part unless you are completely satisfied with all aspects of the study.

WHAT IS THE STUDY ALL ABOUT?
Electronic health (e-health) is a broad domain which includes mobile health, telemedicine, health information system, and all Information and Communication Technologies (ICT’s) used to promote support and strengthen healthcare. E-health implementation promises to bring benefits to the public healthcare sector. E-health records may include a whole range of data in comprehensive or in summary form, including demographics, medical history, medication and allergies, immunisation status,
laboratory test results, radiology images, and billing information. Despite its promises and advantages, the introduction of e-health faces multiple challenges that might lead to a total failure of the project.

WHAT WILL YOU BE REQUIRED TO DO IN THE STUDY?
If you decide to take part in the study, you are required to do the following:
- To sign this informed consent form
- To complete the questionnaires
- After completing questionnaires, you will be required to attend contact session (informal interviews) with the researcher to answer some questions.

ARE THERE ANY CONDITIONS THAT MAY EXCLUDE YOU FROM THE STUDY?

You will not be eligible to take part in the study if you did not sign the Consent Form or don't agree with the terms and conditions specified in it.

CAN ANY OF THE STUDY PROCEDURES RESULT IN PERSONAL RISK, DISCOMFORT OR INCONVENIENCE?

The interview involves no foreseeable emotional discomfort or inconvenience to you. There is no risk to you in participating in this study. If, however, you become uncomfortable or stressed by answering any of the interview questions, we may skip the question or stop the interview, depending on your choice.

WHAT ARE THE POTENTIAL BENEFITS THAT MAY COME FROM THE STUDY?
The results of the study will have no direct personal benefits to you, but you will make a contribution by expanding the understanding of e-health resistance in Limpopo public healthcare.

WILL YOU RECEIVE ANY FINANCIAL COMPENSATION OR INCENTIVE FOR PARTICIPATING IN THE STUDY?
Please note that you will not be paid to participate in the study.
WHAT ARE YOUR RIGHTS AS A PARTICIPANT IN THIS STUDY?
Your participation in this study is entirely voluntary and anonymous. You can freely choose to participate or not to participate. In addition, at any point during this study, you have the right to withdraw without any penalty or future disadvantage whatsoever. You don’t even have to provide the reason/s for your decision. Your withdrawal will in no way influence your continued relationship with the research team.

HOW WILL CONFIDENTIALITY AND ANONYMITY BE ENSURED IN THE STUDY?
Only the researcher and the supervisors will have access to the completed questionnaires. Your answers will be totally anonymous and your identity will not be revealed under any circumstance. Also, nobody outside the study panel and/or Faculty Committee of Research Ethics of the Faculty of ICT, Tshwane University of Technology will be able to connect any answer to you in any recognisable way. The results of this study might be published in a scientific journal and/or presented at scientific meetings, but again without revealing the identity of any research participant. The original interview answers will be stored in a safe place for three years, after which they will be destroyed.

IS THE RESEARCHER QUALIFIED TO CARRY OUT THE STUDY?
The researcher is an adequately trained and qualified researcher in the study fields covered by this research project, specifically in Business Information Systems.

HAS THE STUDY RECEIVED ETHICAL APPROVAL?
Yes. The Faculty Committee of Postgraduate Studies and the Faculty Committee of Research Ethics of the Faculty of ICT, Tshwane University of Technology have approved the formal study proposal. All parts of the study will be conducted according to internationally accepted ethical principles.

WHO CAN YOU CONTACT FOR ADDITIONAL INFORMATION REGARDING THE STUDY?
The primary investigator, Mr MH Nkune, can be contacted during office hours at Tel (011) 564 1600, or on his cellular phone at 072 403 1281. The study leader, Prof N.L Ruxwana, can be contacted on 012 382 9626. Should you have any questions regarding the ethical aspects of the study, you can contact the chairperson of the TUT Faculty of ICT Faculty Committee of Research Ethics of the Faculty of ICT, Tshwane University of
DECLARATION: CONFLICT OF INTEREST
None.

A FINAL WORD
Your co-operation and participation in the study will be greatly appreciated. Please sign the informed consent below if you agree to participate in the study. In such a case, you will receive a copy of the signed informed consent from the researcher.

Thanking you in advance

Mr. MH Nkune (Primary Investigator)       Prof NL Ruxwana (Study Leader)
E-mail: moloti.nkune@gmail.com               E-mail: ruxwananl@tut.ac.za
Cell: 072 403 1281                          Cell: 012 382 9526

CONSENT
I hereby confirm that I have been adequately informed by the researcher about the nature, conduct, benefits and risks of the study. I have also received, read and understood the above written information. I am aware that the results of the study will be anonymously processed into a research report. I understand that my participation is voluntary and that I may, at any stage, without prejudice, withdraw my consent and participation in the study. I had sufficient opportunity to ask questions and of my own free will declare myself prepared to participate in the study.

Research participant’s name: ___________________________ (Please print)

Research participant’s signature: ______________________

Thanking you in advance

Mr. MH Nkuno (Primary Investigator)       Prof NL Ruxwana (Study Leader)
E-mail: moloti.nkuno@gmail.com               E-mail: ruxwananl@tut.ac.za
Cell: 072 403 1281                          Cell: 012 382 9526
7.3 APPENDIX C: CONSENT FROM TUT FACULTY COMMITTEE OF RESEARCH ETHICS

Faculty of Information and Communication Technology
Faculty Committee of Research Ethics

4 November 2015

Ref #: FCRE/ICT/2015/08/004(2)
Name: Nkune M
Student #: 202173631

Mr M Nkune
C/o Prof N Ruxwana
Department of Informatics
Faculty of Information and Communication Technology

Dear Mr M Nkune,

Decision: Final Approval

Name: M Nkune
Proposal Title: Factors contributing towards user resistance on e-health in Limpopo Public Healthcare
Qualification: Magister Technologiae: Business Information Systems
Supervisor: Prof N Ruxwana

Thank you for submitting the revised project documents for ethics clearance. The updates and clarification are duly noted.

Final approval is granted.

The proposed research project may now continue with the proviso that:
1) The researcher/s will conduct the study according to the procedures and methods indicated in the approved proposal, particularly in terms of any undertakings and/or assurances made regarding informed consent and the confidentiality of the collected data.

2) The proposal (inclusive of the applicable information leaflet(s), informed consent document(s), interview guide(s) and/or questionnaire(s) will again be submitted to the
Committee for prospective ethical clearance if there are any substantial changes from the existing proposal, particularly if those changes affect any of the study-related risks for the research participants.

3) The researcher will act within the parameters of any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.

Note:
The reference number [top right corner of this communiqué] should be clearly indicated on all forms of communication [e.g. Webmail, E-mail messages, letters] with the intended research participants.

---

**Annual review:**
1. The formal ethics approval of all research projects need to be renewed on an annual basis.
2. The current ethics approval expiry date for this project is 31 December 2017.
3. No research activities may continue after the ethics approval expiry date indicated on the formal Research Ethics Committee approval letter.
4. The Research Ethics Progress Report (electronic copy available at the following website: http://www.tut.ac.za/Other/rninew/ResearchEthicsCommittees/Pages/default.aspx) constitutes an application for such ethics approval renewal and must be submitted to the FCRE by 1 November 2017.

---

Yours sincerely,

[Signature]

GE DITSA (PROF)

Chairperson: Faculty Committee of Research Ethics

[Ref#2015=08=004(2)=NkunEM]

---

We empower people
7.4 APPENDIX D: CONSENT FROM DEPARTMENT OF HEALTH OF LIMPOPO PROVINCIAL GOVERNMENT

DEPARTMENT OF HEALTH

Enquiries: Lalif Shamila (015 296 6650)  
Ref: 4/2/2

Nkune M  
Tswana University of Technology

Greetings,

RE: Factors contributing towards user resistance on e-health in Limpopo Public healthcare

The above matter refers.

1. Permission to conduct the above mentioned study is hereby granted.
2. Kindly be informed that:-
   - Research must be loaded on the NHRD site (http://nhrd.hat.org.za) by the researcher.
   - Further arrangement should be made with the targeted institutions, after consultation with the District Executive Manager.
   - In the course of your study there should be no action that disrupts the services.
   - After completion of the study, it is mandatory that the findings should be submitted to the Department to serve as a resource.
   - The researcher should be prepared to assist in the interpretation and implementation of the study recommendation where possible.
   - The above approval is valid for a 3 year period.
   - If the proposal has been amended, a new approval should be sought from the Department of Health.
   - Kindly note, that the Department can withdraw the approval at any time.

Your cooperation will be highly appreciated.

Head of Department

Date 15/06/2016

18 College Street, Polokwane, 0700, Private Bag x6302, POLOKWANE, 0700
Tel: (015) 293 6000, Fax: (015) 293 6211/20 Website: http://www.limpopo.gov.za

The heartland of Southern Africa – development is about people

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7.5 APPENDIX E: CONSENT FROM DEPARTMENT OF HEALTH: SEKHUKHUNE
DISTRICT MUNICIPALITY

DEPARTMENT OF HEALTH
SEKHUKHUNE DISTRICT

REF: 4/2/2
ENQ: MASHIANE PN
TEL: 015 633 2309

DATE: 29 SEPTEMBER 2016

TO: CHIEF EXECUTIVE OFFICERS
ST RITAS AND PHILADELPHIA HOSPITALS

FROM: HUMAN RESOURCE UTILIZATION AND CAPACITY DEVELOPMENT

SUBJECT: APPROVAL FOR PERMISSION TO CONDUCT RESEARCH AT ST
RITAS AND PHILADELPHIA HOSPITALS

1. The above matter refers.

2. The Head of Department has granted approval for Nkune M to conduct
research in your institution. Nkune M is a student at Tshwane University of
Technology and has registered M-Tech Degree in Business Information
System. The title of his research is “Factors contributing towards user
resistance on e-health in Limpopo Public healthcare”.

3. Take note that the approval is valid for 3 years.

4. The student will present himself, scope and schedule of working in your
institution during the assumption of research.

5. Hope the matter is found to be understandable.

District Executive Manager

Date

2016/10/03
10 October 2016

Attention Mr. Mahlwele
The Chief Executive Officer
Philadelphia Hospital
Philadelphia Road
Dennilton
1030

By e-mail: Nonhlanhla.Nkuna@dhsd.limpopo.org.za

Re: Request for permission and appointment to conduct a study at Philadelphia Hospital in Sekhukhune District of Limpopo Provincial Government

Dear Mr. Mahlwele,

1. Pursuant to the permission received from the Department of Health of the Limpopo Provincial Government, I hereby submit this request to your office (the Chief Executive Officer of Philadelphia Hospital). The request is as follows:

1.1. I am currently enrolled at the Tshwane University of Technology (TUT) for M-Tech Degree in Business Information System for the 2018 academic year.

1.2. My topic of study is on e-health implementation, with specific focus on e-health system resistance in Limpopo public hospitals.

1.3. My proposal was approved by the TUT Departmental Research and Innovations Committee.

1.4. I was granted permission by the Department of Health of Limpopo Provincial Government.

1.5. My Questionnaire was given clearance by the TUT Faculty Committee of Research Ethics.

1.6. As per the approval of the Department of Health of the Limpopo Government and the Sekhukhune District Executive Manager, I hereby seek permission from your office in order to continue and conduct research at Philadelphia Hospital.

1.7. The information collected will be used to assist me in finalising the Dissertation for the registered degree.
1.8. In order to substantiate my request, the following documents are attached with this letter:

a) Research Questionnaire to be completed by all participants as a method for data collection
b) Research Proposal to outline the study objectives and focus
c) Ethical Clearance Letter from TUT
d) Information Consent Letter to be acknowledged by all participants as my undertaking of the purpose and use of collection information
e) Approval letter from the Department of Health of the Limpopo Provincial Government.

f) Approval from the Sekhukhune District Executive Manager of department of Health of Limpopo Provincial Government.

1.9. These documents will be send through e-mail with this covering letter.

2. Kindly assist by granting me the necessary approval in order for me to go ahead and conduct the interviews and distribute the questionnaire at Philadelphia Hospital. If this request suits you well, I would like to come through on Tuesday 18 October 2016 to handout the questionnaire and conduct interviews with the targeted officials.

3. Please feel free to send all correspondences via e-mail or contact me via cell phone should you need any further clarity.

4. Thanking you much in advance for your assistance.

Sincerely,

Moloi Nkune
Moioi.Nkune@gmail.com
072 403 1281

Approved / Not Approved

CEO'S OFFICE

2016-10-14

Mr. Mahloele MA
Chief Executive Officer
Philadelphia Hospital
7.7 APPENDIX G: CONSENT FROM ST RITA'S HOSPITAL

Ref: SS1/3/1/2/1
Enq: Phahlamohla MA
Ext: 2340
Date: 2016/10/19

To: Moloi Nkune

From: HUMAN RESOURCE UTILIZATION AND CAPACITY DEVELOPMENT

SUBJECT: APPROVAL TO CONDUCT A RESEARCH STUDY “FACTORS CONTRIBUTING TOWARDS USER RESISTANCE ON E-HEALTH IN LIMPOPO PUBLIC HEALTHCARE”

1. Subsequent to the approvals granted by the Limpopo Department of Health and the Office of the Executive Manager, Sekhukhune District, your application to conduct research is hereby acknowledged.
2. We are hereby informing you that your application for the above mentioned research at the hospital on 19 October 2016 is approved.

Regards

[Signature]

Director, Hospital Services
Mr. M. Chokwe

[Stamp]

[LIMPOPO PROVINCE]

CHIEF EXECUTIVE OFFICER

[Stamp]

19 OCT 2016

ST. RITA'S HOSPITAL

[LIMPOPO PROVINCE]

DEPARTMENT OF HEALTH