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E-health and E-governance integration framework for the Namibian government.

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Thesis submitted in fulfilment of the requirement for the degree

Doctor of Philosophy: Informatics

In the

Faculty of Informatics and Design

at the

CAPE PENINSULA UNIVERSITY OF TECHNOLOGY

Supervisor: Prof. Tiko Iyamu

Cape Town

2022

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ABSTRACT

As in many developing countries, the Namibian government strives to improve on service delivery from healthcare and governance perspectives. Thus, the Namibian government has invested efforts and resources in developing the e-health system and e-governance concepts towards improving services in the country. However, both concepts are separated and not integrated with each other. This separation is a problem because the gaps that exist in executing the e-health defeat the primary purpose of improving healthcare services.

The problem emanates from two fronts: from the e-health viewpoint, patients' data are fragmented and decentralised, which sometimes results to duplication. These challenges lead to bigger problems, as diagnoses are duplicated. One of the implications is that it increases the mortality rate in the country. The challenges arise primarily because there is a lack of standard governance, which aids good practice, such as transparency and the evaluation of services. Thus, the aim of the research was to develop a framework that can be used to guide the integration of e-health systems with e-governance for the Namibian government's administrations.

The qualitative method was used for the study and the case study design was applied. Data was collected using unstructured interviews and documentation from the various cases. The cases selected for this study are the Ministry of Information Communication Technology (MICT), Office of the Prime Minister (OPM), Ministry of Health and Social Services (MoHSS) and public and private healthcare facilities. Two theories, Activity theory (AT) and Actor-Network theory (ANT) were used to underpin the study, which means that the theories were used as lenses to analyse the data and interpret the findings from the analysis.

From the analysis, eight factors were revealed to influence the integration of e-health with e-governance from the e-health perspective, namely, disparity, isolation, governance, requirements, know-how, interoperability, synchronisation of data and processes and heterogeneity. From e-governance, six factors were found to influence the integration of e-health with e-governance, namely, know-how, requirements, political-will, heterogeneity, power relationship and governance. These factors were then mapped against each other, and nine factors were found to be common. These nine factors were grouped into three categories, namely, vision which consists of three factors; requirements, know-how, and disparity; IT enablement, which consists of four factors; governance, interoperability, isolation and synchronisation of data and processes, and management, which consists of two factors; power relationship and heterogeneity.

From the findings' interpretation using the four moments of translation from an ANT perspective, six factors were found to mostly determine the integration of e-health with e-governance in the Namibia environment. The factors are (1) alignment between business and technology; (2) environmental assessment; (3) collaboration between actors of both e-health and e-governance; (4) enterprise architecture; (5) skill and retention; and (6) critical success factors to evaluate the fulfilment of the integration goal. Based on these factors, a framework for integrating e-health with e-governance was developed.

The framework that was developed for integrating e-health with e-governance can be used as a reference by other developing countries, particularly in Africa, to counter the current challenges involved in developing an integrated solution. This study will also help stakeholders to understand better why and how the integration of e-health with e-governance is derailed or enabled, which can guide the promoters and managers towards the successful integration of the e-health system with e-governance in Namibia. Such an understanding is significant to health practitioners, IT specialists, and government in improving service delivery. Also, the study benefits the academic domain by adding to the body of knowledge. From the literature review, there is currently no framework for integrating e-health with e-governance; hence, this framework is a valuable addition. The study also adds to existing literature in the fields of health informatics and information systems governance.

Keywords: E-health, E-governance, Integration, Developing countries, Activity theory, Actor-Network theory

ACKNOWLEDGEMENTS

First and foremost, I would like to express my sincere gratitude to my supervisor, Prof Tiko Iyamu, for being my role model and my source of inspiration. I will forever be grateful for his continuous support, patience, enthusiasm, mentorship throughout this whole process. May God continue to bless you.

My sincere gratitude further goes to Dr Martin Ujakpa for the support and encouragement especially when it got tough, and I wanted to give up.

To my sisters Gabby, Tsitsi and Tarry and my brother-in-law, Carl, thank you for your love and unswerving support, I am forever grateful for sacrificing your time to help me with Tayana and always being a listening ear.

To my daughter Tayana, thank you for understanding that mummy had to study.

Lastly, I would like to thank the Lord Almighty for always being faithful and making this possible.

DEDICATION

I dedicate this research to:

- My parents, Musa and Janet Mutasa for what you went through to take me to school. It was tough but you never gave up, look at me now!
- Priscilla Kagijo, I will forever be grateful for everything you did for me. May God continue to bless you.

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GLOSSARY

Terms/ Acronyms/Abbreviations	Definition /Explanation
E-health	The cost-effective and secure use of ICT in support of health and health-related fields, including healthcare services.
E-governance	The application of information and communication technologies for delivering of government services for the benefit of the citizens.
Integration	Inter connecting of different systems to provide a useful exchange of Information.
ICT	Information and Communication Technology
AT	Activity Theory
ANT	Actor-Network Theory
MoHSS	Ministry of Health and Social Services
MICT	Ministry of Information and Communication Technology
OPM	Office of the Prime Minister

CHAPTER 1
INTRODUCTION TO THE STUDY

1.1 Introduction

This chapter introduces the whole study and gives a summary of the seven chapters. The research problem and objectives are presented. A summary of the literature review and methodology are also presented and these are comprehensively discussed in Chapter 2 and 3 respectively. The significance of the research, the delineation, and ethical considerations are covered in the rest of the chapter.

1.2 Background

Increasingly, there are interests in both electronic health (e-health) and electronic governance (e-governance) concepts. Thus, many studies have been conducted in the areas of both concepts across the world (Uribe-Toril et al., 2021; Hartanto et al., 2021; Hooda & Singla, 2020; Mair et al., 2012). In the process of conducting these studies, three things fundamentally standout. Firstly, the concepts have been most studied separately. Secondly, despite the numerous studies, challenges persist. Thirdly, studies where the concepts have been combined did not address the integration aspect, such as Bhuvana & Vasantha (2020), Widén & Haseltine (2015), Sharma & Vaisla (2012), and Roberts & Alsop (2003).

From e-health front, Yusif and Jeffrey (2014) revealed factors such as socioeconomic development constraints, technology infrastructure and operational issues, and skills and human resource as the major challenges of most e-health projects in Africa. According to Hoque, Bao and Sorwar (2017), the success of e-Health implementation lies with end-users. Gregory and Tembo (2017) suggest that the implementation of e-health is characterized by training, lack of regulatory policy, and application of technology.

In the area of e-governance, Basu (2004) examines the legal framework relating to e-governance from the perspective of developing countries. Also, from developing countries' perspective, Iqbal and Bagga (2010) highlight challenges of e-governance as trust, resistance to change, digital divide, cost and privacy, and security. In a study conducted from Tanzania context, Mahundu (2016) argues that implementation challenges of e-governance are not the same, they differ from country to another, based on sociotechnical factors.

The challenges remain unresolved in both e-governance (Gregory & Tembo, 2017) and e-health (Hossain et al., 2019). Most importantly, none of the existing studies address integration or integration between the two concepts, e-governance and e-health. This contributes to the motivation for this study, which focuses on the Namibian environment.

The Namibian healthcare environment is divided into various levels. The unconsolidated data and unintegrated systems make their use by the different health facilities challenging (Iyamu & Hamunyela, 2014). Across Namibia, there are 446 health facilities, which include hospitals, health centres, clinics, stand-alone Voluntary Counselling and Testing (VCT) centres, and sick bays (Ministry of Health and Social Services (MoHSS), 2011). The facilities are under the management of different authorities, including the Ministry of Health and Social Services (MoHSS); private-for-profit; missionary; non-governmental organisations (NGOs); Ministry of Defence (NDF) and the Namibian Police Services (NPS). The facilities are mandated to deliver reputable healthcare services to the communities (MoHSS, 2011).

The Namibian government invested over 54million Namibian dollars towards e-health between the years 2011 and 2014, to offer better health services to its citizens (Smit, 2011). However, with all this input, many systems and processes used in Namibia's healthcare sector are still completely manual, paper-based, or partially electronic. These challenges exist because there are no governance, policies, and standards in the development and use of the health systems. Subsequently, this has led to poor service delivery through e-health, resulting in loss of medical records, duplication, and inconsistent health records. This could lead to incorrect diagnosis of patients that can cause loss of life. These deficiencies or challenges can be addressed through the integration with e-governance.

Another problem that Namibia is facing is the issue of a fragmented e-health system (Dlodlo & Hamunyela, 2017). Nengomasha et al. (2018) also reported that the Namibian e-health system is fragmented, resulting in the duplication of diagnosis, tests, and treatment. Subsequently, this has led to poor service delivery of health facilities to the communities. This is a major issue faced by most developing countries. Additionally, Fanta and Pretorius (2018) state that e-health implementation efforts in developing countries are fragmented because of pressure from donors and economic and political factors. They maintain that there is evidence that many e-health pilot projects introduced in developing countries could not progress to full-scale because of this and Namibia has not been spared. There is no integration between the e-health system of Namibia and its e-governance framework. Applications in e-health are developed and implemented as standalone applications without interacting with any other government system.

1.3 Research problem

As in many developing countries, the Namibian government strives to improve on service delivery from healthcare and governance perspectives. Thus, the Namibian government has

invested efforts and resources in developing the e-health system and e-governance concepts towards improving services in the country. However, both concepts are separated and not integrated with each other. This separation is a problem because the gaps that exist in executing the e-health defeat the primary purpose of improving healthcare services.

The problem emanates from two fronts: from the e-health viewpoint, patients' data are fragmented and decentralised, which sometimes results to duplication. These challenges lead to bigger problems, as diagnoses are duplicated. One of the implications is that it increases the mortality rate in the country. The challenges arise primarily because there is a lack of standard governance, which aids good practice, such as transparency and the evaluation of services. Thus, it is critical to integrate the e-health systems with e-governance to fill the current gap. Otherwise, the challenges highlighted above will continue to persist and impact the health of citizens because of poor service, and negatively affect the economy of the country.

1.4 Research aim and objectives

Based on the problem presented above, the aim of the research was to develop a framework that can be used to guide the integration of e-health systems with e-governance for the Namibian government's administrations.

Research objectives

In achieving the aim of the research, the following objectives were formulated:

i. To understand how both an e-health system and e-governance are developed and implemented within the Namibian government environment.
ii. To examine the factors that can influence the integration of an e-health system with e-governance in the Namibian government environment.
iii. Based on the findings from the above objectives, a framework will be developed for integrating an e-health system with e-governance for the Namibian government.

1.5 Research questions

The following research questions were articulated based on the aim and objectives of the research:

Main question

How can the concepts of e-health systems and e-governance be integrated within the Namibian government environment?

Sub-questions:

i. How are both e-health systems and e-governance developed and implemented within the Namibian government environment?
ii. What are the factors that can influence the integration of the e-health systems within e-governance in the Namibian government environment?
iii. How can a framework be developed based on the responses to the above questions?

1.6 Literature review

This section presents a literature review on the study. The focus areas include information and communication technology, e-health, e-government, and integration of systems. Also covered in this section are the actor-network theory and activity theory that underpin this study.

1.6.1 Information and Communication Technology

The term Information and Communication Technology (ICT) was extended from the term Information Technology (IT) by combining information technology and communication (Lewis & Gazi, 2015). The need to combine the term IT and communication stemmed from the fact that information passed through technology has no meaning if communication is absent in the process (Lewis & Gazi, 2015). Information disseminated by any means of technology such as fax, email, telephone, cell phone and other social media platforms is exchanged from audience to audience; hence, the result is communication. To clarify further, Sarkar (2012:31) referred to ICT as "the varied collection of technological gear and resources which are used to communicate, generate, distribute, collect and administer information."

ICT plays a pivotal role in the economic, social, environmental, political and technological aspects of the world such that life has been made easy (Dhindsa et al., 2013). The role of ICT in development cannot be overlooked as it has become a force to reckon with in improving people's ways of life and the general growth and development of nations. Considering the above, Ssewanya and Busler (2007) highlight that ICT has introduced efficiencies in old services and has brought about new and more advanced services which have given birth to national development strategies in both developed and developing countries. Also, ICT provides faster and more accurate communication and further provides adequate storage with the use of electronic devices and software applications (Dhindsa et al., 2013). The health system has been graced by a magnitude of ICT advancement in a quest to improve service delivery and reduce the number of illnesses and deaths. ICT systems have been developed in the health sector to transform e-health anticipated to offer improved health services (Kuyoro et al., 2012).

1.6.2 E-health in developing countries

E-health's implementation and functioning rate in developing countries remains low (Palvia et al., 2012). In support, Healy (2008) pointed that it has been very challenging implementing e-health systems in different parts of the world but mostly in developing countries. This challenge is shared by the United Nations agencies and health authorities at international, national and local levels and is attributed to the absence of an e-health implementation framework (Healy, 2008). However, Fanta and Pretorius (2018) highlighted that many governments in developing countries and different stakeholders have shown great interest in adopting e-health. Ouma and Herselman (2008) did a technology assessment in the rural areas of Kenya, particularly in Nyanza Province, to find out how the hospitals are using ICT to improve service delivery within the rural hospitals. They went on to conclude that ICTs can improve the quality of service in rural hospitals and reduce costs.

Zambia has introduced the Smart care e-health innovation that enables patient's data to be stored on a smartcard and this helps the health institution visited by the patient to track medical history and ensure confidentiality (Mwiinga, 2013). However only 1.8% of healthcare facilities are using this system (Malunga & Tembo, 2017). The main problem is the factors influencing the implementation of the system. In Namibia and other developing countries, although there are various e-health systems in place, their functionality has been recorded as weak (Kamau et al., 2017) due to various factors such as incomplete and fragmented data sources and lack of documentation (Nengomasha et al., 2018). Similarly, the factors that determine sources are empirically unknown.

In a study of e-health in Ghana, it was found that there was a lack of ICT infrastructure, lack of basic knowledge among health professionals on how the systems work, and internet accessibility (Bedeley & Palvia, 2014). Developing countries, in general, have been found wanting better e-health implementation strategies.

Greece is a developing country that has effectively implemented an e-health system. Healthcare in Greece is provided by the national health system (NHS), and in the past few years, a couple of e-health services have been introduced in line with European Union (EU) priorities to control costs and improve services in a secure manner (Katehakis, Kouroubali & Fundulaki, 2018).

1.6.3 E-governance in developing countries

E-governance efforts are a step in the right direction for reforms as electronic systems have scored high in improving service delivery (Shikha, 2009). E-governance is very vital in

developing countries, as highlighted by Ndou (2004). He recommended that to have a huge economic and social development, developing countries needed to put more effort into the drafting of policies and procedures to promote this. However, Visser and Twunomurinzi (2009) argue that e-governance in developing countries has been associated with failure in most cases, although most governments continue to invest in ICT-based programmes, policies and interventions.

Furthermore, Shikha (2009) highlights that most developing countries find it difficult to achieve their e-governance goals despite taking pride in introducing such reforms. Interesting to note is the effort by governments of developing countries to implement e-governance strategies, yet political instability and other leadership issues hinder their success. In support, Nawafleh et al. (2012) pointed out that social, political and economic downturn in developing countries has failed the successful implementation of e-governance.

Furthermore, the great differences in capacities of developed and developing countries is a precursor for effective e-governance. In support, Nawafleh et al. (2012) asserted a positive relationship between a country's capability and effective e-governance. The more developed a country is, the more it can invest in the best electronic infrastructure. Although it is a developing country, Namibia has made strides in maintaining a moderate e-governance stance. Quite notable efforts have been noted, such as the improvement of the Home Affairs Operating System covering most of the borders surrounding Namibia, which was implemented when the ministry employed a turnaround strategy. However, Nengomasha and Uutoni (2015) maintained that Namibia still lagged in e-governance because of the low usage of ICTs and affordability.

Healthcare providers and governments have no choice but to meet healthcare demands for citizens, and the application of e-health is, therefore, crucial (Abass, 2016). Furthermore, Widen and Huseltine (2015) emphasised that e-health and e-governance should not be treated as separate entities, but they are correlated because e-governance sets the scene for infrastructure, policy, cross border and top-level requirements, while e-health needs the discipline, standards, good practice and scale from e-government.

1.6.4 Integration of systems

System integration is a process whereby a unified system is developed from not specifically designed to work together. Components of an integrated system are often systems (Chapman & Kihn, 2009). In system integration, stand-alone systems are interconnected to share resources. Before systems can be integrated, standards and policies need to be in place to

guide the integration process. The lack of standards leads to no interoperability between systems, meaning that systems developed by different vendors and on different platforms cannot be integrated (Iroju et al.,2013). It is possible to have a perfectly working stand-alone system that cannot be integrated for different reasons, including software and infrastructure incompatibility.

Panetto and Cecil (2013) identified three levels of systems integration: physical, application, and business integration. Physical integration has to do with the infrastructure, devices and networks. Application integration involves the interoperability of software applications and database systems, and business integration involves coordinating functions that manage and control the business process (Panetto & Cecil, 2013).

Systems integration in e-health is necessary because it enables data to be shared amongst the different healthcare facilities and other stakeholders, thereby reducing duplication of data and repetition of effort.

1.7 Underpinning theory

Two theories were selected to underpin this study to accomplish its aim, which was to develop a framework for integrating the e-health system within the e-governance framework for the Namibian government. These two theories are Actor-Network Theory (ANT) and Activity Theory (AT). Mkhomazi and Iyamu (2013) assert that using a theory is crucial in the analysis and collection of data hence the use of the theories above in this study.

1.7.1 Activity theory

Activity theory (AT) originated from Vygotski and Leont'ev in their studies of cultural-historical psychology (Hasan & Kazlauskas, 2014). The theory is often used as a lens to gain a deeper understanding of human activity within a system, through its tenets: subject, tool, object, rules, community and division of labour (Kelly, 2018; Engestrom, 2001). AT has been applied in several IS studies and Hakkinen and Korpela (2006), suggest that AT is useful in understanding the activities of user groups in IS development and information about the relationship between actors in a system. Iyamu and Shaanika (2018) developed a guide to use AT in IS research and suggested six elements to guide the analysis. These are what, who, how, when, where and why (Iyamu & Shaanika, 2018). These are described in depth in chapter 2.

1.7.2 Actor-Network Theory (ANT)

Actor-network theory (ANT) is a socio-technical theory that seeks to understand and explain the relationship between social and technical factors that influence an activity happening within a network (Iyamu & Mgudlwa, 2017). ANT views the world as comprising different networks,

and the networks can include human and non-human actors. In ANT, the social and technical are treated with equal value, and this also applies to human and non-human actors (Nehemia-Maletzky et al., 2018). None is given more priority over the other and hence they are treated as making the same contribution to the network. ANT incorporates 'moments of translation' whereby an activity in IS is given a new meaning. There are four moments of translation available in ANT, and these are problematisation, interessement, enrolment and mobilisation. A more detailed account of ANT and moments of translation is in chapter 2.

1.8 Research methodology

This section presents the methodology applied in the research. The concepts discussed are as follows: research philosophy, paradigm, approach, methods, design, instruments, data collection and data analysis.

1.8.1 Research Philosophy

Research philosophy refers to the nature of knowledge and its development in the context of a phenomenon being studied (Saunders et al., 2009). Three research philosophies commonly applied in the field of IS are ontology, epistemology and axiology (Walliman, 2017).

1.8.1.1 Ontology

Ontology refers to the nature of reality and what exists (Walliman, 2017). Al-Saadi (2014) suggests that with an ontological assumption, a researcher can give an account of what is known or what truth exists in a certain type of research. The truths or realities were: (1) e-health system and e-governance frameworks exist within the Namibian government, (2) both frameworks are not integrated, and (3) the factors that can influence the integration were not known. Thus, what was known is how and why both e-health systems and e-governance exist, from technical and business (government) perspectives. This leads to epistemology inquiry.

1.8.1.2 Epistemology

Epistemology is the nature of knowledge (Saunders et al., 2012). A researcher's belief constitutes or shapes the truth if the researcher has justification for his or her beliefs. In this case, the knowledge available for e-health and e-governance integration is what the researcher considers as valid or factual knowledge. Thus, epistemologically, this study was set to inquire (investigate): (1) how both e-health system and e-governance frameworks currently exist within the Namibian government, (2) why both frameworks are not integrated; and (3) the factors that can influence the integration.

1.8.1.3 Axiology

The axiological assumption holds that one's values play a role in the research process. A researcher has his/her values, which can come to play when doing research (Saunders et al.,

2012). For instance, the belief systems and frame of reference of the researcher can influence the research decision. With axiology, however, the research cannot only value themselves, but should also consider the values of others. Kivunja and Kuyini (2017) specify that axiology will help a researcher see how valuable research subjects are or human subjects are in the research.

1.8.2 Research paradigm

Research paradigms refer to theoretical frameworks within which the practices of art and science take place (Saunders et al., 2012). Some paradigms include positivism, critical realism, constructivism and interpretivism (Thanh & Thanh, 2015). These paradigms are often associated with epistemology philosophy. Positivistic paradigms hold that real events can be noticed empirically (Kaboub, 2008). Therefore, pre-conceived ideas about reality are not accepted, and only ideas that are proven empirically are considered. Constructivism maintains that learning is an active and constructive process (Purwarno, 2018). In other words, people create their subjective representations of objective reality through learning. An interpretive paradigm is of the view that the truth is realised through lived experiences (Thanh & Thanh, 2015).

The study followed the interpretive paradigm. This was primarily because the paradigm directs the researcher into probing human views, experiences, and thoughts in pursuit of first-hand accounts (Thanh & Thanh, 2015). This helped to gain a better understanding of stakeholders' (health professionals, government representatives, and citizens) views, opinions and experiences about the existence of e-health and e-government in the country.

1.8.3 Research approach

There are two main research approaches that researchers usually use, namely, inductive and deductive approaches. The deductive approach is often applied to test theory by looking at the cause of a phenomenon (Berente et al., 2018). The deductive approach begins with formulating a testable hypothesis or theory. In other words, a theory or hypothesis underlying the research is generally formulated, which reflects reality or truth. The hypothesis is a tentative statement that predicts the research outcome but will be accepted or retained after the study is done (Bless et al., 2013). The inductive approach generates new theories based on the studied phenomenon (Berente et al., 2018). It works from the bottom-up, using the participants' views to build broader themes and generate a theory interconnecting them. In summary, the theory related to the study is formulated based on the results or outcome of the findings. As this study aimed to develop a framework, the inductive approach was more suitable. In addition, the inductive approach was suitable for this study because of its qualitative nature.

1.8.4 Research methods

There are two research methods, qualitative and quantitative. However, the methods can be combined, which is referred to as the mixed method. The quantitative method is often used for "explaining phenomena by collecting numerical data that are analysed using mathematically based methods (in particular statistics)" (Bhawna & Gobind, 2015:49). This method quantifies results to gather more objective knowledge from respondents. Qualitative researchers believe that people's behaviour occur naturally, and different people's choices are influenced differently; hence, the need to understand participants 'different accounts rather than generalising results based on assumptions that human behaviour is predictable, as quantitative researchers believe (Antwi & Hamza, 2015). The mixed method is a hybrid that combines both quantitative and qualitative methods in a study (Bless et al., 2013). This study employed the qualitative method. A qualitative method allows the researcher to obtain rich and subjective information from participants seeking an in-depth understanding of human behaviours, attitudes, values, experiences and motivations (Sutton & Austin, 2015). accounts of participants (Antwi & Hamza, 2015).

1.8.5 Research design

There are different types of research designs, including surveys, action research and case studies. Action research involves researchers solving a certain problem to acquire knowledge about a phenomenon by using the knowledge actively to achieve a specific purpose (Saunders et al., 2012). A survey is a systematic approach that enables information from a larger population to be gathered, and solicits information on participants' behaviour, attitudes, perception and beliefs that cannot be observed directly (Ponto,2015). Bartlett and Vavrus (2017:6) define the case study research method as: "an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident." The case study design was used in this research because it enabled the researcher to have a full picture of the activities and interactions involved in e-health and e-governance implementation. The Namibian Government Ministries where the concepts of e-health and e-governance have been implemented are the study cases. This is primarily because Namibia is the focus of the study

1.8.6 Data Collection Technique

Several different techniques exist for collecting data and these include interviews, document analysis, and observation (Kabir, 2016). The interview technique can be structured, semi-structured or unstructured (Antwi & Hamza, 2015). Interviews explore people's feelings, emotions and attitudes in the probing process (Mohajan,2018). A structured interview consists of predetermined responses that the participant should respond to by choosing the best

alternative, and these are in the form of questionnaires. It does not allow follow-up questions or probing of responses from participants (Antwi & Hamza, 2015).

Unlike the structured, the semi-structured interview consists of questions, which are flexible to allow follow-up and probing of participants' responses to questions. Gill et al. (2008:293) stated that "semi-structured interviews consist of several key questions that help to define the areas to be explored, but also allows the interviewer or interviewee to diverge in order to pursue an idea or response in more detail." One of the advantages of semi-structured interviews is that an interviewer can probe more or diverge so that they can solicit more information on a certain point (Bless et al., 2013).

The study made use of semi-structured interviews. This consisted of open-ended questions that made room for probing in the process of collecting data from participants. This study also used documentation from the government and other stakeholders. Documentation from government policies, reports, Ministry of Health reports, and other stakeholders' documents that are useful for this study was gathered

1.8.7 Data analysis

Activity theory (AT) and actor-network theory (ANT) were used as lenses to guide the analysis of the data. In the analysis, AT was used to examine (1) the different activities in the deployment of the e-health and e-governance in Namibia, and (2) the roles of people in the deployment of the e-health and e-governance in the country. These are two aspects that the ANT does not focus on. ANT was used from a different angle to examine: (1) how networks were formed, and the roles of the networks in the deployment of the concepts, which is different from the roles of people; (2) to understand the interaction that happens between actors and network; and (3) how situations and decisions shift from one position to another. These are areas which the AT does not focus on.

1.9 Significance of the research

The study focused on understanding the factors that influence the integration of e-health with e-governance in Namibia. This will help the stakeholder better understand why and how the integration is derailed or enabled, which can guide the promoters and managers toward successful integration of the e-health system with e-governance in Namibia. Such understanding is significant to health practitioners, IT specialists, and the government in improving service delivery in the country.

Another significance of this study is that it can be used as a reference point for other developing countries, particularly in the African continent, can learn from its results. In addition, the study will add to existing literature. This is a contribution to the body of knowledge from e-health, e-governance, and developing country perspectives.

1.10 Justification and motivation of the Study

Despite assuming potential benefits, the adoption rate of e-health solution is low in many countries (Hossain et al., 2019) including Namibia, particularly in the rural areas of the countries. This makes integration of e-health with e-governance rare. Although not the focus of their study, Gregory and Tembo (2017), identify the need to create an integrated system that coordinates the activities of other systems, to improve service delivery in Zambia. That other system could as well be e-governance, primarily because it facilitates society's expectations (Basu, 2004). The implementation of e-governance also poses various socio-technical challenges in attempt to improving quality service (Mahundu, 2016). This is attributed to lack of integration with other solutions such as the e-health, to bridge the gap where it lags.

The integration facilitates and coordinates services between the e-health and e-governance. Systems' integration is most effective in the use of technology solution to provide services. The integration is the assimilation of technology solutions, resources and practices into a single routine for management and transparency purposes. The two concepts maybe well implemented, does not necessarily mean that their individual goal and objectives are achieved. This is primarily because the cost may be prohibitive owing to lack of synergy and resource sharing. Also, it is highly likely that duplications occur. In addition, transparency is not achieved, which contribute to poor performances in many countries.

The research has two key motivations. Firstly, many countries develop e-health and e-government separately, thereafter, try to implement them toward achieving the same goal and objectives, to improve the quality of services that they provide to the communities. This research by identifying key components that influence the integration of the two concepts, e-health with e-governance, seeks to contribute to the accomplishment of a consolidated strategy. Secondly, while many countries are developing e-health and e-government separately, little is known about the non-technical factors that influence integration of the two concepts. To this end, the Activity Theory and Actor-Network Theory were employed to examine the factors that influence the integration of e-health with e-governance in the Namibian government environment.

1.11 Delimitations of the Research

There are four limitations to this study that could have implications for further research work. They are as follows:

i. During the study, it was accepted that e-health and e-governance exist in the Namibian environment. Thus, the development and practices of the concepts were taken as a given.

ii. The developments of e-health and e-governance were not accessible to the researcher and while some aspects of it were discussed, the research in general focused on the integration aspect.

iii. The role of the users of the solutions was not investigated. The focus of the research was not on the application of the individual solutions.

iv. Finally, the events post integration were not investigated. It would be interesting to know more about the interaction between the actors and the role sociotechnical factors continues to play.

Given the limitations presented above, it would be interesting to conduct further research in the areas of these limitations. The conclusion chapter suggests some further opportunities for research.

1.12 Ethical consideration

The protection of study participants using relevant ethical principles is very vital in any research. Ethical considerations help protect the research participants' human rights by ensuring they are protected from any kind of harm, which can be socially, physically or mentally (Arifini, 2018).

In this study, participants were provided with adequate information on the study to enable them to make an informed decision whether to participate or not. No participant was forced or coerced to participate. Written consent was obtained from all participants, and it was explained to them that they were participating voluntarily and were free to withdraw at any time of the study.

The participants' names and identity in the data collection, analysis and reporting of the study findings were not revealed or published; pseudonyms were used to protect their anonymity and confidentiality. Their privacy and confidentiality were maintained during the interviews by ensuring they were done in a private room. The CPUT research code of ethics was used to guide this study and protect all participants.

1.13 Structure of the thesis

This thesis was structured into seven chapters as follows:

Chapter 1: Introduction

This is the introductory chapter of the thesis, and it details the research problem, objectives of the study and research questions. It also summarises the literature review and gives an overview of the methodology.

Chapter 2: Literature Review

This chapter presents a review of literature on the study. The focus areas of the review as related to this study are presented in this chapter and include systems integration, e-health system, e-governance, underpinning theory (actor-network theory and activity theory), and the complementary use of theories**.**

Chapter 3: Research Methodology

This chapter presents the research methodology of the study. It details the philosophical assumptions, methods, approaches, and techniques applied in this study.

Chapter 4: Overview of Case Studies

This chapter presents the overview of case studies targeted for this research. The procedures followed during fieldwork, including some ethical considerations, were discussed before the cases were presented in detail.

Chapter 5: Data analysis

This chapter presents the data analysis of the study guided by two theories, namely actor-network theory and activity theory.

Chapter 6: Findings and Interpretation

This chapter presents the findings and interpretation of the study under the lens of ANT's moments of translation, from which a framework for integrating e-health with e-governance was developed.

Chapter 7: Conclusion and Recommendations

This chapter concludes the study and presents the recommendations, contributions, and discusses further areas of study.

1.14. Operational Definitions of Key Concepts

Table 1.2 presents the definitions, descriptions of the key concepts that are used in this study.

Table 1.1: Operational definitions of key words

Key concept	Operational definition
E-health	E-health refers to healthcare services delivered using electronic devices and related technologies
E-governance	E-governance refers to the use of electronic and technology solution to provide and facilitate government services, and to disseminate and exchange of information.
IT solution	Refers to hardware, software, network protocol, and databases including connectivity.
Integration	Refers to the process or practice of incorporating of 2 or more concepts for a common goal.
Framework	Framework refers to a conceptual structure that connects different but related components towards a specific purpose.
Activity theory	A theoretical approach that focuses on purpose, transformation, and development of interaction between actors.
Actor-network theory	A theoretical approach that focuses on social system.

1.15 Summary

This chapter gives an overview of the study. The research problem was articulated, and the aim, objectives and research questions were derived from the research problem. The study aimed to develop a framework to guide the integration of e-health with e-governance for the Namibian government's administrations.

The methodology used in the study was also presented. The study followed the interpretivist paradigm, and as this study was aimed at developing a framework, the inductive approach was used. The qualitative method was used, and the inductive approach was employed. Documentation and Interviews were used as data collection methods, and data was analysed guided by the actor-network theory and activity theory. The significance of the study and research delineation were also discussed together with the ethical considerations.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

Literature review is a detailed and full synopsis of previous research related to a specific area of study, including what is known and what is not yet known about the study area (Hart, 2018). Literature review enables researchers to be guided by credible information related to their own study so that they align with the research process and objectives. Considering the above, this chapter presents a review of literature that was conducted on the integration of the e-health system within the e-governance framework of the Namibian government.

The review's focus areas of this study are presented in this chapter. They include systems integration, e-health system, e-governance, underpinning theory (actor-network theory and activity theory), and complementary use of theories.

2.2 Systems Integration

Systems integration is a process whereby stand-alone information and communication technology (ICT) systems are combined to make up one system (Garcia et al., 2015). In systems integration, standalone systems are interconnected to share resources such as data, network, and server (Tanenbaum & Steen, 2016). Standards and policies are used to guide the integration of systems (Bürklea et al., 2018). Lack of standards can lead to systems' interoperability challenges. This means that systems developed by different vendors or individuals for different platforms cannot be integrated (Iroju et al., 2013). According to Fanta and Pretorius (2018), it is possible to have a perfectly working standalone system which cannot be integrated for different reasons, including software and infrastructure incompatibility. However, standalone systems that are not integrated make the sharing of patients' data difficult or impossible (Fanta & Pretorius, 2018). Considering the above, the lack of health information systems integration in a secure manner is an impediment to efficient and effective healthcare delivery (Dlodlo & Hamunyela, 2017).

Zanzibar has found it particularly difficult to integrate its health system and this is mainly attributed to the many individual vertical systems that characterise it (Nyella, 2011). These vertical systems are because of the heterogeneity of interests among donors resulting in individual systems that are focused on different diseases, including malaria and human immunodeficiency virus (HIV). Furthermore, in Uganda, another developing country, health information systems integration lacks prior planning thereby failing to come up with a workable

system (Kiberu et al., 2017). Kiberu et al. (2017:3) reported that in Uganda “most e-health applications and products have been run in silos and are not interoperable or compatible, preventing the sharing of information and services.”

Three levels of systems integration were identified by Panetto and Cecil (2013). These are physical, application, and business integration. Physical integration has to do with the infrastructure, the devices and networks. Application integration involves the interoperability of different software and systems, including databases, and business integration is the harmonisation of all roles and processes within a business entity (Garcia et al., 2015; Panetto & Cecil, 2013).

The importance of systems’ integration in e-health is vital in that it allows data to be shared amongst the different healthcare facilities and other stakeholders, such as policy makers (government), thereby reducing the duplication of data and repetition of effort (Maksimovic & Vujovic, 2017). This does not mean the integrity and privacy of patients’ data will not be kept (Nielsen,2017). In relation to the above, Widen and Huseltine (2015) emphasised that e-health and e-governance should not be treated as separate entities. The authors argued that e-governance sets the scene for infrastructure, policy, cross border, and top-level requirements; and e-health needs the discipline, standards, good practice and scale from e-governance.

2.3 E-health system

E-health entails all health-related services that are delivered through ICT systems; that is, health information systems (HIS), data capturing, and analytics, as well as electronic health records (Barbabella et al., 2017). In this case, medical data is transmitted for the purposes of diagnosis, treatment, management, monitoring, and follow-up of patients’ health conditions. Healthcare service providers such as medical aid schemes, laboratories, medical imaging, and blood transfusion services, among others, greatly need compact and organised medical data for them to deliver quality and safe healthcare service (Ross et al., 2016). Dlodlo and Hamunyela (2017) highlight that medical data, as vast as it is, needs to be organised in such a way that it is arranged systematically, and accessed and interpreted easily for the effective management, treatment, and diagnosis of patients’ health conditions. In the same vein, LeGledic et al. (2011:597) highlight that “e-health systems improve patients’ quality of life by giving them the exact care needed due to constant monitoring and efficient diagnosis”. Furthermore, Yaraghi (2015) acknowledges that the presence of e-health systems prevents redundancy and medical errors by healthcare service providers while increasing the quality of healthcare service delivery.

Systems' integration in e-health is vital in that it allows data sharing amongst the different healthcare facilities and other stakeholders, thereby reducing the duplication of data and repetition of efforts (Norgaard et al., 2015). Healthcare actors or stakeholders can be categorised into humans and nonhumans. The humans include health practitioners (such as medical doctors, nurses, pharmacists), policy makers (government, profession association), and patients. The nonhuman includes entities such as medical aid organisations, clinics, laboratories, and blood bank, policies, and programmes. Bygstad et al. (2015) explained that the integration of e-health systems makes information and data sharing easily accessible to healthcare stakeholders at any given time, place, and setting. As reported by Kaelber and Bates (2007), 18% of patient safety errors could be avoided if the right information about the right patient is available and used at the right time. The challenge is whether the integration approach takes privacy and confidentiality of the information into cognizance. Therefore, set standards are needed to aid the integration and ensure that such ethical issues are incorporated and followed.

The integration of e-health systems enhances automated information sharing of health data across health facilities (Unertl et al., 2012). This implies that whenever a patient visits another healthcare centre, his or her health record should be identified in that centre without explaining their history. Patients' medical records from a clinic should be accessed at the laboratory when the patient goes for tests if the systems are integrated. Medical practitioners and other healthcare service providers will also find it easy to provide quality service (Mandirola et al., 2015).

In their study, Ariani et al. (2017) found that utmost service provision in the medical/health sector is enhanced by online consultations between patients and doctors, including the use of email to transmit the images and data of patients. Atinga et al. (2020) also highlight that overall, e-health improves the quality of care given to patients and leads to patient satisfaction. However, in some countries, medical data is still fragmented amid efforts by most governments to introduce e-health in their mainstream health sectors (Nengomasha et al., 2018). Countries such as Zambia, Zimbabwe, Namibia, Kenya, and Uganda have fragmented medical data (Furusa, 2018; Malunga & Tembo, 2017; Kiberu et al., 2017; Kamau et al., 2017).

2.3.1 E-health in developing countries

Increasingly, many governments in developing countries show interest in adopting e-health (Fanta & Pretorius, 2018), which is corroborated by scholarly studies. Some examples include: Hoques et al. (2016) that is about the e-health system in Bangladesh; Ouma et al. (2009) focused on the use of ICT to improve healthcare service delivery in rural areas of Kenya; and

in Zambia, the use of Smartcare as part of e-health innovation was introduced purposely to enable storing patient's data tracking the medical history and ensuring their confidentiality. (Mwiinga, 2013).

Despite this interest, e-health's implementation and functioning rate in developing countries remain low (Mauco et al., 2020; Pretorius, 2018 & Hoque et al., 2016). Along the same line of argument, Mauco et al. (2016) pointed out that it is challenging to have successful e-health projects in many parts of the world. This was also supported by Wynn et al. (2020) who explained the difficulties that are being faced in implementing e-health worldwide. According to Malunga and Tembo (2017), only 1.8% of healthcare facilities are using e-health in Zambia. In Namibia and some other developing countries, although there are various e-health systems in place, their functionality has been recorded as weak (Kamau et al., 2017). This can be attributed to various factors, such as incomplete or fragmented sets of data, as well as lack of documentation (Nengomasha et al., 2018). These challenges can be addressed by integrating systems, as has been done in other areas, such as Estonia (Widen & Heseltine, 2015).

A study of e-health in Ghana found that there was a challenge with shortage of ICT infrastructure, and insufficient IT skills among health professionals, which affect the use of the systems for service delivery (Bedeley & Palvia, 2014). Palvia et al. (2012) suggested better administrative strategies and training and up skilling health personnel to realise improved healthcare service delivery through e-health. This is primarily because if users are insufficiently trained, the full benefits of the system would never be realised. As a result, inadequate training of users has resulted in the failure of e-health systems. In addition, developing countries, particularly in Africa, have been found wanting in better e-health implementation strategies (Mauco et al., 2016).

One example of the few developing countries that have successfully implemented a fully functional e-health system is Greece (Katehakis et al., 2018). Greece has invested a lot of resources in building an effective e-health and e-governance system that has resulted in lowering costs and offering better services to its citizens (Katehakis et al., 2018).

Lack of concrete and comprehensive legislation and policies formulated by stakeholders, such as government policymakers, seems to contribute to the challenge that prevents the effective implementation of e-health in some developing countries (Furusa & Coleman, 2018). There are no clear policies and procedures as to how different government departments are supposed to work together with health institutions in the implementation of e-health systems

as in Namibia. Nielsen (2017) explains that systems' integration standards and models are also needed to guide the implementation of e-health. Moreover, lack of clear legislation and standards in the transfer, security, and confidentiality of information between stakeholders has led to fragmentation in e-health (Malunga & Tembo, 2017; Nielsen, 2017; Mugo & Nzuki, 2014).

Failure to realise e-health is also linked to a lack of prior planning (Kiberu et al., 2017). Mandirola et al. (2015) point out that lack of planning has resulted in e-health projects exceeding their stipulated budgets, which often leads to the termination of some projects. In some areas, the lack of planning is because of not appropriately identifying the key stakeholders, and not having a good understanding of the resources that are needed. It seems clear that if planning is not done well, implementation will not be successful (Bygstad et al., 2015). These challenging factors are critical in the integration of e-health with e-governance, and many implementers or stakeholders have not been able to detect or understand the factors that influence the process.

2.4 E-Governance

Although there is no universal definition for E-governance, it is an application of IT that enables citizens to access government services and information electronically (Dhindsa et al., 2013). Linders et al. (2018) assert that e-governance efforts are a step in the right direction for reforms, as the use of electronic systems has scored high in improving service delivery. Based on this premise, e-governance is very vital in developing countries (Beaumont, 2017; Ndou, 2004). Beaumont (2017) recommended that to have a huge economic and social development, developing countries needed to put more effort into the drafting of policies and procedures to promote it. This is the type of challenge the Namibian government has been grasping with for many years (Amukugo & Peters, 2016). Bhattacharya and Suri (2017) argue that e-governance in developing countries has been associated with failure in most cases, although most governments continue to invest in ICT-based programmes, policies, and interventions.

Some of the challenges which many developing countries are confronted with include internet connectivity, political instability, inadequate ICT infrastructure, and infrastructure management. These challenges, one way or the other, affect the deployment and use of e-government systems, making citizens lose out on the benefits (Beaumont, 2017). Furthermore, Giri and Shakya (2019) highlight that most developing countries find it difficult to achieve their e-governance goals even though they take pride in introducing such reforms. It is interesting to understand why governments of many developing countries continue to make

huge efforts in trying to implement e-governance strategies even though political instability and other leadership issues hinder their successes (Gu et al.,2021; Khan, 2017; Shikha, 2009). In their study, Nawafleh et al. (2012) pointed out that social, political and economic downturn in some developing countries has prevented the successful implementation of e-governance. These challenges are not synonymous with only Namibia.

In Malaysia, an e-health system was introduced but failed, owing to lack of integration with an e-governance system (Ismail & Abdullah, 2017). In Uganda, e-health and e-governance integration was introduced but lacked prior planning at the initial stages such that it has been difficult to implement (Kiberu et al., 2017). Nyella (2011) reported that in Tanzania, political interference, connectivity problems, weak policies, and lack of integration between e-health and e-governance led to the unsuccessful implementation of the e-health system. Considering the above, Thabit and Jasim (2019) highlighted that limited financial capacity and a failure to maintain and integrate data resulted in the failure to implement comprehensive and successful e-governance. Although this study focuses on Namibia, its outcome would be of interest and benefit to many developing countries.

2.5 E-health and E-governance

Integration of e-health and e-governance can result in improved healthcare service delivery (Radhikaashree, 2018), although there is no empirical evidence of such in Africa. However, the scholarly argument can be attributed to the premise that e-governance efforts provide policies, regulations, and guidelines that enhance automated information sharing of health data across health facilities (Alguliev & Yusifov, 2017). The fact is, from an e-health view point, patient's data have been fragmented in many countries (Mbondji et al., 2014). From an e-governance perspective, there have been challenges in tracing, monitoring, and collaborating, as well as in transparency (Seitio-Kgokgwe et al., 2015).

Tracing and monitoring health information, records, and data, using ICT systems, help track progress, ensure coordinated information sharing, health interventions and resource management (Angula & Kandjeo, 2020; Kotevski, Koceska & Koceski, 2016). The incorporation of e-health and e-governance would make use of ICT systems to overcome issues of transparency, such as red-tape and lack of accountability as well as an efficient and effective collaboration among key players, such as government entities, the private sector, academic institutions, businesses, Non-governmental Organisations (NGOs) etc. (Wadhwa, 2020). The failure of various health stakeholders to collaborate in the system would amount to uncoordinated health information records sharing, loss of data, information asymmetry and

so forth. This ultimately necessitates integrating the two systems to ensure quality exchange of information towards improving the quality of healthcare service delivery (Richardson, Abramson & Kaushal, 2012).

2.5.1 Factors influencing the integration of e-health systems within e-governance

In the last two decades, many studies have revealed some of the factors that influence the implementation of e-health and e-governance concepts. It is important to point out two fundamental things: (1) these studies have mostly been conducted separately, i.e., e-health or e-governance; and (2) as at the time of this study, there seem to be no study that focuses on integrating both concepts in an African country. The remainder of this section presents a review of some of the influencing factors.

Lack of health infrastructure and connectivity

E-health and e-governance implementations require necessary infrastructure support. (Giri et al., 2018). In support, Alanezi (2021) explained that health infrastructure is crucial and investment towards that should not be underestimated. E-health systems require sophisticated and modern information systems and technologies that enhance big data capturing, storing, and sharing of information for transparent and easy accessibility of health information (Furusa & Coleman, 2018). Chauhan and Jaiswal (2017) posit that today's patients and other stakeholders are accustomed to some modern technological innovation such that they no longer need conventional healthcare service delivery. Hence, various health sectors around the world rely on e-health systems for better healthcare service delivery (Usak et al., 2019; Bhatia, 2014). E-health has dominated the overall global healthcare domain as a resourceful means to promote and strengthen health systems and health information (Farzianpour et al., 2015).

Nowadays, patients do not outrightly rely on doctors and physical visits to the clinic all the time, and doctors and other service providers do not need to be always physically present (Wynn et al., 2020; Kruse, Krowski, Rodriguez & Tran, 2017). Mallios and Bourbakis (2014) highlight that the 'virtual medical process' can be carried out whereby for instance, the doctor is contacted online and gives diagnosis without meeting the patient. This is only possible if the right infrastructure is put in place as part of the e-health and e-governance effort (Ellimoottil et al., 2018). Studies done on e-projects implementation in some developing countries found that infrastructural issues have weakened the progress of e-projects such as e-health and e-governance implementation (Qureshi et al., 2013).

As important as e-health and e-governance are, most governments are struggling with developing adequate infrastructure and resources to maintain sound e-health systems that enhance quality health service delivery (Zayyad & Toycan, 2018). Internet, in some parts is not accessible while sometimes it is costly; a luxury to some citizens (Kusumasari et al., 2018). In Nyanza Province in Kenya, e-health systems do not function well because of internet connectivity problems and inadequate technological devices to use in health facilities (Ouma et al., 2009). Infrastructure such as internet connectivity, tracking devices, mobile and web technologies for online bookings, remote monitoring devices that can measure physiological parameters, and real-time patient consultations are needed to ensure quality healthcare service delivery as well as maintain a sound e-health system (Crock, 2016).

Complex automation not understood by users

E-health systems are technological innovations which medical care stakeholders, such as hospitals, clinics, medical aid schemes, doctors and patients among others, use to produce quality healthcare service delivery (Tu et al., 2017). Users of such technological innovations automation systems sometimes resist and have failed to fully accept their use because they are not user-friendly and require commitment to master the art of using them (Ask et al., 2016). Considering this, Manyika et al. (2013) assert that the development of technologies causes disruptive changes in business, life, and the global economy. It is imperative, therefore, to introduce e-health systems that are favourable; user-friendly and easily studied for healthcare service providers and other stakeholders to use them without problems. Training and developing medical practitioners, healthcare service providers, such as health administrators and other immediate stakeholders, is encouraged for them to grasp the use of such systems (Malik, Larik & Khan, 2008).

Limited skilled human resource to maintain systems

E-health systems are part of ICT innovations introduced to improve healthcare service delivery in the healthcare sectors across the globe (Tu et al., 2017). Technological innovation is a part of the total innovation discipline which focuses on technology and how to embody it in products, services, and processes with the objective of value creation (Eduah, 2019). However, many developing countries are faced with lack of ICT skills and knowledge (Lam et al., 2016). Human resource can either be available but not equipped with the specific areas of e-health systems or there may be limited skilled personnel to maintain such systems (Sayed & Mamun-ur-Rashid, 2021). As a result, the level of implementation of e-health has been low, especially in developing countries (Qureshi et al., 2013). An observation by Hogan & Palmer (2005), as cited in Qureshi et al. (2013), shows that health care professionals and other healthcare personnel lack the skill of processing online health data and during all this, interpret

data wrongly, waste time thwarting quality healthcare service delivery and, in some instances, stop making use of online health information exchange. Furthermore, Faloye et al. (2021) emphasised the need to re-skill and up-skill personnel so that they become at par with technological trends in the industry.

2.6 Related Work

Several studies have been carried out in e-health and e-governance particularly in developing countries and these have focused on the two concepts separately. From the review of literature, several studies on e-health focused on the factors that affect its implementation and investigating challenges and solutions involved in the implementation. Fanta and Pretorius (2018) developed a framework to support the long-term sustainability of e-health systems in developing countries; Hoques and Sorwar (2016) investigated the factors influencing adoption of e-health in developing countries from the patient's perspective and Malunga and Tembo (2017) investigated the challenges and opportunities in implementing e-health in developing countries. Other studies on e-health include Gu et al. (2021); Mauco et al. (2020); Furusa & Coleman (2018); Kiberu et al. (2017); Kamau (2017); Ross et al. (2016) and Mandirola et al. (2015). Studies done on e-governance mainly concentrated on the challenges and benefits of implementing the concept in different countries including developing countries. Beaumont (2016) and Dhindsa et al. (2013) reported on the challenges and benefits of e-governance, Linders et al. (2018) explored new trends in e-governance implementation centred on the citizens; Amukugo and Peters (2016) reported on the challenges faced by Namibia in implementing a citizen-centric e-government and Khan (2018) analysed the challenges of e-governance in public administration focusing on privacy and security. Other studies that dealt with e-governance include Giri and Shakya (2019); Thabit (2019); Radohikaashree (2018); Nielsen (2017); Bhattacharya (2017) and Nawafeh (2012).

However, a few studies have combined e-health and e-governance together. This includes Bhuvana and Vasantha (2020) study which analysed rural citizens' satisfaction in accessing e-governance health care services during the Covid-19 pandemic. They measured the satisfaction of participants using three different dimensions, namely, e-interaction, public trust and system quality. Public trust was found to be the main factor for citizens to continue using e-health services. Widen and Haseltine (2015) in their study entitled "Case Study: The Estonian eHealth and e-Governance System" reported on the implementation of e-governance and e-health in Estonia. The study emphasised on how e-governance benefited e-health by providing the primary data that was needed through integrating national statistics

and providing a secure storage for the data. E-governance also set the platform for the citizens' national ID numbers to be used as unique identifiers in the e-health system.

Sharma and Vaisla (2012) did a study entitled "E-health for Rural Areas of Uttarakhand under e- Governance Service Delivery Model" which focused on reviewing the use of e-governance through ICT applications which included telemedicine, use of SMS services and tele-referral in the Uttarakhand province. Roberts and Alsop (2003) also carried out a study on e-health and e-governance entitled "Public Services: E-Governance and E-Health- What are we really talking about? 'A Cure All for all Ills?". This study looked at the people's need for HIS and gave recommendations on how different stakeholders can effectively use e-health systems.

Although the above studies are based on both e-health and e-governance, their focus is different from what this study aims to do, it is neither about integration nor developing country or countries. This study is focused on developing an integration framework for e-health and e-governance in a developing country which makes it original. The developing country perspective is a unique environment because of factors which include different culture, political environment and available technology (Burleson & Chipidza, 2017). There seem to be no study that integrates the concept of e-health and e-governance hence the importance of this study.

2.7 E-health and E-governance in Namibia

The first e-health system in Namibia was launched in 2011 under the then Minister of Health and Social Services (MoHSS) Dr Richard Kamwi (Shaanika,2016). It was reported that the system, known as Health Care Information Management System (HCIMS), came at a cost of 55 million Namibian dollars and its mandate was to cover all aspects of hospital management and the day-to-day operations of hospitals in a more efficient and effective way (Smit, 2011). This e-health system came at a time Namibia was to improve its healthcare system to meet top class standards within the region. Introducing electronic systems in the health sector meant that the many manual processes, such as entering data, following up records, and general manual administrative work, were to be replaced with electronic processes for easy assimilation (Gerson & Shava, 2020). In view of the above, Dr Richard Kamwi in Smit (2011:1) assured the nation that "the Integrated Health Care Management System is a total replacement for all the manual procedures and systems in the hospitals; therefore, in the not-too-distant future, both the Windhoek Central and Katutura Intermediate Hospitals are going to be paperless hospitals".

However, to date, not much progress has been made regarding Dr Kamwi's assertations. E-health systems are operating independently and uncoordinated such that data is in silo (Hashiyana et al., 2021; Nengomasha et al., 2018; Shaanika, 2016). Furthermore, many other e-health systems have been introduced, such as the District Health Information System (DHIS), Oracle Web-based application, among others, but implementation problems still loom in Namibia's health sector. Shaanika (2016) reported that Namibia's e-health system has not been fully functional with healthcare medical data for patients mostly recorded manually, and with few online transfers of information used by top level personnel in the ministry.

However, there is no system without guidelines, policies and frameworks. Therefore, e-governance was introduced in the health sector. Information Technology usage became important to governments (Namibia included), hence the creation of e-governance in different sectors of the countries. The Ministry of Health and Social Services (MoHSS) engaged in e-governance efforts together with all other ministries to manage and control systems.
A five-year E-government Strategic Action Plan was implemented by the government of Namibia for the sole purpose of transforming information and service delivery by the Government of Namibia through e-government (Office of the Prime Minister, 2013). E-health systems run under e-governance, but the perfect coordination of these two have not been satisfactory. Nengomasha and Uutoni (2015) reported that by 2015, five years since implementation, Namibia was still at level one of its four-phase e-government implementation strategy. Furthermore, Yrika (2020) acknowledged that not much had improved since the implementation of e-governance, especially notable in the COVID-19 pandemic era.

2.8 Underpinning theory

The study is underpinned by two theories: actor-network theory (ANT) and Activity theory (AT). This means that the theories guide the analysis of the data and interpretation of the findings. Mkhomazi and Iyamu (2013) assert that the use of a theory or theories is very important when analysing and collecting data to gain a deeper insight of the phenomenon being studied. This is primarily because it helps to understand why things happen in the way that they do (Mkhomazi and Iyamu, 2013).

The two theories are first discussed to understand their focus. Thereafter, the theories used in IS research is covered and, finally, an explanation is offered on how the theories complementarily apply to this study.

2.8.1 Activity Theory

Activity theory (AT) originates from three classical viewpoints: (1) Vygotksy and Leont'ev's studies of cultural-historical psychology, (2) Kant and Hegel's classical German philosophy, and (3) the classical writings of Marx and Engels (Thornton, Ocasio & Lounsbury, 2012). In the last two decades, the theory has increasingly been used as a lens to gain a deeper understanding of human activity within a system (Kelly, 2018; Engestrom, 2001). The main tenets of AT are actors and activities.

In AT, actors are living beings with needs (Nehemia-Maletzky, Iyamu & Shaanika, 2018). Human activity is inevitable within a system hence it needs to be considered, whether in the development, implementation or integration. In this study, the integration of an e-health system within an e-governance framework involves activities as integrators and users of the systems. To elaborate further on this, Nehemia-Maletzky et al. (2018) posit that an activity is a collection of actions that living beings carry out to achieve their goals in a lifecycle of an Information Systems (IS) solution. Therefore, there is no system that runs without human activity.

As shown in Figure 2.1, the AT model consists of six (6) components: subject, tool, object, rules, community, and division of labour (Engestrom, 2001). As explained by Shaanika and Iyamu (2015), subject refers to the people who are involved in the activity. This can be an individual or a group of actors who can either be technical or non-technical. Shaanika and Iyamu (2015) further explained that an object can be tangible or intangible and sets the direction in which the activity should proceed. Tools are utilised by subjects to carry out an activity. They are involved in the transition of an object to become an outcome (Iyamu & Shaanika, 2018). Tools can be in the form of language, textbooks, policies, procedures or way of thinking. Rules control activities and interactions in the system and community comprises the participants of the activity (Kelly, 2018). Division of labour comprises how different jobs/tasks are distributed among the community members and the rights they have (Nehemia-Maletzky et al., 2018).

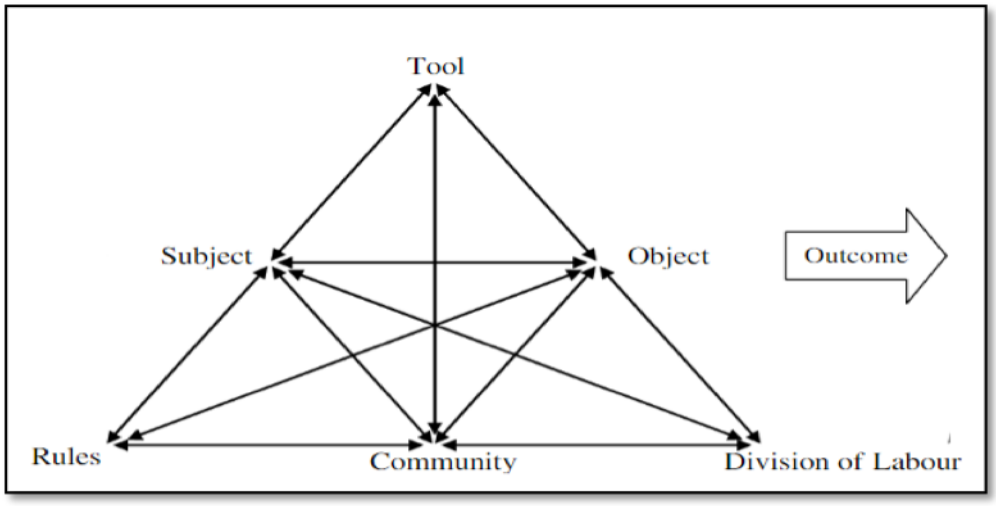

Figure 2.1: Activity Theory Model (Engestrom, 2001).

Activity theory "is a socio-technical theory or concept concerned with the development of social activities" (Iyamu & Shaanika, 2018:165). Social activities that occur in a social system are analysed in a framework-like concept, to understand why certain things happen in a certain way. The AT and IS research have a relationship in that IS operate within a social system, with actors/subjects (human beings) involved where they interact with information systems. In other words, there is always a relationship between information system/technology and human activity in a social system (environment). According to Mursu et al. (2007), IS facilitates work or human activities and activity theory develops these activities. This therefore means that IS development, such as e-health systems, can be better explained by theories such as the AT.

Despite the wide use of AT, challenges remain. According to Sekgweleo, Makovhololo and Iyamu (2017), AT has been employed over 3,380,000 times in IS studies. One of the reasons for this is the suggestion by Hakkinen and Korpela (2006) that AT is useful in understanding the activities of user groups in IS development, and information about the relationship between actors in a system. The theory has been applied in various ways, making it difficult for researchers. The main challenge is that many researchers, particularly postgraduate students, struggle to employ the theory as a lens. Thus, Iyamu and Shaanika (2018) developed a guide to employ AT in IS research, as shown in Table 2.1.

Table 2.1: Activity Theory Components for Analysis (Iyamu & Shaanika, 2018).

Component	What	Who	How	Where	When	Why
Tool	What tools exist within an activity?	Who makes use of the available tools?	How are the tools applied in the different activities?	Where are the different tools used in an activity?	When are the tools used for various purposes?	Why are different tools used in an activity?
Object	What objects are available within an activity?	Who makes use of the available objects?	How are the available objects used in the environment?	Where are the objects within the environment used?	When exactly are the objects used in the environment?	Why are the objects employed in the environment?
Subject	What subjects are available and their roles within an activity?	Who are the subjects that exist in an activity?	How do the subjects exist within an activity?	Where do the subjects exist within the activity?	When do the subjects exist in an activity?	Why are certain subjects involved in some activities?
Rules	What rules exist for various activities in an environment?	Who makes the rules, and for whom are the rules made?	How are the rules formulated, and applied for various activities?	Where are the rules applied in an activity?	When are rules applied within an activity?	Why are different rules applied in an activity?
Community	What community exist in the context of the phenomena being study?	Who are the communities that exist from both human and non-human viewpoints?	How do the communities exist in an environment?	Where exactly do the communities exist in an environment?	When are the communities formed within an environment?	Why are communities created in an environment?
Division of Labour	What labour exists in the different divisions, for an activity?	Who is involved in the division of labour for an activity?	How is labour divided into division for an activity?	Where are the divisions of labour in an activity?	When are divisions of labour created for an activity?	Why are divisions of labour created for an activity?

There are six elements to guide the analysis of data in AT. these are what, who, how, when, where and why (Iyamu & Shaanika, 2018). Bringing together these six elements and the AT components, subject, tool, object, rules, community and division of labour creates a better lens

for data analysis as shown in table 2.1 (Iyamu & Shaanika, 2018). This combination is necessary as it ensures that all data found in the development, implementation and management of IS are analysed.

2.8.2 Activity Theory and Information Systems research

Research in IS has been widely carried out, especially in the contemporary academic discipline. Continuous IS research has been motivated by the fact that information systems and technologies solutions are used to enable and support organisational processes and activities towards competitiveness and sustainability (Vessey, Ramesh & Glass, 2002). Research then seeks to understand new knowledge and gaps that come with such constantly developed systems.

Therefore, the link between AT and IS research lies in the fact that IS consists of socio-technical objects that are created by humans, used by humans, through rules followed by communities/the environment. To understand the way things are done in this process, there is a need to come up with a theory that explains the activities better. Hence, IS research discovering frameworks that link information systems innovation and the use of such innovations. In consideration of the above, Mkhomazi and Iyamu (2013) highlight the fact that the social context of Information System (IS) is complicated, and the use of Activity theory as a lens (perspective) is imperative in bringing out previously complex areas/issues within the social system or environment.

Activity theory has been used in IS studies primarily because it helps to examine how people work together and how technology influences human activities (Mkhomazi & Iyamu, 2013). Thus, Simeonova (2018) applied AT in a study to explore the role of transactive memory systems and Web 2.0. Hasan et al. (2017) used this theory to find out the role of IS in climate change. Karanasios and Allen (2014) applied AT in their study on mobile technologies and mobile work.

2.8.3 Actor-Network Theory

Actor-network theory (ANT) is a socio-technical theory that focuses on actor, network, relationship, and heterogeneity (Callon, 1986; Callon & Law, 1982). The theory seeks to understand and explain the relationship between social and technical factors that influence an activity happening within a network (Iyamu & Mgudlwa, 2017). Explicitly put, Fornazin & Joia (2016) assert that ANT focuses on the relational effect shaped by the interaction or association between humans and non-humans in the networks they dwell in. For example, in the medical sector, patients, health professionals, medical apparatus and so forth operate in a network

and the relationships between these variables need to be well understood so that new systems, such as the integration of e-health within the e-governance framework, can be possible.

From an ANT perspective, the world is viewed as a social system that consists of different networks and the networks include human and non-human actors. In ANT, the social and technical are treated with equal value and this also applies to human and non- human actors (Nehemia-Maletzky et al., 2018). None is given priority over the other and all are treated as making the same contribution to the network.

Actor-Network Theory incorporates what is called ‘moments of translation’ whereby an activity in IS is given a new meaning (Callon, 1984). A more comprehensive understanding of this phenomenon is cited by Elbanna (2012:119) who highlighted that “moments of translation” is a mechanism by which the network builder recruits actors and ensures their faithful associations”. This implies that the relationship between actors, people, IT tools, processes, and network is strong, and the network ensures that the actors support it effectively. An activity is not complete without the participation and interference of a network and its actors. There are four moments of translation available in ANT as shown in figure 2.2. These are problematisation, interessement, enrolment and mobilisation.

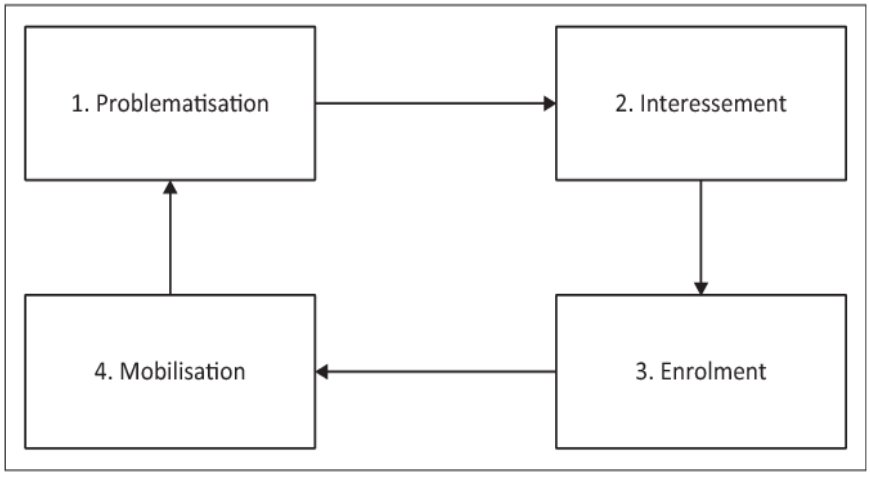

Figure 2.2: Moments of translation (Callon, 1986).

Problematisation – actors within a network identify a problem that needs to be solved. Fornazin and Joia (2016) posit that problematisation involves the formulation and articulation of a problem by actors within a network. Actors take the problem as theirs and act accordingly in a quest to solve that IS problem.

Interessement – more interested actors join in a network of a problem that has been identified and labelled as a problem by other actors. Here, initial actors can recruit or incorporate new actors to assist them with working on a problematised segment. There is unity of purpose between actors in a network, and many other procedures to counter the problem are dealt with at this stage (Muhammad & Wickramasinghe, 2017).

Enrolment – actors accept the roles they are given by other actors in a quest to counter the problem of health data fragmentation, for instance. Only actors that agreed with the responsibilities assigned to them in the interessement stage can work on building the new network (Pollack et al., 2013).

Mobilisation – more and more actors become interested in the network and they show their utmost commitment to come up with solutions. All actors are fully engaged in the network and as a team are willing to take responsibility for whatever outcome (Prado & Baranauskas, 2012). This stage is when the network is in full throttle and advanced innovations and solutions are created.

2.9 Actor-Network Theory and Information Systems research

One of the distinct relationships between ANT and IS research is that IS operate within a social and technological system, where actors are involved and interact with networks (Iyamu & Hamunyela, 2014). It carries the same premise as the Activity Theory in that there is always a relationship between information system/technology and human activity. In IS research, there is need to find out how networks are developed and improved, and ANT can clearly give a picture of the process and dynamics that gave birth to successful networks (Iyamu, 2015). ANT redirects researchers in IS to understand the relationship between actors (human and non-human) and networks and the interaction between them. Here, networks are very useful in IS because they are the platforms with which actors connect to solve IS problems and develop different innovations (Nehemiah-Maletsky et al., 2018).

ANT is used in IS research because it treats human and non-human actors equally. In IS research there is interaction between humans and non-humans (information systems and technologies) and ANT recognises the technologies and information systems as having equal influence with humans in an activity. Several researchers have applied ANT in IS studies, including Berg et al. (2003), in their study on ICT in healthcare; Fornazin & Joia (2016) applied ANT in their study on e-governance; Muhammed & Wickramasinghe (2018) applied ANT in their Understanding the Implementation and Adoption of Health Information Systems; and Iyamu & Mgudlwa (2017) used ANT as a lens in their study on healthcare big data.

2.9 Activity Theory and Actor-Network Theory

Several IS studies have made complementary use of theories. Using two theories ensures that all objectives of the study are fully covered, and any elements not covered by one is covered by the other (Nehemia-Maletzky et al., 2018).

In as much as AT and ANT try to understand why things are what they are, they have some differences in how they are structured. One of the differences is that ANT brings to the fore how interaction began, how an activity is problematised, and how the relationship operates but AT is limited in this regard (Nehemia-Maletsky, Iyamu & Shaanika, 2018). ANT is thus known for advocating the premise that human and non-human actors are equal, without priority given to a variable such as technology and so forth (Wong, 2016). However, Activity Theory emphasises human activity and the relationship between actors and networks more, although it is also a social-technical theory. AT has been used in IS studies primarily because it helps to examine how people work together and how technology influences human activities (Mkhomazi & Iyamu, 2013). On the other hand, ANT is concerned with actors (human and non- human) and networks and the interaction between them (Iyamu & Hamunyela, 2014).

In this study, AT was used to examine the different activities that happen in the deployment of e-health and e-governance in Namibia. ANT was used to examine how networks are formed and the roles of the networks in the deployment of the concepts. Also, ANT was used to understand the interaction between actors and network, which AT does not focus on.

2.10 Complementary use of theories

The objectives of a study determine which theory or theories to choose for the analysis and interpretation of data (Sekgweleo, Makovhololo & Iyamu, 2017). However, sometimes one theory might not be suitable to use on all the objectives (Atkinson & Brookes, 2003), which leads to the complementary use of theories. Complementary theories have been used in several IS studies. Iyamu and Roode (2010) applied structuration theory (ST) and actor-network theory (ANT) to analyse how non-technical factors influence IT strategy for a financial institution in South Africa. The complementary use of both theories was necessitated by the fact that ANT allows the analysis of networks, interactions, and relationships between the people and technology where ST falls short (Iyamu & Roode, 2010). Greenhalgh & Stones 2010 also applied ANT and ST in theorising big IT programmes in healthcare for the same reasons. Other examples of the complementary use of theories are the application of structuration theory and activity (Nyandiere et al., 2012) and the application of technology acceptance theory and structuration theory (Shaanika, 2019).

In a complementary use of theories, the order of use is critical to avoid getting inaccurate results from the study. Iyamu (2013) emphasised that the order of use in the complementary use of theories is very critical as it influences the findings of the research greatly. It is important to know which theory to use first and the sequence to follow in the analysis of data, to avoid any gaps (Iyamu, 2013).

In this study, ANT was used first to examine the interaction and relationship between the technical and non-technical agents in the deployment of an e-health system within the Namibian environment. This means that ANT was applied to focus on the first and second objectives, which are:

i. Understand how both the e-health system and e-governance are developed and implemented within the Namibian government environment.
ii. Examine the factors that can influence the integration of an e-health system with e-governance in the Namibian government environment.

The linking of AT components with elements of data analysis discussed in section 2.6.1 guided the analysis of all the data collected within this study. This encompasses all internal and external factors concerning e-health and e-governance in Namibia including the policies and regulations involved. Therefore, AT was used to analyse the third objective of this study, which is to develop a framework for the integration of an e-health system with e-governance for the Namibian government.

Table 2.2: List of related works.

	Systems Integration
1	Garcia, C. M., Abilio, R. & Malheiros, N. 2015. Approaches and technologies for systems integration: A case study at the Federal University of Lavras. *Revista de Sistemas de Informação da FSMA, 15*: 11-22.
2	Tanenbaum, A. & Steen, M. 2016. *Distributed systems*. 2nd ed. Maarten van Steen.
3	Bürklea, T., Deneckea, K., Lehmanna, M., Zetzb, E. & Holma, J. 2018. Integrated care processes designed for the future healthcare system. In *MEDINFO 2017: Precision Healthcare Through Informatics: Proceedings of the 16th World Congress on Medical and Health Informatics,* 245:20.
4	Iroju, O., Soriyan, A., Gambo, I. & Olaleke, J. 2013. Interoperability in healthcare: Benefits, challenges and resolutions. *International Journal of Innovation and Applied Studies, 3*(1): 262-270.
5	Panetto, H. & Cecil, J. 2013. Information systems for enterprise integration, interoperability and networking: theory and applications. *Enterprise Information Systems, 7*(1): 1-6.

6	Fanta, G. B. & Pretorius, L. 2018. A conceptual framework for sustainable e-health implementation in resource-constrained settings. *South African Journal of Industrial Engineering*, *29*(3): 132-147.
7	Dlodlo, N. & Hamunyela, S. 2017. The Status of Integration of Health Information Systems in Namibia. *The Electronic Journal Information Systems Evaluation*, 20(2): 61-75.
8	Chapman, C.S., & Kihn, L.A. 2009. Information system integration, enabling control and performance. *Accounting, organizations and society*, 34(2),151-169.
9	Kiberu, V. M., Mars, M. & Scott, R. E. 2017. Barriers and opportunities to implementation of sustainable e-health programmes in Uganda. *African Journal of Primary Health Care and Family Medicine, 9*(1): 1-10
10	Maksimovic, M. & Vujović, V. 2017. Internet of things based e-health systems: Ideas, expectations and concerns in health systems: Ideas, expectations and concerns. In:, ed. *Handbook of large-scale distributed computing in smart healthcare: Scalable computing and communications*. Springer, Cham.
11	Nielsen, M. 2017. eGovernance and Online Service Delivery in Estonia. In: *Proceedings of the 18th Annual International Conference on Digital Government Research,*300-309.
12	Widen, S. & Huseltine, W. 2015. *Case study:* The Estonian e-health and e-governance system, New York: *ACCESS Health International*, 3-4.
13	Bedeley, R. T. & Palvia, P. 2014. A study of the issues of e-health care in developing countries: The case of Ghana. *Twentieth America's Conference on Information Systems*. Savannah, 1-12.
14	Mauco, K.L., Scott, R.E. & Mars, M., 2020. Validation of an e-health Readiness Assessment Framework for developing countries. *BMC Health Services Research*, 20(1).
	E-health systems
1	Barbabella, F., Melchiorre, M. G., Quattrini, S., Papa, R. & Lamura. G. 2017. How can e-health improve care for people with multi-morbidity in Europe? *Policy Brief 25.* Utrecht: Nivel and Tu Berlin.
2	Ross, J., Stevenson, F., Lau, R. & Murray, E. 2016. Factors that influence the implementation of e-health: a systematic review of systematic reviews (an update). *Implementation Science*, 11(1): 1-3.
3	LeGledic, S., Fournier, M., Malek, S. & Dupraz-Poiseau, A. 2011. Telemedicine and e-health systems: Regulatory framework and issues. *International Workshop on future Wellness and Medical ICT Systems in Conjunction with the 14th International symposium on Wireless Personal Multimedia Communications*
4	Yaraghi, N. 2015. A sustainable business model for health information exchange platforms: The solution to interoperability in healthcare*, IT. Brookings: Centre for Technology Innovation*,1-15
5	Norgaard, O., Furstrand, D., Klokker, L., Karnoe, A., Batterham, R., Kayser, L. & Osborne, R. H. 2015. The e-health literacy framework: A conceptual framework for characterizing e-health users and their interaction with e-health systems. *Knowledge Management & E-Learning, 7*(4): 522–540.
6	Bygstad, B., Hanseth, O. & Truong, L.D. 2015. From IT Silos to Integrated Solutions. A Study in E-Health Complexity. *Association for Information Systems*,1-8

7	Kaelber, D. C. & Bates, D. W. 2007. Health information exchange and patient safety. *Journal of Biomedical Informatics, 40*(6): 40-45
8	Unertl, K. M., Johnson, K. B. & Lorenzi, N. M. 2012. Health information exchange technology on the frontlines of healthcare: Workflow factors and patterns of use. *JAM Med Inform ASSOC, 19*: 392-400
9	Mandirola, B., Bhuiyan, M., Kumar, M., Kumar, V., Portilla. F., Indarte. S., Luna, D., Otero, C., Otero. P. & González, B. 2015. Challenges and Hurdles of e-Health Implementation in Developing Countries. In: *15th World Congress on Health and Biomedical Informatics*. Brazil: Studies in health technology and informatics, 434-437.
10	Ariani, A., Koesoema, A. P. & Soegijoko, S. 2017. Innovative healthcare applications of ICT for developing countries. In: Qudrat-Ullah H., Tsasis P. (eds) *Innovative Healthcare Systems for the 21st Century*. Understanding Complex Systems. Springer, Cham.
11	Atinga, R.A., Abor, P.,Suleman, S.J., Anaba, E.A. & Kipo, B.2020. E-health usage and health workers' motivation and job satisfaction in Ghana. *PLOS ONE*, 15(9).
12	Nengomasha, C. & Uutoni, W. 2015. E-Government in Namibia. In I. Sodhi, ed. *Emerging Issues and Prospects in African E-Government*. IGI Global, pp. 196-215.
13	Furusa, S. & Coleman, A. 2018. Factors influencing e-health implementation by medical doctors in public hospitals in Zimbabwe. *South African Journal of Information Management*, 20(1): 1-9.
14	Malunga, G. & Tembo, S. 2017. Implementation of e-health in developing countries-challenges and opportunities: A case of Zambia. *Science and Technology, 7*(2): 41-53.
15	Kiberu, V. M., Mars, M. & Scott, R. E. 2017. Barriers and opportunities to implementation of sustainable e-health programmes in Uganda. *African Journal of Primary Health Care and Family Medicine, 9*(1): 1-10.
16	Kamau, J. K., Onyango-Osagu, B. & Njuguna, S. 2017. Challenges facing implementation of referral system for quality healthcare services in Kiambu County, Kenya. *IMedPub. Journals*, 4(1): 1-8.
	E-health in developing countries
1	Fanta, G. B. & Pretorius, L. 2018. A conceptual framework for sustainable e-health implementation in resource-constrained settings. *South African Journal of Industrial Engineering*, *29*(3): 132-147.
2	Hoques, M., Bao, Y. & Sorwar, G. 2016. Investigating factors influencing the adoption of e-health in developing countries: A patient's perspective. Informatics for Health and Social Care, 42(1): 1-17.
3	Ouma, S. & Herselman, M. E. 2008. E-health in rural areas: A case of developing countries. International Journal of Social, Behavioural, Economic, Business and Industrial Engineering, 2(4): 1-5.
4	Ouma, S., Herselman, M. E. & Greunen, V. 2009. Implementing successful e-health implementations within developing countries. *Makerere University Institutional Repository*.
5	Mwiinga, J. 2013. Integrating HealthCare in Africa: The Role of ICTs in eHealth; Can we scale up Governance and Accountability? | *Global Health Corps. Ghcorps.org*.

	https://ghcorps.org/integrating-healthcare-in-africa-the-role-of-icts-in-ehealth-can-we-scale-up-governance-and-accountability/ 20 April 2020.
6	Malunga, G. & Tembo, S. 2017. Implementation of e-health in developing countries-challenges and opportunities: A case of Zambia. *Science and Technology, 7*(2): 41-53.
7	Wynn, R. et al., 2020. Special issue on E-Health Services. *International Journal of Environmental Research and Public Health*, 17(8):2885.
8	Kamau, J. K., Onyango-Osagu, B. & Njuguna, S. 2017. Challenges facing implementation of referral system for quality healthcare services in Kiambu County, Kenya. *IMedPub. Journals*, 4(1): 1-8.
9	Nengomasha, C. & Uutoni, W. 2015. E-Government in Namibia. In I. Sodhi, ed. *Emerging Issues and Prospects in African E-Government*. IGI Global, pp. 196-215.
10	Bedeley, R. T. & Palvia, P. 2014. A study of the issues of e-health care in developing countries: The case of Ghana. *Twentieth America's Conference on Information Systems*. Savannah, 1-12.
11	Palvia, P., Lowe, K., Nemati, H. & Jacks, T. 2012. Information technology issues in healthcare: Hospital CEO & C/O Perspectives. *Communication of the Association for Information Systems, 30*(19): 293-312.
12	Mauco, K., Scott, R. & Mars, M. 2016. Critical analysis of e-health readiness assessment frameworks: Suitability for application in developing countries. *Journal of Telemedicine and Telecare, 24*(2): 110-117.
13	Katehakis, D., Kouroubali, A. & Fundulaki, I. 2018. Towards the Development of a National eHealth Interoperability Framework to Address Public Health Challenges in Greece. *In First International Workshop on Semantic Web Technologies for Health Data Management*. California: SWH@ ISWC.
14	Furusa, S. & Coleman, A. 2018. Factors influencing e-health implementation by medical doctors in public hospitals in Zimbabwe. *South African Journal of Information Management*, 20(1): 1-9.
15	Nielsen, M. 2017. eGovernance and Online Service Delivery in Estonia. In: *Proceedings of the 18th Annual International Conference on Digital Government Research,*300-309.
16	Mugo, D. M. & Nzuki, D. 2014. Determinants of electronic health in developing countries. *International Journal of Arts and Commerce, 3*(3): 49-56.
17	Kiberu, V. M., Mars, M. & Scott, R. E. 2017. Barriers and opportunities to implementation of sustainable e-health programmes in Uganda. *African Journal of Primary Health Care and Family Medicine, 9*(1): 1-10.
18	Mandirola, B., Bhuiyan, M., Kumar, M., Kumar, V., Portilla. F., Indarte. S., Luna, D., Otero, C., Otero. P. & González, B. 2015. Challenges and Hurdles of e-Health Implementation in Developing Countries. In: *15th World Congress on Health and Biomedical Informatics*. Brazil: Studies in health technology and informatics, 434-437.
19	Bygstad, B., Hanseth, O. & Truong, L.D. 2015. From IT Silos to Integrated Solutions. A Study in E-Health Complexity. *Association for Information Systems*,1-8.
	E-Governance

1	Dhindsa, B., Narang, M. & Choudhary, K. 2013. Benefits and challenges of e-governance portal. *International Journal of Soft Computing and Engineering, 3*(5): 121-13.
2	Linders, D., Liao, C. & Wang, C. 2018. Proactive e-governance: Flipping the service delivery model from pull to push in Taiwan. *Government Information Quarterly, 35*(4): S68-S76.
3	Beaumont, S. 2017. Information and Communication Technologies in state affairs: challenges of E-Governance. *International Journal of Scientific Research in Computer Science and Engineering*, 5(1): 24-26.
4	Amukugo, K. & Peters, A. 2016. Citizen-Centric E-Government Services in Namibia*. Proceedings of the First African Conference on Human Computer Interaction* - AfriCHI'16.
5	Bhattacharya, K. & Suri, T. 2017. The curious case of e-governance. *IEEE Internet Computing*, *21*(1): 62-67.
6	Beaumont, S. 2017. Information and Communication Technologies in state affairs: challenges of E-Governance. *International Journal of Scientific Research in Computer Science and Engineering*, 5(1): 24-26.
7	Bhattacharya, K. & Suri, T. 2017. The curious case of e-governance. *IEEE Internet Computing*, *21*(1): 62-67.
8	Amukugo, K. & Peters, A. 2016. Citizen-Centric E-Government Services in Namibia*. Proceedings of the First African Conference on Human Computer Interaction* - AfriCHI'16.
9	Giri, S. & Shakya, S. 2019. Practicing e-governance in Nepal: Challenges of civil service. *International Journal of Computer Trends & Technology, 67*(4): 118-123
10	Gu, D. et al., 2021. Assessing the adoption of e-health technology in a developing country: An extension of the UTAUT model. *SAGE Open*, 11(3):1-16.
11	Khan, H. 2017. The challenges of e-governance in public administration. *Globalization and the Challenges of Public Administration*, 135-160.
12	Shikha, V. 2009. The application of e-government for increased service delivery. The *International Journal of Interdisciplinary Social Sciences, 4*(1): 1-9.
13	Nawafleh, S., Obiedat, R. & Harfoushi, O. 2012. E-government between developed and developing countries. *International Journal of Advanced Corporate Learning, 5*(12), 8-13
14	Ismail, N. I. & Abdullah, N. H. 2017. Malaysia health information exchange: A systematic review. *Business and Economic Horizons, 13*(5): 706-721.
15	Kiberu, V. M., Mars, M. & Scott, R. E. 2017. Barriers and opportunities to implementation of sustainable e-health programmes in Uganda. *African Journal of Primary Health Care and Family Medicine, 9*(1): 1-10.
16	Nyella, E. 2011. Challenges in health information systems integration: Zanzibar experience. *Journal of Health Informatics in Developing Countries, 5*(1):243-251.
17	Thabit, T. & Jasim, Y. 2019. The challenges of adopting e-governance in Iraq. *Current Research Journal of Social Sciences and Humanities, 2*(1): 31-38.
	E-health and E-governance
1	Radhikaashree, D. S. 2018. E-governance in health sector – Challenges. *Eurasian Journal of Analytical Chemistry, 13*(SP): 170-172.

2	Alguliev, R. & Yusifov, F. 2017. Electronic health as a component of G2C services. *International Journal of Advanced Computer Science and Applications*, 8(3): 201-206.
3	Mbondji, P. E., Kebede, D., Soumbey-Alley, E. W., Zielinski, C., Kouvividila, W. & Lusamba-Dikassa, P. 2014. Health information systems in Africa: Descriptive analysis of data sources, information products and health statistics. *Journal of the Royal Society of Medicine, 107*(1): 34-45
4	Seitio-Kgokgwe, O., Gauld, R. D. C., Hill, P. C. & Barnett, P. 2015. Development of the national health information systems in Botswana: Pitfalls, prospects and lessons. *Online Journal of Public Health Informatics, 7*(2): 1-19.
5	Angula, N. and Kandjeo, F.T., 2020. National COVID-19 Health Contact Tracing and Monitoring System: A Sustainable Global and Namibian E-business and E-governance Context. *International Journal*, *1*(1):35-38.
6	Wadhwa, M. 2020. *E-governance in healthcare sector in India.* ICT Indian Working Paper No. 28. Delhi: Centre for Sustainable Development, Columbia University,3-24.
7	Richardson, J., Abraham, E. L. & Kaushal, R. 2012. The value of health information exchange. *Journal of Healthcare Leadership, 4*: 17-23.
8	Kotevski, A., Koceska, N. & Koceski, S. 2016. E-health monitoring system. In *International Conference on Applied Internet Information Technologies,* Bitola*.*
	Factors influencing the integration of e-health systems within e-governance
1	Giri, S. & Shakya, S. 2019. Practicing e-governance in Nepal: Challenges of civil service. *International Journal of Computer Trends & Technology, 67*(4): 118-123.
2	Alanezi, F., 2021. Factors affecting the adoption of e-health system in the Kingdom of Saudi Arabia. *International Health*, 13(5):456–470.
3	Furusa, S. & Coleman, A. 2018. Factors influencing e-health implementation by medical doctors in public hospitals in Zimbabwe. *South African Journal of Information Management*, 20(1): 1-9.
4	Iyamu, T. & Mgudlwa, S. 2017. Transformation of healthcare big data through the lens of actor network theory. *International Journal of Healthcare Management*, 11(3): 182-192.
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2.11 Summary

This chapter presented a literature review conducted in the study on the integration of an e-health system within an e-governance framework for the Namibian government. The focus areas are as follows: Information and Communication Technology, e-health system, e-governance, systems integration, underpinning theories (actor network theory and activity theory), linking activity theory with information systems research as well as linking ANT with information systems research.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the philosophical assumption and methodology applied in the research. This methodology consists of methods, approaches and techniques. The methodology was selected based on the aim of the study, which is to propose a solution through a framework, to integrate e-health systems within e-governance for the Namibian government.

The chapter is divided into nine sections. The first section of the chapter is the introduction. In the second and third sections, the philosophical assumption and research approach are discussed. The fourth and fifth sections cover the research method and design. How the data was collected and analysed are explained in the sixth, seventh and eighth sections. Lastly, the ethical considerations are discussed in the ninth section.

3.1 Philosophical assumption

Research philosophy refers to the nature of knowledge and its development in the context of a phenomenon being studied (Gemma, 2018). Research philosophy guides the scientific knowledge to follow a certain pattern based on the phenomenon under study. Zukauskas, Vveinhardt and Andriukaitiene (2018) point out that research philosophy enables scientists' ideas to be generated into scientific knowledge in the research context. The scientists' ideas or assumptions pave the way for a deeper scientific scrutiny of ideas and facts through research. Given the above, philosophical assumptions are developed into knowledge and nature, which form the basis of scientific research (Hurlimann, 2019). There are three research philosophies that are commonly applied in the field of IS, namely ontology, epistemology and axiology (Walliman, 2017).

3.1.1 Ontology

Ontology is concerned with the nature of reality and existence (Walliman, 2017). What is known and what exists concerning a certain phenomenon under study is regarded as the ontological assumption. Kivunja and Kuyini (2017) clearly highlight that ontology is concerned with the researcher's assumptions about what is real and what exists regarding the phenomenon under study. These assumptions can aid or assist the researcher to conceptualise existing reality to make meaning of data collected during the study. In this case, what can be asked is what exists or what is known about the integration of e-health systems and e-government frameworks in Namibia. In fact, the current situation in this instance is crucial to be able to determine how to come up with solutions. So, the nature of 'being' or existence of truth or reality is very crucial, as it leads to more complex research.

For instance, in a study by Iyamu and Mgudlwa (2017) on the transformation of healthcare big data through the lens of actor-network theory, the ontological assumption was that: what was known is that healthcare big data exists in South Africa's health facilities. This shows the reality of what exists to understand the data collected.

In addition, Kivunja and Kuyini (2017) emphasised that ontological assumptions are fundamental to adjust one's thinking about the research problem, questions, and possible solutions through research. In this study, e-health system and e-governance framework exist within the Namibian government, making it fit within the ontological assumption. What is not known is how they exist and why they exist from both technical and business (government) perspectives. The truths or realities are: (1) e-health system and e-governance frameworks exist within the Namibian government, (2) both frameworks are not integrated; and (3) the factors that can influence the integration are not known. Thus, what is not known are how and why both e-health system and e-governance exist, from both technical and business (government) perspectives. This leads to epistemology inquiry.

3.1.2 Epistemology

Epistemology is defined as the researcher's view of what constitutes acceptable knowledge (Aliyu et al., 2015). Considering the above, epistemological assumptions clarify how the researcher knows the truth or reality about a phenomenon or their relationship with this reality. As Kivunja and Kuyini (2017:26) highlight, "epistemology focuses on the nature of human knowledge and comprehension that the researcher can possibly acquire so as to be able to extend, broaden and deepen understanding in the particular field of research". Hence, epistemology is best suited to position the researcher in the study context to find out new and valid knowledge. Most importantly, epistemology as knowledge should be backed by evidence that depicts it as valid and acceptable (Soini, Kronqvist & Huber, 2016). Hence, the researcher should do an enquiry (scientific research in some instances) to know the truthfulness of the phenomenon.

In a study by Iyamu and Mgudlwa (2017) on transformation of healthcare big data through the lens of actor-network theory, the epistemological assumption was that patients and some of the healthcare workers did not know how the big data exists and what to expect from the data sets. In this case, patients and healthcare workers were not aware of how to acquire the knowledge regarding the big data and its data set. Hence, a scientific enquiry could be the only solution to understand such a phenomenon. In this study on integrating e-health system with the e-governance framework for the Namibian government, healthcare stakeholders did not know how e-health systems could be integrated within the e-governance framework; hence

there should be a scientific enquiry to help them understand how things happen the way they do in terms of integrating the two systems.

Therefore, epistemological assumptions guide the researcher to easily choose a topic, formulate objectives or research questions, and identify theories, methodologies, analyses and conclusions (Ulum, 2016). Thus, epistemologically, this study is investigating: (1) how both e-health system and e-governance frameworks currently exist within the Namibian government, (2) why both frameworks are not integrated; and (3) the factors that can influence the integration.

3.1.3 Axiology

The axiological assumption is of the premise that values are important in research because they benchmark what is good or bad. Axiology deals with judgements about values, which can be represented by ethics in the research process (Mubeshera, 2015). In addition, axiological assumptions determine how systems, knowledge and communities are regulated or governed (Hassan, Mingers & Stahl, 2018). Therefore, ethics and politics strive to maintain what is right or wrong in research and how communities should be regulated or governed.

In this study, the ontological questions that can be asked to relate to the following: how can e-health systems be integrated with the e-governance framework in Namibia; and what is the right way of integrating e-health systems within the e-governance framework in Namibia? Values or belief systems and the frame of reference of the researcher influence the research decision. With axiology, however, the research cannot only assess the researcher's values but also consider the values of others. The issues of minimising harm and the respect of persons come into play. Therefore, an axiological assumption will give a picture of how the study answers questions on ethical conduct such as avoiding harm.

3.2 Research paradigm

A research paradigm refers to a research culture of values and assumptions that researchers possess about a particular research or study (Antwi & Hamza, 2015). A paradigm makes provision for maintaining a pattern or structure of academic and scientific ideas. Furthermore, paradigms are perceptions that guide the researcher in the process of sorting, organising, and classifying information or data. Paradigms can be referred to as intellectual perceptions or views accepted by an individual or a society as clear examples, models, or patterns of how things work in the world (Rehman & Alharthi, 2016). Some paradigms are positivism, constructivism, critical realism, and interpretivism (Thanh & Thanh, 2015). These paradigms are often associated with the epistemology philosophy.

3.2.1 Positivistic paradigm

Positivistic paradigms hold that real events can be noticed empirically (Kivunja & Kuyini, 2017). Therefore, pre-conceived ideas about reality are not accepted, and only ideas that are proven empirically are put into consideration. This paradigm holds that knowledge comes from factual accounts known as objective reality. In the context of this study, objective accounts of the phenomenon under study (integration of e-health systems within e-governance framework for the Namibian government) matter. However, this study will not be based on this premise as it derives truth about the phenomenon from all the parties involved (subjective accounts).

3.2.2 Constructivism

Constructivism maintains that learning is an active and constructive process (Purwarno, 2018). In other words, people create their own subjective representations of objective reality through learning (Mogashoa, 2015). Personal experiences and hypotheses of the environment identify and construct knowledge and truth. Therefore, the construction of truth through personal experiences is inevitable. Humans generate knowledge and meaning from an interaction between their experiences and their ideas (Adom, Yeboah & Ankrah, 2016).

3.2.3 Critical realism

Critical realism as a paradigm aims at identifying challenging approaches taking for granted norms in the form of facts, data or ideas, and aims at exposing structures of power and domination (de Vaujany et al, 2017). It also aims to understand how victims of such social arrangements come to accept and even collaborate in maintaining oppressive aspects of the system. Critical realism depicts that the minority of people and facts are always scorned, taken for granted, or marginalised. However, in qualitative research, the critical realism paradigm is not recommended because of its lack of methodological development (Fletcher, 2017). It is therefore not suitable for this study since it is qualitative in nature.

3.2.4 Interpretive paradigm

The interpretive paradigm emphasises “social construction” of reality and knowledge (Kivunja & Kuyini, 2017). It explains that both knowledge and reality about life are socially constructed. In a nutshell, an interpretive paradigm is of the view that the truth is realised through lived experiences (Thanh & Thanh, 2015). Therefore, this research paradigm aims to understand people’s experiences in their social settings. An understanding of people’s experiences in this case can be realised when the researcher probes deep into human lives with interviews to get a clear picture of their encounters.

This study follows the interpretive paradigm. This is primarily because the paradigm directs the researcher into probing human views, experiences, and thoughts in pursuit of first-hand accounts (Thanh & Thanh, 2015). This has helped to understand stakeholders' (health professionals, government representatives, citizens') views, opinions, and experiences about the existence of e-health and e-governance in the country better.

3.3 Research approach

Approaches to research differ, with some adopting qualitative and some quantitative. An approach in research entails a plan on how to collect data, interpret, and present the findings. Therefore, the two main research approaches commonly used are deductive and inductive.

3.3.1 Deductive approach

The deductive approach adopts a top-down pattern where reasoning moves from theory formulation to the specific conclusion (Janzen et al., 2015). The deductive approach begins with formulating a testable hypothesis or theory that is generalised as the reality and is tested through research findings. In other words, a theory or hypothesis underlying the research is generally formulated, which reflects reality or truth. Therefore, a phenomenon under study is generalised according to a predetermined theory before the actual results are gathered through the findings of the study. Young (2020) highlights that a deductive approach in qualitative research utilises theoretical frameworks to find constructs or support and challenge them.

For instance, in a quantitative study on the impact of e-health systems on customer service delivery, a tentative hypothesis and a null hypothesis which predict the outcome of the results or findings can already be determined. The tentative and null hypotheses can be as follows: There is a relationship between e-health systems and customer service delivery (Tentative hypothesis) and there is no relationship between e-health systems and customer service delivery (Null hypothesis).

3.3.2 Inductive approach

The inductive approach in qualitative research generates new theory based on the findings of the research (qualitative data). Young (2020) posits that the theory is only formulated based on the research results or data collected without a biased interpretation. An inductive approach works from the bottom-up, using the participants' views to build broader themes and generate a theory interconnecting the themes. Unlike the deductive approach which can interpret a biased conclusion, inductive approaches are more objective and accommodate more complex and sophisticated research (Antwi & Hamza, 2015).

For this study, the inductive approach is more suitable because of its aim to develop a framework after the findings are gathered. The rationale for selecting the inductive approach is that there was no room or need for prefabricated knowledge (Zalaghi & Khazaei, 2016). Another important rationale was because the aim of the study was to develop a theory in the form of a framework, as presented in section one of chapter 1.

3.4 Research methods

There are two research methods: quantitative and qualitative. However, the methods can be combined, which is mixed method. The methods are discussed as follows:

3.4.1 Quantitative method

Quantitative research is responsible for quantifying and analysing variables through statistical methods (Oberiri, 2017). In other words, quantitative research collects objective knowledge, as it uses predetermined data collection instruments, which, in turn, present statistical data. There is no room for subjective data or responses, making the study more objective (Bless et al., 2013). The above concludes that quantitative research enables the researcher to collect value-free objective data.

Studies that measure the relationship between variables use quantitative methods in data collection and analysis. For instance, a study by Anshari and Almunawar (2012) on customer relationship management within e-health systems used a quantitative method to understand the relationship between the two variables. The rationale for using the quantitative method is it is relatively quick and research results are statistically significant because they are independent of the researcher (Mohajan, 2018). On the other hand, incorporating a quantitative research method is tantamount to collecting data or knowledge produced that is too abstract and general for direct application to specific local situations, contexts, and individuals, as well as more generalisable results that might bring bias into play (Antwi & Hamza, 2015).

3.4.2 Qualitative method

Qualitative method is concerned with data collection from opinions, feelings, attitudes and experiences of people (subjective assessment) (Setia, 2017). The accounts of people given to the researcher are full of their beliefs, feelings, motivations, drive and suchlike, which can either be under-emphasised or over-emphasised. The over-emphasis or under-emphasis of accounts or responses fosters bias and subjectivity. Furthermore, qualitative approaches are

used to focus on experiences that occur in a natural space or environment and involve studying phenomena in detail (Leedy & Ormrod, 2014).

Studies that must explore phenomenon usually use qualitative methods for inquiry. The whole idea is to capture in-depth information pertaining to the phenomenon under study. Qualitative methods have been applied in IS research in several studies. For example, in a study by Furusa and Coleman (2018) to determine the factors influencing the implementation of e-health by medical doctors in public hospitals in Zimbabwe, the qualitative method was used by conducting interviews and carrying out direct observations. Iyamu and Mgudlwa (2017) also applied the qualitative method in their study on the transformation of healthcare big data through the lens of actor-network theory.

The rationale for using the qualitative method is that interviews are not restricted to specific questions; hence they can be redirected by the researcher at any time (Setia, 2017). In addition to this, the qualitative method outrightly ensures gathering detailed accounts from participants which can provide a rich knowledge about a phenomenon. However, there are drawbacks related to adopting a qualitative research method. The volume of data makes analysis and interpretation time consuming, and the research quality is heavily dependent on the individual skills of the researcher and more easily influenced by their personal biases (Rahman, 2017).

3.4.3 Mixed method

The mixed method emerged when some limitations regarding the qualitative and quantitative methods were discovered (Doyle et al., 2016). This meant that both the qualitative and qualitative methods could be merged to help gather and analyse data. Therefore, a mixed methods approach combines both the quantitative and qualitative methods in a study. Almalki (2016:291) asserted that “a mixed method ensures that a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration.”

As researchers see the need to solicit information both from objective and subjective sources, they adopt the triangulation/mixed method (Bless et al., 2013). The strength of the mixed methods approach lies in the fact that it gives insight that neither type of analysis (qualitative and quantitative) can provide alone (Setia, 2017). In other words, a blend of the two methods ensures that crucial data is not left out because of using either of the methods to capture and analyse data in a study.

This study employed the qualitative method. A qualitative method allows the researcher to obtain mostly subjective information that seeks the in-depth understanding of human behaviours, attitudes, values, experiences and motivations (Doyle et al., 2016). In this study, participants shared their individual experiences and views about the existence of e-governance, e-health, and the integration of the concepts in Namibia from both technical and non-technical perspectives. In this regard, the quantitative method was not suitable because it focuses on objectivism, which does not allow for real and actual accounts of participants (Antwi & Hamza, 2015).

3.5 Research design

There are different types of research design, including action research, case study, surveys, and ethnography.

3.5.1 Action research

Action research is whereby an action inquiry is done to solve a certain problem (Kusumarasdyati, 2016). Here, researchers have a duty to carry out their study through action-based approaches to come up with study findings. Action research is said to have a practical and problem-solving emphasis; hence, researchers go out of their way to perform action by getting involved in activity necessary for soliciting information. Thus, Chisaka et al. (2015) emphasised that action research is a design that is grounded in practical action where participants collaborate and act in their surrounding by coming up with practical outcomes that foster new understanding. Furthermore, action research is meant to change, transform, and turn around the norm, practice or status quo.

3.5.2 Survey

Survey is a process by which data is systematically gathered from the target sample through direct means such as face to face interviews (Mathiyazhagan & Nandan, 2014). So, a survey can collect data by verbal and written means. On the other hand, surveys are known to conveniently capture participants' feelings, emotions, attitudes, behaviours, beliefs, values and motivations which are important in understanding phenomenon (Ponto, 2015). Therefore, survey designs are descriptive in nature; hence, the words, actions, and other techniques used to solicit information from participants are accommodative and friendly to the interviewee. Surveys are also used for large populations, although the sample may be small (but representing a large population).

3.5.3 Case Study

A case study design allows researchers to collect participant's accounts or narrations physically. Contact with participants is key to data collection through a case study. A case study investigates a phenomenon in its depth and within its real-life context, to bring to light the problem and solutions (Setia, 2017). However, Starman (2015) argues that case studies can be used in both quantitative and qualitative studies, although they are most suitable for the latter. A case study can comprehensively describe a case and its analysis, making it possible to gather comprehensive, in-depth and useful data or results. It is worthy to mention that case studies not only describe phenomenon or cases, but they are also concerned with the context in which the research takes place (Bartlett & Vavrus, 2017). The context of the environment says a lot about the outcome of the study.

The case study design was used in this research because it enabled the researcher to have a full picture of the activities and interactions involved in e-health and e-governance implementation. The study employed 4 cases, Ministry of Information and Communication Technology (MICT), Office of the Prime Minister (OPM), Ministry of Health and Social Services (MOHSS) and private and public hospitals. MICT and OPM were chosen because they have the joint mandate to handle e-governance projects in the country. The MOHSS was chosen because they govern all health activities, including e-health, and different health practitioners from private and public health facilities were chosen for their knowledge and experience in interacting with e-health systems.

3.6 Data Collection

There are different types of techniques for collecting data, including questionnaires, interviews, document analysis, and observation (Kabir, 2016).

3.6.1 Questionnaires

A questionnaire is a tool used to collect information and it is mostly highly structured but may also incorporate semi-structured questions. Questionnaires have the same set of questions that are posed to the respondents in a predetermined order (Roopa & Satya, 2015). The advantage of the questionnaire is that questions asked to have the same order across all the respondents to ensure uniformity (Nayak & Narayan, 2019). There are structured, semi structured and unstructured questionnaires. A structured questionnaire consists of predetermined responses that the participant should respond to by choosing the best alternative; an unstructured questionnaire does not have predetermined questions and the responses are also not predetermined by the researcher, while semi-structured questionnaires sometimes include both structured and unstructured questions.

3.6.2 Interviews

The interview technique is in different forms, that is; structured, semi-structured or unstructured (Bolderston, 2015). However, the choice of the instrument or technique depends on the structure of the study and the sample. A structured interview consists of predetermined responses that the participant should make by choosing the best alternative in the form of questionnaires. The semi-structured interview has flexible questions where follow-up and probing questions can be addressed. The whole idea is to get as much information as possible from the participant. One of the advantages of the semi-structured interviews is that an interviewer can probe more or diverge so that they can solicit more information on a certain point (Bolderston, 2015).

Unstructured interview lacks a proper structure and is prone to bias, subjectivity, and irrelevant data collection (Bless et al., 2013). Because of the above, unstructured interviews are known to be time consuming and labour intensive (Bolderston, 2015). The advantages of unstructured interview guides are that open questions have spaces left for the respondent's own answer and view or opinion which are collected through probing by the interviewer (Mohajan, 2018). In contrast, although unstructured interview questions probe deeper into phenomenon, they are value-laden; so, information is too subjective and less credible (Bless et al., 2013).

Interviews may be done through different channels. These channels include telephonic interviews, focus group discussions and face to face interviews.

Telephonic interviews

There are telephonic interviews done over the phone between the interviewer and interviewees/participants. These are suitable when the researcher or interviewer cannot be physically present because of various reasons. Drabble et al. (2016) highlight that telephonic interview are convenient in cases where there are geographically dispersed participants, when dealing with high-risk geographical spaces which may not be safe for the interviewer, and when there are logistical inconveniences (no transport). However, with telephonic interviews, it is difficult to build and maintain rapport with the interviewees, a characteristic that can lead to the collection of censored, incomplete data from participants (Farooq, 2017). In the same vein, lack of rapport is further exacerbated by the fact that there are no visual cues that make a relationship between the parties involved stronger (Farooq, 2017).

Focus group discussion

In focus group discussions, the researcher interviews a group of people with the same characteristics. Focus group discussions that are homogeneous in position and status ensure comfort in expressing opinions (Nyumba et al., 2018). The disadvantages of a focus group are that it is difficult to convince a group to sit down and partake in the focus group discussion. Another setback is its ability to make some members follow the discussions and yet they may have different views (Bless et al., 2013).

Face-to-face interview

Face to face interviews allow one-on-one contact between the interviewer and interviewee. The advantage of face-to-face interviews is that the researcher can clarify or repeat the question if not understood (Schroder, 2016). This is to avoid ambiguous responses by participants who might not have understood the questions. Face-to-face interviews also ensure a good rapport between the interviewer and interviewee due to the physical cues shared by each party. An atmosphere of trust is also developed between both parties within an interview as they get to know and understand each other during the process (Leedy & Ormrod, 2014). This study used face-to-face interviews to clarify ambiguous questions and develop a strong rapport and atmosphere of trust. Since the phenomenon under study is a crucial health issue, it was imperative for the researcher to meet face to face with participants and interview them, taking into consideration all the cues (verbal and non-verbal) necessary to understand their accounts/narrations.

This study used semi-structured interviews done face-to-face (between the interviewer and interviewee). This consisted of open-ended questions that made room for probing in the process of collecting data from participants. Furthermore, Hyman and Sierra (2016) assert that open-ended questions give the participants of the study more opportunity to provide a wide range of answers, thereby giving more insight into what is investigated.

Interview guidelines

Based on the objectives of the study as presented in chapter 1, repeated here as follows: to understand how both an e-health system and e-governance are developed and implemented within the Namibian government environment; to examine the factors that can influence the integration of an e-health system with e-governance in the Namibian government environment, the interview guidelines were developed. This was done by “breaking-down” each of the objectives into many sentences so that they could be understood at every level. In doing so, emphasis was put on not losing the meaning the objectives. The process was repeated several times, to ensure that all aspects of each of the research objectives were well

captured. This was tested with persons who did not participate in the interview process. The interview guidelines are attached as “Appendix A”.

Criteria for selecting the interviewees

The interviewees were selected from e-health and e-governance perspectives: (1) health practitioners and administrative employees in the healthcare sector, from both public hospital (general hospital) private hospitals; and (2) IT specialists and non-IT employees in the government departments, Ministry of ICT and Office of the Prime Minister.

Rather than random selection of participants, criteria were used to select interviewees. According to Dasanayake et al. (2015) criteria is purposely to ensure appropriateness of selection of interviewees. “The criteria should include and highly consider factors such as experience (length of service), area of specialisation, and level in the organisational structure (or society)” Iyamu, 2018 p. 10). The criteria used in selecting interviewees in this study are as follows:

1. The interviewee must have worked in a health or government department where e-health or e-governance solution is implemented.
2. The person must have used either e-health or e-governance solution for at least 6 months.
3. The individual must be willing to participant in the study.

Selected interviewees were only those who were willing to participate, had worked in either a health or government department where e-health or e-governance solution is implemented, and they must have used either solution for at least six months.

As shown in Table 3.1, a total of 22 people were interviewed. The number was reached at the point of saturation, which means that no new information was forthcoming. For example, in the e-health interviews, the point of saturation was reached at eight interviews, the ninth and tenth persons continued to offer the information that was already known and documented, and hence it was considered point of saturation. Five (4 middle managers and an administrator) were in a group during the interviews of the e-governance session. This was because the participants requested to be interviewed at the same time. This was to enable them to either corroborate or contrast and fill the gap that could have been missed by their colleagues.

Table 3.1: Participants

Unit	E-health	E-governance	IT specialist	Total
Senior management	2	2	1	5

Middle management	6	4	4	14
Others	2	1	0	3
Total	**10**	**7**	**5**	**22**

Demographics of the interviewee

The interviewees include some key informants that have knowledge about e-health systems and some with knowledge about the e-governance framework for Namibia. These participants are employed in the healthcare sector of Namibia and other government bodies such as the Ministry of Health and the Office of the Prime Minister (policy makers).

3.6.3 Documentation

Documentation is the use of reading or text/image material that has been recorded without the researcher's intervention (Geiger et al., 2018). Furthermore, Geiger (2009) highlighted that documentation is useful in research, as it provides background data useful to understand the study and provide historical insights. Documentation from government policies, reports, the Ministry of Health's reports and other stakeholders' documents useful to this study was gathered, as shown in the tables below. Most of the documentation was online or was shared through online email.

Strategic documents on e-health were gathered from the MoHSS and OPM and these detailed the plan the ministry has on implementing e-health in the country, the players involved, and the time frames for completing certain tasks. Most of the documents were downloaded from the MoHSS' website. The same was done for e-governance; strategic documents covering e-governance were downloaded from the OPM website and some were sent via email. These documents are listed in table 3.2.

Table 3.2: Strategic documents

Type	Description	# of Pages	Code
Strategic	The E-Government Strategic Action Plan of the Public Service of Namibia (eGSAP) - 2014–2018. This provides a comprehensive plan of the steps to be taken by the government to use ICT to better serve its citizens. This includes the Ministry of Health and Social Services.	86	ST01
	The Ministry of Health & Social Services (MoHSS) Strategic Plan of 2017/2018 – 2021/2022. Its focus includes the deployment of information systems and technology (IS/IT) solutions.	36	ST02
	The 5th National Development Plan (NDP5) 2017/18 – 2021/22. Some aspects of the NDP5 are dedicated to IS/IT solutions and e-governance.	134	ST03
	The World Health Organisation (WHO) Country Cooperation Strategy III - 2018-2022.This outlines the strategic agenda adopted by the WHO in the country over the stated period. It includes e-health and is aligned with the NDP5.	59	ST04
	Office of the Prime minister (OPM) Annual Plan - 2019-2020. This sets out the actions to be taken by OPM in fulfilling its strategic objectives. One of the main objectives detailed in this plan is leveraging e-governance and ICT infrastructure in all government ministries.	10	ST05
	Office of the Prime Minister Annual Plan - 2018-2019. This sets out the actions to be taken by OPM in fulfilling its strategic objectives. One of the main objectives detailed in this plan is leveraging e-governance and ICT infrastructure in all government ministries.	24	ST06
	Harambee Prosperity Plan II. This is the country's plan towards the prosperity of all its citizens and some parts are dedicated to ICT infrastructure and e-services and innovations which cover e-health and e-governance.	104	ST07

Type	Description	# of Pages	Code
	The third Medium Term Strategic Plan for Tuberculosis and Leprosy - 2017/18 – 2021/22. Its focus includes the deployment of TB information systems, which is a part of e-health.	75	ST08
	The National Strategic Framework for HIV and AIDS Response in Namibia -2017-18 to 2021-22. Its focus includes the deployment of HIV/AIDS information systems which is a part of e-health.	116	ST09
	National e-Health Patient Information System Strategy - 2019 – 2024. This focuses on e-health deployment in the country.	48	ST10
Total		**692**	

Some policy documents pertaining to e-health and e-governance were also collected as listed in table 3.3. These contained laws, standards, and regulations that guide the implementation of e-health and e-governance in Namibia. The documents also analysed the current situation within e-health and e-governance implementation and detailed interventions to issues faced. The policy documents were downloaded from the MoHSS and OPM websites.

Table 3.3: Policy documents

Type	Description	# of Pages	Code
	The National Health Care Technology Policy. This sets out the goals and strategies to be followed by the Ministry of Health and Social Services in acquiring and implementing information systems and technology (IS/IT) solutions.	32	P01
	The Ministry of Health and Social Services Universal Health Coverage Policy Framework - 2018. This assesses the existing health sector framework and proposes interventions that also cover the	27	P02

Type	Description	# of Pages	Code
Policy	implementation of health information systems and what must be adopted to achieve universal health coverage.		
	The National Public Health Laboratory Policy - 2012. Its focus includes laboratory information systems deployment, which is a part of e-health.	32	P03
	The e-governance policy for the public service of Namibia -2005 outlines the intentions of the government in implementing e-governance in the country and steps the Office of the Prime Minister (OPM) will take to fulfil these intentions.	66	P04
Total		**157**	

Technical reports which reported the progress of e-health and e-governance implementation were also collected. These documents made up the report derived from some of the strategic documents in table 3.2. This included how far the goals that had been set on e-health and e-governance implementation had been achieved. These documents are listed in table 3.4.

Table 3.4: Technical reports

Type	Description	# of Pages	Code
Report	Harambee Prosperity Plan I Final Report - 2016/17-2019/2020. This gives a report on the progress of e-governance and e-health which were part of ICT infrastructure and e-services in the Harambee Prosperity Plan.	107	RP1
	The Office of the Prime Minister Annual Report - 2016 - 2017. This is a report on the e-governance projects undertaken by OPM, their progress, achievements, and challenges.	54	RP2
Total		**161**	

3.7 Data analysis

The hermeneutics approach was used to analyse the data because it is used for the interpretation of textual data, mostly from the interpretivist perspective (Agrey, 2014). Paterson and Higgs (2005) argue that the hermeneutics helps with continuous and constant dialogue between the text and the enquirer. Within this context, Cole and Avison (2007) suggest that the approach allows for in-depth interpretation of qualitative data. According to Mutasa and Iyamu (2021), the approach increases an understanding and gaining deeper Knowledge of the text under enquiry. The use of the hermeneutics approach is not new in IS study. According to Kroeze & Van Zyl (2015: 6), hermeneutics is used in IS research "to enhance systems development and to evaluate how systems are accepted and how they affect organisations and society after implementation." In applying the hermeneutics approach, the units of analysis was employed, guided by the AT and ANT.

Two theories, Activity theory (AT) and Actor-Network Theory (ANT) were used to underpin the study. This means that the theories were used as lenses to guide the data analysis. The theories were comprehensively discussed in chapter 2. This section provides a brief on how each of the theories was applied.

Activity Theory (AT) focuses on the development of social activities that occur in a social system. The theory is often used as a lens to gain a deeper understanding of human activity within a system, through its tenets: subject, tool, object, rules, community and division of labour (Kelly, 2018; Engestrom, 2001). AT is used in IS studies primarily because it helps to examine how people work together, and how technology influences human activities (Mkhomazi & Iyamu, 2013). ANT is concerned with actors (human and non-human) and networks and the interaction between them (Iyamu & Hamunyela, 2014). Fornazin and Joia (2016) assert that ANT focuses on the relational effect shaped by the interaction or association between humans and non-humans in the networks they dwell in. In elaboration, ANT tries to find out how scientific activity (activity happening within a network) progresses vis-a-vis social and technical factors.

In the analysis, AT was used to examine (1) the different activities that happen in the deployment of e-health and e-governance in Namibia; (2) the roles of people in the deployment of the e-health and e-governance in the country. These are two aspects which the ANT does not focus on. ANT was used from a different angle to examine (1) how networks were formed, and the roles of the networks in the deployment of the concepts, which is different from the roles of people; (2) to understand the interaction that happens between actors and networks;

and (3) how situations and decisions shift from one position to another. These are areas which the AT does not focus on.

Unit of analysis

The units of analysis help to define and put in context the aspects that were being studied. Thus, it assists to shape and provide, to know what is in the scope of the analysis. Owing to the nature of the study, the units of the analysis was at individual and structural levels, as shown in Table 3.5.

Table 3.5: Units of analysis

Unit	E-health	E-governance
Technology solution	X	X
Integration factors	X	X
Non-technology	X	X

3.8 Ethical consideration

Ethics in research emphasise the protection of human subjects and ways to conduct research in an acceptable manner. Various ethical standards are considered in research and failure to adhere to these standards has consequences for the research subjects, researcher, concerned population, and various institutions involved.

In this study, participants were provided with adequate information on the study to enable them to make an informed decision whether to participate or not. When carrying out research, the researcher needs to be as honest as possible and not deceive participants; therefore, the honest information was conveyed to the participants. No participant was forced or coerced to participate. Coercion of participants can be avoided by asking them to give voluntary consent expressed through them filling in an informed consent form (Bless et al., 2013). Written consent was obtained from all participants, and it was explained to them that they were participating on a voluntary basis and were free to withdrawal at any time of the study. Refusing to participate or withdrawing did not affect their jobs in any way.

No participant should be exposed to psychological or physical harm (Leedy & Ormrod, 2014). Hence, the researcher protected participants from any potential harm. The participants' names and identity in the data collection, analysis, and reporting of the study findings are not publicised, to protect them from possible persecution. Also, pseudonyms are used in place of

real names to protect participants. Their privacy and confidentiality were maintained during the interviews by ensuring they were done in a private room. The CPUT research code of ethics was used to guide this study and protect all participants.

Table 3.6: List of studies in the areas of methodology

	Philosophical Assumption
1	Gemma, R. 2018. Introduction to positivism, interpretivism and critical theory. *Nurse Researcher, 25*(4): 41-49.
2	Zukauskas, P., Vveinhardt, J. & Andriukaitienė, R. 2018. Philosophy and Paradigm of Scientific Research. *Management Culture and Corporate Social Responsibility*.
3	Hurlimann, C. 2019. Research philosophy and ethics. *Valuation of Renewable Energy Investments,* 2019, 111-126.
4	Walliman, N. 2017. Research methods: The basics. New York: Routledge.
5	Kivunja, C., & Kuyini, A. B. 2017. Understanding and applying research paradigms in educational contexts. *International Journal of High Education, 6*(5): 26-41.
6	Aliyu, A. A., Singhry, I. M., Adamu, H. & Mu'awuya, A. 2015. Ontology, epistemology and axiology in quantitative and qualitative research: Elucidation of the research philosophical misconception. *Mediterranean Publications and Research International on New Direction and Uncommon, 2*(1): 1-22.
7	Soini, H., Kronqvist, E. & Huber, G. L. 2016. *Epistemology for qualitative research. Qualitative psychology nexus.* Tubingen: Centre for Qualitative Psychology.
8	Ulum, O. G. 2016. Epistemology in qualitative educational research: A review of published articles. *Journal of Education and Humanities, 7*(13): 19-28.
9	Mubeshera, T. 2015. *Axiology: Branches of philosophy*. Islamabad: International Islamic University.
10	Hassan, N. R., Mingers, J. & Stahl, B. 2018. Philosophy and information systems: Where are we and where should we go? *European Journal of Information Systems, 27*(3): 263-277.
	Research Paradigm
1	Antwi, S. K. & Hamza, K. 2015. Qualitative and quantitative research paradigms in business research: A philosophical reflection. *European Journal of Business and Management, 7*(3): 217-225.
2	Rehman, A. A.& Alharthi, K. 2016. An introduction to research paradigms. *International Journal of Educational Investigations, 3*(8): 51-59.
3	Thanh, N. C. & Thanh, T. T. 2015. The interconnection between paradigm and quality methods in Education. *American Journal of Educational Science, 1*(2): 24-27.
4	Kivunja, C., & Kuyini, A. B. 2017. Understanding and applying research paradigms in educational contexts. *International Journal of High Education, 6*(5): 26-41.
5	Purwarno, A. S. 2018. Constructivist learning theory. Contribution to foreign language. *Learning and Teaching*, 87-91.
6	Mogashoa, T. 2015. Applicability of constructivist theory in qualitative educational research. *American International Journal of Contemporary Research, 4*(7): 51-59.

7	Adom, D., Yeboah, A.& Ankrah, A. K. 2016. Constructivism philosophical paradigm: Implication for research, teaching and learning. *Global Journal of Arts Humanities and Social Sciences, 4*(10): 1-9.
8	de Vaujany, F., Mitev, N., Smith, M. & Walsh, I. 2014. Renewing Literature Reviews in MIS Research? A Critical Realist Approach. *SSRN Electronic Journal*.
9	Fletcher, A. J. 2017. Applying critical realism in qualitative research: Methodology meets methods. *International Journal of Higher Education*, 6(5): 26-41.
	Research Approach
1	Janzen, R., Nguyen, N., Stobbe, A. & Araujo, L. 2015. Assessing the value of inductive and deductive outcome measures in community-based programmes: Lessons from the City Kidz evaluation. *Canadian Journal of programme Evaluation*, 30(1):41-63.
2	Young, M. 2020. The spectrum of inductive and deductive research approaches using quantitative and qualitative data. *Academic Medicine, 95*(1): 1122.
3	Antwi, S. K. & Hamza, K. 2015. Qualitative and quantitative research paradigms in business research: A philosophical reflection. *European Journal of Business and Management, 7*(3): 217-225.
4	Zalaghi, H. & Khazaei, M. 2016. The role of deductive and inductive reasoning in accounting research and standard setting. *Asian Journal of Finance and Accounting, 8*(1): 23-27.
	Research Methods
1	Oberiri, D. A. 2017. Quantitative research methods: A synopsis approach. *Arabian Journal of Business and Management Review, 6*(10): 40-47.
2	Bless, C., Higson-Smith, C. & Sithole, S. L. 2013. *Fundamentals of social research methods: An African perspective*. (5th ed). Cape Town: Juta & Company Ltd.
3	Anshari, M. & Almunawar, M. 2012. Framework of Social Customer Relationship Management in E-Health Services. *Journal of e-Health Management*: 1-15.
4	Mohajan, H. K. 2018. Qualitative research methodology in social sciences and related subjects. *Journal of Economic Development, Environment and People, 7*(1): 23-48.
5	Setia, M. S. 2017. Methodology series module 10: Qualitative health research. *Indian Journal of Dermatology*, *62*(4): 367.
6	Rahman, M. S. 2017. The advantages and disadvantages of using qualitative and quantitative approaches and methods in language testing and assessment research: A literature review.
7	Doyle, L., Brady, A. & Byrne, G. 2016. An overview of mixed methods research. *Journal of Research in Nursing, 14*(2): 175-185.
8	Almalki, S. 2016. Integrating quantitative and qualitative data in mixed methods research: Challenges and benefits. *Journal of Education and Learning, 5*(3): 288-296.
	Research Design
1	Kusumarasdyati, B. 2016. Quantitative and qualitative approaches to action research. *Paramasastra Journal, 3*(1): 139-146.
2	Chisaka, B. C., Mamvuto, A., Matiure, S., Mukabeta, M. T., Shumba, T. & Zireva, D. 2015. Action research: Some practical ideas for educational practice. *University of Zimbabwe*.

3	Mathiyazhagan, T. & Nandan, D. 2014. *Survey research method*. New Delhi: Media Mimansa.
4	Ponto, J. 2015. Understanding and Evaluating Survey Research. *Journal of the Advanced Practitioner in Oncology*, 6(2): 168-171.
5	Setia, M. S. 2017. Methodology series module 10: Qualitative health research. *Indian Journal of Dermatology*, *62*(4): 367.
6	Starman, A. B. 2015. The case study as a type of qualitative research. *Journal of Contemporary Educational Studies, 1*(2015): 28-42.
7	Bartlett, L. & Vavrus, F. 2017. *Rethinking case study research: A comparative approach*. (5th ed). New York: Routledge.
	Data Collection
1	Kabir, S. 2016. *Methods of Data Collection. In Basic Guidelines for Research: An Introductory Approach for All Disciplines*. Chittagong: Book Zone Publication, 201-275.
2	Roopa, S. & Satya, R. M. 2015.Questionnaire design for a survey. *The Journal of Indian Orthodontic Society, 46*(4): 37-41.
3	Nayak, M. S. P. & Narayan, N. A. 2019. Strengths and weaknesses of online surveys. *IOSR Journal of Humanities and Social Science, 24*(5): 31-38.
4	Bolderston, A. 2015. Conducting a research interview. *Journal of Medical Imaging and Radiation Sciences, 43*(1): 66-76.
5	Bless, C., Higson-Smith, C. & Sithole, S. L. 2013. *Fundamentals of social research methods: An African perspective*. (5th ed). Cape Town: Juta & Company Ltd.
6	Drabble, L., Trocki, K. F., Salcedo, B., Walker, P. C. & Korcha, R. A. 2016. Conducting qualitative interviews by telephone: Lessons learned from a study of alcohol use among sexual minority and heterosexual women. *QualSoc Work, 15*(1): 118-133.
7	Drabble, L., Trocki, K. F., Salcedo, B., Walker, P. C. & Korcha, R. A. 2016. Conducting qualitative interviews by telephone: Lessons learned from a study of alcohol use among sexual minority and heterosexual women. *QualSoc Work, 15*(1): 118-133.
8	Farooq, M. B. 2017. Telephonic qualitative research interviews: When to consider them and how to do them. *Meditari Accountancy Research, 25*(2): 291-316.
9	Nyumba, T. O., Wilson, K., Derrick, C. J. & Mukherjee, N. 2018. The use of focus group discussion methodology: Insights from two decades of application in conservation. *Methods in Ecology and Evolution, 5*(1): 20-32.
10	Schroder, J. 2016. Face to face surveys. GESIS survey guidelines. Mannheim: *GESIS Leibniz Institute for the Social Sciences*.
11	Leedy, P. D. & Ormrod, J. E. 2014. *Practical research: Planning and design*. (10th ed). New Jersey, USA: Pearson Education International.
12	Geiger, R., Varoquaux, N., Mazel-Cabasse, C. & Holdgraf, C. 2018. The Types, Roles, and Practices of Documentation in Data Analytics Open-Source Software Libraries. *Computer Supported Cooperative Work (CSCW)*, 27(3-6): 767-802.
13	Hyman, M. R. & Sierra, J. J. 2016.Open versus close-ended survey questions. *Business Outlook, 14*(2): 1-4.

3.9 Summary

This chapter presented the philosophical assumption and methodology applied in the research and consisted of methods, approaches and techniques. The methodology was based on the aim of the study, which is to propose a solution through a framework that can be used to integrate e-health systems within e-governance for the Namibian government's administration. The chapter was then divided into nine sections as follows: the chapter introduction, the philosophical assumption (which was epistemological) and research approach (deductive), research method (qualitative) and research design (survey), data collection (through semi-structured interviews) and analysis, and, finally, ethical considerations.

CHAPTER 4

OVERVIEW OF CASE STUDIES

4.1 Introduction

This chapter presents the overview of case studies targeted for this research. The processes and procedures followed during fieldwork, including some ethical considerations, were discussed before presenting the cases in detail. These cases included esteemed offices and settings from which the study collected data. The cases selected for this study are the Ministry of Information Communication Technology (MICT), Office of the Prime Minister (OPM), Ministry of Health and Social Services (MoHSS) as well as health facilities in Namibia (public and private). The data collected from all the cases and were treated independently. Thus, data from each case was analysed separately. For instance, data collected from the Ministry of Health and Social Services officials was analysed separately from that collected from the Office of the Prime Minister officials because the two entities have different mandates and as such, their questions and responses differ.

4.2 Fieldwork

Fieldwork was done according to the COVID-19 World Health Organisation guidelines stipulating social and physical distancing, masking up, sanitising and hand washing to prevent the spread of the Coronavirus. Semi-structured interview guides were used to collect data through interviews from the cases, namely: Ministry of Information Communication Technology (MICT), Office of the Prime Minister (OPM), Ministry of Health and Social Services (MoHSS) and health facilities in Namibia. Participants interviewed were staff members (technical and non-technical) from the cases.

The participant`s behaviours, attitudes, values, experiences, perceptions and motivations were captured in data collection through interviews. Face-to-face interviews were preferred for data collection in the field because they allowed for a good rapport and an atmosphere of trust between the parties involved, allowing probing of questions and flexible follow-up of questions, and, lastly, allowed the interviewer to capture all the verbal and non-verbal cues (gestures, facial expressions, body language, etc.) to understand narrations better. However, several the participants preferred to have telephone interviews, citing Covid issues and that telephone interviews would not take as much time as face-to-face interviews. All interviews carried out physically in participants' work stations followed the WHO Covid-19 guidelines.

The documentation technique was then used to solicit data from the four cases: specifically, from recorded, published, and unpublished but useful data in the form of policy documents, strategic documents, and reports.

The researcher obtained permission to collect data from all the cases before the data could be collected from participants. The ethical clearance letter from Cape Peninsula University of Technology had to be submitted to all the cases before the permission letters could be obtained. It took over six months to obtain permission to collect data from OPM, and when the permission letter was finally issued, the process of securing interviews was also long, as all interviews had to be arranged by the executive director of Public Service IT Management.

4.3 Overview of the Case Studies

Since the study aimed to develop an integration framework for e-health and e-governance for the Namibian government, data was collected from the following: The Ministry of Information and Communication Technology, Office of the Prime Minister, the Ministry of Health and Social Services and private and public hospitals, as illustrated in the diagram below.

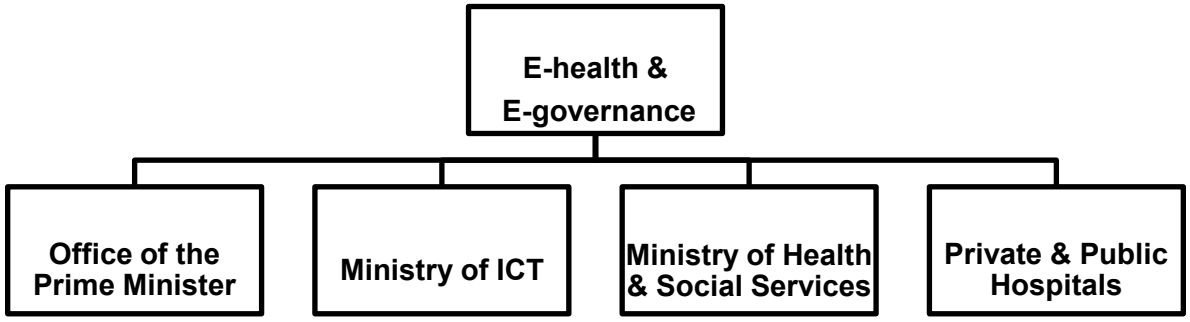

Figure 4.1: Relationship between the cases

One of the key mandates of OPM is coordinating all ICT activities in the country. As a result, e-governance is co-managed by both OPM and MICT.

Participants/staff members or interviewees were briefed about the study and their consent sought to take part in the process. Permission was also granted by the various cases through their management so that the interviewer could collect data from staff members. It was emphasised to participants that data collected from the cases was only meant for the purpose of this study. Before the interviews, permission was sought to record the interview process. Note-taking was also done to complement recorded information.

The chosen cases were crucial and suitable to furnish the study with information on integrating e-health and e-governance for the Namibian government. Each case had different mandates, roles, and responsibilities concerning what was being investigated. Each case is discussed in detail below to understand their mandates, roles, responsibilities, and contribution to the phenomenon under study.

4.3.1 Ministry of Health and Social Services (MoHSS)

The vision of the Ministry of Health and Social Services is to provide quality healthcare and social services according to international standards. Its mission is to "provide integrated, affordable, accessible, equitable, quality health, and social welfare services that are responsive to the needs of the population." The Ministry of Health and Social Services is founded and authorised under the Namibian Constitution, Article 95, where the state is required to maintain the welfare of the people by putting in place legislations that provide high quality healthcare to the people and maintain their social welfare. To achieve this, the MoHSS is made up of seven directorates at the national level which are:

- Primary Health Care Services
- Social Welfare Services
- Special Programmes
- Tertiary Health Care & Clinical Support Services
- Finance and Logistics
- Human Resource Management & General Services
- Policy, Planning and HRD

These directorates are responsible for delivering service to the thirty-five health districts across the country. The directorates are decentralised divisions in the MoHSS that ensure service delivery in various health districts in Namibia.

MOHSS IT Division

Within the ministry of health, there is a division of IT under the directorate of Human Resource Management and General Services. The IT division is responsible for all ICT projects, including procurement, monitoring and evaluating systems, systems maintenance, and training healthcare staff on how to use the different IT solutions available to them in the different government healthcare facilities. The IT division consists of 3 interdependent subdivisions, namely data centre and core infrastructure services, applications systems

development and maintenance, and IT support services and help desk, as shown in figure 4.2.

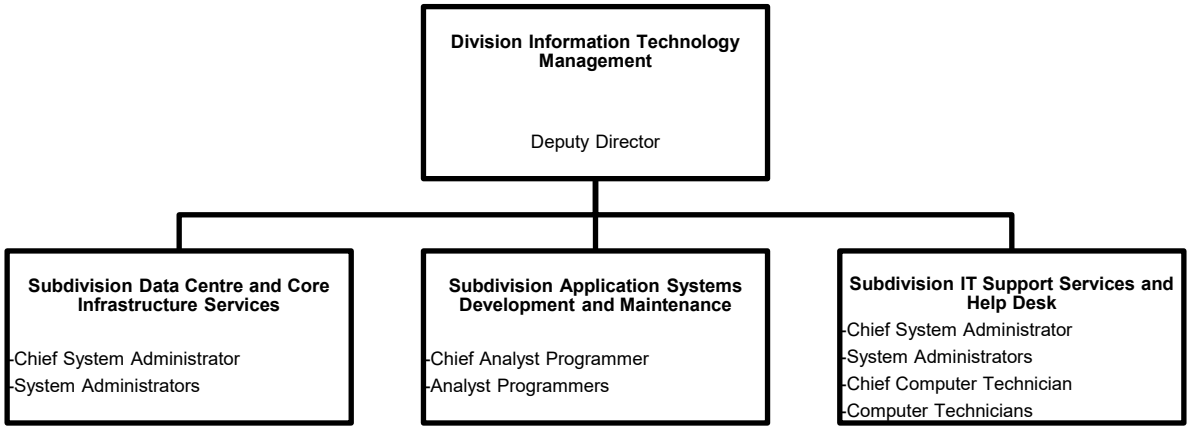

Figure 4.2 MOHSS IT Structure

The deputy director heads the division of IT in the MOHSS. The deputy director ensures that all systems within the ministry are fully operational by recruiting personnel with adequate skills and procuring the hardware and software needed by different ICT systems. The data centre and core infrastructure services subdivision are responsible for maintaining the ICT infrastructure, which includes servers, databases, and networks. A chief system administrator and system administrators work under this subdivision and oversee the training of end users, ensuring that all data has been backed up and the system is secure. The Applications systems development and maintenance subdivision is responsible for systems development and employs a chief analyst programmer and analyst programmers. Their duties include systems analysis and design, requirements gathering, and business process re-engineering. The IT support services and help desk subdivision is responsible for giving technical support to all the ministry employees. This includes updating software, maintaining printers, troubleshooting computer problems and attending to staff IT queries. System administrators and IT technicians are employed in this sub division.

4.3.2 Health Facilities in Namibia

Healthcare service delivery in Namibia has greatly improved since the attainment of independence in 1990. All in all, the latest statistics available reports that Namibia boasts of 1150 outreach points, 265 clinics, 44 health centres, 30 district hospitals, 3 intermediate hospitals, 1 referral hospital and several social welfare points. Patients' records are mainly paper-based, therefore vulnerable to fire and water damage, manipulation, misplacement and

loss, although there are several e-health systems adopted to store and maintain health records electronically but are not in use now.

Public hospitals, health centres and clinics in Namibia are spread around the country to cater for health seekers. However, in these public health facilities, especially the district, the intermediate and the referral hospital; there is severe staff shortage such that the patient-healthcare worker ratio is grossly unproportionable. In most of these public health facilities, the latest reported statistics in 2015 highlight that there are 7000 patients per registered doctor and 947 patients per registered nurse. Furthermore, public district hospitals play a crucial role in providing healthcare services for many patients because they provide institutional medical care, technical and referral support to the over 100 health centres and 300 clinics before they refer specialised cases to intermediate hospitals and the national referral hospital.

There are about 27 main private hospitals and several private health centres, including private consulting rooms (647), pharmacies (126), pathology laboratories (29), radiology laboratories (22), and mobile clinics (5) in Namibia. Private health services are mostly preferred by medical health insurance/medical aid beneficiaries and those can afford such services and the response rate for such services is approximately 70%. The above signals the role that private health facilities play in ensuring utmost patient care in Namibia.

The main referral hospital, Windhoek Central, gets ICT support from the MoHSS IT division through its IT department in the hospital`s premises. This IT division services all other public hospitals in Namibia, although they have smaller IT departments. The IT department at Windhoek central hospital is headed by a chief systems administrator who oversees the management of ICT services, working together with system administrators and IT technicians who are responsible for communicating the hospital's ICT needs to the ministry`s IT deputy director who runs the whole ICT division. The private healthcare facilities have their own IT departments independent of the government.

4.3.3 Office of the Prime Minister (OPM)

The Office of the Prime Minister is under the leadership of Prime Minister Dr Saara Kuugongelwa-Amadhila. Its mandate is to coordinate the executive function in parliament and the work of cabinet and public service, for a result-driven service delivery to citizens. The OPM comprises three political principals: The Prime Minister, who is the head of government, the Deputy Prime Minister, who is also the Minister of International Relations and Cooperation, and the Secretary to Cabinet. OPM has structures which support its governance operations,

namely the Cabinet Secretariat, the Public Office Bearer Commission Secretariat POBCS, the Public Service Commission Secretariat (PSCS), and various departments.

The Cabinet office provides administrative support to cabinet. It implements administrative systems and processes to ensure the overall optimal functioning of the cabinet and its committees. It also facilitates the management of decision-making processes of the cabinet and its committees.

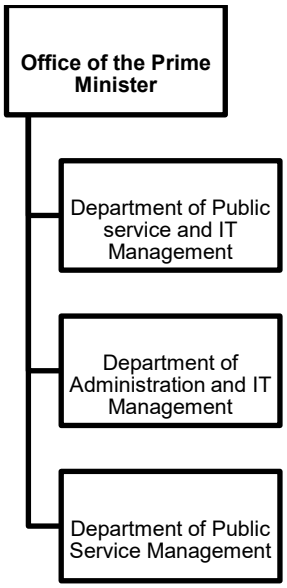

Fig 4.3: OPM IT Structure

Department of Public Service and IT Management

The department is mandated to implement e-governance projects and coordinate ICT-related responsibilities in the entire Namibian public service. Specifically, the activities they perform include but are not limited to quality assurance, modern and reliable ICT infrastructure, as well as electronic documents and records management systems. In terms of electronic documents and records management systems, this department is particularly responsible for the modernization and compliance of both manual and electronic records-keeping in the public service, including ministries.

Department of Administration and IT Management

Under the department of administration and information technology management, the OPM manages the procurement process of ICT resources, which include computers, network cables, and servers. This department is also responsible for developing and implementing ICT policies and standards for all the Namibian government ministries; regulating ICT systems and

strategies; developing systems, acquiring and customising application systems, and maintaining them.

Department of Public Service Management

This department provides regional councils and various government ministries with a framework that develops and strengthens HR policies, strategies, systems, and competencies for good governance. Under this department, the Directorate of HR Planning and Development ensures that there is systematic coordination of HR planning, development and training systems for various ministries, and implementation of HR policies, capacity building, Monitoring and Evaluation (M & E), and many other functions.

4.3.4 Ministry of Information Communication Technology (MICT)

The Ministry of Information Communication Technology was formed by the government in 2008 after realising the need to accelerate the use and development of ICT in Namibia. The MICT is responsible for information technology, telecommunications, broadcasting, media, and postal sectors in Namibia. The mandate of the MICT, according to the constitution of the republic of Namibia, is to lay the foundation for the accelerated use and development of ICT and coordinate information management within the Namibian government. The MICT has 2 directorates: The Directorate of Information and Communication Development and the Directorate of Audio-visual Media Copyright Services and Regional Offices with different functions to help the ministry achieve its mandate, as shown in figure 4.3.

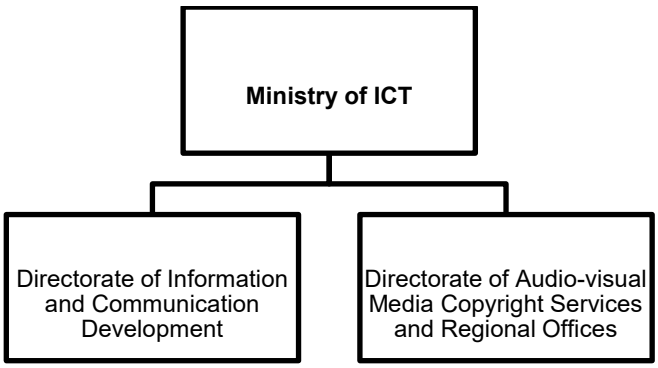

Figure 4.4: MICT IT structure

Directorate of Information and Communication Development

The Directorate of Information and Communication Development is responsible for promoting ICT development throughout the country, both from local companies and foreign investors. The directorate is also responsible for formulating ICT policies and regulations, reviewing them, and ensuring they are implemented across all government ministries and the private

sector. It also oversees companies and individuals introducing new services and technologies into the country to ensure they follow all the laws and regulations.

Directorate of Audio-visual Media Copyright Services and Regional Offices

The Directorate of Audio-visual Media Copyright Services and Regional Offices has the mandate to make Namibia a technology-driven society by making technology available to all the citizens. It is responsible for ensuring people in remote areas have proper IT infrastructure and setting up and managing ICT centres in both remote and urban areas. This directorate is also responsible for distributing government development plans, policies, and activities to the people via printed media, DVDs, and media coverage.

Table 4.1: Overview of functions

	Structure	Function
1	Office of the Prime Minister (OPM)	Responsible for coordinating all ICT activities in Namibia.
2	Ministry of Information and Communication Technology (MICT)	Responsible for information technology, telecommunications, broadcasting, media, and postal sectors in Namibia.
3	Ministry of Health and Social Services (MOHSS)	Mandated by the government to provide quality healthcare and social services according to international standards.
4	Private and public hospitals	Provide healthcare services to the Namibian people.
5	MOHSS IT Division	Responsible for all ICT projects in the ministry, including procurement, monitoring and evaluating systems, systems maintenance, and training healthcare staff on how to use the different IT solutions available to them in the different government healthcare facilities.
6	MOHSS Subdivision - Data Centre and core infrastructure services	Responsible for maintaining the ICT infrastructure, which includes servers, databases, and network.
7	MOHSS Subdivision - Applications systems development and maintenance.	Responsible for systems development, systems analysis and design, requirements gathering, and business process re-engineering.
8	MOHSS Subdivision - IT support services and help desk.	Responsible for giving technical support to all the ministry employees. This includes updating software, maintaining printers, troubleshooting computer problems and attending to staff IT queries.
9	OPM Department of Public Service and IT Management	Mandated to implement e-governance projects and coordinate ICT-related responsibilities in the entire Namibian public service.
10	OPM Department of Administration and IT Management	Manages the procurement process of ICT resources, which include computers, network cables, and servers and implementing ICT policies and standards for all the Namibian government ministries.

11	OPM Department of Public Service Management	Provides regional councils and various government ministries with a framework that develops and strengthens HR policies, strategies, systems, and competencies for good governance.
12	MICT Directorate of Information and Communication Development	Responsible for promoting ICT development throughout the country, both from local companies and foreign investors.
13	MICT Directorate of Audio-visual Media Copyright Services and Regional Offices	Responsible for ensuring people in remote areas have proper IT infrastructure and setting up and managing ICT centres in both remote and urban areas.

4.4 Summary

This chapter presented the cases identified for the study. The cases provided information or data useful to carry out this study on developing an integration framework for e-health with e-governance for the Namibian government. The cases discussed include the Ministry of Health and Social Services, Office of the Prime Minister, health facilities in Namibia, and the Ministry of Information Communication Technology.

CHAPTER 5

DATA ANALYSIS AND INTERPRETATION

5.1 Introduction

This chapter presents the data analysis of the study. The aim of this study is to develop a framework that can be used to integrate both e-governance and e-health for the Namibian government. This aim is prompted by the realisation that presently; patients' data are fragmented. As a result, there are challenges in tracing, monitoring, and collaboration, which affects the evaluation and management of the country's health services. The analysis is guided by two theories, namely Actor-Network Theory and Activity Theory. The justification for selecting the theories is discussed in chapter 2.

This chapter consists of four main sections. The first section presents the overview of the data analysis. The second section presents the data analysis about the two main variables (e-health and e-governance) guided by the two theories mentioned above. E-health and e-governance are analysed separately, and the findings are combined for interpretation purposes toward the realisation of the framework. The interpretation of the findings from the analysis is presented in the third section. Finally, a conclusion of the chapter is drawn in the fourth section.

5.2 Overview of data analysis

For this study, as detailed in chapter 4, data was collected for the two variables; e-health and e-governance from different sources, which include the Ministry of Information Communication Technology (MICT), Office of the Prime Minister (OPM), Ministry of Health and Social Services (MoHSS) and from health facilities in Namibia. Also, the rationale for these sources is explained in detail in chapter 4. The analysis was guided by two theories, Actor-Network Theory (ANT) and Activity Theory (AT).

Fourteen participants were selected for interviews from the four cases combined. Since participants represented their various institutions, it was imperative to ensure confidentiality of the information provided by using it for the specific intended purpose, and not share the data with irrelevant sources. To respect participants` privacy and anonymity, their names were not used in any way to protect them from any kind of persecution. Instead, codes were used to identify participants, for instance, GOV2 and for citation purposes, the codes, followed by a page number and line numbers, were used.

Breaking it down further, participants from the Office of the Prime Minister were labelled GOV1 and GOV2, those from the Ministry of Health and Social Services were labelled TECH1 and TECH2, while health professionals (from health facilities) were identified as HEA1 to HEA10.

AT and ANT were used as lenses to guide this study. The theories were comprehensively discussed in chapters 2 and 3. Activity theory (AT) focuses on the development of social activities that occur in a social system. The theory is often used as a lens to understand human activity within the system deeper (Kelly, 2018; Engestrom, 2001). Actor-network theory (ANT) is concerned with actors (human and non-human) and networks and the interaction between them (Iyamu & Hamunyela, 2014) and constant shifting of negotiations (Latour, 1992). ANT incorporates 'moments of translation' whereby activity in IS is given a new meaning through problematisation, interessement, enrolment and mobilisation. Figure 5.1 below illustrates the complementary use of AT and ANT for data analysis and interpretation of findings in this study.

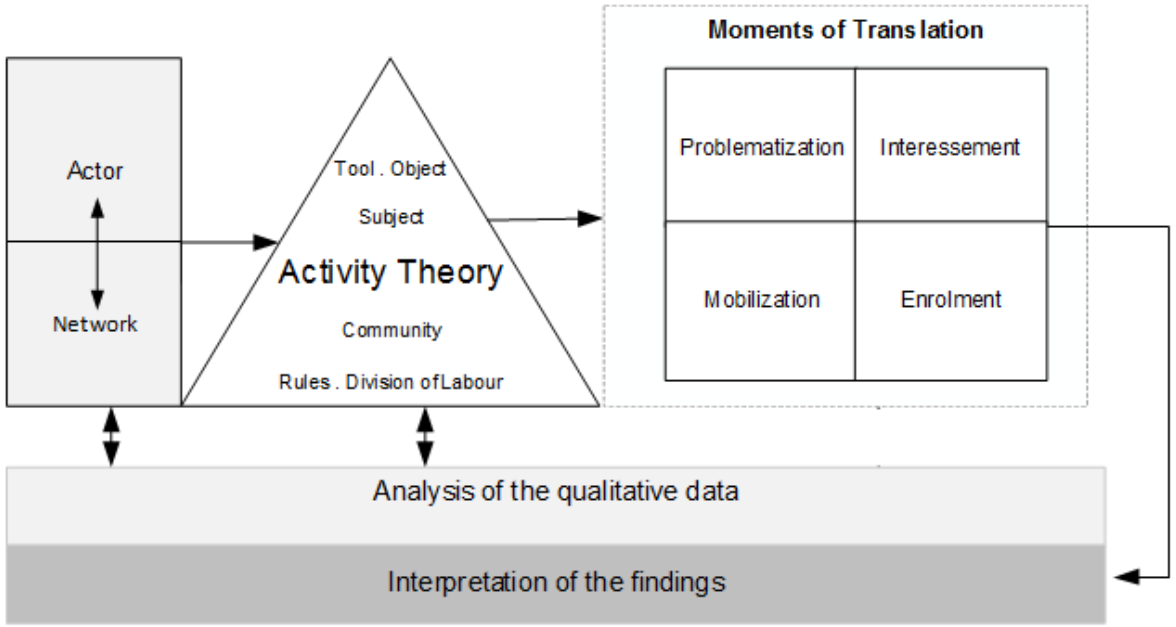

Fig 5.1: Complimentary use of AT and ANT

The use of ANT and AT for analysis and interpretation is divided into three phases, as Figure 5.1 illustrates. Phase 1 is actor and actor-network from ANT. Phase 2 is the use of AT. In phase 3, the moments of translation of ANT are applied for the interpretation of the findings. The justifications for this are as follows:

i. In the study context, it is only logical to identify the actors before exploring the different activities that occur. Thus, the activities can be associated with actors to gain a deeper insight into the complex environments of both e-health and e-governance.

ii. Similarly, to examine and understand how negotiations shifted from one moment to another, the various activities had to be understood prior.

In the data analysis, ANT was used, first to identify the human and non-human actors, including actor-networks that existed in the deployment (development and implementation) and use (practice) of both e-health and e-governance in the Namibia environment. Thus, human and non-human actors were identified first, followed by the actor-networks. This helps to understand the various roles and responsibilities as actors consciously or unconsciously form groups. Thereafter, the activities were viewed through the six components of AT: subject, tool, object, rules, community and division of labour, as shown in Figure 5.1. Following the application of AT were ANT's four moments of translation; problematisation, interessement, enrolment and mobilisation, to understand how various activities existed and their roles in the deployment and practice of e-health and e-governance.

5.3 Data analysis: E-health

As discussed above, ANT and AT were both used as lenses to analyse data for this study. The actors and networks were first identified using ANT, and then AT was used to identify the activities that happen within the networks. ANT was then used to view how these activities are translated to understand the factors that influence integration between e-health and e-governance in Namibia.

5.3.1 Actors

Actors are both human and non-human within an environment or network, and these affect or impact the implementation, innovation and maintenance of information systems (IS). Concerning this study, the human and non-human actors involved in e-health systems and processes had a common interest in implementation, innovation, management, and maintenance of information systems (IS) solutions. For these tasks mentioned above, involving e-health solutions, there were two different sets of human actors: professionals in information technology (IT), healthcare, and the affected citizens.

In IT, both technical and non-technical personnel were involved in the deployment, management and support of the e-health solution in the country. Some of the technical personnel included software developers, system analysts, IT managers, and network administrators. Project managers and business analysts were the non-technical personnel. One of the participants explained:

> *"For the e-health solution, skilled people were needed in the areas such as project management, software development, systems analysts" (GOV2, pg. 2:34-36).*

Like IT, from a healthcare perspective, the human actors involved in the deployment and management of e-health solutions were both health practitioners and non-health practitioners. Some of the health practitioners were nurses and physicians, such as medical doctors (general practitioners), dentists and radiographers, pathologists and pharmacists. The non-health practitioners were project managers, administrators, directors and deputy directors, data entry clerks, and patients. These IT and healthcare personnel were assigned to different teams, units, and departments in their organisations for various purposes. These are identified in the actor-network section below.

The OPM manages the procurement process of ICT resources and the development and implementation of ICT policies and standards for all the Namibian government ministries. The MoHSS IT division housing the IT department is responsible maintaining IS systems in the ministry. The non-human actors in this regard include the computer network, software and hardware.

The computer network consists of the Wi-Fi, Local Area Network (LAN), Wide Area Network (WAN), and other protocols used for different connectivity and various purposes. The software includes business applications, operating systems and databases. The hardware comprises artefacts such as personal computers (PCs), servers, satellite devices, printers, scanners, mobile tablets, and mobile phones. Neither the hardware nor software operates in a vacuum; software is deployed on hardware, and connect through computer networks to enable, support, and facilitate healthcare processes and activities following different approaches and methods. An e-health strategy document by the government states as follows:

> *"Technology infrastructure is a critical requirement for e-Health. It includes a few aspects and has a close relationship with the e-Health workforce needed to establish, maintain and support the infrastructure" (ST10, pg. 29: 2-4).*

Furthermore, the non-human actors also include documentation such as strategic documents, policies, reports and laws. This includes (1) MoHSS Strategic Plan whose focuses are related to the deployment of information systems and technology (IS/IT) solutions; (2) the World Health Organisation (WHO) Country Cooperation Strategic plan, which outlines the strategic agenda as adopted by the Namibian government; (3) e-health and MoHSS Universal Health

Coverage Policy Framework, which assesses the existing health sector framework to propose interventions that cover the implementation of Health information systems and the achieve universal health coverage; and (4) the National Health Care Technology Policy, which sets out the goals and strategies to be followed by the MoHSS in acquiring and implementing information systems and technology solutions. Detailed information about these documents is provided in chapter 3.

In addition, the constitution of the country, data protection act, cybercrime law, and the electronic transactions law, which concern or are related to healthcare or patients' data, are included as non-human actors in this study. The documents (policies, laws, and acts) govern how health information is stored, shared, and managed. For example, there is a statement in the e-health strategy document, which reads as follows:

> *"A well-defined e-Health architecture should contain protocols on data standards, interoperability, security, privacy, confidentiality, the necessary laws and policies. Infrastructure should include high-speed internet connectivity between facilities, computing devices and equipment fit for purpose" (ST10, pg.30:22-25).*

Some of the approaches and methods employed in the deployment and use of hardware, software and computer networks are also actors by their capability to make a difference. According to Bencherki (2017), an entity is considered an actor if it can make a difference. It means that the actors can influence the integration of e-health with e-governance. Some of the approaches and methods include best practices in planning, designing, and implementing IT solutions (hardware, software, and computer network). Substantially, this reduces complexity and increases thoroughness in IT solutions that are selected and implemented to enable and support e-health solutions.

5.3.2 Actor-network

An actor-network is a group of actors that work together or influence each other based on their allied interest through which they create links (Iyamu & Mgudlwa, 2017). The networks were formed consciously or unconsciously by actors with allied interests. Different actor-networks were involved in the implementation and support of e-health solutions in the country. This includes the Business Process Reengineering (BPR) committee, healthcare professionals, IT specialists and government agencies such as MoHSS, Department of Home Affairs, and the Namibia Statistics Agency (NSA).

The BPR committee is made up of different actors who are involved in the implementation of e-health. These actors include systems analysts, project managers, and systems administrators employed by MoHSS, OPM, and MICT with an allied interest to streamline all the processes and ensure the e-health system works efficiently. One of the participants stated:

> *"The OPM is part of the BPR committee tasked with the implementation of the e-health solutions" (TECH2, pg. 5:29-30).*

Healthcare professionals are a group that is also involved in e-health implementation through the requirements that they contribute. The group includes general practitioners, nurses, dentists, radiographers, pathologists and pharmacists. These healthcare professionals work together by ensuring all the patients' data is correctly recorded in the e-health system. All healthcare professionals use patients' data from different departments and facilities a patient has visited to know the patient's history to provide proper diagnosis and offer the patient high-quality care.

In the implementation of e-health, the IT specialists involved are classified as a group, referred to as actor-network in ANT. These specialists include systems analysts, technicians, network managers, programmers, project managers and IT managers who work at the different health facilities around the country and different government agencies. The specialists' roles include providing technical support, maintenance and assessment of the e-health solutions, and co-existence and integration with other technology solutions.

Several government agencies are also networks involved in e-health implementation. These include the Ministry of Home Affairs, the custodians of all the citizens' data required in an e-health system; the Ministry of Defence and Namibian Police that have various health centres and clinics around Namibia; the Namibia Statistics Agency (NSA) which is responsible for sharing information and data from the MoHSS as it is the only entity allowed by law to carry such jurisdiction; the Ministry of Finance that approves the budgetary needs of the e-health project; the Office of the Attorney General to take care of the legal issues; Namibia Institute of Pathology (NIP) and the Health Professions Council of Namibia (HPCN). Each of these agencies distinctively contributes to the deployment of e-health solutions. Consequently, the contributions bring disparity to the e-health solution, which makes some of the solutions unable to co-exist or integrate with other systems such as e-governance.

The lack of co-existence creates a situation in the country where many of the core stakeholders, such as the agencies identified above, have their own e-health solutions. Some of the solutions duplicate functions of each other. Also, there is no synchronisation of data and

processes. This makes it difficult for the MoHSS to electronically coordinate some functions and activities executed by e-health solutions in the country. In addition, from an IT perspective, the deployment of enabling and supporting technologies becomes prohibitive in such scattered and isolated approaches. One of the participants briefly shared his view as follows:

> *"The biggest challenge for e-health is how to collect data from ministry of Home Affairs, ministry of defence, the police and other sources including the Namibia Statistics Agency (NSA) which is heavily dependent on statistics from e-health" (GOV2, pg. 9: 18-20).*

Having identified the actors and actor-networks as presented above, the activities involved in the implementation of e-health solutions are analysed, as illustrated in Figure 5.1. Subsequently, this is to gain a deeper understanding of substantiated circumstances, such as when, how and why the e-health solution is implemented in the manner it is, without being integrated with the e-governance.

5.3.3 E-health: Activity Theory

Activity theory (AT) "is a socio-technical theory or concept concerned with the development of social activities" (Iyamu & Shaanika, 2018:165). Social activities that occur in a social system are analysed in a framework-like concept to understand why certain things happen in a certain way. In other words, the AT concerns itself with activities of people within a system, which involves interaction between many actors and other elements (Engestrom et al., 2016). Therefore, actors within a system contribute immensely within the same system, and the AT tries to underpin how the actors behave, act, and perform within the system.

In this case, the existence of an e-health system means that there are activities in silos or complementarity that make the solutions function and useable. The activities are performed using various tools/apparatus by people (subjects), which determine how and why the system (e-health solution) is implemented and used in different ways, including its stand-alone or integrated with other technology solutions within the country. To be holistic about this investigatory pursuit, the six components, tool, subject, object, rules, community, and division of labour, are used to guide the analysis.

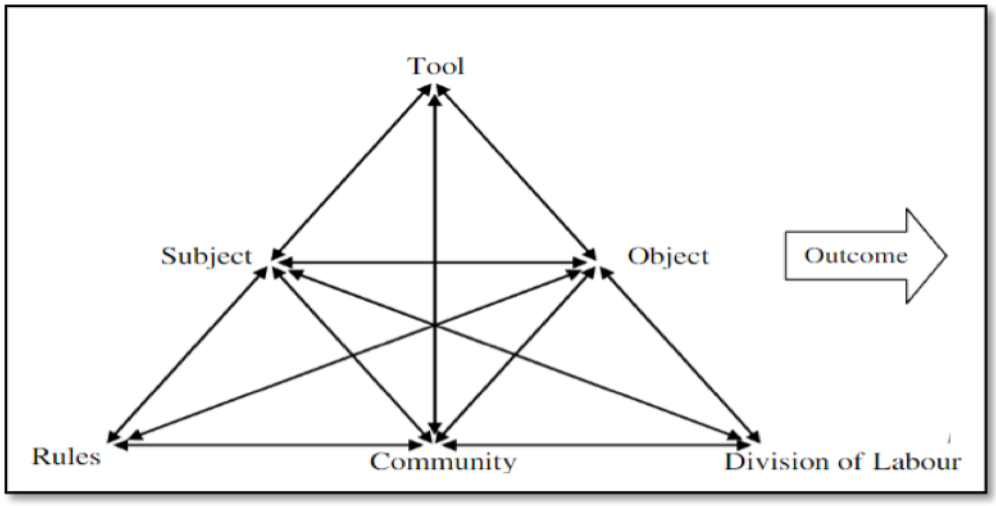

Fig 5.2: Activity Theory Model (Engestrom, 2001).

5.3.3.1 Activity Theory: Tool

In the context of AT, tools consist of physical, psychological, tangible or non-tangible apparatus, systems, procedures or instruments used by subjects when executing their responsibilities (Uden, 2007 as cited by Iyamu & Shaanika, 2019). Various tools such as IT solutions, government policies and health laws and regulations constitute the tools that are applied to guide the implementation, monitoring, management and maintenance of e-health solutions in the country. Consequently, these tools influence how, when, and where the e-health solutions are implemented, managed, and supported, including their integration with other IT solutions.

Thus, knowledgeability about the tools was critical, which can manifest from non-tangible tools such as training (and education), workshops, business process re-engineering and data capturing software (e.g., P-tracker system, district health information system, e-birth system, e-death system, e-TB system and Meditech). Different departments within health facilities (hospitals or clinics) use different IT systems (solutions) from the list provided above to capture patients' data and other processes and activities needed for service delivery.

For example, the e-TB tracker system is used to track TB patients in the country. The e-TB tracker enables health practitioners to record every patient diagnosed with TB and record each time they visit a health facility for check-ups and each time they collect their medication. If a TB patient misses an appointment to collect medication, for example, the system will alert the health practitioners, and they will try and contact the patient using the details stored in the system. Statistics from the e-TB tracker is also sent to the Namibian Statistics Agency so they can report on the prevalence of TB in the country.

However, no tool is integrated with the e-TB for monitoring and evaluation purposes to enhance its governance and durability. Without governance, it is difficult to assess and improve solutions. This could be attributed to unsatisfactory services provided by health professionals in Namibia, despite the use of numerous tools. According to Pierre and Peters (2019), governance guides how objectives for the organisation are set and accomplished and how risks and performance are monitored. Governance is increasingly enforced through electronic means, referred to as e-governance, for synchronising or sharing resources (e.g., data and processes), and for enabling manageability.

These different systems are implemented as stand-alone systems in the different health departments that house them. When health practitioners in a department realise that they need a system to improve or assist them in certain processes, their manager approaches the IT manager of that health institution with the request. The IT manager then escalates the request to the MoHSS, and IT specialists from the ministry will assess the request and carry out BPR. Based on the BPR process, MoHSS engages OPM for approval and funding. It is a lengthy, prohibitive process that derails service delivery. Despite the protracted process, improved effectiveness and efficiency can be achieved if the procedures are automated through a solution such as e-governance. A participant explained this below:

> *"The process of acquiring a system starts with the ministry that needs this system. The ministry identifies a particular area that need a health IT system, discuss and agree internally and do the business process reengineering before approaching OPM" (GOV2, pg2:2-4).*

E-birth and E-death notification systems are some of the tools used by health professionals for e-health activities to ensure quality healthcare service delivery in Namibia. The e-birth notification system is used to record every birth in Namibia and is connected to the ministry of Home Affairs system. For example, once a child is registered in the e-birth system, the parents take the reference number to the ministry of Home Affairs to obtain an official, authenticated birth certificate. The e-death notification system is used to record every hospital death in Namibia and is also connected to the ministry of Home Affairs system. Once the death is recorded, the hospital gives relatives of the deceased a reference number, which they take to the ministry of Home Affairs to be issued with a death certificate. One of the participants explains:

> *"The e-birth notification is used to register a birth in the hospital. The mother's details and baby's details such as weight, place of birth and Apgar*

score are recorded, and the system will produce an ID number, which will be a reference for the Ministry of Home Affairs" (HEA7, pg. 1:9-12).

The District Health Information System (DHIS) is another tool used at the MoHSS district offices. It is also isolated, although used for important healthcare services. The DHIS is used to record and monitor data from different clinics such as bed occupancy rate, number of outpatient visits, HIV mother to child transmission rate and immunisation rates. The DHIS makes it easy for decision makers to interpret health data resulting in high-quality care to the patients. Despite these significant functions, the performance and outcome of the DHIS were not being monitored, assessed, managed or governed at the time of this study.

The functionalities of these tools (such as e-TB, E-birth, E-death, and DHIS) make it crucial to integrate them with an IT solution (e-governance) that can assist with streamlining of procedures, consolidation of enabling technologies, synchronisation of the processes, data sharing, and activity management. In addition to these tools, human efforts and skills are required to enact the plans through integration. This is to improve service delivery of healthcare services in the country.

5.3.3.2 Activity Theory: Subject

Subject, within the Activity theory, entails all actors or groups of actors or entities (human and non-human) responsible for an activity. In this instance, the activity is the implementation and deployment of e-health in Namibia. For the e-health system to function, the subject(s) are involved in the day-to-day activities and operations, from the Ministry of Health and Social Services, hospitals, and other healthcare centres and various other ministries involved.

From AT perspective, the subjects involved in e-health include stakeholders such as healthcare professionals (e.g., medical doctors (General Practitioners) dentists, radiographers, pathologists, nurses and pharmacists), IT specialists (e.g., software developers, system analysts, IT managers, and network administrators); government representatives and citizens (patients). Together, subjects provide requirements, enable, support, and use healthcare IT solutions for various purposes.

The way or manner the subjects (actors) use the tools for healthcare services is viewed from 2 different angles: know-how and purposefulness. Know-how refers to knowledge and skill about the tools. The subjects need to be trained to equip them with skills to utilise the tools properly; for example, the healthcare professionals need to have adequate computer skills to use the e-health solutions. Likewise, IT specialists need to possess the skills needed to

implement e-health solutions. The purposefulness of the tool can be at a personal level or organisational interest. For example, a nurse uses the e-TB tracker to fulfil their day-to-day duties which is on a personal level; the organisation, on the other hand, uses the e-TB tracker to get data that affects the whole organisation and to be integrated with other systems in the organisation.

5.3.3.3 Activity Theory: Object

In AT, an object can be tangible or intangible and sets the direction in which the activity should proceed (Shaanika & Iyamu, 2015). Thus, e-health is an object in a social system of a community through which healthcare is provided to patients. Other objects that enable and relate to the functioning of e-health are of both technical and non-technical nature. The technical include implementation, management and governance of the system. The non-technical are the use of the system for patients' care. The operationalisation of the e-health system is not carried out in isolation in achieving the objectives, goals, mission and vision. It requires consolidated efforts of both technical and non-technical functions. Also, the objects do not operate themselves; it needs personnel with appropriate know-how, knowledge and skill.

Different types of knowledge and skills are required to implement and access e-health. The information technology (IT) specialists focus on activities such as implementation, maintenance, management and governance of the e-health, whilst the health practitioners are primarily concerned with accessing the system for patients' care. These activities are based on requirements, which are gathered from policymakers and users. The health practitioners and administrative personnel require the necessary skill and know-how in using or accessing the e-health system. Thus, healthcare staff need to attend training and workshops to have a good understanding of the systems. This assists the users to enhance the system through the requirements that they provide. Also, it fortifies the usability of the systems rather than leave the systems in a redundant state. One participant explained as follows:

> *"For the successful implementation of e-health, the Namibian government needs to equip the nurses and doctors with computer literacy skills and should consider reviewing their nursing and medical school curricula to include this" (HEA3, pg5:1-3).*

The professionals in IT also need to have the specialised skills to manage e-health projects. One participant expressed concern that Namibia does not have enough specialised IT personnel, which makes it difficult to implement e-health. The participant further explained that the few IT specialists available work in the private sector as it pays them more. Hence, the

government needs to train its own IT specialists to equip them with their required skills. With appropriate knowledge, skill and requirements, the systems can be enhanced from various functional angles such as integration and consolidation.

As of the time of this study, the e-health system in Namibia is fragmented; many of the systems are stand-alone in the health facilities across the country. The e-TB tracker is used to capture data of TB patients; the P-tracker system is used to record and track HIV positive pregnant women; the e-birth system is used to capture data of new-born children, and the e-death system is used to capture deaths in the country. The fragmentation of the systems leads to increasingly poor health services provided to the community. To improve health service delivery in the country, related objects need to be consolidated and integrated. According to one of the participants:

> *"The different systems being used in many health facilities are not connected to each other. They are not integrated; hence there are duplications of data and processes" (TECH2, pg3:28-29).*

Thus, it is of paramount importance to integrate technical objects and non-technical objects related to the functioning of e-health solutions in the country. Furthermore, an integrated system requires monitoring and evaluation, which can be achieved through electronic governance (e-governance). This is to improve service delivery and achieve the objectives of the e-health system.

5.3.3.4 Activity Theory: Rules

Rules control and govern activities and interactions in a system to maintain order, peace, harmony and success (Nehemia-Maletzky et al., 2018). Rules are meant to contain the questionable and not progressive forces that may hinder activities. In implementing and managing e-health solutions, rules are necessary as they guide the other tenets in a quest to reach the outcome.

In Namibia, the implementation and management of e-health solutions are governed and guided by policies and standards contained in different documents. The National Healthcare Technology Policy covers the MoHSS strategic document that guides information systems and technology (IS/IT) acquisition and implementation. The MoHSS has another Strategic Plan tagged "National e-Health Patient Information System Strategy", which focuses on implementing IS/IT solutions. There is a third Medium-Term Strategic Plan for Tuberculosis and Leprosy, which focuses on deploying TB information systems. The National Strategic Framework for HIV and AIDS Response in Namibia that focuses on the deployment of

HIV/AIDS information systems is a part of e-health. The National Public Health Laboratory Policy 2012, which includes the deployment of laboratory information systems, is also a part of e-health.

The documents are in hard copies and electronic formats. Like the technical objects, the documents are scattered across offices and health facilities in the country. Although it is vital for the e-health system to share and synchronise information, the current infrastructure is not deployed to do so. Therefore, there is a need for interoperability, which enables and supports the integration of e-health solutions and other related systems toward improving service delivery. The relevance and importance of interoperability are known to many of the actors responsible for the formulation of the strategies. Here is an extract from the e-health strategy document:

> *Interoperability in healthcare is a critical as it allows different e-health systems to communicate and exchange usable data (ST10, pg28:5-6).*

A memorandum of understanding (MoU) on data exchange between the MoHSS and other government agencies like the Ministry of Home Affairs is vital for e-health implementation. Although this is stipulated in the e-health strategy, the implementation requires a technology solution to facilitate the data exchange. This works in collaboration with other laws, including the data protection Act, to ensure patients' information serves legitimate purposes. Currently, there are discrepancies and differences in views between the Ministry of Home Affairs and the MoHSS because there is no MoU to govern their need to share information. This is a challenge that manifests and derails the implementation of e-health.

5.3.3.5 Activity Theory: Community

In AT, Community consists of a group of people sharing the same motive within an environment (Iyamu & Shaanika, 2018). Thus, community involves people that have a common culture or values in carrying out an activity. In this context, this study explores the roles and influence of the community in the deployment, management, support and use of the e-health system in the Namibia environment. This implies that the different groups of people are involved in e-health as a community. The groups consist of technical (ICT) and non-technical personnel (health and other professionals). Some of the roles of the community are to provide requirements, technical support, maintenance and assessment of the e-health solutions. Also, the community is expected to ensure the co-existence and integration of e-health with other technology solutions, such as e-governance. The technical personnel consist of software developers, system analysts, IT managers, and network administrators. Project managers and business analysts were non-technical personnel.

The groups of the community associate with the e-health solutions from different angles; thus, their perspectives, including requirements, are not the same. As a result, corroboration, consolidation, and alignment of the requirements were critical but did not happen. This could be attributed to one of the factors why e-health could not be integrated with e-governance. Primarily, the healthcare personnel were considered the end-users of the e-health system and play a significant role in implementing the solution. This is primarily because the development (or selection) and implementation of the solution depend on requirements specifications gathered from the personnel. A statement in the e-health strategy explained this below:

> *"Engaging healthcare workers in the development of systems is a key opportunity to improve user experience and results in better, more integrated solutions that disrupt more traditional methods that have resulted in fragmented, siloed information systems" (ST10, pg.23:10-13).*

The BPR committee is also a community in e-health, consisting of systems analysts, project managers, and systems administrators employed by MoHSS, OPM and MICT. The mandate of the BPR committee was to analyse the day-to-day tasks and activities of the different users and simplify them before incorporation into the e-health system. The challenge lies in how to incorporate the activities, which requires interoperability.

5.3.3.6 Activity Theory: Division of labour

Division of labour involves how different jobs/tasks are distributed among the community members and their rights (Nehemia-Maletzky et al., 2018). It entails the allocation of specific tasks by areas of specialisation of subjects. Subjects perform tasks, and these subjects are allocated roles or tasks within the activity. In this instance, healthcare professionals, IT specialists, government representatives and citizens (patients) have specialised tasks that support the implementation of e-health.

The roles of the IT specialists included providing technical support, maintenance and assessment of the e-health solutions, and its co-existence and integration with other technology solutions. The role of health professionals was to ensure the system fulfils their needs and that patients' data are correctly recorded in the e-health system. The roles seem to be clear for those involved in e-health from both technical and non-perspectives. What did not seem clear was whether the activities carried out in accordance with the roles were evaluated to ensure completeness. This could be associated with the challenges or gaps in the integration of e-health with e-governance.

Some of the tasks allocated to the various actors and groups in the implementation, support and management of e-health solutions are business process reengineering, system design, and setting up the network infrastructure across the country. The primary reason for allocating these tasks is to ensure that the right people with the required expertise work on them to produce an e-health solution that solves current problems in healthcare and covers all the objectives. On the one hand, some of the consequences of not allocating these tasks are producing a fragmented, incomplete solution that does not meet requirements. On the other hand, the implications of inappropriately allocating the tasks are not meeting stipulated deadlines and the cost of the project going up.

5.4 Data analysis: E-governance

E-governance is an innovation of the government; whose primary objective is to provide quality service to the citizens. The objective of e-governance is achieved or carried out by promoting transparency (Xia, 2017), enhancing service delivery (Ajibade, Ibietan, & Ayelabola, 2017), and facilitating the integration of services and systems, including e-health. Thus, there are entities that are involved in achieving the objective, which include technologies, processes, activities, and humans. As of the time of this study, e-governance and e-health were not integrated, hence this research.

As discussed in the beginning of the chapter, ANT and AT are complementarily used in the analysis of e-governance to understand the factors that can influence its deployment (development and implementation) as well as its integration with e-health. The analysis begins with identifying the actors and actor-networks, followed by using AT as a lens. The last part of the analysis applies moments of translation to focus on the negotiation that happens in deploying the concept.

5.4.1 Actors

In relation to this study, the human and non-human actors involved in e-governance were responsible for authorising and regulating implementation, innovation, management, and maintenance of information systems (IS). For these tasks involving e-governance, there were human actors applying other materials and processes (non-human actors) in carrying out various tasks in organisations to deploy e-governance in Namibia.

Technical and non-technical personnel (human actors) were involved in implementing e-governance in Namibia. Those considered technical personnel include system analysts, software developers, system administrators, and IT specialists employed by different government ministries, including OPM. The non-technical personnel (human actors) involved

in e-governance activities, such as requirements gathering and users' testing, included procurement officers, policy officers, the legal team, directors, deputy directors and the Prime Minister. A participant explained:

> *"OPM uses its in-house software developers, systems analysts and project managers for some e-governance projects and outsources for other projects" (GOV1, pg2:19-20).*

Some of the non-human actors that were applied in the e-governance activities are categorised into two parts in this analysis. First, they include the information technology (IT) solutions such as the Wi-Fi, Local Area Network (LAN), Wide Area Network (WAN), software (e.g., business applications, operating systems, and databases), servers, and hardware (e.g., computers, satellite devices, printers, scanners, telephones, and mobile phones). Secondly, the non-human actors are mainly documentations associated with or relevant to e-governance activities, particularly in requirements gathering, development, and implementation stages. Some of these include (1) policy documents; (2) strategic documents; (3) National Development Plan (NDP) documents dedicated to IT solutions; (4) government leveraging and strategic document on IT infrastructure; and (5) the e-services and innovations documents. Detailed information about these documents is provided in chapter 3.

5.4.2 Actor-networks

From ANT perspective, as mentioned in the e-health section of analysis, a network consists of actors with a common interest, and the networks can be formed knowingly or unwittingly (Minn, 2016). Different actor-networks were involved in the implementation and support of the e-governance solutions in the country. Thus, some of the actors were in various working groups (networks), which were consciously or unconsciously formed. Consciously, groups and teams were created as allowed by policy, within the organisational hierarchy. Accordingly, the groups or teams consisted of people with similar skill or knowledge. In addition to the formal groupings, some actors were involved in some groups' activities without being recognised members, making them members unconsciously.

Some of the groups (networks) were the Business Process Reengineering (BPR) committee, IT, and government. These were the primary stakeholders in the deployment of e-governance in the country. This is because the groups play vital roles such providing determining requirements, technology enablement and support, financial project sponsorship, and political-will for decision-making. In playing their roles, there were conflicting ideals, sometimes defined or addressed through relationships that were upheld. In terms of conflict, a power relationship was employed. These groups were employed in the different government ministries.

Although the BPR is discussed in e-health, the same committee consists of different people who were involved in the activities of e-governance because of the different requirements. The roles and responsibilities of this committee were critical in that it contributed requirements used to develop and guide the implementation of e-governance. The requirements were major determinants in the decision to integrate e-governance with e-health or not.

The IT group was responsible for enabling the technological support of e-governance. Owing to the vast nature of the responsibility, the group was further divided into groups and teams such as software development, systems analysis, project management, and systems administration. This was based on the specialised nature of their tasks and disciplines. From the pool (team) of the project management, managers were assigned to manage other groups, such as teams of software developers, which ANT refers to as heterogeneity. In ANT, heterogeneity is when an actor is part of multiple networks (Sekgweleo,2018). The heterogeneity brings synergy and corroboration between teams and groups, which is critical for integration.

The involvement of the government administration came from different ministries. The Ministry of Information Communication Technology (MICT), Ministry of Finance (MoF), Office of the Prime Minister (OPM), the cabinet and the parliament were also actor-networks in the deployment of e-governance by nature of their capability to make a difference by political will. Politically, the cabinet wills its power to approve the budget for e-governance projects, including its implementation. The approval was often not based on the technical aspect of the projects, but politics and power. This implies that there exists a power relationship between the government's administration and the IT specialists. This relationship was often not spoken about because it was sometimes unconscious. After the cabinet's approval, the e-governance project is then presented to parliament for approval. MoF is responsible for releasing the funds for e-governance projects after the parliament has approved. One participant explained this below:

> *"Every e-governance project needs the approval of cabinet because there's money involved. The project is presented to the cabinet, thereafter, to the parliament, and both structure (groups) employs their power to approve or not approval" (GOV2, pg7:19-21).*

However, the cabinet does not seem to have the expertise to identity and understand the appropriateness of the e-governance functions. MICT works with OPM in implementing and deploying e-governance projects in the country, but OPM leads the process. The OPM

manages the procurement process of ICT resources, and the development and implementation of ICT policies and standards for all the Namibian government ministries. One participant explained below:

> *"The Prime minister has the mandate, therefore has the power to deliver the e-governance projects hence its office coordinates the activities and makes important decision concerning the solution" (GOV2, pg2:24-27).*

The main actors and actor-networks have been identified. Their roles and responsibilities have also been put into perspective. However, the activities and the factors of influence involved in the deployment of e-governance have not been detailed. Thus, the activity theory is employed to further analyse the existence of e-governance in Namibia.

5.4.3 E-governance: Activity Theory

Different e-governance projects have been implemented for the government to provide quality service to the citizens. This constitutes many activities that make them function. The six components of the activity theory (AT), that is, subject, tools, object, rules, community and division of labour are applied in analysing the different activities under e-governance.

5.4.3.1 Activity Theory: Tool

In AT, a tool consists of tangible or non-tangible apparatus, systems, procedures or instruments used to execute an activity within context, in achieving specific objectives. Tools, such as IT solutions, government policies and regulations, are applied to guide the implementation and management of e-governance to provide quality service to the citizens. These tools in turn influence how, when, and where the e-governance agenda is implemented, managed, and supported. For example, the e-government's strategic action plan provides comprehensive steps to be taken by the government in using ICT to better serve its citizens, including the dates specific steps need to be completed and the people and ministries responsible.

To implement and manage e-governance, the non-tangible and technical tools used include Wi-Fi, Local Area Network (LAN), Wide Area Network (WAN), and software such as applications, operating systems and servers. Although these tools have been identified as actors from an ANT perspective, it is necessary to re-identify them because they share a different connection and relationship with different entities. The OPM, various ministries, and departments within the e-governance framework use software to promote transparency and enhance service delivery. Trainings, workshops and business process re-engineering are also tools used in e-governance. Tangible technical tools in e-governance implementation and

management include hardware such as computers, satellite devices, printers, scanners, telephones, and mobile phones.

These tools are constantly evolving over time and space, meaning that they are updated occasionally to suit the activity or the implementation and management of the e-governance system to ensure that Namibian citizens have access to quality service delivery. This entails integration with a solution like e-health to provide essential services to the community. E-governance integration with e-health is a complex process that requires specific tools to ensure success in promoting transparency and enhancing quality service delivery in the Namibian healthcare system. Therefore, e-governance integration with e-health is enabled firstly by simple tools, such as the internet, which encompasses the WAN and LAN as well as general connectivity coupled with computers and other accessories needed to pull r the e-health and e-governance integration agenda together. As one participant points out:

> *"Some hardware, software and connectivity issues still hinder the implementation of e-health in clinics that are remote areas of the country" (GOV2, pg7:32-33).*

The tools form the basis and integral part of electronic processes (e-process) and electronic services (e-service). The absence of these makes e-governance integration with e-health solution impossible. Also, government policies and regulations set the direction in which different government systems should be implemented, deployed, and integrated. It would be difficult to integrate e-governance with the e-health solution without these guidelines.

5.4.3.2 Activity Theory: Subject

In AT, Subject refers to actors or a group of actors or entities, which are living beings. The actors voluntarily or contractually take ownership or responsibility in an activity. Thus, the actor makes use of tools in the context of AT. Therefore, for the e-governance system to function, the subjects are involved in the day-to-day activities and operations of the various tasks. In the current (as at time of this study) set-up of the country, the actors (or subjects) of e-governance are employed in 4 main administrative offices of the government: The Office of the Prime Minister; Ministry of Home Affairs; Ministry of Health and Social Services; and Ministry of ICT.

The implementation of e-governance in Namibia to improve quality service among citizens through IT solutions requires agents, people or groups to work together. From AT perspective, the subjects involved in e-governance include the technical personnel such as software developers, system analysts, IT managers, and network administrators and IT specialists from

different government ministries, including OPM as well as the non-technical personnel such as procurement officers, policy officers, legal team, directors, deputy directors and the Prime Minister.

The technical personnel involved in e-governance are very critical to its implementation, including integration. Hence, it is essential for the actors to possess specialised skill sets that ensure the processes are efficiently executed to fulfil the goal and objectives of serving the needs of the citizens. However, some critical skill sets were scarce. This could be attributed to two main reasons. Firstly, e-governance was an emerging concept in the Namibia environment. Secondly, there seem to be cases in the region that could be referenced or tapped from. The skill-set manifests in knowledgeability, which contributes to influencing stakeholders' decisions in the various stages of deploying e-governance. A participant explained the following:

> *"The government should hire certified project managers who have the skills to manage e-governance projects" (GOV2, pg5:7-8).*

These factors consequently influence e-governance integration, directly or indirectly, considering the intertwining of the actors' roles in the process. For instance, the home affairs staff must gather biographical data and approve it for use in various ministries, including health facilities. Likewise, ministries such as the ministry of defence have their own clinics and hospitals and their operations need to be supported by e-governance efforts to ensure quality service delivery, transparency, and general efficiency to the benefit of Namibian citizens.

5.4.3.3 Activity Theory: Object

An object can be tangible or intangible and sets the direction in which an activity proceeds (Shaanika & Iyamu, 2015). The objects that enable and relate to the functioning of e-governance are of both technical and non-technical nature, which include processes, policies, and politics. Involving these technical and non-technical factors means that they have the ability or capability to influence the activities that determine the direction and status of e-governance in the country.

From the technical front, some of the subjects, such as systems' analysts, systems' administrators and software developers, have their individual or group motives in the implementation and management of the e-governance solutions. Some of these motives are to enable citizens to get quality service delivery or promote transparency in the activities of the government administrations. These types of motives necessitate the integration of e-governance with e-health to foster and ensure better healthcare services across the country.

Thus, the implementation of e-governance must be aligned to allow integration to take place. This includes implementing e-governance solutions on the platforms that enable and support technologies that are compatible, can co-exist, are flexible, and Interoperable. These can be achieved and ensured through policies, principles, and standardisation based on technology requirements. One of the participants explained the following:

> *"Information systems standards apply to many different parts of information systems and promote the ability for systems to share information and thereby allow users to have integrated views of health data" (ST10, pg28:8-10).*

On the other hand, with the non-technical, subjects with various unique expertise, such as procurement officers, legal officers and policy officers, have a motive to support the implementation and management of e-governance solutions. The objectives, goals, mission and vision of e-governance drive the agenda and are followed to ensure a successful integration of systems. It requires consolidated efforts of both technical and non-technical functions.

The objectives of e-governance are to make government administration more transparent, speedy, and accountable, while addressing the society's needs and expectations through efficient public services and effective interaction between the people, businesses, and government. Furthermore, the OPM highlights that e-governance aims to make it convenient for the general citizens to access information and government services. One participant expressed the following:

> *" The idea for e-governance is to ease access to government services by citizens and to improve collaboration amongst stakeholders" (GOV2, p. 1:13-14).*

At the time of this study, the implementation of e-governance solutions was hindered by much bureaucracy, which in turn supports a fragmented e-health system. A participant expressed the following:

> *"Decisions on projects are often delayed because it is difficult to get the executive government official who chairs the steering committee to attend all meetings as they have other engagements" (GOV2, pg4:6-8).*

The administrative procedures that need to take place before any e-governance solution can be implemented are excessively complicated and lengthy, resulting in different health

departments having their stand-alone systems that are not integrated amongst themselves and the e-governance framework.

5.4.3.4 Activity Theory: Rule

Rules are meant to govern the activity towards producing an outcome. Rules can be classified into different categories such as laws, principles, policies, and regulations. The rules shape and guide the direction of an activity. This can be attributed to the fact that the rules are applied to maintain order in an environment such as an organisation and a community. Consequently, without rules, the objectives of an activity can suffice, which is detrimental to actors involved. Primarily, e-governance is intended to enhance quality service through factors such as transparency, interconnectivity of services, and access to information (electronic records). One participant expressed the following:

> *At OPM we are guided by the e-governance strategic action plan when implementing any e-governance solution (GOV2, pg1:10-11).*

In Namibia, the implementation and management of the e-governance solutions are governed and regulated by policies and standards contained in different documents. The e-governance strategic action plan provides a comprehensive plan of the steps to be taken by the government to use ICT to better serve its citizens. There is the 5th National Development Plan (NDP5) with some aspects dedicated to IS/IT solutions and e-governance. The office of the prime minister's annual plan also sets out the actions to be taken by OPM in fulfilling its strategic objectives, including leveraging e-governance and ICT infrastructure in all government ministries. This action and process manifest in a power relationship between the government administrative offices. This influences requirement gathering and the implementation of e-governance in the country.

> *The office of the prime minister is busy drafting a digital strategy that will guide the implementation of e-governance. All government areas that need to be digitised are included (GOV2, pg1:25-26).*

E-governance systems implementation, support, and use are fundamentally governed by rules, which include regulations, policies, principles, and standards from technology, process, and management perspectives. Through governance, the e-governance can achieve its objectives, including transparency, accountability efficiency, and effectiveness in providing services to the citizens. However, this is not currently the case in Namibia, as of the time of this study. The challenges include lack of integration with critical and essential services in the form of e-health. Although the relevant regulations and standards are there, as mentioned

above, there are no measures put in place to ensure they are applied; making it difficult for integration to happen.

5.4.3.5 Activity Theory: Community

A community involves people that have a common culture or values in carrying out an activity. It is in this context that this study explores the roles and influence of community in the deployment, management, support, and implementation of e-governance in Namibia. Different groups of people are involved in e-governance, and they are referred to as a community.

The groups consist of technical (ICT) and non-technical personnel found within an e-governance context/environment. Some of the roles of the community are to provide requirements, technical support, maintenance, and assessment of the e-governance solutions. Also, the community is expected to ensure the co-existence and integration of e-governance with other systems such as e-health. The technical personnel found in the public service sector context consists of software developers, system analysts, IT managers, and network administrators. The non-technical personnel found in the sector include policy officers, procurement officers, legal team, directors, deputy directors, the Prime Minister and other professionals.

The collaboration, consolidation, and alignment of the requirements for e-governance were imperative, although within the current system there is not much development yet; hence, the idea of integrating e-governance and other systems like e-health to ensure quality healthcare service delivery, transparency, and general efficiency in Namibia`s service industries. The effort of integrating e-health and e-governance systems have been challenging as the community which is supposed to drive the initiative lacks skills and technological support as well as the right policies to support the collaboration. A participant shared the same sentiments below.

> *"The challenge with e-governance implementation is that the people that are involved in the project are not well equipped with the right skills" (GOV1, pg2:32-33).*

In cases where the community is not well equipped to drive the solution due to lack of required skills, e-governance will not suffice, let alone integration with other systems such as e-health. A statement in the e-health strategy explains this below:

> *"The major challenge was most of the health personnel were not confident, they didn't have enough knowledge and computer skills" (HEA3, pg3:19-22).*

The cabinet and parliament are also communities found in e-governance implementation. The cabinet is made up of the president, the vice president, and other ministers nominated by the president. Before any e-governance project can be implemented, it needs the approval of cabinet first. Then, once it is approved by the cabinet, the parliament also needs to approve it. Some members of cabinet are also members of parliament. Currently, there is a challenge of cabinet and parliament members not having the know-how to adequately assess the e-governance solutions that are brought before them. A participant explained:

> *"Legislators and top executive government officials need to receive specialised training aligned to their duties they will be expected to perform" (GOV2, pg5:14-15).*

The lack of adequate skills amongst legislators hinders the integration of e-governance with e-health. Some members within the cabinet and parliament are also computer illiterate, which results in not fully understanding what is brought before them.

5.4.3.6 Activity Theory: Division of labour

Division of labour entails the allocation of specific tasks in accordance with the subjects' areas of specialisation. Tasks are performed by subjects, and these subjects are allocated roles or tasks within the activity. In this instance, IT specialists, government representatives, and citizens have specialised tasks that support the implementation of e-governance.

The roles of the IT specialists in e-governance include providing technical support, maintaining and implementing e-government solutions, and its co-existence and integration with other technology solutions. The role of non-technical personnel, such as policy officers, procurement officers and directors, is to ensure the system fulfils their needs. Iyamu and Shaanika (2019) highlighted that due to the power that actors possess, they can enable or constrain systems and technologies' activities through conscious or unconscious actions. The roles seem to be clear for those who were involved in e-governance from technical and non-technical perspectives. What seemed to be unclear was whether the activities carried out in accordance with the roles were evaluated to ensure completeness. This could be associated with the challenges or gaps in the integration of e-health with e-governance.

Some of the tasks that are allocated to the various actors and groups in the implementation, support and management of e-governance solutions are budget allocation, the recruitment of qualified staff, and setting up the network infrastructure across the country. The primary reason for allocating these tasks is to have the right personnel with the required skills working

on the tasks to produce an e-governance solution that solves current problems in the country, and that covers all the objectives set at the beginning of the project. On the one hand, some of the consequences of not allocating these tasks are producing a solution that will become a white elephant due to its incompleteness, and not meeting requirements. On the other hand, the implications of inappropriately allocating the tasks are not meeting stipulated deadlines, and the cost of the project going up.

5.5 Summary

This chapter presented the data analysis of the study which was guided by two theories, namely Actor-Network Theory and Activity Theory. E-health and e-governance were analysed separately using the above-named theories. The actors and actor-networks were identified using ANT and the six components of AT, that is, subject, tools, object, rules, community and division of labour were applied in analysing the different activities under e-health and e-governance.

CHAPTER 6
FINDINGS AND INTERPRETATION

6.1 Introduction

This chapter presents the findings of the two variables, that is, e-health and e-governance, from the following cases, Ministry of Information Communication Technology (MICT), Office of the Prime Minister (OPM), Ministry of Health and Social Services (MoHSS) and from health facilities in Namibia. It also presents the interpretation of the study under the lens of ANT's moments of translation, from which a framework for integrating e-health with e-governance was developed, which is the aim of this study.

This chapter consists of four main sections. The first section presents the overview of the findings. The second section presents the findings' interpretation guided by ANT's moments of translation. E-health and e-governance were analysed separately in the previous chapter; the findings are combined in this chapter to interpret and create the framework. Finally, the chapter is concluded in the third section.

6.2 Overview of Findings and Interpretation

As shown in Figure 6.1, activity theory (AT) and actor-network theory (ANT) were used for the data analysis and interpretation of the findings, respectively. Five main steps were followed in interpreting the findings. The first step presents the findings from data analysis from both e-health and e-governance perspectives. In the second step, the findings are placed in boxes (Figure 6.2), in preparation for mapping. As shown in Figure 6.3, the findings are mapped against each other, in the third step. This was done to identify the common factors and avoid duplication. After that, in the fourth step, the common factors were categorised by putting together the factors that are most closely related or connected with each other, as presented in Table 6.1. In the last step, the moments of translation from actor-network theory (ANT) are employed to interpret the factors in Table 6.1. The interpretation is summarised in Table 6.2.

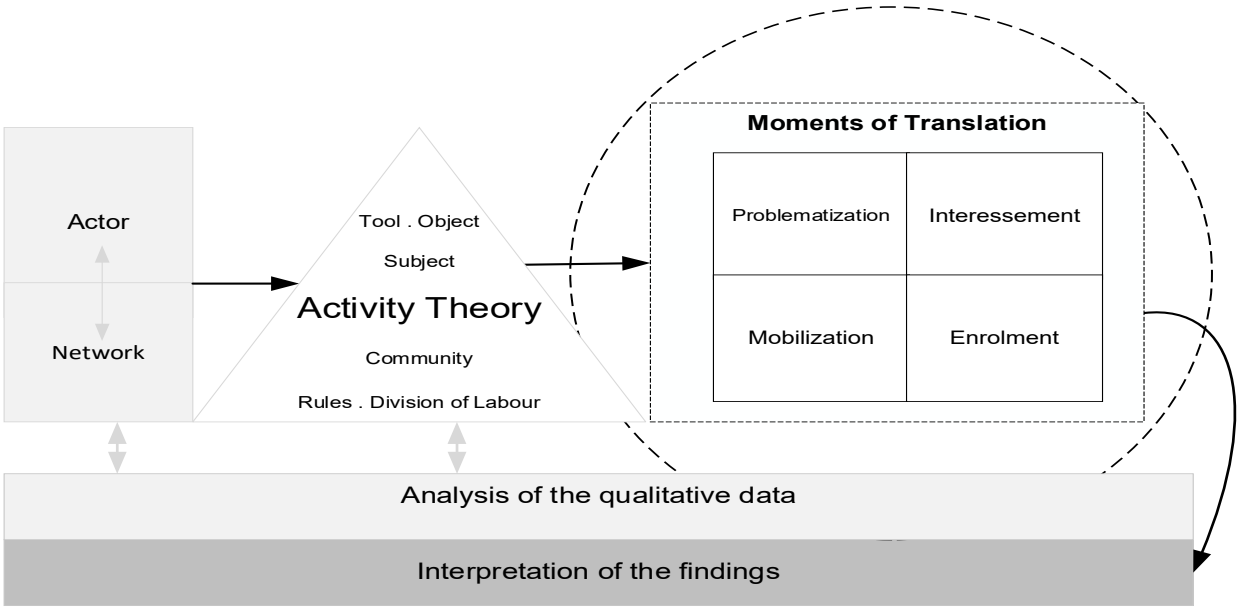

Figure 6.1: Complementary use of AT and ANT.

Based on the analysis of e-health and e-governance as presented in chapter 5, the factors that influence the integration of e-health with e-governance in the Namibian government environment are revealed. The factors were first identified for both variables. Eight factors were revealed to influence e-health: (1) disparity, which affects transparency; (2) isolation; means that e-health solutions are currently stand-alone; (3) governance; which includes standardisation, policies, and principles; (4) requirements that cover functions and technology specifications; (5) know-how; entails skillset and human capacity; (6) interoperability; exchange and information use between IT solutions; (7) synchronisation of data and processes; and (8) heterogeneity; variability of entities.

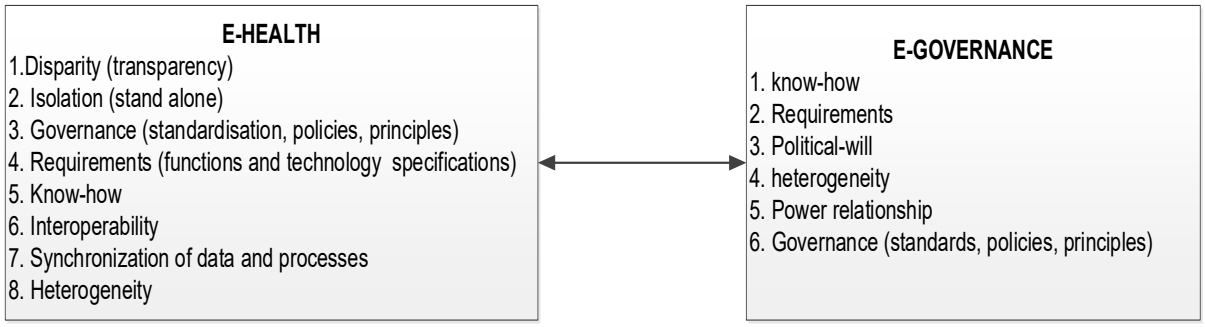

Figure 6.2: E-health and E-governance Findings.

Similarly, from e-governance, six factors were found to influence the integration of e-health with e-governance: (1) know-how; (2) requirements of both technical and non-technical components; (3) political-will, which draws on power to make decision; (4) heterogeneity; a

repertoire of actors (5) power relationship; and (6) governance, which includes standards, policies, and principles.

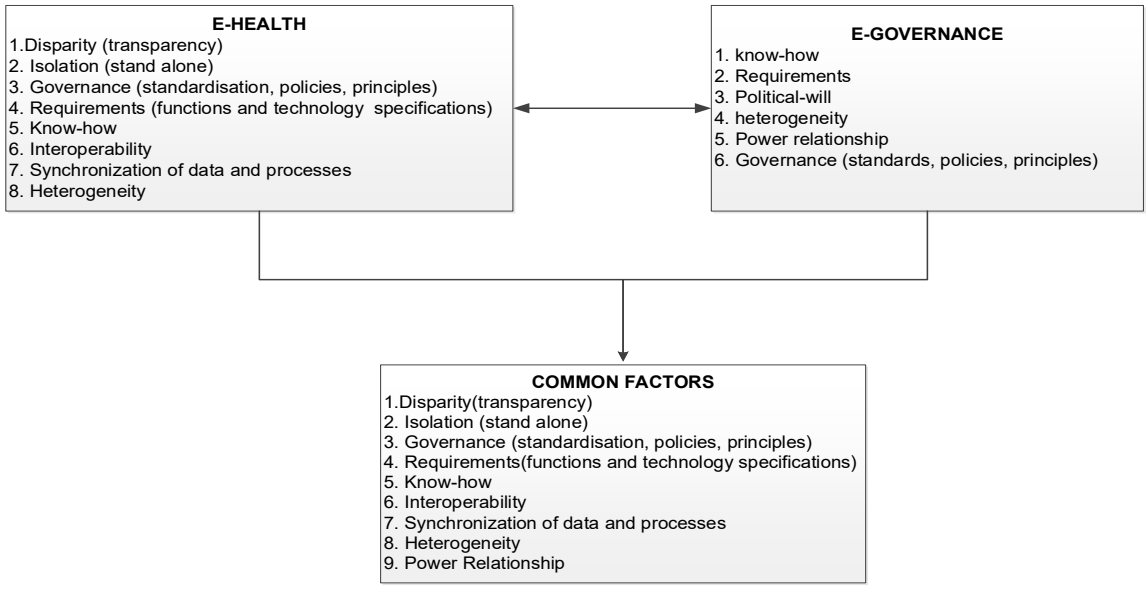

Figure 6.3: Factors influencing the integration of e-health with e-governance

To come up with the common factors, factors from both e-health and e-governance were mapped against each other. Factors found on both sides were then added to the common factors list. Also, similar and closely related factors were combined and added to the list as one. At the end of the process, nine (9) common factors were found to influence the integration of e-health with e-governance. From the common factors, 3 categories were formulated into: vision, IT enablement, and management, as shown in table 6.1.

Table 6.1: Categorisation of factors influencing integration

Vision	IT Enablement	Management
Requirements	Governance	Power Relationship
Know-how	Interoperability	Heterogeneity
Disparity	Isolation	
	Synchronisation of data and processes	

Vision – this category entails the direction of integrating e-health with e-governance and consists of 3 other factors: requirements, know-how, and disparity. IT enablement, focusing on how the integrated system will be implemented, the standards and policies involved, the platforms and how data will be handled, consists of 4 factors: governance, interoperability, isolation and synchronisation of data and processes. The management category has 2 factors:

power relationship and heterogeneity. This category focuses on how responsibilities are assigned to human actors, including the authority and political issues involved when deploying e-health and e-governance.

6.3 Interpretation: Moments of Translation

The actor-network theory incorporates what is called 'moments of translation' whereby an activity in IS is given a new meaning (Callon, 1984). Elbanna (2012:119) states a more comprehensive understanding of the concept as, "moments of translation is a mechanism by which the network builder recruits actors and ensures their faithful associations". This implies that the relationship between actors, people, IT tools, processes and network is strong, and the network ensures that the actors support it effectively. There are four moments of translation as shown in Table 6.2: problematisation, interessement, enrolment, and mobilisation.

Table 6.2: Moments of Translation

Problematisation	**Interessement**
The factors that influence the integration of e-health with e-governance are problematised from various perspectives and at different levels. This is primarily to: (1) ensure a common understanding of the vision; (2) define the functions of IT enablement; and (3) enact management by including human actors responsible for various activities of the integration.	Various groups of individuals, including IT specialists, non-technology employees (such as health practitioners and government employees), and politicians show interest in e-health or e-governance, or both solutions. The interests of the groups vary, based on personal objective or environmental necessity, or both.
Mobilisation	**Enrolment**
To ensure inclusiveness, individuals contractually or voluntarily act as spokespersons to mobilise employees and other stakeholders from their networks to understand and support the need for integrating e-health with e-governance. Thus, mobilisation happens at different quarters such as business, political, professional (healthcare, government, and IT), and at different levels.	The activities and processes in integrating e-health with e-governance are allocated to individuals and groups based on interest or criteria. The execution of the tasks is guided by the vision of the environment, availability of resources (such as enabling IT solutions) and required skill set. Also, participating in the integration requires a contractual agreement.

The discussion that follows presents the interpretation of the factors that influence the integration of the e-health with e-governance solutions. As shown in Figure 6.1 and explained above, the moments of translation from ANT are employed in the interpretation.

6.3.1 Problematisation: Vision/IT Enablement /Management

Problematisation is the first stage of translation and involves formulating and articulating a problem by a focal actor within a network (Fornazin & Joia, 2016). In integrating e-health with e-governance, problematisation must happen from three perspectives: vision, IT enablement, and management. Vision is a concept used to describe the goals of an organisation, where it would like to be positioned in the future, and what it would like to achieve (Heath, Johansen & Bowen, 2018).

There were two levels of problematisation. The first level is problematising the vision of the concepts within the environments, health and governance. The visions were problematised by the Ministers of Health and ICT, respectively. The second level is transforming or translating the visions into implementable solutions. This was problematised by the Directors in the respective Ministries, Health and ICT. The vision of the health sector was formulated and provided by the Ministry of Health. While the vision of e-governance was developed by the Ministry of ICT, under Office of the Prime Minister (OPM). The Ministries remain the custodian of the regulatory practices and governing policies in both areas, health and governance. To integrate e-health and e-governance, the government and other focal actors must (1) have a vision; (2) avail IT solutions capable and appropriate for enablement; and (3) provide management that can manage the processes and activities.

Vision is often problematised at the level where it gets buy-in for sponsorship, thereafter, the inclusiveness of other relevant actors is sought. The vision to integrate e-health with e-governance helps determine three main fundamental factors: gathering of relevant requirements, including personnel with specialised know-how, and understanding well the disparity that exists. In addition to the initial problematisation, each of these factors needs to be problematised separately and at different levels. Requirements come in two forms – functional requirements and technology requirements – which are both geared towards integrating e-health with e-governance. These two sets of requirements are problematised at two different units. The functional requirements are problematised at the business unit while the technology requirements are problematised at the IT unit.

Functional requirements describe the operation of a system/software and include user interaction and technology specifications, data sharing, and the business processes involved. Technology requirements include specifications of the type of IT infrastructure required, the platform the system should be built on, and other hardware and software specifications for integrating e-health and e-governance. Thus, an alignment between business IT solutions and non-technical (business) requirements is critical, to bridge any potential gaps. Also, an

alignment between the different requirements fortifies collaboration between the various networks, increasing inclusiveness and promoting the chances of a successful integration between the two concepts. Considering the cruciality, both alignment and collaboration can therefore form parts of critical success factors in assessing integration in the Namibia environment.

Considering the critical roles of IT enablement and management in the integration process, it is imperative for the problematisation to be initiated at all three levels as shown in table 6.2. This is since these factors bring about other factors and attributes such as transparency, governance, interoperability, and an understanding of actors' relationships and heterogeneity. Together, these factors enact a successful integration of e-health with e-governance while fulfilling the requirements of the stakeholders. In addition, transparency ensures collaboration between the various networks of stakeholders. Also, transparency sets the pace for a proper integration and results in a solution that addresses the current problems. On the other hand, if problematisation is not initiated at the three levels, it is going to be disjointed, resulting in the integration process being derailed, and negatively affecting other important factors such as cost.

6.3.2 Interessement: Vision/IT Enablement/Management

Interessement is the stage in translation where interested actors join in a network that has been identified and labelled to find solution to a problem (Nehemiah-Maletsky et al., 2018). The analysis reveals that three main different groups of individuals show interest in either e-health or e-governance, or both solutions in integrating e-health with e-governance, at the interessement stage. The first group is made up of IT specialists. The second group consists of health practitioners and government employees, and the third group comprises politicians.

The employees (actors) had common interest in their respective areas. Within the health environment, the interest of the employees from both health and IT perspective was to implement, enable, and support e-health solution. While, from the government, particularly from the OPM and ICT Ministry, the interest was to implement e-governance solution. The politicians were more interested in the financial investment in the concepts, health and governance by government.

The interest of the groups is understandably based on the mandate and focus of the entities they are affiliated to, employed by, or they represent. For example, the OPM is responsible for all e-governance-related projects in the country. Both e-health and e-governance are

inevitably enabled by IT solutions, making IT specialists core members of the stakeholders. The practitioners and other employees show interest as the outcome enables them to execute their roles and responsibilities. The interest of the politicians is primarily based on power to control and financial involvement. The politicians approve the budget at parliament and cabinet levels. It is therefore crucial to ensure collaboration between the different groups, for support and cooperation purposes.

Thus, it is essential to have a good understanding of the visions of the groups of people and, thereafter, gather requirements from the groups to avoid disparity. Consequently, the alignment between IT solutions and non-IT entities (such as health practitioners and politicians) can be fortified to improve IT enablement through governance, interoperability, and synchronisation of data, which are critical in integrating e-health and e-governance.

In addition, IT solution can eradicate isolation of systems by enabling the integration of the concepts. The interest of the groups varies based on personal objective or environmental necessity, or both. IT specialists centre their objectives mainly on the design, testing, and deployment of both e-health and e-governance solutions in a way that allows data and process synchronisation to maintain consistency. The objectives of some government employees include formulating standards, policies and rules for the integration process.

The management of the various factors increase the chances of successful integration of e-health with e-governance in the country. Furthermore, the interest of the politicians and some managers is the outcome, which therefore makes it necessary to develop criteria for measuring success. Alhabeeb and Rowley (2018) explain the role of critical success factors (CSFs) in enhancing the accomplishment of a project in an environment. Thus, enrolling and engaging relevant stakeholders from the various groups is essential.

6.3.3 Enrolment: Vision/IT Enablement/Management

Enrolment is the stage where actors that agreed with the responsibilities assigned to them in the interessement stage accept their roles in a quest to solve the problem (Pollack et al., 2013). Certain criteria and interests are used to determine which roles and tasks are allocated to different individuals and groups in integrating e-health with e-governance. The criteria can be the area of expertise of the individuals, the department or organisation they work under, and the individual's job level.

Participations in the implementation of e-health and e-governance solutions were based on two main factors, technical and non-technical, which were both at organisational and personal levels. The interests were identified based on the interest of the actors (individual). Based on the interaction with the focal actors, areas of interests were identified, and tasks were assigned. The interactions were aligned with the focus of the government. Some of the actors volunteered to take certain tasks based on their strengths. This was motivated by personal aspiration and development.

Several factors guide the execution of the tasks, including the environment's vision. The different groups and individuals perform their tasks guided by the goals set at the beginning of the project to fulfil the functional and technological requirements, which must be aligned with the organisational vision. Relevant steps are taken to ensure that every goal is fulfilled, as this also determines the success of integrating e-health with e-governance. The availability of resources also guides the execution of tasks. This includes enabling interoperable IT solutions to support the integrated solution. Also, only qualified and specialised personnel are allocated tasks in their areas of expertise. Possessing adequate skill and in-depth know-how is very critical to e-health and e-governance integration.

Stakeholders' participation in the integration also requires a contractual agreement between the different groups of individuals. This requires qualified personnel to carry out the various tasks from e-health and e-governance perspectives. Also, through management, the relationship between the groups is strengthened to improve collaboration and alignment and reduce disruptive characteristics. Also, the alignment and governance guide and enforce uniform formulation and coherent integration of the concepts.

However, the process requires skilled personnel because of the uniqueness and specialised nature of the concepts. Thus, skill capacity development is not necessarily enough; a strategy for retention is needed to ensure continuity. Narayanan, Rajithakumar and Menon (2019) suggest that talent management should be considered a strategic priority for organisations, specifically for complex situations.

6.3.4 Mobilisation: Vision/IT Enablement/Management

To ensure inclusiveness, individuals can contractually or voluntarily act as spokespersons and mobilise employees and other stakeholders from their networks to understand and support the need for integrating e-health with e-governance. Evidence from the data collected shows the respective Ministers and senior and middle managers in the organisations (health and

government) were contractually made to take responsibilities and account for the implementations and support of the solutions, e-health and e-governance. In doing so, they try to convince other stakeholders or interested parties on the needs and importance of the concepts. Certain individuals are employed to be spokespersons for certain groups, for example, the different health managers represent teams and units. Through such groupings, mobilisation can be used to educate and create awareness for a greater population across various stakeholders to increase in the integration solution. In addition, training can be used to inform interested persons and stakeholders about the benefits and usefulness of integrating e-health with e-governance.

Thus, different professionals, healthcare, administrators and IT specialists can view the integration from their perspectives, to plan support and maintenance for the integration. Also, this can result in spokespersons volunteering for groups knowingly or unknowingly. For example, a nurse who is more computer-literate can comprehend technological concepts better than their peers, as such, is potentially able to mobilise colleagues and other people about the integration purposes and benefits. According to Heeks and Stanforth (2014), mobilisation improves interaction across networks. Through mobilisation, sources of power can be detected and managed, to avoid derailing the integration process.

Mobilisation also happens in different quarters, such as business, political (government), professionals (healthcare and IT), and at different levels, including senior, middle- and lower-income earners' categories of employees or groups. Often, certain narratives exist along these groupings or networks, which is not the vision or requirement of the integration purposes. From this angle, conflicting narratives among stakeholders can be managed through mobilisation (Vickers, Moore & Vickers, 2018). The mobilisation of different quarters and levels is very vital because if the actors do not understand the benefits of integration, it will be difficult to realise the goal. This could influence requirements gathering, budget approval, and ultimately affect IT support for the integration project.

Mobilisation brings together all the stakeholders involved in integrating e-health with e-governance and ensures it is a success. Including actors fully in the integration project fosters teamwork and arouses ownership and accountability amongst the team. As suggested by Tripathy (2018), ownership makes team members make effective contributions to the project and put more effort into dealing with any obstacles that might arise. This is a vital attribute needed in the success and assessment of the outcome of integrating e-health with e-governance.

6.4 Framework for the integration of e-health with e-governance

From the findings' interpretation, as detailed in section 6.3, six factors mostly determine the integration of e-health with e-governance in the Namibia environment. The identification of the factors was based on subjective reasoning following the interpretivist approach, which the epistemological stance that is employed in the study. This is discussed in sections 3.2.2 and 3.3.4 of chapter 3. Each of the factors is either directly visible or it manifests from activity, as presented in the discussion in section 6.3.

The factors are (1) alignment between business and technology; (2) environmental assessment; (3) collaboration between actors of both e-health and e-governance; (4) enterprise architecture; (5) skill and retention; and (6) critical success factors to evaluate the fulfilment of the integration goal. Based on these factors, a framework for integrating e-health with e-governance was developed, as shown in Figure 6.4. The relationship between the factors and how they interconnect are illustrated with arrows in the framework. Also, the sequence of steps is numbered for easy understanding. The factors are discussed below, to be read with Figure 6.4 (Framework) to understand better the integration concept.

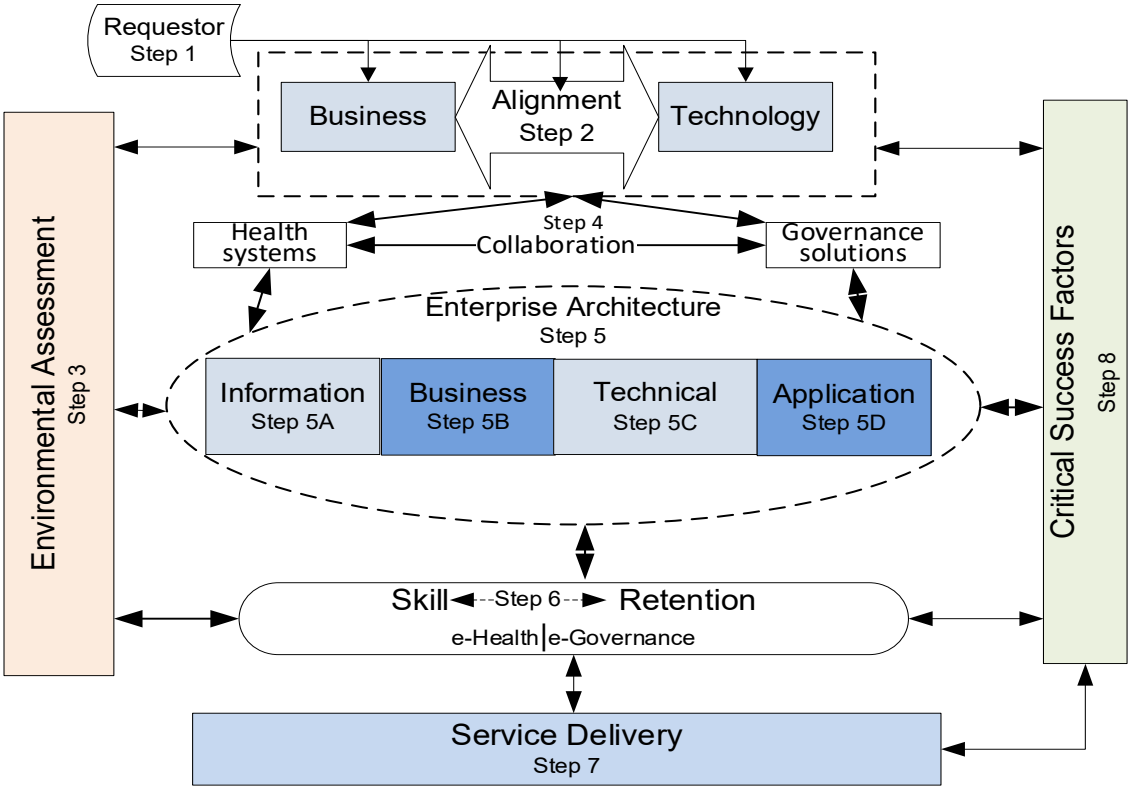

Figure 6.4: E-health and E-governance Integration Framework

6.4.1 Alignment between business and technology

Alignment is a form of synchronisation between the business and IT solutions in the areas of objectives, strategies, and processes towards achieving a common goal and vision, including cost reduction and increased return on investment (Munoz & Avila, 2019). In the context of this study, business refers to all non-IT solutions. In the integration of e-health with e-governance, the business and technology concepts require synchronisation to enable and support a common objective. The alignment ensures that the objectives of e-health and e-governance are considered and the integration of the two does not derail any set targets or alter the business strategy. As explained by Bourdeau et al. (2018:134), all "IT project management activities should be aligned with top business direction" and if any changes occur in the business strategy, the IT activities also need to be altered accordingly to ensure smarter decisions in areas like infrastructure requirements, staffing, and budgeting needs. Lack of alignment can lead to disjoints between business and technology solutions in integrating e-health with e-governance in the Namibia environment. Thus, some challenges would remain unaddressed, which can negatively affect either enabling or supporting the integration.

Based on its significance, aligning business and technology in integrating e-health with e-governance is crucial. Therefore, it sets the foundation for the integration project. Both business and technology requirements are obtained from e-health and e-governance and are synchronised to ensure a holistic coverage. This requires an assessment against the environment to ensure context. Essentially, the environmental factors need to be analysed, fully understood, and incorporated into the alignment for successful integration purposes (Mutasa & Iyamu, 2021). In addition, alignment strengthens the collaboration between the various actors and networks involved in the project from both e-health and e-governance standpoints. Due to the importance of alignment, it forms part of the critical success factors. Kurti, Barolli and Sevran (2013) pointed out that critical success factors can be enablers and inhibitors of business and technology alignment. This is a point that requires attention in the integration of e-health and e-governance in achieving the objective. There is also a direct link between business and technology alignment and environmental assessment.

6.4.2 Environmental Assessment

Environmental assessment refers to the evaluation of the internal and external factors that make up a project, which may include the structure of the organisation, the people involved, the political environment, and the available resources (Englund & Graham, 2019). This is critical for integration, particularly because of the diverse nature of actors and networks that can be involved in the process. Failure to assess the environment in the integration of e-health with e-governance poses a great risk to the project, as environment and context influence the

outcome. According to Mutasa and Iyamu (2021), the integration of e-health with e-governance is not influenced by technological factors alone; it also relies on environmental factors. Therefore, carrying out environmental assessment will ensure that factors from both e-health and e-governance that can influence the integration success in any way are taken into consideration in the process.

Environmental assessment is crucial to the alignment between business and technology (Radujković & Sjekavica, 2017). The environment needs to be fully defined to provide a solid foundation for alignment and integration. Assessing an environment helps detect gaps and potential challenges that could possibly hamper processes or activities and ultimately influence outcome. For example, it can be used to identify the relationship between business objectives and technology solutions. Also, through assessment, required skills are identified and mapped against areas, particularly scarce specialisation such as enterprise architecture (EA). Since EA involves creating a map of the structure of an organisation's IT landscape and operations, this can only be done with a full assessment of the environment to capture all the factors that are involved. Thus, assessing the environment provides useful insights about the influencing factors and significantly fortify the integration of e-health with e-governance.

6.4.3 Collaboration between actors

Collaboration refers to an association between actors or entities towards achieving common goals (Schruijer, 2020). In the integration of e-health with e-governance, collaboration is required between actors that are responsible for both e-health and e-governance. For holistic purposes, the actors should cover technical and non-technical aspects of e-health and e-governance. The collaboration is primarily to avoid gaps and eliminate the possibility of isolating solutions, requirements, and communication. Another aspect is to ensure interoperability, which is a support factor for integration. Mutasa and Iyamu (2021) assert that processes involved in the integration between e-health and e-governance need to be synchronised and uniform. Some of the substantial benefits of collaboration are enabling resources and information sharing. In integrating e-health and e-governance, it is crucial to share technology solutions, processes, and skilled workforce. This can assist in aligning the interests, goals, and requirements of the actors primarily involved in the integration process.

Also, the collaboration between health systems and governance solutions is directly linked to the alignment between business and technology. This is because collaboration between the two concepts can only be strengthened if there is proper alignment between business and technology. The collaboration and alignment can be fortified by enterprise architecture towards a successful integration of e-health with e-governance.

6.4.4 Enterprise Architecture

At the centre of the integration of e-heath with e-governance is enterprise architecture. This is because EA defines processes that help organisations to standardise IT solutions, enable alignment between the business and technology, and govern activities. Vitally, this can be attributed to the focus of EA, which spreads across four domains: information, business, technical, and application (Saleem & Fakieh, 2020). Thus, EA assists in managing information exchange and flow, defining business design and processes, and governing IT solutions in integrating e-health with e-governance. According to Gellweiler (2020), EA integrates and aligns various components of an enterprise in accomplishing the enterprise goals. The domains of EA have distinctive deliverables that allow and guide the manageability of the entire process of integration between e-health and e-governance in the Namibia environment.

Enterprise architecture supports the collaboration of e-health with e-governance as it offers standards, governance, and principles required for the manageability of integration. In addition, EA can be used to guide readiness assessment and define critical factors for a successful integration of e-health with e-governance. Rouhani et al. (2019), pointed out that when implementing EA in projects, not utilising critical success factors may result in the project taking an inappropriate direction and some requirements being unmet.

6.4.5 Skills Development and Retention

Skills development is defined as the capacity and ability received through different forms of training to enable personnel carry out different tasks and job activities (Chandra, 2019). This is very crucial for integration purposes, as specialised personnel are needed from e-health and e-governance perspectives. According to Mutasa and Iyamu (2021), there is a shortage of skilled personnel for the integration of e-health with e-governance. Thus, strategy is needed for skill development, to ensure successful integration. However, skills development by itself is not enough; the trained personnel need to be retained. A high personnel turnover will negatively affect the integrated solution if there are frequent changes of personnel responsible for enablement and support. Singh (2019) points out that retaining skilled personnel is challenging for organisations, as replacement costs of key personnel are too high.

Skilled personnel are needed in all the processes involved in the integration of e-health with e-governance (Lam et al., 2016). This includes implementing EA and conducting environmental assessment. The criticality of skilled personnel requires it to be a part of critical success factors, which can be used to measure the integration of the concepts, e-health and e-governance. The same skilled personnel can be tasked with the responsibility of evaluating

the overall successes of the integration, which require highly skilled persons. Also, CSFs for skills development and retention need to be defined. This produces an integrated solution that facilitates improved service delivery to the citizens.

6.4.6 Critical success Factors

Critical success factors (CSFs) are defined as the indicators required for success in a project and should be prioritised higher than any other factors (Hassan & Mahdavi, 2016). In the integration of e-health with e-governance, the CSFs are vital and should be aligned with the objectives from both e-health and e-governance. CSFs can be used by the managers to monitor the progress of the project to ensure that the objectives for the integration of e-health with e-governance are met. Without the CSFs, it would be impossible to conclude or measure the success of the integration solution (Rouhani et al.,2019).

In coming up with the integrated solution, different CSFs must be set for all the major processes. It is critical to define the CFSs for the alignment between business and technology because not doing the alignment properly has a huge impact on the project, as the requirements will not be properly defined (Kurti, Barolli & Sevran, 2013). CSFs for EA are also required to ensure processes that help organisations to standardise IT solutions are included, and all four domains addressed (Rouhani et al.,2019). CSFs for skills development and retention need to be set to ensure the right skilled personnel for the job are involved in the project to produce an integrated solution. CSFs of service delivery are also crucial as they ensure the goal of improving service delivery to the citizens is accomplished.

6.5 Summary

This chapter presented the findings of the two concepts, e-health and e-governance, initially addressed as separate cases. The findings from each case, which are the factors that influence integration, were mapped against each other and the common factors categorised. The interpretation of the findings was done, using the lens of ANT's moments of translation. Based on the aim of the study, a framework that can be used for integrating e-health with e-governance was developed specifically for the Namibian government. The conclusion of the study and recommendations are presented in the next chapter.

CHAPTER 7
CONCLUSION AND RECOMMENDATIONS

7.1 Introduction

This chapter presents the conclusion of the study. The aim of the study was to develop a framework for the integration of e-health with e-governance, specifically for the Namibian government. In achieving the aim, appropriate methods, approaches, and techniques were employed.

This Chapter is divided into ten sections. It begins with the introduction, followed by a summary. The summary gives an overview of all seven chapters that make up this study. The third section provides an evaluation of the study; it provides details of how the objectives were achieved. A summary of the outcomes of the study are explained in the fourth section. This section focuses on achieving the objectives and aim. Thereafter, the contributions of the study, from three perceptions, methodological, practical and theoretical are discussed. In the sixth section, the study's benefits are presented; and the limitations are covered in the seventh section. Recommendations and areas of further study are discussed in the eighth and ninth sections, respectively. Finally, the chapter is concluded.

7.2 Summary of the chapters

The thesis is structured into seven distinct chapters. This section presents the summary of each of the chapters, as follows:

Chapter 1 gives the study's overview. A background of the research and the research problem are presented. The objectives and the research questions are derived from the aim. A brief literature review is also given in this chapter focussing on the following key areas: Information and Communication Technology, e-health in developing countries, e-governance in developing countries and systems integration. Literature on the activity and actor network theories underpinning this study was also reviewed.

The chapter also presents the methodology applied in the research. Concepts discussed are as follows: research philosophy, paradigm, approach, methods, design, instruments, data collection and data analysis. The rest of the chapter covered the significance of the research, the delineation, and ethical considerations.

Chapter 2 presents an in-depth review of literature related to e-health and e-governance. The key areas were reviewed, including systems Integration, e-health system, e-health in developing countries, e-governance, factors influencing e-health systems integration within e-governance, and e-health and e-governance in Namibia. The review assisted in gaining more knowledge on e- health and e-governance in Namibia and what has been done by other researchers in this area. The activity and actor-network theories underpinning this study were also reviewed, including their application in IS research.

The philosophical assumption and methodology applied in the research is presented in Chapter 3. Different paradigms, approaches, methods, designs, data collection methods were discussed and their application in the study justified. The research objectives guided the choice of the methods. The qualitative method was used for the study and the case study design was applied. Data was collected using unstructured interviews and some relevant documents were collected from the different cases, including policy documents, strategic documents, and reports. A list and a brief description of all the documents collected is also presented in this chapter. A brief discussion on how data was analysed also forms part of this chapter and lastly, the ethical considerations are presented.

Chapter 4 presents the overview of case studies targeted for this research. The processes followed during fieldwork, including some ethical considerations were discussed before the cases were presented in detail. The cases selected for this study are the Ministry of Information Communication Technology (MICT), Office of the Prime Minister (OPM), Ministry of Health and Social Services (MoHSS) and public and private healthcare facilities. The data collected from all the cases was treated independently; thus, data from each case was analysed separately.

Chapter 5 presents the data analysis of the study guided by two theories, namely Actor-network theory and Activity theory. E-health and e-governance are analysed separately, and the findings are combined for interpretation purposes, toward realising the integration framework for e-health with e-governance. The study's interpretation under the lens of ANT's moments of translation from which a framework for integrating e-health with e-governance was developed is presented in chapter 6.

Chapter 7 concludes and summarises the whole study. The objectives of the study are revisited, and a summary given of how they were achieved. The theoretical, practical and methodological contributions are also presented. The limitations of the study and recommendations are also part of this chapter.

7.3 Evaluation of the research

The practice of evaluation is an aspect that assesses the quality of research (Mårtensson et al., 2016). Dane (2010:12) proposes six components (who? what? where? when? how? and why?) for assessing and evaluating qualitative research. Iyamu and Shaanika (2019) systematically employed the 6 components as prefixes to interrogate and elicit information in research. The components are used to evaluate the core aspects of this research, including the objectives, vehicle used, participants'' involvement, and the outcome. Table 7.1 presents the evaluation.

Table 7.1: Evaluation of the study

Component	Evaluation of the study
What	The integration of e-health with e-governance was investigated from the context of Namibia. The study therefore entails the main aspects; integration, e-health and e-governance. Thus, the study was conducted within these parameters. As such, data was collected separately about e-health and e-governance, as explained in chapters 3 and 4. Also, the data was analysed separately in chapter 5, and combined in chapter 6, to examine the integration aspect of the study.
Where	Two main entities, government administration and health sector, were involved in the study. From the government administration perspective, the Office of the Prime Minister (OPM) and the Ministry of Information and Communication Technology (MICT) were involved. The Ministry of Health and Social Services (MoHSS) and health facilities in Namibia participated in the study from the health standpoint. This was to ensure that there was no omission in achieving the objectives of the study and to increase the data quality.
Who	Views and opinions were gathered from different individuals and groups, from both e-health and -governance perspectives. The participants consisted of IT and non-IT specialists (such as health practitioners, government administrators, and project managers) at executive, middle management and lower levels. The participants were identified and selected by using a set of criteria. Consequently, this was to ensure balanced views were obtained. The selection criteria were to enable unbiasedness and increase data richness Also, this was to understand the roles of individuals and groups in an

Component	Evaluation of the study
	integration process in the environment. This process was critical to the quality of the research.
When	The data collection was carried out from DATE to DATE. The data collection was done heuristically (Rubin, Bouabana-Tebibel & Hoadjli, 2016), thereby reaching a point of saturation. The data was still fresh when the analysis began in May 2021 and concluded in July 2021. This was to avoid a time lapse in the data collection as a change of any sort could have happened in the e-health and e-governance environment, or integration. That would have had an impact on the consistency and quality of the research.
How	The study followed the interpretive paradigm, using the inductive approach. The qualitative method was used for the study and the case study design applied. Data was collected using unstructured interviews and documentation from the various cases. Two theories, Activity theory (AT) and Actor-Network theory (ANT) were used to underpin the study, which means that the theories were used as lenses to analyse the data and interpret the findings from the analysis. Based on the interpretation, a framework for integrating e-health with e-governance was developed.
Why	From the literature review, there is currently no framework for the integration of e-health with e-governance. Such a framework is needed to guide the integration of e-health with e-governance and to act as managers, IT specialists, and health practitioners' reference point in improving service delivery in the country. Also, the study gives an understanding of the factors that could enable or derail integration.

7.4 Summary of the outcomes

The aim of the research was to develop a framework to guide the integration of the e-health system with e-governance for the Namibian government's administrations. In achieving the aim of the research, three objectives were formulated. Below is a discussion on how they were achieved in this study.

7.4.1 To understand how both an e-health system and e-governance are developed and implemented within the Namibian government environment.

This objective was achieved from the comprehensiveness of the data analysis as presented in Chapter 5, which helps to gain a deeper understanding of how e-health and e-governance solutions are developed and implemented. This includes the

requirements and the roles and responsibilities of the various actors, as presented in sections 5.3.1 to 5.3.6.

In developing and implementing e-health different systems are implemented as stand-alone systems in the different health departments housing them. When health practitioners in a department realise that they need a system to improve or assist them in specific processes, their manager approaches the IT manager of that health institution with the request. The IT manager then escalates the request to the MoHSS and IT specialists from the ministry assess the request and carry out BPR. Based on the BPR process, MoHSS engages OPM for approval and funding. The OPM manages the procurement process of ICT resources and the development and implementation of ICT policies and standards for all the Namibian government ministries while the MoHSS IT division housing the IT department is responsible maintaining IS systems in the ministry.

Technical and non-technical personnel are involved in developing and implementing e-heath, from the IT field, and health practitioners and non-health practitioners are involved from the healthcare perspective. The implementation and management of the e-health system is also governed and guided by different policies and standards contained in different documents, which are detailed in chapter 3.

As mentioned above, MICT works with OPM in implementing and deploying e-governance projects in the country, but OPM leads the process. E-governance projects need the approval of the cabinet before implementation. Politically, the cabinet has the power to approve the budget for e-governance projects, including their implementation. After the cabinet has approved, the e-governance project is then presented to Parliament for approval. The MoF is responsible for releasing the funds for e-governance projects after the parliament has approved. Currently, there is a challenge of cabinet and parliament members not having the know-how to adequately assess the e-governance solutions that are brought before them.

Technical and non-technical personnel are involved in implementing e-governance in Namibia. The implementation and management of the e-governance solutions are governed and regulated by policies and standards. However, the administrative procedures before any e-governance solution can be implemented are excessively complicated and lengthy, resulting in different departments of health having their own

stand-alone systems not integrated amongst themselves and within the e-governance framework.

7.4.2 To examine the factors that can influence the integration of an e-health system with e-governance in the Namibian government environment.

Three steps were involved in examining the factors that influence the integration of an e-health system with e-governance. First, the analysis was conducted using AT and ANT as lenses. From the analysis presented in chapter 6, 14 factors; 8 of e-health and 6 of e-governance, were revealed, as illustrated in Figure 6.2. In the second step, the factors in Figure 6.2 were mapped against each other. From the mapping, nine factors were found to be common, as shown in Figure 6.3. In the final step, the nine factors were grouped into three categories and examined by using the four moments of translation from an ANT perspective. The examination shows how the factors can influence the integration of e-health with e-governance in the Namibia environment, from different angles. The paragraphs that follow summarises the influence of the factors.

In integrating e-health with e-governance, the business and technology concepts require synchronisation to enable and support common objectives. The alignment ensures both the objectives of e-health and e-governance are considered and integrating the two does not derail any set targets or alter the business strategy. Lack of alignment can lead to a disjoint between business and technology solutions in the integration of e-health with e-governance in the Namibia environment.

Assessing the environment is also a critical factor for integration, particularly because of the diverse nature of actors and networks involved in the process. Failure to assess the environment in the integration of e-health with e-governance poses a great risk to the project, as the environment and context influence the outcome.

Collaboration between actors that are responsible for both e-health and e-governance is a requirement. The collaboration is primarily to avoid gaps and eliminate the possibility of isolating solutions, requirements and communication, and to ensure interoperability, which is a support factor for integration. Enterprise architecture supports the collaboration of e-health with e-governance as it offers the standards, governance, and principles required for the manageability of integration. Thus, EA assists in managing information exchange and flow, defining business design and processes, and governing IT solutions in integrating e-health with e-governance.

It is also crucial to have specialised personnel from both e-health and e-governance perspectives, hence a strategy is needed for skills development and retention, to ensure a successful integration. Another important requirement for the integration solution is critical success factors. These can be used by the managers to monitor the progress of the project to ensure that the objectives of integrating e-health with e-governance are met. Without the CSFs, it would be impossible to conclude or measure the success of the integration solution.

7.4.3 Based on the findings from the above objectives, a framework will be developed for integrating an e-health system with e-governance for the Namibian government.

The above objectives revealed six factors: (1) alignment between business and technology; (2) environmental assessment; (3) collaboration between actors of both e-health and e-governance; (4) enterprise architecture; (5) skills development and retention; and (6) critical success factors. Based on the factors, an integration framework (figure 6.4) was developed. The framework can be used to guide integrating an e-health system with e-governance for the Namibian government, following the discussion presented in section 6.4 of Chapter 6.

The discussion covers the individual and collective consequences and implications of the factors. In addition, the relationship and dependency of the factors are explained in section 6.4. This helps to understand and solve the challenges that are currently being experienced, in attempt to integrate an e-health system with e-governance.

7.5 Contribution of the Research

This section presents the contribution of the research in the following three areas: theoretical, methodological and practical.

7.5.1 Theoretical contribution

Theoretically, this study contributes from three standpoints. First, it contributes by revealing the factors that influence the integration of e-health with e-governance, which have rarely been discussed from both technical and non-technical perspectives. Secondly, the framework is a major contribution to the body of knowledge, particularly, as it combines e-health with e-governance and explores integration. From the literature review, no such framework currently exists, hence this framework is a valuable addition. It, however, remains a theory because the framework has not been tested.

As of the time of this study, such a framework was inexistent. Thirdly, it adds to existing literature in the fields of health informatics and information systems governance. Also, it is a significant contribution from a developing country perspective. The theoretical contribution is evident in the article of Mutasa and Iyamu (2021) published from this study. This conceptualises the integration of e-health with e-governance in a developing country.

7.5.2 Methodological contribution

The complementary use of the activity theory (AT) and the actor-network theory to underpin this study is a methodological contribution for a couple of reasons. This is the first evidence in academic databases of combining both theories in a study in the areas of e-health and e-governance.

Also, how ANT and AT were used in this study is unique, as depicted in figures 5.1 and 6.1. ANT was first used to identify the human and non-human actors, including the actor-networks that existed in the deployment (development and implementation) and use (practice) of both e-health and e-governance in the Namibia environment. Then, the activities were viewed through the six components of AT: subject, tool, object, rules, community and division of labour. In the last step, the moments of translation from ANT were employed to interpret the findings from the analysis.

7.5.3 Practical contribution

Practically, the contribution can be viewed from two perspectives. Firstly, Figure 6.3 can be of use to the stakeholders (IT specialists, health practitioners and others) to understand the factors that could possibly derail the integration. Secondly, the framework (figure F.4) is fundamental in guiding the integration of e-health with e-governance to success. Without such guidance, it is difficult to a successful integration (Kim & Kishore, 2019; Cecez-Kecmanovic, Kautz & Abrahall, 2014; Bartis & Mitev, 2008).

The practical contribution is very important to the Namibian government. This is particularly because there is no previous case that can be used as a reference point, or where experiences can be drawn. Thus, the framework is critical in enabling managers, IT specialists, and health practitioners improve service delivery in the country. Also, the study offers a better understanding of the factors that affect the implementation of e-health and e-governance, and this will ensure all these factors are considered for a smooth implementation of e-health and e-governance.

7.6 Benefits of the study

This study focused on understanding the factors that influence the integration of e-health with e-governance in Namibia. This will help the stakeholders to understand better why and how the integration of e-health with e-governance is derailed or enabled, which can guide the promoters and managers towards the successful integration of the e-health system with e-governance in Namibia. Such an understanding is significant to health practitioners, IT specialists, and government in improving service delivery.

Another benefit of this study is that it can be used as a reference point for other developing countries, particularly in the African continent, to learn from. The framework that was developed for integrating e-health with e-governance can also be used as a reference by other developing countries to counter the current challenges involved in developing an integrated solution.

Also, the study benefits the academic domain by adding to the body of knowledge. From the literature review, there is currently no framework for integrating e-health with e-governance; hence, this framework is a valuable addition. The study also adds to existing literature in the fields of health informatics and information systems governance.

7.7 Limitations of the study

The following limitations were identified for this study:

i. The framework for integrating e-health with e-governance has not been tested. It needs to be applied and tested by IT specialists to assess whether it is fit for the purpose.
ii. All IT personnel who participated in this study were from health facilities in the capital, Windhoek. It would have been helpful to have participants in other areas to also get their experience on e-health and e-governance implementation.

7.8 Recommendations

The aim of the study, which was to develop a framework for the integration of e-health with e-governance was achieved. However, the following recommendations are to address some identified gaps.

7.8.1 Collaboration with IT specialists from Private Health Sector

The shortage of skilled personnel in implementing an integrated solution for e-health and e-governance seems to have a huge impact on operations. Health facilities in the private sector employ highly skilled IT specialists to handle their health systems. If there were MoUs between

the government and these private health facilities, the skills could be shared, and this gap covered.

IT specialists from the private health sector could be asked to be part of the team in developing the integrated solution. This would not only add the required skills, but also ensure the requirements from the private sector are considered when developing the integration solution. This would also strengthen the collaboration between private and government health facilities, improving service delivery in the country.

7.8.2 Change Management

Although a framework for integrating e-health with e-governance has been developed, a comprehensive change management plan is recommended to accompany it when the integrated solution is implemented. The Namibian government might introduce a very good integrated solution, but a change management plan is needed for it to be well adopted amongst all the stakeholders and ensure a smooth transition from the system currently being used.

Measures need to be taken to ensure no data is lost in transiting from the silo systems to the integrated solution. All the steps to be taken, the people responsible, and how the integrated solution is going to be rolled out should be included in the change management plan.

7.9 Further Study

In this study, the way e-health and e-governance are currently being implemented in Namibia was presented. The factors that influence the implementation of e-health and e-governance were also identified. From this, a framework for integrating e-health with e-governance was developed. This framework is meant to guide the implementation of an integrated solution for e-health and e-governance.

The researcher suggests areas of further study to include applying different theories in the data analysis and interpretation to test if a different perspective of the results will be realised. The integration framework developed in different environments is also worth testing and the result analysed.

7.10 Summary

This chapter presented the conclusion of recommendations of the study. The research was evaluated against the objectives set in Chapter 1 and concluded that all the objectives were achieved. The theoretical, methodological and practical contribution of the study was

discussed. The chapter also discussed the benefits of the study, including understanding the factors that influence the integration of e-health with e-governance in Namibia. Such an understanding is significant to health practitioners, IT specialists, and the government in improving service delivery in the country. The limitations and areas of further study were also presented in this chapter.

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APPENDICES

Appendix A: Data Collection Guidelines

Main question

How can a framework be developed, for the integration e-health systems with e-governance for the Namibian government?

Sub-questions:

i. How are both e-health systems and e-governance developed and implemented within the Namibian government environment?
ii. What are the factors that can influence the integration of the e-health systems within e-governance in the Namibian government environment?
iii. How can a framework be developed based on the responses to the above questions?

Interview Questions

Personnel from the office of the prime minister and Ministry of ICT.

1. What is the government's idea about e-governance?
2. Why do you think the government has such an idea about e-governance?
3. How was the e-governance implemented? Please take me through the process.
4. In your view, what are some of the benefits of e-governance?
5. How have those benefits been achieved, in your view? Please share some examples with me.
6. In your view, what are some of the challenges of e-governance? Please share some examples with me.
7. Why do you think those challenges exist?
8. How does the government think these challenges be overcome?
9. What is your view on how to address the challenges?
10. Why do you think e-health is needed or implemented in Namibia?
11. Please kindly take me through the process of implementation of e-health system
12. What are some of things required for the implementation?
13. Who are some of the people, departments or organisations involved in the implementation?
14. Why do you think these people, departments or organisations are involved?
15. What challenges have you faced in implementing e-health?
16. How do you think these challenges can be overcome?
17. Do you think there is relationship between e-governance and e-health?

a. If yes, why do you think the relationship exist? If no, why not?

18. In your view, do you think there should be a relationship?
    a. If yes, why? If no, why not?

Personnel from Ministry of Health

1. What is the government's idea about the health system?
2. Why do you think the government has such an idea about the health system?
3. How was the health system implemented?
4. In your view, what are some of the benefits of the health system?
5. How were those benefits achieved in your view?
6. In your view, what are some of the challenges of a health system?
7. Why do you think those challenges exist?
8. How does your ministry work with office of the prime minister in implementing the health system?
9. How does your ministry work with the ministry of ICT in implementing the health system?
10. In your view, is there a relationship between the health system and e-governance?
    a. If yes, why do you think the relationship exist? If no, why not?

IT Personnel at hospitals

1. What is the government's idea about the health system?
2. Why do you think the government has such an idea about the health system?
3. How was the health system implemented?
4. In your view, what are some of the benefits of the health system?
5. How were those benefits achieved in your view?
6. In your view, what are some of the challenges of a health system?
7. Why do you think those challenges exist?
8. How does your department work with the ministry of health in implementing the health system?
9. How does your department work with office of the prime minister in implementing the health system?
10. How does your department work with the ministry of ICT in implementing the health system?
11. In your view, is there a relationship between the health system and e-governance?
    a. If yes, why do you think the relationship exist? If no, why not?

Health personnel (e.g., Nurses, Doctors, Pharmacists, Physiotherapists)

1. What is the government's idea about the health system?
2. Why do you think the government has such an idea about the health system?
3. How was the health system implemented?
4. In your view, what are some of the benefits of the health system?
5. How were those benefits achieved in your view?
6. In your view, what are some of the challenges of a health system?
7. Why do you think those challenges exist?
8. How does your department work with the ministry of health in implementing the health system?
9. How does your department work with office of the prime minister in implementing the health system?
10. How does your department work with the ministry of ICT in implementing the health system?
11. In your view, is there a relationship between the health system and e-governance?
    a. If yes, why do you think the relationship exist? If no, why not?

Appendix B: Research Ethics Approval Letter

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Office of the Research Ethics Committee	**Faculty of Informatics and Design**

24 April 2020

Ethics approval is granted to Ms Laizah Mutasa, student number 219497877, for research activities related to the DTech: Information Technology at the Faculty of Informatics and Design, Cape Peninsula University of Technology (CPUT).

Title of thesis:	Integration of an e-Health system within the e-Governance framework in a developing country

Comments

Data collection permission is required from the relevant institution and research activities are restricted to those detailed in the research proposal.

	**24 April 2020**
Signed: Faculty Research Ethics Committee	**Date**