A MODEL TO FACILITATE RESEARCH UPTAKE IN HEALTH CARE PRACTICE AND POLICY DEVELOPMENT

by

JERRY SIGUDLA

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SUPERVISOR: PROFESSOR JEANETTE MARITZ

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DECLARATION

Student number: 4186-451-4

I Jerry Sigudla declare that **A MODEL TO FACILITATE RESEARCH UPTAKE IN HEALTHCARE PRACTICE AND POLICY DEVELOPMENT** is my own work and that all sources that I have used or quoted have been indicated and acknowledged by means of references and that this work has not been submitted before for any other degree at any other institution.

30 NOVEMBER 2020

SIGNATURE **DATE**

DEDICATION

To God be the Glory in Jesus Name. I would like to thank the Almighty for giving me the strength and serenity to persevere and complete this thesis.

I dedicate this academic work to my family, my wife in particular (Maria M. Sigudla), sons (Jurek and Vusumuzi) and daughter (Princess) who motivated me and tolerated my absence when working on the thesis. Your motivation and support have inspired me to always dream big and achieve more.

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A MODEL TO FACILITATE RESEARCH UPTAKE IN HEALTHCARE PRACTICE AND POLICY DEVELOPMENT

STUDENT NUMBER: **41864514**
STUDENT NAME: **JERRY SIGUDLA**
DEGREE: **DOCTOR OF LITERATURE AND PHILOSOPHY**
DEPARTMENT: **HEALTH STUDIES, UNIVERSITY OF SOUTH AFRICA**
SUPERVISOR: **PROF JE MARITZ**

ABSTRACT

Despite the availability of numerous models for knowledge translation into practice and policy, research uptake remains low in resource-limited countries. This study was aimed at developing a model to facilitate research uptake in healthcare practice and policy development.

The study used a two-phase exploratory sequential approach (QUAL→QUAN). Qualitative data were collected through semi-structured interviews with a total of 21 participants, categorised as researchers (6), frontline workers/practitioners (7), programme/policy managers (4), and directors/senior managers (4) from government, private sector and academic institutions of higher learning (universities and colleges). Quantitative data were collected through an online cross-sectional survey, administered to 212 respondents who conducted research studies in the Mpumalanga Province between 2014 to 2019.

The most significant findings seem to be lack of awareness of research findings and champions to lead engagements among research stakeholders on research uptake. In addition, the research has established a failure by researchers to align public health research projects to existing local contexts and available resources. Conversely, there is a growing propensity of using informal research without consideration of data quality issues. It was further observed that establishing and sustaining beneficial collaboration between all research stakeholders is required to promote effective research uptake for practice and policy development. The survey results established a total of 13 components: four individual factors (support, experience, motivation & time factor);

four organisational factors (research agenda, funding, resources & partnerships), and five research characteristics factors (gatekeeping, local research committees, accessibility of evidence, quality of evidence & critical appraisal skills). However, the Spearman’s correlation coefficient revealed that of the 13 factors, only six factors had a significant positive correlation with research uptake, namely: support, experience, motivation, time factor, resources, and critical appraisal skills. Consequently, a model for institutionalising research uptake is proposed. The roles of local research committees have been clarified, and a logical framework has been incorporated with pathways and channels of engagements to enable successful implementation of the research uptake model.

Keywords: Healthcare Policy, Healthcare Practice, Local Research Agenda, Local Research Committees, Low-resourced settings, Public Health Research, Research Resources, Research Uptake, Research Uptake Model, Research Uptake Stakeholders

TABLE OF CONTENTS

CHAPTER 1

ORIENTATION OF THE STUDY

CHAPTER 2

LITERATURE REVIEW

CHAPTER 3

RESEARCH UPTAKE THEORIES AND FRAMEWORKS

CHAPTER 4

RESEARCH DESIGN AND METHODS

CHAPTER 5

ANALYSIS, PRESENTATION AND DESCRIPTION OF THE FINDINGS OF THE QUALITATIVE RESEARCH PHASE

CHAPTER 6

ANALYSIS, PRESENTATION AND DESCRIPTION OF THE RESULTS OF THE QUANTITATIVE RESEARCH PHASE

CHAPTER 7

DISCUSSION AND INTERPRETATION OF FINDINGS

CHAPTER 8
PRESENTATION OF RESEARCH UPTAKE MODEL, SUMMARY AND FINAL CONCLUSIONS

CHAPTER 9

SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

TABLES

FIGURES

APPENDICES

LIST OF ABBREVIATION/ACRONYMS

CAHS:	Canadian Academy of Health Sciences
CIHR:	Canadian Institute of Health Research
COHRED:	Council on Health Research for Development
CPUT:	Cape Peninsula University of Technology
CRECA:	Capacity Building, Research Agenda, Engagement, Communication and Appraisal
DFID:	Department for International Development
DRUSSA:	Development Research Uptake in Sub-Saharan Africa
GDP:	Gross Domestic Product
KTA:	Knowledge to Action
MoUs:	Memorandum of Understandings
MPDoH:	Mpumalanga Provincial Department of Health
NDoH:	National Department of Health
NHRC:	National Health Research Committee
NHRD:	National Health Research Database
NHRS:	National Health Research Systems
OMRU:	Ottawa Model of Research Use
PARIHS:	Promoting Action on Research Implementation in Health Services
PHRCS:	Provincial Health Research Committees
SSHRC:	Social Sciences and Humanities Research Council
STATSSA:	Statistics South Africa
TB:	Tuberculosis
ToC:	Theory of Change
UNISA:	University of South Africa
WHO:	World Health Organization

CHAPTER 1

ORIENTATION OF THE STUDY

1.1 INTRODUCTION

In low-resourced settings such as the Mpumalanga Province in South Africa, the use of public health research for practice and policy development is very low (D'Ambruoso, van der Merwe, Wariri, Byass, Goosen, Kahn *et al.* 2019: 418). Although the concept of research uptake has received attention in these settings, there is still much that is unknown about tailored and impactful strategies for improving research uptake.

Public health research plays a significant role in providing new scientific knowledge and in the development of sound health policies, which are critical to the provision of healthcare services. Brownson, Baker, Deshpande and Gillespie (2017: 49) established five broad areas for conducting public health research, namely (1) investigating and understanding links between health and behaviours; (2) developing methods for measuring behaviour; (3) identifying factors influencing behaviours; (4) investigating the impact of public health interventions; and (5) translating research evidence into practice. Furthermore, the World Health Organization (WHO) has identified four goals to support public health research; these include building capacity to strengthen health research systems, developing research priorities, developing norms and standards for good research practice, and translating quality evidence into affordable health technologies and evidence-informed policies (WHO 2017).

Over the years, studies across the globe have shown growing recognition of the importance of public health research uptake for healthcare practice and policy development (Neta, Glasgow, Carpenter, Grimshaw, Rabin, Fernandez *et al.* 2015: 49; London, Naledi & Petros 2014: 1). However, a major challenge in translating public health research findings into practice and policy has been that most evidence-based interventions are not ready for widespread dissemination (Sanetti & Collier-Meek 2017: 3). This view was corroborated by Brownson, Eyler, Harris, Moore and Tabak (2018: 102), who attributed the gap between discovered research evidence and application in practice settings to ineffective research uptake strategies. Ghaffar, Langlois, Rasanathan, Peterson, Adedokunc and Tran (2017: 87) similarly established that unless research is relevant to a specific public health system, the uptake of research will likely remain low.

Despite a significant increase in the number of research publications each year in Africa, efforts to promote research uptake into public healthcare practice and policy development remain hindered by several competing priorities (Edwards, Zweigenthal & Olivier 2019: 1). In addition to a lack of financial resources for research uptake, the difficulties in African countries are exacerbated by factors such as armed conflict, cultural aspects, and the political environment (Gammino, Diaz, Pallas, Greenleaf & Kurnit 2020: 12). Improving research uptake starts with improved health research systems. Nabyonga-Orem and Okeibunor (2019: 1) have noted progress in strengthening national health research systems in Africa, but further argued for the need for individual African countries to set out a clear strategic direction, and create an enabling environment for public health research uptake.

South Africa is no exception in terms of challenges affecting public health research uptake for healthcare practice and policy. However, the South African government has made considerable progress in its effort to strengthen public health system performance in terms of policies, plans and charters (Malakoane, Heunis, Chikobvu, Kigozi & Kruger 2020: 59). This included strengthening public health research systems to improve research uptake for practice and policy (Loots, Mayosi, Van Niekerk, Madela-Mntla, Jeenah & Mekwa 2016: 235). In 2011, the National Department of Health in South Africa convened the National Health Research Summit (NHRS) to focus discussions around the importance of public health research utilisation in policymaking (Senkubuge & Mayosi 2012: 141). This initiative culminated in the development of National Health Research Database (NHRD) that serves as a central repository of public health research outputs in South Africa. At present, permission to access research sites in provinces is coordinated through this research database. However, little is known about the uptake of research findings in order to address local health priorities and policy development.

In the Mpumalanga Province, public health research is undertaken by postgraduate students (academic purpose), research institutions (either academic or non-academic), and in-house departments (mainly for improvement plans). Approval for research projects is coordinated and managed in terms of the National Health Research Policy of 2001, which serves as a framework for the coordination and management of research in South Africa. The policy further identifies the Provincial Health Research Committees as an integral part of the system of coordinating public health research by ensuring efficient use of limited health resources.

Despite this initiative, a large gap still exists in the uptake of research into meaningful healthcare outcomes/plans. This study was aimed at investigating contributory factors to low uptake of public health research by decision-makers and policy developers, considering the challenges discussed above. This formed the basis for developing a tailored model to facilitate the uptake of research.

The following sections focus on the research problem. It also specifies the purpose of the research, research objectives, research questions, significance of the study, the theoretical foundation of the study, a brief overview of the methodology, and concludes by providing an overall layout of the thesis.

1.2 STATEMENT OF THE RESEARCH PROBLEM

An ultimate goal of public health research is to provide evidence to better understand problems, to inform planning/decision-making, to improve the provision of healthcare services, and to guide improvements in policies (Kirigia, Ota, Motari, Bataringaya & Mouhouelo 2015: 61). This does not often happen in low- and middle-income countries where severe resource constraints are present (Chanda-Kapata, Ngosa, Hamainza & Kapiriri 2016: 72).

There is growing acceptance that the emphasis on translating research into practice and policy has been related to the communication of public health research findings rather than the holistic approach of research uptake. A discussion paper by the Cape Peninsula University of Technology (CPUT) (2012:1) found that academic researchers were more concerned with publishing research studies than facilitating the uptake of research output. Furthermore, Oliver, Innvar, Lorenc, Woodman and Thomas (2014: 2) determined that researchers display signs of preference to certain priorities, such as publishing in peer-reviewed journals, rather than ensuring that public health research findings are translated into meaningful healthcare practice and policy. Many studies therefore do not contribute to today's public health debates, as argued by Heleta (2017: 1).

Wallace, Nwosu and Clarke (2012: 5) summarised the most significant factors contributing to the low uptake of research findings as: an inability to use research findings, lack of awareness, inadequate access to research findings, lack of familiarity, lack of perceived practicality, and other external barriers. The study further indicated that almost all the reviewed studies were limited in terms of the quality and generalisability of their results. A study by Yazdizadeh, Majdzadeh, Janani, Mohtasham, Nikooee, Mousavi *et al.,* (2016: 1) found that most studies conducted in Iran were not based on the national needs of the country and lacked stakeholder consultation. This led to the implementation of only 36% of studies conducted, resulting in public health research findings failing to translate into meaningful healthcare outcomes.

One of the recurring factors contributing to the low uptake of public health research findings, as established in the section above, is a lack of involvement by end-users in the entire research cycle. As noted in the literature, organisational factors such as access to research, shortage of opportunities for relevant interdisciplinary training, professional bodies, and lack of managerial support are impediments for the uptake of public health research findings (Pietri, Gurney, Benitez-Vina, Kuklok, Maxwell, Whiting *et al.* 2013: 958). The concept of research uptake is intended to close this gap, as it emphasises being aware of and accessing public health research outputs (Grobbelaar 2013: 7).

1.3 RESEARCH PURPOSE

The purpose of this study was to develop a model to facilitate research uptake in healthcare practice and policy development.

1.3.1 Research objectives

The objectives of the study were divided into three phases:

Phase one (Qualitative Approach)

- To explore and describe key stakeholders' perceptions of research uptake in healthcare practice and policy development.

Phase two (Quantitative Approach)

- To determine factors influencing the uptake of research for healthcare practice and policy development.

Phase three (Research Uptake Model Development)

- To develop a model that will promote optimal research uptake in healthcare practice and policy development.

1.3.2 Research questions

The research questions of the study were as follows:

Phase one (Qualitative Approach)

- What are key stakeholders' perceptions of the uptake of health research for healthcare practice and policy development?

Phase two (Quantitative Approach)

- What are the factors that influence the uptake of health research for healthcare practice and policy development?

Phase three (Research Uptake Model Development)

- Of what should a model for the uptake of health research for healthcare practice and policy development consist?

1.4 SIGNIFICANCE OF THE STUDY

A substantial number of public health research studies are being conducted annually across the globe, producing findings that can deliver life-saving interventions. However, there is little understanding of how to effectively deliver those findings in diverse settings, considering the wide range of existing health systems. Given the absence of a tailored research model for the uptake of research findings from a government's perspective, where there are limited health resources and research systems are inadequately developed, this type of research is important.

The value of this study will ultimately be in the development of a model that is specific to the content of the desired change and the context in which such an intervention is anticipated to occur. The proposed model will enable health researchers, programme managers, and policy developers to effectively examine existing relationships between healthcare practices, research for health, and population outcomes.

The current study is intended to contribute to the rising debates on research uptake for healthcare practice and policy. It is aimed at contributing to the development of strategies for functional local research committees to ensure efficient and effective gatekeeping processes in order to promote research uptake. Furthermore, the study adds to the National Health Observatory System of the National Department of Health which seeks to generate knowledge and understanding of the health research being conducted in South Africa, and whether the research being conducted is in line with national health priorities.

1.5 DEFINITIONS OF KEY CONCEPTS

- **Facilitation:** is defined by Matlala (2018: 174) as a process that enables a procedure to occur easily by reducing obstructions and delays. In this study, facilitation refers to the enhancement and strengthening of research uptake.
- **Healthcare:** is defined as the act of providing services to individuals and communities by a health service provider for the purpose of promoting, maintaining and monitoring or restoring health (WHO 2004: 28). In this study, healthcare

practice refers to the act of maintaining and restoring a person’s well-being following the uptake of public health research findings.

- **Model:** Nilsen (2015: 2) defines a ‘model’ as a thoughtful simplification of a specific aspect of a phenomenon. In this study, a model refers to a symbolic depiction of the uptake of public health research findings for healthcare practice and policy development.
- **Policy:** refers to plans and procedures developed and implemented by governments to respond to public healthcare needs and provide a means for supporting a population’s health (Bryant 2016: 27). In this study, policy refers to plans and procedures developed from the uptake of public health research findings to improve the delivery of public healthcare to communities.
- **Practice:** refers to direct professional involvement in healthcare services (Medical Dictionary for the Health Professions and Nursing 2012). In this study, healthcare practice refers to the involvement of public healthcare professionals in rendering public healthcare services.
- **Research uptake:** DRUSSA (2012) defines ‘research uptake’ as a knowledge-generating process by which research finds its way to key research stakeholders such as practitioners, programme managers, policy developers in government, and other agencies. In this study, research uptake refers to the adoption of public health research project activities by the local research committee with the aim of informing planning, healthcare practice and policy development.

1.6 OPERATIONAL DEFINITIONS

Table 1.1 shows the dependent and independent variables of this study. Christensen, Johnson and Turner (2015: 47) define an ‘independent variable’ as a variable presumed to cause changes in another variable, while a dependent variable is a variable that changes as a result of another variable.

Table 1.1: Operational Definitions

Type of variable	Variables	Explanation of variables	Operationalised variables
Independent variables	Research uptake	The frequency with which research findings have been applied to improve the status of health service delivery (see Annexure B: Q22-Q30)	• Frequency of research results applied to improve the level of health, the status of health determinants, and the status of health service delivery • Score of research findings applied to result in the production of new materials, improvements of goods and knowledge-based entrepreneurship • Score of research findings applied to result in a reduction of leave from work and a reduction in patients' direct costs • Score of research findings applied to result in a reduction of health systems' direct costs
Dependant variables	Healthcare practice	The frequency with which there was a change in health practice over time (see Annexure B: Q12-Q16)	• Number of systematic reviews • Number of guidelines/documents developed • Number of books for healthcare practice developed • Number of educational contents for professional groups developed • Number of studies conducted on demands by stakeholders
	Policy development	The frequency with which there was a change in policy following the conclusion of the study (see Annexure B: Q17-Q21)	• Number of research results used in policy development; • Number of research findings registered for patent locally and internationally

1.7 THEORETICAL FRAMEWORK

The 'Promoting Action on Research Implementation in Health Services' (PARIHS) framework, advanced by Rycroft-Malone (2004: 297), was chosen to guide the overall conduct of the current study. According to Bergstrom, Ehrenberg, Eldh, Graham, Gustafsson, Harvey *et al.* (2020: 36), the PARIHS framework was developed and tested in an international arena, mainly for research within the nursing fraternity to signify the complexities of undertaking research uptake. In this study, the researcher could not fully adopt the PARIHS framework guiding statements; rather, statements were amended for the framework to suit the local context. Figure 1.2 illustrates the PARIHS framework with an emphasis on the involvement of change processes when implementing research uptake.

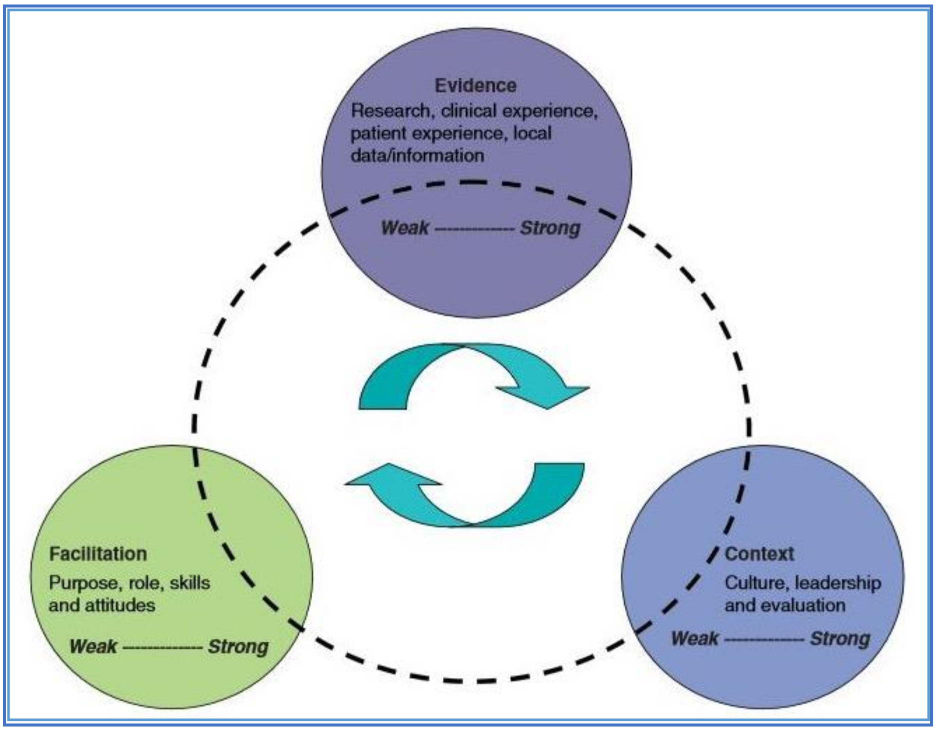

Figure 1.1: The PARIHS Framework (Source: Kristensen, Borg & Hounsgaar 2012: 120)

The PARIHS framework views successful research uptake as a function of the relationships between three domains, namely evidence, context, and facilitation. In other words, for research uptake to succeed, there should be clarity about the strength of evidence used, the environment (context) in which research will be used, and the method required for facilitating research uptake (Seers, Rycroft-Malone, Cox, Crichton, Edwards, Eldh *et al.* 2018: 138). The PARIHS framework, together with several research uptake models and theories, are discussed in detail in Chapter 3 of this thesis.

1.8 RESEARCH DESIGN AND METHODS

The study followed a mixed-methods design with an exploratory sequential approach (Berman 2017: 1) to develop a model for the uptake of research for healthcare practice and policy development. Inductive reasoning was used during phase one of the study, and the researcher continued with deductive reasoning during phase two. Phase three of this study mainly focused on abductive reasoning to develop a model for the uptake of research. The research design, setting and population, sampling methods, validity and reliability, trustworthiness, and ethical considerations are introduced next.

1.8.1 Research design

The chosen research design, which matches the research purpose and the framework of this study, is a mixed-methods design. In a mixed-methods design, qualitative data (data such as opinions that cannot be easily measured) and quantitative data (data easily measured and represented by numbers) are combined in a single research study or a set of closely related studies (Schoonenboom & Johnson 2017: 108). This blending of data types yields greater validity of research results using the richness and breadth of qualitative findings, coupled with the precision of quantitative data to produce a comprehensive understanding of the phenomenon being studied (Myers & Powers 2017: 1).

As outlined in Almalki (2016: 291), approaches associated with the mixed-methods design include sequential and concurrent procedures. For this study, an exploratory sequential approach (QUAL→QUAN) was adopted. According to Berman (2017: 1), an exploratory sequential approach prioritises an initial collection and analysis of qualitative phase data, followed by the use of the findings to guide collection and analysis of the quantitative phase data, with a final phase for the integration of data from the two separate strands of data.

1.8.2 Research setting

The study was conducted in Mpumalanga Province, which is located in the north-eastern part of South Africa, and is sharing borders with Mozambique to the east and

Eswatini to the south-east. The province shares common borders with Limpopo Province to the north, Gauteng Province to the west, Free State Province to the south-west, and Kwa-Zulu Natal to the south-east. It has a population size of just over 4.6 million people, representing 7.8% of the total country's population (STATSSA 2020: 23).

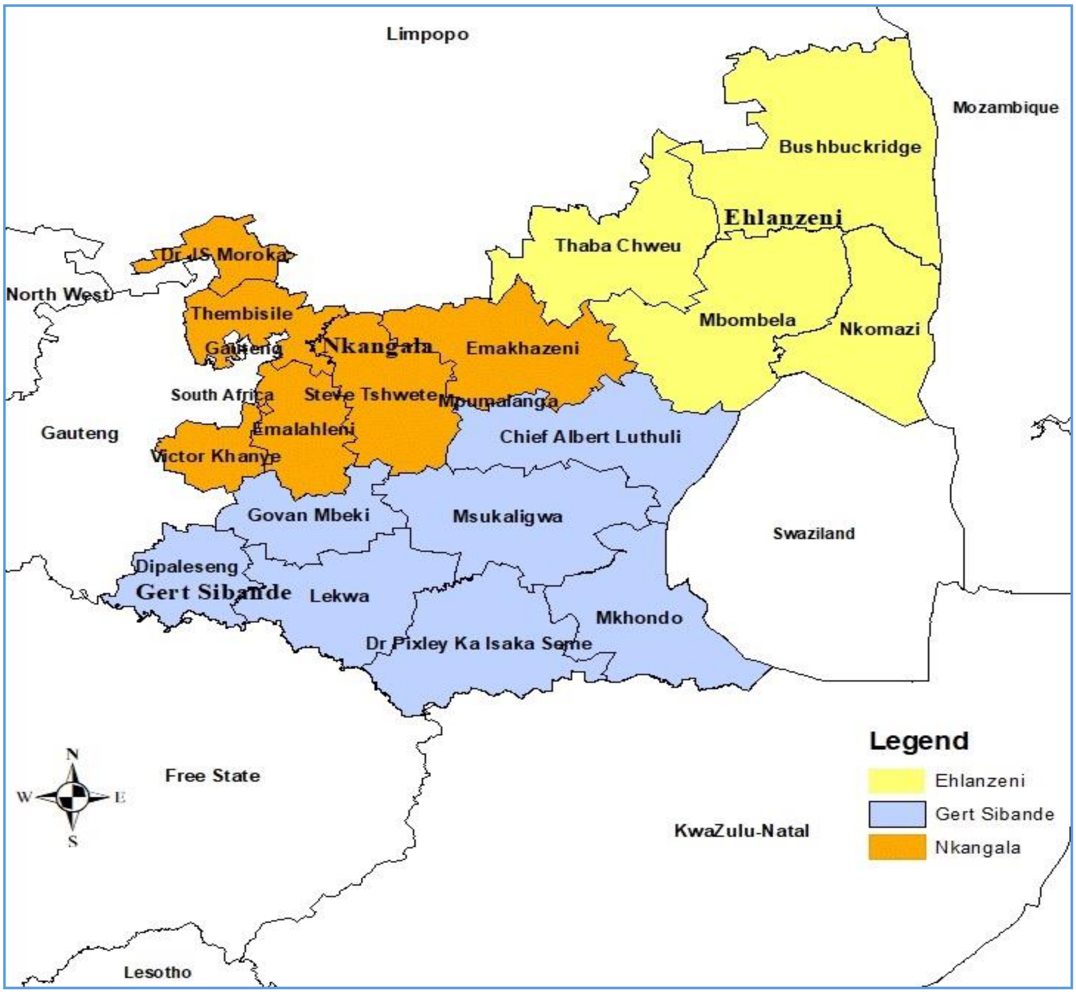

Figure 1.2: **Mpumalanga Map showing national and international borders**

Due to the international borders and health challenges associated with the migration of people across borders (Thela, Tomita, Maharaj, Mhlongo & Burns 2017: 715), the province is an ideal research hub for a number of research organisations. Research in Mpumalanga Province is carried out in all three districts, namely Gert Sibande, Nkangala, and Ehlanzeni District Municipalities, which share a total of 23 district hospitals, five tuberculosis (TB) specialised hospitals, three regional hospitals, two tertiary hospitals, and 279 primary healthcare facilities. These public facilities service just over 90% of the population in Mpumalanga Province (MPDoH 2018: 26).

1.8.3 Population

A population is defined as an aggregate of individuals, cases, things or observation units that constitute the focus of an investigation (Garg 2016: 640). According to data from internal records (research files) of the Mpumalanga Provincial Department of Health (MPDoH), a total of 399 public health research studies were conducted from the year 2014 to 2019. This translates to an equivalent of 67 public health research studies conducted per annum. Research studies were conducted by postgraduate students for academic purposes; research institutions for both academic or non-academic reasons; and in-house research were conducted, mainly for quality improvement plans. According to data from internal records (research files) of the MPDoH, all the 399 health research studies were conducted by the categories: researchers; programme managers; frontline workers; and senior managers or directors. Therefore, the researcher used a total of 399 primary investigators who conducted public health research studies, as the primary sources of data for both the qualitative and quantitative phases of this study. Initially, the researcher did not categorise participants or respondents in both phases into researchers, frontline workers, programme managers, senior managers or directors at higher education institutions, but allowed participants or respondents to categorise themselves into either of the groups, respectively. The study population is elaborated on for each research phase in Chapter 4 of this study.

1.8.4 Sample and sampling methods

A sample is defined as a subset of a statistical population in which its properties are studied in order to gain insights about the entire population (Taherdoost 2017: 237). If selected discerningly, the sample will display the same characteristics or properties as the large group (Martínez-Mesa, González-Chica, Duquia, Bonamigo & Bastos 2016: 327). According to Sharma (2017: 749), the purpose of sampling techniques is to help researchers systematically select a relatively small number of units to be included in the sample; hence, they differ in the manner in which the elementary units are chosen.

Broadly, there are two types of sampling procedures, namely probability sampling approaches and non-probability sampling approaches (Baran & Jones 2016: 110). Non-probability purposive sampling (Taherdoost 2016: 22) was used for the first phase of this research. In phase two of this study, no sampling procedures were used, as the total target population was studied. Details on sampling and sampling methods are provided in Chapter 4 of this study.

1.8.5 Methods

This study was conducted through a phased approach, as follows:

1.8.5.1 Phase one: Qualitative approach

The first phase of this study involved a qualitative approach intended to explore and describe the perceptions of key stakeholders on research uptake in healthcare practice and policy development from an insider’s perspective. The findings contributed to the development of an online questionnaire for phase two of this study.

1.8.5.1.1 Data generation

Semi-structured interviews were used (Evans & Lewis 2018: 2), organised around an interview guide to generate data for this phase. Using a semi-structured interview guide can provide a means to ensure that key interest points are systematically explored during the interviews, with participants using their own knowledge and understanding of the phenomenon to shape discussions, as argued in Wood, Daley-Moore and Powell (2019: 2443). With permission from participants, the researcher audio-recorded the interviews to be transcribed later in preparation for data interpretation.

Participants who were interviewed included frontline workers (7), researchers (6), programme managers (4), senior managers or directors at higher education institutions (4) who are knowledgeable and experienced about the focus of the study. The interview guide was piloted with one individual before data generation could begin to identify and fix likely errors (see Section 4.4.1.3.3). A total of 21 interviews were conducted to gather information from as many perspectives on the uptake of research findings in healthcare practice and policy development. The researcher also kept a journal to write detailed field notes during the interviews (Sanjek 2019: 6). The total number of interviewed participants was based on the concept of data saturation (Gentles, Charles, Ploeg & McKibbon 2015: 1782) as explained in Section 4.4.1.2.3.

1.8.5.1.2 Data analysis

Once data were generated, the audio-recorded semi-structured interviews were transcribed verbatim (Azevedo, Carvalho, Fernandes-Costa, Mesquita, Soares, Teixeira *et al.* 2017: 160) in preparation for data analysis and interpretation. Findings were expressed in the form of thematic interpretation of data to develop and support the theory for this study. This involved identifying recurring themes in the data in order to explore typologies of these themes, while looking at variations in relationships between and within themes (Nowell, Norris, White & Moules 2017: 4).

1.8.5.1.3 Measures to ensure trustworthiness

Trustworthiness has been described as a way in which a researcher can convince consumers of research of the quality of a study, and that the research report/findings are worthy of being used (Connelly 2016: 435). The standards for measuring trustworthiness in qualitative research is equivalent to the standards of reliability and validity in quantitative research, and are refined by Lincoln and Guba (1985: 332) as credibility, dependability, confirmability and transferability (Marshall & Rossman 2016: 46). These standards were used in this study with the inclusion of authenticity (LoBiondo-Wood & Haber 2017: 141).

a) Credibility

Hammarberg, Kirkman and de Lacey (2016: 500) define ‘credibility’ as the criterion for evaluating the absolutes of a qualitative study to enhance the integrity of the findings. In this study, credibility was achieved through prolonged engagement with participants, persistent observation, data triangulation, external checks, reflexivity and peer review.

a.i) Prolonged engagement with participants

The researcher invested sufficient time in the data collection activities by having prolonged engagement with participants (Korstjens & Moser 2018: 121). Each interview with participants lasted for about 42 minutes, however, the overall time spent with the interviewee was approximately 90 minutes. This allowed time for taking pictures of the surroundings and reports pasted on walls, walking about, and obtaining additional information after the interview with participants. This also assisted the researcher in building trust with participants.

a.ii) Persistent observation

According to Korstjens and Moser (2018: 122), persistent observation refers to identifying the most relevant characteristics and elements to the phenomenon being investigated, which will be focused on in detail. Observations in the field allowed the researcher to discover and understand the frustrations participants experienced when undertaking their research projects. This discovery helped the researcher realise that it is vital to clarify the work of local research committees. Subsequently, the researcher constantly read and reread the coded data until a depth of insight was gained. This allowed the researcher to theorise a conceptual, logical public health research uptake framework which may address most of the concerns raised by participants.

a.iii) Data triangulation

Triangulation was established in this study by interviewing different informants to obtain four perspectives (programme/policy managers, frontline workers, researchers, senior managers or directors), gather diverse views, and reduce bias, as argued in Noble and Heale (2019: 67). In addition, data were analysed independently by two different researchers (researcher and co-coder), from which the interpretations were compared until the most appropriate interpretation was found to best characterise the meaning of the data. Furthermore, this study also used a mixed-methods research design for data collection and analysis.

a.iv) External checks

Member checks took place by the researcher sharing preliminary findings with participants and asking them for feedback on the drawn conclusions (Chase 2017: 2689). This was done to validate that the data reflect the contributions of participants.

Peer debriefing was done through sessions being held with members of the local research committee for input on aspects of the inquiry (on both the subject and methodology of the study). In addition, from time to time, the researcher discussed aspects of this inquiry with his supervisor for guidance.

a.v) Reflexivity

Reflexivity in this study was established using reflective notes (Dean 2017: 1) whereby the researcher documented the participants' behaviour, reactions, facial expressions, and moods during discussions. This assisted in providing a detailed and honest account of the study in a reflective journal. With reflexibility, Palaganas, Sanchez, Molintas and Caricativo (2017: 430) emphasise the need to determine the degree of influence the researcher exerts on data collection and analysis to ensure the transparency and openness of the research process. As a public health researcher whose roles are related to ensuring the uptake of public health research, the researcher was mindful that when interviewing participants, he needed to try to remain as neutral as possible, neglecting his own views in order to listen as an interviewer/researcher. It was initially difficult for the researcher to entirely set aside his personal experience, particularly as the interview guide was developed based on literature and his personal experience. However, he was open to change and remained neutral during the interviews. One of the participants (21) was a programme manager who was reluctant to talk openly about experiences, unwilling to provide responses on follow-up probes, and the researcher became doubtful whether the interview would be worthwhile for the research. Suddenly, the participant's tone changed, and he became relentless and spoke in a far more personal and attacking mode, but eventually appeared to value the opportunity to share how things ought to be for improving research uptake. The researcher noted this experience immediately afterwards in a reflective journal.

a.vi) Peer review

According to Anderson (2017: 7), the importance of peer debriefing manifests when researchers discuss their research projects with disinterested peers who systematically question the research approach in order to provide valuable input. Peer review was done by communicating on this study with provincial colleagues, who were skilled and had successfully completed their doctoral degrees on qualitative research.

They provoked the researcher’s critical thinking on categories not covered by the research questions as they provided additional explanations/perspectives. This came in handy in focusing on the study and ensuring the researcher’s personal experience did not influence his judgement during both data collection and analysis processes.

b) Dependability

Korstjens and Moser (2018: 121) describe ‘dependability’ as a process of reflecting that the research findings are stable over time and could be repeated. In this study, dependability was ensured through an inquiry audit and description of the research methodology. The researcher also followed the code co-code procedure.

b.i) Inquiry audit and description of the research methodology

The researcher ensured that aspects of the research were described in detail and recorded. Moreover, records of raw data, transcripts, field notes, and a reflexive journal were kept for ease of crosschecking of the inquiry process by an external reviewer. The researcher also provided a dense description of the study methodology in Chapter 4.

b.ii) Code co-code procedure

The researcher examined the data and listened to the audio-recordings to ensure that the results were grounded in the data. The same data were coded twice by an independent coder after a three-week gestation period to see if findings were similar. This assisted both the independent coder and the researcher in gaining a better understanding of data patterns, and all reflective remarks were recorded.

c) Confirmability

Confirmability refers to the degree to which study findings are shaped by the participants and not the researcher’s own fabrications (Amankwaa 2016: 121). According to Tappen (2016: 180), confirmability is equivalent to maintaining objectivity in a quantitative study. In this study, confirmability was addressed by using an independent coder and by creating a detailed account (audit trail) of activities of the research, thereby generating a chain of evidence for the study.

c.i) Independent coder

Using an independent coder is supported in literature (Belotto 2018: 2622). A qualified independent coder with adequate experience in qualitative data analysis assisted in coding the data. Hence, the findings of this study were confirmed by the independent coder.

c.ii) Audit trail

According to Johnson, Adkins and Chauvin (2020: 143), keeping and reviewing an audit trail with details of all steps and decisions made throughout the study enhance study confirmability. The researcher created a detailed account of activities by keeping a reflective journal which contained all records of events that happened in the field, and personal reflections in relation to the study. From time to time, an independent researcher was invited to discuss the audit trail with the researcher.

d) Transferability

Transferability is described as the applicability of the findings of the study to other research contexts with a wider body of research literature, and is equivalent to validity in a quantitative study (Schloemer & Schroder-Back 2018: 88). In this study, transferability was enhanced by using purposive sampling to select participants who would provide thick descriptions of the research context, transactions and procedures. This included participants who were knowledgeable on the issues under investigation for greater in-depth findings. In addition, the researcher provided an extensive set of details regarding the methodology and research context in the research report, with detailed literature to contextualise the results of this study.

e) Authenticity

Authenticity refers to the researcher's ability to demonstrate that the data were authentic, and there was fairness and correlation between all steps of the research process and the actual study (Amin, Norgaard, Cavaco, Witry, Hillman, Cernasev *et al.* 2020: 8). Authenticity was achieved by ensuring that the real purpose of this public health study was clear, and aimed at serving participants once the study was concluded. Authenticity was also enhanced by conducting an in-depth discussion and empowering key stakeholders by giving them a voice on matters affecting research uptake for healthcare practice and policy development. Furthermore, participants' views were extracted verbatim from transcripts to authenticate their narratives.

1.8.5.2 Phase two: Quantitative approach

The second phase of the study involved a quantitative approach to determine factors influencing the uptake of research for healthcare practice and policy development. In phase two, the researcher collected and analysed quantitative data from an online survey using a structured questionnaire that was designed following the findings obtained in phase one of this study.

1.8.5.2.1 Data collection

After establishing the total number of research studies that were conducted within the sampled period (from the year 2014 to 2019), the researcher emailed an online Likert scale (5 scales) survey questionnaire (Mirahmadizadeh, Delam, Seif & Bahrami 2018: 63) to all identified stakeholders who conducted research in the province to assess whether research uptake relates to healthcare practice and policy.

1.8.5.2.2 Data analysis

Data gathered from research records were collected using REDCap Survey (web-based secure application). SPSS version 26.0 computer program, SAS Version 15 and Microsoft Excel were used, with the assistance of a statistician, to analyse data. Furthermore, tables and figures were employed to summarise the results and present data visually for ease of understanding.

1.8.5.2.3 Measures to ensure validity and reliability

A key issue in quantitative enquiry is the importance of ensuring that data is both truthful and valuable, and this assessment is achieved by measuring the validity and reliability of the data collection instrument (Bolarinwa 2015:195). According to Creswell and Plano-Clark (2018: 217), validity refers to an instrument that provides scores which reflect the truthful indicators of the construct being measured, while reliability refers to an instrument providing scores which are consistent and stable over time.

In this study, content validity was used to determine the effectiveness of the data collection instrument. Almanasreh, Moles and Chen (2019: 214) emphasise that content validity relies on using experts to critique the data collection instrument based on the relevancy of elements in relation to the content domain. To verify the validity of the questionnaire, the researcher piloted the questionnaire to five respondents, whose responses were not processed in this study, but only used for testing purposes. The researcher further requested input from the five respondents, which were used to modify or improve the content of the instrument before being used in the main study. Experts (research promoter and a statistician) were consulted for input, which further assisted in refining the data collection instruments.

Similarly, in ascertaining the reliability of the questionnaire, the researcher carried out a pilot test on the instrument with five respondents. Responses from the pilot study were thus exposed to a reliability test using Cronbach’s alpha coefficient (Chan & Idris 2017: 400). The overall Cronbach’s alpha for four main constructs (Research uptake [questions B2-B6], individual factors [questions C1-C21], organisational factors [questions D1-D20], and research characteristics [questions E1-E20]) representing 66 items was 0.706, illustrating that the questionnaire was reliable. Bujang Omar and Baharum (2018: 85) propose a Cronbach’s alpha value of 0.5 or greater in the assessment of internal consistency of an instrument. The results of scaled items used in this study for the final survey data collection are presented in Chapter 6 of this study.

1.8.5.3 Phase three: Research uptake model development

In this phase of the study, the researcher compared and analysed the results from both phase one and two, integrating these with the theoretical framework to develop a model for research uptake in healthcare practice and policy development. Key concepts emanating from the results were identified, statements were developed, while interrelated elements were identified and used to develop the research uptake model.

According to Guetterman, Fetters and Creswell (2015: 556), there are at least four ways in which the integration of qualitative and quantitative approaches can occur. These include explaining quantitative results with a qualitative approach, building from qualitative results to a quantitative component, merging quantitative and qualitative results, or embedding one approach within another. In this study, the researcher worked from qualitative outcomes to a quantitative component to develop a model that will promote optimal uptake of research findings for healthcare practice and policy.

To further identify actions that needed to be taken to facilitate the optimal uptake of research for healthcare practice and policy development, the researcher proposed a logical framework for local research committees to improve research uptake.

1.8.6 Research uptake plan

From the onset, the study involved various key stakeholders of research uptake. These included managers, researchers, frontline workers and directors/senior managers. The findings of this research will be presented to the local research committee, management committees of the Provincial Department of Health and the Mpumalanga Provincial Research Forum for implementation. The findings will also be shared with various health departments across the country, the National Department of Health, and the management committee of the Department of Health Studies, University of South Africa. It will be recommended that the developed model be adapted and used in other sister departments.

The research findings will be submitted to academic journals with a view for publication, as the researcher hopes to contribute to current debates on research uptake for healthcare and policy development. The research findings will also be presented at various conferences.

1.9 ETHICAL CONSIDERATIONS

Any research has the potential to raise ethical issues, hence researchers are obliged to conduct research in an ethical manner. The National Department of Health (NDoH) (2015: 14) set out ethical principles for public health research to provide the national benchmark of norms and standards for conducting responsible and ethical research. It emphasises the well-being of human subjects above the interest of science and society. To ensure adherence to ethical consideration of the study, permission to conduct the study was sought from the Research and Ethics Committee of the University of South Africa Department of Health Studies (HSHDC/712/2017; see Appendix A). The study was submitted to the Provincial Health Research Committee in Mpumalanga for approval (MP_201711_006; see Appendix B).

1.9.1 Right to privacy and confidentiality

Wasnik (2019: 106) argues the right to privacy as an individual’s freedom about the time, the extent, and circumstances under which private information may or may not be shared with others, whereas confidentiality refers to the magnitude in which participants can give or hide information freely. To maintain privacy, approval to access personal information and records about participants were sought from the Provincial Department of Health. Confidentiality was assured by omitting participants’ identifying particulars such as names and addresses; a coding system was used instead. Personal identifiers were only shared with the research supervisor, who is knowledgeable about maintaining participants’ confidentiality. Electronic data were stored on two password-protected laptops, and only the researcher had access to the keys and passwords. Interviews took place in a private room. Furthermore, confidentiality agreements were signed with the transcriber of the data (see Appendix C2), as well as the external co-coder (see Appendix C3).

1.9.2 Right to self-determination

Participants were formally informed by the researcher regarding all aspects of the research, including benefits and risks related to participation, and this influenced their willingness to participate in the study. According to McCance and McCormack (2017: 55), the concept of a right to self-determination ensures that individuals have a right to participate in decision-making about processes, treatment, and care options. Information provided to participants included: that participation was voluntary, they had the right to terminate participation at any stage during the interview without penalty, and they were entitled to ask for clarity so that they could comprehend the questions being asked by the researcher.

1.9.3 Right to fair treatment

The researcher ensured the right to fair treatment by treating participants fairly and equitably before, during, and after the research. According to Das and Sil (2017: 375), participants may not be excluded unfairly based on social determinants such as race, gender, disability, education and religion, among others. In phase one of the study, all researchers who conducted research from the year 2014 to 2019 were provided with a letter of invitation to participate in the research. In the letter, they were provided with full information on what the research entails and how long the data collection instrument would take to complete, so that they were able to make an informed decision on whether to partake in the study.

1.9.4 Right to protection from harm

Woodfield (2017: 34) argues that researchers are obliged to avoid or minimise undue physical, emotional, or psychological harm to participants. The researcher ensured in this study that participants were not exposed to any undue physical or psychological harm, such as depression, stress and confusion as a result of the in-depth interview. Interviews were conducted in quiet and safe places where there was minimal interference. The researcher also endeavoured to ensure that the interview did not take longer than the proposed 45 minutes (managed an average of 42 minutes), and further allowed the participants to stop the interview should they wished if it had gone over time. All potential participants were treated fairly, and there was no penalty for refusing to participate.

1.9.5 Informed consent

An informed consent informs participants in a study of their rights in the research. According to Lee (2018: 223), informed consent refers to the fact that potential participants in a research project are given adequate information in plain language regarding the study, and they fully comprehend the information provided so that they are able to consent or decline participation in the study. The process of obtaining informed consent is detailed in Chapter 4. The researcher:

i. Explained the ultimate purpose of the study to the participants, which was to develop a model to facilitate the uptake of public health research for healthcare practice and policy.
ii. Indicated reasons why they were specifically selected to participate in this study.
iii. Informed participants of the anticipated time (45 minutes) the interview was likely to last.
iv. Explained why it was necessary to record the interview, with their permission.
v. Further indicated to the participants that no remuneration would be provided for taking part in this study.

Subsequently, research participants were asked to sign a consent form which explained the purpose of the research, and it included a request for permission to participate in the research, and the researcher's contact details should participants seek additional information (see Appendix C1).

1.10 SCOPE OF THE STUDY

With the continuous low uptake of public health research in developing countries due to competing public health priorities, there have been concerted efforts to seek better strategies for improving research uptake for practice and policy. In view of this situation, the current study was focused on developing a tailored research uptake model for healthcare practice and policy development in the low-resourced setting of Mpumalanga Province, South Africa. To this end, the research mainly concentrated on a total of 399 primary investigators of public health research studies who conducted research in Mpumalanga Province from the year 2014 to 2019 (6-year period). Demographically, the study included researchers, frontline workers/practitioners, programme/policy managers, and senior managers/directors at institutions of higher learning.

1.11 LAYOUT OF THE THESIS

This thesis comprises nine chapters, described as follows:

CHAPTER 1 (ORIENTATION OF THE STUDY): This chapter is devoted to reflecting on the background information about the research problem. It also specifies the research problem, presents the aim of the study, objectives of the study, significance of the study, framework used, clarifies the main concepts, and summarises the research methodology. It ultimately concludes with a layout of the thesis.

CHAPTER 2 (LITERATURE REVIEW): This chapter provides detailed information on the existing knowledge that informed and directed the research study. It highlights the source of the research problem and identifies gaps in the area of research uptake for healthcare practice and policy development.

CHAPTER 3 (RESEARCH UPTAKE THEORIES AND FRAMEWORKS): This chapter presents the theoretical basis relevant to justify this study. It provides the rationale for selecting the PARIHS framework as a lens to guide the conduct of the current study. Advantages and disadvantages of using the PARIHS framework and how the framework was applied are discussed.

CHAPTER 4 (RESEARCH DESIGN AND METHODS): This chapter focuses on the overall design of the research and specific methods used in the study. It provides comprehensive information regarding sampling, data collection tools, and data collection and analysis methods. It discusses processes to ensure the validity and reliability of the study, and concludes by discussing the ethical considerations adhered to throughout the research.

CHAPTER 5 (ANALYSIS, PRESENTATION AND DESCRIPTION OF THE FINDINGS OF THE QUALITATIVE RESEARCH PHASE): The qualitative findings of the study are presented in this chapter, which focus on key stakeholders' perceptions of the uptake of research.

CHAPTER 6 (ANALYSIS, PRESENTATION AND DESCRIPTION OF THE RESULTS OF THE QUANTITATIVE RESEARCH PHASE): This chapter deals with the results from the second phase of the study – quantitative research. It describes data analysis and management, and systematically presents the study's results based on the objectives of the study. Factors influencing research uptake in healthcare practice and policy development are also detailed in this chapter.

CHAPTER 7 (DISCUSSION AND INTERPRETATION OF FINDINGS): Based on the research results, the researcher contextualises and connects the results to address answers for the main research questions.

CHAPTER 8 (PRESENTATION OF RESEARCH UPTAKE MODEL, SUMMARY AND FINAL CONCLUSIONS): Based on the results of the quantitative and qualitative phases, key concepts and interrelated elements are compared and analysed to develop a model to facilitate the optimal uptake of research in healthcare practice and policy.

CHAPTER 9 (SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS): The research is concluded in this chapter with a summary of the findings, conclusions and recommendations. In this chapter, the researcher also presents his final thoughts.

1.12 SUMMARY

This chapter began by detailing the broad view of health research and introducing the problem statement, aims and objectives of the study. The significance and conceptual framework of the study were outlined through corroborative evidence from literature. Furthermore, the study methodology was introduced, and it was highlighted which data collection process was systematically followed in conducting the research. The overall layout of the thesis was discussed for the current study, which comprises nine chapters.

In the subsequent chapter, a detailed literature review is presented and aligned with the main research problem, research questions and research methods.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

For a considerable period, private funders, governments and individual researchers have been funding research projects to produce a remarkable foundation of health-related knowledge for both practice and policy development. Yet the gap between research produced and research uptake is increasingly being recognised as a challenge by scholars in the conversation around the formation of health policy, particularly in developing countries with limited resources (Franzen, Chandler & Lang 2017: 1). This chapter is devoted to a discussion of the various aspects in the literature that relate to the uptake of research within the health sciences to understand how research uptake challenges have been investigated, which of the challenges require further investigation, and how the challenges could potentially be mitigated.

The chapter begins with a discussion on the overview of health research, its impact and various impact platforms, and stakeholders for health research. This is followed by a discussion on several concepts related to the uptake of research, including evidence-based research, knowledge transfer, dissemination and implementation, and how these concepts differ from research uptake. The researcher also discusses some of the challenges affecting the uptake of research for practice and policy, followed by an in-depth discussion on health research strategies.

To identify recent publications on the uptake of research in healthcare practice and policy, multiple database searches were conducted. Initially, UNISA librarians were consulted for literature on specific areas of interest that included search terms such as ‘research uptake’, ‘health research and health policies’, ‘health research and healthcare services’, ‘healthcare research’, ‘healthcare policy model development’, and ‘research translation and healthcare’. The search was limited to publications ranging from 2015 to 2018 (inclusive). All identified documents were examined, and those that were relevant were retrieved for inclusion in the review.

Furthermore, the researcher augmented the search by using an online computer search for articles and journals through the Google search engine, Google Scholar, the PubMed database, and using Academic Search Premier Database provided at the UNISA Online Library for latest literature, except in instances where the researcher wanted to emphasise a particular area of interest. The searches included several recommended sources, accredited journals, articles, government publications, term papers, and research papers. These were consulted to enhance the researcher's understanding of the theoretical basis of the uptake of research for healthcare practice and policy development.

2.2 OVERVIEW OF HEALTH RESEARCH

Health research continues to play an integral role in society in terms of improving healthcare outcomes. These include improvements in the quality of health care (Leslie, Hirschhorn, Marchant, Doubova, Gureje & Kruk 2018: 1), distribution of knowledge through significant findings (Greenhalgh, Jackson, Shaw & Janamian 2016: 392), addressing health inequalities (Vilhelmsson & Ostergren 2018: 1; Cash-Gibson, Rojas-Gualdron, Pericas, & Benach 2018: 1), and developing usable models that promote the uptake of rigorous research efforts (Montesanti, Robinson-Vollman & Green 2018: 144).

Instead of classifying it as health research, the WHO describes health research as research *for* health, to mean the improvement of health outcomes which require the involvement of multidisciplinary sectors around the formation and/or improvement of healthcare policies and interventions. It further spearheaded the call for global countries to put systems in place and ensure implementation of healthcare research (WHO 2012: 8). In addition, the WHO is maintaining its global observatory on health research, which functions as a centralised repository of evidence-based knowledge for the development of health research. Its main function is to provide a basis for guiding the efforts of member states to strengthen health research systems (WHO 2018a).

An important component of health research remains the demonstration of accountability by health researchers, which is widely considered inadequate in improving healthcare practice and policy development. Cruz-Rivera, Kyte, Aiyegbusi, Keeley and Calvert (2017: 3) argue for the need for health researchers to close this gap by not only becoming accountable to their sponsors and fellow academics, but society as well. These authors further acknowledge that determining the value of health research is an important exercise in ensuring that limited health resources are distributed efficiently to facilitate effective and sustainable service delivery, while also assisting in minimising research waste. The two cultural approaches of determining the value (impact) of research are discussed in the subsequent sections.

2.2.1 Bibliometrics to determine the value of health research

The traditional approach to determining the value of health research is the bibliometric indicator, which is a publication or citation to measure academic research outputs in terms of the number of research papers and editorials cited in a given paper (Kulczycki 2017: 41). Sponsors and government agencies in many countries have used publications to justify their continued funding of health research (Wang & Shapira 2015: 3). In South Africa, the Department of Higher Education and Training uses research publication output as a barometer to award an annual subsidy to universities, which means a university with more publications receives a bigger share of the subsidy (Harley, Huysamen, Hlungwani & Douglas 2016: 1).

The use of citations to estimate the value of research has its limitations. In a discussion paper by Heleta (2017: 1), the author observed that the majority of articles (approximately 82%) published in humanities' journals remain uncited. This translated into a significant loss of valuable information/knowledge, funding, and potential discoveries that could benefit society. The inaccessibility of published studies due to costs also contribute towards articles not being cited or used for healthcare practice and policy development. In a study that assessed the use, cost, and impact of open access health research publications, Smith, Haustein, Mongeon, Shu, Ridde and Larivière (2017: 1) emphasise that open-access publications have the potential to increase access to global health research. The authors argue that a substantial number of articles are published in subscription journals, which are expensive and could, in many instances, only be accessed by institutions and few researchers. This view is corroborated by Breugelmans, Roberge, Tippett, Durning, Struck and Makanga

(2018: 1), who encourage health researchers to publish in open-access journals for improved scientific impact.

Breland, Quintiliani, Schneider May and Pagoto (2017: 1890) highlight the emergence of social media in researchers disseminating research work to any audience deemed appropriate for such information. According to Tripathy, Bhatnagar, Shewade, Kumar, Zachariah and Harries (2017: 11), social media platforms provide good opportunities to directly engage with individuals and groups within and beyond academia in order to shape the public discourse and influence policy. Popular platforms include Facebook, Twitter, Instagram, Snapchat, WhatsApp, YouTube and Blogs (Townsend & Wallace 2016: 3).

Sinnenberg, Buttenheim, Padrez, Mancheno, Ungar and Merchant (2017: 1) investigated the use of Twitter in translating health research, and discovered a growing trend of its usage, with 33% of articles published in 2015 finding their way there. Approximately 63% of the published studies were funded by federal institutions, followed by universities at 13%. Moreover, Poushter, Bishop and Chwe (2018: 17) estimated that approximately 43% of adults were using social networking sites by 2017. Yet the researcher argues that although social medial helps promote the value of health research in specific groups, its applicability remains a challenge, specifically to a cohort of the elderly population.

2.2.2 Peer review by disciplinary panels to determine the value of health research

Although bibliometrics is frequently used to determine the value of health research by both sponsors and governments in various countries, peer review remains a critical procedure which is most likely to ensure the value of health research (Shepherd, Frampton, Pickett & Wyatt 2018: 1). According to Bornmann (2017: 777), the peer review process is an old method, but closely associated with modern science where qualified experts form an integral part of the process. This is beneficial in ensuring that certain standards on a phenomenon under investigation are met for health research to be considered of value to the economy, society, public policy or services, or academia.

Several developed countries, such as Canada, Australia, United States of America (USA) and the United Kingdom (UK), have fully functional structures designed to coordinate health research activities, and have developed national evaluation systems (models/strategies) which are used to enforce accountability for allocated funding (see Section 3.3). These models/strategies are used to demonstrate that funds allocated for health research have not been wasted (Guthrie, Ghiga & Wooding 2018: 1). The models have also been used to evaluate the impact of academic institutions, not only on scientific progress, but also on the economy, environment, defence and public health (Khazragui & Hudson 2015: 51).

According to Schroter, Price, Flemyng, Demaine, Elliot, Harmston *et al.* (2018: 1), the peer-review system for funding of research proposals and publication of research papers plays an essential role in determining which research is funded or/and published. The authors highlighted that one of the roles of peer-reviewing includes identifying quality health research, while protecting against methodological errors in health research studies that are likely to be recognised early, before the study is conducted. Furthermore, the peer-review system contributes immensely to the evaluation of health policies, which ultimately assist in determining treatment and intervention options for patients (Koshy, Fowler, Gundogan & Agha 2018: 2).

Whereas a peer-review system is critical to research uptake processes to maintain the scientific rigour and integrity of research studies, potential limitations in using a peer-review system include creating a burden on reviewers and selection bias. However, scholars have often raised concerns about the processes involved in peer review as being biased, in particular when large numbers of research units are to be evaluated (Haffar, Bazerbachi & Murad 2019: 670). The high number of studies becomes a burden to the reviewers, and it is a concern that reviewers with an interest in a particular field of study may deliberately delay providing feedback to researchers to delay publication, as evidenced by Ali and Watson (2016: 195).

2.3 STAKEHOLDERS IN HEALTH RESEARCH

The successful implementation of research uptake is a joint effort and requires a mirrored identification and selection of appropriate stakeholders from the onset of a research project to stimulate ownership and understanding among stakeholders. Uprety (2016: 1) indicates that when research uptake is embedded within relevant programmes, the probability of research outcomes being considered for its intended audience becomes high. Also, according to the Department for International Development (DFID) (2016: 4), there are many, and varied, stakeholders in health research, including anyone with the potential or interest in health research. Reed, McIntyre, Jackson-Bowers and Kalucy (2017: 6) also argue that a health research stakeholder has a potential two-way interaction of influence, which is either influencing or being influenced by organisational actions, decisions, policies, practices, or goals.

In addition, Krupa, Cenek, Powell and Trammell (2018: 136) allude that the process of engaging stakeholders begins with mapping them. Subsections 2.3.1 to 2.3.5 indicates some of the key stakeholders identified as being central towards realising the value of health research. Essentially, engagements and communications with relevant stakeholders are integral in realising the impact of health research (Ozanne, Davis, Murray, Grier, Benmecheddal, Downey *et al.* 2017: 1). The mapping process is facilitated by determining the potential interest of each stakeholder, as well as the nature and extent of the required engagement to facilitate research uptake (Colvin, Witt & Lacey 2016: 266).

2.3.1 Government and business in health research

Government and business play a significant role in supporting health research. Persistent calls have been made for governments across the globe to prioritise the implementation of health research through coordinated public and private health systems (Ghaffar *et al*. 2017: 87). Health systems are also improved by the availability of adequate support. In an attempt by the authors to solicit input on strategies to improve research uptake in low-income countries, research funding was the second-highest theme (63 comments), after collaboration and partnership (82 comments). Therefore, participants felt the need for government to play a leading role in incorporating research into existing government health programmes (Conalogue, Kinn, Mulligan & McNeil 2017: 3).

Whereas business would mainly focus on the commercial prospect of health research (Green, Cranston, Sutherland, Tranter, Bell, Benton *et al.* 2017: 320), both government and business are key in sustaining health research by funding specific research projects and research institutions. According to Kirigia *et al.* (2016: 62), it is government's responsibility to provide oversight, foster coalition, design health research systems for accountability, and regulate all health research conducted in both private and public sectors of a country. The authors further implore governments to ensure that there are relevant policies, strategies, research priorities and agenda, legislation or law, and functional health research and ethics review committees.

2.3.2 Higher education sector in health research

The role of the higher education sector in the uptake of health research for practice and policy is significant for knowledge-based healthcare practice and policy development. Shawa (2020: 105) highlights that the three main values of the higher education sector in South Africa are teaching, knowledge production, and community engagement, with research output as one of the indicators under knowledge production.

Evidence-based knowledge creation is indispensable and continues to be the forte of academic scholars in the higher education sector. Kunttu (2017: 21) found that an in-depth collaboration between the higher education sector and industry has the potential of assisting both sides in developing similar attitudes and understanding towards research processes. This collaborative practices could have far-reaching consequences in terms of translating to the improved uptake of research evidence. For the purpose of sustaining the production of world-class knowledge and ideas relevant to everyday life, the higher education sector has dedicated research centres that coordinate interaction between relevant stakeholders to enhance the uptake of research for practice and policy (Kumar 2017: 454). Section 2.5.3.5 further elaborates on initiatives by the higher education sector to bolster research uptake.

2.3.3 Health professionals, administrators in health research and researchers

The success of health research uptake is reliant on health professional support, such as by clinicians and nurses, and those that will be required to facilitate the intervention, such as policymakers and programme managers (Curtis, Fry, Shaban & Considine 2017: 864). Good partnerships between health professionals, administrators and researchers could increase the uptake of research findings. According to Chaet (2017: 174), health professionals have an obligation to participate in research projects, survey the research findings, and use their expertise to advise on alternative ways to facilitate research uptake. In low-resource countries, and despite high levels of zeal to implement research uptake, several impeders are often at play, and Section 2.4.4.3 discusses some of the main factors affecting research uptake.

Administrators are public servants and the face of government tasked with deciding how to allocate funding for research, develop policies based on research evidence, and provide evidence to the public, politicians and non-governmental stakeholders on the implications of health research findings and developed policies (Wood 2017: 95). The support from administrators is critical in public health policymaking with regard to creating a friendly working environment, setting clear-cut criteria for policy development processes, providing monitoring, and training others in the use of research evidence for policy development (van de Goor, Hamalainen, Syed, Lau, Sandu, Spitters *et al.* 2017: 275). Hawkes, Aulakh, Jadeja, Jimenez, Buse, Anwar *et al.* (2016: 161) argue that an optimal level of engagement between researchers and relevant stakeholders would yield the desired outcomes of increasing the application of research evidence.

Researchers who serve as the main custodians and producers of health research are vital, hence they should demonstrate accountability throughout research uptake processes. A cross-sectional study on the role of researchers in disseminating research evidence to public health settings found an encouraging dissemination trend, whereby approximately 58% of the researchers shared their findings with the local settings (McVay, Stamatakis, Jacobs, Tabak & Brownson 2016: 1). Although the study could not provide the extent to which disseminated findings were translated into practice and policy, the authors suggested that researchers can further play a meaningful role in the uptake of research if the barriers with which they are faced can be addressed.

2.3.4 Society in health research

Society’s involvement as stakeholders in health research is increasingly viewed as an essential element in the uptake of research for healthcare practice and policy development. Literature has shown an increase in patient and public involvement in research projects as advisors, investigators, and reviewers of individual research projects (Miller, Patton, Dobrow & Berta 2018: 79). Engaged patients have the potential to determine the best care options for their health (WHO 2016: 4). According to Manafo, Petermann, Mason-Lai and Vandall-Walker (2018:2), the benefit of interacting with patients for the duration of the research lifecycle is the establishment of positive opportunities that will ultimately improve patients’ healthcare outcomes.

Crocker, Ricci-Cabello, Parker, Hirst, Chant, Petit-Zeman *et al.* (2018: 1) evaluated the impact of patient and public involvement in clinical trials and discovered the positive association between patient and public involvement and improved patient and public enrolment in clinical trials. This finding provides a voice to society in the overall research process. This view was elaborated on by Shklarov, Marshall, Wasylak and Marlett (2017: 1428), who found patient and public involvement to be one of the central components of healthcare policy development. The authors suggested the need for continued investment in building patients’ capacity in new engagement research skills.

2.3.5 Media houses

The importance of media as part of research uptake stakeholders is increasingly gaining recognition among scholars. A study on the role of media in agenda setting found that media coverage of long-term care with respect to geographical differences is associated with policy reforms that prioritise community-based care (Miller, Nadash & Goldstein 2015: 30). Various media channels could be used to stimulate the spread and adoption of knowledge (see Section 2.2.1). According to Scott and McGuire (2017: 121), media channels such as television, radio, print media, internet (social media) are effective in the uptake of research evidence. However, the benefits are not yet fully realised as Cabrera, Roy and Chisolm (2018: 140) established that researchers are slowly adopting social media platform to promote research uptake.

2.4 THE UPTAKE OF RESEARCH FOR HEALTHCARE PRACTICE AND POLICY

The slow uptake of new research knowledge into healthcare practice and policy development poses a significant challenge to improving patients' healthcare outcomes. The situation is worse in developing countries where enormous time-lags between discovery and integration in practice and policy are affected by a shortage of resources and competing priorities (Chanda-Kapata *et al.* 2016: 72). According to Hedt-Gauthier, Chilengi, Jackson, Michel, Napua, Odhiambo *et al.* (2017: 7), this trend is likely to continue for some time in developing countries, unless initiatives to promote research uptake strategies take all challenges faced by these countries into consideration.

The difficulties in the uptake of research into healthcare practice and policy development have stimulated interest among scholars as organisations, clinicians, and the general public are now aware of the need to integrate research evidence into practice and policies in order to deliver high-quality patient care (Kristensen, Nymann & Konradsen 2016: 1). As a result, several concepts have been coined and are being used to describe the uptake of research findings into practice and policy. The subsequent section discusses some of the concepts associated with research uptake in detail.

2.4.1 Definition of research uptake and associated concepts

In differentiating the concept of research uptake to related concepts, the researcher purposefully contrasted some of the main concepts associated with research uptake to provide contextual clarity for this study. These concepts included 'evidence-based practice', 'dissemination and implementation', and 'knowledge transfer processes'.

2.4.1.1 Evidence-based practice

In the past, the provision of healthcare services by physicians and clinicians was exclusively based on their judgments and expertise (Lulin, Yiranbon & Asante Antwi 2016: 1). However, since the emergence of evidence-based practice, healthcare providers have adopted the concept to complement their clinical practice experience in making patient-care decisions (Chaet 2017: 174; Djulbegovic & Guyatt 2017: 415). Literature has shown that evidence-based practice has been receiving growing attention across various disciplines (Russo-Campisi 2017: 193).

Evidence-based practice is an approach to healthcare practice that incorporates the best available research evidence with knowledge and appraisal from stakeholders, particularly experts, in order to benefit society (Rehfuess, Durão, Kyamanywa, Meerpohl, Young & Rohwer 2016: 297). According to Dillard (2017: 7), evidence-based practice is a responsive process guided by the availability of best research evidence and clinical expertise in relation to the context and characteristics of the patient. The definition emphasises two fundamentals: (1) research evidence should be available, and (2) experts within the health fraternity who possess the ability to provide sound judgments by interpreting available research evidence must be available. According to Manetti (2019: 102), such experts should have analytical skills and clinical knowledge based on ongoing training and health research, so that the practice is evidence-based, with the ultimate purpose of improving patients' healthcare.

In their book, Brownson, Colditz and Proctor (2017: 22) established three types of evidence in public health, classified as Type 1 for defining, auctioning and concluding on the cause of an outcome, such as frequency, incidence or prevalence; Type 2 is concerned with the impact of interventions to address a particular outcome; and Type 3 focuses on the type of information required for the adaptation and implementation of evidence. This includes information on the context within which the implementation of evidence may occur. Type 3 evidence is mainly concerned with the concept of external validity.

Seidi, Alhani and Salsali (2015: 6) explored the process of developing nurses' sound clinical judgement, and found that nurses used evidence-based practice in conjunction with their own clinical experience and knowledge, coupled with their critical thinking skills to gain autonomy in making clinical judgments. In a study by Naeem, Bhatti and Ishfaq (2017: 101), the authors found a satisfactory positive attitude by nurses towards practicing evidence-based nursing. However, in a study on nurses' experiences and barriers associated with evidence-based practice at a tertiary hospital in South Africa, Mndzebele and Tshivhase (2016: 166) discovered that only 36% of the participants had satisfactory knowledge about evidence-based practice. Also, of these, only 4% had access to the necessary material resources required to implement evidence-based practice.

Common impeders to evidence-based practice include defining and determining what constitutes evidence (Buchanan, Jelsma & Siegfried 2016: 65), poor quality of evidence (ESHRE Capri Workshop Group 2018: 770), accessibility to available research evidence (Hawkes *et al.* 2016: 161), inadequate research capacity to interpret available evidence (Hedt-Gauthier *et al.* 2017: 7), insufficient time (Jordan Bowers & Morton 2016: 52), lack of support from relevant leaders (Bianchi, Bagnasco, Bressan, Barisone, Timmins, Rossi *et al.* 2018: 918), overwhelming workloads (Shayan, Kiwanuka & Nakaye 2019: 12), and limited access to user-friendly technological systems required for evidence-based practice (Tacia, Biskupski, Pheley & Lehto 2015: 93). Although the principles of evidence-based practice have been appraised by scholars as an integrated scientific approach, as evidenced by McTavish (2017:45), the researcher in this study argues that owing to the limitations discussed below, the adoption of evidence-based practice strategies for implementation should be the result of an ideal tailor-made model.

2.4.1.2 Dissemination and implementation process

Closing the knowledge-to-practice gap through the concept of dissemination and implementation dates back decades (Darnell, Dorsey, Melvin, Chi, Lyon & Lewis 2017: 2). According to Jacobsen (2017: 420), dissemination refers to how information designed to address a health problem is distributed to a target audience (such as a specific public health institution or practitioners), whereas implementation is the use of strategies to promote the integration of evidence-based interventions. The definition emphasises two fundamentals: (1) availability of knowledge and the associated evidence-based interventions, and (2) availability of a target audience as recipient of the information. The author further distinguishes the concept ‘dissemination and implementation’ from the concept of ‘diffusion’, which refers to a passive process of making information available through journal citations.

Efforts to promote awareness on dissemination and implementation were made in 2012, when an inventory of 61 frameworks on dissemination and implementation was created to guide researchers and practitioners in the translation of research to practice and policy (Tabak, Khoong, Chambers & Brownson 2012: 337). In 2017, Skolarus, Lehmann, Tabak, Harris, Lecy and Sales (2017: 97) took the process further by mapping the citation rate and creating a citation network which shows relationships among the 61 frameworks on dissemination and implementation. The concept of ‘dissemination and implementation’ evolved rapidly and is embedded into its science, which addresses a sizeable gap between evidence and practice. This is achieved by actively investigating strategies to advance the systematic uptake of research evidence into routine practice to improve the quality of healthcare outcomes (Koczwara, Birken, Perry, Cragun, Zullig, Ginossar *et al.* 2016: 51). Brownson, Proctor, Luke, Baumann, Staub, Brown *et al.* (2017: 2) further argue that dissemination and implementation science has no single disciplinary base; rather, it draws on multiple fields. This results in better coordination of research, building practice collaborations, and dissemination and implementation is likely to cut across many disciplines.

Sin, Henderson, Spain, Gamble and Norman (2017: 701) claim that incorporating research activities into clinical practice is necessary for the workplace. This is achieved through the creation of platforms where staff members are informed of the organisation’s expectations in the research process, incorporating employee opportunities into the daily workplace routine, and establishing mentoring roles which can significantly change how employees view research and use evidence in their daily practices. Kirwan, de Wit, Frank, Haywood, Salek Brace-McDonnell *et al.* (2017: 481) suggest that dissemination and implementation of research evidence is realised by actively sharing synthesised research findings at regular review intervals and targeting key messages to specific audiences. This includes asking stakeholders to develop clinical practice guidelines by synthesising current evidence in order to establish recommendations for best practice in their discipline.

There is a common assertion from scholars that dissemination and implementation of evidence-based findings is dependent on considering several barriers and the application of tailored dissemination and implementation strategies to overcome barriers (Fischer, Lange, Klose, Greiner & Kraemer 2016: 1). Common barriers have been broadly categorised into either personal or organisational factors. Personal barriers include heavy workload, lack of time, shortage of skills, and lack of relevant training related to the implementation of evidence-based decisions. Organisational barriers include lack of institutional support, access in rural areas where there is poor network infrastructure, incentives to implement evidence in decision-making processes, and funding (Budd, deRuyter, Wang, Sung-Chan, Ying, Furtado *et al.* 2018: 5).

2.4.1.3 Knowledge transfer and exchange process

The concept of 'knowledge transfer and exchange' as a strategy aimed at increasing the use of research evidence for practice and policy has been referred to in many different ways across various scientific disciplines such as public health, human and social sciences (Gervais, Marion, Dagenais, Chiocchio & Houlfort 2016: 63). The authors further elaborated that over the years, the field of health sciences has coined several strategies related to knowledge transfer and exchange, namely knowledge dissemination, knowledge mobilisation, knowledge management, knowledge translation, and knowledge application/use. A brief description clarifying the terms is provided in the subsequent sub-sections.

In their definition of knowledge transfer and exchange, Ellen, Lavis and Shemer (2016: 2) referred to it as the application of synthesised and exchanged knowledge by appropriate stakeholders to maximise the benefits of innovations in order to strengthen health systems and improve patient outcomes. In this definition, both knowledge producers (i.e. researchers) and knowledge users (i.e. decision-makers, policymakers) are vital in facilitating the translation of research evidence into practice and policy. Jones, Roop, Pohar, Albrecht and Scott (2015: 664) elaborate that knowledge transfer is an active process that facilitates the introduction of new evidence into practice. The authors further indicate that knowledge transfer has the potential to introduce strategies which may close the gap of translating research evidence into practice and policy.

In a public health study on challenging the knowledge transfer orthodox, a participatory action approach to research for children with autism was emphasised, in which a speech and language therapists, pupil and parents, worked together in order to produce more actionable and effective solutions for practitioners (Guldberg, Parsons, Porayska-Pomsta & Keay-Bright 2017: 394). Traditional research roles are thus challenged in the pursuit of a unified approach of practitioners and the academic world. This approach is supported by the Canadian Institute of Health Research's (CIHR) collaborative model of knowledge translation, which includes synthesis, dissemination, and exchange principles. It promotes adapting research and knowledge to various target audiences, and establishing a learning relationship between knowledge users and researchers (CIHR 2013: 1).

Although knowledge transfer and exchange is considered as planned and structured activities with a view of encouraging the use of research knowledge for practice and policy, a number of barriers still exist and are embedded in the complex systems in which we work (Holmes, Best, Davies, Hunter, Kelly, Marshall *et al.* 2016: 539). For example, the focus of most knowledge transfer and exchange strategies in health remains on the policymakers and physicians, with few studies paying attention to frontline staff such as nurses, family caregivers and social care workers (Prihodova, Guerin & Kernohan 2015: 1718). In a study on knowledge transfer across industries, the authors identified three key challenges critical to the transfer and exchange of knowledge. These included the ability to identify the relevant knowledge to transfer, the ability to create actionable knowledge, and the ability to maintain momentum during project phases (Linnander, Yuan, Ahmed, Cherlin, Talbert-Slagle & Curry 2017: 5).

A study by Sibley, Roche, Bell, Temple and Wittmeier (2017: 5) also identified the potential for miscommunication between researchers and stakeholders, and a lack of skill or ability in practicing knowledge transfer and exchange as some barriers to knowledge transfer. Most of these challenges arise because research projects are conducted by researchers, then handed over to practitioners to implement evidence-based interventions; a typical knowledge transfer model of evidence-based practice. This is different from the concept of ‘research uptake’, which is discussed in Section 2.4.2.

2.4.1.3.1 Knowledge dissemination

The dissemination of knowledge in the form of research findings is a vital component of knowledge transfer processes. According to Gagnon and CIHR (2010: 7), knowledge dissemination refers to the willing transfer of knowledge with the intention that it be used for education or to help implement modified or new practices. Whereas dissemination has been described as an interactive process of communicating knowledge and requiring the identification of relevant audiences in leading to change, Chapman, Haby, Toma, de Bortoli, Illanes, Oliveros *et al.* (2020: 12) argue that disseminated knowledge ought to be readable, relevant, comprehensible, unambiguous, consistent and credible for the target audience.

2.4.1.3.2 Knowledge mobilisation

Knowledge mobilisation is defined as the reciprocal and complementary process of facilitating the uptake of research knowledge between relevant research stakeholders (SSHRC 2020: 1). According to Braedley (2016: 54), knowledge mobilisation is the latest iteration process in the field of knowledge transfer and exchange, playing a significant role in increasing emphasis on partnerships among research stakeholders. Apart from being a requirement for research grant application for accountability, knowledge mobilisation is intended to develop actions based on that knowledge, reduce the gap between knowledge users and relevant empirical knowledge, and facilitate knowledge transfer to address real-life problems (Labbe, Mahmood, Miller & Mortenson 2020: 2).

2.4.1.3.3 Knowledge management

Public healthcare is a knowledge-driven process. According to Lee (2017: 26), knowledge management refers to the process of knowledge creation, knowledge storage, knowledge sharing, and knowledge application among public health employees in order to make an organisation more competitive. Almansoori, AlShamsi, Salloum and Shaalan (2020: 99) argue that in the public healthcare domain, knowledge management is vital in the implementation of different processes to ensure and sustain the existence of healthier public healthcare systems. Lee (2017: 27) further indicates that vital enablers of knowledge management include organisational structure, leadership, collaboration, trust, learning, and the availability of information technology systems.

2.4.1.3.4 Knowledge translation

'Knowledge translation' is a widely used term to describe the science of transferring health research evidence into action healthcare practice and policy. The CIHR defined 'knowledge translation' as a dynamic and iterative process of knowledge which includes synthesis, dissemination, exchange, and the use of knowledge to improve public health populations, deliver effective health services and products, and strengthen the public healthcare system (CIHR 2020: 1). According to Graham, Logan, Harrison, Straus, Tetroe, Caswell *et al.* (2006: 13), knowledge translation emerged as a field in medicine to close the gap between what needs to be done and what is done in practice. Ngamo, Souffez, Lord and Dagenais (2016: 48) also reported three main types of useful public health knowledge for translation as: (1) research-based knowledge (obtained through research or and evaluations); (2) tacit knowledge (intervention, management); and (3) data-based knowledge (includes administrative data, data on population health status and well-being).

2.4.1.3.5 Knowledge utilisation/use/application

According to Brownson *et al.* (2017: 24), knowledge utilisation refers to broadly defined knowledge use, such knowledge emanating from programmatic interventions and scholarly practice in addition to evidence being obtained through research. Knowledge utilisation is often referred to as knowledge application. As established by Ode and Ayavoo (2020: 211), the goal of knowledge utilisation is to integrate both internal and external knowledge sources to improve the operational processes of an organisation, and drive organisational objectives for developing new products. Miguel, Saavedra and Lindemann (2016: 987) claim that knowledge utilisation is a source of competitive advantage and leads to knowledge transfer because it involves the observation of its effects when an action is performed before being transferred.

2.4.1.3.6 Knowledge brokering

Knowledge brokering has been recognised by governments worldwide as a way to achieve improved healthcare practice and policymaking, hence an increase in resource allocation for knowledge brokering initiatives (MacKillop, Quarmby & Downe 2020: 335). According to Hering (2016: 364), knowledge brokering is defined as an iterative two-way participatory process of translating, tailoring information for specific contexts, feedback, and integration by relevant public health research stakeholders. The author also argued that in addition to facilitating public health research uptake, knowledge brokering assists in the identification of useful information that could support in policy decisions, and this would allow research to be prioritised to address only critical knowledge gaps.

2.4.2 Research uptake process

The relationship between health researchers and end-users has historically been variant. In some instances, limited engagements have negatively affected the uptake of health research for practice and policy (de Beurs, van Bruinessen, Noordman, Friele & van Dulmen 2017: 1). Traditionally, researchers would produce research evidence, which requires end-users with both analytical skills and clinical knowledge to take over and implement the research evidence (see Sections 2.4.1 - 2.4.3). In this instance, these end-users (policymakers and health practitioners) get involved at the tail-end of the research project when findings are ready for dissemination through presentations or publication in academic journals. Ultimately, it renders the process of knowledge translation into practice and policy as an uncoordinated activity between knowledge producers and knowledge users rather than a holistic science (Uzochukwu, Onwujekwe, Mbachu, Okwuosa, Etiaba, Nyström *et al.* 2016: 2).

2.4.2.1 The definition of research uptake

The concept of 'research uptake' is intended to close the gap by affording end-users and relevant stakeholders an opportunity to be immersed in shaping the research project in one way or another, so they know about the existing research project (Morton 2015: 406). Grobbelaar (2013: 1) defines 'research uptake' as a process by which knowledge generated through research enters the domain of audiences such as practitioners, scholars, end-users, policymakers in government and other agencies. Accordingly, research uptake starts from the inception of a research project. DRUSSA (2012: 1) emphasised that research uptake is a comprehensive process that focuses on the entire research cycle, from the proposal right through to practice and policy development. This process is significant for all stakeholders as they become aware and are able to shape the project from the onset, which could stimulate interest about the research project.

2.4.2.2 Resources required to implement research uptake

Research uptake required significant investment in relation to required resources. Kim, Wilcher, Petruney, Krueger, Wynne and Zan (2018: 1) argue that a change in culture and practice is a requisite if we are to maximise the uptake of health research by non-research-oriented audiences. The researcher identified three key resources required for the effective implementation of research uptake, namely specialised research institutions, skilled personnel, and financial support.

2.4.2.2.1 Knowledge hub centres

In a number of developed countries, there are structured knowledge hub institutions which play an important role in the uptake of health research for practice and policy (Graham, Langlois-Klassen, Adam, Chan & Chorzempa 2018: 2). The authors indicated that the knowledge hub institutions are tasked with demonstrating that the investment of health research resources yields the desired returns and are not wasted.

Knowledge hub institutions further serve as a link between funders, governments and researchers in a quest to ensure health research improves patients’ health outcomes. These institutions further provide opportunities for dialogue among researchers, policymakers and healthcare practitioners in addition to playing a supporting role in streamlining research projects to address key critical health challenges (Kirigia, Pannenborg, Amore, Ghannem, IJsselmuiden & Nabyonga-Orem 2016: 308). The researcher in the current study is of the view that local research committees can supplement the functioning of knowledge hub institutions.

2.4.2.2.2 Stakeholders for research uptake

A list of key stakeholders relevant to the uptake of health research has been discussed above (see Section 2.3). Authentic stakeholder consultation and involvement is critical for informed healthcare decisions and policy development processes; hence, it is essential that such engagements begin as the research project starts. In a study investigating models for an antiretroviral therapy initiation in sub-Saharan Africa, the authors demonstrated the concept of ‘research uptake’ by involving a wide range of high-level stakeholders in their research project (Rosen, Fox, Larson, Sow, Ehrenkranz, Venter *et al.* 2016: 11). The stakeholders included researchers, higher education sectors, funders, government ministers, policy developers, health institutions, and health professionals, who were all kept abreast of the research processes for the duration of the project. The study advised individual countries to integrate improved and patient-oriented strategies (linkages to care or treatment eligibility) that are supported by evidence in terms of effectiveness and cost-effectiveness to overcome nonclinical barriers to the uptake of antiretroviral therapy. Importantly, each key stakeholder in the study had a differing role to play throughout the project cycle.

2.4.2.2.3 Health research funding

Funding by either the private or public sector remains one of the key requirements for successful research uptake. The released landmark report by the Commission on Health Research for Development proposed a funding initiative of at least 2% of gross domestic product (GDP) expenditures (Commission on Health Research for

Development 1990: 89) for health research. This generated a growing interest for critical assessment initiatives to determine the value in funding health research against the uptake of research findings into healthcare delivery and policy development (Dobrow, Miller, Frank & Brown 2017: 1). Harding, Lynch, Porter and Taylor (2017: 45) claim that research investment in the workforce has the potential to translate into an increase in research productivity among the health workforce.

In the developed world, countries such as United States (US), United Kingdom (UK) and Canada, have been investing billions of dollars in health-related research per annum. According to Thakkar and Sullivan (2017: 619), in 2010, the US, UK and Canada were spending US$6.46, US$2.50 and US$3.76 per person spending on healthcare service and policy research, respectively. However, in the African continent, there is a shortage of concrete data on government expenditure regarding health research. Available evidence suggests that African countries have not met targets set by the Africa Union Health Ministers of 15% of national budgets being devoted to the health sector, of which 2% should be committed for health research (WHO Regional Office for Africa 2008: 1). In a paper to evaluate how a regional project contributed to strengthening the NHRS in Guinea-Bissau, Liberia, Sierra Leone and Mali, the authors found Mali to be the only country with a dedicated budget for health research, although the study could not quantify the amount in relation to the GDP (Sombie, Aidam & Montorzi 2017: 95).

In South Africa, health research allocations are far below the required 2% of GDP. The latest available literature on health research funding shows that in the 2012/13 financial year, government directly spent approximately 0.36% on health research (consolidated government expenditure on health), an increment of 0.01% from the 2011/12 financial year (Paruk, Blackburn, Friedman & Mayosi 2014: 472). The authors further highlighted a lack of health research systems capable of providing research for health expenditure trends in these developing countries.

2.4.2.3 Challenges affecting research uptake

The failure to make progress towards closing the gap between produced research evidence and the uptake of research evidence to practice and policy is attributed to several factors. These are discussed next.

2.4.2.3.1 Insufficient resources

Literature has shown that a shortage of research uptake resources such as skills, financial support and time significantly affect the ultimate translation of research findings into practice and policy. This has been the main challenge in developing countries. For example, Semrau, Alem, Abdulmalik, Docrat, Evans-Lacko, Gureje *et al.* (2018: 11) identified a lack of stakeholder capacity in low-resourced countries as a severe challenge to the successful uptake of research for practice and policy. Similarly, Hawkes *et al.* (2016: 161) evaluated the capacity of low-resource countries (Bangladesh, Gmbia, India and Nigeria) to implement public health research evidence and found less zeal to address the need to strengthen institutional capacity among the countries.

2.4.2.3.2 Overcommitted personnel

Another factor hampering research uptake in low-resource countries is the shortage or over-commitment of health professionals at facilities (Joarder, Tune, Nuruzzaman, Alam, Cruz & Zapata 2020: 1). Unertl, Fair, Favours, Dolor, Smoot and Wilkins (2018: 3) found that both the time constraint of a deadline for a thoughtful compilation of relevant clinical research findings, and the time constraint from a routine clinical practice hardly permit for the considerable task of acquiring, appraising, and applying research evidence in clinical practice. In a study on the general patterns of behaviour that are discovered when clinical nurses attempt to integrate research evidence into their daily work, the authors found time constraints to be the most common barriers to using scientific knowledge. They further argued that even the additional time set aside for nurses is insufficient to allow for research uptake among clinical nurses (Renolen, Hoye, Hjalmhult, Danbolt & Kirkevold 2018: 186).

2.4.2.3.3 Lack of high-quality scientific outputs

Literature suggests that the poor quality of research outputs due to the relevancy, reliability, and credibility of health research findings could contribute to low uptake of research for practice and policy (Baatiema, Otim, Mnatzaganian, Aikins, Coombes & Somerset 2017: 83). These include issues such as (i) the research does not address a pressing clinical challenge, (ii) findings are not translatable to practice and policy, and (iii) research is not replicable (Edwards *et al.* 2019: 7). Furthermore, research evidence should also be produced and communicated timeously in line with the key challenges or requisite research priorities, and tailored to the requirements of programme managers and policy developers (Young, Garner, Clarke & Volmink 2017: 24).

2.4.2.3.4 Inadequate stakeholder consultation

The concept of ‘research uptake’ advocates for a proactive collaboration between researchers and all relevant stakeholders (Ghaffar *et al.* 2017: 87). It is critical for the researcher to have buy-in from all relevant stakeholders if the research evidence is earmarked for uptake. This is vital to avoid issues such as the research not being communicated properly, or not being communicated in a way that is useful to practitioners and policy developers, or not addressing the pressing needs. According to Curtis *et al.* (2017: 867), unlocking both organisational (e.g. unsupportive organisational culture) and individual factors (e.g. clinician behaviour) through adequate stakeholder consultation is essential for the successful uptake of research.

2.4.2.3.5 Lack of incentives

Literature has suggested a correlation between (financial) incentives and health behaviour change, which could, in turn, improve the uptake of research for practice and policy (Clark, McArthur, Papaioannou, Cheung, Laprade, Lee *et al.* 2017: 1953). Lack of incentives, particularly in low- to middle-income countries, could severely constrain the uptake of research. As argued by Slade, Philip and Morris (2018: 11), to sustain the adoption of evidence-informed behaviours, incentives need to be provided.

2.5 HEALTH RESEARCH POLICY AND STRATEGY

The WHO has been at the forefront in ensuring that health research contribute significantly in the formation of sound health policies and strategies (see Section 2.2).

2.5.1 Health research policy and strategy in the world

There has been progress in health research since the ground-breaking Alma Ata Conference in 1978, which expressed the need for evidence-based intervention in primary health care (WHO 2002: 2). The Alma Ata Declaration was followed by the recommendation for the Commission on Health Research for Development (1990: 1) to invest in research and strengthen capacity, which found a gross mismatch between the burden of disease and investments in health research.

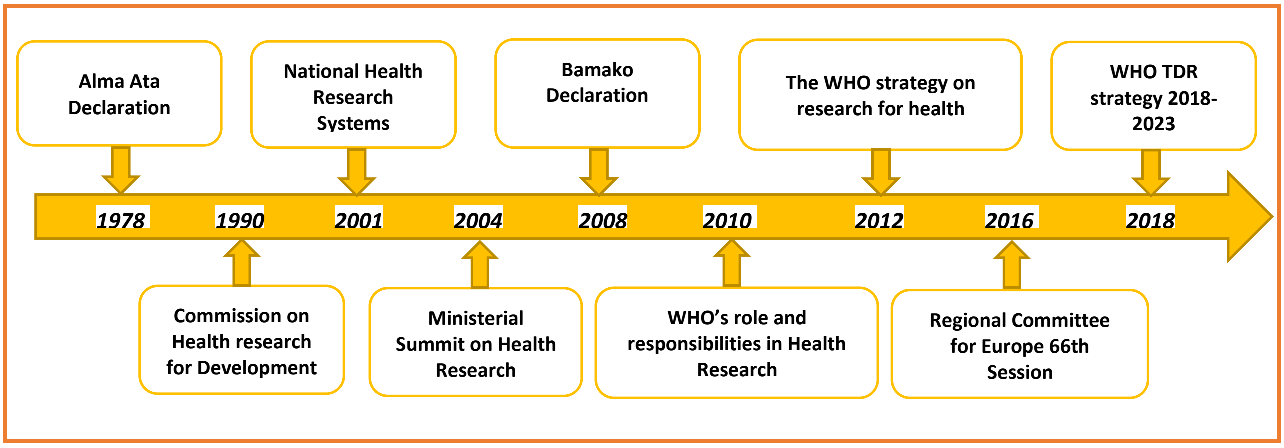

Figure 2.1: Milestones of health research and strategy in the world

At the 2001 Thailand Summit on NHRS, a conceptual framework of health research systems was developed which included values and principles, key features, output and impact of health research systems (WHO 2002: 1). In 2004, Mexico City hosted a Ministerial Summit on health research which emphasised the need to produce high-quality research evidence for healthcare practice and policy development, and to strengthen health research systems by building capacity and funding health research (WHO 2013: 1). The 2008 Bamako Call to Action on Research for Health urged countries to prioritise health research systems by establishing strong institutions and capacity for research (Lancet 2008: 1855).

In 2010, the 63rd World Health Assembly prepared a report detailing the role and responsibilities of the WHO with respect to health research and presented a draft strategy on research for health (WHO 2010: 1). In this document, the WHO highlighted the fact that improving health outcomes requires the involvement of several disciplines and sectors, hence the term “research for health”. The draft strategy outlines how the WHO seeks to strengthen its involvement in research for health, in partnership with member states to harness science, technology and the broader knowledge in order to produce evidence-based research that improves health outcomes.

In 2012, the WHO released its strategy on research for health, which was founded on the principle that healthcare practice and policies should be supported by the best available research evidence (WHO 2012: 1). The strategy consists of five interrelated goals, namely strengthening the research culture to enable the WHO to provide requisite leadership; the need for research to focus on priority health needs; strengthening NHRS; developing norms and standards to promote good practice; and strengthening links between health research and health policy and practice.

At a 2016 regional committee for Europe’s 66th session in Denmark, the WHO European Region developed an action plan for strengthening the use of research evidence for policymaking (WHO 2016: 1). This was to be achieved by establishing and promoting European research institutes to develop public health research priorities. In 2018, the special programme for research and training in tropical diseases released a strategy for research on diseases of poverty (WHO 2018b: 2).

Upon looking at the historical developments since 1978 through to 2018, it can be noted that health research forms an integral component in developing health systems and understanding the causes of poor health. The emphasis remains on individual countries to provide adequate health resources and strengthen their health research systems in order to promote research uptake.

2.5.2 Health research policy and strategy in the African continent

Albeit at a slow pace, several summits have been held by African leaders to make key resolutions on the need to scale up support for health research in the African countries;

in particular regarding investments to develop functional NHRS. The WHO Regional Committee for Africa in 1998 adopted a strategic health research plan (Strategic Health Research Plan for the WHO African Region, 1999-2003) and passed a resolution (AFR/RC48/R4), which implored African countries to develop research agendas, build national health research capacities, and use evidence-based information for practice and policy (WHO Regional Office for Africa 1998: 2). Subsequently, in 2008, a total of 46 health ministers of the African Continent adopted the Algiers Declaration on Research for Health in the African Region, which committed their countries to set aside at least 2% of the national health expenditure budget and at least 5% of external aid for health projects and programmes (WHO Regional Office for Africa 2009: 1).

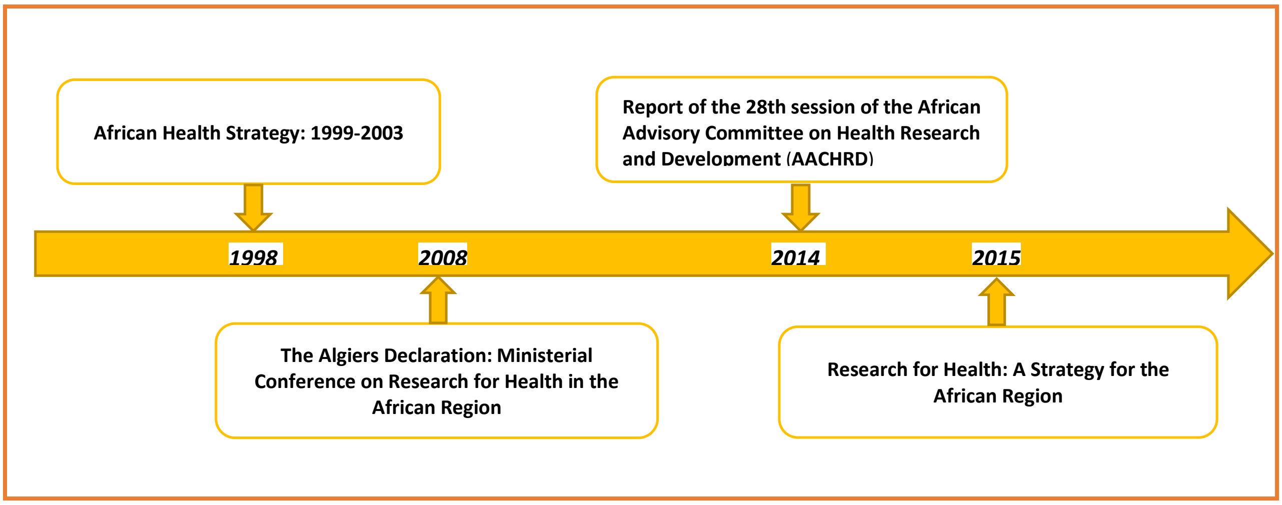

Figure 2.2: Milestones of health research policy and strategy in Africa

In 2014, the 28th session of the WHO African Advisory Committee for Health Research and Development (2014: 1) endorsed the development of a barometer for assessing and tracking NHRS performance in countries of the WHO African Region. Furthermore, in 2015, the WHO Regional Office for Africa developed the 2016-2025 strategy for the African Region on research for health (WHO Regional Committee for Africa 2016: 3). The main purpose of the strategy was to support the development of NHRS aimed at generating scientific knowledge for evidence-based practice in African countries.

Due to a lack of adequate resources and competing priorities, most recommendations from these policies and strategies fell short of implementation. This led to the establishment of DRUSSA in 2010 to build research capacity and facilitate research uptake at 22 universities across Africa by addressing impediments to successful research uptake (Grobbelaar & Harber 2016: 168). Targeted countries for the DRUSSA programme include universities in Nigeria, Ghana, Cameroon, Ethiopia, Kenya, Uganda, Rwanda, Zimbabwe, Zambia, Botswana, Mauritius and South Africa. Although successes were recorded for the programme, DRUSSA was mainly centred on university-focused research uptake.

2.5.3 Health research policy and strategy in South Africa

South Africa has its own trail of health research policy and strategy. Immediately after its first democratic election of 1994, the country adopted the 1997 White Paper for the Transformation of the Health System in South Africa (NDoH 1997: 1). The White Paper emphasised the importance of evidence-based knowledge for health research, which must be integrated into planning, policy development, and health programmes' management and implementation.

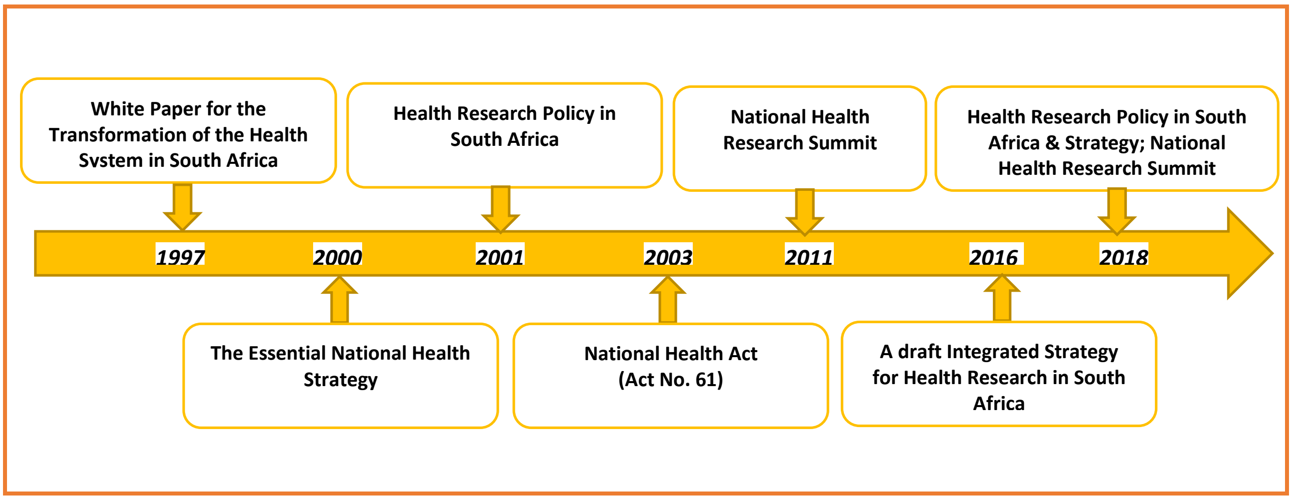

Figure 2.3: Milestones of health research policy and strategy in South Africa

In 2000, the Essential National Health Research Committee developed the National Health Research Strategy to promote integrated, multidisciplinary approaches to health-related research. The strategy focused on four research fields, namely epidemiology, social and behavioural research, clinical and biomedical research, and health systems management and policy research (COHRED 2000: 1). In the year 2001, the Health Research Policy in South Africa was adopted with the purpose of creating a framework for health research to effectively contribute to healthcare practice (NDoH 2001: 1). The policy outlined strategies for streamlining government spending per health sector according to research priorities, capacity building initiatives in health research, and health research management approaches in South Africa. Section 3 of the National Health Act (No. 61 of 2003) prescribes the establishment of the National Health Research Committee to serve as an advisory body to the Minister of Health on research for health issues (see Section 2.5.3.1).

In 2011, the first South African National Health Research Committee Summit was held to deliberate on ways to drive and strengthen health research priorities and health research systems (Mayosi, Mekwa, Blackburn, Coovadia, Friedman, Jeenah *et al.* 2011: 26). The following were recommendations from the summit: the need for health research funding to reach 2% of the health budget; to increase the number of health researchers through a National Health Scholars Programme; improve infrastructure for health; prioritise identified priority research fields; ensure effective regulation of health research; develop and strengthen the systems of health research; and provide effective monitoring and evaluation of health research. This led to the subsequent development of a draft Integrated Strategy for Health Research in South Africa in 2016 (2016-2030), aimed at ensuring sustainable financing for research on health, the development of human resource and infrastructure to support research on health, prioritisation of health research, and the establishment of a National Health Research Observatory to monitor, evaluate, translate, and coordinate health research (Loots *et al.* 2016: 235).

In 2018, the National Health Research Committee (NHRC) developed a draft health research policy in South Africa, which replaced the 2001 health research policy (NDoH 2018: 6). A significant development in the policy includes its realignment with both the global and local socio-economic contexts to effectively and proactively address the social determinants of health by drawing on various sectors (NDoH 2018: 9). The policy seeks to promote both national and international research capable of producing high-quality research evidence and tools for improving the healthcare outcomes of South Africans. Moreover, the policy on research for health in South Africa is accompanied by the National Health Research Strategy (NDoH 2018), which clearly outlines how the policy should be implemented, targets, timelines and main interventions, resource requirements, budgets, monitoring and evaluation, and responsible organs/individuals who must ensure the policy is implemented. Importantly for South Africa, the National Development Plan is critical of the higher education sector for its poor knowledge production that fails to translate into innovation (National Planning Commission 2011: 50).

2.5.3.1 National Health Research Committee

The NHRC was established in terms of the National Health Act (No. 61 of 2003). According to Loots *et al.* (2016: 237), the NHRC is tasked with strengthening the national health research system's governance. The authors broadly argue that the NHRC must ensure the establishment and management of the National Health Research Observatory, which will enable coordination and the integration of research for health. Second, the NHRC must determine what health research has been conducted by public health authorities to advise the Minister of Health on progress regarding the implementation of health research policy and the coordination of research activities.

2.5.3.2 Provincial Health Research Committee

The National Health Research Policy of 2001, which serves as a framework for the coordination and management of research in South Africa, proposes the establishment of Provincial Health Research Committees (PHRCs) in all nine provinces that will serve as a link to the National Health Research Committee (NDoH 2001: 6). Functions of the PHRCs include coordinating health research through interaction with all research stakeholders conducting research within the province, managing the process of priority setting, reviewing of preliminary and final research reports, and giving advice on policy implications of completed research projects (NDoH 2018: 16).

2.6 CONCLUSION

Several conclusions can be drawn from the discussion in this chapter with regard to research uptake for practice and policy. First, health research is no longer viewed in isolation, as other disciplines contribute significantly to health research. Second, there are several challenges affecting low-resourced countries which resulted in slow uptake on new research. The implications of low public health research uptake in low-resourced countries is that return on research investment remains lower than it could potentially be, which poses a significant challenge to improving patients' healthcare outcomes. Therefore, development of a tailored research uptake model for low-resourced countries could assists improve research uptake by providing a clear linkage between public health researchers and research stakeholders. Third, although there are many concepts related to the uptake of health research, the term 'research uptake' is different from the other concepts as it emphasises the adoption of a research project from its onset, which could stimulate interest and improve uptake. Fourth, there is a significant shift regarding policy and strategy for research uptake, albeit at a slow pace in the African continent due to a shortage of resources and competing health priorities. The main challenge in African countries is implementing the developed strategies. However, South Africa has made significant progress with regard to strengthening the NHRS, as discussed. In the subsequent chapter, the theoretical foundations of this study are presented in detail.

CHAPTER 3

RESEARCH UPTAKE THEORIES AND FRAMEWORKS

3.1 INTRODUCTION

According to Alla, Hall, Whiteford, Head and Meurk (2017:1), increasing demands for accountability from research stakeholders have placed pressure on researchers to provide information in a systematic, timely, and thorough way. This has led to the development of various theories, frameworks or models in a quest to describe the process of implementing research findings for healthcare practice and policy development (Lien & Jiang 2017: 259). This chapter deals with an overview of selected traditional theories and contemporary frameworks contributing to research uptake initiatives.

As corroborated by Nilsen (2015: 3), theories, frameworks and models differ in complexity and their intended scope of practice. The author described five different types of functions, which include: process models (describing processes); determinant frameworks (understanding and explaining); classic theories (describing change mechanisms); implementation theories (explaining aspects of implementation); and evaluation frameworks (evaluating implementation). Strifler, Barnsley, Hillmer and Straus (2020: 2) argue that although some theories, frameworks and models are comprehensive, it is often advisable to use multiple theories, models or frameworks in addressing complex theoretical requirements/interventions.

In Figure 3.1, the selected theories and frameworks to be discussed in this chapter are presented. These listed theories and frameworks represent just a fraction of all theories and frameworks associated with research uptake. In this chapter, the key traditional theories and associated concepts are summarised, followed by the description of the selected contemporary frameworks. The researcher’s chosen framework for this study is described by looking at its originality, purpose, and why it was specifically selected for this study.

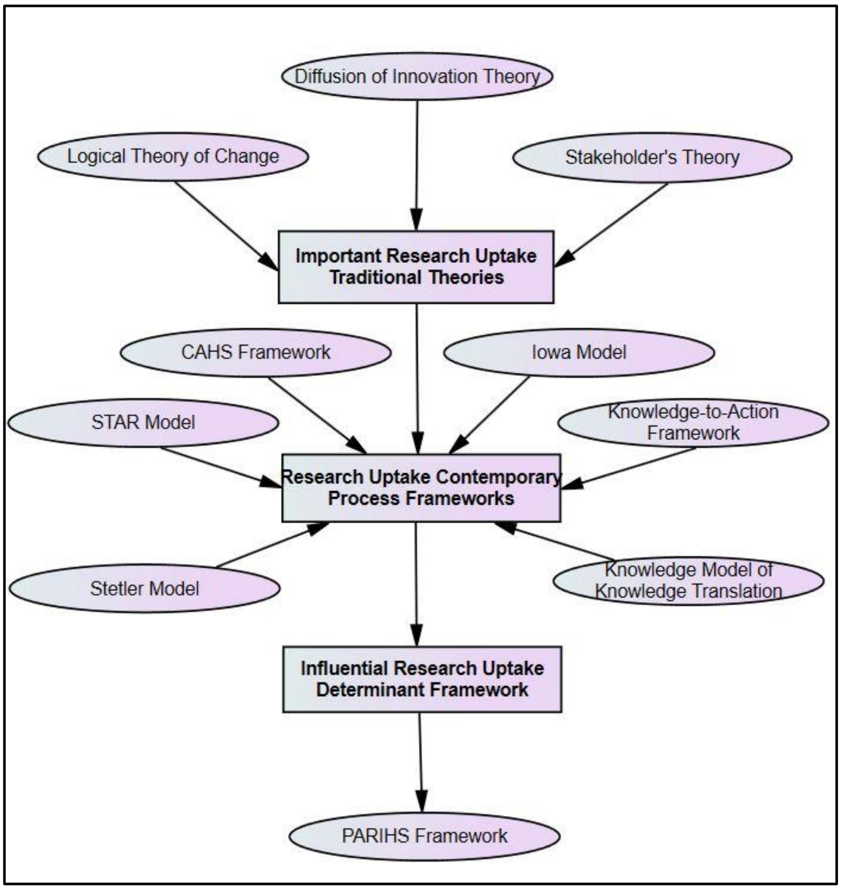

Figure 3.1: Theories and models/frameworks linked with research uptake

3.2 IMPORTANT RESEARCH UPTAKE - TRADITIONAL THEORIES

Huggins and Johnston (2015: 3) reason that any research intended to robustly describe, explain or predict phenomena must encompass a theoretical foundation or background model. McKenna, Pajnkihar and Murphy (2014: 8) define a theory as an organised coherent set of constructs (two or more) that present specific phenomena in a purposeful and systematic way. With a theory, researchers can explain how and why some parts of the world works and make further predictions about the world (Kivunja 2018: 45). According to Birken, Powell, Shea, Haines, Kirk, Leeman *et al.* (2017: 124), the benefit of applying a theory is the ability to examine, report, and improve its utility and validity, in addition to providing evidence about the phenomenon of interest to support adaptation or replacement. Three main fundamental traditional theories attached to the uptake of health research for practice and policy were selected and are discussed next.

3.2.1 Diffusion of innovation theory

The process for adopting innovations has been appraised in literature for more than five decades, with the most appraised theory pioneered by Rogers (2003: 1) in his 1995 book *Diffusion of Innovations*. Although the theory has been empirically validated across diverse disciplines, it has been especially influential in guiding strategic public health strategies (Kreps 2017: 1). Thus, it played a significant role in focusing research by demonstrating how people translate new ideas (innovations), such as knowledge on diseases, new treatment skills, or educational strategies, into society or communities (Olsson, Skovdahl & Engstrom 2016: 1). According to Sasidhar (2020: 6), the diffusion of innovation theory helps clarify the process through which innovation is communicated through specific channels, and in what time-span among members of a social system. The diffusion of innovation theory explores the relative adoption rate to the speed by which an innovation is taken up within a population. In the process, variables most likely to explain the adoption are identified (Garcia-Aviles 2020: 1).

3.2.1.1 Diffusion of innovations elements

Four fundamental elements for the diffusion of innovations have been proposed, namely innovation, communication channels, time, and social system or context (Lien & Jiang 2017: 259).

i. **Innovation:** is described as an idea, object or a practice perceived as new for adoption by individuals.
ii. **Communication channels:** refer to the medium through which messages get transferred from one individual to another.
iii. **Time:** refers to the period required for an innovation to pass through the decision process.
iv. **Social system/context:** refers to a set of interconnected units engaged in a combined problem-solving initiative for a common purpose.

3.2.1.2 Diffusion process

Diffusion of innovations refers to developmental innovations' spread through a population, with the ultimate result being that the potential adopters will likely embrace innovation in the form of behaviour, practice, programme or idea as new (Kee 2017: 1). Figure 3.2 illustrates the different categories for diffusion of innovation theory for accepting an innovation.

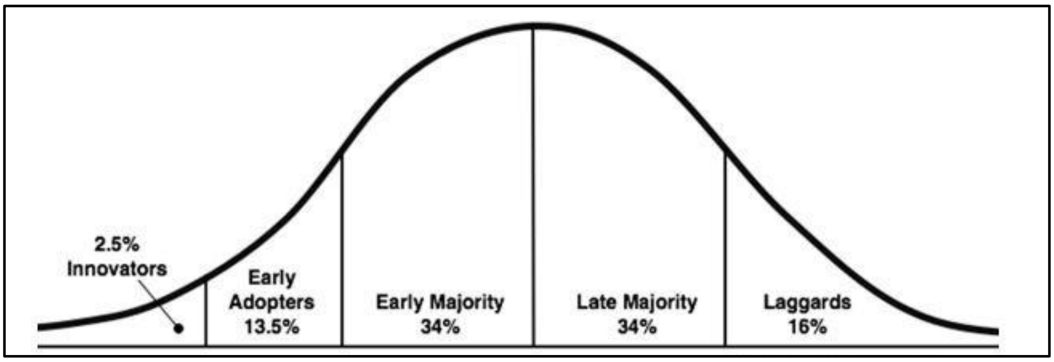

Figure 3.2: The order to accept the innovation (Source: Rogers 2003)

From the figure above, it can be seen that the adoption of innovation has a slow start, and then gradually accelerates during the subsequent intermediate phases, until it finally slows down, getting leveraged by laggards who finally adopt the innovation (Sasidhar 2020: 12). According to Olsson *et al.* (2016: 1), theoretically there is a long history of empirical attempts to understand how actions and ideas spread within social systems, over a period. For example, these ideas or actions could refer to physicians adopting a new drug, or programme managers adopting a new policy.

Rogers (2003: 1) indicates that the main criticism of the diffusion of innovations is the element of bias, since it assumes that the diffusion process is good for already capacitated innovators. Furthermore, Jacobsen (2017: 420) argues that diffusion of innovation is rather passive regarding the uptake of research findings for healthcare practice and policy development due to its limitation to foster a participatory process to adoption. It is failing to consider individuals' resources or social support when adopting a new behaviour. The diffusion of innovation theory has laid a foundation for the development of many conceptual frameworks on the uptake of research for practice and policy, with particular emphasis on active participation and the involvement of key research stakeholders (White, Dudley-Brown & Terhaar 2016: 36).

3.2.2 Stakeholder theory

Pioneered just over 35 years ago by Freeman (1984: 5), the stakeholder theory contributes to the theoretical underpinnings of research uptake theories, models and frameworks. Freeman's point of departure in developing the theory was an observed lack of consistency in the quantity and kinds of change happening within the business environment around the 1980s. This was as a result of the static nature of traditional strategic frameworks (i.e. that business has only one responsibility and that is mainly to make more profits), which focused on how an organisation works instead of how it should function (Harrison, Barney, Freeman, & Phillips 2019: 97). In early 2000, the concept of a stakeholder was broadened to refer to any group or individual with a role in the achievements or failures of an organisation (Freeman & McVea 2001: 191). Stakeholder theory (see Figure 3.3) has now been applied in multiple contexts, reinterpreting different concepts, models and phenomena across a variety of disciplines (Harrison, Freeman & Abreu 2015: 858).

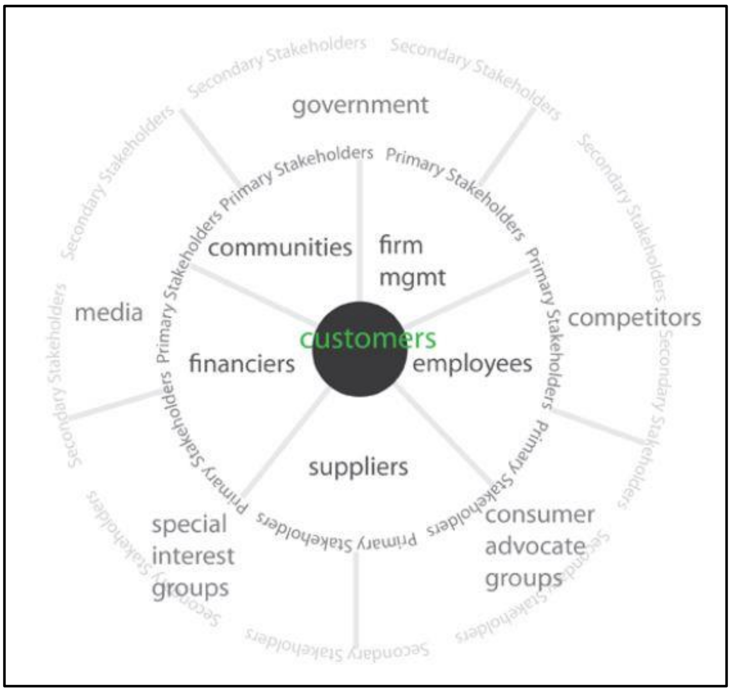

Figure 3.3: Stakeholder theory (Source: Freeman, Harrison & Wicks 2007)

The role that multiple stakeholders play in research uptake is increasingly gaining more attention, and this leads to the adoption of the stakeholder theory in order to determine ways of dealing with multiple stakeholders (De Gooyert, Rouwette, Kranenburg & Freeman 2017: 402). A stakeholder is explained as any person or group with a direct interest in the outcome of a service, financial matters, implementation, practice, processes, or decision-making in an organisation (Cho, Lee & Kim 2020: 3). It is therefore of the utmost importance for research uptake processes to attentively build and maintain engagement, communication and cooperation with relevant stakeholders to promote the translation of research findings to suitable audiences. The stakeholder theory argues that low-resourced countries tend to benefit greatly from the value of creating processes associated with the management of stakeholders (Harrison *et al.* 2015: 861). This view was further corroborated by Moyo, Francis and Bessong (2018: 1), who emphasised that through interactions, participants are able to express their ‘experiences and thoughts’ on research studies being carried out in their communities.

The stakeholder theory becomes a relevant theoretical framework for research uptake based on the following characteristics of the theory:

i. First, effective management is vital in the stakeholder theory and in ethics in business, making it a suitable theoretical point of departure for this study that is concerned with effective collaboration with research stakeholders.
ii. Second, the stakeholder theory does not refer to a single theory, but rather to a set of ideas that could form a framework for a wealth of applications (Freeman, 1994:413). This makes it more suited for research uptake in that it explores and describes, in detail, the relationships of stakeholders.

Cukor, Cohen, Cope, Ghahramani, Hedayati, Hynes *et al.* (2016: 1703) named four important steps in a research paradigm that are essential for successful stakeholder-engagement. These include creating a clear vision of their desired roles; identifying relevant stakeholders; engaging identified stakeholders so that they appreciate and understand their value in the research process; and diagnosing and overcoming barriers and challenges identified during engagements with stakeholders.

An organisation will therefore have multiple stakeholders, depending on the core business of the organisation, and this may require different types of stakeholders. For research uptake, these could be consumers (i.e. patients, caregivers, or families), providers (i.e. physicians, nurses, and professional associations), governments (i.e. legislative bodies and accrediting agencies), and researchers (Cho *et al.* 2020: 3). Individual stakeholders will present different needs and expectations/perspectives about the organisation, and each stakeholder or group has the power to affect the organisation, its operations, and therefore its performance and success in some way (Hendricks, Conrad, Douglas & Mutsvangwa 2018: 191). An engaging and excellent stakeholder relationship can also greatly benefit research uptake and the organisation, as discussed in Chapters 2 and 5.

3.2.3 The (logical) Theory of Change

The Theory of Change (ToC) is significant in the field of research uptake as it is concerned about why and how initiatives work or contribute to the value chain of early and intermediate outcomes, right through the intended outcomes (Burbaugh, Seibel & Archibald 2017: 195). De Silva, Breuer, Lee, Asher, Neerje, Lund *et al.* (2014: 1) have established that the ToC originated in the 1930s, with further amendment in the late 1950s, and later in the 1980s. According to Paina, Wilkinson, Tetui, Ekirapa-Kiracho, Barman, Ahmed *et al.* (2017: 37), the ToC is intended to manage expectations among diverse stakeholders and highlights common understanding regarding the outcomes of an intervention.

Figure 3.4 illustrates the basic elements of the ToC, which are expected to lead to the desired outcome. Briefly, ToC begins with the identification of the main goal and working backwards while examining assumptions throughout to establish prerequisites for achieving the ultimate objective (Allen 2016: 1). The author further outlines that the identification of the main goal is followed by an identification of indicators, activities or interventions, and completed by a draft to explain the ToC in a comprehensive way, while using clear language usually complemented by a logical model diagram.

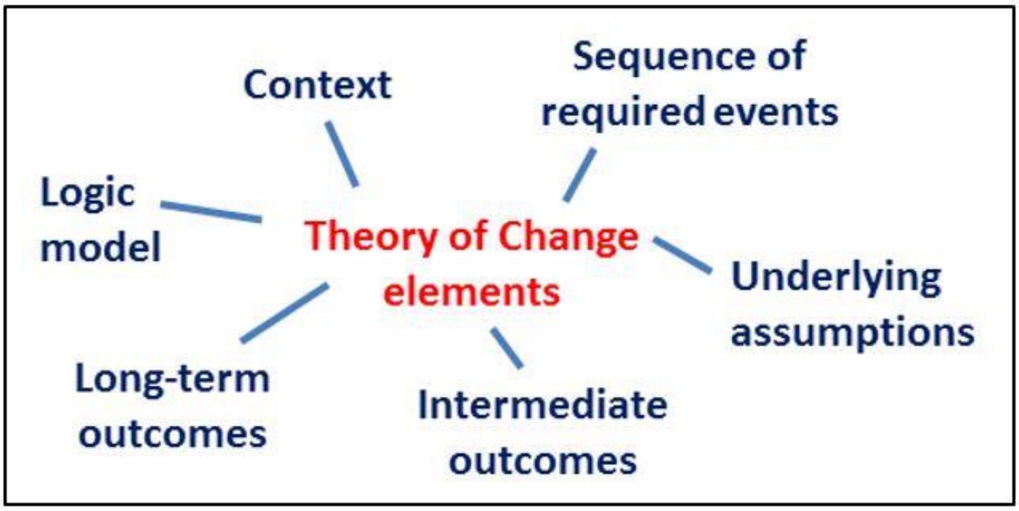

Figure 3.4: Theory of Change elements (Source: Allen 2016)

The basic elements of the ToC are explained as follows (Allen 2016; Mayne 2017: 159):

i. The context for the ToC (initiative) includes political, social and environmental circumstances, in addition to actors and the main problem for the project.
ii. Mapping intermediate outcomes is worked backwards, and this considers the changes which must occur prior to the attainment of long-term outcomes.
iii. The long-term outcomes are backwardly established in support of what the ToC seeks.
iv. The sequence of events is anticipated, which leads to the expected long-term objective.
v. The underlying assumptions are determined by how the ToC is based.
vi. Logical model diagrams and narrative summaries that represent the sequence of events leading to the output of the project are established.

According to Serrat (2017: 239), the main purpose of the ToC is to produce both early and intermediate outcomes, which are the preconditions to outputs in the long-term. The author further indicates that following the identification of goals intended to better the future, a resultant framework can be drawn to explain how the intended goals will be reached, considering the probable assumptions for the theory. Mayne (2017: 159) highlighted the differences between both structurally sound, and structurally sound and plausible ToCs (see Table 3.1).

Table 3.1: A robust Theory of Change (ToC)

Structurally sound ToC	Structurally sound and plausible ToC
Determine if: the ToC is understandable; there are pathways of results; the causal link assumptions are set out; and there is a reasonable number of results.	Determine whether the ToC is generally agreed.
Determine if the ToC results and assumptions are well defined.	Determine whether the results and assumptions, or at least the key results and assumptions, are measurable, and the likely strength or status of evidence.
Determine whether the timing sequence of results and assumptions is plausible.	Determine whether the causal link assumptions are likely to be realised, and if the at-risk assumptions are mitigated through confirming or corrective actions.
Determine if the ToC is logically coherent, and whether the results follow a logical sequence. Determine the causal link assumptions pre-events and conditions for the subsequent effect, and whether the sequence is plausible or at least possible.	Determine whether the sets of assumptions for each causal link along with the prior causal factor are plausibly sufficient to bring about the effect.
Determine if the causal link assumptions are necessary or likely necessary.	Determine if the level of effort (activities and outputs) is commensurate with the expected results.
Determine if the assumptions independent of each other (recognising that some assumptions may apply for more than one causal link).	Determine the extent at which the assumptions are sustainable.

Source: Adapted from Mayne (2017: 159)

ToCs have been gaining popularity as the basis for theory-based evaluations (Moore & Evans 2017: 132). The main benefit of applying the ToC comes from making unambiguous views and assumptions about the change process, creating the possibility to effectively consider a programme holistically, and connecting expected outcomes with the programme design (Amundsen & D’Amico 2019: 206). The authors further indicate that the ToC promotes the importance of engaging stakeholders, acknowledging multiple viewpoints, and considering power relations, as well as contextual political, social and environmental realities.

3.3 IMPORTANT RESEARCH UPTAKE CONTEMPORARY FRAMEWORKS/ MODELS

Nilsen (2015: 2) defines a ‘model’ as a thoughtful simplification of a phenomenon that could include phases or steps, while a framework denotes an overview, a structure or an outline which includes concepts, constructs or categories, and identify the relationship between variables; however, a framework does not predict a relationship. Moreover, models are more related to theories. According to Casanave and Li (2015: 104), some features of a theory can be presented in the form of models showing relationships among concepts (a name given to phenomena being studied). In the subsequent sections, selected frameworks/models associated with research uptake are discussed, and most of these frameworks/models have been used in developed countries to determine the impact of health research, in addition to accountability (value for money), advocacy (increase awareness), and the learning purposes for identifying opportunities, challenges and successes emanating from research performed in an institution. Where permission to use frameworks/model in a text is a requirement, the researcher has attached permission (see Appendix I).

3.3.1 Stetler Model

This model was developed in the US in 1976 to provide strategies and insights to postgraduate nurses on how to successfully integrate and use research findings for professional performance (Uitterhoeve & Ambaum 1999: 185). Specifically, the model emphasised the key role of critical thinking and reflexivity in research utilisation processes by individual practitioners in order to create formal change within organisations (Rycroft-Malone & Bucknall, 2010: 51). The model was refined in 1994 to include a series of judgmental activities which focus on desirability, appropriateness, feasibility, and the manner of applying research evidence at the individual practitioner level (Stetler 2001: 272). Figure 3.5 illustrates the five main phases of the Stetler Model, as proposed by the developers of the model:

i. **Preparation phase:** This serves as an initial phase whereby the practitioner is encouraged to identify a priority need. The phase further requires that the purpose of the evidence-based project is mapped, its context in terms of how the project will happen is presented, and the relevant sources of evidence are determined.

ii. **Validation phase:** Identify, access and critique sources of evidence in terms of the overall quality, and make a determination whether the research source is credible for inclusion, or is rejected in relation to the main aim of the research project.

iii. **Comparative evaluation/decision-making phase:** In this phase, the findings of accepted sources are summarised logically for comparison and evaluation. Furthermore, it is determined if it is feasible and acceptable to translate the summary of findings into practice.

iv. **Translation/application phase:** This phase requires a strategy on how to successfully implement the summarised findings to influence change in an organisation. The practitioner in this phase must clearly identify practice implications and present a justification for implementing evidence.

v. **Evaluation phase:** The outcomes of implementing evidence are evaluated in this phase to determine whether the goals of implementing evidence were successfully achieved.

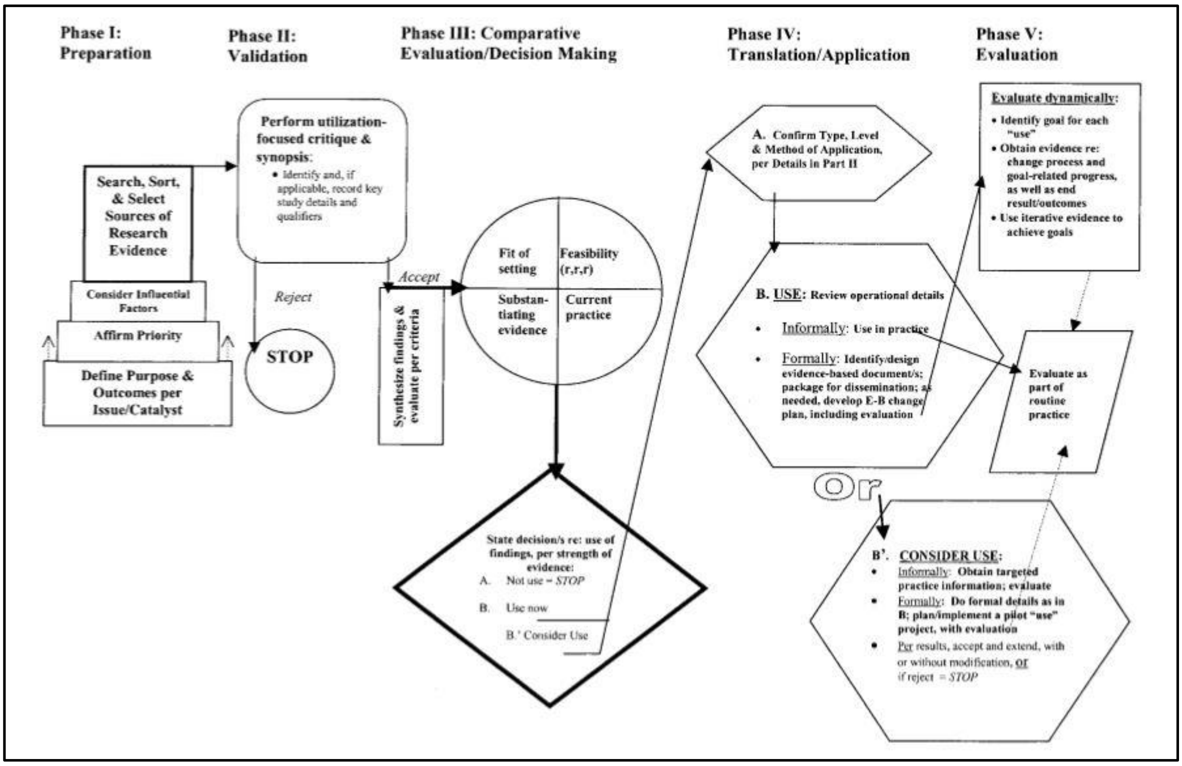

Figure 3.5: Stetler Model (Source: Stetler 2001: 276)

The aforementioned phases enable practitioners to critically determine how research evidence is implemented in clinical practice, and this model has been successfully applied in a number of research projects, as shown by Stuckey (2020: 14) and Glenda (2019: 11). The advantages of using the Stetler Model relate to its ability to encourage critical thinking in integrating research findings to practice; it promotes the use of best available evidence as an ongoing practice; it helps minimise errors in decision-making; and it is flexible as it may include groups of stakeholders instead of an individual practitioner (Christenbery 2017: 356).

3.3.2 CAHS Payback Framework

The widely used Canadian Academy of Health Sciences (CAHS) framework was designed to provide an organised approach to health research stakeholders in determining return on health research investment. It does this by demonstrating that money spent on health research yields the desired outcomes in relation to practice and policy (CCA 2013: 1).

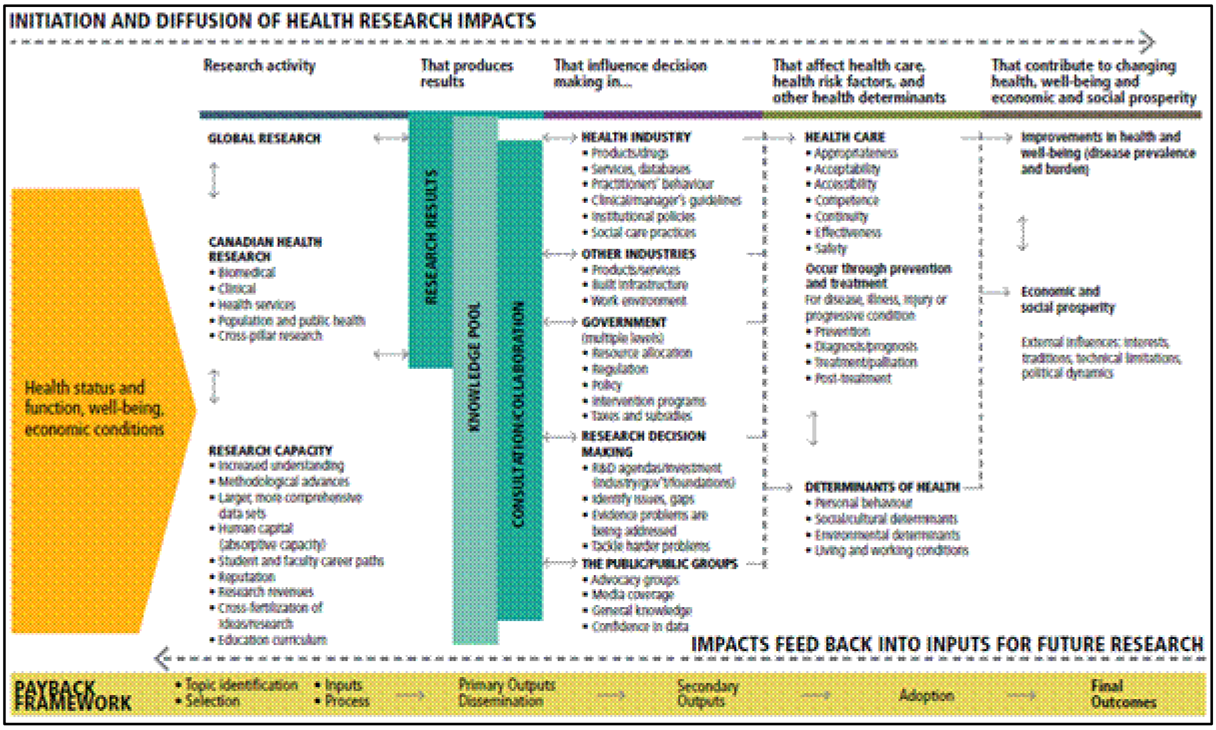

Figure 3.6: Canadian Academy of Health Sciences 'Payback' Framework (Source: CCA 2013: 2)

In Figure 3.6 above, the CAHS framework is mostly referred to as the CAHS Payback Framework, adapted from the payback model developed by Buxton and Hanney in 1996. The framework is aimed at capturing specific impacts in multiple domains, at multiple levels, and for a wide range of audiences as stated in Greenhalgh, Raftery, Hanney and Glover (2016: 9). The authors further indicated the two main components of the CAHS Payback Framework, namely, an impact category approach (in the top half of the diagram below) fused with a logic model (at the bottom half of the diagram).

The tracking of impact for health research using the CAHS Payback Framework is classified into five key categories which reflect a wider range of benefits, from knowledge production to the social benefits of informing practice, policy and improved economy (CCA 2013: 1):

i. **Advancing knowledge:** this category is measured through contributions to scientific literature, i.e. articles published, collaboration and partnerships;
ii. **Building research capacity:** this is measured in respect to the development of research skills and the ability to use existing research, awards and recognition, further funding, research tools and methods, facilities and resources;
iii. **Informing decision-making:** measured by determining the impact of research in the areas of clinical, administrative and government policy, and engagement activities;
iv. **Health impacts:** measure impact in terms of the availability of medical products, interventions and clinical trials; and
v. **Socio-economic impacts:** benefits to the economy from commercialisation of innovations, healthcare system cost-savings, capital gains, and the value of human life and health.

Unlike the original payback model that contained a logical model of the research process, the CAHS Payback Framework combines an impact category approach through a logic model in order to provide a standardised research evaluation approach which allows a comparison of evaluations (Strahan, Keating & Handmer 2020: 6). Figure 3.6 further illustrates the versatility of the framework to capture research for health based on five identified pillars. These generate a variety of health-related research outputs, namely clinical, biomedical, health services, cross-pillar research, and population and public health (Greenhalgh *et al.* 2016: 8). However, the authors argue that applying this framework is labour intensive and could require substantial investment in some circumstances, and the framework itself is tailored to the Canadian context. Conversely, the main advantage of applying the CAHS Payback Framework is its ability to provide linkages between health/medical research and impact (CAHS 2009: 1).

3.3.3 Star Model of Knowledge Transformation

Founded by Stevens in the early 2000s at the Academic Centre for Evidence-Based Practice at the University of Texas Health Science Center in San Antonio (Stevens 2004: 1), the Star Model of Knowledge Transformation was aimed at providing an understanding of the cycles, nature, and characteristics of knowledge used in several aspects of evidence-based practice (Parkosewich 2013: 73). Figure 3.7 depicts a schematic representation of the ACE Star Model of Knowledge Transformation.

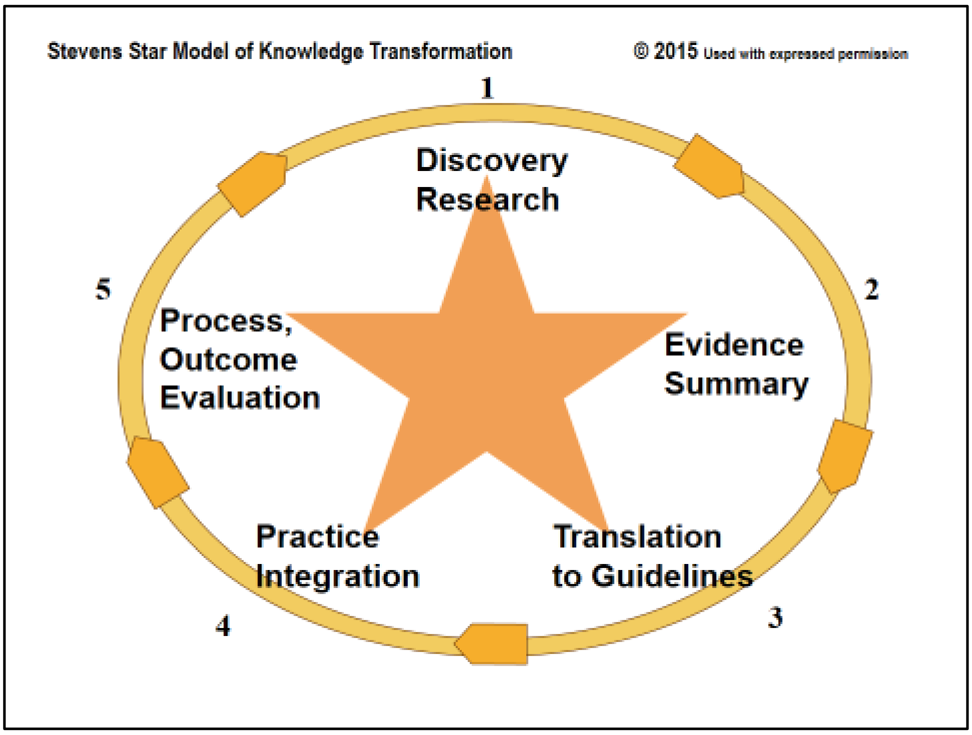

Figure 3.7: ACE Star Model of Knowledge Transformation (Source: Stevens 2015)

The model helps in the systematic conversion of the best available evidence through different stages in order to have an impact on health outcomes. The model comprises five major stages that illustrate forms of knowledge in relative sequence (Amistad 2019: 9). Research migrates through the cycles combining with other forms of evidence-based knowledge before integration into practice happens. The five stages of ACE Star Model of Knowledge Transformation are (Murray 2017: 14):

i. **Discovery research stage:** The stage involves sourcing new knowledge from the usual qualitative and quantitative approaches.
ii. **Evidence summary stage:** In this stage, research evidence is synthesised into meaningful statements of evidence in relation to a phenomenon being studied. It is a knowledge-generating stage that happens concurrently with new findings emanating from the synthesis.
iii. **Translation to guidelines stage:** During the third phase of translation, and following the summation of research evidence, a practice document is produced (guideline) for practitioners.
iv. **Practice integration stage:** in this stage, synthesised evidence influences both healthcare organisation practices and practitioners through formal and informal channels.
v. **Process outcomes and evaluation stage:** The outcomes of implementing synthesised evidence is evaluated based on impact, quality, economic analysis and satisfaction.

Effective outcomes resulting from evaluation can be incorporated into system healthcare policy and procedure protocols, as appropriate. According to John (2016: 74), this model does not make use of non-research (informal research) evidence, such as practitioners' experience or values from patients. However, according to the Institute of Medicine (2001: 1), a disadvantage of this model is the long period it takes to translate evidence due to the rigorous practice involved in understanding the cycle.

3.3.4 Iowa Model

Based on the Diffusion of Innovation by Rogers (see Section 3.2.1), the Iowa Model was founded by a group of nurses from the University of Iowa Hospitals, Iowa Clinics, and Nursing College in 1994 (Titler, Kleiber, Steelman, Goode, Rakel, Barry-Walker *et al.* 1994: 307). With this model, the authors intended to use research findings to improve the quality of healthcare, monitor healthcare costs, and improve the nursing practice.

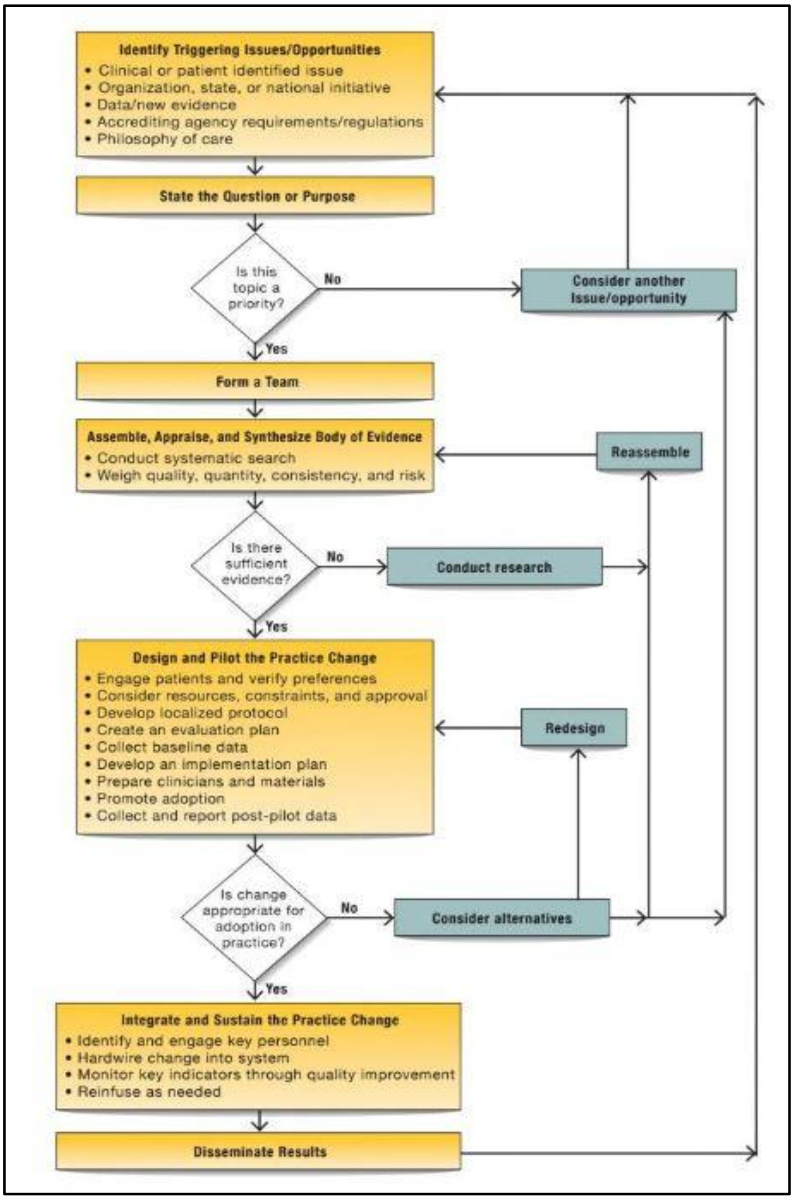

Figure 3.8: Revised Iowa Model: Evidence-based practice to promote excellence in health Care (Source: Iowa Model Collaborative 2017)

The model had since been revised following its development. In 2001, developers reviewed the model to allow the use of different types of evidence, such as targeted information on pilot testing and implementing the practice change (Titler, Kleiber, Steelman, Rakel, Budreau, Everett *et al.* 2001: 497). In 2017, developers revised and validated the model to include a purpose statement, feedback loops and piloting, implementation, patient engagement and change sustainment (Buckwalter, Cullen, Hanrahan, Kleiber, McCarthy, Rakel *et al.* 2017: 175). Figure 3.8 above illustrates the revised and validated Iowa Model.

The Iowa Model consists of ten steps with two triggers, namely problem-based triggers and knowledge-based triggers (Zhao, Duan, Liu, Han, Jiang, Wang *et al.* 2016: 2). The authors further argue that with the problem-based triggers, topics are identified from multiple sources such as risk management data, financial data, process improvement data, or presentation of a clinically induced problem. Moreover, topics for the knowledge-based trigger arise mainly from literature or new research findings.

The Iowa Model dictates that once a problem has been established, the practitioner should determine its priority level and lobby for organisational buy-in, which is critical, particularly for high-priority projects with higher costs (Zhao *et al.* 2016: 2). Once priority and buy-in have been determined, the practitioner assembles a team of relevant stakeholders with required skills to assist in developing, evaluating and implementing the evidence-based practice change. Although literature has shown increasing trends in applying this model (Lloyd, D'Errico & Bristol 2016: 51), many people in low-resourced countries lack interest in applying the model, mainly due to healthcare practice barriers such as lack of time, relevant research studies, resources, and insufficient organisational support (Karki 2019: 2). However, the strength of the Iowa Model is that it emphasises pilot testing rather than the implementation of evidence-based change.

3.3.5 Ottawa Model of Research Use

The Ottawa Model of Research Use (OMRU) was established by Logan and Graham in the late nineties (Logan & Graham 2010: 83) for use by policymakers with an interest in evidence-based research for healthcare practice by practitioners and researchers. According to Graham and Logan (2004: 93), the model was developed based on the theories of change from literature, and on applying own reflection which resulted in a comprehensive, interdisciplinary framework of elements that guides the translation of healthcare knowledge into practice. Specifically, the authors highlighted that OMRU assists administrators to control factors that will influence the likelihood of organisational-level changes occurring, and the way the changes occur. In Figure 3.9, the schematic representation of OMRU is illustrated.

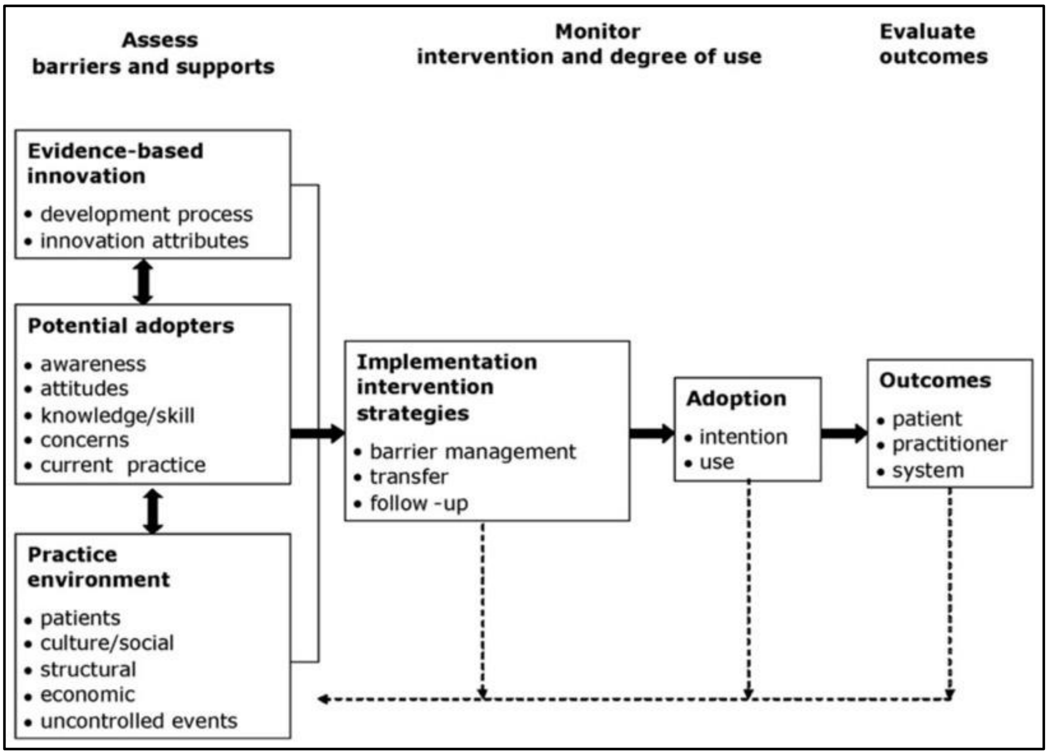

Figure 3.9: Ottawa Model of Research Use (Source: Graham & Logan 2004)

OMRU is organised into three research phases featuring six designated primary elements that are important when integrating research evidence into practice, as listed below (White, Dudley-Brown & Terhaar 2019: 41):

i. **Assess barriers and supports phase includes:**

- **Evidence-based innovation** (development process and innovation attributes): This stage requires a clear identification of the nature of innovation, and determining what the implementation of evidence will entail.
- **Potential adopters** (awareness, attitudes, knowledge/skill, concerns, and current practice): the stage involves identifying potential adopters with characteristics that could influence the adoption of the innovation.
- **The practice environment** (patients, culture or social, structural, economic, uncontrolled events): in this stage, the environment is

assessed for required resources, and all leaders (potential adopters) capable of inspiring change are identified.

ii. **Monitor intervention and degree of use phase includes:**
   - **Implementation of intervention strategies** (barrier management, transfer, and follow-up): In this stage, appropriate strategies to increase awareness of implementation are chosen, coupled with the required training to facilitate the implementation.
   - **Adoption of innovation** (intention and use): This stage requires the determination of the extent to which innovation is adopted and implemented, and the adoption of innovation is monitored.

iii. **Evaluate outcomes phase includes:**
   - Outcomes (patient, practitioner, and system): This is where the impact of innovation on practitioners, patients, and the system is evaluated to determine if an innovation is producing the intended outcome.

OMRU is a process model which demonstrates that research is a dynamic process with interconnected decisions and actions that are taken by stakeholders (White *et al.* 2019: 41). This is a widely used evidence-based model and has been applied in a variety of clinical areas (Jager, Vandyk, Jacob, Meilleur, Vanderspank-Wright, LeBlanc *et al.* 2020: 1). The strength of the OMRU includes the holistic approach that considers all aspects of the research use processes, and its impact on health outcomes. The model acknowledges that both external and internal healthcare environments affect all aspects of the knowledge translation process and should be considered when planning the implementation of new knowledge (Jager *et al.* 2020: 5). Furthermore, the model is patient-centred because patients play a significant role when the innovation is developed, implemented and evaluated (Evison, Agrawal, Conroy, Bendel, Sewak, Fitzgibbon *et al.* 2018: 99).

3.3.5 Knowledge to action framework

First reported in 2006, the Knowledge to Action (KTA) framework is a conceptual evidence-based framework developed in Canada by Graham *et al.* (2006: 13) in response to confusion caused by the numerous terms used to describe the process of translating knowledge into action. The authors undertook a process of reviewing 31 planned action theories, which eventually informed the development of the KTA framework, with key knowledge to action steps. In essence, the KTA framework has been adopted by the CIHR as an acceptable model for promoting and translating research-based knowledge (Straus, Tetroe & Graham 2009: 165). The KTA model is viewed as a cyclical process in which features of research, knowledge transfer intervention, and the evaluation process lead to the identification of novel problems. Furthermore, phases of the model can be used out of sequence if necessary. Lazo (2018: 1056) argues that the use of the KTA framework by the CIHR is significant in promoting an iterative, complex, yet dynamic knowledge translation process made up of two main concepts: knowledge creation and knowledge action. Figure 3.10 below illustrates the KTA framework.

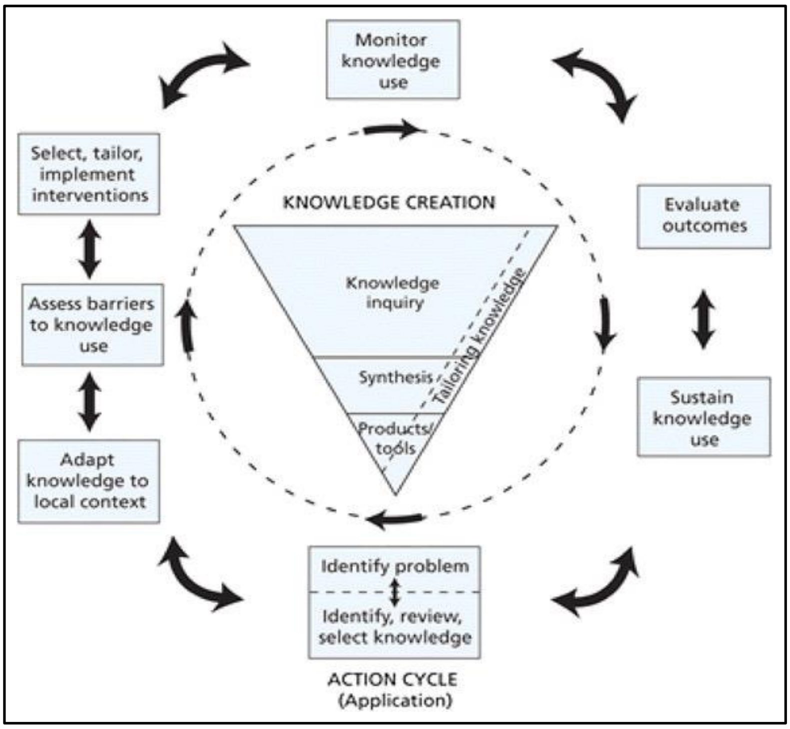

Figure 3.10: Knowledge to Action Framework (Source: Straus *et al.* 2009: 167)

The two main cycles of the KTA framework follows:

i. **Knowledge creation cycle:** The creation of knowledge involves three phases, namely knowledge inquiry, knowledge synthesis, and knowledge tools and products. Whereas knowledge inquiry includes the primary research, knowledge synthesis involves the merging of findings from similar research studies in order to identify common patterns or themes. Knowledge products and tools refer to the result emanating from the synthesis of the best studies, practice guidelines and algorithms.

ii. **Knowledge action cycle:** This cycle includes seven phases which focus on creating change in healthcare systems and groups (Straus *et al.* 2009). The authors highlight seven phases of the KTA, which include identifying the problem; identifying, reviewing and selecting the knowledge to disseminate; customising the knowledge to the local context; assessing the barriers to knowledge use; selecting, tailoring, and implementing interventions; evaluating outcomes of using the new knowledge; and determining strategies for making sure the knowledge is sustainable. Integral to the framework is ensuring that end-users and relevant stakeholders are constantly engaged in the processes. This enables the adaptation of knowledge and changes to the local context.

Although KTA framework is classified as a process model, its strength is in its ability to take cognisance of all relevant research stakeholders (such as patients, nurses, managers, physicians), who are the end-users of the knowledge (White, Daya, Karel, White, Abid, Fitzgerald *et al.* 2020: 1427). This consideration provides an opportunity to customise knowledge to the local context, and makes it acceptable and more relevant to the local needs. According to Sudsawad (2007: 1), the KTA process is a comprehensive framework when compared to the OMRU, as it incorporates the knowledge creation phase in addition to the action cycle. As highlighted in White *et al.* (2020: 1425), advantages of KTA framework are that the model is easily adaptable and is grounded in planned action theory. This makes the model adaptable to different settings. The authors further indicated that the KTA allows the identification of barriers to the use of knowledge, while it allows the transfer to knowledge to action to be broken into manageable sections.

3.4 INFLUENTIAL RESEARCH UPTAKE DETERMINANT (PARIHS) FRAMEWORK

The frameworks discussed above (see Section 3.3) are mainly process models/frameworks and view the research path as a logical flow. While the models/frameworks are critical for research uptake, a holistic view for factors affecting research uptake was deemed necessary in the current study, hence a determinant framework was chosen as a lens through which to view the current study.

3.4.1 The PARIHS Framework

Of the six models/frameworks described above, the researcher found that framing the current study using the PARIHS framework was beneficial in determining factors affecting research uptake, and the subsequent development of a research uptake model focused on low-resourced countries. The framework was founded in 1998 by Kitson and colleagues, to provide an alternative to existing one-dimensional models of transferring research to practice (Kitson, Harvey & McCormack 1998: 149). Figure 3.11 below illustrates the PARIHS framework.

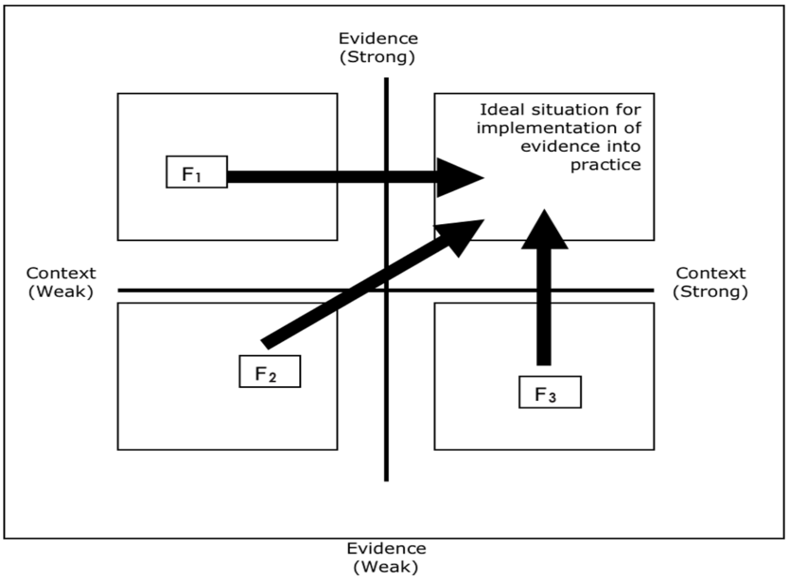

Figure 3.11: PARIHS framework (Source: Kitson, Rycroft-Malone, Harvey, McCormack, Seers & Titchen 2008: 9)

The PARIHS framework provides a method to successfully facilitate the uptake of research into healthcare practice by exploring the interactions among three key determinants, namely, evidence, context and facilitation (Rycroft-Malone, Seers, Chandler, Hawkes, Crichton, Allen *et al.* 2013: 6).

i. **Evidence:** the determinant ‘evidence’ requires a search for the best available evidence from clinician experience, patient values, research, and organisation data and information. According to Rycroft-Malone *et al.* (2002: 6), evidence can be evaluated on a range from low to high, and is characterised by the availability of a certain level of expertise. The authors argue the most successful research implementation happens when the evidence is scientifically strong and correspond to both patient needs and professional consensus.

ii. **Context:** the determinant ‘context’ deals with the local environment for which a change is earmarked. It comprises the sub-elements leadership, organisational culture and evaluation/measurement of desired outcomes. Context is also evaluated from a range of low to high, where high depicts the presence of sympathetic cultures, appropriate resources, clear decision-making processes, appropriate information and feedback systems available, strong leadership, and an environment receptive to change.

iii. **Facilitation:** the determinant ‘facilitation’ requires the organisational participants’ use of their own skills and knowledge in order to practice/ implement change within the organisation. Facilitation is also judged on a continuum from low to high, where higher facilitation suggests an appropriate facilitation of change as a result of input from skilled internal and external facilitators.

3.4.2 Application of PARIHS framework in the current study

The main aim of this thesis was to apply the PARIHS framework to determine what factors are contributing to or impeding research uptake, using the three core elements of the framework. Although no scaling or scoring information was provided with the statements, Kitson *et al*. (2008: 1) proposed a list of draft statements to be used for the identification and evaluation of measures of the elements of the framework. The authors suggested that the statements could be individually answered or through a facilitated dialogue where views about existing practice, assumptions, prejudices, and anticipated change are vigorously discussed and debated by each team member. The researcher in the current study successfully amended the draft statements to suit the local context. For the qualitative phase, the researcher reviewed literature to formulate the interview guide, and all questions supported the PARIHS framework domains. Table 3.2 shows the model's key elements.

Table 3.2: Model key elements

Domain	Model key elements	Specific elements included in the current study
Evidence	• Research • Experience • Preferences • Routine information	In evidence, the researcher studied factors that would encourage potential change to practice. In the current study four elements representing individual factors were studied. These included: Support, experience, time constraints and motivation.
Context	• Receptive context • Culture • Leadership • Evaluation	With context, the researcher looked at organisational elements that affects the environment/setting where a proposed change is desired. These included: partnerships, resources, research agenda and private funding.
Facilitation	• Purpose/ characteristics • Role • Skills and attributes	With facilitation, the researcher studied enablers of research uptake, that which make things easier. Five elements were associated with this domain, and are: local research committee, critical review skills, gatekeeping process, and accessibility and quality of evidence.

3.4.3 Advantages and disadvantages of the PARIHS framework

The strength of PARIHS framework lies in the fact that the statements possess high face validity, maps directly to the PARIHS sub-elements, and has also been widely used to translate research knowledge into healthcare practice (Bandeira, Witt, Lapao & Madruga 2017: 3). However, there is no scaling provided with the statements (constructs are not operationalised), which implies the need for further developmental work on these measures to provide usable scores for easy application (Lynch, Mudge, Knowles, Kitson, Hunter & Harvey 2018: 861). In addition, the authors argued that a lack of scaling presents a challenge for novice researchers/practitioners to understand and use the model without being supported by an expert facilitator. Contrarily, for experienced researchers/practitioners, the model’s toolkit can be easily used to conduct both pre- and post-implementation evaluation.

3.5 SUMMARY

Research findings are valuable if they find ways to practice and policy, and several theories, frameworks and models relevant to the translation of research evidence to meaningful health outcomes have been discussed in this chapter. Despite these theories, frameworks and models developed for the context of respective countries (mainly for developed countries) provided an important guide since they all aimed to achieve one important goal of translating research evidence into healthcare practice and policy. The ultimate adoption of the PARIHS framework was essential for this study with regard to the determining factors affecting the uptake of research. However, it should also be noted that the PARIHS framework’s guiding statements could not be wholly adopted; rather, statements were amended for the framework to suit the local context. As a result, the framework assisted in soliciting ideas from researchers, frontline workers/practitioners, programme managers/policy developers, and directors/senior managers leading to the development of a tailored research uptake model for use within the South African context.

The subsequent chapter discusses the methodology used to gather data for this study.

CHAPTER 4

RESEARCH DESIGN AND METHODS

4.1 INTRODUCTION

An important requirement in research is knowing precisely which methods would best answer the research questions, whereas a sound research methodology systematically dictates the way in which research methods and tools are used. This chapter provides a detailed description of how this research was conducted using methods appropriate for the research purpose, responding to the research questions stipulated in Chapter 1. The researcher further provides justification for the choice of these methods by outlining how the chosen methods guided data collection, analysis and the development of a research uptake model for healthcare practice and policy development.

In this study, a mixed-methods design was employed whereby both qualitative and quantitative data collection stages were incorporated into an exploratory sequential approach involving two phases. The results obtained from these phases were henceforth used for the development of a model to facilitate research uptake for healthcare practice and policy. In each phase, the appropriate components of the methods are detailed.

4.2 PHILOSOPHICAL FOUNDATIONS

The philosophical foundations (paradigms) in research play a pivotal role in framing an appropriate approach to a research problem, while also providing essential suggestions on how to address the research problem considering certain beliefs about the world (Shannon-Baker 2016: 321).

4.2.1 Research paradigms

Paradigms are virtually opposing, often conflicting, worldviews reflecting and guiding decisions that researchers make. They represent a collection of assumptions and values regarding the nature of knowledge and reality which provides the basis for a research study (Tappen 2016: 91). There are four main useful paradigms in research, which assist researchers in selecting research questions and applicable methods in responding to the research questions. These paradigms include positivism, critical realism, interpretivism, and pragmatism (Rechberg 2018: 61).

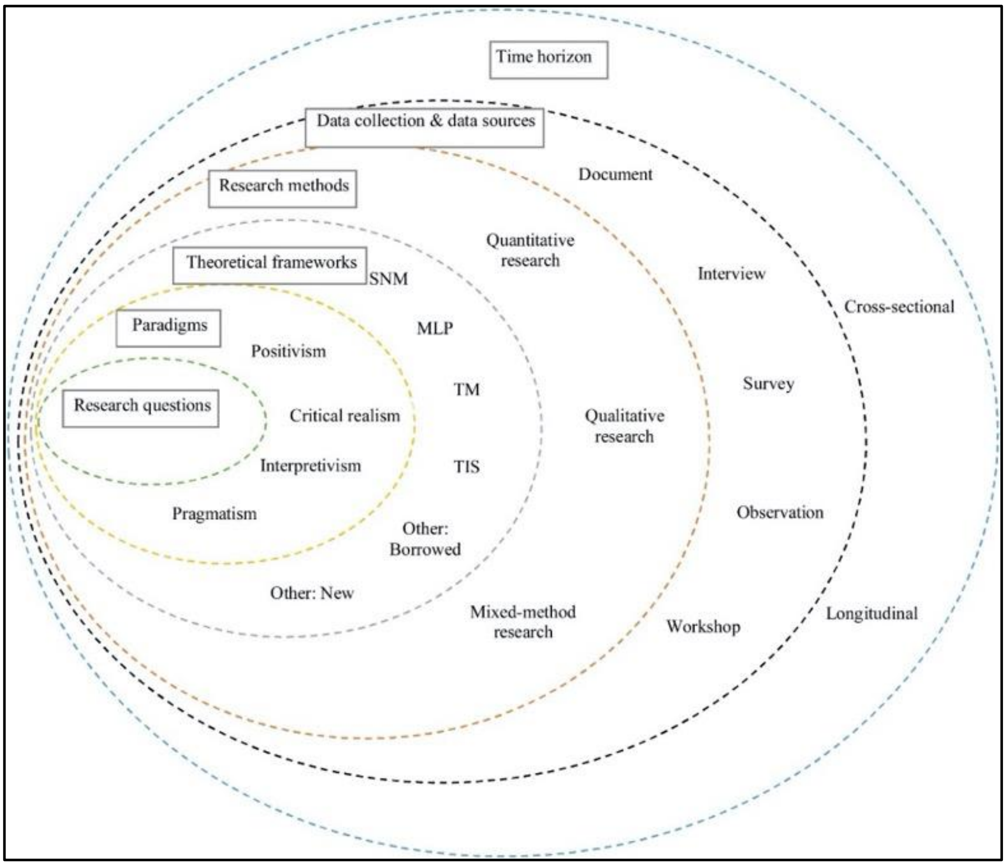

Figure 4.1: Transition research onion[1] (Source: Zolfagharian, Walrave, Raven & Romme 2019: 4)

Associated with these paradigms are three main research methods, namely qualitative research linked with the interpretivist worldview, quantitative research linked with a positivist worldview, and a mixed-methods design associated with the critical realism and pragmatist worldviews (Zolfagharian *et al.* 2019: 7). The pragmatist view was considered suitable for this study, given the stated research objectives. According to Kaushik and Walsh (2019: 3), pragmatism bases its assumptions on the fact that researchers may use a methodological approach best suited for the research problem,

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[1] MLP: Multi-level perspective; SNM: Strategic niche management (SNM); TM: Transition management and TIS: Technological innovation systems

in which the focus is predominantly on the research consequences and research questions rather than research methods.

4.2.2 Pragmatism as a research paradigm

Pragmatism is described as a philosophical foundation that came about after scientist rejected the proposition of a single method design of research inquiry (Kaushik & Walsh 2019: 3). Rather, pragmatism holds the view of not only single, but also multiple realities to scientific inquiry, and that researchers ought to select a methodological approach that is suited for a particular phenomenon being investigated. Ling and Ling (2020: 8) argue that pragmatism can be shaped by a variety of methods which suite the research practically. As emphasised by Parvaiz, Mufti and Wahab (2016: 68), pragmatists held the view that science's mandate does not revolve around finding the 'continuously' disputed truth or reality, but rather the facilitation of human problem-solving. Consequently, pragmatists are oriented towards resolving practical problems in the real world under the premise that all individuals have their own unique interpretations of the real world shaped by individuals' unique experiences (Maarouf 2019: 5).

Accordingly, with regard to the mode of enquiry, pragmatism embraces the two extremes of deductive reasoning (supported by positivism) and inductive reasoning (supported by interpretivists). Shah, Shah and Khaskhelly (2018: 90) argue that because pragmatism emphasises a pluralistic methodological orientation (mixed methods), researchers can obtain useful knowledge which will enable them to understand the world and appreciate the complexity and unpredictability of public health life. Kaushik and Walsh (2019: 6) claim that pragmatism is rather associated with abductive reasoning, which alternates between deduction and induction approaches to solving real-life problems in the real world. The two most appraised mixed-methods research designs are: the concurrent (parallel), in which both research components are carried out 'almost' simultaneously, and sequential approaches, in which the qualitative phase precedes quantitative component, or vice versa (Venkatesh, Brown & Sullivan 2016: 438).

For public health researchers, the nature of research and its objectives shape their choice of paradigmatic perspective. The researcher in the current study selected the pragmatist philosophy because he felt that there could be more than one way of understanding the public health research problem being investigated. Ling and Ling (2017: 12) emphasise that pragmatic research is primarily concerned with providing conclusions satisfying a practical need to a problem. Therefore, using one worldview would have stifled the researcher's freedom to explore the concept of research uptake from different worldviews that best met the need for depth of understanding.

4.3 RESEARCH DESIGN

Christensen *et al.* (2015: 238) define the term 'research design' as the strategy that specifies the procedure to be used to investigate research question(s), and this includes data collection, analysis and interpretation methods. There are two types of research approaches, namely qualitative and quantitative (Taguchi 2018: 23). When both approaches are used systematically in one study, it is referred to as a mixed-methods research design (McKim 2017: 203). Accordingly, this type of research design allows for the systematic blending of qualitative and quantitative data collection and analysis strategies. As corroborated by Edmonds and Kennedy (2016: 208), this blending allows for broader purposes of breadth and depth of understanding of a phenomenon.

Pardede (2019: 233) highlights the main reasons for selecting a mixed-method design to guide data collection for the research:

- Triangulation: allows the researcher to use different approaches to answer the same question.
- Complementarity: allows the researcher to gain more insights by using data gathered through one method to enrich or clarify data gathered through another method.
- Development: allows the researcher to use one form of data to develop a data collection instrument for the next data collection phase.

- Initiation: allows the researcher to use different methods of the same phenomenon with the purpose of studying contradictions in preparation for new studies.
- Expansion: allows the researcher to use different methods to address different questions.

The current study adopted a mixed-methods design that allowed the researcher to use in-depth interviews (qualitative phase) to develop a data collection instrument (quantitative phase) for the subsequent quantitative phase (development). This is because neither of these two approaches individually were sufficient to provide both details and trends for the development of a model to facilitate the uptake of research for healthcare practice and policy. However, when both approaches were used in combination, a clearer and more detailed picture of the research problem emerged. According to Almeida (2018: 137), the goal of using mixed-methods research is to ensure a richer and broader description of the research problem, while overcoming some inherent shortfalls of either of the approaches.

4.4 RESEARCH APPROACH

In this study, an exploratory sequential approach was used as illustrated in Figure 4.2 below (Subedi 2016: 573). Based on the original proposal, the researcher adopted an exploratory sequential approach. However, embarking on a literature search resulted in only a few sources justifying this approach. This method allowed the researcher to gather rich and thick description of the phenomenon supported with statistical analysis of the contributory factors.

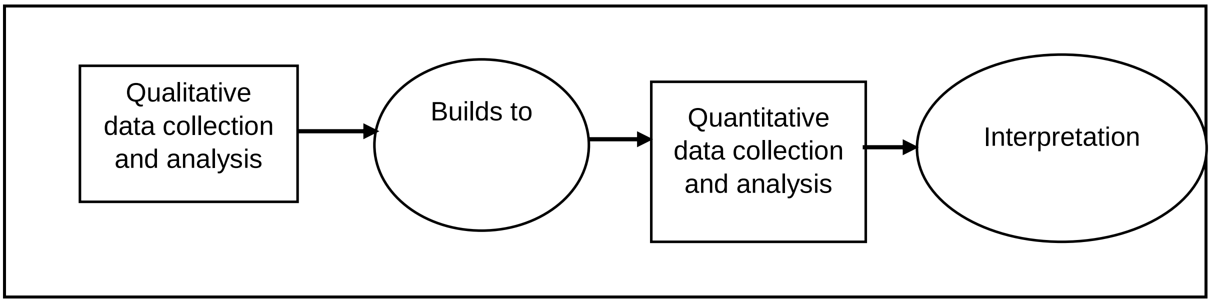


Figure 4.2: An exploratory sequential data collection methods (Source: Subedi 2016: 573)

Baran and Jones (2016: 85) emphasise that this design is a two-phased interactive approach that identifies cause-and-effect relationships. According to Alavi, Archibald, McMaster, Lopez and Cleary (2018: 528), in an exploratory sequential approach, qualitative data are collected and analysed first, followed by quantitative data collection and analysis, with integration at the level of interpretation. As a result, qualitative data were collected and analysed first, then followed by the collection and analysis of quantitative data, with the purpose of expounding the qualitative phase. In this study, both elements were given approximately equal weight, although the second phase contributed to clarifying the content of some of the qualitative findings and offered a theoretical and pragmatic understanding of why certain relationships exist between factors and the uptake of research.

4.4.1 Phase one: Qualitative research

This phase was used to explore stakeholders' perceptions (insider's point of view) on the important aspects of research uptake, mainly within the practical decision-making contexts in which researchers and professional health officials work. Rutberg and Bouikidis (2018: 209) indicate that qualitative research uses an in-depth, holistic approach, and a fluid research design with the ultimate purpose of yielding rich narratives. These narratives assisted the researcher in using the findings in the development of items for the quantitative phase instrument.

4.4.1.1 Target population

Literature has shown that in some cases, research uptake is affected by lack of effective communication between stakeholders – in particular research producers – and research users (Gopichandran, Luyckx, Biller-Andorno, Fairchild, Singh, Tran *et al.* 2016: 167). This study sought to get views from most of these categories of people who could play a significant role in promoting research uptake. In this phase of the study, the researcher was interested in the following categories of participants: researchers who conducted health-related research within Mpumalanga Province, frontline workers/practitioners responsible for healthcare practice, programme managers responsible for managing and implementing departmental policies, senior managers or directors at higher education institutions responsible for the uptake of research. These categories of participants were drawn from a total population size of 399 principal investigators of public health research studies conducted in Mpumalanga Province from the year 2014 to 2019.

4.4.1.2 Sample and sampling methods

Of the two broad categories of sampling, namely probability and non-probability sampling, qualitative research applies non-probability sampling (Elfil & Negida 2017: 1). Since using an appropriate sampling strategy for qualitative research is equally important as the sampling strategy for quantitative research, the researcher intentionally selected the sample according to the research purpose and objectives (see Sections 1.4.1 & 1.4.2), as discussed below.

4.4.1.2.1 Sampling strategy

The researcher used non-probability purposeful sampling (Etikan & Bala 2017: 1) whereby samples were selected in a non-random manner using the subjective judgment of the researcher. Etikan, Musa and Alkassim (2016: 2) emphasise that with a purposive study, the researcher specifies the characteristics of the population of interest and then locates individuals who match the required characteristics. The main purpose of using a non-probability sampling process is not to provide all the units of analysis in a population an equal chance of being included, but rather to ensure that selected individuals are knowledgeable and experienced about the phenomenon being investigated, and can speak about the experience under cross-examination (Flannery 2016: 518).

In this study, a maximum variation approach was used comprising a heterogeneous mix of settings and participants who are knowledgeable, experienced and informative about the focus of the study (Beaudry & Miller 2016: 41). The researcher used different portfolios of participants (i.e. researchers, programme managers, frontline workers & senior managers or directors) to maximise differences in relation to the central phenomenon. Due to the nature of the research problem, the researcher used purposeful sampling to select participants who were known to have experience with the problem of interest. According to Christensen *et al.* (2015: 171), purposive sampling affords the researcher an opportunity to specify the characteristics of the population of interest and locate individuals with those characteristics. One key attribute that is used in identifying eligible participants in this study was exposure or experience concerning the content being investigated. The researcher identified and recruited participants most relevant to the subject area in order to explore all elements of research uptake based on the participants' perceptions about the phenomenon being investigated.

4.4.1.2.2 Inclusion and exclusion criteria

Inclusion and exclusion criteria for participants in a study is an essential component required in scientific research protocol (Patino & Ferreira 2018: 84). According to Garg (2016: 643), inclusion criteria refer to all requirements identified by the researcher in the study, which must be present for participants to be included in the study sample. Exclusion criteria are factors or characteristics identified by the researcher, which make recruited participants ineligible for the study sample. The author argued that these factors may be confounders for the outcome parameter, which may negatively affect the results of the study. Patino and Ferreira (2018: 84) illustrated that typical inclusion criteria include demographic, clinical, and geographic characteristics, and exclusion criteria encompass features of potential participants who meet the inclusion criteria but also have additional features that could interfere with the success of the study. For instance, those lost to follow-up, who provide incorrect data, miss scheduled appointments for interviews, have comorbidities that could introduce bias in the findings of the study, or increase their risk for adverse events.

a) Inclusion criteria

The researcher included all people aged 18 or older; both male and female participants, with both knowledge and experience of the phenomenon being investigated; and researchers who successfully completed their research projects in Mpumalanga Province within the sampled timeframe (2014-2019).

b) Exclusion criteria

The researcher excluded participants who refused to provide written informed consent; participants who missed scheduled appointments more than twice; and participants who indicated an unwillingness to comply with the requirements of the protocol.

4.4.1.2.3 Sampling size determination

Determining a sample size is often associated with quantitative studies. However, Malterud, Siersma and Guassora (2016: 1753) established that much like in quantitative studies, sample sizes in qualitative studies must also be ascertained, albeit not by the same means, for the purpose of generalisability. Instead, in qualitative research, the commonly proposed concept for sample size is data saturation (Gentles, Charles, Ploeg & McKibbon 2015: 1782). A total of 21 participants were interviewed for the qualitative phase of this study.

The researcher selected participants who provided richly textured information relevant to the phenomenon under study. After interviewing participant 16, the researcher conducted an initial analysis of the field notes to determine trends in the data, and found that in each category of participants, after the third interview no new information emerged as participants sufficiently represented each category. At the time, only one participant was interviewed representing programme/policy managers. Thus, the researcher found that five additional interviews needed to be conducted, mainly with programme/policy managers. With the researcher category, the researcher broadened the territory to include both individual researchers (4) and those representing private partners/companies (2). The category of frontline workers/practitioners included mainly medical officers (doctors (4) and nurses (3)) in order to capture different perspectives. Saturation became evident at interview 21, as little new information was further generated, and no new themes or codes emerged.

4.4.1.3 Data collection methods and procedures

Data were collected during phase one from a list of experienced and knowledgeable participants on the subject matter by means of in-depth, semi-structured interviews. As outlined in Gerrish and Lathlean (2015: 391), the process of data collection using in-depth interviews (Eppich, Gormley & Teunissen 2019: 85) involves the use of a predetermined set of topics with open-ended questions known as an in-depth interview schedule. During the interviewing process, the researcher took field notes (Phillippi & Lauderdale 2018: 381) in order to record activities and behaviours expressed by the participants about the phenomenon being studied. Furthermore, the researcher used a reflective journal to review and critically reflect on his learning experience with each participant (Bassot 2016: 6).

Table 4.1: Data collection process in phase one

		Data Collection Process (phase one)		
Study Participants	**Sample Size (n=21)**	**In-depth semi-structured interviews**	**Field notes**	**Reflective Journal**
Academic institution & Private healthcare institution	**4**	√	√	√
Programme Managers	**4**	√	√	√
Frontline workers/ practitioners	**7**	√	√	√
Researchers	**6**	√	√	√
Total	**21**			

According to Züll (2016: 1), the advantage of using open-ended, in-depth interviews is participants' ability to formulate and articulate their responses using their own words. This allowed the researcher to uncover the feelings and beliefs participants had regarding the phenomenon being investigated. The researcher had a list of probing questions to ensure all aspects of the interview were covered, otherwise the interview was freely guided by the responses from interviewees.

4.4.1.3.1 In-depth semi-structured interviews

For the in-depth semi-structured interviews, the researcher used three domains of the PARIHS framework (i.e. evidence, context and facilitation), as discussed in Chapter 3. The domain ‘evidence’ was associated with individual factors, ‘context’ related to organisational factors, and ‘facilitation’ was linked with research characteristics. With this framework, strategies to promote research uptake for practice and policy were viewed as a function of relationships between these domains (Rycroft-Malone 2004: 297). Conversely, the conceptual foundations for the PARIHS framework reflect that for research uptake to be successful, there should be clarity concerning the nature of the research evidence being generated, the quality of context, and the facilitation type necessary to safeguard a successful research uptake process.

According to Morris (2015: 3), an in-depth, semi-structured interview is the most commonly known and used qualitative research method which gathers conversations between the researcher and research participant. The main purpose of an in-depth, semi-structured interview is to holistically explore the expertise, thoughts and perceptions of participants in relation to the phenomenon being studied using a detailed interview schedule (McIntosh & Morse 2015: 1).

A predetermined requirement for this study was for the researcher to gather data using in-depth, semi-structured interviews, in a comprehensive manner that allowed participants sufficient time to freely express their own experiences and perspectives (Bieh, Weigel & Smith 2017: 3). This method allowed the researcher to ask the participants a sequence of predetermined, open-ended questions to understand the participants’ experience regarding the uptake of health research for practice and policy in depth. Wood *et al.* (2019: 2443) argue that with a semi-structured interview, a researcher is likely to discover previously unknown information. In this case, not only did interviews yield rich responses, but also included feelings and emotions of participants, which were laden with meaning.

Despite the acknowledged advantages of using in-depth, semi-structured interviews to obtain rich descriptions of the phenomenon being studied, there are various criticisms accompanying this procedure (Morris 2015:10). Two limiting factors were identified in using an in-depth, semi-structured interview in the study:

- The availability of a list of leading questions which may be suggestive and might mean that a decision has already been taken on what needs to be covered by the researcher in relation to the subject being investigated. To avoid potential bias by the researcher, the leading questions were kept simple, without sentences that could favour a particular assumption by the researcher. In addition, responses were continuously evaluated to ensure that pre-existing assumptions are kept in check by the researcher.

- The notion that the participant can discuss the subject being investigated at length (‘*ramble’*) could defeat the purpose of the interview. The researcher’s position at the time of data collection was that of ‘public health research manager’, and he had been subjected to research methodology training over a period of time. The skills he acquired were used in this study to conduct high-level interviews. This effectively ensured that all key topics indicated in the interview guide were adequately covered and the interview remained focused. The initial interviews were shared with the supervisor for endorsement and quality purposes, before the researcher continued with the subsequent interviews.

4.4.1.3.2 Preparation for the interviews

According to Adhabi and Anozie (2017: 7), preparing for the interview requires the initial selection of appropriate personnel as per the sample criteria. The researcher had interacted with nearly all interviewees on a professional level, and almost none were complete strangers. The researcher then reviewed literature on conducting successful interviews. The interview guide was practiced several times with a colleague for the researcher to be familiar with the interview guide (Appendix D). For each interview, the researcher arrived approximately 20 minutes before the scheduled time to prepare the office and the required logistics, and this was appreciated by the participants. A high-quality digital audio recorder was tested before each interview to ascertain if it was in good working order. A cell-phone was also used as a backup for recording the interview. Supporting material, such as a consent form, registration form, interview guide, water, and field notebook/diary were prepared in advance before each interview and following confirmation for the interview.

4.4.1.3.3 Pilot interview

Piloting of the interview guide provided an opportunity to identify likely errors and fix them before the instrument was used in the research study. As alluded in Majid, Othman, Mohamad, Lim and Yusof (2017: 1073), piloting an interview is essential and useful to ensure the interview guide works ‘flawlessly’ during the data generating stage of the research. In this study, the researcher conducted a pilot interview with one individual who had similar characteristics to the sampled group. The interview was audio-recorded, and upon review it became apparent that the interview guide questions elicited the responses the researcher was looking for. However, the findings of this pilot interview were not included in the main study.

4.4.1.3.4 Conducting and recording the interview

The interviews for this study were conducted by the researcher as the main data collection instrument, who therefore played an active role in making decisions about the progress of interviews. Each interview was held in a quiet private office organised by either the researcher or the participants. The interview process was explained to each participant who was invited to ask any question before formalities began. Each participant was given a consent form (see Appendix C1), which explained the objective of the study, potential benefits and risks, recording of the interview, confidentiality, and their rights of voluntarily participating or withdrawing at any time. The researcher assured participants that their responses would be kept confidential. The information on the consent form was read and explained to all participants by the researcher, and participants were required to sign their consent. Each participant was given a copy of the signed consent form upon request. Interviews for this study were conducted in English.

Some participants provided additional information, while others recommended individuals who may want to participate in the research project. On average, interviews lasted approximately 42 minutes and participants were registered on a registration form that documented individual characteristics such as names, age group, gender, department, and the time the interview started and ended. Each recorded interview was immediately transferred to two password-protected computers.

a) Facilitative communication techniques

Facilitative communication techniques are skills used to develop a trusting relationship with participants (Carter & Van Andel 2019: 61). As argued by Horvat (2013: 71), conducting an in-depth interview is not the same as having a normal conversation, as it is aimed at affirming the interviewee's contribution while eliciting more information. The researcher used the following strategies to create opportunities for more information (see Appendix G):

- Active responsive listening: Is defined as a deeper and more attentive listening process that involves understanding the communication (verbal and nonverbal) and then relating that understanding to the interviewee (Carter & Van Andel 2019: 64). In this study, the researcher asked the participant whether their response was understood.

  I: "So, you said you have presented some of these findings to…"

- Making minimal verbal response: The researcher displayed his listening skills and ability through verbal cues in the form of an occasional nod (Okun & Kantrowitz 2014:76).

  I: "I see…"

- Warmth: Refers to the ability of the researcher to show interest and communicate a sense of caring (Carter & Van Andel 2019: 62).

  I: "That's quite interesting."

- Probing: The researcher used probing to elicit information about how participants arrived at an answer to create further opportunities for exploration (Carter & Van Andel 2019: 82).

  I: "But were there guidelines developed?"

- Clarifying: Refers to the means to understand the basic nature of the participant's statement during an interview by seeking additional information (Stainsby & Gandhi 2016: 20). The researcher communicated his perception to the participant to clarify whether statements were on the right track.

  I: "What do you mean?"

- Paraphrasing: By paraphrasing, the researcher repeated what the participant said, without distorting the meaning of what has been said, to ensure understanding and clarity of statements (Stainsby & Gandhi 2016: 20).

  I: "So, let me get it clear…"

b) Bracketing and intuiting

Bracketing is defined as the process of 'setting aside' preconceived ideas about a phenomenon (Gregory 2019: 3). According to Dorfler and Stierand (2020: 1), bracketing does not mean getting rid of preconceived ideas, but rather raising awareness and explicitly incorporating them. As a public health official, the researcher had preconceived ideas about factors affecting research uptake, and bracketing became an unrealistic task. Throughout the interviewing process, the researcher remained neutral during the discussion by suspending any knowledge he had to focus on subjective meaning and appearances.

Intuiting refers to the researcher being immersed in the description of participants' lived experience (Cunningham & Carmichael 2018: 63). The researcher accomplished this by remaining fully immersed in the experiences of participants and reflecting on their descriptions. At the end of each interview, the researcher recapped what was discussed to check if all information was captured correctly. Furthermore, the researcher allowed each participant an opportunity to provide additional comments or ask any question just before they were thanked for participating in the study. Thereafter, the audio recorder was turned off to conclude the interview process.

4.4.1.3.5 Field Notes

Taking field notes is a valuable process carried out by the researcher during qualitative fieldwork, which includes taking notes on what is seen, heard or thought (Maharaj

2016: 114). These in-depth recordings serve many functions, including aiding in providing a thick description of the phenomenon being studied, a description of surroundings, researcher reflections and identification of bias, increasing rigour and trustworthiness, and providing an essential context to inform data analysis (Phillippi & Lauderdale 2018: 381). The researcher took field notes on what was done, seen, heard and even felt during the in-depth, semi-structured interviews and the time spent in the field. Pictures of the surroundings and examples of reports pasted on the walls were taken to expand the researcher’s perspective and highlights important connections on the phenomenon being studied. Thus, any analytical and reflected information that was regarded as critical in understanding collected data and the data analysis was recorded in a diary. A total of 15 notes were prepared during the interviews for reflection purposes. At this point, the researcher listened, compared and contrasted descriptions of the phenomenon being studied.

4.4.1.3.6 Reflective notes/practices

Reflective practice has become a significant component of qualitative research, whereby the researcher understands that he/she is part of the investigated social world (Lune & Berg 2017: 131). This practice requires researchers to consistently reflect on their roles throughout the research process to enhance data collection, analysis and ethics. Palaganas *et al.* (2017: 430) emphasise that reflexivity has to do with providing a detailed and honest account in relation to the degree of influence the researcher exerts on the research process, which could, in turn, contribute to making the research process open and transparent. In this study, a reflective diary (Dean 2017: 1) was used as a reflective practice to meet the methodological and ethical challenges which occasionally emanate when conducting research that includes the viewpoint of participants. These reflective notes were not only important for learning purposes but also contributed towards enhancing the model’s development and establishing an audit trail in relation to what the data meant (Vaismoradi, Jones, Turunen & Snelgrove 2016: 105). Orange (2016: 2178) argues that it must become a duty of every novice qualitative researcher to practice reflexivity in the form of reflective journals, so that they are aware of their positionality and the impact they could have on the research processes.

4.4.1.4 Data management

Ethical management of data is essential to ensure research integrity (Goosen 2018: 14). Recordings of the in-depth semi-structured interviews were transcribed into Microsoft Word format. All transcripts were stored on two password-protected computers for further management. The researcher was the only one with access to the keys and passwords of stored records. All data records will be stored only for the duration of the study and will be destroyed by the researcher five years after the findings have been published. Records will be destroyed in the form of shredding data sheets and deleting saved electronic files from both computers.

4.4.1.5 Data analysis

In qualitative research, data analysis is defined as a systematic procedure used to transform and organise raw data into patterns and themes for the final presentation (Akinyode & Khan 2018: 173). Interviews were verbatim transcribed by a professional transcriber in preparation for data analysis and interpretation. Subsequently, transcripts were read again and again by the researcher to develop a final edited set of transcripts ready for analysis. All transcripts in Word format were uploaded onto the Atlas.ti 7.5.18 software program for further analysis by the researcher who identified emanating codes for this study. The data analysis process followed guided thematic analysis (Table 4.2) as proposed by Nowell *et al.* (2017: 4).

To enhance the credibility of analysis, two coders were involved in analysing each data set; one was the researcher, and the other an independent coder with sufficient experience in qualitative data analysis. The researcher obtained a sense of the data by reading through the transcriptions carefully to develop a general understanding of the data. Ideas that came to mind were recorded by writing short memos. Following the completion of the data analysis, the researcher and the independent coder met for a consensus discussion to finalise the findings. The researcher, with assistance from the independent coder, developed a qualitative codebook that contained statements of the codes for the database. During this discussion, a validation of the data took place to enhance credibility. The Atlas.ti 7.5.18 software was instrumental in assisting both the researcher and the independent coder to organise the datasets, which resulted in the development of a coding frame based on emerging major themes.

Table 4.2: Guided thematic analysis

Phases of Thematic Analysis	**Means of Establishing Trustworthiness**
Phase 1: *Familiarising yourself with your data*	The researcher had a prolonged engagement with data by carefully reading through the transcripts and triangulating the different data collection modes. Important Ideas were documented in the reflective journals. Data records were stored in secured archives.
Phase 2: *Generating initial codes*	Peer debriefing sessions were documented in writing. Researcher triangulation was used in order to detect observer and interviewer bias, whereas reflective notes provided an audit trail of code generation.
Phase 3: *Searching for themes*	The researcher and the independent coder looked carefully at words and phrases to make sense of theme connections. Detailed reflective notes were kept in relation to development and hierarchies of concepts and themes.
Phase 4: *Reviewing themes*	The researcher and the independent coder discussed how emanated themes and subthemes supported the data. For incomplete analysis, the researcher went back to raw data in order to find missing data.
Phase 5: *Defining and naming themes*	The researcher named and defined what each theme mean, followed by documentation of theme naming in a reflexivity journal.
Phase 6: *Producing the report*	The researcher conducted member checking to determine if descriptions accurately represented the views of participants, the results which are thick descriptions of the phenomenon being investigated.

Source adapted from Nowell *et al*. (2017: 4)

There was continuous assessment by the researcher to check the data accuracy during data collection. In addition to using an audio recorder, a paper trail (reflective journal) was kept to track all the steps and processes of the study to ensure confirmability. All research team members (researcher, independent coder and the researcher’s supervisor) systematically reviewed the entire data set, and individually coded data in as many different themes as possible while paying full and equal attention to each data item. The results were represented in the form of categories. Chapter 5 of this study details the research findings and interpretation.

4.4.2 Phase two: Quantitative research

The second phase of this study employed a quantitative design to answer the second research question, stated in Chapter 1 (see Section 1.4.3). Apuke (2017: 1) describes quantitative research as a more logical and numerical data-led approach to study an observable phenomenon via statistical, mathematical or computational techniques that may be generalised. The author further indicates that the main strength of this approach is in providing coded responses to research questions that can be aggregated from the survey data for analysis. In this study, the quantitative data consisted of primary data collected by means of an online survey involving participants who were once involved in the research studies conducted in Mpumalanga Province from 2014-2019. Due to the size of the data and content of variables for this study, the researcher deemed the data sets sufficient to provide relevant information on the uptake of research for healthcare practice and policy development.

4.4.2.1 Target population

Alvi (2016: 10) describes the target population as a group of elements on which the study is focused. The target population for this phase comprised a total of 399 primary investigators of public health research who contributed towards the completion of research studies conducted in Mpumalanga Province. In this study, all 399 primary investigators of public health research studies received in the province from the period 2014-2019 were included. This is illustrated in Figure 4.3 below.

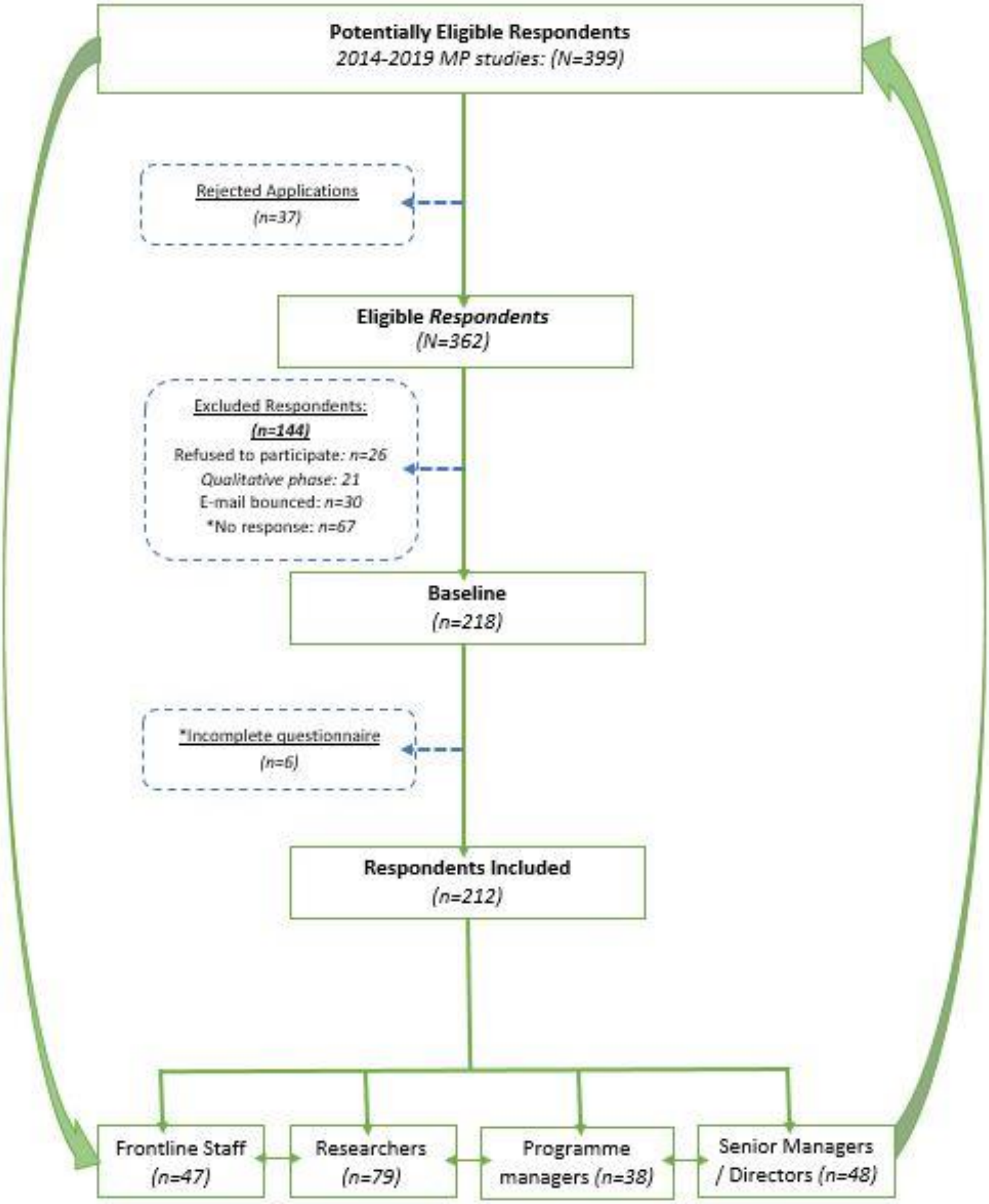


Figure 4.3: Total target population

Given the availability and accessibility of all the historical records pertaining to the research studies conducted in the Mpumalanga Provincial Department of Health from the year 2014 to 2019, no sampling was required. Tyrer and Heyman (2016: 57) state that if the target population is sufficiently small, and the researcher is able to include the entire population (i.e. population of 600 or less), sampling becomes meaningless, hence this is called a census study. As such, the total target population was studied. A total of 362 research studies were eligible for inclusion in this study. However, 144 were excluded due to the following reasons: refusal to participate (n=26); participated in the qualitative phase (n=21); email bounced and was untraceable (n=30); email went through, but respondents chose not to participate despite two reminders (n=67). This resulted in a response rate of about 59%, which was deemed acceptable for this study.

4.4.2.2 Data collection methods and procedures

According to Wang and Park (2015: 90), questionnaire surveys have become the most widely used data-gathering technique. For this study, an online self-administered survey was deemed appropriate (Salvador, Alves & Rodrigues 2020: 1). Da Costa and Schneider (2016: 182) explain data collection in quantitative studies as a consistent process of gathering information to address the questions being asked in the study, while the data collection process itself is not influenced by the researcher (data collector). The REDCapTM web-based tool was used to capture data anonymously and privately (Harris, Taylor, Minor, Elliott, Fernandez *et al.* 2019: 1). According to Minto, Vriz, Martinato and Gregori (2017: 158), when a sampling frame is available with email contact details, the use of web-based questionnaires becomes a preferred strategy for collecting data. This view was supported by Sebo, Maisonneuve, Cerutti, Fournier, Senn and Haller (2017: 83), who indicated that using web-based questionnaires is simple, inexpensive (i.e. no cost for printing), less time consuming, while providing high-quality data due to several validity checks that could be introduced on electronic questionnaires.

Despite this, literature has raised several specific concerns in using web-based/online questionnaires which include coverage, low response rate, issues of anonymity and confidentiality, and selection bias (Mauz, von der Lippe, Allen, Schilling, Müters, Hoebel *et al*. 2018: 3). Nonetheless, a structured web-based questionnaire was used in this study to collect data from respondents to answer the second research question of phase two. In addition to sending initiation emails to potential respondents, those whose telephone contact details were available and updated were reminded telephonically to complete and return the completed survey forms. For those who did not respond, two email reminders were sent ten days apart.

4.4.2.2.1 Development of the data collection instruments

The questionnaire used in this study to address research objective two was developed following the analysis of the qualitative phase of the study and literature review. According to Rahi (2017: 4), a questionnaire is used mainly to determine what respondents like, and their feelings about a phenomenon are investigated. In addition, the author established two ways of developing an instrument from literature; first, by specifying the domain items, and second, by using literature to generate an item.

From the qualitative findings of this study, a pool of items was generated which were eligible for inclusion in the data collection instrument. In consultation with the supervisor and a statistician, and guided by literature, the researcher finalised the instrument to address local issues as raised during the in-depth interviews. Questions were selected in order of relevance and were used to determine factors affecting research uptake in the local context.

Leggett (2017: 568) argue that there are two types of formats for questionnaires, namely open and closed-ended questions. The latter allowed for greater uniformity of collected data. A five-point Likert scale-style survey questionnaire (Awang, Afthanorhan & Mamat 2016: 13) was developed and used to gather online data from respondents.

The questionnaire was piloted with five researchers who were identified from records of research studies falling outside the inclusion criteria to identify any source of difficulties or misunderstanding that participants may encounter when responding to the questions. Tappen (2016: 502) claim that a pilot is necessary to test researchers' ideas and procedures before embarking on the full-scale research study. This allowed for necessary amendments to be made following this pre-test stage. Double-barrel questions were revised to reduce ambiguity, and all items under each factor were written as either positive or negative statements, to avoid a mixture of negative and positive statements on one factor.

4.4.2.2.2 Structure of the survey questionnaire

The survey questionnaire consisted of the following five sections: Section A (questions A1-A6) covered questions concerning respondents' personal information. Basic demographic data such as age group, educational qualification, employment sector, work position, work experience, and email address; the latter was only used for follow-up purposes. Section B (questions B1-B6) covered questions concerning the respondents' understanding of research uptake. Variable items were included in determining whether the respondent had ever used research evidence in their current role for practice and policy.

Section C (questions C1-C21) covered issues regarding individual factors affecting research uptake. Factors studied under this section included research experience (5 items), time factor (5 items), motivation (6 items), and attitudes (5 items). Section D (questions D1-D20) covered issues regarding organisational factors affecting research uptake. Factors under this construct included resources (5 items), research agenda (5 items), partnerships (5 items), and private funding (5 items). Research characteristics (questions E1-E20) consisted of four factors, namely availability of research evidence (5 items), quality of research evidence (5 items), gatekeepers' permission (5 items), and local research committee (5 items). The questions were closed-ended to obtain the maximum amount of information without imposing on the time and resources of the respondents. The researcher emailed the survey questionnaire link to all identified respondents to determine factors affecting research uptake (see Appendix H).

4.4.2.3 Data management

Data collected from identified researchers using an online structured survey questionnaire were exported to Microsoft Excel for further management. The main advantage of using the online data collection instrument was reducing the data management time as it eliminated the data capturing process. Second, data values were coded; out of range values could not be captured, resulting in improved data quality as evidenced in Blumenberg and Barros (2016: 672). All data records will be stored and kept, as indicated in Section 4.1.4.

4.4.2.4 Data analysis

Data extracted from the online survey questionnaires on research uptake were analysed and are described in Chapter 6 of this study. The data analysis was done using SPSS version 26.0, SAS Version 15, and Microsoft Excel computer programs with the assistance of a statistician. The researcher used the occurrence of research uptake as a dependant variable, while the independent variable included individual factors, organisational factors, and research characteristics. Descriptive statistics were used to understand and summarise key numerical characteristics of the data set. The results of this study were expressed in descriptive statistics, namely: mean ± standard deviation, frequencies, and percentages.

The identified factors for research uptake required the measurement of the scale's reliability and validity. First, confirmatory factor analysis was used to determine the validity of the responses and further assist in clarifying the constructs being measured (Keith & Reynolds 2018: 253). Exploratory factor analysis (EFA) is a technique that statistically explores the underlying factors of a variable through factor rotation on the basis of factor loading values, so that researchers assume that some indicators may be related to several factors (Alavi, Visentin, Thapa, Hunt, Watson & Cleary 2020: 1). EFA was used since the researcher wanted to broadly explore the factors that influence research uptake by allowing the research variables to form their own patterns. In this study, factor analysis was computed using the:

1. Principal component method with the condition of retaining factors with eigenvalues greater than 1.0, to determine the number of constructs in the instrument used for data collection. This method analyses the interrelationship between variables and retains them accordingly to their common core dimensions as factors with minimal loss of information (Mooi, Sarstedt & Mooi-Reci 2018: 278);

2. Principal component analysis with varimax rotation was conducted to assess the underlying structure for the components of the questionnaire and enhance the interpretability of the results (Mooi *et al.* 2018: 282).

Furthermore, a maximum likelihood method was used for communality estimates to examine the loading pattern and determine the item with the most influence on each factor (Osborne & Banjanovic 2016: 14). The author argued that commonalities are estimates representing shared variance in each variable, and are always less than 1.

Second, the internal consistency of the items under each component of research uptake constructs was analysed using Cronbach's alpha (Alpha coefficient). McNeish (2018: 85) defines Cronbach's alpha as a measure of the reliability of responses from the data collection instrument. A sample size of less than 30 is required to achieve a minimum reliability coefficient of 0.7. Cronbach's alpha is determined in terms of the average inter-correlations among the items measuring the concept. The closer the reliability coefficient is to 1, the higher the internal consistency reliability (Bujang *et al.* 2018: 85). It is important that all reliability measures exceed the minimum value of 0.6, as recommended by scholars (Gallais, Gagnon, Forgues, Cote & Laberge 2018: 23).

Third, a multivariate normality analysis, which is critical in the modern statistical inference, was performed. According to Wijekularathna, Yi and Roka (2019: 1), this is because most parametric statistical techniques were developed based on the theory of normal distribution. In this study, to determine whether collected data satisfy the normality requirement, skewness and kurtosis tests were used (Kwak & Park 2019: 5). According to the authors, skewness is explained as a measure of the 'asymmetry' of the probability distribution, whereby the curve is skewed either to the right or left. For a normal distribution, the tails of the curve are mirror images of each other. Kurtosis is a measure of the peakedness of the probability distribution, in which the tails asymptotically approach zero or not.

Last, Spearman's correlation coefficient was performed to determine the relationship between dependent and independent variables (Schober, Boer & Schwarte 2018: 1763). According to Hung, Bounsanga and Voss (2017: 902), with correlations, the extreme values of -1 (strong negative correlation) and 1 (strong positive correlation) indicate a perfectly linear relationship in which a change in either variable results in a perfectly consistent change in the other. A coefficient of zero illustrates a lack of linear relationship between variables.

In this study, Spearman’s Rank correlation coefficient (R_s) was used to statistically measure the strength and direction (negative or positive) of the relationship between research uptake and the potential predictors of research uptake (Akoglu 2018: 92). It is the non-parametric alternative of Pearson’s correlation and is used when data have violated the assumptions of Pearson; if data are normally distributed, there is availability of significant outliers, and one or both of the variables are ordinal (Sarstedt & Mooi 2019: 116). According to Akoglu (2018: 91), this test is used for non-normal distributions of data with extreme values and outliers, whereby the closer R_s is to +1 or -1, the stronger the likely correlation, and zero means there is no correlation.

4.4.3 Phase three: Research uptake model development

A model is defined as an iterative process aimed at describing, predicting, testing or understanding a complex system (Grover, Zweig & Ermon 2019: 2434). Literature has classified statistical models in two broad categories, namely, explanatory modelling, which is applicable for inferential purposes, and predictive modelling, which is mainly used in predicting future observation (Liu & Koedinger 2017: 69). Several approaches have been proposed describing the process of developing a model. However, depending on which is selected, almost all approaches cover three fundamental steps for developing an appropriate model. These are model selection, model fitting, and model validation (Lever, Krzywinski & Altman 2016: 704).

According to Bode and Ronchi (2019: 12), model selection involves the plotting of the data, processing knowledge and assumptions about the process to determine the model form best fitting the data. Following the selection of a model best fitting the data, an appropriate model-fit method is used in estimating unknown parameters within the model. After all estimates have been made, the model is assessed to determine if the underlying assumptions are plausible. If the assumptions are plausible, the model is deemed fit to be used for the designed functions, otherwise the model is repeated to improve the model fit.

Developing a research uptake model for this study was a continuation of phases one and two of the study; data gathered through both phases were used for the purposes of developing the model. Model development in the current study followed two approaches: first, the structural equation modelling (SEM) technique was used for confirmatory factor analysis, followed by specification and estimation of the models (Civelek 2018: 6). Subsequent to this process and using the PARIHS framework, the logical ToC model process (Martinez & Cooper 2020: 1) was used to develop a research uptake model. The results are reflected in Chapter 8 of this study.

4.4.3.1 Measurement model in the SEM technique

SEM was performed on a total of 212 study records collected during the quantitative phase to test hypothesised relationships among identified key study factors. According to Fan, Chen, Shirkey, John, Wu *et al.* (2016: 1), SEM has gained popularity with the scientific community as a powerful, multivariate technique designed to test and evaluate causal relationships. The two main components for SEM are: the structural model and measurement model, with the measurement model measuring how well variables are represented, while the structural model deals with statistical confirmation of the theoretical model. Civelek (2018: 6) argues that its widespread use is attributed to its ability to allow a measurement of direct and indirect relationships between casual variables within a single model. In this study, Analysis of Moment Structures (Amos) version 21 (Thakkar 2020: 35) was used for the analysis according to the following five stages:

4.4.3.1.1 Specification of the model

Based on the findings and theoretical knowledge of research uptake, the researcher established research uptake variables and the nature of relationships which existed among the variables.

4.4.3.1.2 Identification of the model

In identifying the model, the researcher calculated the degrees of freedom (*df*) obtained by subtracting the number of parameters to be estimated from the number of known elements from the variance-covariance matrix. According to Wang and Wang (2019: 11), in this stage, when the *df* is less than zero, the model is under-identified, *df* is equal to zero, the model is identified, and when *df* is greater than zero, the model is over-identified.

4.4.3.1.3 Estimation of the model

This stage involves obtaining values for the parameter specified within the model. The researcher used the maximum likelihood method to estimate the model (Maydeu-Olivares 2017: 383), and this was achieved using the expected information matrix and the goodness-of-fit of the model.

4.4.3.1.4 Evaluation of the model

The evaluation of the model is performed to determine the best fit for the model. It ensures that variables actually represent the relationships observed in the data. The researcher used the following five types of statistics in evaluating the model (Fan *et al.* 2016: 4):

- Chi-square, for instance (χ^2)- in the form of (χ^2/df);
- Adjusted Goodness-of-Fit index (AGFI);
- Goodness-of-fit index (GFI);
- Comparative Fix Index (CFI);
- The root mean square error of approximation (RMSEA).

The cut-off values used for each test are indicated in Chapter 8 of this study.

4.4.3.1.5 Re-specification of the model

The final stage of re-specification allows one to improve the model fit (Tarka 2018: 331). This is achieved by the amendment of the said residuals (adding or deleting paths) in order to improve its fit. Sharif, Mostafiz and Guptan (2018: 37) indicate the importance of adding or removing parameters in accordance with the underlying theory of the model. Furthermore, model fit is improved by inspecting the modification indices (MI) result, whereby the value of MI corresponds with the reduction in χ^2

values, obtained after coefficients were estimated (Fan *et al.* 2016: 4). The researcher in this study achieved the model fit by adding paths connecting variables, but in line with the theoretical underpinnings of this study (see Chapter 8).

4.4.3.2 Research uptake logical framework development

For some years, logical frameworks have been used in managing change since their conception in the 1960s (Yearwood 2018: 2); partly because they play a significant role in managers' decision-making. The building foundations for a logical framework is the ToC (Biggs, Cooney, Roe, Dublin, Allan, Challender *et al.* 2017: 7), which seeks to determine how best interventions may influence decisions or manage change (decision tool). In the current study and based on the findings of both the qualitative and quantitative phases, a research uptake logical model was developed using the template below, adapted from Szczepanski and De Herdt (2019: 7). The logical research uptake model is presented in Chapter 8 of this study, and Table 4.3 shows components of the framework.

Table 4.3: Logical framework development

Component	Explanation
Situation	Summarises what is the project/problem intended to undertake/solve.
Inputs	Types of resources required to successfully realise the intended objectives.
Activities	Indicates activities required to achieve these objectives and what are the assumptions.
Stakeholders	Who are the role players in the project?
Outputs	What are the actual research findings?
Outcomes	What are the actual changes expected as a results of research outcomes?

Source: Adapted from Szczepanski and De Herdt (2019: 7)

4.5 SUMMARY

This chapter outlined the research paradigm, research methods, and strategies used in the study, including procedures, participants, data collection tools, data collection and analysis methods. A mixed-methods design was employed. An exploratory sequential approach (QUAL→QUAN) was used in two phases of the study, which involved collecting and exploring in-depth qualitative data, followed by collecting and describing quantitative data in the second phase. The ethical issues pertaining to the study, such as maintaining privacy and confidentiality of the source of data and the anonymity of the participants, were addressed. Validity and reliability issues and ways of ensuring the consistency and integrity of the data were discussed; these included credibility, dependability, authenticity, transferability, and confirmability.

In the next two chapters, the results and interpretations of phase one (in-depth interviews) and phase two (quantitative research) are presented in detail.

CHAPTER 5

ANALYSIS, PRESENTATION AND DESCRIPTION OF THE FINDINGS OF THE QUALITATIVE RESEARCH PHASE

5.1 INTRODUCTION

As outlined in Chapters 3 and 4 (see Sections 3.4.2 & 4.4.1.3), obtaining participants' subjective viewpoints from in-depth, semi-structured interviews was guided by the PARIHS framework (Rycroft-Malone 2004: 297) to address the research question for the qualitative phase: *"What are key stakeholders' perceptions of the uptake of health research for healthcare practice and policy development?"* In this chapter, data generated from the semi-structured interviews are presented in a systematic manner as themes and categories. Direct quotes are provided from participants to preserve their original responses in accordance with the theme. Thus, the researcher drew conclusions from a diverse group of stakeholders who were purposefully selected.

5.2 THE BIOGRAPHICAL DATA OF PARTICIPANTS

Table 5.1 reflects the biographical data for participants interviewed in this study. The information in the table shows that four programme managers, four directors of various institutions (three from academic institutions and one from a private healthcare institution), six researchers, and seven frontline staff members participated in the semi-structured interviews. Most participants (57%) were females. The age cohort of participants was as follows: three were aged 25-34 years (14%), five aged 35-44 years (24%), six were aged 45-54 years (29%), and seven were aged 55-64 years (33%), with a mean age of 47.6. In total, participants had a mean of 19.4 years of work experience.

Table 5.1: Biographical information of participants

	Frontline staff (*N*=7)	**Researchers (*N*=6)**	**Programme managers (*N*=4)**	**Academic institution & private healthcare institution (*N*=4)**
Participants ID:	1; 3; 8; 11; 12; 13; 15	4; 6; 7; 14; 16; 18	2; 19; 20; 21	5; 9; 10; 17
Age Group: N (%): (Mean±SD) = 47.6±2.4				
25-34	2 (28.57)	1 (16.67)	0	0
35-44	2 (28.57)	1 (16.67)	0	2 (50)
45-54	2 (28.57)	3 (50)	0	1 (25)
55-64	1 (14.29)	1 (16.67)	4 (100)	1 (25)
Gender *N* (%)				
Female	4 (57.14)	3 (50)	3 (75)	3 (75)
Male	3 (42.86)	3 (50)	1 (25)	1 (25)
Years of work experience: N (%): (Mean±SD) = 19.4±1.9				
2-5 years	1 (14.29)	1 (16.67)	0	0
6-10 Years	1 (14.29)	2 (33.33)	1 (25)	0
11-38 years	5 (71.43)	3 (50)	3 (75)	4 (100)
Educational level: N (%)				
Degree	4 (57.14)	0	0	0
Honours degree	1 (14.29)	0	2 (50)	0
Master’s degree	2 (28.57)	4 (66.67)	2 (50)	1 (25)
Doctoral degree	0	2 (33.33)	0	2 (50)
Post-doctoral degree	0	0	0	1 (25)
Employment sector: N (%)				
Government Institution	4 (57.14)	1 (16.67)	4 (100)	0
Institution of higher learning	1 (14.29)	2 (33.33)	0	3 (75)
Private institution	2 (28.57)	2 (33.33)	0	1 (24)
Student at academic institution	0	1 (16.67)	0	0

5.3 CENTRAL STORYLINE

A central storyline for this study was formulated. Participants mostly experienced the need to bridge the gap between government and researchers to successfully promote the uptake of research findings. Based on the participants' experiences, their responses on research uptake fell into six broad themes: i) research uptake; ii) research use for decision-making; iii) role of government; iv) research uptake stakeholders; v) dissemination of research findings; and vi) the local research committee. By interrogating the data obtained from participants, the researcher noted that a successful research uptake strategy could be realised when all research uptake barriers have been successfully addressed and opportunities to up-skill and build local capacity have been created. The use of informal research for quick decision-making appears common, however it is vital to address data quality issues for good decision-making, and establish beneficial collaborations based on continued engagements among relevant research stakeholders. Whereas government should play a key role in ensuring accountability among researchers using local research committees, research projects ought to be aligned to existing contexts and available resources to mitigate low research uptake. The findings of this study are described and interpreted in accordance with the central storyline.

Table 5.2: Overview of the themes, categories and codes using the PARIHS Framework

PARIHS Domains	Themes	Categories	Codes
1. Evidence	1. Research uptake	• The goal of research in terms of uptake	
		• Impediments to research uptake	• Relevance and usefulness of research
			• Awareness and access to research conducted
			• Unreliable research and data quality
			• Poor and inconsistent data collection processes
	2. Research use for decision-making	• Research findings to inform decisions	• Acceptable quality research
			• The role of informal research
		• Factors affecting research use	• Lack of budget
			• Lack of resources

PARIHS Domains	Themes	Categories	Codes
2. Context	3. Role of government	Government and research	Audience not research or academically oriented
			Research insufficiently prioritised
			Government focus is selective on health conditions
		Beneficial collaborations	Researchers and government engaging to find solutions
			Collaboration with universities
			Collaboration with private healthcare partners
		Challenges experienced working with government	Availability & Inflexibility
			Bureaucracy & Political influences
	4. Research uptake stakeholders	Part-time researchers	Time and responsibility constraints
			Lack of support
		Full-time and international researchers	
		Independent research units	
		Funders	Local and international
			Drives performance and standards
			Agenda is set by the funder
			Up-skilling and building local capacity
		Programme managers/policy developers	
		Community stakeholder involvement	
3. Facilitation	5. Dissemination of research findings	Insufficient dissemination of results Feedback forums	
	6. The local research committee	Envisioned role of the health research committee	
		Research approval process	Long and onerous process
			Participants' experiences with the research committee

5.3.1 Domain 'Evidence'

The domain 'evidence' encompasses knowledge derived from various sources and is perceived as credible by users after withstanding scrutiny (Holt, Pankow, Camire, Cote, Fraser-Thomas, McDonald *et al.* 2018: 1111). Evidence can come from patient feedback, clinical experience, clinical observations, and local information (Meherali, Paul & Profetto-McGrath 2017: 641). Two themes were associated with this domain, namely research uptake and decision-making.

5.3.1.1 Theme 1: Research uptake

Research uptake to support effective and efficient public health interventions is paramount in the specific context of resource scarcity in low- and middle-income countries (Langlois, Montekio, Young, Song, Alcalde-Rabanal & Tran 2016: 28). Hence, the use of public health research findings is important to enhance the responsiveness of public health systems. In this study, all participants acknowledged a full understanding of research uptake and highlighted some of the factors affecting research uptake.

5.3.1.1.1 Category: The goal of research in terms of uptake

Research uptake is a vital aspect in ensuring that health research findings find ways into healthcare practice and policy development, otherwise there is no point in conducting research. Furthermore, participants emphasised research uptake as a process requiring adequate involvement of all relevant stakeholders for the duration of the research project.

> [Despite arriving an hour late due to traffic, the participant looked composed and ready for the interview] *"For me, I think, if we do research and it doesn't make it into policy and programmes, it's just a complete waste of time.* [as a researcher from the private sector, he was eloquent regarding research uptake issues] *So, I think research uptake is everything, I think research uptake is the entire point of doing research".* (Participant 18)

> *"Research uptake, I think it's these activities that contribute to the use of research in practice and that also will influence policy or decision making to those people that are supposed to make decision for the department."* (Participant 4)

> *“What is vital is that, from very, very early on, we* [short pause affirming that it is currently not happening] *researchers should be talking and engaging with people in the services, at different levels: provincial, district, national.”* (Participant 7)

The goal of research is to address local health priorities and policy development through effective engagements between stakeholders. This view is corroborated in a study by Young *et al.* (2017: 24), who highlight a growing awareness among research stakeholders of the need for evidence-based practice and policies in developing public health systems.

5.3.1.1.2 Category: Impediments to research uptake

Scientific research is systematic and its goal is to solve a problem. However, multiple factors are influencing research uptake in literature, including lack of time, availability of research evidence, individual motivation, and more (Curtis *et al.* 2017: 862). Participants acknowledged that there are a substantial number of impediments which affect research uptake, particularly in low-resourced countries. These broadly included the usefulness of research, access to research, data quality issues, and research processes that do not conform to acceptable scientific research standards.

a) Relevance and usefulness of research

There was a strong feeling among participants that research should be current and useful in addressing real-life problems affecting government. This view is further corroborated by Masters, Anwar, Collins, Cookson and Capewell (2017: 827), who indicated the need to ensure a return on investment in public health interventions, especially when public health research budgets are continuously being slashed. The participants in the study felt a return on investment was missing at present.

> *“…you are here in government* [she stressed], *you must help government to solve its problems … So, it’s applied research here and what’s the function of applied research? Solve pertinent problems.”* (Participant 16)

> *“…usefulness of your research output. Somebody may not uptake something because it doesn’t feel that the research is useful or that* [little pause, as he

> composed himself to emphasise the importance of conducting needs-based research]… *or doesn't feel that this research would address his or her real-life problems."* (Participant 10)

> *"…most of the research that gets conducted here is not informed by the challenges that we have in the province or the challenges that we have in the department."* (Participant 19)

b) Awareness and access to research conducted

Lack of feedback by researchers appeared to be a contributory factor to low research uptake. This was attributed to a lack of awareness of, or access to, research findings among participants in this study. Awareness and the accessibility of research evidence are key to research uptake. This was emphasised by Goodenough, Fleming, Young, Burns, Jones and Forbes (2017: 392), who state that research uptake begins by fostering awareness of public health research evidence.

> *"Oftentimes, the people that most need that, those insights, those findings, don't even have access to them, might not know that the research was even done."* (Participant 18)

> *"A lot of research gets conducted, and you don't get to know the results, the recommendations, and how that can inform policy. So, it's a gap to me."* (Participant 19)

c) Unreliable research and data quality

Recognising the importance of reliable and quality research for decision-making, participants demonstrated low levels of trust for produced research evidence, mainly attributed to methodological factors, lack of consultation, and lack of critical appraisal skills.

> *"So, some of the findings you'll find that the how part, how did they come to conclusion of that finding, some quality and also the methods that they use should be…sometimes is questionable."* (Participant 21)

> *"…here's a lot of information floating around but it's just what can we trust? I think that is the main issue that limits uptake. Can we trust it or do we stick with what we know? And you know human beings, we stick to generally with what we know."* (Participant 3)

The ability of policymakers and some programme managers to effectively assess the quality of research was also questioned:

> *"Some of the factors that are limiting research uptake is that, in my view, we don't have maybe people who are grounded as researchers who understand the important of research in making decisions for policymaking or for implementation of programmes."* (Participant 19)

In an environment receptive for research findings, availing high-quality research by researchers can substantially promote research uptake, and the opposite is the case when decisions are based on questionable findings. As argued by Dowell, Blazes and Desmond-Hellmann (2016: 190), the quality of data in many developing countries is often too poor for healthcare practice and policy.

d) Poor and inconsistent data collection processes

Some participants expressed the view that the use of routine clinical data for research purposes frequently led to inconclusive research findings due to data quality aspects. This is compounded by paper-based systems being used to capture data from patients in most public health facilities. While acknowledging data quality issues and the limited choices available to them, participants clarified.

> *"Though the data that is being collected it's not the true representative of what the services are being rendered in our primary healthcare because there is poor recording and hence it does skew the planning when it comes to policies."* (Participant 4)

> *"It's unfortunate to a large degree that we are using such paper-based systems and, so, it means* [looking down for few seconds-acknowledging the difficulties that clinicians are experiencing regarding data quality] *…in the middle of the night when*

> *we are short on staff, if I don't record the birth of your child in the register, then it will not be there, even though it may have happened, and, because it must be written by hand, it's possible for that to slip through."* (Participant 3)

One of the participants felt that often a decision is incorrectly taken due to delays in capturing data as a result of a shortage of resources, which include poor network connectivity and human resources.

> *"… there's a wrong number that's just typed in and then it sort of stands out as an obviously wrong number but often it's underreporting because of late capturing, files are piling up, there are backlogs or the system was offline, and then it makes it a bit difficult to interpret the findings 'cause you're not sure…"* (Participant 12)

These expressions by participants on continuous data quality challenges could lead to errors in clinical care (Kumar, Gotz, Nutley & Smith 2018: 1). An in-depth discussion about these challenges is presented in Chapter 7 of this study.

5.3.1.2 Theme 2: Research use for decision-making

Using research evidence for decision-making has not been adequately implemented. This is despite an awareness among participants of the need for decisions and policies to be influenced by scientific evidence. According to Turner, D'Lima, Hudson, Morris, Sheringham, Swart *et al.* (2017: 1), this has been attributed to cultural and organisational factors preventing research uptake. Similarly, several significant challenges were experienced by participants in accepting research evidence for decision-making.

5.3.1.2.1 Category: Research findings to inform decisions

A fair requirement for considering research evidence, as indicated by participants, was good quality research, conforming to rigorous, acceptable standards of scientific investigation. Dumitriu (2018: 31) argues that the availability of research information for planning purposes is highly valuable for managers looking for programme and policy solutions.

a) Acceptable quality research

The use of acceptable quality research for healthcare practice and policy development is an important strategy for improving healthcare systems (Katowa-Mukwato, Mwape, Siwale, Musenge & Maimbolwa 2018: 502). Participant 10 described acceptable and quality research in relation to his daily routine practice. He started opening up and drawing a line between government and a private institution:

> *"So, in my environment, we are recipients of outputs of research and that informs what we do, from time to time. Even the strategies that we utilise in doing them, they are usually based on research."* (Participant 10)

For research uptake to happen, the quality of research findings ought to be acceptable to research users. This should be based on local research needs and available resources (Rasanathan, Atkins, Mwansambo, Soucat & Bennett 2018: 1).

> *"So, decision making* [she paused and composed herself]*… current research also affects that we have done and also what is out there. The guidelines, the policies. So, there are many things that inform what we do, the activities."* (Participant 13)

> *"So, if you have reliable data, then you can actually focus on the real problem areas."* (Participant 12)

b) The role of informal research

Most participants acknowledged a growing trend of using informal research for decision-making. It appeared that the driving force behind using informal research was often the need to make quick decisions, as emphasised by the quotes below.

> *"Our environment is very, very fast-paced, so we do not always have the luxury of waiting to conduct full structured formal research before we take decisions. We can just identify a problem…we go through the steps of a typical research but it's a very quick process where we identify a problem and we say which method will be used to understand what is the problem."* (Participant 10)

> *"… but, when it comes to* [voice broke, she looked down a few seconds justifying the use of administrative data]*…, it's a research but it's not formal. It's not that formal research."* (Participant 4)

> *"… I think we are doing it to some extent, especially with our data reviews. I don't think that strictly counts as research but it's a quick, fast snapshot of what's going on, which informs our work for the next day or the next week."* (Participant 12)

Using routine primary care data depends on the completeness and accuracy of available databases (Houston, Probst & Martin 2018: 25), and this view is further substantiated in Chapter 7 of this study.

5.3.1.2.2 Category: Factors affecting research use

Governments have a growing interest in research uptake, which requires both access to research evidence as well as the skills to use such evidence (Rodríguez, Hoe, Dale, Rahman, Akhter, Hafeez *et al.* 2017: 1). Several factors were observed by participants which contributed to low research uptake. However, most factors identified by participants were organisational in nature, and linked to the unavailability of resources.

a) Lack of budget

Financial constraints were cited by participants as an important factor in the uptake of research for practice and policy, due to a number of competing priorities. Some participants believed that the alignment of research initiatives with an available budget would facilitate the implementation of research findings.

> *"In the department, indeed we have been working under budgetary constraints and because we are working on a minus on accruals, so in such a way that we do not have enough budget to allocate to research. Because unfortunately, with research, you don't see immediate results. It's long-term."* (Participant 19)

> *"One of the reasons given by the DoH person was that they don't have money to implement that in every district hospital. There's no money. The budget doesn't allow." (Participant 13)*

> *"But I do think that's a big downfall with research is that it often generates solutions that would be wonderful solutions if you had …tens of millions of rands but maybe not good solutions for the situation that we actually have*." (Participant 8)

From these views, it can be noted that research has not been prioritised due to other competing concerns. Similar observations emerged in low-resourced countries in which there was the lack of a dedicated research budget for research uptake (Nair, Ibrahim, Almarzoqi, Alkhemeiri & Sreedharan 2019: 1147), and this view is substantiated further in Chapter 7 of this study.

b) Lack of resources

In addition to the shortage of financial resources, essential equipment necessary to implement research findings would, at times, not be available. This finding is supported by the following three quotes in which participants displayed varying degrees of frustration with the current resource status.

> *"… they don't have enough clinicians to deploy..."* (Participant 10)

> *"They were called centres, Centre for TB. Why?…if you talk of an ideal hospital, you must have a proper outpatient, you must have a laboratory, you must have a x-ray department, you must have all those necessary resources that are needed for TB."* (Participant 20)

> *"PubMed and then Cochrane Library, which is similar to looking at these meta-analyses and so on, but, for those things, you need computers, internet access, and you may need to pay a fee to be …like a subscription almost and I wonder if, in terms of that, the province may not want to look at providing access for some."* (Participant 3)

On a similar sentiment as the shortage of budgets for research uptake, the shortage of resources is also prevalent, particularly in low-resourced countries. As Kumar *et al.* (2018: 1) alluded, this has the potential to impact negatively or lead to errors in population health management and clinical care. It is therefore critical for researchers to consider the context and resources available to them when conducting their research and making recommendations.

5.3.2 Domain 'Context'

The domain 'context' focusses on organisational characteristics that foster a conducive environment for research uptake. According to Holt *et al.* (2018: 1111), the organisational characteristics in this domain refer to issues of organisational culture, leadership, and the general approach to evaluation. Two relevant themes were associated with this domain, namely the role of government and various stakeholders that can mediate research uptake.

5.3.2.1 Theme 3: Role of government

A general feeling from participants was that government has a responsibility to enhance research uptake through research reprioritisation, fostering collaboration, and providing a leading role in facilitating investments on research uptake. Kasprowicz, Chopera, Waddilove, Brockman, Gilmour, Hunter *et al.* (2020: 8) established a lack of enthusiasm from some African governments regarding prioritising public health research uptake as most countries, on average, spent approximately 0.4% of GDP annually on research, instead of the 2% suggested by the WHO.

5.3.2.1.1 Category: Government and research

Most participants indicated that government is lagging in promoting research uptake due to not being research or academically oriented. This results in research not adequately being prioritised, and it is selective in picking which areas of health conditions must be prioritised. However, Rodríguez *et al.* (2017: 2) argue that researchers ought to understand the individual capabilities of research users in governments.

a) Audience not research or academically oriented

Several participants acknowledged that when disseminating research findings to targeted government audiences, it is essential to consider the language used in disseminating the information. As seen in the quotes below, the level of understanding in research is critical.

> *"…because now, if you go deep and become academic, you are not dealing with* [voice breaks as she gathers her thoughts on how to put her response clearly]*… for consumption by politicians, firstly. They may not have gone that far in their education. So, you have to be as practical as possible in your findings. At the same time, we don't compromise standards. So, equality, it has to be good."* (Participant 16)

> *"And the culture of reading is not very prominent here where people read research results, research journals, and so on. So, we just work as government officials based on the strategic plans that we have."* (Participant 19)

A government engaging in research evidence gives a sense of hope for promoting research uptake. Bertolo, Hentges, Makarchuk, Wiggins, Steele, Levin *et al.* (2018: 756) recommend that researchers endeavour to understand the culture and motivation of research users.

b) Research insufficiently prioritised

As established in Chapter 2 (see Section 2.3.1), it is incumbent on government departments across the globe to prioritise research uptake. Participants indicated an existing and continuing culture of insufficiently prioritising research within various government departments, as acknowledged by the following participants:

> *"I don't know if research is given prominence within departments. When I was there, it wasn't."* (Participant 10)

> *"...as a department, I will be talking as a department, we don't take research seriously, to be honest. We don't take research as one of the key aspect(s) in the department."* (Participant 21)

> [Looking distressed about lack of research uptake] *"…we also feedback to district management and…provincial management …to district management and to the*

> *facilities, like the hospital management, they were not very receptive."* (Participant 13)

In general, there is a failure of government to consider research findings when formulating policy or guidelines, and this was experienced by participants. It was not only the fact that research feedback reports were not forthcoming, but that even when provided, the findings were not considered. Fleming, Greene, Li, Marx and Yao (2018: 1139) similarly reported that an increase in government-funded research projects is likely to stimulate research uptake.

c) Government focus is selective on health conditions

There was a general feeling from participants that some important research areas are ignored by government in favour of others. An example provided was *Mycobacterium tuberculosis* (TB) disease, which some participants felt is not getting the necessary attention from government.

> *"I think there's a problem with TB management, probably, the way it's been ignored and yet it's the biggest killer."* (Participant 13)

> *"Where there's money, people get interested. That's why the politicians also get interested because there are resources. And whereas, with TB, there are no resources, so it is not unique to Mpumalanga."* (Participant 19)

> *"…whether they don't understand or they're just not interested in seeing the TB issues resolved. We had an issue with the political will in South Africa."* (Participant 13)

Government has a responsibility to ensure a supportive public health research environment. Baker, Friel, Kay, Baum, Strazdins and Mackean (2018: 101) attribute the selectiveness of government to address certain public health conditions to media and political discourse; limited supporting evidence; institutionalised norms and ideologies; and leadership, among others.

5.3.2.1.2 Category: Beneficial collaborations

There are a few collaborations that either exist or could exist to assist the government in identifying and solving problems experienced in the health system. In this section, some of these collaborations are discussed together with possible limitations. Kalibala and Nutley (2019: 214) argue that engaging stakeholders and end-users from the inception of a research project throughout the study is good for research uptake.

a) Researchers and government engaging to find solutions

Closing the gap between researchers, programme managers and policymakers requires a concerted effort from all relevant stakeholders. As emphasised by Masood, Kothari and Regan (2020: 7), the use of robust public health research findings has been strongly encouraged in bridging the engagement gap between research producers and users. Hence, most participants in this study acknowledged the existence of the gap between all relevant stakeholders.

> [Sounded optimistic about closing the gap between different research stakeholders, the participant with a calm voice alluded] *"it's so important to bring the researchers and the policymakers closer together."* (Participant 17)

> *"…if I look at the stuff we've done in Johannesburg, we have had some contact with Department of Health but, most of the projects, there isn't a link to government. So, I think, in terms of uptake at policy level, it could be a lot better than it is."* (Participant 6)

> *"…to have research focussed on a question that the province sees as a high priority and the researchers acknowledge and share that as an important question and know that they can do good research in this environment and that, together as a team, they agree that this is important research to be done."* (Participant 17)

b) Collaboration with universities

This study revealed that while a lot of research is conducted at universities, the results do not get conveyed back to government. According to literature, collaboration with academia increases research capacity and ensures high-quality research output

(Owusu-Nimo & Boshoff 2017: 1099). Participants emphasised that government is responsible for ensuring that research undertaken in universities is communicated back and is aligned with local research needs. This should be done by drafting a memorandum of understanding (MoU) with universities.

> *"I've become quite critical of self-serving research, research that never comes out of the university, never is taken up."* (Participant 9)

> *"… after having conducted the research, you don't even know what the results are. They are not shared with management to say these were our findings, these are the recommendations.* [With a brief pause and a depressed facial expression, she took a glass of water for a sip before acknowledging the challenge]*… So, we just work as government officials based on the strategic plans that we have."* (Participant 19)

> *"…most of the research work is being done from the university, like if you do a degree…otherwise, the department, there is not much of research happening. So, the other problem, we don't have a* [ethics] *committee. If you want to do a research, you need a [sic] ethical approval. We don't have a committee. So, that also hinders or delays because you had to pay money to other ethical committees, so the process is very long."* (Participant 1)

> *"… the universities with which we have MOUs, partnerships, they must also be made aware that this is our research agenda. It must be sent to all the universities that we have a relationship with. … It must work for us."* (Participant 19)

However, the lack of a medical school or department at a university in Mpumalanga was experienced as a challenge to generating high-quality research.

> *"… the Mpumalanga University doesn't have a medical faculty, or not yet in any case … if we had closer collaboration with some sort of university, it would actually help because it would bring that academic input and push from proper qualified people with an academic background and who are interested in high-quality research."* (Participant 12)

c) Collaboration with private healthcare partners

In addition to partnering with universities, participants felt that government should strengthen collaboration with private healthcare partners, and use them as a resource in research uptake. Several private healthcare partners have the resources to support public health research uptake. According to Larkan, Uduma, Lawal and van Bavel (2016: 1), such collaboration can be effective when all parties agree in advance to a common research agenda. Participants further provided examples of how prior collaborations with independent health and research units have been successful and beneficial.

> *"… we participated in an evaluation of decentralised drug-resistant TB care in the province. The main aim was to check how far…that policy that was set up in twenty eleven, how far it was implemented in the province and also the quality of the implementation of that."* (Participant 13)
>
> *"What I liked about the project was the fact that the department actually wanted a very scientific approach to it. I liked it.* [she glowed when narrating about the interaction she had with research stakeholders]*… they were …very much involved with site visits, with data collection, and all of that. And the recommendations were also utilised by the department. And there was also the feedback session for the districts and all of that, … So, it was a study that added value to the department"* (Participant 10)

5.3.2.1.3 Category: Challenges experienced in working with government

Government plays a vital role in research uptake in terms of utilising research findings for decision-making. According to Glied, Wittenberg and Israeli (2018: 1), an important instrument for research uptake is linkages and exchanges between researchers and government officials. Participants reported some of the challenges they experienced during encounters with government.

a) Availability and inflexibility

Lack of organisational support (Jordan *et al.* 2016: 50) for research uptake processes were experienced by several participants in this study. In the process of working with government, participants in this study noted that government's availability for research uptake meetings was problematic at times. The inflexible attitudes displayed by government were another area of concern. According to the participants, this assertion is entrenched so that despite available evidence, if it is not a priority for government, it will not be accepted. Participants narrated a gloomy picture of missed appointments with government:

> *"So, yes, researchers are sometimes negligent, they don't put the time necessary, to meet with policymakers …but, of course, policymakers have got to be available and often you guys are really busy or we have an appointment and then it's cancelled because you've got meetings and so on."* (Participant 17)

> *"you go to some places, people are completely incapable, and they are not even to be disturbed. You can't even disturb them with new research findings."* (Participant 10)

Another researcher felt that *"They don't care about the research …"* (Participant 14), using hand gestures to emphasise that research is not a priority in most government departments.

b) Bureaucracy and political influences

Participants expressed the view that bureaucracy and red tape found in government slows the process of obtaining gatekeepers' permission. However, they acknowledged that political influence can have a positive effect on research uptake when research has buy-in from politicians, although some political influences were experienced as being negative or corrupt and not always to the advantage of the province. In a study by Uzochukwu *et al.* (2016: 13), the authors found low interest among decision-makers to use research for practice and policy, which was greatly influenced by the political context within the country.

> *"…think there's a lot of layers that things have to go through, there's a lot of bureaucracy somehow. …all the different provinces and they all have their own different take on things and it just takes so long before you can actually start implementing things."* (Participant 12)

> [Agreeing by nodding her head] *"...I think that's a huge issue in Mpumalanga with people below that political ceiling being afraid to make a change because the people above won't make changes because they're singing to these other people's tune. So, political contra-employment and political strings"* (Participant 5)
>
> *"For example, if you are in a working environment and then there are politicians … They will look at what makes them to win at that time. So, it really affects. And the issue of research is something that is not even on their agenda."* (Participant 11)

Most of the participants shared a similar sentiment that the lack of capacity in government obstructs the uptake of research for practice and policy. As a researcher, it can be frustrating to have a great idea connected to a seemingly important need, yet still being unable to contribute to research uptake and have an impact on the daily life of the relevant public sector decision-makers.

5.3.2.2 Theme 4: Research uptake stakeholders

Research uptake stakeholders are an important component of public health research uptake (Pollock, Campbell, Struthers, Synnot, Nunn, Hill *et al.* 2017: 2). The expectations and concerns of key research stakeholders in this study, which included researchers, frontline staff, programme managers, private research units, academic institutions, and the role of communities, were explored as they impact on the quality of research generated in the province and the resultant uptake.

5.3.2.2.1 Category: Part-time researchers

Pollock *et al.* (2017: 2) defined 'stakeholders' as any potential research knowledge user whose primary job may not be directly in research, including communities, patients, health professionals, decision-makers, and others. Participants, such as frontline staff and programme managers, whose core function does not involve research, but who nevertheless are either engaging in their own research or are required to incorporate research in their activities, found matters challenging. This was especially true in terms of a lack of time and experiencing poor support from line managers.

a) Time and responsibility constraints

Often, research is neglected because it is not participants' core function of duty. This is indicated in the quotes below, where participants highlighted a lack of time for conducting research:

> *"We're not paid to sit and do research. We're paid to assist the Department of Health to quickly fix the problems on the ground with practical things. …so, you look at your clinics, you see which ones have got higher numbers, lower numbers, and you run there, you fix the problem, and you show them the new numbers."* (Participant 12)

> *"For instance, if you are a full-time worker and you have got a lot of other competing activities at work and it limits your interest in research. … I have to go and attend meetings, and then I have to conduct my research during my spare time, which will depend…and even other activities in the society, we are living in a very busy society."* (Participant 20)

> *"I think that's why most nurses they are not doing the research because of time. … We are overworked and always tired. You have to sacrifice your resting time and your sleeping time."* (Participant 15)

Lack of protected time and responsibility constraints were cited by frontline staff as one of the limiting factors for research uptake. This is in line with previous research that found 97.1% of respondents have identified a lack of protected time in a schedule with heavy clinical duties as a common barrier for research uptake (Nair *et al.* 2019: 1147).

b) Lack of support

Participants experienced a profound lack of support and encouragement from multiple sources such as government, research committees, line managers and other researchers. Participants argued that:

> *"The environment is just not conducive and the people's support, the researchers are not getting the relevant support from their managers."* (Participant 16)

> *"If you're in the university and you have to write your thing, you will have a supervisor and you will have your internal structures and they will tell you what to do but, if you're out here, then you might feel I'm by myself, how can I do research?"* (Participant 12)

> *"If we are really serious about remaining up to date and current, at the very least there should be some support of that, my belief. It would go a long way to encourage people to continue in that way."* (Participant 3)

As established by Pollock *et al.* (2017:2), active involvement of all stakeholders improves the quality, relevance, and the impact of health research. The researcher was of the view that managers, as those closest to part-time researchers, are the cornerstones to drive and encourage research uptake.

5.3.2.2.2 Category: Full-time and international researchers

Unlike part-time researchers, there are those whose core function is research. These are students at universities who conduct research for the duration of their master's degrees or PhD, and international researchers affiliated with independent research units who arrive for a specified period to conduct research. One of the challenges experienced with these researchers was that their primary focus was on getting their studies published, as vehemently indicated in the quotes below:

> *"So, in my experience, a lot of research, the aim is really just to publish in a journal or to present as a conference. The influence that we've had from the foundation is to say that is not your metric for success. Your metric is to produce something that people can make practical use of."* (Participant 18)

> *"Sometimes researchers are doing research not primarily to influence policy but to enhance their publication record and professional development and, at the end of*

> *the day, the research that they do, they are not linked into the strategic plans of the government."* (Participant 7)

> *"When the research ends and I want information to go back to the community, it's so hard to get because they're out the field now. They don't really care about us,… about the community here. They care about their peer-reviewed papers. So, while they're busy writing peer-review papers, they're not thinking about what … this mean(s) for South Africa, … the South Africans."* (Participant 5)

Fussy (2018: 210) argues that for a substantial number of researchers, the publication of research findings in peer-reviewed journals appears to be their main incentive. There is considerable consistency between the experiences of participants, as expressed above, in relation to full-time and international researchers' desire to publish in peer-reviewed journals. The researcher was of the view that successful research uptake requires a functioning research culture, which is often lacking in some provincial departments.

5.3.2.2.3 Category: Independent research units

Whereas some participants, especially those from the government sector, expressed doubt about the quality of research and data being used (see Section 5.3.1.1.2), researchers from equipped and funded research units expressed confidence in the quality and reliability of their research projects:

> *"I'm biased but I think the research that we've done has been very solid."* (Participant 18)

> *"There's very few people who do the quality of research that we do in a rural area. Have you seen our lab? We do amazing research here. We've got minus-eighty freezers."* (Participant 5)

> *"It's a research infrastructure to conduct population-based research in a rural area where we've needed to build an infrastructure for research that is so excellent that it can compete with the best research centres internationally."* (Participant 17)

In countries where health research systems are less developed, tapping into resourced private institutions and universities is beneficial to the quality, relevance and impact of health research as indicated by the participants in this study. Sombie *et al.* (2017: 89) argue that the fragile context of these countries requires long-term engagement, and support from regional institutions is needed to address existing research uptake challenges and build local research capacity.

5.3.2.2.4 Category: Funders

Several local and international institutions were key in sustaining health research by funding some research projects and/or research institutions (Grepin, Pinkstaff, Shroff & Ghaffar 2017: 1). There are positive and negative aspects to funders; they increase the quality of research and performance but may also have their own priorities.

a) Local and international

Research units received some local funding, but international funders predominantly funded most of their research projects.

> *"So, the way we do it was we raise money is through science funders, like the National Institutes of Health in the United States, the Medical Research Council here, the Medical Research Council in the United Kingdom. They are big, big funders at the moment. … they're highly competitive."* (Participant 17)

> *"So, we applied for funding. So, the project is funded by SAMRC, so South African Medical Research Council, and it's funded by overseas…an overseas funder called the Newton Fund and it's also funded by GlaxoSmithKline. So, it's quite a weird combination of funders … So, those are the stakeholders."* (Participant 6)

There is increasing activity among international funders and fewer local funders are contributing to research studies in the local settings. Although these funders emphasise publishing in peer-reviewed journals, research funded through the funding institutions is of the highest scientific standard and could be appropriate for research uptake to practice and policy (Shepherd *et al*. 2018: 2).

b) Drives performance and standards

Participants strongly acknowledged that funders of research projects demand high levels of performance and standards which raise the quality and productivity of the research being undertaken:

> *"So, everything we do, … is performance based. So, funding from the funders, the level of funding, is based on performance and, as such, all decisions you make will be geared towards improving performance."* (Participant 10)

Similarly, another participant felt that justification for continuous funding depends on performance improvement.

> *"The immense pressure on time. USAID see…our funders see something yesterday and they want an improvement tomorrow."* (Participant 12)

As reflected above, it is worth mentioning that improvement was vehemently emphasised by participants for the amelioration of future performance in conducting high-quality research studies.

> *"research … at the highest standard required by the funder."* (Participant 17)

As highlighted, the funding of research projects resulted in improved performance and high-quality standards. This view was corroborated by Guthrie *et al.* (2018: 3), who established that approximately 95% of United Kingdom medical research funding was allocated based on peer review.

c) Agenda is set by the funder

A potential disadvantage of having funders is that they have their own priorities and dictate the type of research to be conducted. Sombie *et al.* (2017: 96) argue that the alignment of priorities between funders and research users has the benefit of greater involvement from local stakeholders, which in turn maximises the potential for research uptake.

> *"…usually research drives the mandate we get from the funders."* (Participant 10)

In some instances, it was found that funders' priorities do not meet the needs of the province, as corroborated below:

> *"So, the funders will say we'll fund research on pneumococcal disease. We haven't found that pneumococcal disease is a problem in our community but we have a researcher who's interested and says can I do it here? And then of course we're gonna say yes. So, …you get it. It's because of the funder."* (Participant 5)

Furthermore, a participant felt strongly that there is a need for an enormous adjustment in terms of greater alignment between funders' research needs and provincial priorities.

> *"I think it would be very valid for the province to go to the foundation and say we appreciate that you're funding this but, if you want it to be taken up, we would also like you to consider X, Y, and Z. And I think it's incumbent on funders to take that seriously, to say, if we're funding research, let's make sure we're also funding the uptake piece adequately."* (Participant 18)

d) Up-skilling and building local capacity

The need for researchers, research units and funders to give back to the province and assist with local up-skilling and capacitating was deemed imperative for research uptake. Although Franzen *et al.* (2017: 1) argue that major impediments exist in low- and middle-income countries regarding public health research capacity development, participants in this study felt little had been done to improve local capacity. This is substantiated in the quotes below:

> *"I would like to see our young scientists being up-skilled and doing research that's relevant for us without people coming in from outside doing the research and taking what they want back out. I feel very strongly about that. I feel that it's fine to have people coming in to up-skill and allow our younger generation to be the future, not people coming in and going out and not capacitating locally."* (Participant 6)

> *“You’re using our facilities, you’re accessing our population, what are you gonna give us back? I think you’re entitled to ask that.”* (Participant 5)

> *“And it doesn’t even have to be people from outside the country. …What am I gonna give back? There’s a primary healthcare clinic right here. You can go and have a meeting and tell the nurses what you found in the study or whatever. There’s so much you can do, particularly in an under-resourced area where people don’t have access to a lot.”* (Participant 6)

5.3.2.2.5 Category: Programme managers/policy developers

It was interesting to note that despite the communication gap that existed between research producers and research users (see Section 5.3.2.1.2), programme managers appreciated the role research could play in decision-making, although they were sometimes excluded from research being conducted in the province.

> *“I understand the value of research and how research can assist us as programme managers or as strategic managers in basing our decisions on research. Not on assumptions or not on the usual practice that we’ve been doing this over year.”* (Participant 19)

One participant mentioned that programme managers ought to be involved from the inception of a research project rather than when the results are disseminated. This has been a missing link for research uptake because, in most projects, programme managers were not thoroughly informed, as alluded in the quote below:

> *“…programme managers are realising that research is important and data is important but sometimes they don’t know all the research that’s happening because we haven’t involved them from the beginning. So, how can they ask you for results when you haven’t told them what you’re researching. So, that’s something that I need to think about, is…it’s not just results. … Also feedback to managers about ongoing research.”* (Participant 5)

A participant emphasised that input from programme managers should be offered at all stages of the research process.

> *"And then also I should think the issue of opening to programmes manager to say they need to identify gaps, areas of interest in terms of research, so that they are able to provide…will be able to assist in terms of conducting a research."* (Participant 21)

Participants in this study acknowledged that engagement between researchers and programme managers/policy developers using research must occur to better align research findings with stakeholder needs and goals, to ultimately improve practice and policy. Furthermore, Stander, Grimmer and Brink (2018: 1) established that such engagements are vital in improving the quality, relevance and impact of health research.

5.3.2.2.6 Category: Community stakeholder involvement

The most important stakeholder is the community, and participants agreed that all research and efforts are directed to the benefit and upliftment of the community it serves.

> *"we are not researching for ourselves, we are researching for the public, we are researching for the patients to improve high quality care of the patient. Our goal… is the patient."* (Participant 15)

As such, it is important to involve the community at all stages of the research process, starting at the inception stage, for research to be guided by their needs. This should be followed by frequent updates.

> *"The community that would eventually receive the implementation should, from the beginning, be part of the process, the journey."* (Participant 10)

> *"You conceptualise the study, it should be with the stakeholders, first and from the start. You can conceptualise but then engage them as early as possible. And then*

> *frequent updates on that, on the study, progress, feedback at completion, maybe also facilitated discussion on how we could have the implementation."* (Participant 13)

Generally, participants had a strong feeling on the need for communities to be provided with feedback on the results of the research, as a failure to do so would result in a lack of buy-in from affected communities. This would, in turn, limit public health research uptake. It therefore benefits research uptake to involve communities as decision-makers, not just as part of a consultation process (Essex, Ocloo & Rao 2019: 456).

5.3.3 Domain 'Facilitation'

The domain 'facilitation' is supported by making things easier for others to realise research uptake through their attitudes, habits, skills, and creativity in working (Holt *et al.* 2018: 1111). This can be realised by creating manuals, using electronic practice records to document progress, and providing feedback to practices. One relevant theme has been associated with this domain, namely local research committee.

5.3.3.1 Theme 5: Dissemination of research findings

Chambers (2018: 56) emphasises that the usefulness of scientific research is realised only when findings are effectively disseminated and implemented by research users. The reliable and efficient dissemination of research findings to all stakeholders is central to research uptake.

5.3.3.1.1 Category: Insufficient dissemination of results

Brownson *et al.* (2018: 102) established the importance of effective dissemination of research findings to relevant audiences, which is vital for research uptake. However, participants acknowledged that there is insufficient dissemination of relevant information and results regarding research projects within the local settings.

> *“We know that there is research within the department but we don’t know what is happening.”* (Participant 4)

One participant indicated the need to streamline how research findings are communicated to targeted audiences.

> *“So, is it the understanding of clinicians on the ground that this research is going to benefit their practice? And that comes to really how does it get communicated back?”* (Participant 3)

This view was further expressed as an important research uptake gap which needs to be addressed.

> *“…most of the time research gets conducted, a lot of research gets conducted, and you don’t get to know the results, the recommendations, and how that can inform policy. So, it’s a gap to me.”* (Participant 19)

5.3.3.1.2 Category: Feedback forums

The participants’ views indicated that information sharing is critical in public health settings to address the challenges that are experienced. Some participants were enthusiastic about holding research days in which their research findings could be shared, and this should be coordinated by the internal research unit.

> *“I think this research day is a beautiful idea. If it were possible to have one of those say twice a year and somehow to connect with everyone who’s doing research in this province and say come through, … that would allow researchers to learn from each other what’s happening.”* (Participant 18)

> *“So, there was a research day, you organised it if I remember, but that was two years ago. … I can’t remember but I was there. …So, closing the loop of communication. So, the more good stories people share about how research impacted on their performance, the more others will be encourage to uptake*

> *research outputs and the more researchers themselves will be encouraged that what they are doing is having significant impacts."* (Participant 10)

Participants expressed the view that platforms for the dissemination of information should bring together the relevant stakeholders sharing common interests, to make the process more productive.

> *"I don't know if we can have more local symposiums and things… It brings together all the doctors and nurses and pharmacists from the whole province into one room and everybody can sit and someone can present something that was recently published or something and knowledgeable … it's difficult to really know…how people change in their daily practice. But it definitely helps in disseminating knowledge and getting everybody on the same page as well."* (Participant 12)

A feedback forum is one of the preferred reporting modes among participants. Having an interactive feedback session does not only build relationships with end-users, but affords them the opportunity to request additional evidence or gain answers to questions that may require further investigation before uptake decisions can be made (Kim *et al.* 2018: 5).

5.3.3.2 Theme 6: The local research committee

The use of local research committees in preparing contextual knowledge and expertise for promoting research uptake has been established in literature (Uneke, Sombie, Johnson, Uneke & Okolo 2020: 2). However, in this study participants felt that the local research committee is subdued, hence the categories that emerged under this theme included: the envisioned role of the research committee and gatekeepers' permission.

5.3.3.2.1 Category: Envisioned role of the local research committee

On a critical note, most participants mentioned the need for the local research committee to develop health research priorities/agenda. Once developed, research conducted in the province should be aligned with research priorities, which, as noted by participants, does not always occur in practice. The following narratives by the participants were some of the envisioned roles for the health research committee:

> *"… before we can give permission for people to do the research, we need to come up with topics that we want them…researchable ideas, to say this is what we want to know about this particular field…"* (Participant 4)

> *"…where I want to also recommend that maybe those who are approving research studies that must be based on a research agenda for the department to say how is it going to assist solve the problems or generate new knowledge that you will improve service delivery in the province."* (Participant 19)

> *"The full research outputs must be available, that one is non-negotiable. ... But, in addition, there should be a research feedback session where a PowerPoint presentations with basic tables and graphs should be used to communicate the main findings and the same PowerPoint presentation should be made available to the department subsequently."* (Participant 10)

> *"If you're in the university and you have to write your thing, you will have a supervisor and you will have your internal structures and they will tell you what to do but, if you're out here, then you might feel I'm by myself, how can I do research? So, I think if the committee (Local Research Committee) can be visible and accessible."* (Participant 12)

> *"Then you could use your committee to read those, decide what are important for uptake, and channel those up to decision makers at the right level in the province where you really hope that there will be uptake at the right policy level. That's what I think how you could use your committee and that could be really effective."* (Participant 17)

> *"And then it must be the work of the Research Unit to ensure and to put pressure on management that, when results are ready, let us communicate them to…present them to management to say these are the research results, this is where the research has been conducted, these are the recommendations."* (Participant 19)

The driving force behind successful research uptake is the need for quality research studies informed by local research needs (Rasanathan *et al.* 2018: 1). Participants in this study felt that resource-limited provinces should have clear research priorities and a workable research agenda with achievable research goals. Furthermore, the health research committee can serve a pivotal role in promoting engagements among research stakeholders to make research a more dialogic and transformative process.

5.3.3.2.2 Category: Gatekeepers' permission

For researchers to conduct a research study in any of the government facilities or workforces, they need to request permission from accountable officers. Singh and Wassenaar (2016: 42) describe a gatekeeper as someone who is responsible for granting access to an institution or an organisation. Some of the participants were eloquent in raising their dissatisfaction regarding the time it takes for such permission to be granted.

a) Long and onerous process

According to Singh and Wassenaar (2016: 43), the process of obtaining a gatekeeper's permission may be complex, hence researchers ought to understand the multiple influences on his process. Participants felt that the approval process is long and onerous. The researcher is of the view that this paints a pessimistic picture of research as it clearly impacts negatively on several factors such as funding and turnaround time for completing a research project.

> *"What is the timeframe between me submitting something and getting a response? Ethics committees, the reviews, support, general support. I think that is sort of the thing that…to get it off the ground, to know that, if I submit something to a provincial or a national committee, it wouldn't go down a deep, dark hole and … never get a response."* (Participant 3)

> *"it can take six to ten weeks to get permission from Mpumalanga to do a research…. it's just confusing to us because there was a time where we'd get permission from province in two weeks, no problem, and then suddenly it became six to ten weeks."* (Participant 5)

A participant indicated that there was still a lack of interest and involvement, even when research was commissioned by government.

> *"So, I never got a comment: we'd love to hear about it, can you come and do a presentation? Or maybe … we want someone to come and tell us about the project and why you think it should be done at Mpumalanga in our Department of Health."* (Participant 6)

b) Participants' experiences with the research committee

Some participants expressed confusion concerning the role and composition of the local research committee.

> *"I don't think the researchers really even know there's a committee. They know about the office, they know about your office because you give the permission, but the research committee, I don't think they even know it exists, I'm afraid."* (Participant 5)

> *"Support from them (the local research committee) of the findings or recommendations would also improve uptake by everyone. But I don't know if they can actually do that."* (Participant 13)

There was also confusion and frustration expressed on who to contact within the department.

> *"But I think, if people…for me, I wouldn't even know how to contact the ethics committee, honestly. I don't think I know who the person is or what the e-mail address is. Maybe if I Google it, I'll find."* (Participant 12)

> *"They need to be more visible. And we have to understand mostly the roles of that committee. I think perhaps there is a gap there in terms of their roles and functions."* (Participant 2)

The process of obtaining approval casts a dire reflection on the part of government due to slow responses by government institutions. Most of the delays were in part due to researchers' lack of understanding of the approval process (Marland & Esselment 2018: 685).

5.4 SUMMARY

The most significant findings seem to be a lack of awareness and a champion to lead engagements among research stakeholders on research uptake. This was followed by a failure among researchers to align research projects to existing contexts and available resources. Conversely, there is a growing trend of using informal research without consideration of data quality issues. The findings suggest that a visible and active local research committee can play a significant role in promoting research uptake, starting by developing a current and practical research agenda. Finally, collaboration between all research stakeholders is imperative, and it is therefore required to promote effective research uptake for policy and practice, which is in line with the findings from several studies (Forsythe, Frank, Hemphill, Tafari, Szydlowski, Lauer *et al.* 2018: 1161).

The subsequent chapter is comprised of a comprehensive analysis, presentation and description of the results of the survey on the uptake of public health research for healthcare practice and policy. It reports on the quantitative phase which systematically quantified factors influencing the uptake of research for healthcare practice and policy.

CHAPTER 6

ANALYSIS, PRESENTATION AND DESCRIPTION OF THE RESULTS OF THE QUANTITATIVE RESEARCH PHASE

6.1 INTRODUCTION

The previous chapter of this study contained a discussion on the perceptions of key stakeholders on the uptake of research using the PARIHS framework, as outlined in Chapter 4 (see Section 4.3). In this chapter, the results derived from an online survey using a structured questionnaire that was designed following the findings obtained in Chapter 5 are presented to answer the research question: "*What are the main factors influencing the uptake of research for healthcare practice and policy development?"* The factors were thematically categorised into three broader concepts namely, (1) individual factors, (2) organisational factors, and (3) research characteristics.

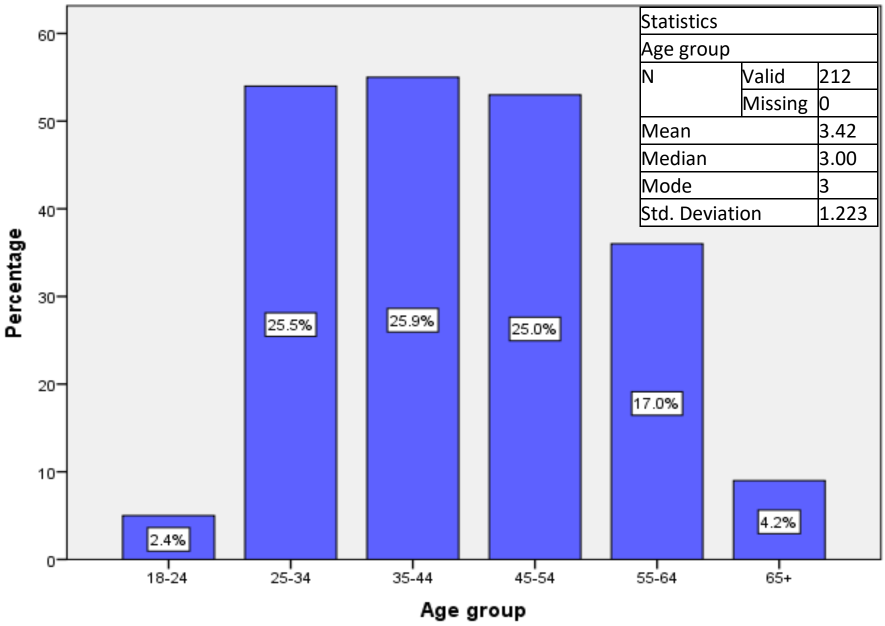
Therefore, Chapter 6 outlines the results that were obtained from interpreting a total of 212 responses which were gathered from an online survey. The results were analysed using the SAS Version 15, SPSS Version 26 and Microsoft Excel. At the outset, respondents' background is provided by analysing their profiles through descriptive statistics. This is followed by factor analysis of variables used for measuring factors affecting research uptake. Tables and figures are employed to summarise the results and present data visually for a quick and easy understanding. A discussion is provided in Chapter 7 of this study. Finally, the chapter is concluded with a summary.

6.2 THE BIOGRAPHICAL DATA OF RESPONDENTS

Respondents' demographic statistics, as indicated in the subsequent frequency figures and tables, illustrate the total number of respondents. The figures and tables were computed according to the following variables: age group, educational attainment, occupation, work position and work experience.

6.2.1 Age group

In Figure 6.1, the age group composition for this study is illustrated. Of the total 212 respondents, 55 (26%) were aged between 35-44 years, followed by the age group 25-34 years, which contributed 54 (26%) respondents. It could thus be noted that those with ages 25-34 years, 35-44 years and 45-54 years represented approximately 77% of the sample size.



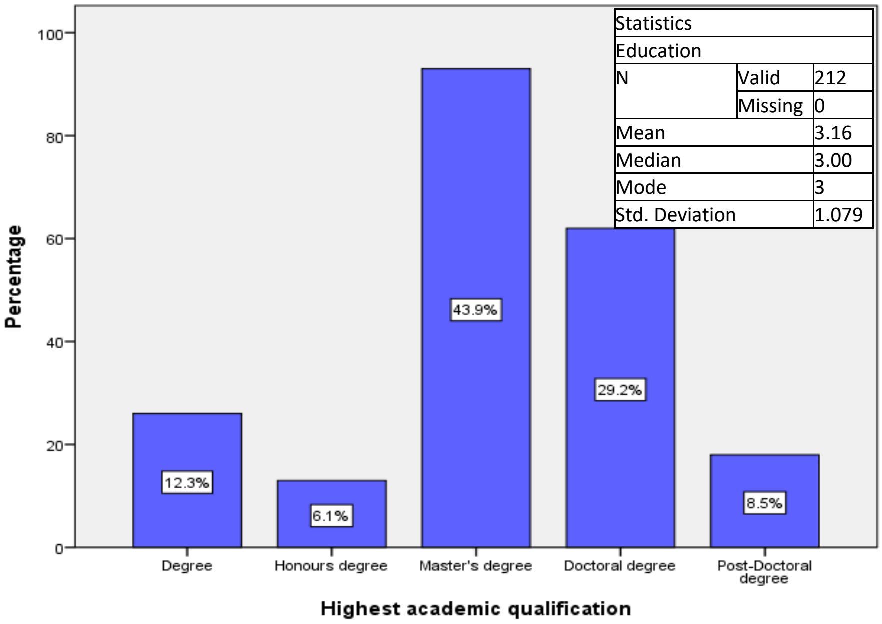
Statistics		
Age group		
N	Valid	212
	Missing	0
Mean		3.42
Median		3.00
Mode		3
Std. Deviation		1.223

Figure 6.1: Age group of respondents

Both the median and the mode scores were 3, representing the age group 35-44 years. The mean age for respondents was 43.7, ±0.7 standard deviation, which indicates a heterogeneous sample with regards to age. Overall, the respondents' age groups suggest that they were reasonably experienced to provide insight on factors affecting research uptake.

6.2.2 Educational attainment

Qualifications obtained by respondents were of particular importance for this study. As reflected in Figure 6.2, most respondents had a minimum of a master's degree. This indicates that the respondents had considerable academic qualifications, deemed important for the study.



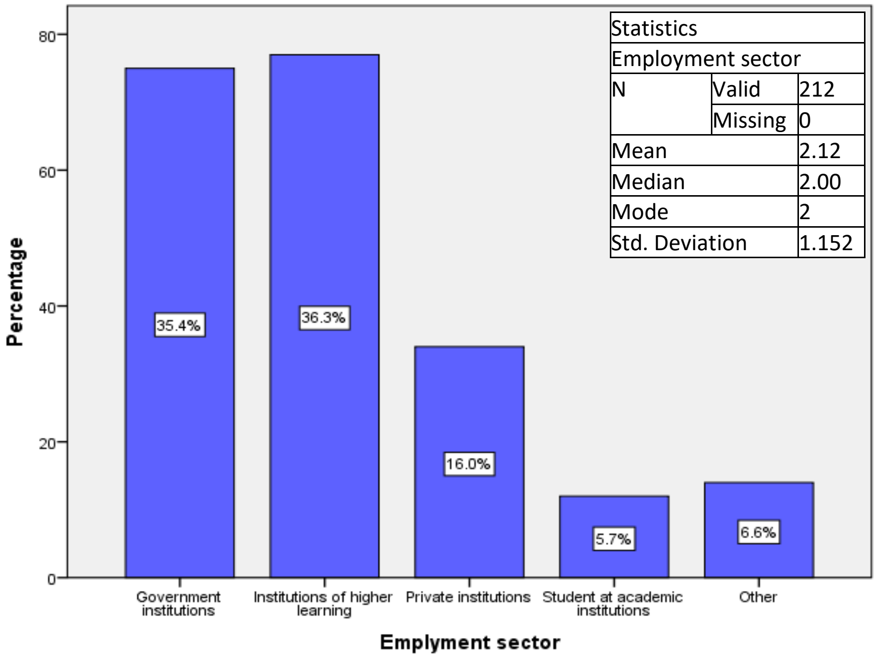
Statistics		
Education		
N	Valid	212
	Missing	0
Mean		3.16
Median		3.00
Mode		3
Std. Deviation		1.079

Figure 6.2: Educational attainment of respondents

In terms of the highest qualifications, only about 12% of the respondents had an undergraduate qualification in the form of a degree or equivalent. This leaves approximately 88% of the respondents with a postgraduate qualification, of whom 13 (6%) had an honours degree, and 92 (44%) had a master's degree. Respondents with a doctorate and above contributed 38% of the study population.

6.2.3 Employment sector

Respondents were asked to indicate their employment sector during the completion of the questionnaire. The researcher could thereby attempt to establish the pattern that mostly contributed to health research in the province, which was also significant for this study. This is shown in Figure 6.3 below. The majority of the 212 respondents who conducted research were from institutions of higher learning (universities and colleges for obtaining a degree or diploma) contributing approximately 36.0%, while 35% were working at government institutions. The remaining participants either worked for the public sector (16%), were full-time students (6%), or other (7%).



Statistics		
Employment sector		
N	Valid	212
	Missing	0
Mean		2.12
Median		2.00
Mode		2
Std. Deviation		1.152

Figure 6.3: Employment sector of respondents

6.2.4 Employment sector versus work experience

Cross-tabulating the employment sector with work experience revealed that the most experienced respondents had ten years or more work experience and contributed 39% of the sampled size, while the least experienced had between zero to two years' work experience and contributed only 2% of the sample size. Accumulatively, respondents who had five years and above contributed approximately 72% of the sampled size. These figures correlate with the relatively high age of the respondents as reported earlier (see Section 6.2.1). Table 6.1 indicates the cross-tabulation between employment sector and work experience.

The result revealed that those with ten or more years' work experience were four times more likely to contribute to health research than those with zero to two years, three times more likely than those with two to five years' work experience, and just above one times more likely to contribute to health research than those with between five to ten years' work experience.

Table 6.1: Employment sector versus work experience

Employment sector	Work experience: Count					
	0-2 years	2-5 years	5-10 years	10+ years	Not applicable	Total
Government institutions	6	9	26	34	0	75
Institutions of higher learning	8	8	30	31	0	77
Private institutions	6	8	8	12	0	34
Student at academic institutions	3	4	3	1	1	12
Other	1	2	2	5	4	14
TOTAL	24	31	69	83	5	212

6.2.5 Employment sector and main position

Table 6.2 illustrates the respondents' positions in their respective sectors of employment at the time of data collection.

Table 6.2: Employment sector versus main classification

Employment sector	Main classification				
	Frontline workers	Researcher	Policy/Programme manager	Senior manager	Total
Government institutions	29	14	16	16	75
Institutions of higher learning	5	37	15	20	77
Private institutions	4	13	6	11	34
Student at academic institutions	2	10	0	0	12
Other	7	5	1	1	14
TOTAL	47	79	38	48	212

From Table 6.2, it is evident that researchers accounted for 37% of the respondents, with senior managers and frontline workers accounting for 23% and 22%, respectively, of the sampled size. Policy/programme managers only contributed 18% of the sampled size for this study. Approximately 62% of frontline workers who participated in this survey were from government institutions. A total of 39% of programme managers who participated in this study were from government institutions, while a further 39% were programme managers at higher education institutions. Senior managers who participated in this study included 42% directors from institutions of higher learning, and 33% directors from government institutions. Private institutions contributed 23% of the senior managers of the sampled size.

6.3 FACTORS AFFECTING RESEARCH UPTAKE

The researcher established (see Tables 6.4.2.4, 6.4.3.4 & 6.4.4.4) a total of 13 components from the survey responses which were categorised as individual factors (4 components), organisational factors (4 components), and research characteristic factors (5 components). A mean average of 3.00 indicated that respondents were neither agreeing nor disagreeing with the listed items of factors affecting research uptake, whereas a mean average of 1.00 indicated a strong disagreement, and 5.00 strong agreement with listed items.

6.3.1 Mean scores of factors affecting research uptake versus categories of respondents

Respondents were categorised into four main groups as per their line of function. These categories were: researcher, frontline/practitioner, senior manager/director, and policy/programme manager. In Figure 6.4, the results show similar patterns regarding the overall mean averages among respondents. However, the mean averages for frontline staff/practitioners were low in almost all individual factors as compared to the other groups of respondents, in particular on ‘time constraints’ (mean= 2.93) and lack of ‘support’ (mean= 2.66). Frontline staff/practitioners also had lower mean averages on the variables ‘resources’ (mean= 2.73) and ‘quality of evidence’ (mean= 3.13) compared to the other groups. Conversely, policy/programme managers had low mean averages on the variables ‘research agenda’ (mean= 2.45) and ‘accessibility of research evidence’ (mean= 2.39) when compared with the other groups. Lower mean averages were also observed for senior managers or directors on ‘gatekeeping processes’ (mean= 2.93) and ‘local research committees’ (mean= 2.71) as compared with the other groups.

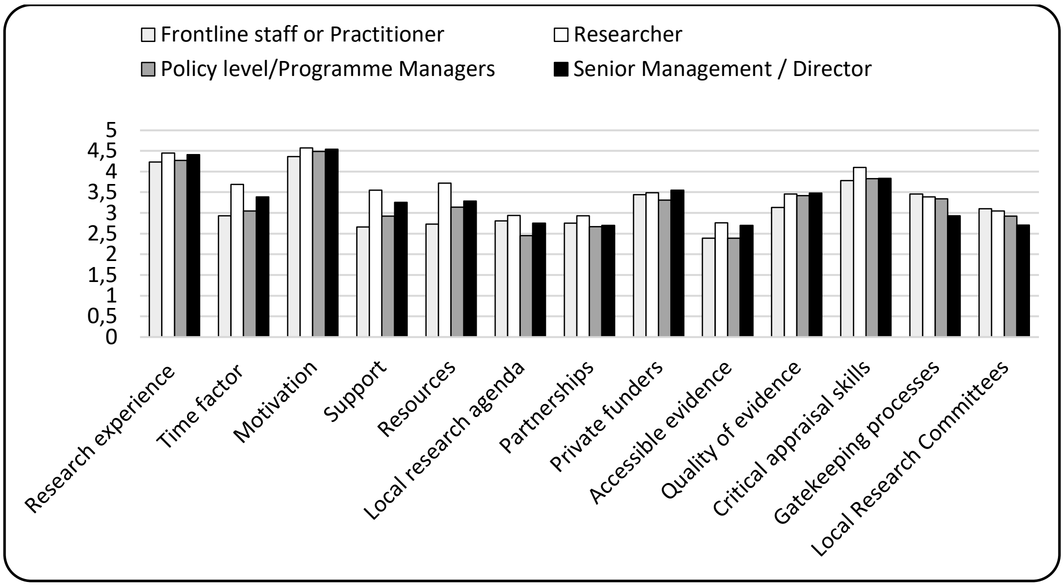


Figure 6.4: Average mean on research uptake factors per classification

In comparison with the other groups of respondents, researchers had higher mean average values on the variables ‘time factor’ (mean= 3.69), ‘support’ (mean= 3.55), ‘resources’ (mean= 3.72), ‘research agenda’ (mean= 2.94), ‘partnerships’ (mean= 2.93), and ‘critical appraisal skills’ (mean= 4.10). Whereas, senior managers/directors had higher mean average scores on the variables: ‘experience’ (mean= 4.41), ‘motivation’ (mean= 4.54), ‘private funders’ (mean= 2.93), and the ‘quality of research evidence’ (mean= 3.48) compared to the other groups of respondents.

6.3.2 Average mean scores on factors affecting research uptake versus employment sector

Figure 6.5 illustrates the average overall mean for research uptake factors against respondents’ employment sector, namely government employee, private or non-governmental research institution, universities or institutions of higher learning, student at academic institution, and other or unemployed.

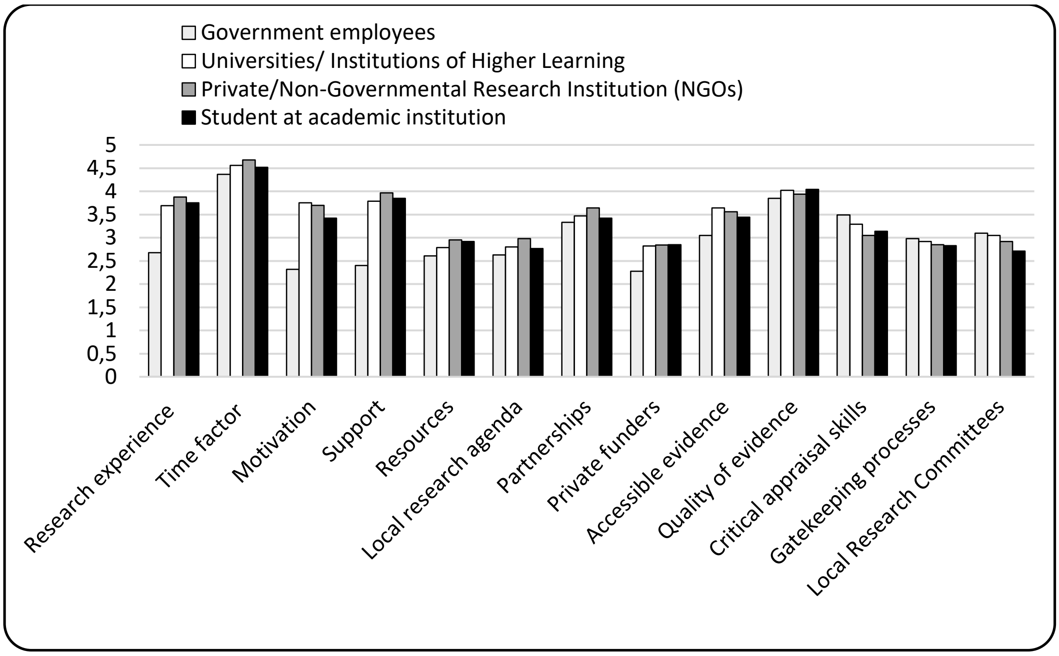


Figure 6.5: Average mean on research uptake factors per employment sector

The results show similar patterns regarding the overall mean averages among respondents as per the employment sector. However, the mean averages for government employees were lower on a number of variables than for respondents from other employment sectors. Evidently from the figure above, low average mean scores for government employees were observed in almost all variables except on 'critical appraisal skills', 'gatekeeping processes' and 'research committees' in comparison with the other employment sectors. Variables 'time factor' (mean score = 2.68), 'support' (mean score = 2.32), and 'resources' (mean score = 2.4) were the most predominant outliers with low mean average scores for government employees.

6.4 EXPLORATORY FACTOR ANALYSIS

In this study, factor analysis was computed using the principal component method and the principal component analysis with varimax rotation were conducted.

6.4.1 Data adequacy test using KMO and Bartlett's Test

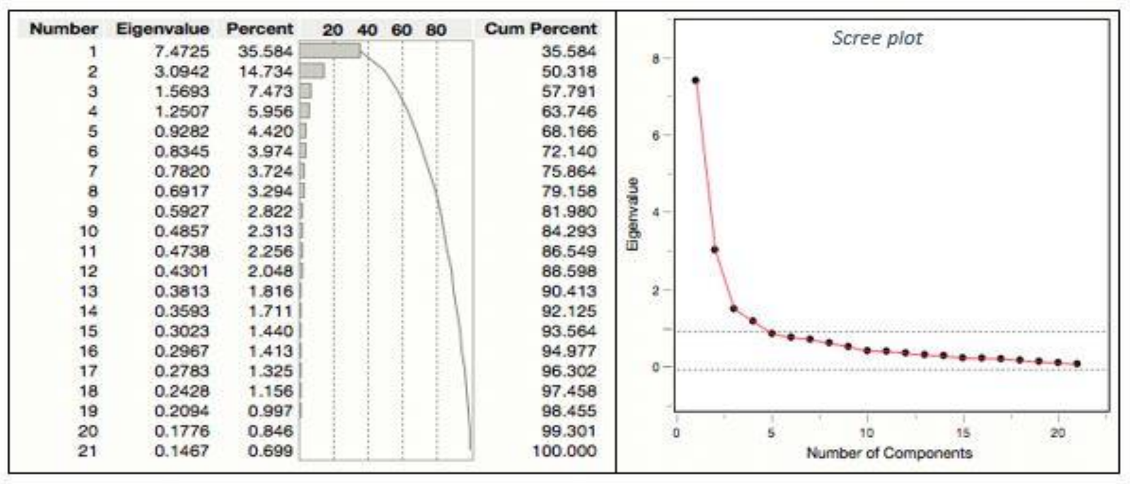
In order to perform factor analysis on the data, it was critical to ascertain the appropriateness of the data using Barlett's Test of Sphericity to measure the strength of the relationship, and Kaiser-Meyer-Olkin Test (KMO) to measure the adequacy of the sample (Hadi, Abdullah & Sentosa 2016: 215). The results in Table 6.3 indicate that Bartlett's Test of Sphericity was significant for all constructs, with a p-value of .000. The KMO measure of sampling adequacy for all constructs ranged from 0.791 to 0.883, indicating that the value is close to 1.0 and exceeded the recommended threshold value of 0.6. Both results suggest that the data value of 212 is adequate and appropriate for conducting factor analysis.

Table 6.3: Result of factor analysis for all constructs

Construct	Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Bartlett's Test of Sphericity Significant Value Result
Individual factors	.883	.000
Organisational factors	.841	.000
Research characteristics	.791	.000

6.4.2 Factor analysis using principal component analysis for individual factors

The total variance explained by these generated factors is reflected in Figure 6.6. The selected four factors had a rotation sum squared loadings equal to 63.75. This means that in terms of the cumulative extracted sums of the loading value, the four components extracted are able to explain 64% of the construct.



Number	Eigenvalue	Percent	Cum Percent
1	7.4725	35.584	35.584
2	3.0942	14.734	50.318
3	1.5693	7.473	57.791
4	1.2507	5.956	63.746
5	0.9282	4.420	68.166
6	0.8345	3.974	72.140
7	0.7820	3.724	75.864
8	0.6917	3.294	79.158
9	0.5927	2.822	81.980
10	0.4857	2.313	84.293
11	0.4738	2.256	86.549
12	0.4301	2.048	88.598
13	0.3813	1.816	90.413
14	0.3593	1.711	92.125
15	0.3023	1.440	93.564
16	0.2967	1.413	94.977
17	0.2783	1.325	96.302
18	0.2428	1.156	97.458
19	0.2094	0.997	98.455
20	0.1776	0.846	99.301
21	0.1467	0.699	100.000

Figure 6.6: The total variance plot indicating eigenvalues for individual factors and the scree plot

The range of percentage as total variance explained is acceptable as per the researches in this type. The scree plot obtained from the output results is shown in Figure 6.6. The plot confirms that the first four factors for the construct account for most of the data's total variability, with the remaining factors accounting for the remaining small proportion of the variability, therefore being less important. For this construct, the choice of the four factors is the solution.

6.4.2.1 Factor structure and final communality estimates

The results of the factor analysis on correlations with the four identified factors is shown in Table 6.4, in which each item has a loading corresponding to each of the four identified components. The principal axis factoring method was used to extract communalities which represent the relation between the variable and all other variables before rotation. Table 6.4 indicates that item C16 has the highest correlation (0.90) with Factor 1, and item C17 has the lowest at 0.10, thus, item C16 clearly describes 'support'. Similarly, item C4 has the highest correlation (0.78) with Factor 2 (experience), and item C15 the lowest at 0.16. Item C13 has the greatest influence on Factor 3 (motivation) compared with Item C15 at 0.08, while in Factor 4, item C9 depicts the highest correlation compared to C17, which indicates the lowest at 0.12. This means that item C9 clearly describes 'time constraints'.

The results on the final communality estimates further revealed that most communalities are high (>0.30), which shows that even a small sample is less likely to distort results. Looking at Table 6.5, the communalities provide us with the information that we are looking at 11.727 units of common variance as the specific variance portion has been eliminated and the proportion of common variance is 11.727 = 0.558. It is important to note the communality for item C17 is considerably lower than the rest at 0.245, followed by the communality for item C21 at 0.320. Therefore, these items have less than half of their variability in common with the other variables (Larose & Larose 2015: 109).

Table 6.4: Correlations with the four identified factors

Item	Factor 1	Factor 2	Factor 3	Factor 4	Final Communality Estimates
C1	0.4276698	0.6763899	0.3574839	0.2806844	0.51440
C2	0.1646902	0.7360996	0.3833178	0.1713465	0.54878
C3	0.1904266	0.6848852	0.3612348	0.2590323	0.47304
C4	0.2637870	0.7792348	0.3779824	0.2949999	0.60964
C5	0.2073787	0.7128841	0.4738351	0.3150911	0.53554
C6	0.6980924	0.4174357	0.2041640	0.7358762	0.68721
C7	0.6705538	0.3844332	0.2615928	0.8160170	0.74003
C8	0.3639646	0.2421799	0.2150465	0.7348947	0.54386
C9	0.4970437	0.2882729	0.2782713	0.8296768	0.69310
C10	0.7507904	0.3479511	0.2299083	0.6280512	0.63236
C11	0.2456312	0.3851629	0.7297866	0.2603224	0.54136
C12	0.1563394	0.3201298	0.7807000	0.2433732	0.62040
C13	0.1563873	0.3802528	0.7830288	0.1878549	0.61381
C14	0.8083246	0.2210059	0.1495470	0.4226330	0.65530
C15	0.7104545	0.1577667	0.0812656	0.4351154	0.51543
C16	0.9004478	0.2858287	0.1515698	0.4672807	0.81537
C17	0.1031827	0.3659341	0.4699500	0.1201555	0.24512
C18	0.2050945	0.4776740	0.6858057	0.2139414	0.49455
C19	0.7668155	0.2762488	0.2611721	0.4413093	0.59780
C20	0.5560669	0.2192067	0.2511097	0.3705628	0.33014
C21	0.4648598	0.3886956	0.3523290	0.4072123	0.31970
Total					11.727

6.4.2.2 Variance explained by each factor ignoring other factors

The variance explained by each factor shows how the variance is divided among the possible factors (Osborne & Banjanovic 2016: 76). Table 6.5 displays variances of the rotated factors. After rotation, the first factor accounted for 26.1% of the variance, followed by 20.7% of the second factor, the third factor accounted for 18.2%, while Factor 4 accounted for 21.4%.

Table 6.5: Variance explained by each factor ignoring other factors

Factor	Variance	Percent
Factor 1	5.4833	26.111
Factor 2	4.3571	20.748
Factor 3	3.8130	18.157
Factor 4	4.4985	21.421

6.4.2.3 Rotated factor loading

Principal components analysis with varimax rotation was conducted to assess the underlying structure for the 21 components of the Research Uptake Individual Factors Questionnaire. The items were designed to index four factors namely, support, experience, motivation, and time constraints, measured using a five-point Likert scale that ranged from 1 (Strongly Disagree), to 5 (Strongly Agree). This procedure was important to determine which items belong to which factor, and this was used as a tool for item reduction (Samuels 2017: 4). The rotated component matrix for individual factors affecting research uptake is shown in Table 6.6, with loadings less than 0.40 dimmed to improve clarity.

Table 6.6 shows the factor loading of 20 items under four components. In this case, component 1, which indexed ‘support’, had strong positive loadings on the first six items (C16, C14, C19, C15, C10 & C20). The subsequent five items (C4, C2, C3, C5 and C1) had high loadings and belong to component 2, which indexed ‘experience’.

Table 6.6: Final rotated matrix for individual factors for research uptake

Item	Factor 1	Factor 2	Factor 3	Factor 4
C16	**0.93**	0.04	-0.1	-0.1
C14	**0.84**	-0.0	-0.0	-0.0
C19	**0.75**	-0.0	0.10	-0.0
C15	**0.70**	-0.1	-0.1	0.08
C10	**0.57**	0.09	-0.0	0.29
C20	**0.50**	-0.0	0.14	0.06
C21	0.30	0.17	0.17	0.14
C4	0.00	**0.78**	-0.0	0.05
C2	-0.0	**0.75**	0.03	-0.1
C3	-0.1	**0.67**	0.02	0.07
C5	-0.1	**0.63**	0.14	0.12
C1	0.28	**0.61**	0.01	-0.1
C12	-0.0	-0.1	**0.82**	0.07

Item	Factor 1	Factor 2	Factor 3	Factor 4
C13	0.00	-0.0	**0.80**	-0.0
C11	0.08	-0.0	**0.71**	0.03
C18	0.04	0.17	**0.60**	-0.0
C17	-0.0	0.19	**0.39**	-0.0
C9	0.04	-0.0	0.06	**0.79**
C8	-0.1	0.00	0.02	**0.77**
C7	0.29	0.10	-0.0	**0.62**
C6	0.39	0.19	-0.1	**0.48**

The third factor, which indexed ‘motivation’, loaded highly on the next four items in the table (items C12, C13, C11 & C18), with item C17 indexed low on motivation, although still positive. The last factor, which indexed ‘time constraints’ had strong loadings for items C9, C8 and C7, and a positive low loading (0.48) for item C6. There was no cross-loading from all factors in Table 6.6. Due to the low factor loading measured, only one item (C21) was dropped from the original 21 items as it had less than half of their variability in common with the other variables.

6.4.2.4 Reliability analysis for the construct: Individual factors

To determine the reliability coefficient of the data collection instrument, the Cronbach’ alpha was used. Table 6.7 shows reliability coefficient values of the final items used in this study for the construct: individual factors. The results show that values of all Cronbach’s alphas for individual items are between 0.76 and 0.89 when selected items are deleted. These values are in the acceptable range, which demonstrates satisfactory internal consistency reliability of all dimensions. The values of Cronbach’s alpha are 0.8853, 0.8385, 0.8323, and 0.8668, for components 1 to 4, respectively. Table 6.7 also shows the reliability measure for the consolidated four components (i.e. 20 items), which also exceeds the minimum value of 0.6, with a value of 0.901. Thus, the final items used for the individual factors are shown in Table 6.7.

Table 6.7: Reliability analysis for the construct: Individual factors

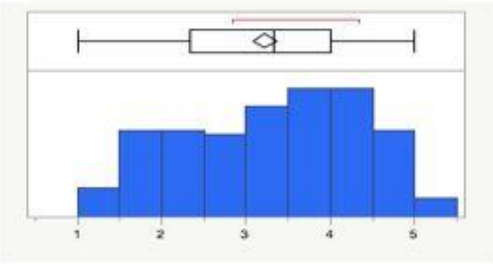
Factors	Construct	Question Code	Statement	Cronbach's Alpha (α) - Items	Cronbach's Alpha (α)
Individual Factors	**Support (CF1)**	C10	My organisation affords me a protected time to conduct research.	0.8677	0.8853
		C14	There is proper mentoring on research in my organisation.	0.8553	
		C15	There are financial incentives to promote research uptake.	0.8712	
		C16	There is broad support within the organisation at all levels on research related matters.	0.8386	
		C19	I believe research is valued by my colleagues.	0.8642	
		C20	I believe research is valued by government.	0.8900	
	Experience (CF2)	C1	I have adequate exposure to research methods.	0.8197	0.8385
		C2	I have a clear understanding of research methods.	0.7996	
		C3	I have adequate experience of putting research evidence into practice.	0.8140	
		C4	I have sufficient knowledge to search literature to retrieve research evidence.	0.7870	
		C5	I am able to determine the applicability of research findings.	0.8097	
	Motivation (CF3)	C11	I am always motivated by the desire to promote the use of research for practice.	0.7784	0.8323
		C12	I am always motivated by the desire to come up with creative ideas to improve something.	0.7624	

Factors	Construct	Question Code	Statement	Cronbach's Alpha (α) - Items	Cronbach's Alpha (α)
		C13	I am always motivated by the desire to learn new things.	0.7680	
		C18	I have a responsibility to keep updating myself with the latest research evidence.	0.8310	
	Time factor (CF4)	C6	I have sufficient time at workplace to search for research articles/reports.	0.8362	0.8668
		C7	My workload allows me to keep up to date with all new research evidence.	0.8002	
		C8	I have sufficient time at home to search for research articles/reports.	0.8653	
		C9	My personal responsibilities allows me to keep up to date with new research evidence.	0.8155	
The overall Cronbach's Alpha for all factors					0.901

6.4.2.5 Sample characteristics: Individual factors

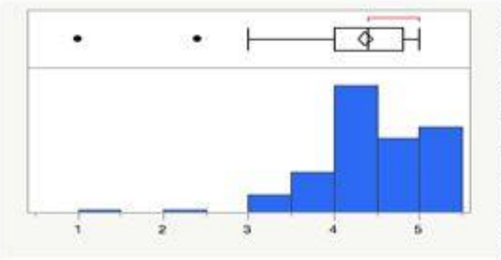
To determine whether collected data satisfy the normality requirement, a multivariate normality analysis was performed. The tests chosen to determine normality of the data were skewness and kurtosis tests (Kwak & Park 2019: 5). Figure 6.7 illustrates the distribution of data on individual factors affecting research uptake. As seen in the figure, a visual inspection of histograms on individual factors affecting research uptake showed that data were approximately normally distributed for the variable ‘support’, with a skewness of -0.256 (*SE* = 0.072) and a kurtosis of -1.048 (*SE* = 0.072), and ‘time factor’ with a skewness of -0.410 (*SE* = 0.066) and a kurtosis of -0.396 (*SE* = 0.066). The data were not approximately distributed for variables ‘experience’ with a skewness of -1.305 (*SE* = 0.040) and a kurtosis of 4.651 (*SE* = 0.040), and ‘motivation’ with a skewness of -1.355 (*SE* = 0.038) and a kurtosis of 2.639 (*SE* = 0.038).

a) Support (CF1)



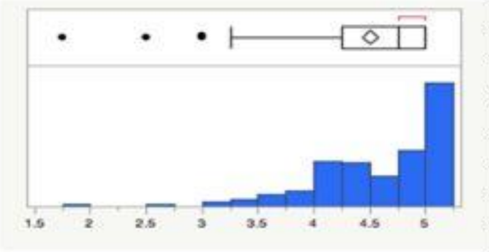
CF1 Summary Statistics	
Mean	3.2172196
Std Dev	1.0444226
Std Err Mean	0.071901
Upper 95% Mean	3.3589598
Lower 95% Mean	3.0754793
N	211
Skewness	-0.256114
Kurtosis	-1.048297

b) Experience (CF2)



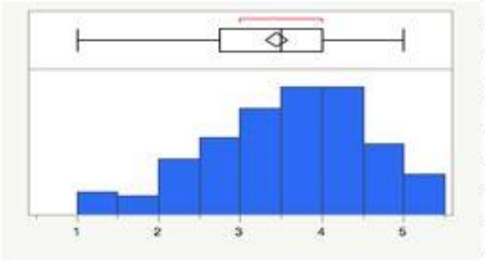
CF2 Summary Statistics	
Mean	4.3630332
Std Dev	0.5753329
Std Err Mean	0.0396075
Upper 95% Mean	4.4411125
Lower 95% Mean	4.2849538
N	211
Skewness	-1.304625
Kurtosis	4.6507254

c) Motivation (CF3)



CF3 Summary Statistics	
Mean	4.5023697
Std Dev	0.5552726
Std Err Mean	0.0382265
Upper 95% Mean	4.5777266
Lower 95% Mean	4.4270127
N	211
Skewness	-1.354626
Kurtosis	2.6393084

d) Time factor (CF4)

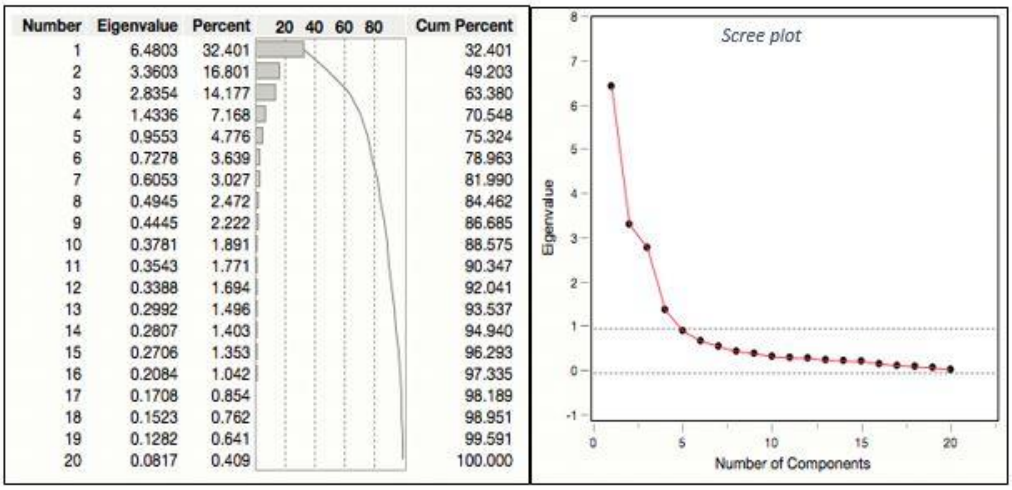


CF4 Summary Statistics	
Mean	3.436019
Std Dev	0.9639607
Std Err Mean	0.0663618
Upper 95% Mean	3.5668396
Lower 95% Mean	3.3051983
N	211
Skewness	-0.410024
Kurtosis	-0.396059

Figure 6.7: Normality check for individual factors affecting research uptake

6.4.3 Factor analysis using principal component analysis for organisational factors

The principal component analysis for the construct ‘organisational factors’ extracted four components with eigenvalues exceeding 1.0. As indicated in Figure 6.8, the selected four factors have a rotation sum squared loadings equal to 70.55. This indicates that approximately 71% of the total variance is explained by these four factors.



Number	Eigenvalue	Percent	Cum Percent
1	6.4803	32.401	32.401
2	3.3603	16.801	49.203
3	2.8354	14.177	63.380
4	1.4336	7.168	70.548
5	0.9553	4.776	75.324
6	0.7278	3.639	78.963
7	0.6053	3.027	81.990
8	0.4945	2.472	84.462
9	0.4445	2.222	86.685
10	0.3781	1.891	88.575
11	0.3543	1.771	90.347
12	0.3388	1.694	92.041
13	0.2992	1.496	93.537
14	0.2807	1.403	94.940
15	0.2706	1.353	96.293
16	0.2084	1.042	97.335
17	0.1708	0.854	98.189
18	0.1523	0.762	98.951
19	0.1282	0.641	99.591
20	0.0817	0.409	100.000

Figure 6.8: The total variance plot indicating eigenvalues for organisational factors and the scree plot

Similarly, the scree plot obtained from the output results on organisational factors is shown in Figure 6.8. The plot further confirms that the first four factors account for most of the total variability in data, and are indeed the largest. The remaining factors are likely unimportant, as they account for a very small proportion of the variability. For this construct, the choice of the four factors is the solution.

6.4.3.1 Factor structure and final communality estimates for organisational factors

The results of factor analysis on correlations with the four identified factors are shown in Table 6.8, in which each item has a loading corresponding to each of the four identified components. This result indicates that item D2 has the strongest positive correlation (0.90) with Factor 1, while item D20 has the lowest negative correlation of -0.09. Item D2 clearly describes Factor 1. This result also indicates that item D12 is strongly correlated with Factor 2 (0.85), while item D5 has the lowest positive correlation with Factor 2. Item D12 clearly describes Factor 2. Similarly, item D7 has the highest correlation (0.88) with Factor 3, and item D17 the lowest at 0.00. This means that item D17 clearly describes Factor 3, while it has no correlation with Factor

3. It is also noted that D17 has a strong positive correlation (0.88) with Factor 4, and no correlation was identified between item D6 (0.00) and Factor 4. This means item D17 clearly describes Factor 4.

Table 6.8: Correlations with the four identified factors for organisational factors

Item	Factor 1	Factor 2	Factor 3	Factor 4		Final Communality Estimates
D1	0.895674	0.236615	0.234630	0.116908		0.80443
D2	0.901938	0.212892	0.251516	0.110934		0.81365
D3	0.888671	0.200548	0.299832	0.145860		0.79808
D4	0.828599	0.222872	0.289302	0.097839		0.69159
D5	0.411528	0.135696	0.148356	0.081233		0.17232
D6	0.219643	0.467636	0.801056	0.004330		0.64307
D7	0.252454	0.509847	0.882604	-0.044831		0.78726
D8	0.310201	0.467199	0.786847	0.043562		0.63012
D9	0.268124	0.446820	0.815976	0.020942		0.66950
D10	0.182553	0.462655	0.622768	0.156783		0.41493
D11	0.232142	0.754883	0.583081	0.199028		0.60687
D12	0.229048	0.850123	0.491927	0.156850		0.72661
D13	0.229887	0.848408	0.456496	0.205146		0.72318
D14	0.180268	0.834503	0.446966	0.241707		0.69946
D15	0.102160	0.742602	0.460909	0.161103		0.55913
D16	0.122066	0.245187	0.018905	0.747232		0.56855
D17	0.233799	0.208561	0.004253	0.884094		0.80288
D18	0.157718	0.157483	0.020521	0.860072		0.74614
D19	0.167252	0.139399	-0.040533	0.786913		0.63392
D20	-0.096475	0.178125	0.135413	0.528398		0.33147
Total						**12.823**

The table above further indicates that the final communality estimates of almost all but one item (D6) have communalities greater than 0.30, which confirms that even a small sample is less likely to distort results. As can be seen in Table 6.8, the communalities illustrate that we are looking at 12.823 units of common variance the specific variance portion has been eliminated, and the proportion of common variance is 12.823 = 0.641.

6.4.3.2 Variance explained by each factor ignoring other factors for organisational factors

The variance explained by each factor, as indicated in Table 6.9, reveals that after rotation of the four factors, the first factor accounted for 19.5% of the variance, followed by the second factor with 23.8%. The third factor accounted for 23.2% of the variance, while Factor 4 accounted for approximately 16.3% of the variance.

Table 6.9: Variance explained by each factor ignoring other factors

Factor	Variance	Percent
Factor 1	3.9087	19.543
Factor 2	4.7600	23.800
Factor 3	4.6307	23.154
Factor 4	3.2612	16.306

6.4.3.3 Rotated factor loading for organisational factors

The principal component analysis with varimax rotation was conducted to assess the four ‘organisational factors’ variables clustered. Similarly, these variables indexed into four factors namely, resources, partnerships, research agenda, and private funders, when measured using a five-point Likert scale that ranged from 1 (Strongly Disagree) to 5 (Strongly Agree). The rotated component matrix for organisational factors affecting research uptake is shown in Table 6.10, with loadings less than 0.40 dimmed to improve clarity.

Table 6.10: Final rotated matrix for organisational factors for research uptake

Item	Factor 1	Factor 2	Factor 3	Factor 4
D2	**0.90**	0.01	0.01	0.00
D1	**0.89**	0.06	-0.0	-0.0
D3	**0.87**	-0.1	0.10	0.05
D4	**0.81**	0.00	0.07	-0.0
D5	**0.40**	0.03	0.03	0.03
D13	0.05	**0.87**	-0.1	-0.0
D12	0.04	**0.86**	-0.0	-0.1
D14	-0.0	**0.85**	-0.0	0.04

Item	Factor 1	Factor 2	Factor 3	Factor 4
D15	-0.1	**0.72**	0.07	-0.0
D11	0.03	**0.61**	0.23	0.04
D7	0.03	0.04	**0.86**	-0.1
D9	0.06	-0.0	**0.82**	-0.0
D6	0.01	0.03	**0.79**	-0.0
D8	0.11	0.02	**0.75**	-0.0
D10	-0.0	0.13	**0.55**	0.10
D18	0.07	-0.1	0.00	**0.87**
D17	0.15	0.02	-0.1	**0.87**
D19	0.10	-0.0	-0.1	**0.78**
D16	0.03	0.12	-0.1	**0.72**
D20	-0.2	-0.0	0.17	**0.55**

The results from Table 6.10 show that the first factor, which seemed to index ‘resources’, had the highest positive loadings on the first five indicated items (D2, D1, D3, D4 & D5). Similarly, the second factor, which seemed to index ‘partnerships’, had strong loadings on the next five items (D13, D12, D14, D15 & D11). The third factor, which indexed ‘research agenda’, loaded strongly on the subsequent five items in the table (D7, D9, D6, D8 & D10). The last factor, which seemed to index ‘private funders’, had high loadings for item D18, D17, D19, D16 and D20, respectively. There was no cross-loading from all factors, as illustrated in the table above.

6.4.3.4 Reliability analysis for the construct: Organisational Factors

Table 6.11 illustrates reliability coefficient values of the final items used in this study for the construct ‘organisational factors’, using the Cronbach’s alpha.

Table 6.11: Reliability analysis for the construct: Organisational factors

Factors	Construct	Question code	Statement	Cronbach's Alpha (α) - Items	Cronbach's Alpha (α)
Organisational factors	**Local research agenda (DF3)**	D6	Government has a clear research agenda.	0.8577	0.8868
		D7	Government's research agenda has been communicated clearly.	0.8396	
		D8	The research agenda is current and addressing real-life problems affecting government.	0.8614	
		D9	I have an adequate understanding of government's research agenda.	0.8508	
		D10	Most research studies conducted are based on government's research agenda.	0.8955	
	Funding (DF4)	D16	Private funders of research play a significant role in promoting research uptake.	0.8388	0.8669
		D17	Private funders of research assist in building local capacity through research projects.	0.8082	
		D18	Private funders of research drive performance and improve standards in	0.8128	

Factors	Construct	Question code	Statement	Cronbach's Alpha (α) - Items	Cronbach's Alpha (α)
			government institutions.		
		D19	Private funders of research play a critical role in research on community stakeholder involvement.	0.8295	
		D20	Key research questions chosen by private funders of research is always aligned with the research agenda of decision makers.	0.8973	
	Resources (DF1)	D1	Research is sufficiently prioritised by my organisation.	0.8380	0.8874
		D2	My organisation invests substantial resources on improving research capacity.	0.8387	
		D3	My organisation has enough manpower to support research activities.	0.8389	
		D4	My organisation has sufficient resources available to influence research uptake.	0.8511	
		D5	My organisation is selective on which researchable condition it focuses on.	0.9285	
	Partnerships (DF2)	D11	Government effectively collaborates	0.8919	0.9028

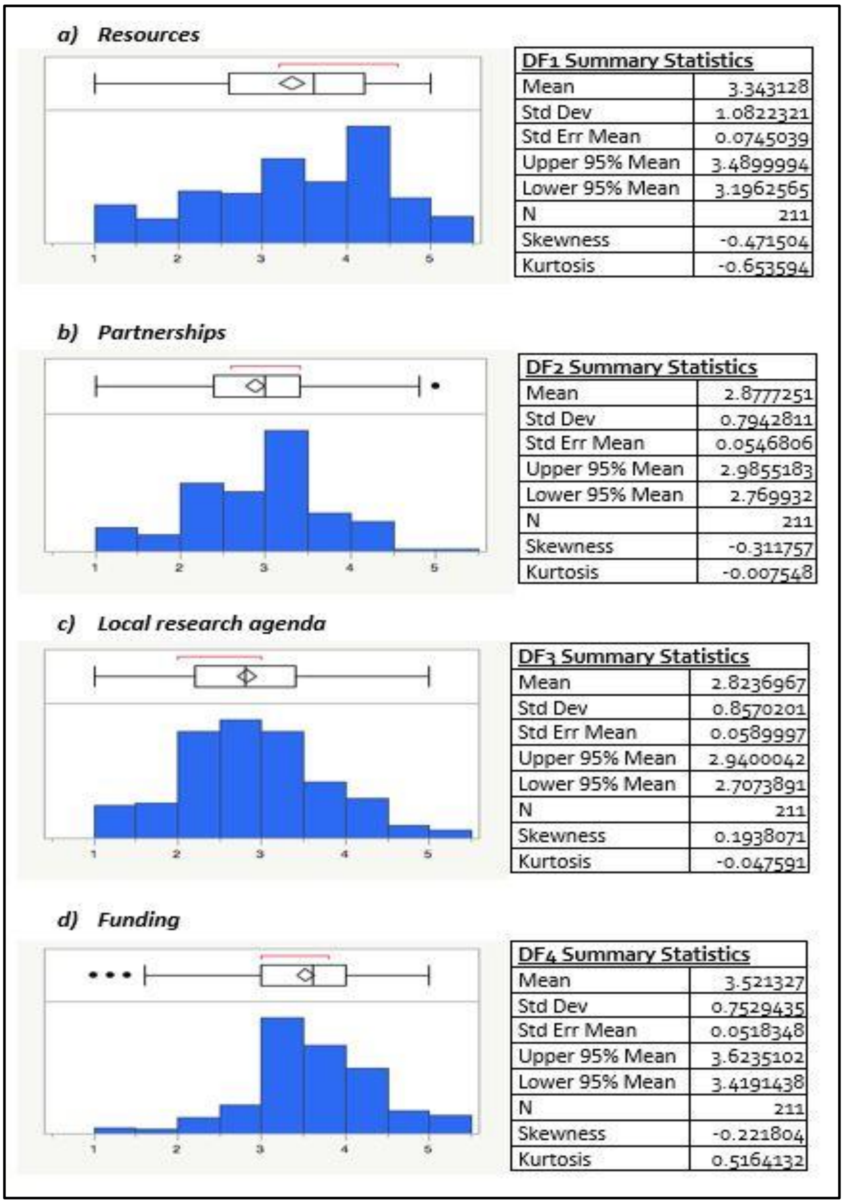
Factors	Construct	Question code	Statement	Cronbach's Alpha (α) - Items	Cronbach's Alpha (α)
			with other research institutions to promote research use.		
		D12	Government frequently engages with researchers to find researched solutions.	0.8708	
		D13	There is active engagement from government with stakeholders at all stages of the research being conducted.	0.8725	
		D14	There is proper communication between government and various groups involved in research matters.	0.8752	
		D15	Government has platforms for stakeholders with related interests to engage in research matters.	0.8951	
The overall Cronbach's Alpha for organisational factors					0.878

Table 6.11 shows that values of all Cronbach's alphas, even when certain items are deleted, are between 0.81 and 0.92 for all items, and are in the acceptable range. This demonstrates satisfactory internal consistency reliability of all dimensions. The values of Cronbach's alpha are 0.8868, 0.8669, 0.8874 and 0.9028, for components 1 to 4, respectively. Thus, the final items used for the individual factors are presented in this table. Furthermore, the overall reliability measure for the consolidated four

components (i.e. 20 items) also exceeds the minimum value of 0.6, with a value of 0.878, and is therefore reliable.

6.4.3.5 Sample characteristics: Organisational factors

Skewness and kurtosis statistical tests were used to determine whether collected data satisfy the normality requirement for parametric tests for organisational factors affecting research uptake (see Section 6.4.2.5).



a) Resources

DF1 Summary Statistics	
Mean	3.343128
Std Dev	1.0822321
Std Err Mean	0.0745039
Upper 95% Mean	3.4899994
Lower 95% Mean	3.1962565
N	211
Skewness	-0.471504
Kurtosis	-0.653594

b) Partnerships

DF2 Summary Statistics	
Mean	2.8777251
Std Dev	0.7942811
Std Err Mean	0.0546806
Upper 95% Mean	2.9855183
Lower 95% Mean	2.769932
N	211
Skewness	-0.311757
Kurtosis	-0.007548

c) Local research agenda

DF3 Summary Statistics	
Mean	2.8236967
Std Dev	0.8570201
Std Err Mean	0.0589997
Upper 95% Mean	2.9400042
Lower 95% Mean	2.7073891
N	211
Skewness	0.1938071
Kurtosis	-0.047591

d) Funding

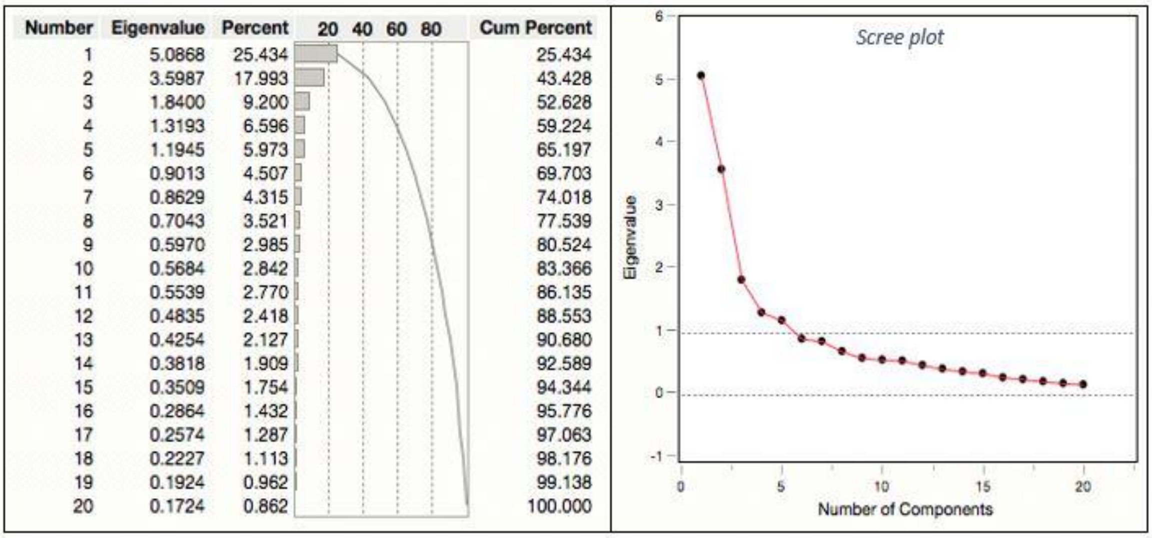
DF4 Summary Statistics	
Mean	3.521327
Std Dev	0.7529435
Std Err Mean	0.0518348
Upper 95% Mean	3.6235102
Lower 95% Mean	3.4191438
N	211
Skewness	-0.221804
Kurtosis	0.5164132

Figure 6.9: Normal distribution check for organisational factors

As illustrated in Figure 6.9, a visual inspection of the histograms on organisational factors affecting research uptake showed that data were approximately normally distributed for all variables: with a skewness of -0.472 (*SE* = 0.075) and a kurtosis of -0.653 (*SE* = 0.075) for ‘resources’, a skewness of -0.312 (*SE* = 0.055) and a kurtosis of -0.008 (*SE* = 0.055) for ‘partnerships’, a skewness of 0.194 (*SE* = 0.059) and a kurtosis of -0.048 (*SE* = 0.059) for ‘local research agenda’, and a skewness of -0.472 (*SE* = 0.052) and a kurtosis of 0.516 (*SE* = 0.052) for ‘funding’.

6.4.4 Factor analysis using principal component analysis for research characteristics

The total variance explained by these generated factors is shown in Figure 6.10 on research characteristic factors affecting research uptake. There are five factors with variances (eigenvalues) that are greater than 1. As illustrated in the table, the selected five factors have a rotation sum squared loadings equal to 65.20. This indicates that approximately 65% of the total variance is explained by these five factors.



Number	Eigenvalue	Percent	20 40 60 80	Cum Percent
1	5.0868	25.434		25.434
2	3.5987	17.993		43.428
3	1.8400	9.200		52.628
4	1.3193	6.596		59.224
5	1.1945	5.973		65.197
6	0.9013	4.507		69.703
7	0.8629	4.315		74.018
8	0.7043	3.521		77.539
9	0.5970	2.985		80.524
10	0.5684	2.842		83.366
11	0.5539	2.770		86.135
12	0.4835	2.418		88.553
13	0.4254	2.127		90.680
14	0.3818	1.909		92.589
15	0.3509	1.754		94.344
16	0.2864	1.432		95.776
17	0.2574	1.287		97.063
18	0.2227	1.113		98.176
19	0.1924	0.962		99.138
20	0.1724	0.862		100.000

Figure 6.10: The total variance plot indicating eigenvalues for research characteristics and a scree plot

The scree plot (Figure 6.10) obtained from the output results confirms the selection of the five factors as accounting for most of the total variability in the data. The remaining factors are likely unimportant, as they account for a very small proportion of the variability. For this construct, the choice of the five factors appears to be the solution.

6.4.4.1 Factor structure and final communality estimates for research characteristics

The results of factor analysis on correlations with the five identified factors are shown in the Table 6.12, in which each item has a loading corresponding to each of the five identified components. The table also shows the final communality estimates.

Table 6.12: Correlations with the five identified factors for research characteristics

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5		Final Communality Estimates
E1	0.025347	0.126731	0.649333	0.360572	0.241977		0.46133
E2	0.022953	-0.042897	0.621518	0.277610	0.302433		0.39743
E3	0.047821	0.090346	0.492530	0.350560	0.385574		0.31444
E4	-0.011494	-0.008152	0.536972	0.083821	0.213690		0.30216
E5	-0.007896	-0.139886	0.579254	0.344079	0.227685		0.38218
E6	-0.032643	0.032478	0.342514	0.731017	0.282616		0.54639
E7	0.040352	0.057839	0.386725	0.790334	0.325121		0.64086
E8	0.041742	0.039341	0.245555	0.530739	0.489351		0.39537
E9	-0.061184	0.032416	0.209227	0.248901	0.628898		0.40084
E10	0.038605	0.111561	0.413286	0.222775	0.680077		0.49830
E11	0.800499	0.297710	-0.050840	0.092676	-0.068978		0.66076
E12	0.806475	0.349518	-0.014963	-0.086549	-0.020984		0.66289
E13	0.795372	0.240638	-0.016470	0.059417	-0.092899		0.65112
E14	0.806380	0.340242	0.132068	-0.027774	0.068524		0.67718
E15	0.760337	0.390033	0.119505	0.033141	0.074963		0.60060
E16	0.624094	0.417767	-0.091982	-0.052112	-0.142656		0.44226
E17	0.625113	0.647726	0.024668	0.033466	-0.078979		0.58669
E18	0.355119	0.822131	0.068394	-0.019495	0.083759		0.68638
E19	0.306217	0.815323	-0.008748	0.112817	0.071323		0.67542
E20	0.342753	0.756133	-0.049478	0.024702	0.078539		0.57920
Total							10.562

The results show the highest positive correlation (0.81) between Factor 1 and both item E12 and E14, while item E5 depicts low negative correlation (-0.01). This indicates that Factor 1 is described by items E12 and E14. Item E18 has the strongest positive correlation with Factor 2, while item E4 has the lowest of -0.01. This result further suggests that Factor 2 is clearly described by item E18. There is a high positive correlation (0.64) between item E1 and Factor 3, and a low negative correlation (-0.01) with item E19. It can be deduced that item E1 clearly describes Factor 3. Item E7 depicts a strong positive correlation (0.79) with Factor 4, while there is a low negative correlation of -0.02 with item E18. Factor 4 is best described by item E7. Similarly, there is a strong positive correlation (0.68) between item E10 and Factor 5, and a low negative correlation with item E12. This illustrates that Factor 5 is best described by item E10.

The final communality estimates in Table 6.12 indicate that almost all items have communalities greater than 0.30, which confirms that even a small sample is less likely to distort the results. Looking at this table, the communalities reflect that we are looking at 10.562 units of common variance as the specific variance portion has been eliminated, and the proportion of common variance is 10.562 = 0.528. It is important to note the communality for the items E3 and E4 are considerably lower than the rest at less than 0.320.

6.4.4.2 Variance explained by each factor ignoring other factors for research characteristics

The variance explained by each factor is indicated in Table 6.13. The result obtained after the rotation of five factors indicates that the first factor attributed for 21.4% of the variance, followed by Factor 2 with 15.5% of the variance. The third factor accounted for 11.3% of the variance, followed by 10.2% and 8.7% of the variance for Factor 4 and 5, respectively.

Table 6.13: Variance explained by each factor ignoring other factors for research characteristics

Factor	Variance	Percent
Factor 1	4.2831	21.416
Factor 2	3.1082	15.541
Factor 3	2.2672	11.336
Factor 4	2.0467	10.233
Factor 5	1.7483	8.741

6.4.4.3 Rotated factor loading for research characteristics

Similarly, the principal components analysis with varimax rotation was conducted to assess the five ‘research characteristics’ variables clustered. These variables indexed into five factors namely, gatekeeping process, local research committees, accessibility of evidence, quality of evidence and critical appraisal skills, were measured using a five-point Likert scale that ranged from 1 (Strongly Disagree) to 5 (Strongly Agree). The rotated component matrix for research characteristics affecting research uptake is shown in Table 6.14, with loadings less than 0.40 dimmed to improve clarity.

Table 6.14: Final rotated matrix for individual factors for research uptake

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
E13	**0.83**	-0.1	-0.0	0.09	-0.1
E11	**0.82**	-0.0	-0.1	0.13	-0.0
E14	**0.81**	0.01	0.12	-0.1	0.09
E12	**0.80**	0.02	-0.0	-0.1	0.05
E15	**0.73**	0.09	0.09	-0.0	0.08
E16	**0.54**	0.20	-0.1	-0.0	-0.1
E19	-0.0	**0.83**	-0.0	0.10	0.00
E18	0.02	**0.81**	0.08	-0.1	0.03
E20	0.04	**0.73**	-0.1	0.01	0.06
E17	***0.42***	***0.48***	*0.05*	*0.04*	*-0.1*
E1	-0.1	0.15	**0.62**	0.16	-0.1
E2	0.04	-0.1	**0.58**	0.06	0.07
E4	-0.0	0.00	**0.57**	-0.1	0.04
E5	0.04	-0.2	**0.53**	0.17	-0.0
E3	0.02	0.07	0.31	0.16	0.19
E7	0.02	0.03	0.12	**0.74**	0.03
E6	-0.1	0.03	0.10	**0.69**	0.01
E8	0.06	-0.0	-0.0	**0.42**	0.39
E9	-0.0	0.01	-0.1	0.06	**0.63**
E10	0.03	0.06	0.19	-0.1	**0.62**

The first factor, which seemed to index ‘gatekeeping process’, had strong loadings on seven items (E13, E11, E14, E12, E15, & E16). There was cross-loading on item E17 for Factor 1 and Factor 2, and therefore this item (the local research committee is ensuring that research conducted is geared towards improvement of service delivery) is omitted as a contributory item in either of the factors. The second factor, which seemed to index ‘local research committees’, had high loadings on the next three items (E19, E18 & E20) in Table 6.14. Factor 3 indexed ‘accessibility of evidence’, and loaded positively high on the subsequent four items in the table (E1, E2, E4 & E5). The fourth factor, which seemed to index ‘quality of evidence’ had strong loadings for item E7, E6 and E8. There was a fifth factor that indexed ‘critical appraisal skills’, which loaded strongly positive on two items (E9 & E10). However, because there are only two items depicting Factor 5, more evidence is required to associate the items with the factor. Item E3 (*there is lack of research evidence relevant to my work context*) is also omitted, as it has a loading of 0.31.

6.4.4.4 Reliability analysis for the construct: Research characteristics

Table 6.15 shows reliability coefficient values of the final items used in this study for the construct ‘research characteristics’ using the Cronbach’s alpha (see Section 6.4.2.4). The values of Cronbach’s alpha in all constructs of items deleted (Cronbach’s alpha (α)-Items) for almost all items are between 0.60 and 0.90 and are in the acceptable range, except item E7 which results in Cronbach’s alpha value of 0.50 when the item is deleted. However, all Cronbach’s alpha values demonstrate satisfactory internal consistency reliability of all dimensions. The values of Cronbach’s alpha are 0.8915, 0.8442, 0.6914, 0.7367 and 0.6546 for components 1 to 5, respectively.

Table 6.15: Reliability analysis for the construct: Research characteristics

Factors	Construct	Question code	Statement	Cronbach's Alpha (α) - Items	Cronbach's Alpha (α)
Research characteristics	**Gate keeping process (EF1)**	E11	Government has a clear approval process for granting permission to conduct research.	0.8657	0.8915
		E12	Government's approval process for permission to conduct research has been communicated clearly.	0.8648	
		E13	I have a clear understanding of government's approval process for permission to conduct research.	0.8694	
		E14	Government's approval process for permission to conduct research is short and easy to carry out.	0.8652	
		E15	Feedback on government's approval process for permission to conduct research is communicated timeously.	0.8727	
		E16	I am fully aware of the role of Provincial Health Research Committee in facilitating research uptake.	0.8952	

Factors	Construct	Question code	Statement	Cronbach's Alpha (α) - Items	Cronbach's Alpha (α)
	Local Research Committees (EF2)	E18	The Provincial Health Research Committee is ensuring that research findings are channelled to the decision makers.	0.7834	0.8442
		E19	The Provincial Health Research Committee is actively engaging at all stages of research being conducted.	0.7316	
		E20	The Provincial Health Research Committee is ensuring that research outputs are always communicated back to the department by researchers.	0.8314	
	Accessibility of evidence (EF3)	E1	There is poor access to good quality relevant research.	0.6083	0.6914
		E2	There is lack of delivery of research results to target audiences.	0.6032	
		E4	There is lack of resources (web-based) to access research evidence within government.	0.6579	
		E5	There is lack of communication between researchers and decision makers for dissemination of research findings.	0.6377	

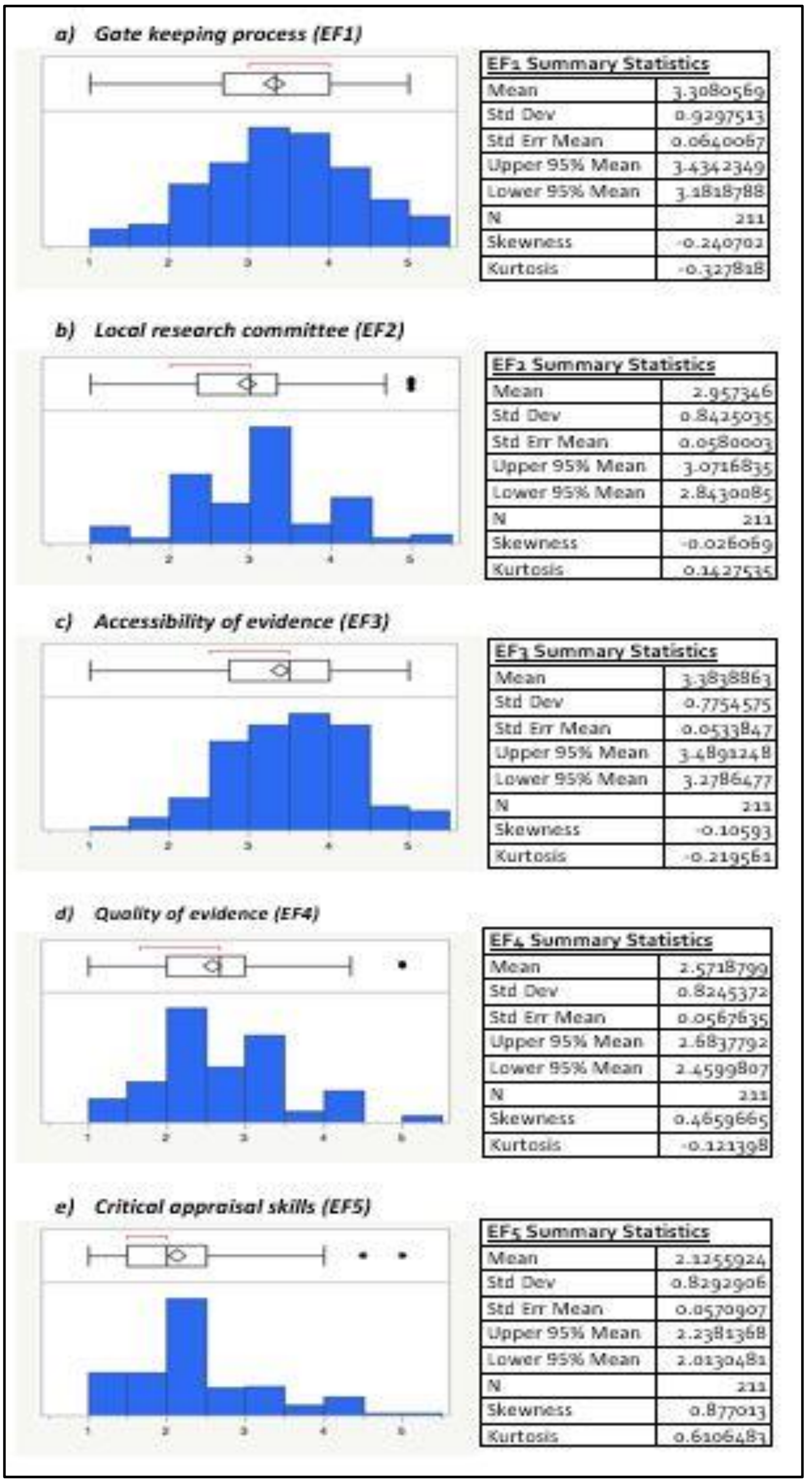
Factors	Construct	Question code	Statement	Cronbach's Alpha (α) - Items	Cronbach's Alpha (α)
	Quality of evidence (EF4)	E6	Most research evidence are of poor quality.	0.6213	0.7367
		E7	Presentation of research evidence not detailed enough for decision-making.	0.4990	
		E8	Most research articles are not relevant to my work activities.	0.7988	
	Systematic Review Skills (EF5)	E9	Research articles are difficult to understand because of research jargon.	-	0.6546
		E10	I have difficulty of judging the quality of research findings in articles and reports.	-	
The overall Cronbach's Alpha for research characteristics factors					0.791

Furthermore, the reliability measure for the consolidated five components (i.e. 18 items) also exceeds the minimum value of 0.6, with a value of 0.791, as indicated in Table 6.15.

6.4.4.5 Sample characteristics: Research characteristics

Skewness and kurtosis statistical tests were used to determine whether collected data satisfy the normality requirement for parametric tests for research characteristics affecting research uptake (see Section 6.4.2.5).

A visual inspection of histograms on Figure 6.11 for research characteristic factors which affect research uptake showed that data were approximately normally distributed for the variable ‘gatekeeping process’, with a skewness of -0.241 (*SE* = 0.064) and a kurtosis of -0.328 (*SE* = 0.064), ‘local research committee’ with a skewness of -0.026 (*SE* = 0.058) and a kurtosis of 0.143 (*SE* = 0.058), ‘accessibility of evidence’ with a skewness of -0.106 (*SE* = 0.053) and a kurtosis of -0.220 (*SE* = 0.053), and ‘quality of evidence’ with a skewness of 0.466 (*SE* = 0.057) and a kurtosis of -0.121 (*SE* = 0.057).



EF1 Summary Statistics	
Mean	3.3080569
Std Dev	0.9297513
Std Err Mean	0.0640067
Upper 95% Mean	3.4342349
Lower 95% Mean	3.1818788
N	211
Skewness	-0.240702
Kurtosis	-0.327818

EF2 Summary Statistics	
Mean	2.957346
Std Dev	0.8425035
Std Err Mean	0.0580003
Upper 95% Mean	3.0716835
Lower 95% Mean	2.8430085
N	211
Skewness	-0.026069
Kurtosis	0.1427535

EF3 Summary Statistics	
Mean	3.3838863
Std Dev	0.7754575
Std Err Mean	0.0533847
Upper 95% Mean	3.4891248
Lower 95% Mean	3.2786477
N	211
Skewness	-0.10593
Kurtosis	-0.219561

EF4 Summary Statistics	
Mean	2.5718799
Std Dev	0.8245372
Std Err Mean	0.0567635
Upper 95% Mean	2.6837792
Lower 95% Mean	2.4599807
N	211
Skewness	0.4659665
Kurtosis	-0.121398

EF5 Summary Statistics	
Mean	2.1255924
Std Dev	0.8292906
Std Err Mean	0.0570907
Upper 95% Mean	2.2381368
Lower 95% Mean	2.0130481
N	211
Skewness	0.877013
Kurtosis	0.6106483

Figure 6.11: Normal distribution check for research characteristics

6.5 SPEARMAN'S CORRELATION

Correlation was conducted to examine if there is a relationship between research uptake and various potential predictors (Sarstedt & Mooi 2019: 18). Table 6.17 shows the Spearman correlation coefficient results for research uptake factors. Specifically, the results indicated that there was a significant positive association between research uptake and research experience ($r_s[212] = 0.421$, $p < 0.01$), and research uptake and motivation ($r_s[212] = 0.398$, $p < 0.01$). These suggest a moderate concurrence between research uptake and the two variables (experience and motivation). However, there was a significant positive association between research uptake and time factor ($r_s[212] = 0.283$, $p < 0.01$), and research uptake and support ($r_s[212] = 0.260$, $p < 0.01$). The results suggest a weak concurrence between research uptake and the two variables (time factor and support).

Results of the Spearman correlation indicated that there was a non-significant weak positive association between research uptake and organisational factors of ($r_s[212] = 0.172$, $p < 0.05$) for resources, ($r_s[212] = 0.079$, $p < 0.01$) for local research agenda, ($r_s[212] = 0.088$, $p < 0.01$) for partnerships, and very weak positive association of ($r_s[212] = 0.007$, $p < 0.01$) for funding. However, there was a significantly strong positive correlation of ($r_s[212] = 0.565$, $p < 0.01$) between partnerships and local research agenda.

Furthermore, the results of the Spearman correlation indicated that there was a significant weak positive association between research uptake and critical appraisal skills of ($r_s[212] = 0.203$, $p < 0.01$). There was a non-significant weak positive association between research uptake and the other research characteristic factors. However, there seems to be a significant moderate association between critical appraisal skills and quality of evidence ($r_s[212] = 0.340$, $p < 0.01$), and between accessibility of evidence and quality of evidence ($r_s[212] = 0.403$, $p < 0.01$).

Table 6.16: Spearman’s rho correlation coefficient

Spearman's rho		Research Uptake	Experience (Cf2)	Time constraints (Cf4)	Motivation (Cf3)	Support (Cf1)	Resources (Df1)	Local research agenda (Df3)	Partnership (Df2)	Funding (Df4)	Quality evidence (Ef4)	Review skills (Ef5)	Accessible evidence (Ef3)	Gate keeping (Ef1)	Research committees (Ef2)
Research Uptake	Correlation Coefficient	1.000	.421**	.283**	.398**	.260**	.172*	.079	.088	.007	.122	.203**	.071	.020	.053
	Sig. (2-tailed)	.	.000	.000	.000	.000	.012	.254	.203	.921	.076	.003	.304	.770	.445
	N	212	212	212	212	212	212	212	212	212	212	212	212	212	212
Experience (Cf2)	Correlation Coefficient	.421**	1.000	.411**	.449**	.357**	.289**	.167*	.073	.104	.164*	.337**	.127	.112	.009
	Sig. (2-tailed)	.000	.	.000	.000	.000	.000	.015	.291	.131	.017	.000	.065	.103	.894
	N	212	212	212	212	212	212	212	212	212	212	212	212	212	212
Time constraints (Cf4)	Correlation Coefficient	.283**	.411**	1.000	.321**	.659**	.518**	.262**	.307**	.178**	.123	.196**	.223**	.131	.000
	Sig. (2-tailed)	.000	.000	.	.000	.000	.000	.000	.000	.009	.073	.004	.001	.057	.999
	N	212	212	212	212	212	212	212	212	212	212	212	212	212	212
Motivation (Cf3)	Correlation Coefficient	.398**	.449**	.321**	1.000	.268**	.200**	.157*	.196**	.191**	.050	.180**	.012	.176*	.024
	Sig. (2-tailed)	.000	.000	.000	.	.000	.003	.022	.004	.005	.467	.008	.860	.010	.734
	N	212	212	212	212	212	212	212	212	212	212	212	212	212	212
Support (Cf1)	Correlation Coefficient	.260**	.357**	.659**	.268**	1.000	.832**	.372**	.344**	.193**	.244**	.124	.281**	.035	.092
	Sig. (2-tailed)	.000	.000	.000	.000	.	.000	.000	.000	.005	.000	.072	.000	.617	.184
	N	212	212	212	212	212	212	212	212	212	212	212	212	212	212
Resources (Df1)	Correlation Coefficient	.172*	.289**	.518**	.200**	.832**	1.000	.295**	.221**	.163*	.215**	.136*	.300**	-.061	.036
	Sig. (2-tailed)	.012	.000	.000	.003	.000	.	.000	.001	.017	.002	.049	.000	.377	.598
	N	212	212	212	212	212	212	212	212	212	212	212	212	212	212
Local research agenda (Df3)	Correlation Coefficient	.079	.167*	.262**	.157*	.372**	.295**	1.000	.565**	.134	.205**	.098	.258**	.268**	.354**
	Sig. (2-tailed)	.254	.015	.000	.022	.000	.000	.	.000	.052	.003	.155	.000	.000	.000
	N	212	212	212	212	212	212	212	212	212	212	212	212	212	212
Partnerships (Df2)	Correlation Coefficient	.088	.073	.307**	.196**	.344**	.221**	.565**	1.000	.243**	.118	.048	.265**	.231**	.385**
	Sig. (2-tailed)	.203	.291	.000	.004	.000	.001	.000	.	.000	.086	.486	.000	.001	.000
	N	212	212	212	212	212	212	212	212	212	212	212	212	212	212
Funding (Df4)	Correlation Coefficient	.007	.104	.178**	.191**	.193**	.163*	.134	.243**	1.000	.074	.046	.109	.044	.191**
	Sig. (2-tailed)	.921	.131	.009	.005	.005	.017	.052	.000	.	.285	.505	.114	.521	.005
	N	212	212	212	212	212	212	212	212	212	212	212	212	212	212

Spearman's rho		Research Uptake	Experience (Cf2)	Time constraints (Cf4)	Motivation (Cf3)	Support (Cf1)	Resources (Df1)	Local research agenda (Df3)	Partnership (Df2)	Funding (Df4)	Quality evidence (Ef4)	Review skills (Ef5)	Accessible evidence (Ef3)	Gate keeping (Ef1)	Research committees (Ef2)
Quality evidence (Ef4)	Correlation Coefficient	.122	.164*	.123	.050	.244**	.215**	.205**	.118	.074	1.000	.352**	.403**	-.003	-.060
	Sig. (2-tailed)	.076	.017	.073	.467	.000	.002	.003	.086	.285	.	.000	.000	.969	.386
	N	212	212	212	212	212	212	212	212	212	212	212	212	212	212
Review skills (Ef5)	Correlation Coefficient	.203**	.337**	.196**	.180**	.124	.136*	.098	.048	.046	.352**	1.000	.285**	.014	-.083
	Sig. (2-tailed)	.003	.000	.004	.008	.072	.049	.155	.486	.505	.000	.	.000	.837	.229
	N	212	212	212	212	212	212	212	212	212	212	212	212	212	212
Accessible evidence (Ef3)	Correlation Coefficient	.071	.127	.223**	.012	.281**	.300**	.258**	.265**	.109	.403**	.285**	1.000	.012	.040
	Sig. (2-tailed)	.304	.065	.001	.860	.000	.000	.000	.000	.114	.000	.000	.	.867	.562
	N	212	212	212	212	212	212	212	212	212	212	212	212	212	212
Gatekeeping (Ef1)	Correlation Coefficient	.020	.112	.131	.176*	.035	-.061	.268**	.231**	.044	-.003	.014	.012	1.000	.334**
	Sig. (2-tailed)	.770	.103	.057	.010	.617	.377	.000	.001	.521	.969	.837	.867	.	.000
	N	212	212	212	212	212	212	212	212	212	212	212	212	212	212
Research committees (Ef2)	Correlation Coefficient	.053	.009	.000	.024	.092	.036	.354**	.385**	.191**	-.060	-.083	.040	.334**	1.000
	Sig. (2-tailed)	.445	.894	.999	.734	.184	.598	.000	.000	.005	.386	.229	.562	.000	.
	N	212	212	212	212	212	212	212	212	212	212	212	212	212	212

6.6 SUMMARY

The chapter reported on several statistics and related analyses that were used. The EFA was performed to determine the number of constructs from the instrument used for data collection. The results of factor analysis showed that individual factors could be grouped into four significant and meaningful constructs of research uptake. These four constructs of individual factors are categorised as ‘support’, ‘experience’, ‘motivation’, and ‘time constraints’. The four factors were explaining 64 percentage of the total variance. Similarly, organisational factors can be grouped into four significant and meaningful constructs of research uptake, which are ‘resources’, ‘partnerships’, ‘research agenda’, and ‘private funders’. The four factors were explaining 71 percentage of the total variance. However, research characteristics appeared to have five meaningful constructs of research uptake. These five constructs are categorised as ‘gate keeping process’, ‘local research committees’, ‘accessibility of evidence’, ‘quality of evidence’, and ‘critical appraisal skills’. These five factors were explaining 65 percentage of the total variance.

Factor analysis was followed by computing the reliability tests which revealed acceptable scores of 0.901 (individual factors), 0.878 (organisational factors), and 0.791 (research characteristic factors). These findings reflected that the study questionnaire was both reliable and valid. Sample distribution statistic was performed and overall indicated a need to use a non-parametric test as the sample was not normally distributed. A Spearman’s correlation coefficient was used and revealed moderate to weak correlations among variables when correlated against research uptake. This chapter solely focused on presenting the results of the online survey in a way to facilitate the discussion presented in Chapter 8. The next chapter explains the outcome of the data gathered in Chapters 5 and 6, respectively, and provides the implication of these outcomes for the proposed research uptake model in Chapter 8 of this study.

CHAPTER 7

DISCUSSION AND INTERPRETATION OF FINDINGS

7.1 INTRODUCTION

The main framework that guided the overall conduct of the current study was the PARIHS framework (see Section 5.1). This framework was used to determine factors affecting research uptake to develop a model to facilitate research uptake in healthcare practice and policy. In the two preceding chapters (Chapter 5 & Chapter 6), the researcher outlined the findings obtained using both qualitative and quantitative data.

The idea of developing a model for research uptake seems quite straightforward, namely, that a model is developed by identifying research uptake gaps, followed by implementation. However, its actual design has greater consequences as research uptake is a complex process requiring the involvement of all relevant stakeholders in the design, execution and dissemination phases of a research project. This study attempted to solicit input regarding factors affecting research uptake from various categories of respondents and institutions. The research results from this study demonstrated a varying degree of mean scores on several factors for respondents, such as the time factor, support, resources and availability of evidence, and these varied according to each institution. In addition, based on literature review, some factors affecting research uptake were identified, and the research findings confirmed that a substantial number of these factors also contribute to the low uptake of research among this study's population.

In this chapter, the researcher provides a discussion on the main findings from the research and, where applicable, correlates literature to the research findings. The chapter begins by providing a summary of the relationship between emanated themes and validated statistical factors, followed by a discussion of the qualitative findings and quantitative results, and lastly, an overview of the key highlights from the findings.

7.2 SUMMARY DATA ON FACTORS AFFECTING RESEARCH UPTAKE

Figure 7.1 reflects the ultimate relationship between the themes and the statistically confirmed factors affecting research uptake for healthcare practice and policy. As illustrated, the qualitative data analysis outcomes using the PARIHS framework yielded six themes, which explained stakeholders' perception regarding research uptake. From the themes, three main constructs yielded 13 components from the survey responses and were categorised as individual factors (4 components), organisational factors (4 components), and research characteristics factors (5 components). However, the results of Spearman's correlation in this study (see Section 6.5.3) indicated a significant correlation between research uptake and six factors (support, experience, motivation, time factors, resources and critical appraisal skills). Furthermore, the results of Spearman's correlation indicated significant cross-correlations between the individual, organisational, and research characteristic factors.

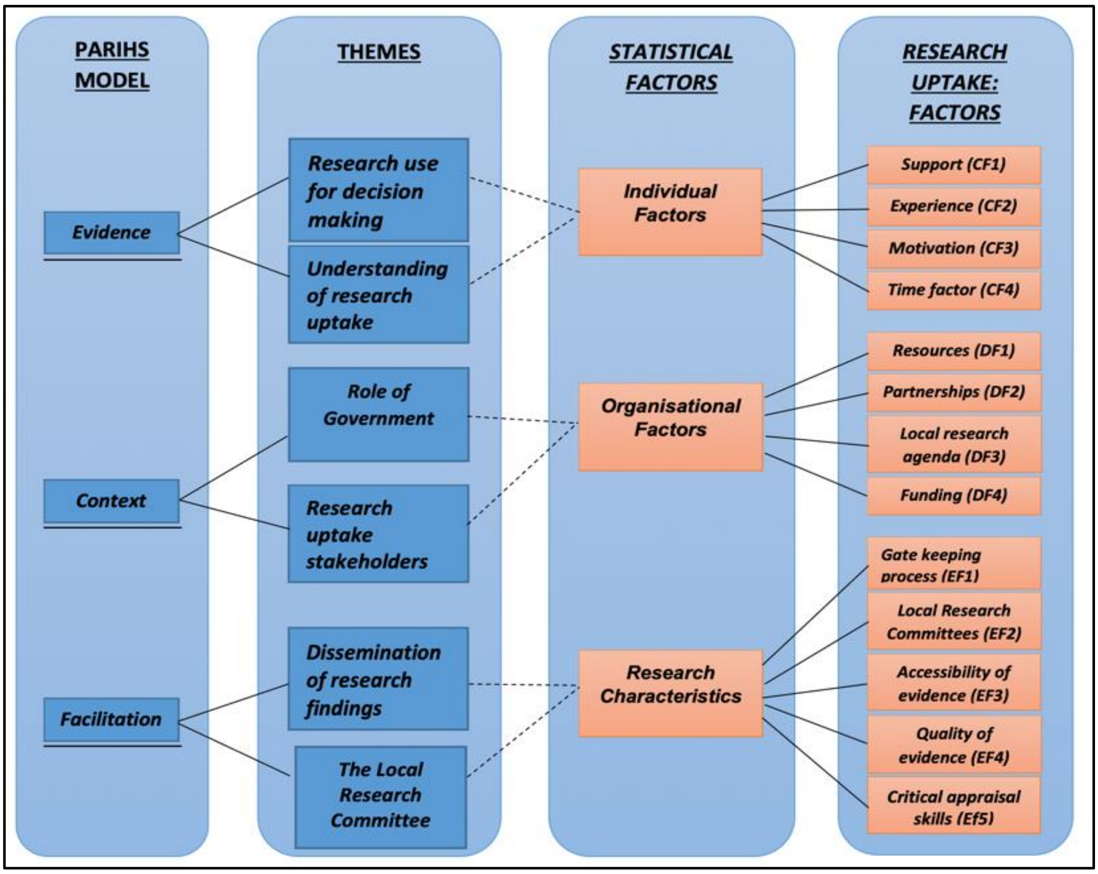


Figure 7.1: Relationship between PARIHS model, themes and statistical factors

7.3 INTEGRATING QUALITATIVE FINDINGS WITH QUANTITATIVE RESULTS

The qualitative data analysis aimed to gain an understanding of various stakeholders' perception on research uptake for healthcare practice and policy development.

7.3.1 Understanding of research uptake

The first theme that emanated from qualitative findings presented in Chapter 5 reflected participants' understanding of research uptake. Several conclusions were drawn from the results that pertain to this theme that could be generalised across the general study population. Importantly, participants acknowledged their full understanding of research uptake and highlighted some of the factors affecting research uptake.

During in-depth interviews, participants were of the view that for research uptake to succeed, all relevant stakeholders should be involved. This will ensure that research has direct implications ranging from practical application to policy development. Thus, the execution of a research project should be a collaborated effort. Law, Harrington, Alexander, Saha, Oehrlein and Perfetto (2018: 181) agree that research uptake benefits from involving research stakeholders in the design, execution and dissemination phases of a research project. Dumitriu (2018: 1) indicates that research uptake is a process that includes all activities which support engagements between research users and research producers in ensuring that the research is relevant, well-communicated to different audiences, and has capacitated research users. A match was established between the qualitative and quantitative phases as the results of the survey showed higher mean average values on the variable 'research uptake' among all different categories of respondents (see Figure 6.5).

However, the involvement of all relevant stakeholders in research uptake processes has been a challenge, particularly in low- and middle-income countries where public health systems are inadequately developed (El-Jardali, Fadlallah, Daouk, Rizk, Hemadi, Kebbi *et al.* 2019: 15). This is partly due to a lack of willingness among relevant stakeholders to use research findings for practice and policy (Uzochukwu *et al.* 2016: 1). The researcher believes that it is critical to institutionalise a culture that supports research uptake through the engagement of researchers, decision-makers, and relevant personnel within the institutions to facilitate buy-in at the initial phase of the research process; this would aid with the implementation process. Moreover, the SEM in the current study revealed that motivation and experience are the two most significant factors for research uptake (see Section 8.3.2.5.2), as discussed next.

7.3.1.1 Motivation

The results reflected a significant positive moderate correlation between research uptake and motivation. This demonstrated that the respondents' decision to embrace research uptake appears to be motivated by their desire to establish creative ways of doing things, learning new things and just updating themselves with the most recent information. A study conducted previously reported the need for health professionals to keep up with rapidly changing and developing science to benefit and develop new skills and attitudes to advance effective patient care (Ayvaz, Akyol & Demiral 2019: 52).

The outcomes of this study revealed nine other factors significantly associated with motivation, which directly or indirectly influence research uptake. These included the time factor, experience, resources, support, critical appraisal skills, research agenda, partnerships, funding, and gatekeeping processes (see Section 6.5.3). Although the correlation between motivation and the gatekeeping process was found to be weak (0.176), this finding was significant in affecting respondents' motivation to promote research uptake. This is in line with participants' views which revealed a low and complex process for obtaining gatekeepers' permission, and they recommended that local research committees ought to be efficient and timeous in reviewing applications to reduce uncertainty (see Section 5.3.3.2.2).

7.3.1.2 Experience

Research experience or capacity is key to any country that seeks to promote research uptake for healthcare practice and policy development (see Section 2.4.1). This study revealed that government is inadequately resourced with research-skilled managers who are experienced enough to implement research findings, and this potentially stifles innovations for improving healthcare outcomes. This observation is, to some extent, at odds with that in the developed world where authors demonstrated that an increase in government-funded research projects leads to more research innovations (Fleming *et al*. 2018: 1139). The researcher in this study argues that research uptake solely relies on managers and practitioners at all levels having adequate skills to make locally informed and locally relevant evidence-based decisions. Similarly, according to Slade *et al.* (2018: 2), it is essential for governments to capacitate individuals internally to higher levels of research skill for them to conduct quality research and promote research uptake for better patient outcomes.

Contrary to this finding from in-depth interviews, and that of a study by Conalogue *et al.* (2017: 5), which found the task of building research capacity difficult in low- and middle- income countries, most participants in this study were sufficiently educated, including those employed by the government sector. Almost all respondents in this study had enough experience to promote research uptake for healthcare practice and policy, with a mean score above 4.2 (see Section 6.3.1). This is arguably attributed to the tremendous working relation between respondents and various local universities across the country, which has contributed to immense progress in respondents' research capacity (see Section 7.3.4).

However, having research experience alone would not bear many results in research uptake. Franzen *et al*. (2017: 1) argue that although stable progress has been noticed in low- and middle-income countries concerning health research capacity, major barriers to research persist, and different strategies are required to overcome these. The authors suggest newer development thinking, such as equally valuing research experience and research outputs. The online survey revealed seven other factors that correlated with research experience, which directly or indirectly affect research uptake. These included the time factor, motivation, resources, support, critical appraisal skills, research agenda, and quality of research evidence (see Section 6.5.3). Of these, 'support' had a significantly moderate correlation with motivation (0.449). The researcher argues that sustaining partnerships between research institutions and public practitioners or policy developers could alleviate most of the other factors associated with research experience, resulting in improved research uptake.

7.3.2 Research use for decision-making

The goal of research uptake is research findings that deliver life-saving interventions in terms of healthcare practice and policy development (Morton 2015: 406). As argued earlier (see Section 7.3.1), this remains a challenge in low- and middle-income countries with limited health resources and inadequately developed research systems. In this study, participants highlighted the shortage of a budget to translate research findings into practice and policy, vividly revealing that research is not prioritised due to other competing interests. This finding is consistent with those of a previous study, which found a lack of dedicated research budget as a barrier for research uptake (Nair *et al*. 2019: 1147). The stipulated funding of at least 2% of the country's GDP appears unrealistic for the immediate time in low- and middle-income countries. Therefore, these countries ought to develop their own research uptake initiatives to mitigate lack of funding.

The findings of this study demonstrated a surge in the reliance on informal research (routine primary care data) to obtain information quickly for rapid decision-making. Katowa-Mukwato *et al*. (2018: 502) support the argument that using acceptable quality research in healthcare practice and policy development is an essential strategy for improving the healthcare system of a given country. Furthermore, an increase in the use of informal research (such as using routine primary care data for decision-making) has been observed in some countries (Smeets, Kortekaas, Rutten, Bots, Kraan, Daggelders *et al.* 2018: 1). The researcher argues that despite the benefits of using informal research, the use of routine primary care data for decision-making should depend on the completeness and accuracy of available databases but, where possible, this should be avoided in low- and middle-income countries with data quality issues, as argued above (see Section 7.3.1). According to Houston *et al*. (2018: 25), data quality should be evaluated before being used in decision-making, and if more than 10% of data is missing or incorrect, the reliability of the resultant analysis becomes low.

7.3.2.1 Support

In line with these findings, the survey established that a lack of support is indeed one of the major challenges affecting research uptake as reported by all categories of respondents in the current study (frontline workers, researchers, programme managers and directors). Furthermore, the results revealed that a lack of broad support within organisations is severe in government institutions, with the lowest mean score (2.32) among all the other individual factors. Lack of support for individuals to promote research uptake has consistently been reported as a major barrier for effective research uptake into healthcare practice and policy development (Courtenay, Khanfer, Harries-Huntly, Deslandes, Gillespie, Hodson *et al.* 2017: 3).

Equally significant, of the 13 research uptake factors,' support' is directly correlated to ten factors (resources, motivation, time factor, experience, research agenda, partnerships, funding, quality and accessibility of research evidence). Of these, 'support' had a significantly high correlation with 'resources' (0.832). This illustrates how critical institutional support is in encouraging the individual to promote research uptake. Other scholars who conducted similar studies include, *inter alia*, Bianchi *et al.* (2018: 918) and Nkrumah, Atuhaire, Priebe and Cumber (2018: 1). They addressed aspects of the perceived lack of support for public health research, particularly for frontline workers. Specifically, they mention the need to encourage an institutional support mechanism to promote research uptake initiatives, which reciprocate and change people's attitudes towards research, and ultimately contribute to improved healthcare practices. This approach is supported by scholars (Hawkes *et al.* 2016: 161), as established in the literature (see Section 2.4.4.3.1).

7.3.2.2 Time constraints

Lack of time to be involved in research projects has consistently been reported as a major barrier for effective research uptake into healthcare practice and policy, particularly among frontline workers in low- and middle-income countries (Ritchie, Khan, Moore, Timmings, van Lettow, Vogel *et al.* 2016: 234; Edwards *et al*. 2019: 1). Analogous to these studies, one of the findings in this study was the significant correlation between time and research uptake (see Section 2.4.4.3.2).

Respondents indicated that due to their heavy workload and personal responsibilities, most were unable to appraise the huge volume of research publications to keep up to date with all the new research findings (see Section 5.3.2.2.1). A novel cross-country qualitative exploration study found that lack of time is not only a factor affecting low- and middle-income countries, but practitioners in developed countries such as Australia, United States and China regularly cited a lack of time and heavy workload as individual barriers affecting research uptake (Budd *et al.* 2018: 4).

Similar barriers were also reported by Smith and Thew (2017: 351) in their study. They claim that finding time for involvement in research uptake initiatives is challenging in the context of tight work schedules, particularly among frontline workers. Therefore, creating blocks of time for research activities is vital for research uptake and ensuring that research becomes an established activity. In this study, it was evident that in addition to frontline workers, lack of time was prevalent among programme managers as well, which does not bode well for research uptake, especially when research activity is not embedded into their overall job roles.

7.3.3 The role of government and research stakeholders

The importance of governments across the globe prioritising health research through coordinated health research systems has been established in the literature (see Section 2.2.1). This has resulted in most countries developing an interest in improving research uptake initiatives through various investments (Rodríguez *et al.* 2017:1). Such investments in low-income countries include collaboration, partnerships and funding, as argued by Conalogue *et al*. (2017: 3).

Glied *et al*. (2018: 4) emphasise that where academic researchers conduct research that may be helpful for practice and policy, research in government is conducted for the sole purpose of informing practice and policy in real-time. This view was also supported by Kirigia *et al*. (2016: 62), who emphasised the need for institutional capacity and resources to improve health research systems.

Overall, participants in this study identified four main impediments they experienced while working in government institutions relating to research uptake initiatives, namely, availability, inflexibility, bureaucracy, and political influences. Gredig, Heinsch, Amez-Droz, Huttemann, Rotzetter and Sommerfeld (2020: 1) allude that an important instrument for research uptake is linkages and exchanges between researchers and government officials. However, Bertolo *et al.* (2018: 756) recommend that while it is essential to work on these impediments, it is equally important for researchers to consider and understand research users' culture and motivation. The researcher argues that the culture of promoting research uptake is currently weak within the health system in most low- and middle-income countries. This calls for relevant senior managers in government institutions to advocate for measures to strengthen the culture of using research evidence for healthcare practice and policy development.

7.3.3.1 Partnerships/collaborations

To improve research uptake, a mirrored identification and selection of appropriate stakeholders is required in a joint effort, particularly during the initial stages of a research project. The findings of this study have illustrated that, due to limited resources for research, collaborations could assist the government in promoting research uptake. According to Forsythe *et al.* (2018: 1161), establishing partnerships that engage stakeholders and end-users early on enhances the usefulness of the research findings for uptake by decision-makers and policymakers.

However, many low-resource countries have not been able to adequately deal with and promote the translation of research evidence for healthcare practice and policy development (Owusu-Addo, Renzaho & Smith 2020: 1). Yet it is equally significant for these countries to participate in research uptake activities to generate new strategies for improving healthcare practice and policy development (Andermann, Pang, Newton, Davis & Panisset 2016: 1). As stated, beneficial partnerships could promote research uptake; this finding is supported by Estabrooks, Harden, Almeida, Hill, Johnson, Porter and Greenawald (2019: 176), who argue that, should human resources and the requisite skills to facilitate research uptake be unavailable, partnerships could provide a vehicle to ensure that the best available evidence finds its way to healthcare practice and policy development.

The online survey reflected that ‘establishing partnerships’ had an indirect significant relationship with research uptake. Significantly, the results showed that establishing partnerships had a positive correlation with five factors, namely, time constraints, motivation, support, resources and local research committees. In a survey that investigated collaborative health research partnerships, the authors found acceptable satisfaction levels from participants who indicated resource constraints (funding/time) and differences in contribution and involvement among team members as barriers inhibiting partnerships (Sibbald, Kang & Graham 2019: 1). Boum, Burns, Siedner, Mburu, Bukusi and Haberer (2018: 1) further suggest that better understanding of partnerships is essential to deliver unbiased, equitable research findings for healthcare practice and policy development.

7.3.3.1.1 Researchers

Researchers are important components of the research uptake chain of events. The results of this study highlighted a need for partnerships between researchers and relevant government officials to promote research uptake. The researcher argues that such partnerships should be informed by healthy linkages and exchanges between researchers and government officials, to stimulate interest in the research project, and contribute to making the research relevant to the everyday life of a government institution. Arney, Thurman, Jones, Kiefer, Hundt, Naik *et al.* (2018: 9) advocate for local staff in any organisation to facilitate research engagements to minimise the gap between the two key stakeholders. Furthermore, literature has shown a growing interest in establishing closer partnerships between researchers and research users to promote research uptake (see Sections 2.3.3 & 7.3.4).

7.3.3.1.2 Universities

The findings of this study further revealed that institutions of higher learning (universities) conducts most research projects. Literature has shown that low- and middle-income countries could tap into the involvement of universities to improve the quality and acceptability of research findings (Van Niekerk, Mathanga, Juban, Castro-Arroyave & Balabanova 2020: 1). According to Dye and Zarate-Bermudez (2018: 35), collaboration with academia increases research capacity (skill transfer) and ensures high-quality research output. Similarly, in South African universities, publication output has been increasing at a rate of 7.8% per annum (DHET 2020: 19). The researcher in this study thus argues that collaboration with academia can build the capacity and quality of research findings, and has the potential to deliver innovations that are aligned with the broader development objectives of the local area. Partnerships with universities could be explored further and should provide mutual benefits. For example, universities can provide training on critical appraisal to healthcare practitioners and policy developers, which is essential for research uptake.

7.3.3.1.3 Private healthcare partners

The findings also pointed to the need to tap into resourced private healthcare partners to improve research uptake. This assertion was supported by Sombie *et al*. (2017: 89), who alluded that the fragile context of low- and middle-income countries require long-term engagement, and support from regional institutions is needed to address existing research uptake challenges and build local research capacity.

7.3.3.2 Research funding

Private healthcare funders are vital in sustaining health research in countries where health research systems are less developed. Literature has shown that studies funded by private funders are of acceptable quality. Shepherd *et al*. (2018: 2) argue that despite the emphasis of publishing in peer-reviewed journals, research funded through the funding institutions is of the highest scientific standard and could be appropriate for research uptake to practice and policy. This finding was corroborated by Guthrie *et al*. (2018: 3), who established that approximately 95% of UK medical research funding was allocated based on peer review.

The participants in this study felt less impressed with the conduct of some funders taking advantage of health research systems in less developed countries. They alluded that private funders are exploiting poor countries by conducting research projects suiting their research agendas, with minimal impact on capacity building initiatives. A study by Cartier, Creatore, Hoffman and Potvin (2018:2) found that private funders use mainly two strategies to fund research projects, namely, investigatordriven (exclusively based on investigators' research ideas), or strategic (based on strategic priorities of the funder). According to these authors, both strategies have the potential to neglect local research priorities.

Goodyear-Smith, Bazemore, Coffman, Fortier, Howe, Kidd *et al.* (2019: 34) contend that aligning the health research priorities of private funders with those of the governmental departments in low- and middle-income countries could be an epitome for stimulating research uptake in healthcare practice and policy. This could further result in capacity building initiatives for local research partners. Literature had shown that low- and middle-income countries are faced with several significant challenges, including budgetary constraints, which make investments by respective governments to research uptake practically impossible (Dodd, Ramanathan, Angell, Peiris, Joshi, Searles & Webster 2019: 1). Yet, it is also known that in most low- and middle-income countries, research projects were primarily funded by private research agencies (Aifah, Iwelunmor, Akwanalo, Allison, Amberbir *et al.* 2019: 103). The current study revealed that there is an indirect relationship between 'private funders' and research uptake.

As seen in the previous chapter (see Section 6.5.3), the factor 'private funders' had a significant relationship with four research uptake factors, namely support, resources, motivation, and time factor. This finding was corroborated in McLean, Graham, Tetroe and Volmink (2018: 1), who argue that one of the benefits of privately funded research projects was that they promote research uptake in the countries in which they were conducted. Beran, Byass, Gbakima, Kahn, Sankoh, Tollman *et al.* (2017: 567) emphasise that through research resources provided by private funders, they have been able to build local capacity in low-resourced community settings. The researcher is of the view that through private funders, health research stakeholders are further motivated and able to mitigate time constraints to promote research uptake within their localities.

7.3.3.3 Availability of resources

In addition to the shortage of financial support for research uptake, participants in this study indicated the scarcity of essential equipment required for research uptake and human resources, particularly in rural facilities, to translate research findings into meaningful healthcare practice and policy. According to Kumar *et al*. (2018: 1), such a shortage has the potential to negatively influence or lead to errors in population health management and clinical care. Dumitriu (2018: 61) vehemently emphasises that the actual research uptake is the conclusion of a process that involves human and financial resources, requiring significant investment by respective governments to develop health research systems. Rasanathan *et al*. (2018: 1) maintain that for research findings to be acceptable to research users, it should not be limited to local research needs or contexts, but also the availability of resources to implement research findings. Moreover, the researcher argues that rural facilities might experience severe low research uptake due to overcommitted personnel who might lack time to read and use research evidence.

Literature has established that to promote research uptake, there should be significant investment in three areas, namely knowledge hub centres, skilled personnel, and financial investments (see Section 2.4.4.2). The results of the online survey highlighted the shortage of resources, which impacted heavily on frontline workers and employees, particularly at government institutions. Resource investments have lagged in low- and middle-income countries for far too long, and countries are instead faced with more attenuated healthcare resources (Lynch, Young, Jowaisas, Rothschild, Garrido, Sam *et al.* 2020: 10). Therefore, the question remains, how can healthcare practitioners and policymakers in low- and middle-income countries promote research uptake with fewer resources?

The outcomes of this study revealed ten other factors significantly associated with resources, which directly or indirectly influence research uptake. These included, explicitly, the time factor, experience, motivation, support, critical appraisal skills, research agenda, partnerships, funding, quality and accessibility of research evidence (see Section 6.5.3). In this study, the availability of resources was highly correlated with individual support (0.832) and time constraints (0.518). In a study on steps that researchers can adopt to promote research uptake by policymakers in China, the scholars argued that adapting research in a manner that accommodates the environment and making alliances with key stakeholders can be effective in low-resource countries (Wu, Khan & Legido-Quigley 2020: 665). The researcher in the current study argues that having effective local research committees would not only assist in improving research uptake initiatives, but continue some of the functions of specialised knowledge hub centres, facilitate research uptake training for personnel, and establish partnerships to reduce the need for substantial financial investments (see Section 7.3.6).

7.3.3.4 Local research agenda

The main importance of a local research agenda, as emanating from this research, was that research conducted should be based on local priorities to addresses local challenges.

The local research agenda loaded first as one of the organisational factors that affect research uptake for healthcare practice and policy. The correlation between local research agenda and research uptake was not significant as evident in the research findings. However, the findings suggest that the local research agenda has an indirect, significant correlation with research uptake through five factors, namely motivation, time factor, experience, support, and resources. Researchers have in the past emphasised the need to understand local context, and the research agenda provides such a platform for shaping health research (cf. Point 7.3.6). Moreover, Brownson *et al.* (2017: 10) highlight in their study that organisations differ greatly, and research uptake strategies ought to be developed in light of identified local needs.

Results in this study demonstrated low mean scores for local research agenda in all groups of respondents, suggesting that studies conducted were not based on an explicit research agenda that has been adequately understood and communicated to researchers. Forsythe, Carman, Szydlowski, Fayish, Davidson, Hickam *et al.* (2019: 359) suggest that engagement to understand local context would lead to relevant research aligned with the real-life problems affecting patients and clinicians. Considering all factors associated with the local research agenda, the results of the current study support the view for an all-inclusive stakeholder involvement, multidisciplinary approach to setting up local research agenda and its communications (Pinz, Roudyani & Thaler 2018:1).

7.3.4 Dissemination of research findings

The reliable and efficient dissemination of information to all stakeholders is central to research uptake as evidenced by both the in-depth interview findings and the online quantitative survey results.

7.3.4.1 Quality of research evidence

Another critical factor in research uptake cited by participants in this study was the reliability and quality of research findings. This factor appeared to be a major challenge, particularly for healthcare professionals and managers at government institutions, who had doubts about produced research evidence, concerning sample size and biases due to conflict of interest by those involved in the research. In a critical appraisal of evidence-based interventions, Hailemariam, Bustos, Montgomery, Barajas, Evans and Drahota (2019: 5) found that approximately 4% of studies were of poor quality. The researcher in this study argues that given this challenge, improving research uptake in low- and middle-income countries will remain a challenge. However, this difficulty would be mitigated by the involvement of all relevant stakeholders for the duration of the research project, as discussed above (see Section 7.3.1).

Another barrier to research uptake was identified as data issues, which is incorrectly captured by government institutions. This was mainly attributed to local challenges experienced in facilities such as shortage of data capturers and incompleteness of the captured data. In their study on the analysis of erroneous data entries in paper-based and electronic data collection systems at a hospital in Ley, Rijal, Marfurt, Adhikari, Banjara, Shrestha *et al.* (2019: 1) found discrepancies in 13% of captured data, of which 64% of the discrepancies were due to data omission. Ouedraogo, Kurji, Abebe, Labonte, Morankar, Bedru *et al.* (2019: 1), who found inefficiencies in data management systems, further corroborate this type of anomalous finding. The researcher contends that one of the bases of research uptake is sound data sources, and the expressions by participants in this study are in line with a previous study observing continuous data quality challenges in low- and middle-income countries, which could lead to errors in clinical care (Iqbal, Rabrenovic & Li 2019: 165).

Research uptake for healthcare practice and policy development requires high-quality decisions based on the best available scientific research evidence (Hasanpoor, Bahadori, Yaghoubi, Haghgoshayie & Mahboub-Ahari 2020: 83). Using robust research findings in public healthcare practice and policy development has been strongly encouraged for promoting research uptake (Masood *et al*. 2020: 7). Above-average mean scores were observed in the findings of this study on the quality of research evidence, suggesting that respondents were satisfied with the quality of evidence produced.

The study found that there were no significant differences in terms of the mean scores for quality of research evidence among all the categories of respondents, except with the frontline workers with a mean average below the other categories. This was more prevalent among respondents working in the government sector than those of the other sectors. The results might suggest the availability of low-quality research data as shown by the mean scores. However, a more plausible explanation is data quality issues within government institutions. In a study to assess data quality, Nagle, Redman and Sammon (2020: 325) found that approximately 47% of recently created data records had at least one critical error. Often, this data is used in research projects which could lead to a serious lack of quality in research evidence. Data in this study contribute a clearer understanding of the quality of evidence; it has a significant positive relationship with research uptake through the factors: support, resources, critical appraisal, and experience (see Section 6.5.3).

7.3.4.2 Accessibility of research evidence

The outcomes of this study also highlighted difficulties in accessing relevant and useful research evidence. Participants reiterated the need for researchers to initiate and promote research uptake. The responses gathered indicated that researchers are often less engaging during the initial stages of the research process, which affects the usefulness and relevancy of the research evidence. Furthermore, participants in this study highlighted a mismatch between clinical relevance (applicable in the clinical practice) and research in the academic environment, as one of the factors limiting research uptake. The paucity of relevant research and usefulness of available research evidence was previously highlighted in several studies as some of the main features limiting research uptake (Dobrow *et al*. 2017: 1; Yazdizadeh *et al.* 2016: 1). These findings are broadly in line with the recommendations by Oliver and Cairney (2019: 1), who argue that researchers ought to be accessible to research users by routinely engaging with them to promote research uptake.

Low mean scores were observed in the findings of this study for accessibility to research evidence (see Section 6.3.1). Frontline workers and programme managers felt most affected by the accessibility of research evidence as compared to directors and researchers. Similarly, respondents working in the government sector were more affected than those at institutions of higher learning/universities. In a critical appraisal of both empirical and non-empirical literature in low- and middle-income countries, the authors found that in a number of articles, available research evidence did not meet the needs of decision-makers, and evidence was not presented in a succinct format that was easily understood by non-technical decision-makers (Khalid, Lavis, El-Jardali & Vanstone 2020: 6). While previous research has focused on the format for delivering research results, the findings from this study suggest a lack of delivery and poor communication between researchers and decision-makers as the main impediments to accessing research evidence. This results in evidence not reaching the intended recipients responsible for healthcare practice and policy development (see Section 5.3.1.1.2).

In the current study, the accessibility of evidence indirectly had a significant relationship with research uptake through the factors: support, resources, critical appraisal, and time factor (see Section 6.5.3). Literature on the best strategies specifically designed to enable the use of research evidence in decision-making have suggested that collaborative initiatives in research projects include all relevant stakeholders in the research process (Oliver, Kothari & Mays 2019: 1); produced research evidence ought to be unambiguous to accurately reflect its implications and impacts (Kobashi, Sawano, Crump, Kami & Tsubokura 2020: 90); the formation of local research steering committees as argued in Edwards *et al*. (2019: 6) should be prioritised; the hosting of feedback sessions should be encouraged (Kaunda-Khangamwa, van den Berg, McCann, Kabaghe, Takken, Phiri *et al.* 2019: 1); priority settings initiatives should be established (Lam, Liu, Bhate, Fenwick, Reed, Duffy *et al.*

2019: 715); and capacity building workshops should be encouraged (Goodyear-Smith *et al.* 2019: 31).

7.3.4.3 Critical appraisal skills

The responses from in-depth interviews highlighted a lack of basic understanding of critical appraisal skills by healthcare professionals, which limits their ability to sieve through various research findings to effectively assess the quality of research for uptake. According to Todd (2019: 99), critical appraisal is an essential skill, which assists practitioners to evaluate the extent to which the primary research provides a solid base for the reviewed findings to inform evidence-based practice and policy. As Sells, Bassing, Barker, Forshee, Keever, Goerz *et al.* (2018: 486) postulate, decisions based on spurious conclusions generated by non-rigorous research that lacks quality could be ineffective and detrimental for research users.

Meanwhile, the results of the online survey showed satisfactory average mean scores on critical appraisal skills for most respondents. This revealed that respondents had the potential to understand research jargon, and they were able to judge the quality of research findings and reports. According to Ham-Baloyi and Jordan (2016: 125), critical appraisal skill is an integral part of research uptake in that it affords healthcare practitioners an opportunity to keep abreast with the most robust evidence-based research, which is essential in formulating best-practice guidelines and informing healthcare practice. Searching and understanding research evidence is an important part of conducting critical appraisals, as errors made in the search process could potentially result in biased or incomplete evidence, which will negatively affect the quality and validity of critical appraisal (Salvador-Olivan, Marco-Cuenca & Arquero-Aviles 2019: 210).

Likewise, critical appraisal plays a key role in formulating evidence-based practice and policy development by including only the highest-quality evidence. The online survey results indicated a significant positive relationship between critical research appraisal skills and research uptake. Conversely, this is limited by the fact that only two items (statements) were loaded for this factor (see Section 6.4.4.4). Nevertheless, the Spearman’s correlation outcomes in this study revealed six other factors significantly associated with resources, which directly or indirectly influence research uptake. These included the time factor, experience, motivation, resources, quality and accessibility of research evidence (see Section 6.5.3). These findings can be seen to be beneficial for research uptake, mainly in improving the usefulness, quality and relevance of research (see Section 7.3.1). This may further enhance the usefulness and uptake of critical appraisals. However, there is a lack of resources and knowledge in most low- and middle-income countries to guide researchers on how to vigorously involve stakeholders in critical appraisals (Uneke, Langlois, Uro-Chukwu, Chukwu & Ghaffar 2019: 1).

7.3.5 The local research committee

The in-depth interviews revealed that the local research committee should champion the establishment of personal connections between researchers and research users to facilitate research uptake. Treichel, Silva, Presotto and Onocko-Campos (2020: 35) emphasise that functional research committees provide a platform whereby members of the research team, managers and frontline staff could engage systematically to plan, monitor and make adaptations in the research project to promote uptake.

7.3.5.1 Envisioned role of the health research committee

The online survey indicated that the research committee does not significantly influence research uptake or the primary factors affecting research uptake (see Section 6.5.3). However, the outcomes of the Spearman’s correlation in this study revealed a significant relationship between ‘research committee’ and four other factors, namely, research agenda, partnerships, funding, and the gatekeeping process. Conversely, the online survey results revealed low mean scores for the involvement of local research committees as indicated by almost all categories of respondents, suggesting failure by the local research committee to effectively engage, communicate, and facilitate the translation of research findings for practice and policy.

These results build on existing evidence from Boaz, Hanney, Borst, O’Shea and Kok (2018: 1), who indicated that thorough engagements and communication by all relevant stakeholders could achieve the desired research uptake. Similarly, the researcher argues that research committees can indirectly influence research uptake through availing a sound research agenda, lobbying sufficient funding, establishing beneficial partnerships, and clearly communicating the gatekeeping process. According to Keita, Lokossou, Berthe, Sombie, Johnson and Busia (2017: 113), effective local research committees can catalyse to increase research uptake for practice and policy. A study by Shabani, Dove, Murtagh, Knoppers and Borry (2017: 469) further alluded that local research committees are required for the duration of the research lifecycle.

Moreover, the findings obtained from the current study demonstrated that a lack of capacity building initiatives, lack of up-to-date local research agenda/priorities, ineffective communication, inadequate engagements, and a lack of critical appraisal skills are challenges participants experience in promoting research uptake. The researcher maintains that for a functional local research committee to effectively promote research uptake, a CRECA strategy should be developed and implemented (where, C: *capacity building*; R: *research agenda*; E: *engagement*; C: *communication*; and A: *appraisal strategies*), as summarised in Figure 7.2.

Figure 7.2: CRECA strategy

7.3.5.2 Gatekeeper’s permission

The researcher further alludes that in addition to improving research uptake, the CRECA strategy will also ensure a smooth facilitated process for granting permission to local research facilities. This study revealed that the process of obtaining gatekeepers’ permission have in the past cast a poor reflection on the part of government due to slow response by government institutions (see Section 7.4.3). The researcher argues that most of the delays were in part due to a lack of understanding of the gatekeepers’ process for researchers to obtain permission. Marland and Esselment (2018: 685) advise that researchers should tailor their approach accordingly when requesting gatekeepers’ permission.

Based on these findings, local research committees should not be established to approve research studies as they are not ethics bodies, but rather grant permission to access sampled research sites. This process should be thoroughly communicated to ease the burden on researchers. However, there are specific localised requirements or prescripts that local research committees adhere to for the process to be facilitated. For example, local research committees must know the type of resources a researcher would require from the sample site to conduct a study, and correlate that against the availability of such resources in the sampled site. Azungah (2019: 410) shared a similar feeling that researchers ought to set aside sufficient time and build relationships of trust with gatekeepers.

The researcher concludes that an engaging researcher has the potential to stimulate interest from research users, who in turn could contribute to the research project by enhancing its relevance and usefulness in solving everyday problems. Upon reflection, the researcher ponders on the right strategy for researchers to engage government in executing a research project considering the challenges identified when initiating engagements (see Section 7.3.3.1). Literature has recommended the establishment of local steering committees (Maguire, Garside, Poland, Fleming, Alcock, Taylor *et al.* 2019: 218). These committees can assist in shaping the research objectives, and adding valuable input, such as on acceptable cultural practices, to the research project (Skewes, Hallum-Montes, Gardner, Blume, Ricker & FireMoon 2019: 72), and relevant to everyday life problems (Teufel-Shone, Schwartz, Hardy, de Heer, Williamson, Dunn *et al.* 2019: 1), to make it culturally acceptable and relevant for a particular population. As a result, research users will feel a sense of ownership in the research project.

7.4 SUMMARY

In the current chapter, the researcher discussed and integrated the findings acquired from the qualitative and quantitative data to detect factors that affect research uptake and influence low research uptake using the PARIHS framework.

The qualitative data analysis outcomes revealed a lack of access to relevant and useful research evidence by participants from the government sector. However, the findings suggested that this challenge can be mitigated by establishing functional local research committees, who in turn would develop a CRECA strategy essential to promote research uptake. The local research committees were also highlighted as an important component of government in establishing research partnerships, which could strengthen the culture of using research evidence. The findings also highlighted and discouraged a growing reliance on informal research, where unevaluated routine clinical data are used for quick decision-making.

Conversely, the quantitative data analysis also focused only on research stakeholders' feedback in the qualitative phase of this study. The results revealed six factors (critical appraisal, support, resources, motivation, time factor and experience) which directly correlated with research uptake. Interestingly, the outcomes revealed that there was no significant relationship between local research committees and research uptake. This helped the researcher to clarify and confirm the qualitative outcomes, which suggested the need for local research committees to influence research uptake through the CRECA strategy. In Chapter 8, a model for research uptake is presented, as well as conclusions and recommendations for further research.

CHAPTER 8

PRESENTATION OF RESEARCH UPTAKE MODEL, SUMMARY AND FINAL CONCLUSIONS

8.1 INTRODUCTION

In this chapter, based on the findings and empirical outcomes from this study, the researcher presents a conceptual research uptake model. The model was developed by exploring the theoretical relations of research uptake with factors identified to play a significant role in the uptake of research. Accordingly, the model will act as a framework to assist with the strategy to facilitate the optimal uptake of research for healthcare practice and policy.

Using the PARIHS framework, the qualitative findings of this study arrived at a number of themes which ultimately led to a grouping of three main constructs for the subsequent quantitative phase of this study. The constructs were individual factors, organisational factors and research characteristics. Through the EFA and reliability coefficients, a total of 13 factors were identified to be affecting the uptake of research for healthcare practice and policy. However, of these, the Spearman's correlation identified six predictors of research uptake, which consisted of multiple relationships that are suitable for further examination (see Section 8.2).

In Section 8.2, the initial hypothesised research uptake model is presented, and the key outcomes from the current study are discussed. In Section 8.3, the SEM is used to test how sets of variables characterise constructs, and in what way the constructs are associated with one another. This allowed a revision of the model, which is presented in Section 8.3.2.3, followed by a discussion of key concepts and the use of the model. Section 8.4 presents conclusions drawn from the discussion of this study, followed by recommendations in Section 8.5.

8.2 PRESENTING THE HYPOTHESISED RESEARCH UPTAKE MODEL

The researcher's intention in this study was to develop a tailored model for research uptake, which is easy to understand and practical to solve real-life problems. The hypothesised research uptake model is generated from the qualitative themes and 212 observations from data collected from the quantitative phase of the current study. The data from survey respondents excluded responses with missing data, and almost all responses were engaged as they provided varying answers to the Likert-scale items. Figure 8.1 represents the initial conceptualised path of the theoretical research uptake model.

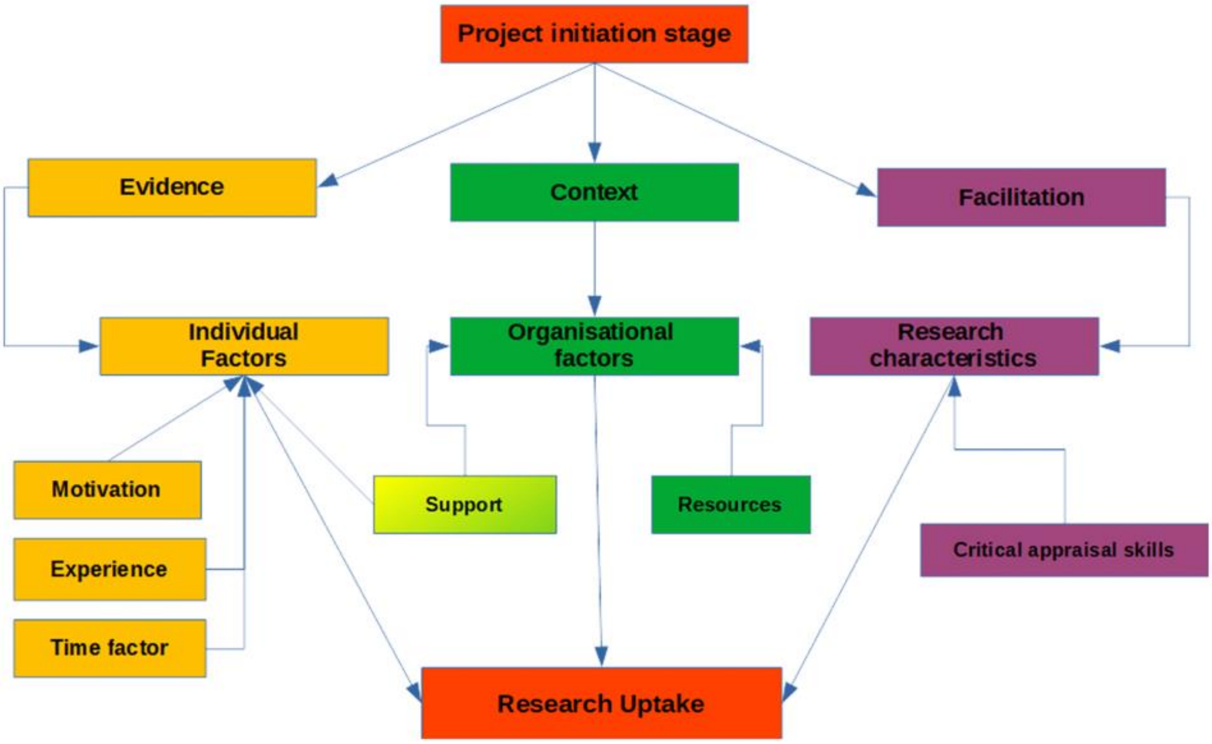


Figure 8.1: Hypothesised research uptake model

For the conceptual foundations (Figure 8.1), the PARIHS framework (Stetler, Damschroder, Helfrich & Hagedorn 2011: 1) was considered, which indicates that for research uptake to be successful, there should be clarity about the nature of the research evidence generated, the quality of context, and the type of facilitation necessary to ensure a successful research uptake process. The main factors affecting research uptake were thematically categorised into three broader concepts, as indicated above. Four factors (motivation, experience, time factor, support) which fit the domain ‘evidence’ were associated with the concept ‘individual factors’. The concept ‘organisational factors’ was associated with the factor ‘resources’, which is the responsibility of leadership and fit the domain ‘context’. Finally, the concept ‘research characteristics’ was associated with the factor ‘critical appraisal skills’, which is associated with skills and attributes in the domain ‘facilitation’. To further validate the extent at which these factors affect research uptake, SEM was carried out as indicated in the subsequent section.

8.3 VALIDATION OF RESEARCH UPTAKE MODEL

The dataset used for validating the model factors, as highlighted above, comprised 212 survey records from the quantitative phase of the current study.

8.3.1 Multiple regression summary for the model

In preparing for SEM estimation, correlation (R) between the actual values of an outcome variable and the values predicted by a multiple regression model was computed. According to Zhang (2017: 310), the r squared (R^2) measures the variation in the dependent variable as explained by the predictors included in the model. As can be seen in Table 8.1, $R^2 = 0.247$ indicates that approximately 25% of the data fit the regression model. However, there is still a lot of variation in outcomes that are not related to research uptake. Similarly, on average, predicting research uptake with this model will be wrong by 0.52.

Table 8.1: Multiple r and r^2 for model

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.497[a]	.247	.225	.521158197885600
a. Predictors: (Constant), Critical appraisal (Ef5), Support (Cf1), Motivation (Cf3), Experience (Cf2), Time constraints (Cf4), Resources (Df1)				
b. Dependent Variable: Research Uptake				

A multiple linear regression was carried out to establish the extent to which critical appraisal, support, motivation, experience, time constraints and resources can predict research uptake. As illustrated in Table 8.2, the model was suitable for predicting the outcome $R^2 = 0.247$, $F(6, 205) = 11.22$, $p < .001$. Thus, the sample data provided evidence that the regression model fits the data.

Table 8.2: ANOVA for model fit

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.280	6	3.047	11.217	.000[b]
	Residual	55.679	205	.272		
	Total	73.959	211			

a. Dependent Variable: Research Uptake

b. Predictors: (Constant), Critical appraisal (Ef5), Support (Cf1), Motivation (Cf3), Experience (Cf2), Time constraints (Cf4), Resources (Df1)

8.3.2 SEM estimation

To proceed with estimating the fit, Hartwell, Khojasteh, Wetherill, Croff and Wheeler (2019: 4) described five steps for presenting and describing a model. These include identification of the research problem; identification of the model; estimation of the model; determination of the model's goodness-of-fit; and re-specification of the model, if necessary. This ensured that the model was developed based on a logical theory.

8.3.2.1 Identification of the research problem and model (step 1 & 2)

The gap between research produced and research translated into healthcare practice and policy development has been established in this study (see Chapter 2). The hypothesised research uptake model was deduced as a result of the confirmatory factor analysis (CFA) which incorporated testing the unidimensionality of a dataset by confirming the underlying theoretical structure (Shau 2017: 221). Although the model was conceptualised using CFA, modification and standardised loadings were computed using Amos 21 statistical package (Arbuckle 2012: 101). Amos' outputs further provided options to verify the dimensions of the model fit. MI, which comprised variances, covariances and regression weights, were examined to determine the model-fit evaluation (Collier 2020: 81). This provided guidance on modification processes, whether freeing of incorporating parameters among variables.

8.3.2.2 Estimation of the model and determination of the model’s goodness-of-fit (step 3 & 4)

Based on the hypothesised model depicted in Figure 8.1, an elaborate model comprising the latent variables was developed. However, the outcome of the initial conceptualised research uptake structural model could not produce an appropriate fit, and as a result, one latent construct (time constraints) was deleted due to weak relationships with other factors. According to Wang and Wang (2019: 58), item deletion or the addition of a new path indicator are ways of improving model fit. Figure 8.2 shows the initial standardised path coefficients for the initial theoretical structural model, with eight hypothesised paths, namely, ‘experience’ to ‘individual factors’, ‘motivation’ to ‘individual factors’, ‘support’ to ‘individual factors’, ‘resources’ to ‘organisational factors’, ‘critical appraisal’ to ‘research characteristics’, ‘individual factors’ to ‘research uptake’, ‘organisational factors’ to ‘research uptake’ and ‘research characteristics’ to ‘research uptake’.

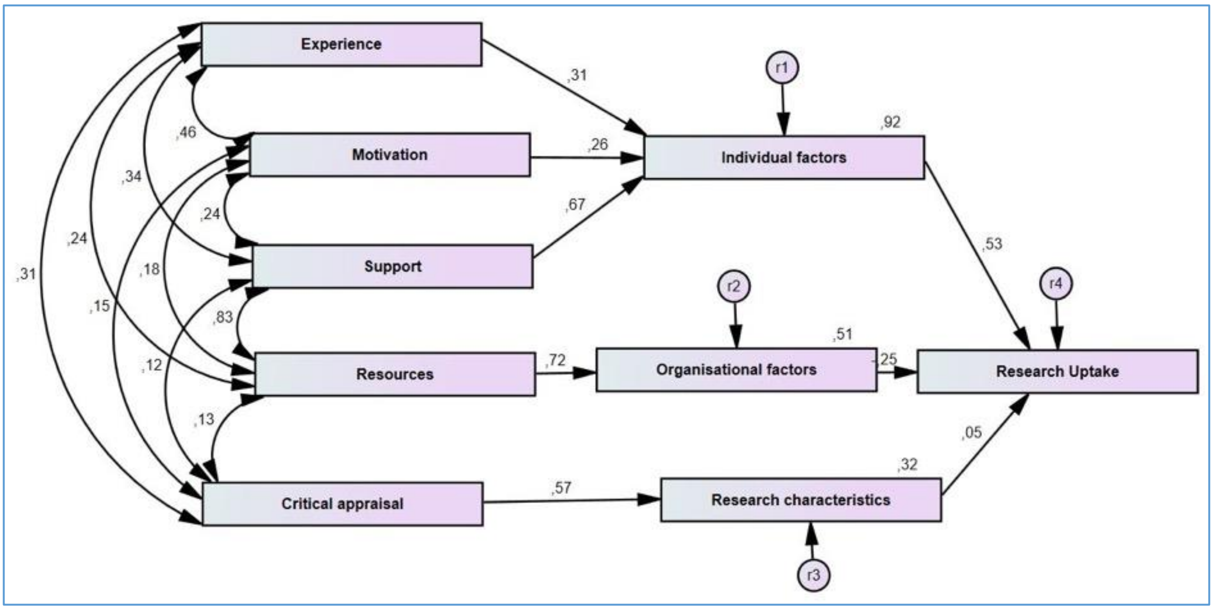


Figure 8.2: The initial standardised path coefficients diagram

Only one conceptualised path from ‘research characteristics’ to ‘research uptake’ was insignificant. This initial theoretical structural model resulted in a χ² of 105.893 with 18 df, was statistically not significant with $p < 0.05$, and did not meet the requirement for an appropriate fit. Table 8.3 shows the measurement models for the initial standardised path coefficients.

Table 8.3: Initial research uptake measurements models

The initial research uptake structural measurement model	Chi squared (χ^2) = 105.929 with $p < 0.05$ (not statistically significant)					
Model fit summary	df	χ^2/df	GFI	AGFI	CFI	RMSEA
	19	5.575	0.905	0.774	0.929	0.147
Benchmark (Schreiber, Stage, King, Nora & Barlow 2006: 330)		<3.00	>0.90	>0.90	>0.90	• ≤ 0.05: good fit • 0.05-0.08: adequate fit • 0.08-0.10: mediocre fit
Where, df=degree of freedom; χ^2/df: ration of likelihood to degrees of freedom; GFI: Goodness-of-Fit index; AGFI: Adjusted Goodness-of-Fit index; CFI = Comparative fit index; RMSEA = Root Mean Square Error of Approximation						

8.3.2.3 Re-specification of the Model (step 5)

To improve the model fit, and in accordance with the MI technique, an extra structural path was added, as suggested in literature (see Section 4.5.3.1). In the current study, the largest MI (44.17) was detected in a path from ‘organisational factors’ to ‘research characteristics’. This indicates that ‘organisational factors’ had a direct effect on research characteristics and, as a result, the first modified structural model was elaborated through the addition of the identified path in this study. Two additional paths were added to further improve the fit, namely ‘support’ to ‘organisational factors’, and ‘resources’ to ‘research characteristics’ as they improved the model fit. There were no validity concerns with the model after the addition of this path when checking the master validity (Gaskin & Lim 2016: 1). In Figure 8.3 and Table 8.4, the standardised path coefficients are presented for the standardised theoretical structural model.

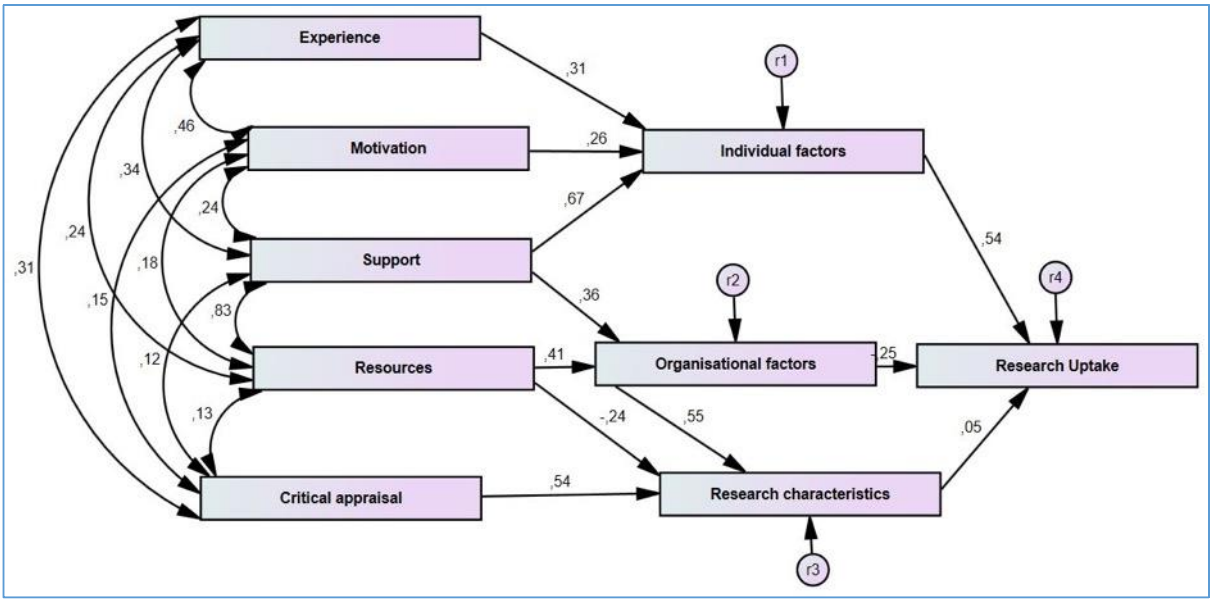
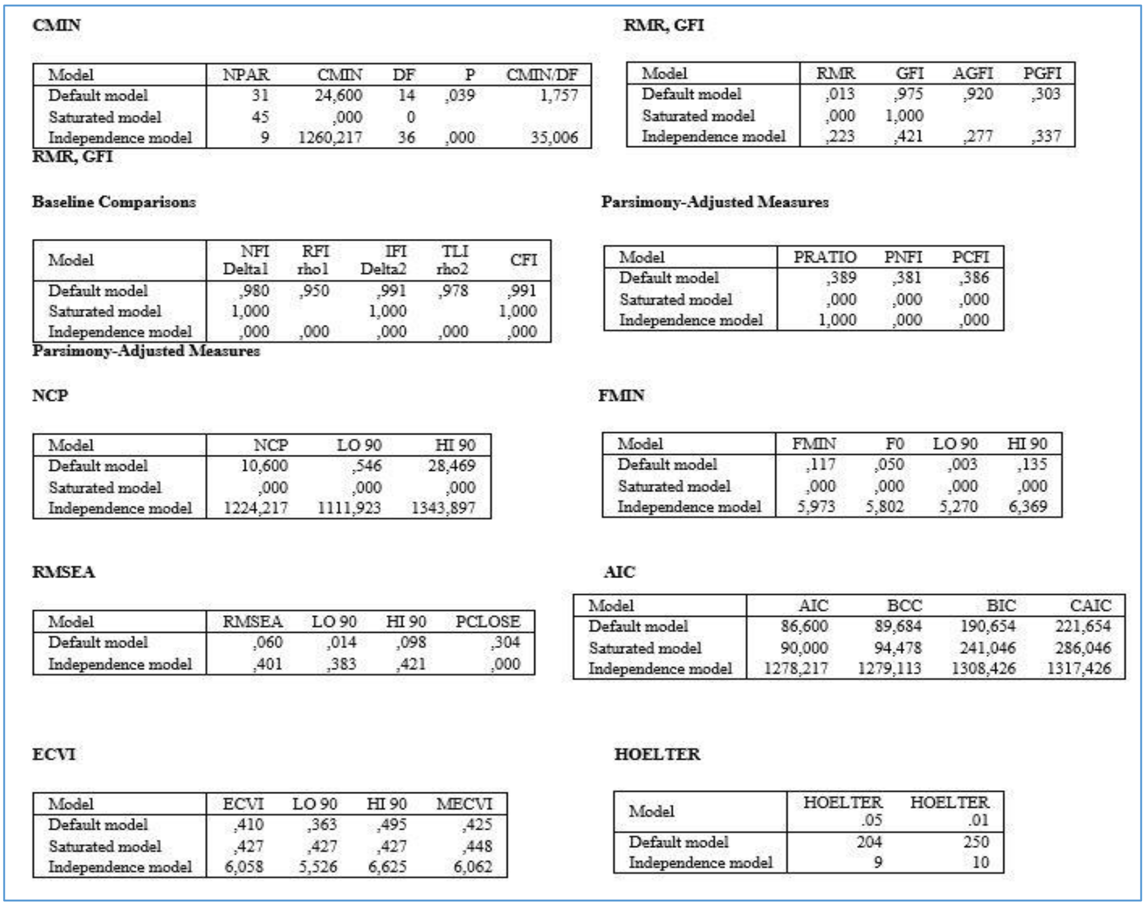


Figure 8.3: The final standardised path coefficients diagram

The modified structural model showed a χ² of 26.698 with 15 df was statistically significant with $p < 0.05$, which met the requirement for an appropriate fit. Modifying the conceptualised structure revealed a good fit between the theoretical model and the data. A total of nine out of 11 significant paths were observed. As shown in Table 8.4, all the remaining statistics were within acceptable ranges (χ²⁄df = 1.779; GFI= 0.973; AGFI=0.919; CFI=0.990; RMSEA =0.061).

Table 8.4: Model fit summary



CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	31	24,600	14	,039	1,757
Saturated model	45	,000	0		
Independence model	9	1260,217	36	,000	35,006

RMR, GFI

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	,013	,975	,920	,303
Saturated model	,000	1,000		
Independence model	,223	,421	,277	,337

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,980	,950	,991	,978	,991
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

Parsimony-Adjusted Measures

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	,389	,381	,386
Saturated model	,000	,000	,000
Independence model	1,000	,000	,000

NCP

Model	NCP	LO 90	HI 90
Default model	10,600	,546	28,469
Saturated model	,000	,000	,000
Independence model	1224,217	1111,923	1343,897

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	,117	,050	,003	,135
Saturated model	,000	,000	,000	,000
Independence model	5,973	5,802	5,270	6,369

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,060	,014	,098	,304
Independence model	,401	,383	,421	,000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	86,600	89,684	190,654	221,654
Saturated model	90,000	94,478	241,046	286,046
Independence model	1278,217	1279,113	1308,426	1317,426

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	,410	,363	,495	,425
Saturated model	,427	,427	,427	,448
Independence model	6,058	5,526	6,625	6,062

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	204	250
Independence model	9	10

As a result, a good fit was identified from this modified structural model and the data. This was the final modified structural model with no extra paths recommended through a MI, hence it was not necessary to further re-specify the research uptake model because of a good fit of data to the model. The model in Figure 8.3 shows the following:

i. The latent variable '**research uptake**' is the outcome variable determined by individual factors, organisational factors, and research characteristics.
ii. The latent variable '**individual factors**' is the outcome variable determined by support, experience and motivation, and has a positive unidirectional relationship with research uptake.
iii. The latent variable '**organisational factors**' is the outcome variable determined by support and resources, and has a unidirectional relationship with research characteristics and research uptake.
iv. The latent variable '**research characteristics**' is the outcome variable determined by critical appraisal skills, resources and organisational factors. It has a unidirectional relationship with research uptake.

v. The latent variable ‘**experience**’ has a unidirectional relationship with individual factors.

vi. The latent variable ‘**motivation**’ has a unidirectional relationship with individual factors.

vii. The latent variable ‘**support**’ has a unidirectional relationship with individual factors and organisational factors.

viii. The latent variable ‘**resources**’ has a unidirectional relationship with organisational factors and research characteristics.

ix. The latent variable ‘**critical appraisal skills**’ has a unidirectional relationship with research characteristics.

8.3.2.4 Summary of SEM analysis output

Table 8.5 shows a summary of the analysis on the SEM. The table indicates that a local minimum for developing the model has been reached.

Table 8.5: Variable summary

Particulars	**Value**
Sample size	212
The model is recursive	-
Number of variables in your model:	13
Number of observed variables:	9
Number of unobserved variables:	4
Number of exogenous variables:	9
Number of endogenous variables:	4
Minimum was achieved	-
Chi-square	26,698
Degrees of freedom	15
Probability level	.031

8.3.2.5 Hypothesis testing

To answer the research questions for this study (see Section 1.4.3), a hypothesised framework was developed and is now being tested in this section using outputs from

SEM. Table 8.6 shows the hypothesised path results for the modified hypothesised model to test the hypothesis.

Table 8.6: Hypothesis testing

	Type of Variables/relationship
1	H1. Motivation strengthen the positive relationship between individual factors and research uptake.
	Standardised path coefficient: **0.281*** (p<0.001).** Therefore, this hypothesis was supported by the data.
2	H2. Experience strengthen the positive relationship between individual factors and research uptake.
	Standardised path coefficient: **0.321*** (p<0.001).** Therefore, this hypothesis was supported by the data.
3	H3. Support strengthen the positive relationship between individual factors and research uptake.
	Standardised path coefficient: **0.386*** (p<0.001).** Therefore, this hypothesis was supported by the data.
4	H4. Support dampens the negative relationship between organisational factors and research uptake.
	Standardised path coefficient: **0.203*** (p<0.001).** Therefore, this hypothesis was supported by the data.
5	H5. Resources dampens the negative relationship between organisational factors and research uptake.
	Standardised path coefficient: **0.224*** (p<0.001).** Therefore, this hypothesis was supported by the data.
6	H6. Resources strengthen the positive relationship between research characteristics and research uptake.
	Standardised path coefficient: **-0.102*** (p<0.001).** Therefore, this hypothesis was not supported by the data.
7	H7. Critical appraisal skills strengthen the positive relationship between research characteristics and research uptake.
	Standardised path coefficient: **0.303*** (p<0.001).** Therefore, this hypothesis was supported by the data.
8	H8. Individual factors have a positive effect on research uptake.
	Standardised path coefficient: **0.533*** (p<0.001).** Therefore, this hypothesis was supported by the data.
9	H9. Organisational factors have a positive effect on research uptake.
	Standardised path coefficient: **-0.255*** (p>0.001).** Therefore, this hypothesis was not supported by the data.

	Type of Variables/relationship
10	H10. Organisational factors strengthen the positive relationship between research characteristics and research uptake.
	Standardised path coefficient: **0.440*** (p<0.001).** Therefore, this hypothesis was supported by the data.
11	H11. Research characteristics have a positive effect on research uptake.
	Standardised path coefficient: **0.068*** (p>0.001).** Therefore, this hypothesis was not supported by the data.

8.3.2.6 Assumptions of the model

The assumptions in the current research uptake model are based mostly on predictive values and residuals. They are as follows:

8.3.2.6.1 Errors should be normally distributed

The normality of sample distributions was investigated using skewness and kurtosis tests, and histograms for all the factors. The researcher observed fairly normal distribution for the predictor variables in terms of skewness, however, with mild kurtosis for the variable ‘experience’ (value of 4.505) (see Section 6.4.2.5). EFA and reliability scores revealed that the findings are reliable and valid (see Section 6.4). Figure 8.4 shows Cook’s distance.

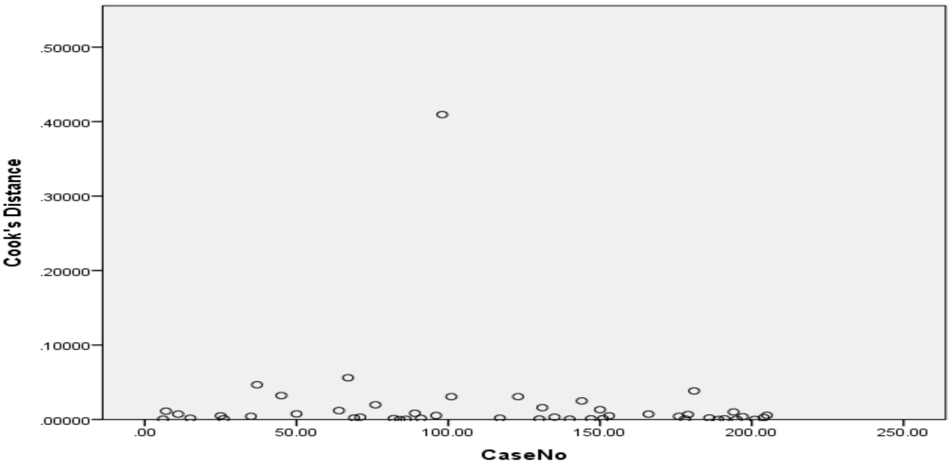


Figure 8.4: Cook’s distance

The Cook’s distance analysis was computed to determine if any influential outliers existed in the data (Kim 2017: 317). The results show that almost all cases observed a Cook’s distance of less than one, as all cases were far less than 0.500.

8.3.2.6.2 The absence of multicollinearity

According to Daoud (2017: 1), multicollinearity is a phenomenon that appears when multiple predictors are correlated, with the potential to increase the standard error of the coefficients. The coefficient table (Table 8.6) shows the constant and regression coefficients (Beta values) for every predictor variable. Only experience and motivation made a statistically significant contribution to the predictive power of the model. This indicates that research uptake is likely to substantially improve when stakeholders are experienced and motivated in research, after controlling for the other variables in the model. Equally, the findings also suggest that time constraints, support, resources and appraisal skills did not contribute to the multiple regression model. The coefficients for the explanatory variables are tabulated below:

Table 8.7: Coefficients for model

Coefficients[a]								
		Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1.994	.347		5.747	.000		
	Experience (Cf2)	.316	.077	.307	4.110	.000	.660	1.515
	Motivation (Cf3)	.243	.074	.227	3.298	.001	.773	1.293
	Support (Cf1)	.083	.073	.147	1.142	.255	.222	4.502
	Resources (Df1)	-.067	.061	-.123	-1.109	.269	.297	3.362
	Critical appraisal (Ef5)	-.025	.046	-.034	-.538	.591	.897	1.114
a. Dependent Variable: Research Uptake								

One of the diagnostic tools for multicollinearity is the variance inflation factors (VIF) and the tolerance statistics. Table 8.8 also shows that the VIF and the tolerance statistics for the data are within the tolerance level (Kim 2019: 559). That is, the largest VIF (4.502) is for the variable 'support', but is not greater than 10, so it is within tolerance threshold. Similarly, the tolerance statistics for 'support' (0.222) is not below 0.1, again within the tolerance threshold (Daoud 2017: 5). The average VIF for the model data is 2.289, which is not substantially greater than 1, while the average tolerance statistic is 0.5603, which is not below 0.2. These findings suggest the absence of multicollinearity. The collinearity diagnostics table below confirms these findings.

Table 8.8: Collinearity diagnostics

Collinearity Diagnostics[a]									
Model	Dimension	Eigenvalue	Condition Index	Variance Proportions					
				(Constant)	Experience	Motivation	Support	Resources	Critical appraisal
1	1	6.789	1.000	.00	.00	.00	.00	.00	.00
	2	.113	7.740	.01	.01	.01	.05	.07	.05
	3	.040	13.081	.00	.00	.00	.00	.17	.11
	4	.029	15.270	.04	.02	.07	.00	.01	.78
	5	.013	22.807	.01	.02	.00	.88	.69	.01
	6	.008	28.487	.09	.94	.27	.04	.03	.03
	7	.007	30.945	.85	.01	.65	.03	.03	.02

a. Dependent Variable: Research Uptake

For multicollinearity, values above 30 show a strong sign for problems with multicollinearity as suggested in literature (Thompson, Kim, Aloe & Becker 2017: 82), and Table 8.9 shows only one dimension (Dimension 7) with high condition index. However, collinearity could not be confirmed with the VIF values.

8.3.2.7 Explanation of identified concepts for the research uptake model

Consistent with recent calls for an increase in locally developed theory-based research uptake frameworks (Franzen *et al*. 2017: 1), the researcher used the PARIHS framework to identify factors affecting research uptake to develop this research uptake model. Below are the measurement models for each construct measure.

8.3.2.7.1 Individual factors: Support

Support was measured using six items with a composite reliability for this six-item measure of 0.89. A simple linear regression was computed to predict ‘research uptake’ based on ‘support’. A significant regression equation was found (F (1,210) = 11.1420, p< 0.00), with a R^2 of *0.051.* Participants predicted that research uptake = 4.0923082 + 0.127753*C Support. Thus, if support increased 1 point, then research uptake increased 0.128 point (an increase of 13%). These findings suggest a need for low-resourced countries to build a culture of supportiveness in relation to research uptake.

In this regard, strategic managers and leaders are key to the successful adoption of research evidence. The current study found that line managers can provide support by creating an appreciative environment, providing incentives, and availing enough resources for their subordinates in order to stimulate research uptake. If enablers of research uptake are absent, the probability of failure to improve research uptake becomes higher.

8.3.2.7.2 Individual factors: Experience

Experience was measured using six items with a composite reliability for this six-item measure of 0.84. A simple linear regression calculated to predict ‘research uptake’ based on ‘experience’ produced the equation (F (1,210)= 49.0693, p< 0.00), with a R^2 of 0.19014. Participants predicted that research uptake = 2.5421099 + 0.4495056*C Experience. Thus, if experience increased 1 point, then research uptake increased 0.450 point (an increase of 45%). Research experience is key to any country that seeks to promote research uptake for healthcare practice and policy development. In today’s era, it is paramount to continuously seek knowledge on the changing patterns of everyday life. Without research expertise, low-resourced countries would likely continue an endless cycle of low research uptake. Perhaps the challenge is on how to convince decision-makers in government institutions of the importance of research in addressing life’s everyday challenges. It is not sufficient for leaders in low-resourced countries to only speak of research from a distance; rather, they should also be in a position to critically scrutinise scientific research evidence for the purpose of incorporating best practices into their environment.

8.3.2.7.3 Individual factors: Motivation

Motivation was measured using four items with a composite reliability for this six-item measure of 0.83. A simple linear regression was calculated to predict ‘research uptake’ based on ‘motivation’. A significant regression equation was found (F (1,210) = 37.7434, p< 0.00), with a R^2 of 0.152966. Participants predicted that research uptake = 2.6224857 + 0.4177426*C Motivation. Thus, if motivation increased 1 point, then research uptake increased 0.418 point (an increase of 42%). One of the best ways to encourage research uptake is through motivation. A motivated researcher is likely to produce ground-breaking research evidence, while a motivated practitioner is likely to keep up with the rapidly changing healthcare practice to benefit and develop new skills and attitudes required for advancing effective patient care. It is critical for governments in low-resourced countries to invest in resources necessary to keep essential personnel motivated and committed to research uptake. It is demonstrated in the current study that the gatekeeping process is directly correlated with research uptake. It is critical to have clearly communicated gatekeeping guidelines to increase motivation.

8.3.2.7.4 Organisational factors: Resources

Resources were measured using five items with a composite reliability for this six-item measure of 0.89. A simple linear regression was calculated to predict ‘research uptake’ based on ‘resources’. A significant regression equation was found (F (1,210) = 3.5418, p< 0.00), with a R^2 of 0.016664. Participants predicted that research uptake = 4.2668141 + 0.0707431*D Resources. If the research resources increased 1 point, then research uptake increased 0.071 point (an increase of 7%). Low-resourced countries are faced with several competing priorities, and often health research systems are neglected. Just like with any process, the availability of adequate resources is fundamental to stimulate the uptake of health research. Adequate human skills, time, money and any other physical resources such as equipment are primary drivers for the translation of research findings to healthcare practice and policy. It is therefore important that adequate reasonable resources are allocated for the implementation process, to at the very least give research uptake initiatives a fair chance at success.

8.3.2.7.5 Research characteristics: Critical appraisal skills

Critical appraisal skills were measured using two items with a composite reliability for this six-item measure of 0.65. A simple linear regression was calculated to predict ‘research uptake’ based on ‘critical appraisal skills’. A significant regression equation was found (F (1,210) = 2.1984, p< 0.00), with a R^2 of 0.010409. Participants predicted that research uptake = 4.2206166 + 0.0729662*E Critical appraisal skills. If critical appraisal skills increased 1 point, then research uptake increased 0.073 point (an increase of 7%). Research uptake requires varying levels of capabilities and skills. Critical appraisal is one such specialised skill in which stakeholders would have to sieve through research evidence and take necessary decisions. Critical appraisal plays an important role in research uptake as only the highest-quality evidence is included in formulating evidence-based practice and policy decisions. Low-resourced countries need to audit available skills to recommend for up-skilling should critical appraisal skills be needed. It is also essential to integrate up-skilling strategies with sustainability and the retention of skilled research uptake personnel to ensure the right people are always present.

8.3.3 Synthesised research uptake model using the logical framework

The researcher adopted the logical framework to develop a research uptake model with the hope of improving the translation of research findings to practice and policy. As highlighted by Russo, Iiritano, Pellicano, Petrungaro and Zito (2020: 236), a logical framework is a bottom-up approach that begins by observing views from the target group on the assessment of the phenomenon investigated and their needs. Based on the findings of the two phases (quantitative and qualitative) of this study, the next section illustrates a research uptake model.

8.3.3.1 Definition of key components for the research uptake model

In developing the model through a logical sequence, the following components, listed in Table 8.9, were defined. According to Szczepanski and De Herdt (2019: 8), it is necessary when applying a logical framework to establish specific long-term outcomes.

Table 8.9: Definition of key research uptake components

Component	Explanation
1. Situation	Low uptake of research and lack of facilitated feedback on conducted research projects.
2. Inputs	Time, support, experience and motivation.
3. Activities	Local research committee should develop a CRECA strategy, and facilitate gatekeeping process.
4. Stakeholders	Relevant audiences required to promote research uptake.

Component	Explanation
4.1: Researchers	Producers of research evidence.
4.2: Policy developers	Users of research evidence to improve policies.
4.3: Programme managers	Users of research evidence to improve healthcare practice.
4.4: Local research committee	Facilitators of research uptake and gatekeeping permission.
4.5: Partners	Research/private institution with interest on research uptake processes.
4.6: Funders	Sponsor of research uptake initiatives/research projects.
5. Outputs	Realisation of quality research evidence.
6. Outcomes	Improved healthcare practice and policy.

8.3.3.2 Research uptake model

The research uptake model is intended to assist research stakeholders in low-resourced countries to use available resources to improve research uptake. The researcher intended to develop a user-friendly tailored model which is practical to apply despite limited resources. The model suggests that management in low-resourced countries must address issues of support, motivation, experience, and time factors at the onset of a research project to improve research uptake. It is clear from the empirical data that the local research committee is critical in creating strategies that will facilitate research uptake. The success of implementing the model depends on the availability of an up-to-date research repository to enable communication between research users and producers.

Timeous feedback and consistent engagements are the cornerstones of this research uptake model. They are critical to sustaining interest and buy-in for the research project. The researcher believes significant investments need to be made to improve critical appraisal skills among practitioners and policy developers for outputs to have an impact on health outcomes. The subsequent section provides details on how this model could be used to improve research uptake.

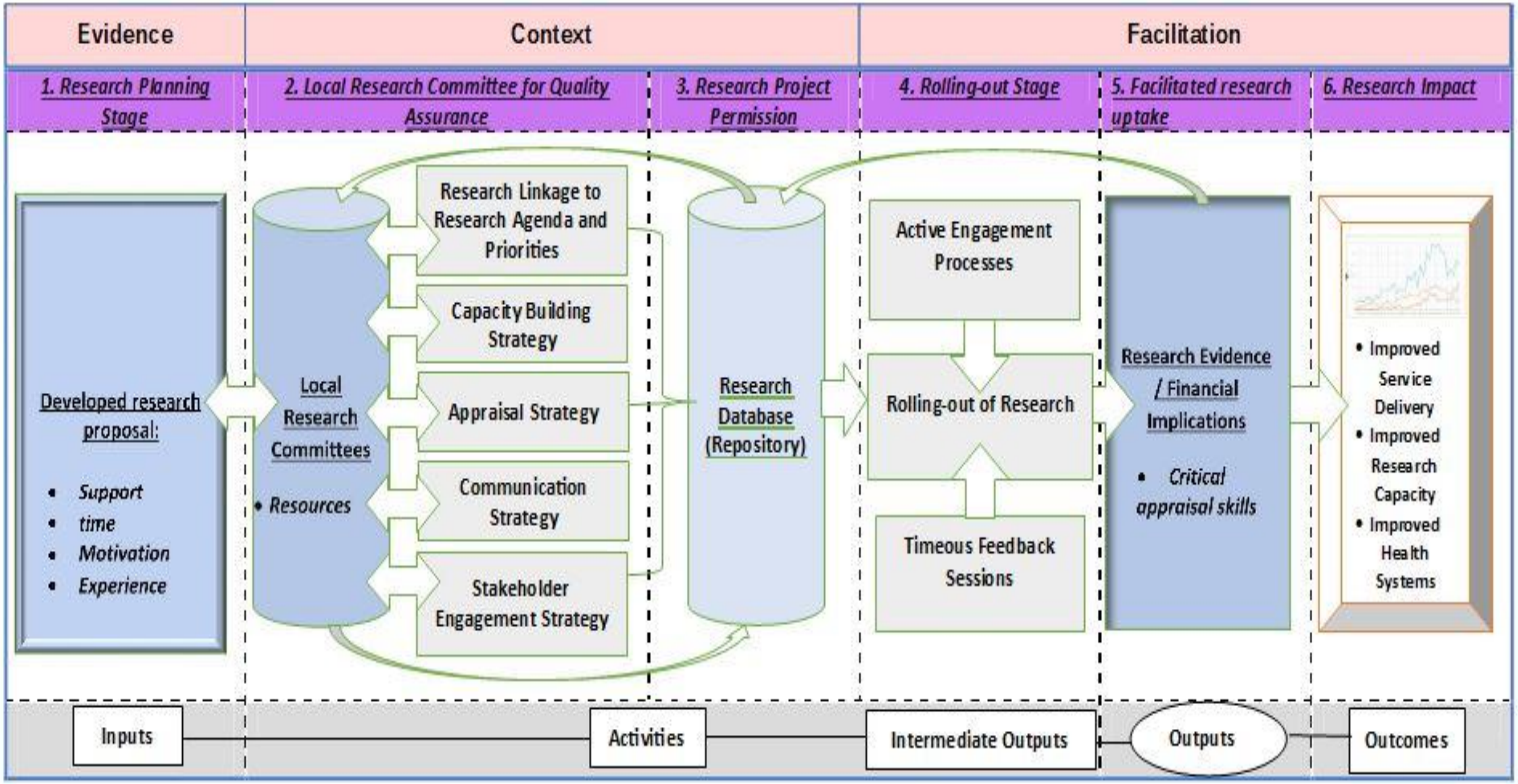


Figure 8.5: **Research uptake model for healthcare practice and policy development**

8.3.3.4 Model application

The successful implementation of this model is dependent on the availability of a local research committee/steering committee. Figure 8.6 provides guidance on steps that should be followed for putting the research uptake model to practice.

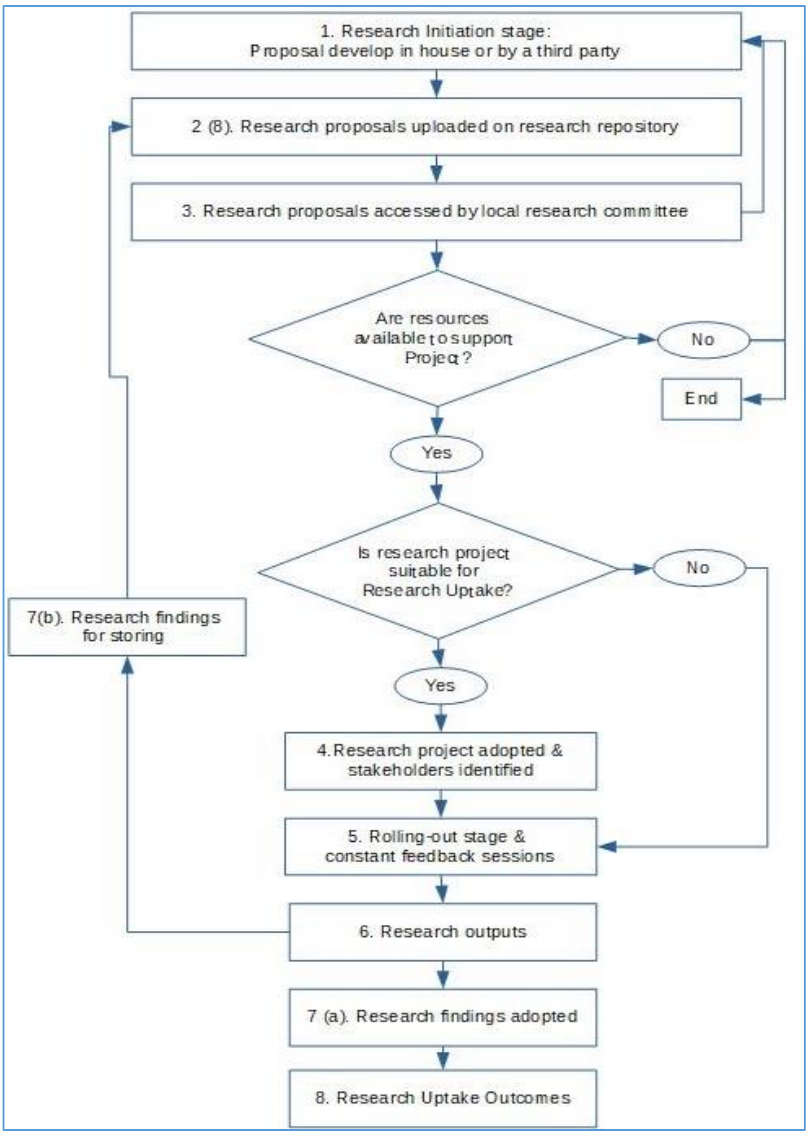


Figure 8.6: Logical framework for local research committees

i. **Research Initiation/planning stage:**
The stage refers to the drafting of a research proposal to conduct a study. In the study's current settings, this process is either done in-house, outsourced, or initiated by a third party. In either case, the research is subjected to ethical review for approval. There are also additional documents that respective local

research committees may require at this stage, and researchers ought to enquire about any other requirements to avoid delays.

ii. **Research proposals uploaded on research repository:**

Following the approval of a research project by an ethics committee, the research is uploaded on the research database for the attention of the local research committee for gatekeeping purposes. The research repository facilitates communication between researchers and gatekeepers, and it serves as storage for research documents.

iii. **Research proposals accessed by local research committee:**

In this stage, the local research committee accesses the research proposal (report) for further handling in line with its developed strategic research documents. For a research proposal, two questions that guide the local research committee are on availability of resources at the local institutions to support the research, and the suitability of the research project for adoption and subsequently research uptake. In answering the first question, the local research committee determines the required resources the researcher indicated to successfully conduct the study. This could include personnel, facility equipment, availability of space, and others. Failure to understand these requirements from the onset of a research project could result in misunderstanding which could have a devastating effect on an organisation (service delivery) and the researcher, and this without any malice being intended. The local research committee is expected to take a decision to either accept, review, or as a last resort reject the research project. For the second question, local research committees consider its strategic research documents in consultation with experts in a related field to determine if the project addresses any of the locally identified research priorities.

iv. **Research project adopted and stakeholders identified:**

Should the research project meet the criteria for adoption by the local research committee, stakeholders are identified. These would include experts nominated because of expertise in a particular field of study, who will play a significant role in further assisting and ‘shaping’ the research project for successful research uptake. Relevant experts could be clinical experts, decision-makers, and even a member from the community, all of whom may provide different expertise.

v. **Rolling-out stage and constant feedback sessions:**

This stage refers to the actual data collection process. Not enough can be said about effective communication, which is perhaps one of the most important missing links observed in this current study. It is critical for all stakeholders to receive regular feedback during the data collection process. This is important to highlight research progress, challenges, and engage with stakeholders to solicit research ideas.

vi. **Research outputs:**

This refers to produced research evidence which must be disseminated to appropriate audiences using an appropriate platform. When communicating research findings, it is also important to understand the types of audience for which the research is intended to benefit research uptake.

vii. **Research findings adopted (a & b):**

Research findings deemed suitable for healthcare practice and policy development are adopted by stakeholders to inform practice and policy. All research findings/reports are uploaded on the repository for future access and utilisation of the information.

viii. **Research uptake outcomes:**

A successful research uptake study should result in improved service delivery or healthcare practice, advances in policies, improved research capacity, and improved health research systems. The benefits of which are improved patients' outcomes.

8.4 SUMMARY

In this chapter, a statistical package (Amos 21) was used to develop the hypothesised research uptake model. The model was based on 212 observations from the quantitative phase of the current study. Importantly, the research uptake model had an R^2 of 0.247, which indicates that 25% of variance in the model is explained by support, motivation, experience, time constraints, resources and critical appraisal skills, while the remaining 75% is explained by the other factors which were not studied in this work. A total of nine out of 14 hypothesised paths were found significant with p-values of less than 0.05. Although the outcome of the initial theoretical structural model resulted in X^2 of 105.929 with df of 19, it did not meet the requirements for an appropriate fit. The model was then modified in accordance with the MI, and it produced a X^2 of 26.654 with a df of 15. This was statistically significant at a p-value of less than 0.05, and duly satisfied the requirements for an appropriate fit.

Following the development of the model, 11 hypothesis tests were developed and tested. Of these, only eight were found to be significant predictors of research uptake, as supported by the data at $\alpha=0.01$ level. Three were not supported by the data. The results of this study showed the importance of two cognitive variables, experience (0.450) and motivation (0.418), as the main predictors of research uptake. Therefore, for the successful promotion of research uptake, efforts should be made which are aimed at improving these variables. Assumptions underpinning the developed research uptake model related to the normality of data tested in terms of skewness and kurtosis, and the outcomes revealed fairly normal distribution with mild kurtosis for the variance ‘experience’. Furthermore, the findings suggested the absence of multicollinearity in the data, with the tolerance statistics within the acceptable threshold.

CHAPTER 9

SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

9.1 INTRODUCTION

This chapter summarises the findings and presents the contribution and limitations of the study. In addition, conclusions and recommendations for future research are also discussed.

When the journey of this thesis began, the researcher served in a local research committee where low uptake of research, lack of research feedback, poor communication between research producers and research users, and a lack of resources for research uptake, among others, were observed. The central research question was posited to identify the perceptions of researchers, frontline workers/practitioners, programme/policy managers and directors/senior managers regarding research uptake. It was also aimed at identifying strategies that local research committees could adopt to improve research uptake, especially due to insufficient rigorous guiding principles for health research uptake within the health sector. The conceptual model developed in this study complements existing frameworks as it is focused on public health research.

The model in this study suggests that improving research uptake can only be successful when the process is systematically and logically managed. From the onset of the research uptake process, the planning stage highlights the need for a careful consideration of individual factors (support, time, motivation & experience) which can influence the implementation stage. These factors were deduced through the domain ‘evidence’ of the PARIHS framework (Rycroft-Malone 2004: 297) as evident from the empirical research phases of this study. Although the research planning stage is initiated by the researcher, the process itself is bi-directional, involving the local research committee. The overall responsibility for input in this stage lies with the researcher.

In this model, the ‘domain’ context of the PARIHS framework is associated with both the local research committee and research project permission stages, all facilitated by the local research committee. The research findings confirmed the factor ‘resources’, and several strategies which are critical for these stages. The domain ‘facilitation’ of the PARIHS framework was associated with three stages of the research uptake model: rolling-out (intermediate outputs), facilitated uptake (outputs), and research impact stages (outcomes). The empirical research phases of this study confirmed critical appraisal skills are essential for these stages. For a successful research uptake, from stage two to stage six of the model, the local research committee assumes an active role in facilitating the processes.

The model is unique in that it successfully integrated the PARIHS framework with the logical framework to streamline the research uptake process for public healthcare practice and policy. According to the researcher’s knowledge, no other research uptake model developed for low-resourced countries was uncovered during the appraisal of literature for this study. As outlined, the model shows relevant factors associated with research uptake. In Section 8.3.2, the data suggested that a careful consideration of these fundamental factors could result in a successful research uptake process for public healthcare practice and policy.

The model process is cyclic in nature which allows a continuous engagement between the local research committee, researcher, and all other relevant public health research uptake stakeholders. This assists in curtailing the existing gap between research producers and research users, while promoting the establishment of long-lasting partnerships. In addition, implementing the model does not require a substantial initial monetary investment. This means that, with proper coordination, improvement of research uptake could be realised through the implementation of this model.

Moreover, despite the model providing a comprehensive list of activities required for a successful research uptake process, the researcher is mindful of the fact that all the processes detailed in the model were designed specifically to address issues associated with low-resourced settings, such as Mpumalanga Province, as identified during the conduct of the study.

The specific factors limiting research uptake uncovered from literature and the empirical research were the basis for developing this model. This model and its application can be modified for use in other settings on the basis of conditions associated with respective settings, such as the availability of resources and critical appraisal skills. In addition, the researcher has provided a logical framework for applying this model, which simplified the model for ease of application to stimulate interest among relevant research stakeholders to promote research uptake.

9.2 SUMMARY OF THE REPORT

Following the identification of the research problem, Chapter 2 reviewed literature around the key challenges within the public health research systems. Specifically, the researcher established why research uptake is not just a dissemination of research evidence, but rather a complex process requiring the involvement of relevant stakeholders from the onset of the research project until its uptake to healthcare practice and policy. The review highlighted important key issues needed for research uptake to improve, and adequate resources should be provided when dealing with evidence-based interventions, in particular funding and the requisite human skills. Literature also highlighted how far the world has mitigated low research uptake with legislations and policies, yet these measures fell short in terms of implementation. For example, the recommendation of setting aside 2% of the overall health budget for health research (Paruk *et al*. 2014: 472) has not been followed. Consequently, there is a need for low-resourced countries to adapt and develop strategies for doing more with less.

Chapter 3 considered some of the issues highlighted within literature reviewed in Chapter 2. The chapter reviewed literature relating to existing conceptual models applicable for research uptake. A key finding of the review was that a conceptual model should guide the identification of factors affecting research uptake. Finally, the review suggested the PARIHS framework (Seers *et al.* 2018: 1). The chosen framework is progressive and long-term as it provides a platform for successfully investigating factors impeding the implementation of research evidence into clinical practice. Subsequently, all research questions in this study were constructed using the PARIHS framework. Specifically, for research uptake to be successful, there should be clarity about the nature of research evidence, the quality of contexts, and the type of facilitation. Details on the framework and all other previous theories suited for this study were explained in detail in Chapter 4.

Chapter 4 provided an overview of the mixed-methods data collection and analysis approach. Importantly, as clearly explained by Schoonenboom and Johnson (2017: 117), the current study adopted an exploratory sequential approach, in which the first phase of qualitative data collection and analysis was followed by the quantitative phase to generalise the initial qualitative outcomes. Data analysis for both phases were conducted separately, with integration occurring in the data interpretation phase of the study (Pluye, Bengoechea, Granikov, Kaur & Tang 2018: 45). Key achievements for using this approach was that both qualitative and quantitative methods complemented each other as confirmatory techniques. A total of 21 participants were interviewed for the qualitative phase to understand their perceptions regarding research uptake, particularly impeders contributing to low uptake of research and some strategies that can be implemented to improve research uptake. In the second phase, the quantitative approach was used, and data were collected from 212 respondents who were categorised into researchers, programme managers, directors, and frontline workers. Eventually, the SEM technique was used to analyse the quantitative data.

Chapter 5 provided an analysis of the findings guided by principles of the PARIHS framework analysis, which led to the development of themes. Coding was centred on themes consistent with the PARIHS framework: evidence, context and facilitation. Accordingly, subthemes were identified within each of the major domains. The sample size was determined by thematic saturation, defined as an occurrence whereby two independent coders identified no new codes on three consecutive transcripts (Lowe, Norris, Farris & Babbage 2018: 191). The most significant findings in the current study appeared to be the following:

First, ineffective local research committees to drive research uptake was alluded to by most participants. The findings suggested that engaging a local research committee could possibly be the missing link for research uptake. It is important that local research committees play a role in coordinating health research, advocate for resources such as funding, skills, and enough time for health research. The findings established that local research committees ought to develop a ‘CRECA’ strategy in dealing with capacity building (C), research agenda (R), engagement (E), communication (C) and appraisal strategies (A).

Second, lack of research alignment by researchers, in particular private funders. Participants highlighted that in most cases, research is earmarked for peer review rather than contributing to solving real-life problems. This is compounded by a lack of a tailored research agenda with current and practical research problems and priorities.

Third, the study also found a growing propensity of using informal research. This refers to using data that has not been validated for decision-making. This is carried out despite the known challenge of data quality within government institutions.

Fourth, a need for improved partnership between research institutions (academia), and healthcare practitioners/public policy developers in their operations to use the research outcomes for healthcare practice and policy. As indicated by Forsythe *et al.* (2018: 1161), such partnerships would likely result in capacity building initiatives and could deliver high-quality research outputs that are aligned with broader development objectives.

Fifth, the gatekeeping process is onerous and long, indicating the need for the process to be timeous to minimise delays in data collection. Communicating clearly on the gatekeeping process could alleviate difficulties in gaining access to research sites.

Last, deficiency in communicating research outcomes to relevant stakeholders. Communicating research findings needs to be an interactive process that clearly relates research to current healthcare practice. An improved system of sharing research knowledge facilitated by the local research committee could ensure research uptake.

In Chapter 6, based on an analysis of the previously mentioned qualitative data findings, a final list of factors affecting research uptake was highlighted. This list identified 13 factors that were categorised in three different groups. The first group was about individual factors, the second group was organisational factors, and the third group was research characteristics. The individual factors were specifically outlined as: (1) support, (2) time factor, (3) motivation, and (4) experience. Organisational factors comprised: (1) resources, (2) local research agenda, (3) partnerships, and (4) private funders. The research characteristics consisted of: (1) accessibility of research evidence, (2) quality of research evidence, (3) critical appraisal skills, (4) gatekeeping process, and (5) local research committee. However, the findings revealed no significant difference in mean scores between the groupings (researchers, frontline workers, programme managers and directors) as their mean scores on the variables followed nearly a similar pattern.

The chapter reported on several statistics and related analyses used. In particular, the EFA was performed to determine the number of constructs from the instrument used for data collection. Importantly, the individual factors retained the four factors which were explained by 64% of the total variance on the factor loading. Similarly, organisational factors retained the four factors identified loading 71% of the total variance explained. However, the findings suggested five factors for research characteristics with the additional factor ‘Critical appraisal skills’, which was not present on the initial data collection instrument. Five factors were explaining 65% of the total variance.

Furthermore, reliability scores and Spearman correlation were checked for these factors. The reliability analysis revealed a reliable and acceptable score of above 0.7, with 0.901 for individual factors, 0.878 for organisational factors, and 0.791 for research characteristic factors. A Spearman’s correlation coefficient was used and revealed moderate to weak correlations among variables when correlated against research uptake. Specifically, Spearman’s correlation coefficient showed a total of six factors seem to be essential for research uptake. These included ‘support’, ‘motivation’, ‘experience’ and ‘time factor’ from the construct ‘individual factors’, ‘resources’ from ‘organisational factors’, and ‘critical appraisal skills’ from ‘research characteristics’. It is important to note that by visual inspection of the average mean score graph, the researcher could not find any significant differences in mean scores from the different groupings of respondents.

Likewise, Spearman’s correlation coefficient revealed that despite the local research committee not directly being correlated to research uptake, it is positively significant for the factors: local research agenda, partnerships, funding and gatekeeping processes. Local research committee was coded under the domain ‘facilitation’ by the PARIHS framework, hence the finding confirmed the outcomes of the qualitative phase which suggested the need for the local research committee to facilitate engagements between research producers and research users.

The outcome from the quantitative data analysis using SEM indicated that the PARIHS framework was modest towards the examination of factors for low research uptake. The model only predicted 25% of the research uptake variance. The SEM outcomes defined that eight out of the 11 hypotheses recommended by PARIHS framework were supported by statistically significant outcomes, as supported by the data at $\alpha=0.01$ level. Specifically, the hypotheses supported the significance of ‘experience’ to ‘individual factors’, ‘motivation’ to ‘individual factors’, ‘support’ to ‘individual factors’, ‘support’ to ‘organisational factors’, ‘resources’ to ‘organisational factors’, ‘resources’ to ‘research characteristics’, ‘critical appraisal’ to ‘research characteristics’, ‘individual factors’ to ‘research uptake’ and ‘research characteristics’ to organisational factors. Similarly, the three unsupported hypotheses of the model were ‘resources’ to ‘research characteristics’, ‘organisational factors’ to ‘research uptake’, and ‘research characteristics’ to ‘research uptake’.

Finally, the outcomes of the rich data analysis results in this study were aimed at answering the two broad questions: What are stakeholders’ perceptions of research uptake, and the main factors affecting the use of research for healthcare practice and policy? While the results of this study cannot be generalised as they focused mainly on perceptions and experiences about the study area, the consistency of the mean scores among different groupings of respondents increases confidence in the commonality regarding the issues raised. A discussion on the contribution, limitations and recommendations of the current study is presented in the section below.

9.3 CONTRIBUTION OF THE STUDY

Within the field of public health and other fields, research is ongoing around finding better strategies to improve research uptake, and this study fits into this discourse. The overarching purpose of this research was to develop a model to facilitate research uptake in healthcare practice and policy. Conversely, several contributions have been made in this study for promoting research uptake in low-resourced countries. To the researcher's knowledge, this is the first explicit contribution that looked at the breadth of the understanding of research uptake in public health, with input from various categories of stakeholders. These contributions are comprehensively substantiated below.

From a theoretical perspective, the study employed two fundamental theories or conceptual models and their casual arguments as the basis for understating research uptake factors and strategies to improve research uptake. These are: the PARIHS framework for determining research uptake factors, and the logical framework to offer a more practical approach towards improving research uptake.

From a statistical ground, contributory factors to low research uptake have been identified, and evidence was provided on the significance of these factors. Importantly, the identified factors satisfied the requirements for a model fit to the data, and was subsequently validated through SEM. Again, for the first time according to the researcher's knowledge, the study revealed the six most important factors affecting research uptake (motivation, experience, support, time factor, resources and critical appraisal skills), but of these, motivation and experience are key factors identified in the current study. Understanding these important issues is critical to developing targeted interventions for improving research uptake, such as developing a cohort of skilled practitioners/programme managers who would play a critical role in the research uptake process.

Most significantly, from a methodological perspective, the majority of literature articles targeted a specific group/category of participants. In the current study, the researcher sought to subject various categories of participants to the same data collection instrument to identify factors specific to each category. However, no statistically significant difference could be found in the mean scores of all participants. This indicates that similar targeted strategies can be employed to promote research uptake, and a developed model would have to cater for various categories of participants.

Moreover, the study contributed methodologically by developing and validating a five-point Likert scale data collection instrument for describing research uptake factors. The data collection instrument was developed mainly based on the findings of qualitative research and supported by related literature. The current study adopted these measures following comprehensive pre-testing and extensive reliability and validity tests to achieve reliability and validity of the measures.

Intrinsically, from a procedural point of view, the current study recommended specific strategies essential for local research committees to promote research uptake. The CRECA strategy is an important tool that can be used in low-resourced countries to promote research uptake. The CRECA strategy is critical to bridge the gap between research producers and research users. It would also assist to significantly reduce delays in granting gatekeepers' permission for researchers to access research study sites.

Currently, there are no standardised guidelines prescribing the functions of local research committees, and the researcher recommended a logical framework for local research committees, which will be handy in clarifying roles and responsibilities. Confusion surfaced from the in-depth interviews on extreme delays in gaining gatekeepers' permission to researchers for accessing research sites. The impression was that there was duplication of functions caused by reviewing research studies, a function already carried out by ethics committees, hence the logical framework for local research committees (Figure 8.6) provided guidance on the handling of research applications requiring gatekeeper's permission.

Finally, it is important to note that there is limited evidence around the impact of research uptake models in low-resourced countries, mainly because they are not locally tailored and due to budgetary constraints. As such, this research will be beneficial in this regard. Through the implementation of this research uptake model, the gap between researchers and programme/policy managers will be substantially reduced and there will be clearer paths for promoting research uptake. Therefore, despite limitations highlighted in this study, the researcher believes the purpose of this study was achieved.

9.4 LIMITATIONS OF THE STUDY

Research uptake is a complex process that requires the involvement of all relevant stakeholders, and the researcher felt that several stakeholders were left out in this study, which is a limitation. Their inclusion in this study could have added another dimension of looking into research uptake. However, this was beyond the scope of the current study, as the database did not capture details for the following categories of research uptake stakeholders:

- Public (community members/patients): Public participants could have added value to the views of community members participating in this study. De Freitas (2017: 32) established the importance of involving lay citizens in research projects. This enables them to have a voice in health decision-making processes to improve the quality of health research, healthcare practice and public health interventions.

- Politicians: Politicians in leadership are responsible for policies, hence they ultimately influence what research is conducted. It would have been beneficial in this study to get their views and strategies for improving research uptake. Allen (2017: 1831) argues for the need to speak to politicians in a more engaging narrative with the attention on returns on investment.

- Healthcare managers without practical research experience: Managers play a central role in research uptake, and for considerable periods, managers have been identified as one of the barriers to research uptake (Bianchi *et al.* 2018: 918). The challenge is that, without practical research experience, these managers might not clearly understand the challenges posed by low uptake of research, and therefore, it would have also added value in this study to include this group and obtain their perspectives regarding the phenomenon studied.

While the inclusion of different categories of stakeholders from various organisations is a strength of the current research, the application of the research uptake model is considered limited. Its generalisability has not been tested as the study was conducted in one rural province of South Africa. Therefore, it cannot be assumed that the findings represent all situations in low-resourced countries, and therefore must be accepted with some caution as settings could be unique.

The two main types of survey errors which might have affected the quality of the online survey for the current study include the nonresponse error and the measurement error (Biemer, de Leeuw, Eckman, Edwards, Kreuter *et al.* 2017: 255). The authors highlighted that the nonresponse error occurs when a sampled unit fails to participate in the survey or when not all questions in the questionnaire are answered. The measurement error arises when respondents fail to provide accurate responses, and this could be due to question-wording, or fatigue effects from long questionnaires. Despite sending two reminders to potential respondents, only a response rate of 59% was realised for the current study. The total of 212 survey responses had no missing responses due to control or validity measures included in the online survey questionnaire. According to Lyberg and Weisberg (2016: 29), increased measurement errors are influenced by efforts to reduce nonresponse error, and therefore this is a limitation to the current study. However, a visual inspection of data also revealed that respondents were somewhat engaged when providing responses.

Finally, with the researcher being a public health official in a local area, an unintended bias could have existed in the selection of participant, question design, and data interpretation.

9.5 CONCLUSIONS

Research uptake is significant to healthcare practice and policy development. Not only does it lead to better working relationships between researchers and research users, but it is vital for making improved decisions about public health. However, research uptake is a lengthy, complicated process, and despite a growing body of literature on effective strategies, many low-resourced countries continue to struggle.

The central problem addressed in this thesis is low research uptake in low-resourced countries, which is mainly caused by a disjuncture between research users and research producers, in addition to limited resources. Most of these challenges can be addressed through the developed tailored research uptake model for low-resourced countries, as presented in this study. The key strength of this model is that it was developed based on the views of different categories of participants, which included researchers, frontline workers, programme/policy managers, and directors/senior managers. Importantly, these participants were drawn from a variety of institutions including government, universities/colleges and private institutions, and provided a more focused view on research uptake.

Essentially, as indicated by participants, research uptake requires adequate resources, extensive collaborative efforts and constant engagements among stakeholders. Participant 19 said: *"A lot of research gets conducted, and you don't get to know the results, the recommendations, and how that can inform policy. So, it's a gap to me".* The researcher agrees with this perspective as it confirms a broken health research system. However, as a public health official, the researcher will rather categorise this view as unintentional wastage of public health resources. It is further argued that the proper implementation of the suggested model might curtail this gap by ensuring accountability from the side of government and that of researchers.

Out of the six main factors affecting research uptake, the current study flagged motivation and adequate experience as inextricably linked factors to research uptake. A well-motivated health research stakeholder will have the urge to successfully contribute towards research uptake initiatives, while an experienced health research stakeholder will enhance the credibility of the health research uptake systems. It is critical to governments, particularly in low-resourced countries, to invest substantially in the development of strong research skills among government employees and be able to retain such skilled healthcare workers contributing to research uptake.

Furthermore, a detailed research agenda and a functional local research committee will provide opportunities and programmes to permit interactions among stakeholders to make the research uptake process better. Based on these findings, the researcher proposed the Logical Research Uptake Process Flow for improving research uptake in low-resourced countries. This is aimed at, among others, improving communications, streamlining the roles of local research committees, and accelerating gatekeepers' permission.

9.6 RECOMMENDATIONS FOR FURTHER RESEARCH

The following are recommendations for future research as based on the outcomes from this study:

9.6.1 Evaluation of the model

This study was focused on the development of the research uptake model. Future research studies could be interested in testing, exploring and evaluating the developed model extensively to determine its applicability to other research settings, not similar to those of the current study, i.e. within a national and international perspective. Furthermore, research can be conducted to determine the impact of this research uptake model towards improving research uptake for healthcare practice and policy development.

9.6.2 Model's total variance

The construct measures from qualitative and quantitative data provided a solid foundation for many research avenues. However, subjecting the contracts to SEM revealed that the developed model explains only 25% of the total variance, that is, 75% of the data does not fit the regression model. This calls for future research to look deeper into this model and account for the remaining percentage.

9.6.3 More inclusive group of participants

In developing the model, the researcher interviewed researchers, frontline workers/practitioners, programme manager/policy developers, and directors/senior managers. Although these individuals are important, the researcher feels it is not exhaustive, and a more comprehensive list of participants can provide further insight on factors affecting research uptake. Therefore, future research may share more insights by incorporating additional groups of participants, such as politicians, funders and communities within a similar study.

9.6.4 Government health research funding

It would be a disservice to public health research and participants in this study not to indulge in health research funding as one of the main contributors to low research uptake. There is a need for clarity on financial resources for health research. Future research studies on research uptake should investigate the existing mechanism for funding research in government institutions to quantify health research spending against the goal of 2% of the national health budget (Barnabe, Gordon, Ramjee, Loots & Blackburn 2020: 274).

9.6.5 Private health research funding

The contribution of private health research funding has been acknowledged by participants in the current study. However, often there is misalignment between funder's research priorities and government's research agenda. Therefore, a balance needs to be established between the two sources of funds for health research. Future researchers would be interested in determining the impact of privately funded health research and the extent to which private funders contribute to capacity building initiatives through the existing research.

9.6.6 Impact of health research

Health research must lead to tangible healthcare outcomes aimed at improving public health. Conversely, it is critical to map health research in relation to local research priorities or agenda. This is important in ensuring that scarce health research sources are used efficiently and effectively for the improvement of research uptake. It is essential for future research to look at the impact of health research on improving healthcare practice and policy development.

9.6.7 Data quality issues

Findings of the current study revealed an increase in the use of formal research for quick decision-making. It is therefore imperative to further investigate data quality, particularly in low-resourced countries, before it is used for decision-making. Public health research is dependent on the quality of the produced data. It is important for future research to investigate the quality of data and its impact on research uptake.

9.7 RESEARCHER’S FINAL THOUGHTS

Through this research, I interacted with different stakeholders from diverse institutions, provinces and even from other countries, precisely because research is not conducted in isolation. The current study has evoked hope in the face of most participants with whom I had the pleasure of interacting. This is particularly due to the significance of the subject being discussed and the fact that I am in a unique position to implement recommendations developed from this study because of my current employment position. Moreover, I could not have chosen a better or more relevant topic in the field of public health than this one.

Throughout this journey, I saw myself being led by the research processes rather than me fitting the research processes to what I had envisioned to achieve. I interacted profoundly with research producers from diverse backgrounds. This made me realise that public health research is very important, as attested by several complimentary email messages received from various people – including university lecturers – many of whom offered to continue collaborating with government for the betterment of research uptake. Through this model, I hope the use of public health research for practice and policy development will be improved in low-resourced settings.

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APPENDIX A: UNISA ETHICAL CLEARANCE

UNISA
university of south africa

RESEARCH ETHICS COMMITTEE: DEPARTMENT OF HEALTH STUDIES
REC-012714-039 (NHERC)

11 October 2017

HSHDC/712/2017
Mr Jerry Sigudla
Student No 4186-451-4
Supervisor: -Prof JE Maritz
Qualification: D Cur
Joint Supervisor: -

Dear Mr Jerry Sigudla

Decision: Ethics Approval

Name: Mr Jerry Sigudla

Proposal A Model to facilitate research up take in health care practice and policy

Qualification: **DPCHS04**

Thank you for the application for research ethics approval from the Research Ethics Committee: Department of Health Studies, for the above mentioned research. Final approval is granted from 11October 2017 to 11 October 2022.

The application was reviewed in compliance with the Unisa Policy on Research Ethics by the Research Ethics Committee: Department of Health Studies on 2 August 2017.

The proposed research may now commence with the proviso that:

1. *The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.*

2. *Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the Research Ethics Review Committee, Department of Health Studies. An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.*

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

3) The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.

4) [Stipulate any reporting requirements if applicable].

Note:

The reference numbers [top middle and right corner of this communiqué] should be clearly indicated on all forms of communication [e.g. Webmail, E-mail messages, letters] with the intended research participants, as well as with the Research Ethics Committee: Department of Health Studies.

Kind regards,

Prof JE Maritz
CHAIRPERSON
maritje@unisa.ac.za

Prof MM Moleki
ACADEMIC CHAIRPERSON
molekmm@unisa.ac.za

Prof A Philips
DEAN COLLEGE OF HUMAN SCIENCE

Approval template 2014

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

APPENDIX B: MPUMALANGA PROVINCIAL HEALTH RESEARCH COMMITTEE GATEKEEPERS' PERMISSION

health
MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

No.3, Government Boulevard, Riverside Park, Ext. 2, Mbombela, 1200, Mpumalanga Province
Private Bag X11285, Mbombela, 1200, Mpumalanga Province
Tel: +27 (13) 766 3429, Fax: +27 (13) 766 3458

Litiko Letemphilo Departement van Gesondheid UmNyango WezeMaphilo

Enquiries: Research [illegible]

Mr Jerry Sigudla
Building 3, No 7 Government Boulevard
Riverside Park ext. 2
Mbombela, 1200

Dear Mr Sigudla

APPLICATION FOR RESEARCH APPROVAL: GUIDELINES TO ENABLE THE OPTIMAL USE OF EVIDENCE-BASED RESEARCH FOR HEALTH CARE PRACTICE AND POLICY DEVELOPMENT

The Provincial Health Research Committee has approved your research proposal in the latest format that you sent.

MP_201711_006
Approval Valid for 5 Years

Kindly ensure that the study is conducted with minimal disruption and impact on our staff, and also ensure that you provide us with the soft and hard copies of the report once your research project has been completed.

Kind regards

DR JJ ONGOLE
CHAIRPERSON: MPUMALANGA PHRC

2017/11/29
DATE

MPUMALANGA PROVINCE
DEPARTMENT OF HEALTH
PLANNING & INFORMATION
2017 -11- 29
PRIVATE BAG X 11285
NELSPRUIT 1200

MPUMALANGA
THE PLACE OF THE RISING SUN

APPENDIX C: CONSENT FORMS

Study Consent

Dear Research Participant,

My name is **Jerry Sigudla**, (contact details: 0137663766/0818154458), studying towards a doctoral degree in Health Sciences at the University of South Africa (UNISA). As a requirement for the degree, I am conducting research on the uptake of research findings in healthcare practice and policy development. In achieving this, I need to look at effective ways of promoting research uptake into healthcare practice and policy development. For this reason, I would like to invite you to participate in this research project as it is hoped that your participation may assist in bridging the gap between researchers, policy developers and decision makers on the uptake of research findings.

Participation in study: You will be asked to respond to questions about you and your experiences in an interview that will take at most 45 minutes. Your participation is voluntary, which means that you do not have to participate if you do not want to. If you say no, this will not affect you negatively in any way whatsoever. The information that you provide is confidential. This means that your information will be kept private and will not be shared with any other person, except researchers involved in the study, who also will not know that the information came from you, as your name will not be recorded on any of the document.

I will audio-record the interview so that I accurately capture what you say, but we will not capture any information that might identify you. I will switch audio recorder ON after brief introductions to start the recording and, as we proceed with the interview, we will not use any names. You many request that the recording be paused at any time.

If you agree to participate, it is important to take note of the following information presented below:

Aim of the study: A substantial number of research studies are being conducted annually across the globe producing findings that can deliver life-saving interventions. However, there is little understanding of how to deliver those findings effectively in diverse settings considering a wide range of existing health systems. There is also no clear linkage between health researchers, policy makers, health programme developers and practitioners. This study seeks to develop a tailored research model on the uptake of research findings in particularly from a government's perspective where there are limited health resources and research system inadequately developed.

Reason for your invitation: Please note that you have been invited to participate in this study because you are deemed knowledgeable and experienced on this subject area.

Study benefits and risks: There is no direct benefit to participation in this study; however, the answers you provide may help to improve the uptake of research findings for healthcare practice and policy development. The risks of participating in this study are minimal. As we mentioned, you can refuse to answer any question or withdraw from the study at any time.

Rights: If you have any further questions about this study or about your rights as a study participant, you can contact Jerry Sigudla at 0818154458.

If you agree to participate in this study, please sign below to indicate that you have understood what the study is about and what your role is. You will be given a copy of the signed consent form.

Consent sheet

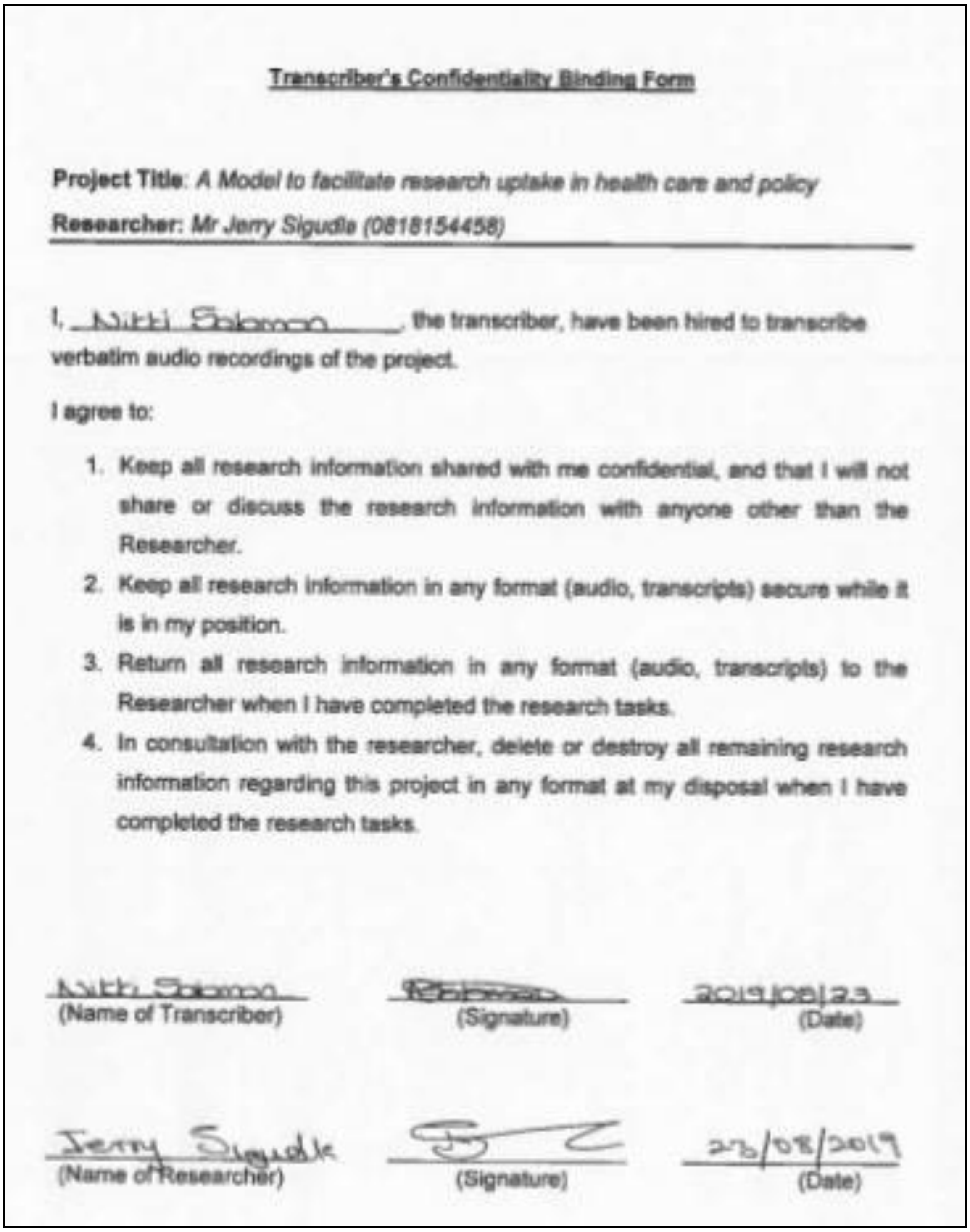
I have been informed of the study purpose and of my rights as a study participant. The researcher has offered to answer my questions concerning this study. I hereby:

- consent to participate in the **Yes** ☐ **No** ☐ study:
- allow the researcher to audio record the interview **Yes** ☐ **No** ☐ proceedings:

Participant's Name: ____________________ Researcher's Name: ______________________

Signature: ____________________ Signature: ____________________

Date: ____________________ Date: ____________________



Transcriber's Confidentiality Binding Form

Project Title: *A Model to facilitate research uptake in health care and policy*

Researcher: *Mr Jerry Sigudla (0818154458)*

I, Nikki Solomon, the transcriber, have been hired to transcribe verbatim audio recordings of the project.

I agree to:

1. Keep all research information shared with me confidential, and that I will not share or discuss the research information with anyone other than the Researcher.
2. Keep all research information in any format (audio, transcripts) secure while it is in my position.
3. Return all research information in any format (audio, transcripts) to the Researcher when I have completed the research tasks.
4. In consultation with the researcher, delete or destroy all remaining research information regarding this project in any format at my disposal when I have completed the research tasks.

Nikki Solomon (Name of Transcriber) (Signature) 2019/08/23 (Date)

Jerry Sigudla (Name of Researcher) (Signature) 23/08/2019 (Date)

Co-coder's Confidentiality Binding Form

Project Title: *A Model to facilitate research uptake in health care and policy.*

Researcher: *Mr Jerry Sigudla (0818154458)*

I, Dr **Elizabeth M. Solomon**, the independent coder, have been hired to independently confirm the findings of the project.

I agree to:

1. Keep all research information shared with me confidential, and that I will not share or discuss the research information with anyone other than the Researcher.
2. Keep all research information in any format (audio, transcripts) secure while it is in my position.
3. Return all research information in any format (audio, transcripts) to the Researcher when I have completed the research tasks.
4. In consultation with the researcher, delete or destroy all remaining research information regarding this project in any format at my disposal when I have completed the research tasks.

Elizabeth M. Solomon — E Solomon — 06/11/2019

(Name of Independent Coder) (Signature) (Date)

Jerry Sigudla — 06/11/2019

(Name of Researcher) (Signature) (Date)

APPENDIX D: INTERVIEW GUIDE AND GUIDING PROBES

Questions:

1. What is your current job position and functions, and some of the main influences on decision making in your current job?

   Prompts: Role within Organisation, post's Key Performance Areas, policies/guidelines, research findings, organisational culture, public/student needs.

2. What is your understanding of research uptake and its relevancy to your work environment?

   Prompts: Benefits of Research, problem solving, promote best practice, inform policy, promote programme evaluation, too complex-not relevant, I don't really trust research.

3. Specifically, what do you use research for in your environment?

   Prompts: Inform practice, policy, to justify expenditure, training is informed by research findings.

4. In your opinion, what are the factors limiting the uptake of research findings?

   Prompts: complicated findings, lack of access to research information, lack of time, quality of research findings, limited budget.

5. What do you consider to be a successful practice in supporting/promoting research uptake, in light of the limited resources available?

   Prompts: develop strategy on research uptake, conduct research workshops, and establish collaboration with universities, use research in planning sessions, short term and long term actions.

6. What would encourage you as an individual to use or promote research uptake?

   Prompts: access to quality research data, regular feedback sessions on research findings, further studies, and support from line managers.

7. In which format would you like your research findings?

   Prompts: the type of research findings, research reports, summary of key findings, clear practice implications, and articles.

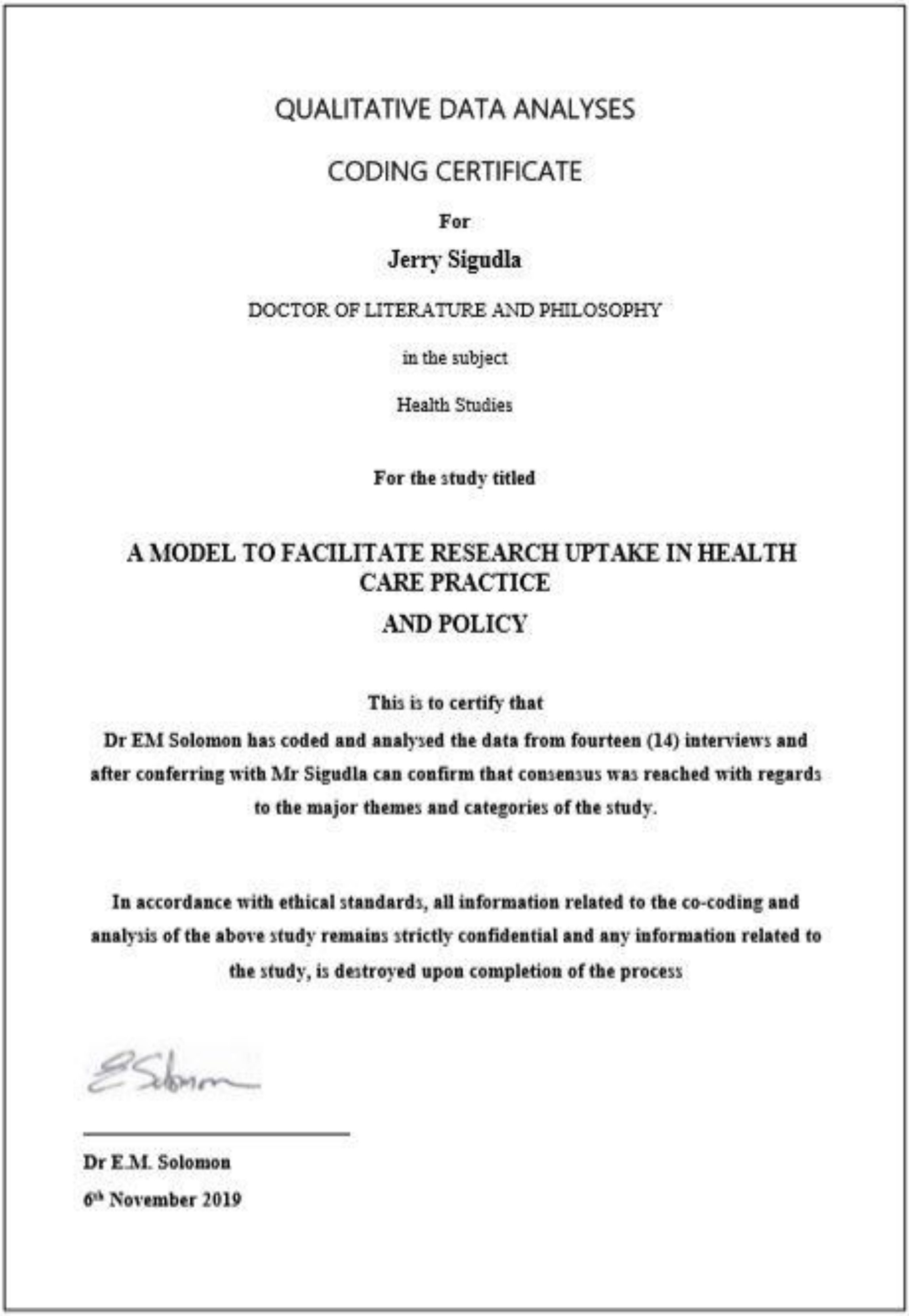
8. How would you like to access research findings?

   Prompts: newsletters, media, feedback sessions, journal articles etc.

9. What could be the role of the Local Research Committees on promoting the successful uptake of research for policy and practice?

10. This has been a very informative interview, is there anything we haven't covered that you would like to add?

APPENDIX E: CO-CODER CERTIFICATE



QUALITATIVE DATA ANALYSES

CODING CERTIFICATE

For

Jerry Sigudla

DOCTOR OF LITERATURE AND PHILOSOPHY

in the subject

Health Studies

For the study titled

A MODEL TO FACILITATE RESEARCH UPTAKE IN HEALTH CARE PRACTICE AND POLICY

This is to certify that

Dr EM Solomon has coded and analysed the data from fourteen (14) interviews and after conferring with Mr Sigudla can confirm that consensus was reached with regards to the major themes and categories of the study.

In accordance with ethical standards, all information related to the co-coding and analysis of the above study remains strictly confidential and any information related to the study, is destroyed upon completion of the process

Dr E.M. Solomon

6th November 2019

APPENDIX F: LETTER OF STATISTICIAN

LIMINAL
RESEARCH CONSULT

12 March 2021

Letter of Statistician

RE Statistical analysis of the dissertation: "*A MODEL FOR RESEARCH UPTAKE IN HEALTH CARE PRACTICE AND POLICY DEVELOPMENT*"

TO WHOM IT MAY CONCERN

This letter serves to confirm that HJ Gerber was involved in the empirical research efforts of Mr Jerry Sigudla for his doctoral degree in Health Sciences at the University of South Africa (UNISA).
HJ Gerber can vouch for the accuracy of the statistical evaluation undertaken for the empirical chapter of the student's dissertation.
Although every effort was made to ensure that the student presented the statistical results correctly, HJ Gerber cannot accept responsibility for the structure and presentation of the results of this study.
Kindly contact me should you need to verify the contents of this letter, should it be required.

Hennie Gerber
Statistician
hennie.gerber@liminalrc.co.za
083 229 9993

MONIQUE KOCK
RESEARCH CONSULTANT
monique.kock@liminalrc.co.za
082 928 1286
www.liminalrc.co.za

HENNIE GERBER
RESEARCH CONSULTANT
hennie.gerber@liminalrc.co.za
083 229 9993
www.liminalrc.co.za

APPENDIX G: SAMPLE INTERVIEW

I Thank you once again for agreeing to participate in this study and also for signing the consent form. May you please tell me about your current job position and some of the functions that you're doing?

P So, it's a little bit complicated 'cause I'm a …[2] but I'm doing research. So, as part of this research project, some of it is based in …[3] and then some of it is based here but I'm also doing my PhD in the project. So, sometimes I wear a researcher hat and then sometimes I wear a student hat. I suppose a bit like you're doing this is part of your PhD but you're also doing your research as part of your work. So, it's a combination of the two. So, this is part of my PhD but it's also part of a bigger research project, which is what I do anyway.

I What are you enjoying the most in the research that you are doing?

P I think doing it here has been very valuable and I think there's a few things that I've noticed that are different, for example in …[4]. So, because this is an …[5], there's already an existing relationship with the clinics and it's much easier for us to have a good relationship with the clinics for referral, in and out with the participants. So, I've noticed that that's been much easier here compared to, for example, in … where everyone tends to just be in their silo. So, if you wanna refer someone into …, it's a fight. If you want to try and speak to the clinics, the clinics do their own thing and no-one talks to each other whereas here there seems to be a much better relationship. So, that's been very nice to be here because there is an existing relationship with the clinics, there's much more crosstalk, and we have met, for example, people from Department of Health here that I've never met in Jo'burg. So, I think the site itself makes it easier to do that, if that's what you want as a researcher. So, that's one of the things. I don't know if there's anything else you want me to speak about?

I What's your role in this research project that you are currently doing?

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[2] Details removed
[3] Details removed
[4] Details removed
[5] Details removed

P So, I'm the PI. So, I lead the project. So, I basically head up the project.

I Could you tell me about your understanding of the concept of research uptake?

P So, I think there are levels of that. I think the one aspect, which is very important for me, is that your research should not exist in isolation. So, I think for a lot of academics, they want to do the research and publish the papers but I think we have an obligation to do more than that and part of that is getting colleagues to understand what the research is about and to change their practice. So, I think, for me, uptake would mean that the results for my project result in maybe nurses screening people differently or a change in how practitioners work. Not necessarily doctors but health practitioners as a group. So, for me, uptake would be at the level of practice. I think the other thing which we're probably much worse at is uptake in terms of health policy. So, for example, I'll take, for me…the … always fight with government about access to dialysis and why there isn't more access but the counterargument to that is that government will say to us what are the numbers? So, I think, as a research clinician community, we have an obligation to be able to give government the correct information, not information that comes from work that's been done elsewhere or in higher-income countries, and I think that's where, at some level, we have failed, really, because I think, as a scientific community, we have an obligation to provide that information to government. And I think that that's where a lot of the communication breaks down or it just doesn't happen. So, for me, uptake would be at the level of clinical practice, the next tier would be at the level of health policy which could be regional and, ideally, national. And then I also think, if we had to extend it beyond our borders, how much of that is relevant for other countries in sub-Saharan Africa and in other low- and middle-income settings where what we're learning or doing might benefit other health systems.

I I see, have you had a research project that you were involved in and ended up being used for policy development or for healthcare practice?

P So, I think this project will help 'cause we're screening people for risk factors for …[6] So, I think this is the first time we will have a very good idea on how

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[6] Details removed

much … [7] is in the community. And I think government needs to know 'cause I think a lot of the studies that do get published are from very high-risk groups and I think the prevalence gets over-reported. So, for me, I think what we're doing now would be very valuable. We've screened participants and we've found that there's lots of untreated …[8]. I think that's very relevant for government policy. So, I think it's about…I think this project will and is…we have been discussing with Department of Health around the screening and what we've been finding and we have presented some of the information to other members of your team in a meeting. So, I'm hoping that, with this project, we really can do that. I have done lots of other research where there has been no communication with Department of Health and I think that's the norm actually. A lot of people do their projects and they publish their papers but not a lot of it gets to kind of your level, I guess.

I So, you said you have presented some of these findings to…but how did they receive it?

P They were very interested and…I think it's also a process. I think it's about…you need a relationship. I can't just rock up and knock on your door and go hi, I want to know about this. I think there needs to be a to and fro. And I think what I would like from government is what's on government's agenda. So, if government said to me you're doing this project on this disease, that's very nice, but we really wanna know about this. Have you guys looked at that or can you include it in your study or would you be able to give us information on this in particular? I think that conversation would be very nice 'cause it would make…it might make us…it might be very easy to do. If you say I wanna know how many people have got this disease in their urine when you screen them, that's not a hard thing to include but it might be something that I don't think about because it's not on my agenda but it's on your agenda.

I Who are actually your stakeholders in this project and how did you find them?

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[7] Details removed

[8] Details removed

P So, we applied for funding. So, the project is funded by …[9], and it's funded by overseas…an overseas funder called the … and it's also funded by ….[10] So, it's quite a weird combination of funders. So, those are the stakeholders.

I How is the uptake of research relevant to your environment?

P I think it depends on what drives you with research. So, I think most of us who do it wanna make something better. You don't do it just because you're morbidly fascinated by some gene, I think those days are over, but I think there has to be a fundamental contribution that you want to make by doing this, 'cause it's not easy. So, I think, in terms of uptake, it needs to be part of what you're trying to do with the project and, if you start off like that, I think you also, as a researcher, can't just think that you're there just to do the research. I think it has to go beyond that if you want uptake. So, you can just go and do it and publish if you want, which is what most people do, or, if you want uptake, I think you have to make a concerted effort, A, to make the results of your study accessible and understandable. So, a lot of people can't take what they've done, if it is very complicated, and make it simple and relevant. So, I think that's where researchers need to make their communication better because, if you can't explain to somebody why it's relevant, they're not gonna change what they're doing. So, I think that that next step has to be publish your papers if you need to, to make the funders happy or to get your PhD, but I think there needs to be another set of communication around your environment that translates that and makes it relevant and from then you can then try and influence practice or policy or whatever.

I What's your feeling about research uptake? Especially in this province.

P I think it's bad.

I Can you elaborate?

P I can't talk about this province because I…[11]this is the first time I'm doing a project in … but, if I look at the stuff we've done in …, we have had some contact with Department of Health but, most of the projects, there isn't a link to

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[9] Details removed

[10] Details removed

[11] Details removed

government. So, I think, in terms of uptake at policy level, it could be a lot better than it is. In terms of uptake at the level of practice, I think it depends who you're talking about 'cause I think, if you're talking about specialists who read the literature and will look at it and say, oh, so-and-so found this and this and this, often they will change their practice but I think, if you're talking about integrating…implementing practice change at the level of primary healthcare nurses or level of screening programmes, I think that's much harder to do. I think, on the whole, uptake could be a lot better, let's put it that way.

I What do you think are factors limiting research uptake?

P I think it's complicated. I think a lot of researchers want their work to have an impact, otherwise why would you do it? So, I think there's a willingness. I think resources impact on it. I don't have a team of people that I can go to that can make me some beautiful infographics and help me make my message simple. If I look at how they do it in other parts of the world where they've got lots of resources, there's teams of people that take a research and make it much easier. 'Cause some people are very clever but they can't make it simple. So, I think it's about resources, I think it's about making researchers think about how they do that. So, it needs to be on the researcher's agenda, they need resources or they need to be helped to do it, and I think…at policy level I think it's much harder. At policy level, I think firstly there needs to be a much more open relationship with…I would call you guys the stakeholders but Department of Health. So, for example, if I…say in Johannesburg, the findings that we have from the study, I don't know who I could go speak to in Department of Health to say to them we're doing this study, would you guys like to hear about it? I don't know how…where those channels are. Here, I can phone …[12]and I can say, how do we do this or is there a way of doing this? So, I think a lot of researchers want to, they just don't know how to or who they would speak to or… I'm just trying to think if there's… When I look at what happens when there are these huge breakthroughs, they have…the media are on it and they have a media briefing. And we had that last year with …[13], with another project that we did, but we met the minister, we briefed him, we told him about it, we had a

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[12] Name removed

[13] Name removed

discussion about it, he told us that he wants national guidelines, and we all…everyone is there, they really want that, but there's a whole lot of resources that go into that. When you do a study that's at a much lower level and maybe the impact isn't a world-first, let's say, but it still has value, I think that's when it falls through because how do you then get hold of maybe not …[14] but who's next in the line, who's next in the chain? So, I think we haven't developed those systems that allow researchers to come and present their findings and for DOH to interrogate the research and say that's all very nice but how valuable is this to us? So, we did present our findings in Cape Town last month and …[15] was there and that's the first thing he said to me. He said how is this gonna change policy? So, I think a lot of researchers don't think about that and, if they were reminded of that at the beginning, think about those things, how is this gonna impact on policy? What is gonna come out of it? How is this gonna be relevant to yourself or Yogan or whoever's writing the next policy on NCDs or whatever? So, I think it's not easy but I think there is a willingness. Researchers want that to happen, they want to feel that they have contributed something and it's been worthwhile. I think we just don't have clear mechanisms in place.

I Which resources are you referring to?

P Like accessing the media, how do you do that? How do you make a short video clip on your project that people can watch for thirty seconds? I have no idea how to make a video. I know I can do it with my phone. But it's things like that that don't have to be expensive. We went to the people at Wits and we said can you make a quick video for us and they were like ja, sure, we can do it for it. So, it's things like that that make it accessible. A simple infographic or a flash on TV or something that goes out on YouTube or just ways that you can get information out there that I don't have to worry about as a researcher that I have to do this myself 'cause I can't do everything. So, if you said to me we've got a media person and they wanna make a short video on risk factors for kidney disease that we found in Agincourt, let's do it or…I don't know. I also think it might be worth pushing funders to fund that stuff. So, when I apply for the grant, if I say to them I want us to make a video for DOH and we put that

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[14] Name removed

[15] Name removed

money and we ring-fence that money…I think there's ways to do it. I think we're just not being innovative about it. 'Cause funders all want their impact, they all wanna know…so, if we say to funders it's funding a meeting with DOH or it's funding a video or an online something that people can see, I think it's also just prioritising it as part of the project instead of thinking about it after the project is over.

I Do you thing government is capacitated to promote research uptake?

P I don't know. The people I've met here through Department of Health have been very receptive and very open and I haven't had a sense that they are incapable of doing that. I think they're very aware of what the problems are. Perhaps they might be informed incorrectly or take advice from people who are giving them the wrong advice but I don't think I can say a blank thing about Department of Health because I don't think I've had enough interaction. But, It could potentially be a problem, theoretically.

I What do you mean?

P A researcher can't interpret the relevance for DOH. It might be that DOH looks at this and goes, well, ja. I think theoretically it could be.

I So, you have never had a study that you have done and you have submitted the research findings to maybe let's say government for implementations and they were not implemented?

P I think that's common. Where that breaks down I'm not sure but I think implementation of any policies is probably one of the hardest things to get right and I think there's a whole lot of reasons for that but I think that's a huge area that we could do a lot better.

I Someone was saying the quality of research finding is also a limiting factor.

P I agree.

I Why?

P A lot of studies are done very badly. There's a lot of studies out there that are done really badly and their results are rubbish.

I Have you encountered that?

P So, I think…and I think part of that is about young researchers being upskilled and mentored properly because, when you are a young researcher, you do wanna make a difference but sometimes you don't know how. And I've been in that situation. There's some studies I've done that I've designed appallingly and I haven't been able to use the results. But that's a learning curve. I think where we're not strong on the ground is that we don't have an army of people who are mentoring the younger generation and saying I know you wanna make a difference but think about what's relevant to Department of Health, think about what's relevant for this country, think about how you're pitching your research, and then, if you are gonna do it and get funding, make sure you do it really well so that when you say to me, June [SP], is this data reliable, I can say to you it is. This is good data. So, I think there's a lot of work that needs to be done on that because, if you want government to change policy, you need to make sure that the information that they're using is good. And I think what also…because I think we do work in a relatively resource-limited environment is I think there needs to be an aligning of what government needs to come out of research that they fund versus what the research agenda of the researchers are. 'Cause it does make sense to me for government to say we know that this is a problem and we want the answers, so we're gonna do it ourselves and you guys go off and do whatever you want and hopefully somewhere in these two parallel universes we'll have some conversations. I think that's a very inefficient way of doing it.

I So, you are saying lack of departmental priorities is also a limiting factor.

P Ja. If DOH said to us, guys, we know that there are issues and we want to focus on these priorities, what research are you guys doing on these topics that can help us? 'Cause these are the questions that we want answered. I think that would be a very useful conversation rather than DOH going we know that these are our problems, we know we're short on the ground with researchers to do this, so either we're gonna do it really badly or we're just not gonna do it, to inform policy. 'Cause there is a strong research community, I think, that could work much better together. I think at the moment…ja.

I Now, considering those limitations, what do you think could be a best practice going forward for research uptake in the province?

P I think there needs to be a strong …you need a meeting of the minds. You need your scientists at DOH to be able to talk to the scientists here and for those minds to innovate what's needed for healthcare or the country or whatever. And I suppose that's where you're saying is it a manager at DOH or is it a scientist at DOH? And maybe it needs to be a scientist who can scrutinise the studies that are being done and interrogate them and say, actually, this is very nice but we would like this. So, I think, for me, it would be nice to be able to have a conversation with people at DOH who are scientists and who get the science, not just a policymaker or a manager. And for that crosstalk to inform what gets done going forward, I think an established or an ongoing relationship where I know that I can access you or there's a channel, a conduit, for me to be able to access you and then, when…as projects are moving and the results start coming out, for us to be able to interrogate those results, as you say, and say what does this mean for practice, for policy, locally, nationally? …[16] isn't relevant in the Western Cape, so is this just for Mpumalanga DOH or, for…[17], can we generalise this? So, I think, for me, it would be nice to know what the pathway is gonna be and who's gonna be on that journey with us. My other experience is that there's often changes. So, you'll just start developing a relationship with someone and then they get moved and they move into another portfolio or…that's also very hard. So, some continuity or, if that person is gonna move, a proper handover. And then I think, in terms of implementation, that has to be prioritised beyond the researchers 'cause I think a lot of researchers are not good at implementation, they don't understand health policy, they don't understand what's required. So, maybe they feed into a system that then goes we're gonna take this to implementation level and these are the people that are gonna take it forward. But I don't know if the researchers need to be involved right through that. I think that would be DOH's call to say how are we gonna implement this? If they choose one person to be on the team and say, come, we need you to evaluate this or whatever. But it's

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[16] Details removed
[17] Details removed

complicated. I think we can make it simpler but I think it requires a commitment from both sides ‘cause you can’t do this independently of each other and make it work. I think it’s about relationships and communication.

I When do you think it’s the correct stage for someone from the department to get involved in a particular research study?

P From the beginning. Definitely.

I Why?

P If I think of the funders that we’ve had now, it’s been interesting ‘cause we’ve had one funder that’s been…made it their job to be very involved from the beginning. And some people have got a bit pissed off. They’re like just because this person gave us money it doesn’t mean that they can just come in and ask where’s our ethics, where’s this, where’s that, why are we doing this, why are we doing that? But I don’t have an issue with that because I think they are the funder and they are invested in the project and I would see DOH in that same role that this is a big project, it has relevance for the country, we’d like you to be part of it from the beginning. Look at the protocol, see how it’s being developed, is this information gonna help DOH? And, if it isn’t, maybe we can relook at it or rework. But I think it’s very hard to get people to invest at the end after it’s all happened ‘cause they haven’t…I just think it’s better for everyone to be involved from the beginning and I think that if …[18], which is accountable to government is funding something, I don’t see why someone from government shouldn’t be on the study. You know what I mean? Every other funder does that. They come to us and they say we want a progress report from you, we wanna see how you’re doing, we wanna know about any problems, we wanna know what’s working, we wanna know what’s not working, we want you to present your results. They’re very demanding. But that doesn’t happen with DOH although …[19] is funding the project. And I think that that would be very valuable. It would be valuable for the researcher and it would be valuable for government as well.

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[18] Name removed

[19] Name removed

I Thanks a lot for that information. As an individual, what will encourage you to promote research uptake?

P The most important thing I want out of the work that I do is that it has an impact and it makes healthcare for South Africans better. I don't wanna do research that doesn't have an impact. So, for me, the most important thing is that, A, the study gets done properly, the results do go into the public domain in whichever way that is, and, if they can impact on policy to make healthcare better, for me that would be the ultimate. From my perspective, I would do anything to help inform policy. I just don't know what to do. I can say to …[20] what do I need to do? And I've said that to …[21] from the beginning. Must I go to Department of…tell me what to do and I'll do it. So, I think…you tell me what to do and I'll do it, if it'll make it better.

I The next question is: in which format would you like to find research findings and why? So, which format have you found it maybe user friendly to others and why was it like that?

P I think video, social media, stuff people can access easily on their phones is the best way to do stuff. Having a very boring research paper that's twenty-five pages long and putting that in somebody's hands and asking them to read it, who is not a scientist in your field, I think is like committing suicide, really. I think it has to be easy to read, easy to understand, very accessible, and short. Tell people something in thirty seconds or a minute but don't…if you want your message to get across simply. So, I think it should be multimedia. I think it should just depend on what you're trying to do with it. For example, if it's Department of Health, maybe it's a thirty-minute presentation and a face-to-face. If it's information going out to the communities, I know …[22] makes a one-page pamphlet and they do that. Is it getting all the nurses together and doing a seminar with them? I don't know. I think you've got to choose what's gonna work, work out what's gonna work.

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[20] Name removed

[21] Name removed

[22] Name removed

I According to your experience can social media play a role in disseminating research findings?

P Probably Facebook, although I'm not even on Facebook. But I think it depends on your target as well. If you wanna target the youth, I think Instagram or Facebook. I think if you're targeting older people, maybe the results on a sheet. I also think what we're not anticipating is that people's expectations are changing from research. So, ethics will say, if you find something that's wrong, you have to tell the participant. The participants are here, are saying that's not good enough, I wanna know what all my results showed. And I think, if we want buy-in from communities, we have to address that as well. You want people to participate, you wanna collect blood on them, but you don't think it's your responsibility to give them any results. So, I think people are becoming more demanding, which I think is good, but I think that needs to be factored in as well is who are you targeting with this information? And I think it has to be at an individual level, a community level, and I think the ways you do that are different depending on who your participants are.

I Do you have any research that you have conducted and you have used social media to share the findings?

P We made a video last year that was on the …[23] website and that had thirty thousand hits and it was a three-and-a-half-minute video. So, that was very successful. For this project, we've generated a one-page report for participants for their individual results and we've given that to them and that's been very well received.

I What was the video about?

P It was a transplant from an HIV positive mother to her HIV negative child and we made a short video. So, it's the first time it's ever been done. And it was very successful. So, basically what we were saying is that there's a lot of people living with HIV who are well, who want to donate, say…so, this baby was gonna die if the mother didn't donate and…so, that was the whole principle of it. But that was very successful. But again we had resources to do that, that

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[23] Name removed

we might not have had if it was something less spectacular, say, or…not spectacular but it was the first time it had ever been done, so it got a lot of attention. But that…just the comments on…so, …[24] managed it for us but it was social media, it was…I can send you the report on it if you want but they used everything and it was literally thousands. So, the message got to thousands of people and there was a lot of good response but it was a whole network that enabled that to happen, you know what I mean?

I Your audiences from the video, were they from the medical fraternity or the general public?

P It was a mix because it got a lot of…it was on radio, it was on TV, it was on social media. So, there was a lot of general public involvement plus an academic involvement because it was part of …[25]. But there was Department of Health, …[26] was there. And that was really nice. He's a smart guy. He didn't know anything about it and within fifteen minutes he got it. He was like, oh, okay, I understand this. And it was really nice for us to have the contact with him. And then he said you've gotta write guidelines for this and… So, he did engage, which was also nice 'cause I think a lot of the time you don't know what he wants or what DOH wants. If DOH said, okay, guys, we want some very simple guidelines on how nurses screen for diseases in kids, or whatever, I think there's things like that that you can do.

I But were there guidelines developed?

P So, again it's resources. So, the one person who was on the team, she's got funding through …[27]. So, the guidelines are now being developed by …[28] but it's for Department of Health. So, it's not like he said to us we'll give you fifty thousand bucks to do the guidelines. He didn't. But they are being done. We've had the first meeting and we'll get it done. But again, all those things require money and resources. We had to get a whole lot of people in a room for a day, we had to find a venue, we had to discuss what's gonna be in the

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[24] Details removed
[25] Details removed
[26] Name removed
[27] Name removed
[28] Name removed

guidelines, what's gonna be out the guidelines. So, it's a process. And he'll say that's what I want but he's not gonna give us…

I The research we are talking… was it pure research or was it maybe a case during practice?

P Wo, it was both. So, this mother…so, we tried to find a donor for this child and this mother kept saying to us I'm well, I want to save my baby's life, and we were like this doesn't happen, it's never been done before, we don't take organs from people who have got HIV because of the risk and blah-blah-blah. And then one of the surgeons sat down and he said why are we saying no to this mother? She's asking a very valid question, she's well, she knows her child is gonna die. And then we asked people in her family and we tried to screen them and we couldn't find a donor and then the baby got really sick and was admitted and the baby nearly died and then she came to us again and she said I'm asking you again. So, it was a response to a need and I think that's what researchers need to get is that what we're doing needs to be relevant for South Africa, for our communities, for our society. So, it was a first in the world but, in actual fact, it wasn't really. It was a response to a need that was actually quite a simple thing to do actually, it wasn't that complicated. And then we thought, if we're gonna do this, we need to do it properly. We need to make sure that we get ethics approval, we need to make sure that there's a whole lot of people who scrutinise this, we need to make sure that everything gets done properly, we got the …[29] involved. So, it was very considered and thought through but, at the end of it, we could say to the minister this was done as a research project but it was a research project that was done in response to a desperate need that is not being met. And I think that's why it worked.

I So, it became, actually, a case study, in a way.

P Ja. And we've just done another one now, so there's a second baby that's been done. So, it's gonna become an ongoing study where we…it's a study but it's a study that's responding to a need.

I Follow-up, is it still being done on the patient?

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[29] Details removed

P Ja. So, we're gonna follow them up, ongoing.

I That's quite interesting.

P I'll send you the link if you want. You can see the video and…

I Finally, I just want to check from you what do you think the local research committee should do to successful promote the uptake of health research?

P So, my experience with this project has been that the only interaction I've had is that, when…is that we needed the province to give us the stamp of approval to do the study here. That's it. And I don't know whose fault that is or if that is just the way it happens but I think that process could be different. If I sent my protocol to you and you sent me an e-mail and you said, June [SP], I've had a look at your study, it's very nice, but the health issues we have in this province or I would like to be involved, I would like to see here about the outcomes. So, I think engaging more actively from the time that we get those protocols approved from Department of Health, I think that's probably where the start could be done a little bit differently. 'Cause, for me, it sounds like now it's just a formality. You submit your protocol, someone signs it off, and the only comment I got was don't interfere in our clinics and make the nurses do your work. That's the only comment I got. So, I never got a comment: we'd love to hear about it, can you come and do a presentation? Or maybe you guys change that policy and say we wanna see the PIs, we want someone to come and tell us about the project and why you think it should be done at Mpumalanga in our Department of Health. So, I think that could maybe be reworked where you pull in the researchers and you make them accountable. You're using our facilities, you're accessing our population, what are you gonna give us back? I think you're entitled to ask that. Or this is what we want. We want you to give us progress report, we want you to give us an update, we wanna know about interesting findings. I think there's a lot more Department of Health could ask for, let's put it that way.

I Getting researchers' feedback it's a challenge.

P Exactly. And that's why I think you could say we will give you permission but the conditions are this. And then what's a researcher gonna say? They're not gonna say I'm not gonna do that 'cause you're gonna say then I don't give you permission. So, I think that's where the engagement could start is…I was just thinking again it's that analogy with the funders. The funders don't just give us money and walk away. The funders are like we're gonna give you this money but this is what we want in return. We want this, we want this, we want this, we want this. It's not a free ride. And I think DOH should be the same. It should be like we'll give you permission but this is what we want out of it. We want a commitment from you, whatever it is. And I don't think people will…you're not in a position to say no, you can't say no.

I Thank you very much. This really has been a very informative interview. I don't know whether there is anything that we haven't covered and you would like to add?

P I just think a lot of research in this country gets done by people who are not South African and I would like to see that change. I would like to see our young scientists being upskilled and doing research that's relevant for us without people coming in from outside doing the research and taking what they want back out. I feel very strongly about that. I feel that it's fine to have people coming in to upskill and allow our younger generation to be the future, not people coming in and going out and not capacitating locally. And I think that's also what needs to be prioritised.

I So, let me get is clear, are you saying there should be someone from around this province or maybe anywhere in South Africa who actually collaborate [sic] with a foreign researcher to conduct [sic] a study.

P So, I think what we have to focus on is not people coming in, doing it, and leaving. I'm not saying people mustn't come in 'cause they often have skills that we don't have but I think people need to come in knowing that they have an obligation to upskill and maybe that is the project comes in and pays for …[30] [SP] to do a master's or…you know what I mean? Just give something back to the local community and I think that that should be a priority of ours as well.

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[30] Name removed

I So you think that is something that we’re not paying attention to, probably, as a department?

P So, maybe it’s just a question about how are you upskilling? How are you upskilling Mpumalanga? So, we’re hosting this, we’re giving you permission to do this, and maybe it’s just committing to giving lectures for primary healthcare nurses or funding a master’s for someone from Mpumalanga or mentoring one of the nurses to learn how to do this or that. I just think, with the project that we’re doing now, there’s so many opportunities to upskill and capacitate and I don’t think we push hard enough to make that happen. ‘Cause, if it was on our agenda that you can come here from anywhere in the world and you can do a project, we welcome you but you have to capacitate. Tell us how you’re gonna do that. A US dollar goes a long way. It doesn’t cost a lot to send someone on a course to help them upskill. And people can think of different ways of doing it, whatever, but I think those are the questions that need to be asked. What are you gonna do? What are you gonna give back? How are you gonna upskill?

I So this is something that should be included in departmental research policies?

P Exactly. And it doesn’t even have to be people from outside the country. I come from Jo’burg. What am I gonna give to Mpumalanga? What am I gonna give back? There’s a primary healthcare clinic right here. You can go and have a meeting and tell the nurses what you found in the study or whatever. There’s so much you can do, particularly in an under-resourced area where people don’t have access to a lot. And the staff here are desperate to learn. They’re desperate. It’s not hard to give something back.

I Thank you very, very much. Really, I appreciate it. It has been a very informative interview. The whole interview is recorded. You have given me your understanding of research uptake and discussed in detail some of the factors contributing to low research uptake, in particular you mentioned lack of resources that we experience here, and then you’ve also indicated some of the things that we can consider to promote research uptake, relationship with all stakeholders, that is very important, as you have mentioned, and then social media, the use of social media is something I think that you mentioned. And then finally you spoke very strong about tapping on foreigner’s knowledge of conducting to up-skill locals. I appreciate information provided, and I will still listen to the captured recording and ensure that the life’s experience shared with me is used for both academic purpose and practice. Once again, thank you very much for sharing that information.

P Pleasure.

--- END OF AUDIO ---

APPENDIX H: ON-LINE SURVEY QUESTIONNAIRE

A MODEL TO FACILITATE RESEARCH UPTAKE IN HEALTHCARE AND POLICY DEVELOPMETN

Dear Sir/Madam

Thank you in advance for agreeing to participate in this study. My name is Jerry Sigudla. I am studying towards a doctoral degree in Health Sciences at the University of South Africa (UNISA), and I am conducting a study on the uptake of research findings in healthcare practice and policy development in order to develop a tailored research model on the uptake of research findings particularly from a government's perspective where there are inadequately developed research systems and limited health resources.

For this reason, I would like to invite you to participate in this research project as it is hoped that your participation may assist in bridging the gap between researchers, policy developers and decision makers on the uptake of research findings. The results obtained from the investigation would be captured in publication format whilst maintaining due respect for the anonymity of sources and the confidentiality of information gathered. At your request, such findings would be made available to you.

If you agree to participate, you are requested to respond to questions on this questionnaire which will take you approximately 10-20 minutes to complete. Should you find ambiguous points in the questionnaire, you may contact me on 0818154458.

Your participation would be highly appreciated.

TERMINOLOGY USED IN THIS QUESTIONNAIRE

1. Research uptake: all activities that contribute to the use of research evidence by researchers, policymakers, implementers or practitioners to inform policy or practice.
2. Research evidence: information gathered through sound (high-quality) research.
3. Research methods: processes used in data collection for analysis in order to produce research evidence.
4. Private funders: funding of research projects obtained from non-governmental institutions.

SECTION A: DEMOGRAPHIC INFORMATION OF PARTICIPANTS

Please indicate response by ticking in the appropriate box

1. How old are you? (Please tick applicable box)
    - 18-24 years ☐
    - 25-34 years ☐
    - 35-44 years ☐
    - 45-54 years ☐
    - 55-64 years ☐
    - 65+ years ☐

2. Highest Education
    - Degree ☐
    - Honours degree ☐
    - Master's degree ☐
    - Doctoral degree ☐
    - Post-doctoral degree ☐
    - Other:_________________

3. In which employment sector do you currently work?
    - Provincial/National Government Department ☐
    - Local Government/Municipalities ☐
    - Universities/ Institutions of Higher Learning ☐
    - Non-Governmental Research Institution (NGOs) ☐
    - Other, please specify:_______________________ ☐

4. At what position do you work at within your organisation?
    - Frontline staff or Practitioner ☐
    - Researcher / Student ☐
    - Junior Official ☐
    - Policy level/Programme Managers ☐
    - Senior Management / Director ☐
    - Other: _________________________ ☐

5. How many years have you been working in your organisation?
    - 0-1 Year ☐
    - 1-2 years ☐
    - 2-5 years ☐
    - 5-10 years ☐
    - 10+ years ☐

6. Email Address: ____________________________________

SECTION B: RESEARCH UPTAKE

Below are statements about research uptake. Please indicate the extent to which you agree or disagree with the statement by ticking the corresponding number in the 5-point scale below:

Understanding of Research Uptake		**Strongly Disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly Agree**
B1.	Have you used research evidence in your current role?	**No**			**Yes**	
B2	Research uptake is important to support **my** job activities.	**1**	**2**	**3**	**4**	**5**
B3	I believe research uptake is relevant to **all** job activities.	**1**	**2**	**3**	**4**	**5**
B4	I believe research uptake requires stakeholder's involvement in all research activities.	**1**	**2**	**3**	**4**	**5**
B5	I prefer using research evidence in my work environment.	**1**	**2**	**3**	**4**	**5**
B6	I can relate research findings to my work activities.	**1**	**2**	**3**	**4**	**5**

SECTION C: PERSONAL FACTORS

Below are statements about personal factors affecting research uptake, please rate the extent to which you agree or disagree with the statement by ticking the corresponding number in the 5-point scale below.

	Research experience	**Strongly Disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
C1	I have adequate exposure to research methods.	**1**	**2**	**3**	**4**	**5**
C2	I have a clear understanding of research methods.	**1**	**2**	**3**	**4**	**5**
C3	I have adequate experience of putting research evidence into practice.	**1**	**2**	**3**	**4**	**5**
C4	I have sufficient knowledge to search literature to retrieve research evidence.	**1**	**2**	**3**	**4**	**5**

C5	I am able to determine the applicability of research findings.	**1**	**2**	**3**	**4**	**5**
	Time constraints	**Strongly Disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
C6	I have sufficient time at work-place to search for research articles/reports.	**1**	**2**	**3**	**4**	**5**
C7	My workload allows me to keep up to date with all new research evidence.	**1**	**2**	**3**	**4**	**5**
C8	I have sufficient time at home to search for research articles/reports.	**1**	**2**	**3**	**4**	**5**
C9	My personal responsibilities allows me to keep up to date with new research evidence.	**1**	**2**	**3**	**4**	**5**
C10	My organisation affords me a protected time to conduct research.	**1**	**2**	**3**	**4**	**5**
	Motivation	**Strongly Disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
C11	I am always motivated by the desire to promote the use of research for practice.	**1**	**2**	**3**	**4**	**5**
C12	I am always motivated by the desire to come up with creative ideas to improve something.	**1**	**2**	**3**	**4**	**5**
C13	I am always motivated by the desire to learn new things.	**1**	**2**	**3**	**4**	**5**
C14	There is proper mentoring on research in my organisation.	**1**	**2**	**3**	**4**	**5**
C15	There are financial incentives to promote research uptake.	**1**	**2**	**3**	**4**	**5**
C16	There is broad support within the organisation at all levels on research related matters.	**1**	**2**	**3**	**4**	**5**

	Attitudes	**Strongly Disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
C17	Research improves the quality of decision-making.	**1**	**2**	**3**	**4**	**5**
C18	I have a responsibility to keep updating myself with the latest research evidence.	**1**	**2**	**3**	**4**	**5**
C19	I believe research is valued by my colleagues.	**1**	**2**	**3**	**4**	**5**
C20	I believe research is valued by government.	**1**	**2**	**3**	**4**	**5**
C21	It is easy to relate research findings to my work activities.	**1**	**2**	**3**	**4**	**5**

SECTION D: ORGANISATIONAL FACTORS

Below are statements about organisational factors affecting research uptake, please rate the extent to which you agree or disagree with the statement by ticking the corresponding number in the 5-point scale below.

	Research Resources in Organisations	**Strongly Disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
D1	Research is sufficiently prioritised by my organisation.	**1**	**2**	**3**	**4**	**5**
D2	My organisation invests substantial resources on improving research capacity.	**1**	**2**	**3**	**4**	**5**
D3	My organisation has enough manpower to support research activities.	**1**	**2**	**3**	**4**	**5**
D4	My organisation has sufficient resources available to influence research uptake.	**1**	**2**	**3**	**4**	**5**
D5	My organisation is selective on which researchable condition it focuses on.	**1**	**2**	**3**	**4**	**5**

	Research agenda	**Strongly Disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
D6	Government has a clear research agenda.	**1**	**2**	**3**	**4**	**5**
D7	Government's research agenda has been communicated clearly.	**1**	**2**	**3**	**4**	**5**
D8	The research agenda is current and addressing real life problems affecting government.	**1**	**2**	**3**	**4**	**5**
D9	I have an adequate understanding of government's research agenda.	**1**	**2**	**3**	**4**	**5**
D10	Most research studies conducted are based on government's research agenda.	**1**	**2**	**3**	**4**	**5**
	Partnerships	**Strongly Disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
D11	Government effectively collaborates with other research institutions to promote research use.	**1**	**2**	**3**	**4**	**5**
D12	Government frequently engages with researchers to find researched solutions.	**1**	**2**	**3**	**4**	**5**
D13	There is active engagement from government with stakeholders at all stages of the research being conducted.	**1**	**2**	**3**	**4**	**5**
D14	There is proper communication between government and various groups involved in research matters.	**1**	**2**	**3**	**4**	**5**
D15	Government has platforms for stakeholders with related interests to engage in research matters.	**1**	**2**	**3**	**4**	**5**
	Private funders	**Strongly Disagree**	**Disagree**	**Neither agree**	**Agree**	**Strongly agree**

				nor disagree		
D16	Private funders of research play a significant role in promoting research uptake.	**1**	**2**	**3**	**4**	**5**
D17	Private funders of research assist in building local capacity through research projects.	**1**	**2**	**3**	**4**	**5**
D18	Private funders of research drive performance and improve standards in government institutions.	**1**	**2**	**3**	**4**	**5**
D19	Private funders of research play a critical role in research on community stakeholder involvement.	**1**	**2**	**3**	**4**	**5**
D20	Key research questions chosen by private funders of research is always aligned with the research agenda of decision makers.	**1**	**2**	**3**	**4**	**5**

SECTION E: RESEARCH CHARACTERISTICS

Below are statements about research characteristics affecting research uptake, please rate the extent to which you agree or disagree with the statement by ticking the corresponding number in the 5-point scale below.

	Accessibility of research evidence	**Strongly Disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
E1	There is poor access to good quality relevant research.	**1**	**2**	**3**	**4**	**5**
E2	There is lack of delivery of research results to target audiences.	**1**	**2**	**3**	**4**	**5**
E3	There is lack of research evidence relevant to my work context.	**1**	**2**	**3**	**4**	**5**
E4	There is lack of resources (web-based) to access research evidence within government.	**1**	**2**	**3**	**4**	**5**
E5	There is lack of communication between researchers and decision makers for dissemination of research findings.	**1**	**2**	**3**	**4**	**5**
	Quality of research evidence	**Strongly Disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
E6	Most research evidence are of poor quality.	**1**	**2**	**3**	**4**	**5**
E7	Presentation of research evidence not detailed enough for decision-making.	**1**	**2**	**3**	**4**	**5**
E8	Most research articles are not relevant to my work activities.	**1**	**2**	**3**	**4**	**5**
E9	Research articles are difficult to understand because of research jargon.	**1**	**2**	**3**	**4**	**5**
E10	I have difficulty of judging the quality of research findings in articles and reports.	**1**	**2**	**3**	**4**	**5**

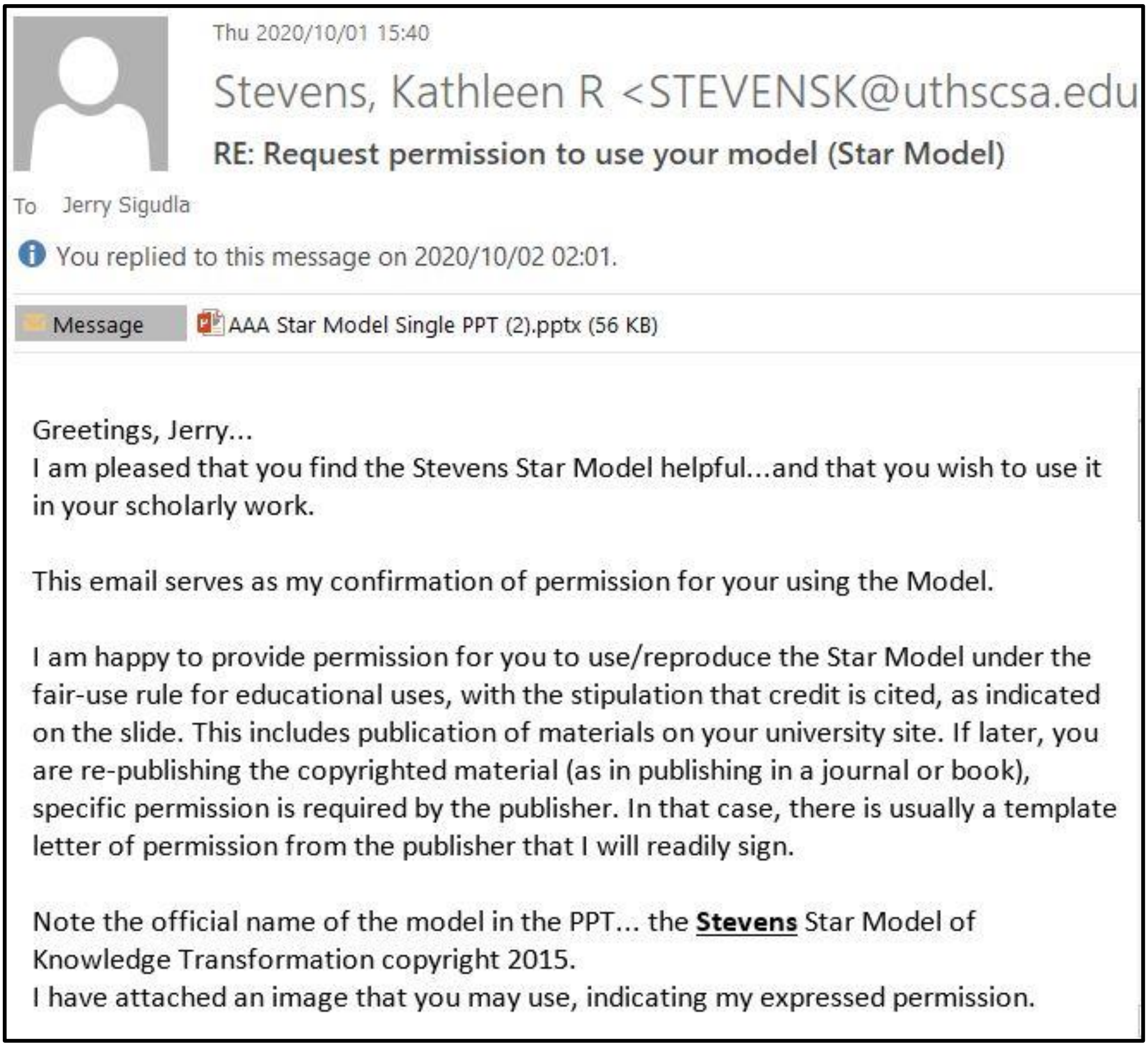
	Gatekeeper’s permission application process	**Strongly Disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
E11	Government has a clear approval process for granting permission to conduct research.	**1**	**2**	**3**	**4**	**5**
E12	Government’s approval process for permission to conduct research has been communicated clearly.	**1**	**2**	**3**	**4**	**5**
E13	I have a clear understanding of government’s approval process for permission to conduct research.	**1**	**2**	**3**	**4**	**5**
E14	Government’s approval process for permission to conduct research is short and easy to carry out.	**1**	**2**	**3**	**4**	**5**
E15	Feedback on government’s approval process for permission to conduct research is communicated timeously.	**1**	**2**	**3**	**4**	**5**

SECTION F: RESEARCH CHARACTERISTICS

	Local Research Committee (LRC)	**Strongly Disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
F1	I am fully aware of the role of PHRC in facilitating research uptake.	**1**	**2**	**3**	**4**	**5**
F2	The PHRC is ensuring that research conducted is geared towards the improvement of service delivery.	**1**	**2**	**3**	**4**	**5**
F3	The PHRC is ensuring that research findings are channelled to the decision makers.	**1**	**2**	**3**	**4**	**5**
F4	The PHRC is actively engaging at all stages of research being conducted.	**1**	**2**	**3**	**4**	**5**
F5	The PHRC is ensuring that research outputs are always communicated back to the department by researchers.	**1**	**2**	**3**	**4**	**5**

Thank you for sharing your perspectives with me. The information you have provided is very helpful and will assist streamline the uptake of research findings for healthcare practice and policy development.

APPENDIX I: PERMISSION TO USE FRAMEWORKS



Thu 2020/10/01 15:40

Stevens, Kathleen R <STEVENSK@uthscsa.edu

RE: Request permission to use your model (Star Model)

To Jerry Sigudla

You replied to this message on 2020/10/02 02:01.

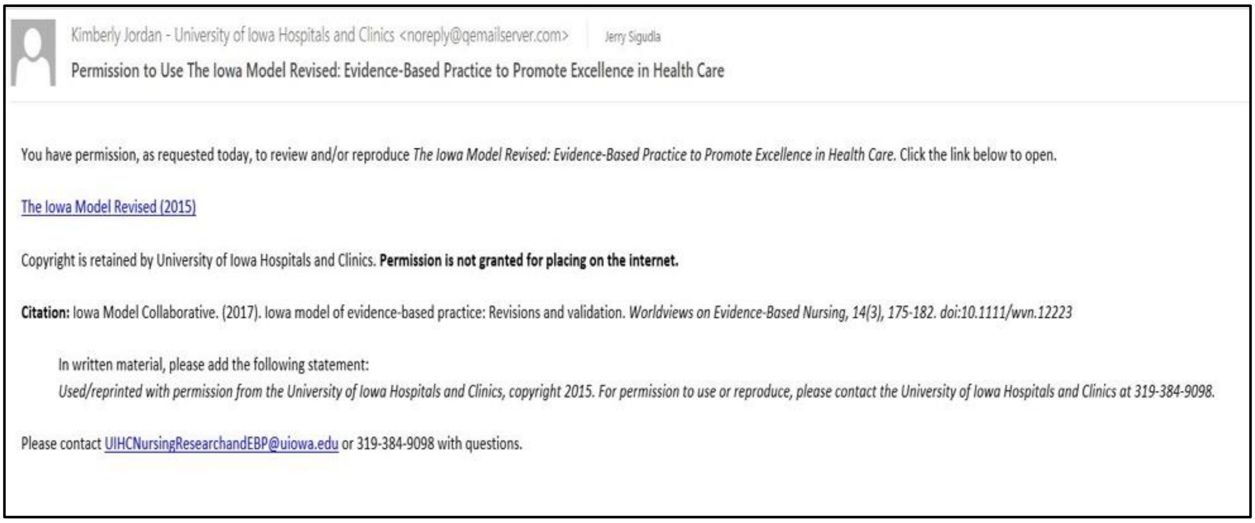
AAA Star Model Single PPT (2).pptx (56 KB)

Greetings, Jerry...
I am pleased that you find the Stevens Star Model helpful...and that you wish to use it in your scholarly work.

This email serves as my confirmation of permission for your using the Model.

I am happy to provide permission for you to use/reproduce the Star Model under the fair-use rule for educational uses, with the stipulation that credit is cited, as indicated on the slide. This includes publication of materials on your university site. If later, you are re-publishing the copyrighted material (as in publishing in a journal or book), specific permission is required by the publisher. In that case, there is usually a template letter of permission from the publisher that I will readily sign.

Note the official name of the model in the PPT... the **Stevens** Star Model of Knowledge Transformation copyright 2015.
I have attached an image that you may use, indicating my expressed permission.



Kimberly Jordan - University of Iowa Hospitals and Clinics <noreply@qemailserver.com> Jerry Sigudla

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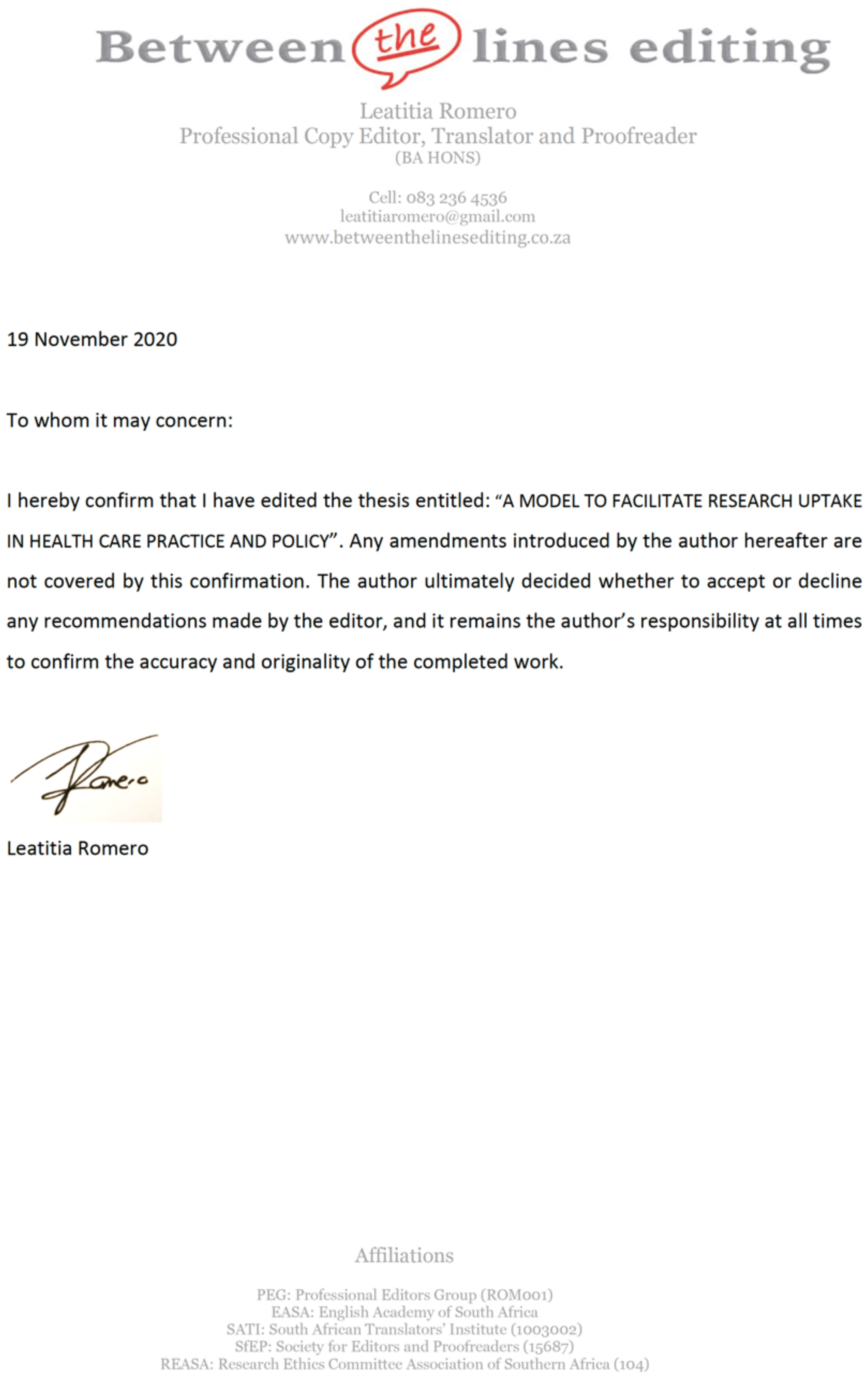
APPENDIX J: LANGUAGE EDITING CERTIFICATE



Between the lines editing
Leatitia Romero
Professional Copy Editor, Translator and Proofreader
(BA HONS)

Cell: 083 236 4536
leatitiaromero@gmail.com
www.betweenthelinesediting.co.za

19 November 2020

To whom it may concern:

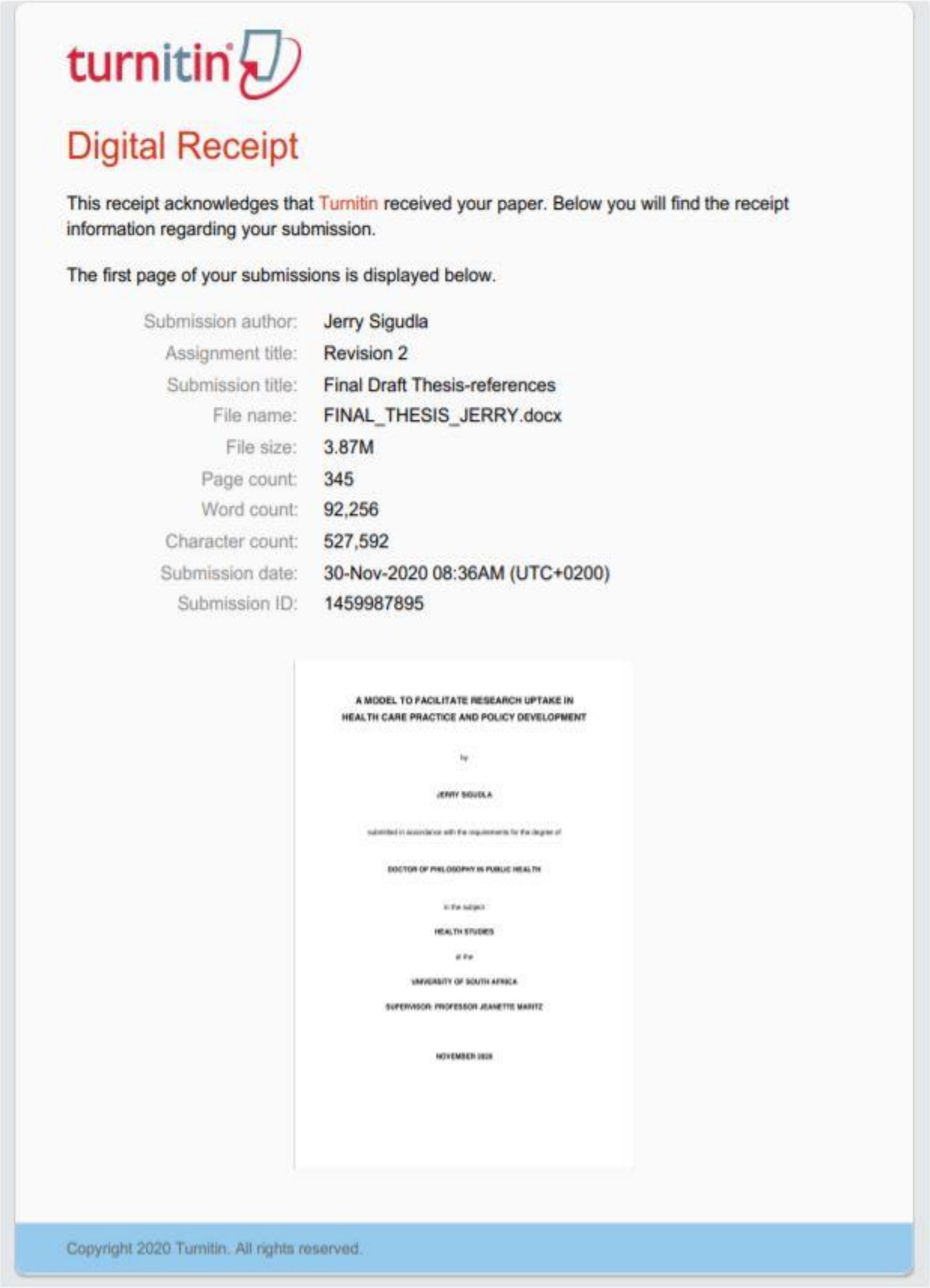
I hereby confirm that I have edited the thesis entitled: "A MODEL TO FACILITATE RESEARCH UPTAKE IN HEALTH CARE PRACTICE AND POLICY". Any amendments introduced by the author hereafter are not covered by this confirmation. The author ultimately decided whether to accept or decline any recommendations made by the editor, and it remains the author's responsibility at all times to confirm the accuracy and originality of the completed work.

Leatitia Romero

Affiliations

PEG: Professional Editors Group (ROM001)
EASA: English Academy of South Africa
SATI: South African Translators' Institute (1003002)
SfEP: Society for Editors and Proofreaders (15687)
REASA: Research Ethics Committee Association of Southern Africa (104)

APPENDIX K: TURNITIN REPORT



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A MODEL TO FACILITATE RESEARCH UPTAKE IN
HEALTH CARE PRACTICE AND POLICY DEVELOPMENT

by

JERRY SIGUDLA

submitted in accordance with the requirements for the degree of

DOCTOR OF PHILOSOPHY IN PUBLIC HEALTH

in the subject

HEALTH STUDIES

at the

UNIVERSITY OF SOUTH AFRICA

SUPERVISOR: PROFESSOR JEANETTE MARITZ

NOVEMBER 2020