

https://dspace.org/

The influence of digitalization on work and employment in the Banking Sector in South Africa

Naidoo, Angie

2021
https://hdl.handle.net/10539/32884

Downloaded from a DSpace repository. https://dspace.org/

The Influence of Digitalization on Work and Employment in the Banking Sector in South Africa

Angie Naidoo
1561744
Supervisor: Dr Lynn Hewlett

Research Report submitted in partial fulfillment of the Degree
Master of Education at the University of the Witwatersrand

October 2021

THE INFLUENCE OF DIGITALIZATION ON WORK AND EMPLOYMENT IN THE BANKING SECTOR IN SOUTH AFRICA

Angie Naidoo
1561744

A research report submitted to the School of Education in the Faculty of Humanities at the University of the Witwatersrand in partial fulfillment of the requirements for the degree of Master of Education by Coursework and Research Report.

29 October 2021

ABSTRACT

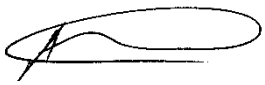
Digitalization, through the adoption of digital technologies, is changing banking practice in South Africa (SA) resulting in new ways of working which in turn requires new knowledge and skills. Designed as an exploratory study, this research, applied an occupational analysis process to explore the empirical cases of key banking occupations to examine the influence of digitalization on the nature of work and conditions of employment in SA. It interrogated if and how, work within occupations is changing or may change in the future because of, or in response to, digitalization, with a view to determining the nature and direction of skills change to better inform skills planning.

The adoption of digital technologies by banks in SA, changes the setting or the context of occupations. To explore these occupational changes, five dimensions of occupations were examined, that is, jobs, work, knowledge, skills and employment. The results of this study provide an indication of occupations and jobs that are disappearing as well as those that are emerging; new tasks and responsibilities (changes to work); emerging generic and specialized knowledge and skills; changes to skills levels and changes brought about through the adoption of flexible work arrangements. Examining occupations in this way is useful for sector skills planning to inform occupational shortages and the identification of current and future skills needs linked to digital transformation.

***Keywords*:** Digitalization, Work, Employment, Occupations, Occupational Analysis, Skills Planning

DECLARATION

I declare that this research is my own unaided work. It is being submitted for the Degree of Master of Education at the University of Witwatersrand, Johannesburg. It has not been submitted before for any degree for examination at any University.



_____

Angie Naidoo

Date: 28 October 2021

ACKNOWLEDGEMENTS

A special note of appreciation to my Supervisor, Dr Lynn Hewlett for her invaluable support and guidance.

A special note of gratitude to the participants who shared their insights and experiences on a voluntary basis.

Table of Contents

ABSTRACT 3

DECLARATION 4

ACKNOWLEDGEMENTS 5

LIST OF FIGURES 9

LIST OF TABLES 9

ACRONYMS 10

CHAPTER 1: INTRODUCTION TO THE STUDY 11

1.1 Background to the Study 12

1.2 Purpose Statement and Research Questions 14

1.3 Significance of the Research 15

1.4 Work and Employment in the Banking Sector 15

1.5 Occupation as a Frame of Analysis 17

1.6 Overview of Chapters 18

1.7 Conclusion 19

CHAPTER 2: LITERATURE REVIEW 21

2.1 Introduction 21

2.2 Occupations as a Frame of Analysis in Skills Planning in SA 21

2.2.1 Conceptualizing Occupations 21

2.2.2 Frameworks for Analyzing Occupational Change 22

2.2.3 Occupational Classification Systems 24

2.2.4 The Role of the OFO and Occupations in Skills Planning in SA 26

2.2.5 The Relationship Between Work, Jobs and Occupations 30

2.3 Digitalization and Occupational Change 31

2.4 Linking Education and Work 36

2.5 Levels of Skill as an Indicator of Occupational Change 40

2.6 Conditions of Employment and Occupational Change 43

2.7 Conclusion 45

CHAPTER 3: RESEARCH METHODOLOGY 48
3.1 Introduction 48
3.2 Research Design 48
3.3 Research Aim and Research Questions 50
3.4 Data Collection Methodology 50
3.5 Selection of Participants for the Study 53
3.6 Analysis of the Data 54
3.7 Ethical Considerations 56
3.8 Conclusion 57
CHAPTER 4: INSIGHTS INTO KEY OCCUPATIONS IN BANKING IN SA 59
4.1 Introduction 59
4.2 The Effects of Digital Technologies on Banking Practice in SA 59
4.2.1 Understanding the Concept of Digitalization 59
4.2.2 Understanding Global Trends on Digitalization in Banking 60
4.2.3 Digital Technologies Adopted by SA Banks 61
4.2.4 Changes to Banking Practice in SA 65
4.3 Occupations and Jobs in Banking in SA 68
4.3.1 Changes to Banking Occupations in SA 68
4.3.2 Changes to Banking Jobs in SA 70
4.3.3 The Use of the OFO in the Banking Sector in SA 74
4.4 Work within Banking Occupations in SA 74
4.4.1 Current Changes to Work in Key Banking Occupations in SA 74
4.4.2 Perceived Future Changes to Work in Banking Occupations in SA 76
4.5 Knowledge and Skills from Occupational Change in Banking in SA 76
4.5.1 Emerging New Knowledge and Skills for Banking Employees in SA 76
4.5.2 Future Skills Required to meet the needs of Digitalization 78
4.5.3 Interventions Implemented to Address Skills Gaps in Banking in SA 79
4.5.4 Training Methods Applied in the Banking Sector in SA 80
4.6 Shifting Skills Levels of Banking Occupations in SA 81
4.7 Conditions of Employment in the Banking Sector in SA 83
4.8 Conclusion 85

CHAPTER 5: DIGITALIZATION, WORK AND EMPLOYMENT IN THE BANKING SECTOR IN SA 88
5.1 Introduction 88
5.2 Summary of Findings 89
5.2.1 Features of Digitalization and their Implications for Banking in SA 89
5.2.2 The Effects of Digitalization on Work, Education and Employment in SA . 90
5.2.3 The Effects of Digitalization on Skills Levels in Banking in SA 91
5.3 A Framework for Analyzing the Influence of Digitalization on Occupations .. 92
5.4 Further Research 93
5.4 Conclusion 94
REFERENCES 97
ANNEXURE 1: INFORMATION LETTER TO PARTICIPANTS 104
ANNEXURE 2: PARTICIPANT CONSENT FORM 106
ANNEXURE 3: GUIDING QUESTIONS FOR DATA COLLECTION 107
3.1 Semi-structured Interview Schedule for Bank Employees 107
3.2 Guiding questions for Focus Group Discussion with SASBO 108
3.3 Guiding questions for focus group discussion with BANKSETA 109
ANNEXURE 4: PARTICIPANT SCHEDULE 111
ANNEXURE 5: ARCHIVE OF DOCUMENTS 112

LIST OF FIGURES

Figure 1: A Framework for Analyzing the Effects of Digitalization on Occupations 24

Figure 2: Structure of the OFO 28

Figure 3: Changes to Jobs in the Banking Sector in SA 70

LIST OF TABLES

Table 1: OFO Classification System 27

Table 2: List of Source Documents for Analysis 51

Table 3: List of Interviews Conducted 52

Table 4: Digital Technologies Influencing Banking in SA 62

Table 5: Changes to Banking Practice in SA 65

Table 6: Changes to Occupations in Banking in SA from 2015 to 2019 69

Table 7: Job Changes for Major Occupational Groups in Banking in SA from 2018 to 2019 ... 71

Table 8: Changes in Jobs for Key Occupations in Banking in SA from 2015 to 2019 72

Table 9: Changes to Conditions of Employment in Banking in SA 83

ACRONYMS

4IR	Fourth Industrial Revolution
AI	Artificial Intelligence
App(s)	Applications (Software)
ATM	Automated Teller Machine
BANKSETA	Banking Sector Education and Training Authority
CEDEFOP	Centre for the Development of Vocational Training
DHET	Department of Higher Education and Training
Fintech	Financial Technology
HCT	Human Capital Theory
ILO	International Labour Organization
ISCO-08	International Standard Classification of Occupations 2008
IT	Information Technology
OECD	Organization for Economic Cooperation and Development
OFO	Organizing Framework for Occupations
OIHD	Occupations in High Demand
NAS	National Academy of Science
NQF	National Qualifications Framework
NSDP	National Skills Development Plan
PSET	Post-School Education and Training
SASBO	South African Society of Bank Officials
SASCO	South African Classification of Occupations
SETA	Sector Education and Training Authority
SA	South Africa
SARB	South African Reserve Bank
SSP	Sector Skills Plan
WEF	World Economic Forum
WSP	Workplace Skills Plan

CHAPTER 1: INTRODUCTION TO THE STUDY

Since Professor Klaus Schwab, announced the impending Fourth Industrial Revolution (4IR) at the World Economic Forum (WEF) in 2016 and in that same year released his book titled *The Fourth Industrial Revolution*, South African banks have been swept up in the anticipation created around the role of smart and connected digital technologies in reshaping the banking industry. In the same year, the release of the "Future of Jobs: Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution" Report articulated the relationship between digitalization and changes to occupations, jobs, work and skills. This report (WEF, 2016, p.7) states that

> *... as entire industries adjust to the adoption of emerging digital technologies, most occupations are undergoing a fundamental transformation and whilst some jobs are threatened by redundancy but others grow rapidly, existing jobs are also going through a change in the skills set required to do them.*

South African banks initially perceived the innovation of emerging digital technologies by financial technology (Fintech) companies as a threat, referring to this as "digital disruption" because financial technologies have the potential to disrupt traditional banking models (BANKSETA, 2017; Coetzee, 2018; Makina, 2019). In addition, digital disruption also presents a challenge for skills planning, since digital transformation requires changes to the existing ways of working resulting in the need for new and emerging skills. As the mandated skills development intermediary responsible for skills development for the banking sector, the Banking Sector Education and Training Authority (BANKSETA) led an international benchmark study on digitalization of the banking sector. The two-fold purpose of this benchmark study was to assist the banks (employers) to expand their understanding of this phenomenon, and for BANKSETA to comprehend the implications of digitalization on current and future skills needs for the sector.

Post the benchmark study, digitalization was identified as the key driver of change for the banking sector (BANKSETA, 2017); Louw & Nieuwenhuizen, 2020). For the banks the changes relate to their unique digital transformation plan that each bank develops and to ensure it has the skills required to deliver its digital strategic intent. BANKSETA, on the other hand, needed to examine digitalization as a driver of change to determine the implications of digitalization on skills planning for the banking sector.

Occupations serve as the framework for skills planning in South Africa (SA). Therefore, insight into analyzing occupations to determine the influence of digitalization on current and future skills forecasting was required. This sparked my interest in undertaking this research to conduct an occupational analysis to determine the influence of digitalization on work and employment in the banking sector. This study, focused within the post school education and training landscape, interrogated if and how, work within occupations is changing or may change in the future because of, or in response to, digitalization, with a view to determining the nature and direction of skills change to better understand the emerging skills required in the banking sector in SA.

This chapter is an introduction to the study and provides a brief background to the study explaining the link between digitalization and the nature of work and employment. It clarifies the problem statement, articulates the purpose for the research including the research questions the study seeks to address. The focus of the chapter shifts to a description of the concepts of work and employment and the basis of using occupations as the chosen frame of analysis for this research. The chapter concludes with an overview of the chapters of the report.

1.1 Background to the Study

There are several reasons why traditional banks should consider moving towards digitalization. Broeders and Khanna (2015) suggest four reasons why banks must engage in digital transformation: firstly, it increases the banks connection with customers; secondly, as banks house big data, they can use analytics to support decision making; thirdly, it allows the automation of many repetitive processes increasing the operational effectiveness of the banks; and finally, it fosters innovation to support the demand for a diverse range of products and services. These four reasons provide a strong motivation for banks to adopt various digital technologies. The adoption of digital technologies results in a shift from traditional banking to digital banking.

Digital banking refers to the use of digital technologies to provide a range of banking services through the use of innovative digital technologies (Abbasi & Weigand, 2017). However, the adoption of digital technologies changes or 'disrupts' banks operating models hence the term 'digital disruption'. For example, in traditional banking, most banking services occur at a bank branch. However, digitalization results in many of these banking services becoming accessible

through the use of digital technologies, platforms and channels (Abbasi & Weigand, 2017). This shift from traditional to digital banking activities brings changes to banking practices, resulting in new ways of working. These new ways of working influence occupations and the work undertaken by bank employees.

Many organizations like the International Labour Organization (ILO), the Organization for Economic Cooperation and Development (OECD) and the World Bank, amongst others have highlighted the changing nature of work brought about by digitalization in several reports. The OECD (2019, p.1) emphasizes that "the impact of digitalization on the workforce depends on technological innovations and the uptake of these new technologies". The World Bank discusses six main aspects dominating conversations on the changing world of work and cites technology as key to reshaping the skills needed for work (World Bank, 2018; Anner, Pons-Vignon & Rani, 2019). Hence, for the workforce, the first challenge arising from digital transformation is to enable workers to make the transition to the new world of work by ensuring their adaptation to the changes brought about by the new skills and competence requirements. The second challenge is that technological change also generates new types of work arrangements, redefining the place where work happens, working time arrangement as well as creating new non-standard forms of employment (ILO, 2018; OECD, 2019; World Bank, 2018; Svahn, Mathiassen, Lindgren & Kane, 2017). In contrast to the two challenges identified, digital innovations also present emerging new opportunities including the formation of new markets, new occupations, new jobs, new knowledge and skills, and positive changes to the employer-employee relationship (ILO, 2018; OECD, 2019; World Bank, 2018; Svahn, Mathiassen, Lindgren & Kane, 2017).

This research is an empirical investigation of the influence of digitalization on work and employment by examining occupational change of key occupations in banking in South Africa (SA). The elements of occupational change include the content of occupations, competencies required, changing skills levels and conditions of employment. This provided an understanding of the change digitalization brings to occupations, jobs and work; the knowledge and skills required to perform the job; the levels of skill demanded; and the standard working relationship. Analyzing occupations and work are central constructs for understanding skill. Within the context

of this study, the process of analyzing occupations included examining the work that makes up the occupation and the skills that are required for carrying out the work.

1.2 Purpose Statement and Research Questions

Digitalization has a direct influence on occupations but the change is dependent on the firm, the sector and the industry. Therefore, the potential impact of the adoption of digital technologies on the current and future labour market must not be disregarded. There is consensus that as firms adopt new digital technological innovations, new ways of working emerge and hence the knowledge and skills required of their labour force changes (Reljic, Evangelista & Pianta, 2019). Skills planning research by BANKSETA is limited to a measure of occupational shortages and skills gaps at major occupational categories but not at individual occupation levels (BANKSETA, 2019). There is a need to understand how individual key occupations, jobs that make up the occupations, and work that makes up the jobs are changing. This will further impact the identification of new knowledge and skills required to inform the development of relevant education and training programmes.

The purpose of this study was to obtain a comprehensive understanding of how digitalization brings about changes to occupations, jobs, work (tasks and responsibilities), education (knowledge, skills and competencies), skills levels as well as conditions of employment of three key banking occupations in SA. Therefore, the aim of the research was to carry out an occupational analysis and through the process of exploring the empirical cases of three key banking occupations namely Bank Teller, Bank Worker and Bank Manager to understand the influence of digitalization on the nature of work and conditions of employment within the banking sector in SA. It interrogated if and how work within each of these occupations is changing or may change in the future because of, or in response to, digitalization, with a view to determining the nature and direction of skills change. This study establishes the link between the concepts of occupations, work and skill leading to the examination of changes brought about by digitalization to determine occupational changes and skills gaps in the banking sector. Understanding occupational change and skills gaps are important for the identification of education and training needs within the banking sector for skills planning purposes.

This study was guided by the following research questions:

1. What are the key features of digitalization within the banking sector in SA and what have been their implications for banking practice for SA?
2. How do these trends (from question 1) influence key banking occupations in SA in relation to work, education and employment?
3. What do these trends imply for patterns of skills changes in SA within these occupations?

1.3 Significance of the Research

This study recognizes the importance of occupations as they are central to the mechanisms for skills planning. At a national level, occupational data collected from various sources are analyzed by the Department of Higher Education (DHET) for the development of the list of Occupations in High Demand (OIHD); at the sectoral level, occupational data is used to determine the list of occupational shortages developed by the Sector Education and Training Authorities (SETA). At the employer level, jobs are aligned to occupations and skills demands and training interventions are linked to occupations.

Acknowledging the centrality of occupations to skills planning, this research examines the contextual change brought about by digitalization to three key occupations in the banking sector in SA. The occupational analysis framework explores the influence of digitalization to changes to jobs and work, educational and training requirements, shifts in the level of skills required and changes to the context within which employment takes place. An exploratory study of this nature contributes to enhancing the current skills planning process and provides a wide-ranging analysis for determining how occupations are affected by digitalization in the banking sector in SA.

1.4 Work and Employment in the Banking Sector

The financial services sector encompasses a wide range of businesses that manage money in some form and consists of banks, insurance companies, asset managers, stock brokers, credit unions, and credit issuing companies (BANKSETA, 2017; Botha & Makina, 2011). The banking sector as a sub-set of the financial services sector consists of banking, credit grantors and micro-financiers. Banking is further categorized into retail, investment and corporate banking. Retail banking refers to that component of banking for individual, personal banking or consumer banking accounts;

investment banking refers to the division that helps clients make investments and raise capital; whilst corporate banking refers to the portfolio of business banking accounts.

According to the 2020 Banking Sector Skills Plan (SSP), "the top five banks, Absa, Nedbank, First Rand, Standard and Capitec collectively employ approximately 96% of the banking labour force" (BANKSETA, 2019, p.26). The banking sector created an additional 867 jobs from 2018 to 2019; employed 197 288 employees in 2019 of which 77 413 were male and 119 875 females, reflecting a female dominated workforce with the largest number of banking employees being based in Gauteng, followed by the Western Cape and then Kwa-Zulu Natal (BANKSETA, 2019, p.26). The banking workforce is employed in a varied number of occupations. A detailed analysis of these occupations is examined in Section 4.3.

Work and employment are fundamentals constructs of the labour market and are central to this study. Work and employment are often used interchangeably. However, in this study they hold specific meaning. The National Academy of Science (NAS, 1999, p.14) suggests that

> *... when people speak of the nature of work, they usually refer to firstly what people do for a living (the occupations), secondly the content of work or how people do what they do (the techniques, technologies and skill they employ), thirdly the organizations social and institutional contexts in which work takes place and finally the nature of work that encompasses the way work affects and relates to other aspects of daily life.*

This definition of work does not align to its use within the context of skills planning in SA. Benner's (2002, p.23) definition of work as "the actual activities that people perform whilst engaged in the process of production" provides a clear and concise description. Work is what the employees do including all the activities and tasks carried out to perform their duties to fulfil all occupational obligations to the employer. Employment, on the other hand, refers to the external context where work takes place which is impacted on by social, cultural and physical factors. It is generally carried out in physical environments referred to as the workplace. Benner (2002, p.24) defines employment as "the nature of the relationship with the employer and the nature of compensation provided for the activities performed by the worker". The conditions of employment refer to the contractual and social conditions of the employee-employer relationship. In this study,

work refers to the tasks or activities carried out by the employee whilst employment refers to the conditions fundamental to the employee-employer relationship (Pot, Dhondt & Oeij, 2012; Valenduc, 2019).

1.5 Occupation as a Frame of Analysis

The conceptual focus of this research is on occupations in the banking sector in SA. The justification for this focus is that occupational analysis is central to skills planning in SA. Legere (1978, p.27) describes occupational analysis as "a system of procedures used to verify the existence of particular jobs in an occupational field; define those jobs within the context of the field and observe the performance of the job holders". Blackmore (2000, p.292) explains an occupational analysis "have to deal with knowledge, understanding, performance and the environment in which the occupations occur". The NAS adds that occupational analysis must "take into account the attributes of the persons who perform the work, the processes by which they perform it and the outputs they produce, and the organizational factors that interact with all three" (NAS, 1999, p.5).

Drawing from the conceptual focus, an occupational analysis is a complex process involving various elements. These elements of an occupational analysis involve examining jobs that make up the occupations and work that makes up the jobs. It must also consider the changes in knowledge and skill requirements of the various jobs that make up the occupation. An occupational analysis therefore involves the analysis of the activities that make up the occupation, the work environment and the knowledge and skills of the individual carrying out the work. It must also include the contextual changes brought about by external factors that influence the occupational holder.

A study of this nature, based on the process of an occupational analysis, cannot examine all occupations in the banking sector. Therefore, the empirical focus of this research is limited to the Bank Worker, Bank Teller and Bank Manager because these three occupations currently collectively constitute the largest number of employees in the banking sector (BANKSETA, 2017). A focus on these three occupations is insightful for an investigation into the influence of digitalization on work, employment and levels of skill as they represent mass employment jobs

since they form a substantive part of the current workforce. As these are frontline occupations, they are the most likely occupations to be affected by digitalization in the banking sector as some of the work undertaken by the Bank Teller and Bank Worker is easily automated whilst Bank Managers may find their job functions changing because of changing branch operating models in banks. Digitalization of the banking environment threatens the existence of physical branches of banks and this may a direct influence on the Bank Manager, Bank Worker and Bank Teller occupations. The characteristics of these occupations described above make them good empirical cases to understand occupational changes brought about by the influence of digitalization on the banking sector.

1.6 Overview of Chapters

Chapter One describes the background to the study and links digitalization to the changing nature of work and employment and articulates the purpose and aim of the study. It further explains the significance of carrying out this occupational analysis within the realm of skills planning for the banking sector in SA. It describes the context within which the terms work and employment are used in this research as well as the relevance of the use of occupations as a frame of analysis.

Chapter Two presents the literature review. It draws on theoretical scholarly literature as well as the work of experts and organizations like the DHET, ILO, WEF, OECD and World Bank. It also draws on research on digitalization in banking carried out by consulting firms like Accenture, Price Waterhouse Coopers, Deloitte, and others. The chapter begins with a review of occupations as a frame of analysis and discusses the term occupations, occupational classification systems and occupational analysis as a mechanism for skills planning including the relationship between work, jobs and occupations. The second section examines current literature on digitalization, with specific reference to digital technologies driving change in the banking sector. Understanding how digital technologies are driving change, provides a foundation to explore the new ways of working and the identification of current and future skills. The third section describes the relationship between education (knowledge and skills) and occupations with reference to the role of the firm in skills formation and the role knowledge plays in technological innovation. The fourth section examines changes to skills levels relating to low, intermediate and high skills as well as upskilling,

reskilling, multiskilling and deskilling of work and occupations. The last section in this chapter examines conditions of employment as an aspect of occupational change.

Chapter Three describes the research methodology adopted in this study. This includes a description of the qualitative research design, a description of the three data collection methodologies (document analysis, semi-structured interviews and focus group discussions), the selection of participants for the study as well as the techniques used to analyze the data. Ethical considerations that influenced the study are also discussed.

Chapter Four reflects on the insights drawn from participants and focus group discussions within the framework of an occupational analysis. The body of this chapter is structured into six sections, each dealing with a dimension of the occupational analysis carried out. The first describes insights into digitalization and the changes it brings to banking practice. The second examines current banking sector occupational data to determine changes to occupations and jobs, whilst the third section focuses on changes to work, that is, the tasks and activities carried out in the job. The fourth section describes changes to knowledge and skill required resulting from the new ways of working whilst the fifth section looks at skills through the lens of changes to the levels of skill. The final dimension of the occupational analysis describes changes to the conditions of employment resulting from digital transformation of the banking sector in SA.

Chapter Five describes the occupational analysis carried out including the influence of digitalization on occupational change and its implications for skills planning for the banking sector in SA. A summary of the findings is presented in relation to the research questions posed. The recommendations made reflect on the occupational analysis framework adopted for this study as an instrument to enhance the collection of occupational data for skills planning where digitalization has an influence on occupation(s). It concludes by providing some guidelines on further research related to this study.

1.7 Conclusion

Digitalization has many benefits for banks and as banks choose their digital transformation strategies, they adopt appropriate digital technologies. These digital technologies however, have

the potential to create new ways of working resulting in some jobs and occupations becoming obsolete whilst simultaneously creating new jobs and occupations. The new ways of working that emerge create a demand for new knowledge and skills. They may also cause changes to the levels of skill required. Therefore, this research was undertaken to carry out an occupational analysis to examine changes to key banking occupations to determine the current and future knowledge and skills resulting from the adoption of digital technologies. This chapter also provided a brief introduction to the link between digitalization and the concepts of work and employment as well as the use of occupations as a frame of analysis to examine these linkages. This chapter concluded with a brief overview of the five chapters of this research report.

The next chapter engages with a literature review of key concepts relevant for this study to better understand the framework of an occupational analysis. Pertinent literature to each of the dimensions of an occupational analysis is examined.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature covering relevant aspects drawing on theoretical scholarly literature on occupational frameworks and relevant theories on skills formation. Skills development documents released by the DHET forms the main source of literature on the role of occupations in skills planning in SA. In addition, several reports on the changing nature of work produced by the ILO, WEF, OECD and World Bank forms part of the discourse. In addition to the use of scholarly literature, reports produced by consulting firms like Deloitte and short journal articles written for practitioners contributed to the literary context. The literature review is structured in five sections; the first section examines occupations as a frame of analysis in skills planning, and the following four sections each focuses on a dimension of occupational change.

2.2 Occupations as a Frame of Analysis in Skills Planning in SA

2.2.1 Conceptualizing Occupations

As a form of human activity, occupation is not a homogeneous construct since it holds a social, economic and individual meaning. This heterogeneous nature of occupations requires a broader meaning than the one provided by DHET. Within skills planning, occupations are defined as "a set of jobs whose main tasks and duties are characterized by a high degree of similarity" (DHET, 2013, p.6; Balwanz & Ngcwangu, 2016). This definition limits occupations to an analysis of three aspects: jobs, work and skill specialization. Using this definition to examine occupational change limits the empirical investigation of the key occupations selected to the economic meaning of occupations but it is silent on the social and individual meaning. This is why the notion is now explored further.

In a working paper titled *Linking Knowledge, Education and Work*, Shalem and Allais (2018) carry out a detailed examination of occupations. Drawing on the work of several authors, they outline two aspects relevant to the economic meaning of occupations. The first relates to the bundle of tasks which refers to the clustering of work into either standard repetitive tasks or specialized tasks. The second refers to the manner of organizing and acquiring knowledge, including the kinds of

knowledge (both practical and theoretical) required by the different work to be performed, especially the formal knowledge required to perform specialized work (Shalem & Allais, 2018).

On the social and individual meaning of occupation, Shalem and Allais (2018) refer to the "normative dimension" of power and status associated with occupations and the career paths provided by occupational progression. Wilcock (1993) expands on this explaining that occupations allow people to develop social and cultural capacities to grow in their chosen careers, thus providing a sense of social identity. This meaning of occupations at an individual level, serves as an indicator of social class and status providing an individual with prestige and power. Combining the economic and individual meaning of occupations indicates that occupations have financial value as occupational holders are remunerated for the work they do. Levenson and Zoghi (2010, p.366) point out that "occupations are highly correlated with income and this partly reflects the complexity of knowledge acquisition in order to learn specific tasks". Therefore, there is a direct correlation between the remunerative benefit and the complexity of the knowledge and skills required in performing the work. In addition to the remunerative benefit, occupations shape the individual through their occupational identity but individuals also shape the design of occupations (Krause, (1971). Whilst the occupation holder influences the design of the occupation, they also make sense of the occupation by performing the tasks, duties and responsibilities aligned to it.

The varied definitions illustrate different elements linked to the conception of occupations. These elements include the concepts of jobs, work, skill, knowledge and identity are form important aspects of an occupational analysis and must be included in a framework for studying occupations. A framework for occupational analysis is a structure that supports and guides the way in which the elements of occupations can be analyzed to determine occupational change. In the next section, three frameworks for analyzing occupational change are discussed which informs the occupational analysis framework used in this study.

2.2.2 Frameworks for Analyzing Occupational Change

Limited literature exists on frameworks for analyzing occupational change specific to skills planning (Blackmore, 2000). Despite this limitation, the works of Krause, Blackmore, and the National Academy of Science suggest important aspects of a framework for studying occupations.

In his model, Krause (1971) presents four perspectives for studying occupations: the historical perspective which considers the role of occupational groups in society; the biographical perspective which explores the meaning individuals give to their activity including the relationship between the individual and the employer; structure and function perspective which analyzes occupations and major issues on work, such as the nature of the labour market, occupational categories, status, occupational mobility and professions; and conflict of interest in the division of labour.

Blackmore (2000) suggests the use of a matrix for comparing dimensions of occupational categories. Blackmore's (2000) matrix approach to analyzing occupations centers around the terms of role, skill and function. Role emphasizes formal relationships and is negotiated and open to individual influence, whilst skill is concerned with human capabilities and function refers to a study of the work itself (Blackmore, 2000).

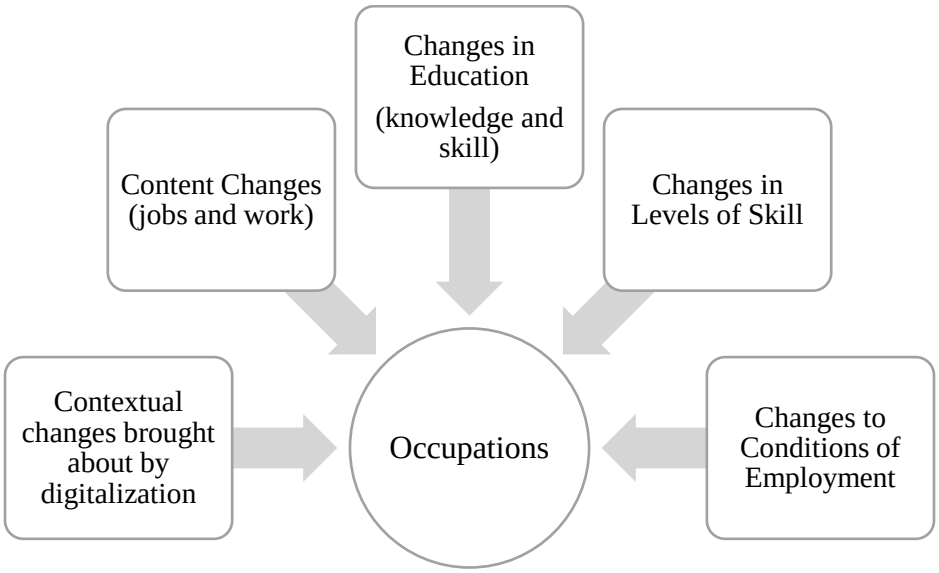
The National Academy of Sciences (NAS), defines occupational analysis as "the procedures that analysts use to characterize the attributes of a specific job and the knowledge, skills and abilities that are required to perform the job" (NAS, 1999, p.34). Their framework proposes three aspects of occupational analysis: the external context of work which includes examining changing technology and workforce demographics; changes to the organizational context of work including restructuring, job stability and changing employment relationships; and changes to the structure and content of work (NAS, 1999).

Drawing from the above three approaches, an occupational analysis framework should include the role of occupations in society, the structure of the labour market, the meaning of occupations to the individual occupational holder, changing technology, the human capabilities (knowledge, skill and attributes) required to perform the work, an examination of the work itself and the changing employment relationship. Therefore, a well-balanced framework should incorporate these elements. The elements of this occupational analysis are developed from these frameworks and the conceptual analysis. The occupational analysis framework for this study is shown in Figure 1. Five dimensions emerge from the literature to inform the framework. The first is the external context, in this instance, digitalization; the second is the content of the occupation; the third is the

educational requirements; the fourth refers to skills levels and the fifth is the conditions of employment.

Figure 1

A Framework for Analyzing the Effects of Digitalization on Occupations



Source: Author's Analysis (2021)

Occupational classification systems are also viewed as a type of framework used in occupational analysis. Occupational classification systems are linked to Krause's structure and function perspective through the creation of occupational structures and categories of the labour market. It is therefore useful to examine occupational classification systems because these systems are used to gather statistical labour market data, and can be used to augment skills planning.

2.2.3 Occupational Classification Systems

Occupational classification data are used for several reasons. It is a mechanism for grouping as well as ranking occupations to study the workforce through the quantitative analysis of labour market data. It also provides a means of identifying the jobs and skills within each occupation by providing qualitative data on the content of jobs and signaling the educational requirements for these jobs. It is also useful for individuals to obtain data on job requirements. Scott and Marshall

(2009, p.523) emphasize that occupational data is used for three reasons: to understand the workforce; to provide labour market socio-economic data; and to signal educational, skills and training needs. Levenson and Zoghi (2010, p.366) recommend its use as a suitable means to describe the content of a job, since "the job requirements associated with any occupation are important for those who want to enter an occupation whether by formal qualifications or on-the-job training".

To understand the structure of occupational classification systems and their use in occupational analysis, the ISCO-08 system is selected for this analysis since SA aligns its domestic occupational classification systems to this international system. The ILO (2012, p.4) states the purpose of the ISCO-08

> *... is to facilitate international communication about occupations by providing statisticians with a framework to make internationally comparable occupational data available, and by allowing international occupational data to be produced in a form that can be useful for research as well as for specific decision-making and action-oriented activities such as those connected to international migration and job placement.*

The ISCO-08 is a tool for organizing jobs into defined sets of occupations incorporating two main concepts of job and skill (ILO, 2012). It organizes millions of jobs into groups according to their similarities. It comprises the tasks and activities to be performed. Features that are used to classify skill are skill level and skill specialization. These features are further examined in section 2.5.

Contrary to its usefulness in labour market analysis and skills planning, occupational classification systems have limitations. One shortcoming is that it does not present reliable occupational data, considering that jobs are in a constant process of change. Scott and Marshall (2009, p.524) caution that "social and economic change continually modifies the occupational structure and limits the capacity of any particular classification to reflect this structure over time". Another challenge is that it treats occupations as homogeneous. Levenson and Zoghi (2010, p.366) note "that all occupations are brought in a way that it is expected that all occupation holders share the same characteristics and context of the labour market and work situation and experience".

Despite its limitations, many countries adopt national systems for occupational classification to create their own domestic system. SA has developed its own domestic occupational classification system by aligning to the ISCO-08 standards. The SA system operates two frameworks, the South African Classification of Occupations (SASCO) and the Organizing Framework for Occupations (OFO). Whilst SASCO provides a national framework for the identification of occupations for international occupational comparability and the collection of labour market statistical data, the OFO (DHET, 2013, p.4)

> *… is a skill based coded occupational classification system that captures all jobs in the form of occupation and provides a framework for the identification, articulation, reporting and monitoring of skills demand and supply in the SA labour market.*

The OFO is therefore the framework used for skills planning in SA. In the next sections, the role of the OFO as the SA framework to inform skills planning is examined.

2.2.4 The Role of the OFO and Occupations in Skills Planning in SA

The introduction of the Skills Development Act of 1998 and the Skills Development Levies Act of 1999 brought a new emphasis to skills development in SA. To support the implementation of these Acts, the National Skills Development Strategy was developed as a new framework for skills formation in SA (Kraak, 2004). A central tenet of this new system was the introduction of the skills levy and the establishment of SETAs. The former was intended to incentivize employers to engage in developing skills of the labour force through the claiming of grants, whilst SETAs were created to determine the training needs of their sector and to distribute grants back to employers (Allais, 2013, p.203). Skills planning for their allocated sectors therefore became an important responsibility of the SETAs.

The role of skills planning is to identify the kinds of skills required by the labour market and then determine training programmes to acquire them. Allais (2015, p.248) describes this as the process to "get employers to stipulate the competencies that they require and then get educational providers to produce them". This demand-led approach to skills planning, identifies the skills needed from employers and the SETA plans interventions to address these (Wilson et al., 2004). DHET placed emphasis on a mechanism to improve the quality of data submitted by employers and adopted the

OFO as the SA occupation-based classification system to be used by SETAs to identify and measure the demand and supply of skills and to determine occupational shortages and skills gaps in their sectors (DHET, 2015).

In 2005, the Department of Labour created and adopted the OFO; but in 2009, the OFO was transferred to the DHET. Since 2005, various versions of the OFO have been released with the most recent being the OFO 2019 version. The OFO is based on two main concepts: the concept of the kind of work/job performed and the concept of skill (DHET, 2013). The OFO is a five-level hierarchical structure as outlined in Table 1.

Table 1

OFO Classification System

Group	**Description**
Major Group	This is the highest level of classification. There are eight major occupational groups defined by skill level. Each of these has a one-digit classification code.
Sub-Major Group	This is the second level of classification. The sub-major group starts to cluster occupations into disciplines. Each of these has a two-digit classification code.
Minor Group	This is the third level of classification, further breaking down sub-major groups into more specific disciplines. Each of these has a three-digit classification code.
Unit Group	Unit groups start to group together related occupations. Each of these has a four-digit classification code.
Occupation	This is the lowest level of classification in terms of individual occupations. Each of these has a six-digit classification code.

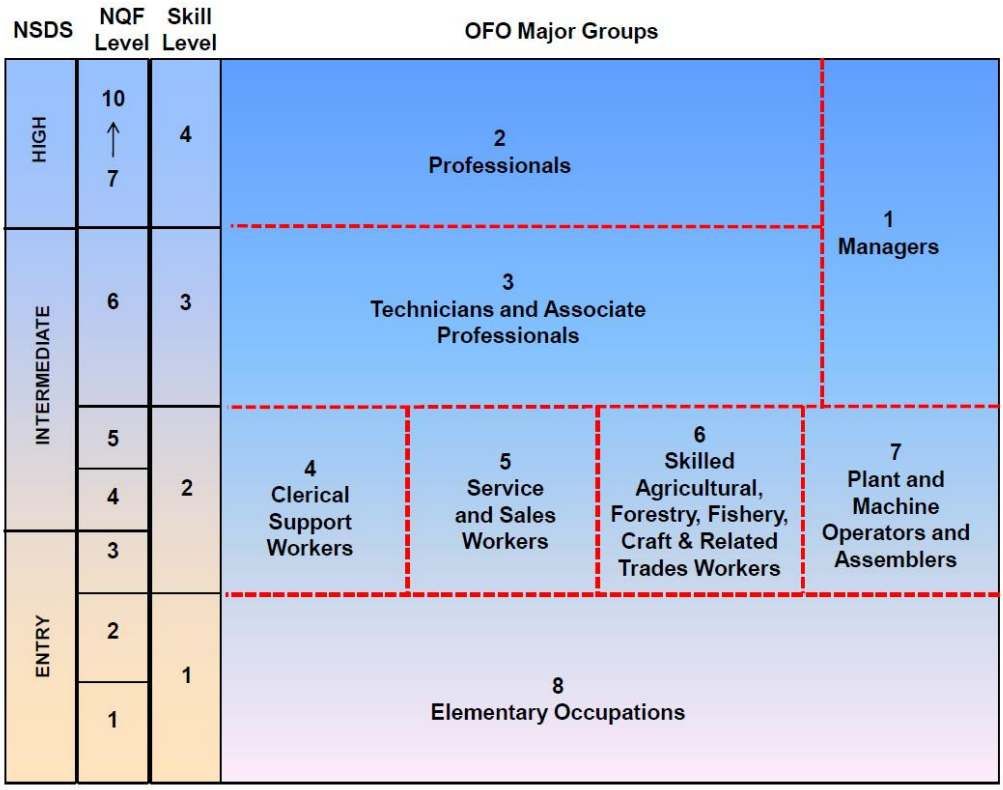
Source: Author's Analysis (2021)

The OFO is further structured into eight major groups, four skill levels, ten levels of the National Qualifications Framework (NQF) and entry, intermediate and high skills as illustrated in Figure 2. The eight major groups classify occupations into Manager, Professionals, Technicians and

Associate Professionals, Clerical Support Workers, Service and Sales Workers, Skilled Agricultural, Forestry, Craft and Related Trade Workers, Plant and Machine Operators and Assemblers and Elementary Occupations. The four skills levels are an indication of the complexity of the skill required for the occupations. The alignment to the NQF is an indication of the level of education required to perform the work linked to the occupation.

Figure 2

Structure of the OFO



Source: OFO Guideline (DHET, 2017)

Many undocumented criticisms on the OFO have emerged over the years. One criticism on the use of the OFO in skills planning relates to its relevance in supporting the collection of data about the labour market and how it has supported the translation of occupational skills demand into education provision (DHET, 2013, p.23). This critique of the OFO is that occupations are organized to reflect the world of work but not education since the direct link from occupations to educational requirements is missing.

Despite the criticisms of the OFO, occupations have remained the common language for skills planning. The DHET has a key role to play in both identifying occupations and skills to support interventions to grow the economy, and in improving the responsiveness of the Post School Education and Training (PSET) system to the skills needs of the labour market (DHET, 2020). Skills planning is a bottom-up process commencing with the submission of occupational demand captured in the Workplace Skills Plan (WSP) by employers, the consolidation of employer data by SETAs to determine occupational shortages and skills gaps and the further consolidation of SETA data into the development of the National OIHD list by DHET.

OIHD refers to occupations in the country that show relatively strong employment growth or are experiencing shortages in the labour market or which are expected to be in demand in the future (Reddy et al, 2016). According to the DHET (2020, p.4)

> *... the primary purpose of the OIHD is to support the planning process in the PSET system by serving as a signpost for enrolment planning signaling the need for the development of new qualifications specially to respond to new and emerging occupations and skills needs, guiding and informing resource allocation processes and informing career guidance for learners and work-seekers.*

At the sectoral skills planning level, "it is a requirement of the SETAs to use the OFO in the submission of the 5-year Sector Skills Plan and annual updates" (DHET, 2017, p.31). As part of the skills planning process, SETAs are required to determine occupational shortages and skills gaps for their specific sectors. Occupational shortages are determined by measuring hard-to-fill vacancy data. Cappelli (2015, p.14) supports the use of hard-to-fill vacancies and suggest that the "amount of time that positions remain vacant may suggest difficulties in hiring and hence provides a supply side indicator of occupational shortages". However, Walwei (2016, p.23) cautions that "recruitment difficulties may not necessarily be equivalent to skill shortages". Individuals with the required skills may exist in the labour market, but the price employers are willing to pay is below the price that labour demands and hence the occupation remains hard-to-fill.

Employers are required to provide information about their workforce at a six-digit occupation level in line with the OFO. DHET (2013, p.20) mandates that "employers should provide information at occupation level so that the SETAs can roll this up at the right level to enable identification of common skills development needs and interventions". Employers submit their WSP to their constituent SETA by providing annual data on employees, data on hard-to-fill vacancies, the skills required by employees and data on training interventions. The data provided must align to an occupational classification code using the OFO, that is, the data is reported in terms of occupations as defined in the OFO (DHET, 2017).

Occupations have a central role to play in skills planning; however, occupations are made up of similar jobs, whilst jobs comprise a set of work activities. This relationship suggests that in the process of analyzing occupations, jobs and work must also be examined. In the next section, the historical development of the relationship between work, jobs and occupations is examined.

2.2.5 The Relationship Between Work, Jobs and Occupations

The historical context reflects that work, jobs and occupations are linked to industrial periods. Whilst in the pre-industrial period, work had a broad meaning referring to what people did in everyday life, the industrial periods introduced the concept of jobs and later gave rise to the notion of occupations. Barley and Kunda (2001, p.82) indicate that before industrialization, work was defined as what people did in everyday life, that is, all the activities they carried out as part of their day-to-day living. They (Barley & Kunda, 2001, p.82) go on further to explain that in the industrial period, "segments of the day were set aside for work and separated from family, community, and leisure by the punching of a time clock". Work thus became separated from personal activities and developed an economic meaning.

The industrial revolution changed the concept of work and gave it economic meaning. By the middle of the twentieth century, "job" became associated with the labour market. Such jobs had a clear start date but no end date, giving rise to job stability and security (Barley & Kunda, 2001). Elias and McKnight (2001, p.509) suggest that this "perception of holding a job can also be interpreted in relation to the social status or rank in which people find themselves". Jobs later

evolved into occupations in modern-day and refers to the way people use their time in paid work. Elias and McKnight (2001, p.509) clarify work and occupation by stating that

> *... when asked what kind of work a person does or what type of job, he/she may have, the answer is likely to be detailed and/or precise. Asked for their occupation however, and the reply might reflect more upon a long-term plan or indicate events on a broader time scale.*

With the emergence of the Fourth Industrial Revolution, the relationship between work, jobs and occupations will be further influenced. The World Bank (2018, p.13) suggests that "new and more specialized occupations that complement technology will emerge whilst other occupations will become redundant as a result of automation". The WEF (2016, p.7) points out that

> *… massive explosion of digital technologies constantly evokes debates over the impact of technologies on the labour market whether it serves as an opportunity to create new jobs or on the contrary it significantly limits the number of jobs available*.

Another dimension influencing changes to occupations relates to the adoption of digitalization. Since digitalization changes the setting or the context of occupations, it is important to examine the role of digitalization as a driver of change in the banking sector. A further examination of the various types of digital technologies driving change in the banking sector is discussed with a view to determining the changes they bring to banking practice and the identification of resultant occupational change.

2.3 Digitalization and Occupational Change

The terms digitization and digitalization are often used interchangeably as they are perceived to have the same meaning. Digitization refers to the "conversion of physical phenomenon and meaningful symbols like words and numbers into binary or electronic signals and the use of those signals to control machines and create or manipulate information" (NAS, 1999, p.37). Simply stated, it is the conversion of data from analog to digital format without any changes to the process itself. Digitalization refers to the use of digital technologies to change to a digital business and in this way provide new revenue and value-producing opportunities (NAS, 1999; Cijan et al., 2019). Throughout this study, the term digitalization is used since the focus is on the effect of digital technologies on occupational change.

Locating digitalization within firms is best described by the dynamic capabilities approach which acknowledges the ability of firms to evolve and adapt to industrial change. In this context, industrial change refers to the adoption of digital technologies that is prevalent in the Fourth Industrial Revolution. Nelson (1985, p.38) argues that "firms try to modify the demand for their products and engage in the development of new technologies, rather than merely reacting to market conditions by choosing the most appropriate technology for those conditions". Teece (2009, p.87) supports this by describing this dynamic capability of firms as "the particular capacity business enterprises possess to reshape and reconfigure assets to respond to changing technologies and markets". Dynamic capabilities therefore relate to the firms' ability to identify opportunities and create and use new knowledge, adapt to new business models and develop new products and services.

By adopting digital technologies firms find better ways of doing things, and in this way, they remain relevant and ensure sustainability of their operations. The seven digital technologies now described and discussed are deliberately chosen as they were the themes that emerged in the analysis of data in sections 3.6 and 4.2.3. This makes a literature review of these digital technologies obligatory. These digital technologies are: Artificial Intelligence (AI) and robotics, digital payments platforms, digital banking channels, blockchain and cryptocurrency, algorithms and data analytics, biometrics and cloud technology are driving change in the banking sector. To comprehend the influence these technologies may have on occupational change, how they change banking practice must be understood. This will further inform comprehending the new ways of working which in turn changes the knowledge and skills required to perform them. Each of these digital technologies will now be discussed.

Artificial Intelligence (AI) is the blend of advanced technologies of machine learning, natural language processing and cognitive computing. Jubraj, Graham and Ryan (2018, p.3) describes AI as "a system that can perceive the world around it, analyze and understand information it receives, take action based on that understanding, and improve its own performance by learning from what happened". Indriasari, Gaol & Matsuo (2019, p.865) explicates that "artificial intelligence enables banking institutions to entirely redefine how they make innovative products and services, how they

operate, and how they create sophisticated customer journeys and turn customer experiences". A challenge with AI is that digital technologies translate knowledge through the extraction and codification by software developers and engineers and downgrade operators to doing little more than data input or monitoring a machine's action (Braverman, 1974; Brown et al., 2008). Chatbots are automated chat systems which simulate human chats (Jubraj, Graham and Ryan, 2018). Allahar (2014, p.9) advises that "a new occupation titled Robotician, a person skilled in servicing the various components of a robot is emerging". However, since chatbots displace humans in the chat, this may lead to job losses.

A blockchain is a decentralized digital ledger across a peer-to-peer network where participants can confirm transactions without a central certifying authority (Thavanathan, 2017). It takes a few working days to complete a transfer in a traditional international bank settlement network, however in contrast, "blockchain technology allows settlements between any different banks in around ten minutes around the clock, almost instantaneous" (Cocco, Pinna & Marchesi, 2017, p7). Blockchain technology and cryptocurrency can potentially disrupt banking with the former increasing the speed of clearing banking transactions and the latter replacing cash through the introduction of electronic currency. Regarding emerging jobs, Allahar (2014, p.13) proposes that cryptocurrency will create "positions of crypto currency bankers, regulators, lawyers, anonymity advocates and theft recovery specialists".

Regarding data analytics and algorithms, banks analyze customer data in real time for prediction of future customer behaviour by using deep learning and probabilistic algorithms (Lipton et al., 2016). Data analytics requires skills in data mining and data science. On its influence on occupational change, for example, an employer created risk management or data analysis related jobs to manage databases and digitized lending instead of hiring traditional loan officers (World Bank, 2018).

According to Normalini and Ramayah (2012, p367) "biometrics is essentially an automated process of the recognition of individuals through a physiological or behavioural characteristic. As the biometric characteristic is part of the user, it cannot be forgotten, lost or stolen". Biometrics has changed the way banks verify customers changing a key task of the Bank Teller and Bank

Worker. Hosseini and Mohammadi (2012) explains that banks use biometrics for the following four purposes: Authentication through the use of fingerprint and facial technologies in branch banking, Automated Teller Machine (ATM) banking through the use of finger vein, internet banking through the use of keystrokes and telephone banking through the use of voice authentication.

Cloud technology is defined as "computing that uses data stored on an external server, accessed via the internet. It is a ubiquitous, convenient, on-demand network access to a shared pool of computing resources" (Lakshmi & Rani, 2018, p.802). Cloud technology relates to the provision of a range of computer services over the internet (the cloud) (Kawatra & Kumar, 2014). It helps banks "transform their business processes and enhance their ability to grow in new sectors or regions without the time and cost burdens involved with establishing a physical presence" (Kawatra & Kumar, 2014, p.17). The adoption of Cloud technology results in the development of a range of occupations for Cloud Engineers and skills in AI, cloud infrastructure, amongst others.

Banks play an important role in the economy as they operate the payments system. Digital payments platforms allow users to make payments in many digital forms. Bezhovski, (2016, p.128) suggests these include "electronic payment cards, e-wallets, virtual credit cards, mobile payments, loyalty and smart cards, electronic cash and store-value card payments". Digital payments platforms use a range of mobile and online digital technologies to support payments (Lipton et al., 2016, p.12). Bezhovski, (2016) suggests that mobile banking allows customers to conduct financial transactions using a mobile device. By using various software languages, banks develop their own unique Software Applications commonly referred to as Apps for different digital payment platforms. Apps has resulted in a growing demand for software developers with coding skills across various software programming languages.

Abbasi and Weigand (2017, p.3) explain digital channels as including the "mobile phones, ATMs, point-of-sale terminals, enabled devices, chips, electronically enabled cards, biometric devices, tablets, phablets and any other digital system". Shaikh and Karjaluoto (2016, p.6) differentiate between mobile banking and internet banking as "internet banking refers to the use on online services, mobile banking embraces the use of mobile technology to carry out banking transactions".

Banking channels are changing from a single to a multichannel approach to banking. Kearney (2013, p.5), comments that "the traditional branch-based model is being replaced by an integrated channel approach which allows customers to conduct banking seamlessly across various channels". Digital banking channels make banking services available twenty-four hours a day. Vasiliev and Serov (2019, p.2) suggests that the multi-channel approach streamlines banking by providing customers with the option to "continue the transaction started in one channel in another channel without the need to duplicate information".

The digital technologies described above, also pose a serious threat in the form of cybercrime and cyber fraud. Shukla (2014, p.4) explains that "the key challenge in the digital era is to ensure all customers are safeguarded from cybercrimes and the most advanced cybersecurity are employed". From an occupation perspective, new occupations like Ethical Hackers, Cyber-Security Engineers, Technicians and other occupations in cyber-security are emerging.

The manner in which these technologies drive changes in banking emerges in two ways: whilst the first is the new ways in which digital technologies reshape customer services, the second relates to changes to the operating and business banking models. Shukla (2014, p.6) argues that "customers drive this trend of digitalization and look for business that fulfil their end-to-end needs and provide multi-channel experience looking for banks that are more customer centric". In this regard, new jobs linked to User Experience Design and new Product Design are emerging within banks.

The second relates to the strategic and operating models within the bank. Teece (2009, p.84) states that "technological innovation and changing customer tastes are part of the landscape in which strategic decisions are made". Teece (2009, p.84) further reflects that

> *... strategic choices include the selection of products and services to offer customers, the market segments to address, the business models to employ, the appropriate level of diversification, and organizational structures, policies and practices needed to coordinate activities.*

The adoption of digital technologies has two contrasting effects on jobs; they either result in some jobs becoming obsolete, or in the creation of new, emerging jobs. Concerning the creation of jobs through the adoption of digital technologies, the World Bank reports that "just as Bank Tellers in the past shifted their tasks towards more relationship building at the dawn of ATMs, clerks can be retrained to include tasks that involve data analytics, cyber security and other related work" (World Bank, 2018, p.21). For example, the Bank Teller now uses biometrics to authenticate a client. The traditional way was to carry out client verification at a bank branch by checking several hard copy documents that the client needed to provide. Now they follow the biometric authentication process. However, if the branch closes, the Bank Teller may be moved to work in a call center as a Customer Support Agent. In this instance, the entire job changes and he/she carries out a completely different set of tasks or activities. According to Stubbings and Williams (2017, p.30) "as more individual tasks become automatable through artificial intelligence and sophisticated algorithms, jobs are being re-defined and re-categorized resulting in a massive reclassification and rebalancing of work".

The new ways of working are also changing the skills needed in many jobs. The World Bank (2018, p.13) argues that "the demand for advanced skills increases as routine jobs become automated and at the same time, the demand for less advanced skills that can be substituted by technology decreases". The proponents of skill biased technologies (Goldin & Katz, 2008) argue that technological advancements may generate an increased demand for skills.

Digital technologies have a direct influence on jobs and occupations by making some jobs redundant whilst creating new ones. The new occupations and jobs that emerge require new knowledge and skills to engage in the new ways of work. This relationship between education and work is discussed in the next section.

2.4 Linking Education and Work

The relationship between education and work as reflected in Human Capital Theory (HCT), argues that knowledge and skills acquired through education improves productivity (Schultz, 1961). Goldin and Katz (2008) reflect that knowledge and skills is the source of productive work, and that the skills required for innovation and the operation of new technologies has increased the

importance of education. However, Bowles and Gintis (1975, p.77) critique the view of HCT and argue that the skills and knowledge that the worker acquires do not automatically make them productive. Therefore, education holds no economic value until it is converted into useful skill and knowledge transferable into labour value.

Evolutionary economists view a firm's knowledge as essential to its ability to remain competitive. Hall (2004) advocates that knowledge that is specific to a firm is at the heart of understanding what makes them more or less competitive. New knowledge is required for a firm to innovate, and to find better ways of doing things requires knowledge. According to Nelson (2007, p.34),

> *... a central part of learning is simply learning about ways of doing things that had not been thought of before. In the process of learning and implementing new practices, a broad body of knowledge thus evolves along with the body of practice.*

The adoption of digital technologies by firms results in the emergence of new ways of working and, as alluded to by Nelson (2007), the emergence of new knowledge and skills. This new knowledge and skill must be disseminated throughout the firm. Teece (2009, p.95) therefore suggests that firms should be viewed "as knowledge-creating and learning entities making the firm a repository of capabilities and knowledge". In this instance, learning becomes central to the sustainability of the firm.

One of the main reasons for studying occupational change is to determine the emerging and new knowledge and skills required for the new ways of working. Martin (2017, p.49) suggests that "skills in modern industrial economies are typically grounded into two ideal types: general skills and specific skills". Firms, according to Hall and Soskice (2001, p.25), "are loath to invest in imparting industry specific skills where they have no guarantees that competing firms will not poach without investing in training themselves". Hence, firms invest less in general skills that are transferable and more on specific skills that are firm-specific and non-transferable (Lauder et al., 2017).

There is also the view that in some instances, firms only want to focus on informal methods of acquiring specific skills and not full qualifications. The Centre for the Development of Vocational

Training (CEDEFOP, 2013, p.28) points out that in cases were certain jobs require specific skills, "employers only want to focus on the specific skills needs and not full qualifications". Shalem and Allais (2018, p.5) differ in their view and argue that

> *... there is a move away from the idea of domains of specialized knowledge linked with occupations to generic notions such as core skills, flexible skills, communication skills, creativity and problem solving. It is argued that the rapid pace of social, economic and technological change as well as the eroding away of long-term employment in one firm, render specialized knowledge out of date.*

However, within the firm, the need for both generic skills and specialized skills exists. Generic skills, include communication skills, creativity, problem solving, critical thinking and all other skills that apply across a variety of jobs. Specialized skill relates to the adoption of digital technologies in the banking sector including deep learning, machine learning, robotics, data analytics, design and data visualization and cloud infrastructure amongst others.

Knowledge can be classified into tacit knowledge and explicit knowledge. Tacit knowledge is characterized by difficulty in codification and is hard to articulate and difficult to separate from the knower whilst explicit knowledge is knowledge which can be expressed and codified and is easily substitutable by technology (Kirsimarja & Aino, 2013, p.3). Therefore, occupations with explicit knowledge are easily automatable and labour can be displaced, whilst in occupations with tacit knowledge the power of labour increases as that knowledge is difficult to automate and codify.

In addition, the method of acquiring this knowledge and skills within firms is important as a firm's "learning system plays a crucial role in imparting knowledge and skills to the employees" (Nair et al., 2019, p.1). The OECD (2019, p.12) suggests that learning to master knowledge takes place through different channels including "reading books, attending lectures, practical experience through apprentices in a learning role or actual work day to day doing and reflecting". Kraak (2008, p.208) explains that the Skills Development Act of 1998, introduced learnerships which are described as having a three-fold purpose

> *… firstly, they are aimed at providing workplace learning in a structured way; secondly, they sought to link structured learning to multiple sites of work experience; and thirdly, they would culminate in a formally recognized qualification.*

However, learnerships, which were conceived to be demand-led and closely aligned to the needs of employers, "did not prevail as they were intended in the absence of employer support to upskill the existing workforce" (Kraak, 2008, p.211).

Given the growth in educational technologies, learning is shifting away from face-to-face classroom training to blended learning approaches. The WEF (2017, p.5) suggests that

> *... learners tend to participate to a greater degree in blended courses that combine in-person and digital formats, are contextualized to their field of work and provide skills that can be applied in future employment*.

In addition, online informal learning, comprising small micro-learning sessions has grown in recent years. This self-directed approach to learning, through accessing digital learning platforms, is an important method for acquiring new skills in the workplace (Berger & Frey, 2016, p.35).

Knowledge and skills are important for productivity as outlined in Human Capital Theory, but their value is derived from their application in the workplace. For firms to remain competitive, they require bodies of knowledge along with necessary skills to find new ways of doing things. Within the context of digitalization, these bodies of knowledge and skill required must be transferred to workers. Skill can be grouped into general skills and specific or specialized skills with firms generally focusing on the latter in their skill formation strategies. The acquisition of skill and knowledge does not readily imply the achievement of a qualification as skill and knowledge are also achieved through informal learning in the workplace. Regarding the influence of digitalization on occupations, whilst tacit knowledge is difficult to automate, explicit knowledge is replaceable by digitalization and could become obsolete. The manner in which knowledge and skill is transferred in the workplace is dependent on the learning systems of the firm. The new skills development regime introduced learnerships as a work-based route to acquire a qualification. Given the growth of digital educational technologies, contact learning is being replaced with the

blended learning approach. In addition, online informal learning, especially micro-learning is self-directed to meet the immediate need for updates of knowledge and skill.

In the next section, the levels of skill as described in the OFO are examined as it serves as an important indicator of occupational change.

2.5 Levels of Skill as an Indicator of Occupational Change

As indicated in the OFO, skill level and skill specialization are used to classify skill. Skill level according to the ILO (2012, p.11) is measured by considering the

> *nature of the work performed, the level of formal education required for competent performance of the work, and the amount of informal on-the-job training or previous work experience for competent performance of the work in an occupation*.

The level of skill attached to occupations is an indicator of complexity; the greater the complexity, the higher the skill level. As defined in the OFO (DHET, 2017, p.7), "skill level is a function of the complexity and range of tasks and duties to be performed in an occupation".

Skills are broadly classified into low, intermediate and high skills. There is general consensus that skills are changing with the adoption of digital technologies leading to a demand in high skills. The World Bank (2018, p.13) argues that

> *... technology is shifting the mix of skills required to succeed in the labour market. The demand for advanced skills increases as routine jobs become automated. At the same time the demand for less advanced skills that can be substituted by technology decreases. As work becomes increasingly intellectual, challenging and complex, workers are exposed to higher levels of information, higher skills are required.*

The need for high skills as indicated above, implies that low-skilled workers need to become high-skilled to match the needs of the labour market. It is difficult, however, for low-skilled workers to move to occupations that are not at risk of automation as they first need to move to intermediate skill jobs before they become high-skilled workers (OECD, 2019). For SA, this challenge is

exacerbated. Kraak et al. (2004, p.12) suggest that the SA skills formation typology reflects a hybrid and differentiated model which represents a

> *...highly segmented and inequitable labour market comprising a small flexible market for high skills, a sizeable but weakly evolved market for low to intermediate skills and a large secondary market for the unskilled and unemployed.*

There are two differing views on the level of skills demanded: whilst some authors argue for an increase in the levels of skills demanded, the critiques argue a decrease in the level of skills demanded. According to Bhorat et al. (2016, p.137), "the South African economy is increasingly demanding highly skilled and educated workers to match the growth of skilled occupations". Beaudry et al. (2013), however, reports a weakening in the demand for skill, although the supply of workers with higher education has continued to grow. They argue that high-skilled workers are taking on jobs below their skills level, thereby forcing low skilled workers further down the ladder and even out of the labour market (Beaudry et al., 2013).

Debates on the relationship between technology change and skills focus on changes to the overall skill structure of the labour market. These debates center on whether occupations require upskilling, reskilling, multiskilling and deskilling, given the effects on digital technologies. The upskilling thesis refers to the enhancing of skills and capabilities of workers. It implies increased complexity of the skill required, brought about by the new ways of working. The WEF (2018, p.4) explains upskilling as "learning new competencies to stay in current role, due to the change in skills required or adding certain competencies for career progression".

Literature suggests that SA banks are already engaged in the upskilling of their workforce. Coetzee (2018, p.8) suggests that "all the South African banks have aggressively focused on upskilling their staff to have the requisite skill set to deal with the digital era". Deloitte (2018) supports this claim that bankers would need upskilling to work more effectively in a digital environment. Nair et al. (2019, p.2) oppose this view of upskilling and argue that "employers prefer to hire new employees with the required skill set and experience rather than upskilling current employees".

Reskilling is an indicator of job obsolescence but it could also indicate the emergence of new jobs. Reskilling happens because of reduced demand for the current job or increased demand for a new job. According to the WEF (2018, p.4), "reskilling is new sets of competencies to transition to a completely new role". Reskilling is the learning of new skills for a new job. Berger and Frey (2016, p.36) advocate that "as the role of reskilling increases, what will increasingly matter is the potential for acquiring new knowledge and skills".

When the job functions or scope of work increases and employees are required to carry out more tasks at the similar skill level, they would require to be multi-skilled to perform at the current level of work. DeVaro and Farnham (2011, p.5) argue that "multiskilling allows firms to flexibly reallocate labour in response to changing demand conditions". Owan (2001, p.30) explains that "when a firm chooses to multi-skill, it adopts work teams to facilitate communication amongst workers, delegate more responsibilities to workers and introduce job rotation". Multi-skilling is a way of organizing work so that workers are able to acquire and use a wide range of skills. For those working in multi-skilling environments, an important skill required is transferable skills; that is, skills that are applicable in different contexts in a variety of tasks. The problem with multi-skilling, however, is that it limits workers expertise to innovate and create demand driven products and services to meet the changing needs of consumers.

The deskilling hypothesis postulates that widespread use of digital technologies will result in less skilled, more routine work. Braverman (1974) explained the planned deskilling of workers by employers to increase control in the labour process. According to Braverman (1974), employers use technology is a powerful instrument to control labour. The demand for skills is reduced if technology can be used to capture the knowledge and skills of workers. Critiques of the deskilling thesis indicate that while technology has moved at a rapid pace, modern management strategies exploit the skills of workers to improve productivity and competitiveness.

Occupational change can result in changes to the levels of skill by workers moving from low to high skill or in the opposite direction where workers move from high to lower levels of skill. Linked to the introduction of digital technologies, occupations are requiring upskilling, reskilling, multiskilling and in some instances deskilling. In the next section, the last dimension of the

occupational analysis framework is examined relating to the conditions of employment that bind the employee-employer in a formal relationship.

2.6 Conditions of Employment and Occupational Change

Employment relates to the conditions that bind the employer-employee relationship and includes the location where work takes place, hours of work, the type of employment offered, the remuneration and benefits and other aspects. Benner (2002, p.24) sees work as distinct from employment describing the latter as comprising "the nature of the relationship with the employer, the processes employers use to monitor workers' activities and the nature of compensation agreed for the labour workers agree to provide".

The OFO (DHET, 2013, p.8) defines a job as "a set of tasks and duties carried out by one person for a particular employer". A job is usually related to a specific location. In employment contracts this is referred to as the workplace or place of work. Much of the current labour legislation and regulation is geared towards strengthening the long-term relationship between the employer and the employee assuming a standard employment contract. Benner (2002, p.30) identifies three fundamental components of standard employment: "full-time employment, a single employer and employment for an indefinite period of time". In a standard employment model, "workers earn wages and salaries in a dependent employment relationship with the employers, have stable jobs and work full time" (ILO, 2015, p.11).

However, in the modern economy, the standard employment relationship is shifting towards flexible work. Flexible work arrangements imply a change from the traditional place of work and standard hours of work. Traditionally, the workplace is a physical location provided by the employer where an employee carried out all their work activities on a daily basis. Digital technologies are changing the traditional workplace by creating flexible work environments. Ratna and Kaur (2016, p.2) explains that technology offers workers the means to "work faster and more efficiently, and it facilitates flexible and remote working … but it can also mean that we cannot ever really ever get away and switch off". The flexibility arises from changes to where the employee carries out the work, including the option to work remotely. Brown et al. (2008, p.34)

argue that "innovations in communications technologies are blurring the distinctions between work and home, between work and commuting, and between work and recreation".

For employees who work remotely, they are not bound by office hours and can adjust when they work to match their individual needs with those of the employer. However, the use of digital technologies has blurred the boundaries between working time and non-working time. Given flexible working arrangements and the use of digital technologies for work, it is difficult to control working hours when an employee is able to work away from the agreed workplace. In addition, this constant availability brought about by digital technologies influences employees' work-life balance. Work-life balance is a balance of a person's job and personal life are equal to someone's priorities regarding employment and personal lifestyle (Lockwood, 2003; Ratna & Kaur, 2016). Cijan et al. (2019, p.9) provide an appropriate description of the effects of digitalization on work-life balance

> *...being connected to work while at home means that an individual has less opportunity to recover from work-related efforts. Digitalization might increase expectations colleagues have that staff can always be available to do work, which might increase stress levels.*

An imbalance between working and personal time can negatively affect employees by increasing stress levels. Gailani et al. (2018, p.15) explain that the "blurring of work and home life boundaries resulting from the necessity of being connected disrupts balance and raises stress levels". Stress can lead to low employee morale and this can further result in poor productivity. The ILO (2019, p.40) suggest that

> *… technology allows work to take place anywhere and at any time which blurs the line between working and personal time and can contribute to the extension of working hours; it therefore is necessary to establish a right to digitally disconnect*.

The new occupational landscape signals a shift from stable employment to job instability and insecurity. Employment contracts are changing and workers can no longer expect to retain long-term stable employment (Benner, 2002). Shalem and Allais (2018, p.3) reflect that "the stability once enjoyed by employees and their loyalty to a firm are no longer the main characteristics of work". This shift away from job stability and long-term employment relationships place

employees at risk. According to the ILO (2019, p.38), "as the organization of work changes, new ways must be found to afford adequate protection to all workers".

Digital communication technologies have impacted on standard employment relationship, encouraging flexible work arrangements. Proponents of flexible work arrangements indicate that flexibility allows workers to choose where they work and when they work. However, critiques argue that flexible work arrangements combined with digital communication technologies makes the worker constantly available to work, leading to a destabilizing of work-life balance often resulting in increased stress.

2.7 Conclusion

This chapter comprised five key sections. The first section examined literature on occupations as a framework of analysis in skills planning in SA. Because occupations are a heterogeneous concept with an economic, social and individual meaning, its meaning extended beyond the elements of job and work to include knowledge, skills, and social and individual identity. This was followed by an examination of three frameworks for occupational analysis. Whilst Krause (1971) used four perspectives of historical, biographical, structure and function and conflict of interest in the division of labour, Blackmore (2000) suggested a matrix centering on the terms of role, skill and function. The National Academy of Science (1999) suggested three aspects covering changes brought about by technology, changes to the organizational context and changes to the content of work. Drawing from the literature, an occupational analysis framework emerged for use in this study.

Occupational classification systems as another framework analyzes occupational data for labour market statistics and its use in skills planning. The ISCO-08 as the international occupational classification system provided the basic premise to link job and skill to occupations and a further examination of the OFO as a tool for skills planning in SA. The new skills regime suggests a demand-led approach to skills planning with three layers to analyze occupations. Employers map jobs to occupations to determine their training needs, SETAs use this data to identify occupational shortages and DHET consolidates this data into the creation of a list of occupations in high demand. Since work, jobs and occupations are linked, the historical context provided an indication of the

change from work as a social construct to an economic one and the emergence of jobs and occupations within the labour market.

The second section, introduced the concept of digitalization and its potential influence on occupational change. Literature on digital technologies influencing banking were discussed. The influence of these technologies in changing banking practice included changing customer experiences and changes to business and operating models. The last aspect examined the link between digital technology and occupations.

The third section examined the relationship between education and work. The relationship between education and work provided the first indication that knowledge and skills are a dominant source of work. In addition, the value of knowledge in a firm to remain competitive and innovative, led to an understanding of the emergence of new ways of working brought about by digitalization. Drawing from Martin (2017), two types of skill emerged, namely, general and specialized skill. Further examination indicated that firms lean towards investing in specialized skill; however, they require both types to perform productive work. Regarding knowledge, whilst tacit knowledge is least likely to be automated, occupations with high levels of explicit knowledge seemed to be at risk of automation. Turning to the methods of acquiring knowledge and skills, learnerships emerged as a new workplace-based methodology. However, the growth of digital educational technologies is shifting learning to become self-directed, informal learning.

The fourth section on the nature and direction of skills changes examined low, intermediate and high skills as well as changing levels of skills related to deskilling, upskilling, multiskilling and reskilling. The last section examined changing conditions of employment relating to flexible work arrangements, work-life balance and job security and stability.

The fifth section focused on the effects of conditions of employment on occupational change. The concept of employment relates to relationship between the employer and employee and includes agreement on the place of work, the agreed employment relationship, flexible work arrangements, remote work and work-life balance. Job instability and insecurity have surfaced as issues that contribute to increased stress for workers.

These five sections form a holistic approach to studying occupational change by analyzing the elements of jobs, work, knowledge, skill, changes to skill level and employment thus combining these factors as a means of understanding the changes that digitalization brings to occupations at a firm, sector and national level. In the next chapter, the research approach taken to conduct the occupational analysis is described. It details the exploratory approach adopted to obtain further insights identified in the research areas selected.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the process followed to carry out the empirical research to address the formulated research problem. It begins with a description of the research design which was an exploratory study, using a qualitative analysis and an interpretivist paradigm. Any research study must have an articulated research aim and the detailed research questions it plans to address. This is presented in the next section. Simply stated, the aim of the research is to explore the changes brought about to key occupations in the banking sector as a result of digitalization. The next section describes the three data collection methods used in the study. The document analysis provides details of the documents identified for the study, the semi-structured interviews explain the reason for its choice and the focus group section provides details on the two focus groups held with key experts. This is followed by an explanation of the process followed to select participants. This process proved a challenge which is explained in detail with added explanations of how this was overcome. Data analysis involved four core processes of preparing source files for data from the document analysis, preparing transcripts for the semi-structured interviews and focus group discussions, coding the data and the development of themes for three areas of the analysis. The final section of this chapter explains the steps taken to ensure the anonymity of participants and confidentiality of their shared insights and experiences.

3.2 Research Design

Exploratory research design was selected for this study to explore the insights of bank employees and key experts in banking to find answers to the research questions. As indicated earlier, the purpose of this study was to obtain a comprehensive understanding of how digitalization brings about changes to occupations, jobs, work (tasks and responsibilities), education (knowledge, skills and competencies), skills levels as well as conditions of employment of three key banking occupations in SA. Participants' personal insights, experiences, understanding and interpretation to determine how occupations are changing or may change in the future and whether any of these changes can be attributed to digitalization were analyzed.

Linked to an exploratory design, a qualitative approach was adopted as it allowed for the collection of rich data based on the insights and experiences of participants. Combined with document analysis, it resulted in the gathering of rich and complex data for textual analysis at a broad level. Scott and Morrison (2006, p.182) advise that in qualitative research "the focus is upon seeing the world through the eyes of those being studied". Therefore, understanding the perspectives of participants drawn from their personal experiences was central to the qualitative analysis of this study.

This research was underpinned by the interpretivist understanding of the nature of reality as the interpretivist paradigm tends to place emphasis on the value of the human interpretation of a situation. Denzin and Lincoln (2018, p.29) suggest that "qualitative researchers deploy a wide range of interconnected interpretive methods, always seeking better ways to make more understandable the world of experiences they have studied". An interpretive approach sees people as primary data by particularly seeking their perceptions rather than imposing an external view.

The interpretivist approach aims at exploring and understanding phenomena inductively (Creswell, 2012). Inductive reasoning was selected to construct a broader understanding of the influence digitalization has on work and employment in the banking sector. Through the interpretation of the data collected, conclusions and recommendations were made which are detailed in Chapter Five of this report. The focus was on the interpretation of individual experiences aimed at finding common themes, not statistical analysis and generalizations. These findings represent uniqueness not generalizations because the adoption of digitalization is unique in each bank. According to Mason (2002, p.58), "the interpretive approach allows the researcher to see people and their interpretations, perceptions, meanings and understandings as the primary data sources".

This research design incorporated the analysis of both primary as well as secondary data. By utilizing this research design, the researcher attempted to make meaning of the data collected which was informed by the researcher's interactions with participants, the documents reviewed and the researcher's expertise and experiences. This was the basis of discovering more about changes to the key occupations. The research instruments were designed to draw on the perceptions and interpretations of the participants. Its purpose was to shed some light on the

changing nature of work and employment as a result of digitalization in terms of the experiences of the participants. In this way, the outcomes of the analysis were understood and their usefulness examined in relation to the effects of digitalization in banking.

3.3 Research Aim and Research Questions

The aim of the research was to carry out an occupational analysis and through the process of exploring the empirical cases of three key banking occupations (Bank Teller, Bank Worker and Bank Manager) to understand the influence of digitalization on the nature of work and conditions of employment within the banking sector in SA. It interrogated if and how work within occupations is changing or may change in the future because of, or in response to, digitalization, with a view to determining the nature and direction of skills change.

This study was guided by the following research questions:

1. What are the key features of digitalization within the banking sector and what have been the implications for banking practice?
2. How do these trends (from question 1) influence key banking occupations in relation to education, work and employment?
3. What do these trends imply for patterns of skills changes within these occupations?

3.4 Data Collection Methodology

Research methodology is a choice about how researchers plan to position the study within a social context which involves the researcher's epistemological and hermeneutical stance coupled with personal and ethical choices (Scott, 2013). The initial plan was to collect data through document analysis and semi-structured interviews from workers in key banking occupations. However, to strengthen the research and to ensure that data collection was robust, rich and complex, focus group discussions with key experts was added. These key experts provided a broader understanding of the research problem and provided data that enhanced the study. This additional data collection method led to richer data being obtained resulting in stronger findings. The three research methods used in this study were document analysis, semi-structured interviews and focus group discussions with key experts.

The document analysis was based on a number of documentary sources that were sourced and analyzed in order to gain more data for the analysis. Bowen (2008, p.27) describes document analysis as "a systematic procedure for reviewing or evaluating documents. They provide background and context, supplementary data, a means of tracking change and verification of findings from other data sources". The documents selected proved to be a valuable source of information to examine as they presented a good source of text (words) for a qualitative analysis. It allowed the researcher to draw upon rich data that already exists which was less time-consuming and cost-effective. Many documents were available in the public domain and therefore did not require any permission for use. On the negative side, not all documents were made available for analysis. For example, this research would have benefited from the examination of employment and performance contracts, but these are confidential documents and could not be sourced. Table 2 reflects the documents used and their source.

Table 2

List of Source Documents for Analysis

Title of Document	**Source**
The OFO version (2015 and 2019)	DHET
Bank 1 Report (2018) Bank 2 Report (2018) Bank 3 Report (2018)	Banks
Banking WSP Data (2015 - 2019)	BANKSETA
Banking International Benchmark Study Report	BANKSETA

Source: Author's Analysis (2021)

Two versions of the OFO (2015 and 2019) were analyzed for data relating to occupations in the banking sector. A comparison of the two sets of occupation data was carried out to determine any changes to the occupations over the five-year period. The annual integrated reports for 2018 of three major banks were examined to draw data relating to digital adoption by the banks. The banking WSP data from 2015 to 2019 was used to perform several trend analyses of occupations in the banking sector.

Gall et al. (2006, p.246) advise that "qualitative research interviews typically involve a format that is not tightly structured, because the researcher's goal is to help participants express their views of a phenomenon in their own terms". The researcher chose to use semi-structured interviews as they provided the flexibility to adapt the questions asked to obtain richer and relevant data. The questions posed in the semi-structured interviews allowed participants to express their views, thoughts and experiences by drawing from their work context to provide rich descriptive explanations. Probing questions were used when necessary to allow participants to elaborate and provide further clarification. Table 3 reflects the interviews conducted.

Table 3

List of Interviews Conducted

Participant Reference Code	Participant Occupation	Bank
Participant 1	Bank Manager A	1
Participant 2	Bank Manager B	2
Participant 3	Bank Worker, A	2
Participant 4	Bank Worker, B	3
Participant 5	Bank Teller, A	3
Participant 6	Bank Teller, B	1

Source: Author's Analysis (2021)

Data from key experts was included to obtain additional data, explore concepts further and provide a more in-depth account of the effects of digitalization on work and employment. Gall et al. (2006, p.243) explain that in a key informant interview, "the researcher collects data from individuals who have special knowledge or perceptions that would not otherwise be available". Key experts often have more knowledge or different perspectives than other members of the population.

Two focus group discussions were held with key experts to draw specific data needed to fill gaps and to obtain rich data. The first focus group session with BANKSETA was held at their offices. This focus group comprised four individuals representing senior management and management. BANKSETA develops the banking SSP and supports relevant education and training interventions

for the banking sector in SA. The second focus group session with the South African Society of Bank Officials (SASBO) was held at their offices. This focus group also comprised four individuals from leadership and management. SASBO is the predominant trade union in the banking sector bringing expertise in labour issues especially related to fair labour practice. Both focus groups comprised of individuals chosen by their organizations because they are well informed about the research topic. Guiding questions was customized for each of these discussions. The guiding questions for the SASBO focus group session is attached as Annexure 3.2 and for the BANKSETA focus group session is attached as Annexure 3.3.

3.5 Selection of Participants for the Study

Banking in SA is dominated by four large banks. The initial data collection plan was to interview three employees from each of the key occupations (Bank Teller, Bank Worker and Bank Manager) from the four large banks resulting in a total of thirty-six participants for this study. The researcher's first attempt was to gain access via the banks to interview the sample of participants. Information letters requesting the banks to participate in the research were sent to the banks. However, this study commenced at a time when major banks announced the closing of branches, the introduction of robots and other activities that were negatively affecting their labour force. With impending retrenchments and restructuring in the banks, access to research participants via the banks became difficult. Whilst three banks responded negatively to the researcher's request, one bank chose to keep silent and not send a response. In light of the unsuccessful attempts to gain access, the researcher searched for alternative methods to obtain access to possible participants. The researcher approached individuals from various banks to participate in this research in their personal capacity.

Although interviews with these voluntary participants were limited to six, they together with the focus groups, provided the rich data required for the analysis. A reduction in the number of interviews conducted whilst simultaneously introducing the viewpoints of key experts provided a richer analysis by bringing a diverse group of participants into the study.

Further, the selection of participants for the study was not influenced by gender, race, age and cultural backgrounds which the researcher considered to have no importance. This criterion was therefore excluded in the data analysis process.

Each participant completed a consent form to participate in this research study, which included the granting of consent for the interviews to be audiotaped. Audio-recordings provided the means to capture the responses of participants accurately so that the outcome of this research study was not compromised and simultaneously providing the researcher the intellectual freedom to focus on the discussion. This also enabled interviews to be post facto, transcribed accurately to capture relevant information provided by the participants.

The Researcher initially chose purposeful sampling as the method of sampling for the selection of participants. The selection criteria for participants were that participants possess at least five years' experience in the selected occupations. This was to ensure that they had adequate exposure to possible changes that may have occurred in the selected occupations. The actual sample composition was not controlled as planned in regard to representing the characteristics of the initial sample proposed. The researcher therefore had to contend with a diverse, relatively uncontrolled sample. One reason is the constraints the researcher faced accessing the sample through the official bank channels and thereby had to apply an opportunistic approach to accessing respondents and hence had no control over certain variables. As participation was voluntary, the researcher combined purposive sampling with convenience sampling and selected participants based on their willingness to participate, availability, accessibility and convenience.

3.6 Analysis of the Data

A range of techniques were used to analyze the data. Data preparation included the creation of source files of data collected through analyzing relevant documents and preparing transcripts of recordings from the semi-structured interviews. The data was then coded by grouping them and arranging them in themes to present in the analysis. This approach allowed for the drawing of insights and experiences shared by participants to ensure adherence to confidentiality and anonymity protocols.

Bowen (2009, p.28) proposes that "document analysis requires that data be examined and interpreted in order to elicit meaning, gain understanding, and develop empirical knowledge". The documents were initially skimmed to provide a bird's eye view of the data. Content was analyzed and useful data was highlighted. Useful data was then copied to create a source file. Data in the source file were then further examined and, in some instances, tables were drawn to determine comparative notes against different years. Data from the document analysis were integrated into the data drawn from the interviews and followed the process of coding and the development of themes.

The written analysis started with transcribing the recordings. Repetition and information that was insignificant and irrelevant was not transcribed. The researcher read through the transcribed data several times before beginning the analysis to gain a comprehensive understanding of the whole data. Maxwell (2012, p.95) proposes that "rich data must be detailed and complete enough that it provides a full and revealing picture of what is going on". Transcripts of each interview were created first and then checked and edited to ensure accuracy. The transcripts were then read a few times and text relevant to the study was highlighted using coding for each key research area.

The empirical analysis was done by manual coding. Manual coding was seen as a less constrained and more creative method for interpreting the data. Coding is the core activity of whole-text analysis and a necessary process when analyzing transcripts and documents to make judgements about the text. According to Braun and Clarke (2006), codes are drawn from data collected from responses based on the research questions. This was done by reading each statement and highlighting similar or related phrases.

According to Braun and Clarke (2006, p.79), "thematic analysis is a method for identifying patterns or themes within text". The thematic analysis provided a flexible approach to summarize key features from large bodies of text. Once all the data was coded, the researcher started to construct themes. Taking Miles and Huberman (1994) suggestion into consideration, the researcher started with some themes derived from the literature and added more themes and sub-themes as the analysis progressed. Using the literature review as a starting point, the researcher

constructed the initial set of themes. As the researcher progressed with the analysis, further themes emerged. The final themes and their aspects emerged after the completion of this analysis process.

A thematic analysis was carried out for three areas of the research: the digital technologies that are influencing banking, changes to banking practice, and conditions of employment. On the thematic analysis carried out on digital technologies that are currently being adopted by SA Banks, the following seven themes emerged: artificial intelligence, machine learning and robotics, cloud technologies, data analytics using algorithms, blockchain technology and cryptocurrency, biometric authentication, digital banking platforms, and digital channels/tools. On the changes that digitalization brings to banking practice, seven themes emerged and includes the emergence of new banking products and services, new operating models, new business models, demand for product and services driven by customer/user experience, increased financial inclusion, increased cyber risk and increased competition. On the changing conditions of employment, five themes emerged as follows: changes to working hours, place of work, increased stress impacting wellness, decreased job security/stability and the adoption of technologies to manage human capital processes.

In Chapter Four, each of these themes is described, with the text segments providing the analysis for each theme for clarity. Guba and Lincoln (1982) advise the inclusion of negative cases is essential to ensure reliability of the analysis. Where negative cases emerged in the analysis, it was included in the discussion. Points of view that conflicted with other data within the theme were also included. Braun and Clarke (2006) suggest that each theme needs to be consistent and also be distinct from other themes. Taking this into consideration, the researcher ensured that throughout this process, the data extracts and the themes were kept consistent.

3.7 Ethical Considerations

Confidentiality and anonymity were two important aspects taken into consideration in this research. Bell (2005, p.65) defines "confidentiality is a promise that you will not be identified or presented in identifiable form whilst anonymity is a promise that even the researcher will not be able to tell which responses came from which respondent". The researcher, maintained confidentiality in two ways by ensuring that in writing up the analysis, coding references were used and all hard copy

documents were scanned electronically and then destroyed. Regarding anonymity, this is easier to achieve with research instruments like questionnaires but is impossible with interviews and focus groups. Although the identity of the respondents cannot remain anonymous as the researcher personally interacted with them in face-to-face interviews or focus group discussions, the researcher ensured the anonymity of respondents in the research report. This was done through the use of coding references ensuring that neither the names of the banks nor the respondents who participated in the interviews and focus groups were used throughout the report.

The first ethical consideration was obtaining ethical clearance which was granted by the Ethics Committee and the second was the informed consent obtained from participants prior to the commencement of interviews and focus group discussions. Consent and permission were sought from participants for their voluntary participation as well as for the audio recording of the session. Participants were informed of their right to privacy and that their identity would remain anonymous and all personal information would remain confidential. Participants were further informed that there was no direct benefit from participating in the study and that they could withdraw at any time or not answer a question if they did not want to. The consent form is attached as an annexure.

3.8 Conclusion

The research design was carefully constructed as an exploratory study adopting a qualitative approach to collect and analyze data for this study. The three methods of data collection (document analysis, semi-structured interviews and focus group discussions with key experts) resulted in the collection of rich data for analysis and interpretation to address the research questions. Finding participants to engage in the study presented a challenge as banks that initially agreed to participate later withdrew, leading to the use of convenience sampling being used.

The data analysis involved four steps starting with the preparation of source files for data drawn from the document analysis followed by the preparation of transcripts for the semi-structured interviews. The next step involved the process of coding of the data which led to the development of the themes for three key areas of the study. The final aspect of the research design included an explanation of how anonymity and confidentiality of participants would be protected.

In the next chapter, the insights drawn from the data analyzed relating to the key occupations selected for the study is presented. The presentation of these insights is structured into the five dimensions of the framework for the occupational analysis.

CHAPTER 4: INSIGHTS INTO KEY OCCUPATIONS IN BANKING IN SA

4.1 Introduction

This chapter presents the analysis and interpretation of data collected from documentary analysis, semi-structured interviews and focus groups. In keeping with the ethical protocol of confidentiality and anonymity made to all participants, insights shared are summarized into general statements. The framework for analyzing the effects of digitalization on occupations as presented in Figure 1 is used to structure the analysis. The analysis is presented to address the five dimensions of the framework: the first dimension is contextual changes brought about by digitalization; the second dimension is content changes to occupations brought about by changes to jobs and work; the third dimension is changes to education specifically knowledge and skill; the fourth dimension is changes to the skills levels of occupations; and the fifth dimension is changes to conditions of employment. Each analysis is carried out within the context of the banking sector in SA and is specific to banking occupations.

4.2 The Effects of Digital Technologies on Banking Practice in SA

4.2.1 Understanding the Concept of Digitalization

The data gathered indicates that the banking sector understands the concept of digitalization. According to participants', digitalization refers to the fourth industrial revolution and the use of technologies to improve banking products. Participant 3 (Bank Worker A, personal communication, August 03, 2020) remarked: "it includes all the new technologies that the bank is deploying to compete with the digital banks". According to the bank reports, all three banks are actively engaged in digital transformation. Bank A described that it needs to "build digital capabilities" (Bank Report 1, 2018, p.12). Bank B (Bank Report 2, 2018, p.23) reported: "the digitization of banks means that innovation, disruption and cybersecurity mean top of mind in banking". Bank C (Bank Report 3, 2018, p.15) reflected: "the increased use of complex algorithms and cognitive engines like chatbots require a balanced approach to digitization".

In the Banking SSP (BANKSETA, 2020, p.33), digitalization is described as

> *...digitization in banking is driven by three major factors: technology push, customer experience and economic benefits and digital is a collective term which refers to an*

integrated and collaborative platform that allows consumers, suppliers and organizations to transact using various electronic devices or technologies.

SASBO indicated that the Union is not against digitalization and accepts the need for banks to digitalize; however, their challenge is "when digitalization is used as a means to increase profit whilst jobs are lost and employees are retrenched because banks are closing branches" (SASBO official, focus group discussion, August 11, 2020).

4.2.2 Understanding Global Trends on Digitalization in Banking

BANKSETA and SASBO made reference to the international benchmarking study undertaken in 2017, where the delegation visited four countries and many organizations including central banks, commercial banks, trade unions and education and training institutions. The delegation included representatives from the banks, government and the union. These key stakeholders who participated in the study were exposed to global trends relating to digitalization of the banking sector. The benchmark study report is extensive in providing detailed discussions and provides recommendations for the Banks, DHET, SASBO and BANKSETA.

BANKSETA further indicated that they commissioned several research studies related to digitalization and appointed Research Chairs at two Universities to undertake research relating to Digitalization of the Banking Sector in SA (BANKSETA official, focus group discussion, October 14, 2020). The Commissioned Research outputs as well as those of the Research Chairs provide detailed evaluations of global trends in banking.

SASBO's understanding of global trends is reflected in the international studies they have undertaken as a Union. Their benchmark studies were not limited to matters pertaining to fair employment practices, job losses and skills for the new ways of working but also covered the technical aspects of digitalization, especially understanding the adoption of AI by the banks. The Union indicated that they hosted a financial sector indaba in 2018 to provide a platform for stakeholders to engage on the concept of digitalization. SASBO stated: "we are not over-awed by the digital revolution – our response to the challenge will be based on fairness, opportunity and decent work" (SASBO official, focus group discussion, August 11, 2020).

The BANKSETA International Benchmark Report (2018) reflects that there are no blue-prints for SA banks to replicate as the uniqueness of each country indicates that the interventions to be adopted must be tailored to the technology infrastructure available and the customer demand for banking products and services. Bank C suggests that "given the nature of ever advancing technologies in the fourth industrial revolution identifying emerging trends is made more difficult" Bank Report 3, 2018, p.15). Customer demand for banking products and services drives the business models of banks. This in turn shapes the new jobs and skills that emerge because of digitalization.

4.2.3 Digital Technologies Adopted by SA Banks

The adoption of digital technologies is driving the advancement of the banking industry in SA. Seven themes relating to the digital technologies currently adopted by banks in SA emerged. These themes align with the digital technologies examined in the literature. Bank B (Bank Report 2, 2018, p.35) provides a detailed explanation of what digitalization for banks in SA means

> *...the digitization of banks includes embracing and leveraging mobile technology, Fintech partnerships, cloud computing, big data, advanced analytics, machine learning, blockchain technology, artificial intelligence, robotics, and biometrics*.

The seven themes emanating from the analysis is shown in Table 4.

Table 4

Digital Technologies Influencing Banking in SA

Digital Technologies Influencing Banking in SA
Artificial Intelligence, machine learning and robotics
Cloud technologies
Data analytics using algorithms
Blockchain technology and cryptocurrency
Biometric technologies
Digital banking platforms
Digital channels/tools

Source: Author's Analysis (2021)

SA banks are exposed to artificial intelligence, machine learning and robotics. Participant 4 (Bank Worker B, personal communication, August 03, 2020) explained that Chatbots provide real time support as advisors even when the physical bank is closed and bank employees cannot be reached. Participant 3 (Bank Worker A, personal communication, August 03, 2020) commented:

> *chatbots enable clients to buy funeral policies and do other basic tasks using WhatsApp. The WhatsApp chatbot allows clients to use a platform they are familiar with to conduct simple transactions, ask questions without having to go to through a call center.*

Banks confirm that they are already using robots and artificial intelligence. Bank A states that "we were first to launch ChatBanking on Facebook and WhatsApp" (Bank Report 1, 2018, p.23). Bank B confirms that they have "implemented software robots that is, robotic process automation, to enhance efficiencies and reduce processing errors in administrative intensive processes" (Bank Report 2, 2018, p.46).

For the banks, AI and Robotics have positive benefits, but the Union draws caution on the adoption of AI because they (AI and robotics) have the potential to displace humans. The Union strongly believe that banks must commit to embrace AI ethically with due consideration given to the effect it will have on the workforce (SASBO, focus group discussion, August 11, 2020). This caution is

valid considering that AI possesses the capability to translate explicit knowledge into codified form and this can displace workers or deskill certain jobs (Braverman, 1974; Brown et al., 2008).

Moving from legacy systems to Cloud is a step into the digital environment for the banks. Participant 1 (Bank Manager A, personal communication, July 12, 2020) indicated that they are aware that their bank is trying to migrate from the legacy IT infrastructure to cloud technology. Participant 4 indicated that "the process to move to cloud is slow in the bank as the migration from the legacy system is complicated" (Bank Worker B, personal communication, August 03, 2020). From the bank's perspective, Bank A indicted that "cloud services are faster, more versatile and have reduced overhead support; they are more reliable, agile and scalable" (Bank Report 1, 2018, p.32).

Data analytics, have become an important part of the work in banks as bank employees collect data from the customer on their experience. Participant 1 (Bank Manager A, personal communication, July 12, 2020) indicated that "data analytics helps to improve understanding client data and we use the data to improve on customer experiences". Bank A confirms the importance of data analytics indicating that "data is aimed at better understanding customers to be able to offer them the right products and services within their affordability" (Bank Report 1, 2018, p.32).

On the theme of blockchain technology and cryptocurrency, the analysis revealed that the South African Reserve Bank (SARB) was piloting a cryptocurrency with selected banks and that digital currencies are a mechanism to automate money leading to a cashless society. Bank C mentions that "digital currencies and blockchain technology support client privacy and data protection by enabling anonymous transacting" (Bank Report 3, 2018, p.15). From both the participants' perspective and the bank reports analyzed, it was difficult to determine if the banks are currently using this technology.

Findings indicate that biometric authentication has been implemented in their banks with the recent adoption of the two-factor process of authentication, with the fingerprint or facial recognition being used. Participant 6 (Bank Teller B, personal communication, August 05, 2020) confirmed:

Biometrics is used fully throughout the banking system. The biometrics system is linked to the Home Affairs system for finger print profiles. Biometrics is aimed at customer safety and ensuring compliance.

Banks also confirmed the use of biometric authentication and extend their explanation to include its use on digital banking channels. Bank C (Bank Report 3, 2018, p.47) reflects

we have protective measures such as two-factor authentication and device authentication enabling customers to verify higher risk transactions on our online and mobile banking channels.

Banking platforms are becoming digital where clients can access many banking products and services through a digital device. Bank A explains it has "developed a global payments hub, offering transactions on a single digital platform, linking businesses across the continent" (Bank Report 1, 2018, p.12). This bank explains further that its innovative payment system allows customers to use smartphones to make payments at point of sale. These statements reflect that the shift to digital payments in SA is growing.

The analysis shows that there are a growing number of transactions on digital channels. These include Apps, e-wallets, banking being done online and using the mobile. There is a growth of smartphone usage as a digital channel for banking activities. Smartphone penetration is growing giving rise to the increased use of WhatsApp and Facebook in banking advisory services. Banking Apps are becoming the main channel for digital banking. This was confirmed by the following comment by Participant 4, (Bank Worker B, personal communication, August 03, 2020):

your phone is becoming your bank in your hand because customers are encouraged to do their banking via their phones and they come in to the bank when there is major complicated stuff that they cannot do on their own.

The banks confirm that the expansion of digital channels to service their clients better is an important aspect of product development. Bank A (Bank Report 1, 2018, p.31) reflected:

> *we provide services to our customers through a multi-channel approach providing a choice of platforms from digital solutions to call centers and face-to-face engagements in branches to customer suites to relationship management*.

This links to Vasiliev and Serov's (2019, p.2) view that multi-channel banking provides customers with the option to seamlessly move across different banking channels.

4.2.4 Changes to Banking Practice in SA

The analysis resulted in the emergence of seven themes relating to the effects of digital technologies on banking practice in SA as listed in Table 5.

Table 5

Changes to Banking Practice in SA

Changes to Banking Practice in SA
New Banking Products and Services
New Operating Models
New Business models
The Demand for Product and Services Driven by Customer/User Experience
Increased Financial Inclusion
Increased Cyber Risk
Increased Competition

Source: Author's Analysis (2021)

Regarding new banking products and services, the list of innovative banking products and services is extensive and covers almost all aspects of banking that can now be done digitally. Participant 2 (Bank Manager B, personal communication, July 12, 2020) noted that:

> *the lines between banking and non-banking services are becoming increasingly blurred as banks have increased the scope of their service and product offering to other non-banking financial services*.

A comment made by Participant 5 (Bank Teller A, personal communication, August 05, 2020) supports this claim: “Customers can now get full support to open a business, where we even assist with the registration of their companies”.

The banking reports also provide details of innovative digital products and services developed in recent years. Bank B reflected: “We have launched numerous innovative Apps to make banking more convenient and reduce the footprint in branches” (Bank Report 2, 2018, p.73). Bank C (Bank Report 3, 2018, p.64) stated that:

> *digitization is contributing to increased transparency, consistency and efficiency of client services processes, proactive credit limit approvals using data analytics and faster turnaround time in client service interactions*.

The pace at which banks have adapted products and services align to Nelson’s (1985) view that firms modify their products and services to align to the development of new technologies.

Findings reveal that banks are moving away from traditional banking models which were fixed in branch banking. The shift is happening in two ways: firstly, digital banking is growing and secondly where branches are used, the banking models of branches have also changed. On the aspect of bank branches, the analysis revealed that branch floor space has been reduced and will continue to be reduced with the closing of branches and the reconfiguring of branch layouts. Bank B reflects: “Branch floor space has been reduced” (Bank Report 2, 2018, p.46).

With respect to new business models, the bank reports revealed that banks have well established digital banking strategies. However, no participants commented on the digital strategies of the bank. Bank C states that “our strategy is to become a more client focused digital, competitive agile bank to launch new digital innovations” (Bank Report 2, 2018, p.50). Bank C reflects: “our transformation into a client centric digital and integrated financial services organization is heavily reliant on technology” (Bank Report 3, 2018, p.44). These comments by the banks link directly to the literature by Teece (2009) that technological innovation and customer demand drives strategic decision making.

The customer was described as the focal point with the bank with the banks giving the customer the freedom to choose to bank digitally when they want it and to go into a branch when they need the human interaction. Participant 1 indicated that customers do not want to be restricted by the bank telling them what to do; they prefer to tell the bank what they want and they expect the bank to listen to their banking needs (Bank Manager A, personal communication, July 12, 2020). Participant 4 (Bank Worker B, personal communication, August 03, 2020) commented:

> *customer experience goes further where the customer gets a full set of services from one consultant and need not go to different people in the bank to get all the advice they need*.

Bank B (Bank Report 2, 2018, p.28) indicated that:

> *these innovations which will further enhance client experiences include simplified client digital onboarding capabilities, end-to-end digital applications and loyalty programmes*.

Regarding financial inclusion, banks are extending banking services to individuals without banking accounts, thereby growing financial inclusion of the previously unbanked into the formal banking environment. Participant 2 references the use of stokvel accounts and e-wallets as products supporting the growth of financial inclusion (Bank Manager B, personal communication, July 12, 2020):

> *For people who do not have bank accounts, they do e-wallets. They send money to the phone, then go the ATM, insert the phone number and withdraw the cash they need. Also, smaller amounts can be withdrawn at retail stores at the till.*

Two banks, in their reports, draw attention to the products and services they are developing to ensure financial inclusion. Bank B reflects that it offers a stokvel account for the stokvel community and a mobile based bank account (Bank Report 2, 2018, p.28). Bank C (Bank Report 3, 2018, p.21) reflects that it:

> *ensures its banking products improve access and affordability through convenient digital products and services accessible even without a bank account and is relooking unsecured loans*.

Cybercrime has grown to become a major challenge as the banks are subject to a growing number of cyber-attacks. In the three bank reports analyzed, cybercrime is discussed as part of the banks risk strategy. Bank B (Bank Report 2, 2018, p.35) mentioned that:

> *cyber risk has been identified and listed as a top ten risk and its threat has grown given the digitization of products and services as banks may suffer reputational damage or financial loss from compromised client information*.

On the final theme that emerged, the growth of competitors in the financial services space has exposed banks to increased competition as a result of digitalization. According to Bank B, "competitors in the banking sector have evolved to include new entrants, fintech disruptors, and big tech disruptors" (Bank Report 2, 2018, p.35). The bank further reports that "non-traditional players are increasingly exploring new opportunities enabling them to challenge incumbent banks" (Bank Report 2, 2018, p.35). In 2019, Discovery Bank, Tyme Digital Bank, Post Bank and Bank Zero had all been licensed by the SARB. These banks are likely to offer innovative digital solutions, increasing the competition for incumbent banks in SA.

4.3 Occupations and Jobs in Banking in SA

4.3.1 Changes to Banking Occupations in SA

An examination of occupational data provided in the Banking SSP (2017), reveals employers use 349 occupations to classify various jobs. Further analysis reflects that the top five occupations in terms of number employed includes the Bank Worker, Bank Teller, Office Administrator, Credit and Loans Officer and the General Clerk. This confirms that the largest number of workers are employed in the two key occupations selected for this study, the Bank Teller and the Bank Worker. In the OFO (DHET, 2019), these occupations are classified as "clerical support" linking to the intermediate level of skill. Therefore, the majority of occupations in the banking sector require intermediate level skills.

The data presented in the SSP (2017) provided limited information on occupational change. To determine occupational change, the researcher compared the 2015 WSP data with the 2019 WSP Data. Table 6 shows occupations that became obsolete, new occupations that emerged, occupations showing an increase in jobs and occupations showing a decrease in jobs.

Table 6

Changes to Occupations in Banking in SA from 2015 to 2019

Unit Group Occupations	2015	2019	Change
Organization and Methods Analyst	10 441	0	-10 956
Computer Operator	2 236	0	-2 236
Sales Assistant	0	3 359	3 359
Sales and Marketing Manager	0	2 727	2 727
Currency Exchange Officer	0	2 457	2 457
Sales/Clerk Officer	0	2 165	2 165
Credit Manager	0	1 942	1 942
Compliance Officer	0	1 579	1 579
Credit/Loans Officer	6 468	9 065	2 597
Programme Administrators	3 137	5 112	1 975
Enquiry Clerk	2 738	4 492	1 754
Developer Programmer	1 481	2 915	1 434
Contact Centre Consultant	1 492	2 829	1 337
Corporate General Manager	8 738	5 053	-3 685
General Clerk	9 473	8 635	-838
Sales Manager	4 074	3 237	-837
Finance Manager	2 180	1 611	-569
Office Administrator	8 996	8 462	-534

Source: Author's Analysis (2021)

In the five-year period from 2015 to 2019, two occupations, the Organization and Methods Analyst and the Computer Operator became obsolete whilst six new occupations, the Sales Assistant, Sales and Marketing Manager, Currency Exchange Officer, Sales/Clerk Officer, Credit Manager and Compliance Manager emerged as new occupations. The top five occupations that experienced an increase in the number of jobs are the Credit/Loans Officer, Programme Administrators, Enquiry Clerk, Developer Programmer and Contact Centre Consultants whilst the top five occupations that saw a decrease in jobs are the Corporate General Manager, General Clerk, Sales Manager, Finance

Manager and Office Administrator. By comparing two years of occupational data provided in the WSP, data on occupational change provides an indication of occupations that are becoming obsolete or showing a reduction in the number of jobs whilst also depicting new, emerging occupations and those in which jobs are increasing. This data is useful for the identification of occupational qualifications required by the banking labour market in SA. In addition, this process of examining occupational change can enhance the determination of occupational shortages within a sector which is an important aspect of skills planning by SETAs.

The literature review describes occupations at individual, social and cultural levels. However, the researcher took an analytical perspective on this section focusing on a comparison of data to determine occupational movement. The analysis of occupational change reflected in Table 6 was carried out at an individual level. Unfortunately, no data was gathered on occupations at a social and cultural levels from participants or key experts during the focus group session.

4.3.2 Changes to Banking Jobs in SA

The presentation of the 2015 to 2019 data of the number of employees compared year-on-year provides clarity on the number of jobs created or lost in the banking sector.

Figure 3

Changes to Jobs in the Banking Sector in SA



Source: Author's Analysis (2021)

The sector has created jobs year-on-year from 2015 to 2019. However, the jobs created are at a declining rate. In 2016, 12 781 job were created; in 2017, 5 386 jobs were created which was less than 50% of the previous year; in 2018, only 1081 jobs were created, only 20% of the previous year; and in 2019 only 867 jobs were created. Using this extrapolation into future years, the banking sector can predict a loss of jobs in the near future. This analysis is useful to forecast occupational change. This data contradicts the jobs data provided by the big four banks. Data of the big four banks drawn from their annual integrated reports for 2017 to 2019, indicate that whilst three of the banks experienced job losses, one bank had experienced job gains. Jobs data at major occupational level are presented in Table 7 to reveal job increases and job decreases in the banking sector in SA from 218 to 2019.

Table 7

Job Changes for Major Occupational Groups in Banking in SA from 2018 to 2019

Major Occupational Group	**2018**	**2019**	**Change**	**% Change**
Managers	38 415	40 302	1 887	5% increase
Professionals	34 293	34 695	402	1,2% increase
Technicians and Associate Professionals	32 673	35 600	2 927	9% increase
Clerical Support	64 061	70 642	6 581	10% increase
Service and Sales	9 274	10 425	1 151	12,4% increase
Skilled Trade Workers	301	392	91	3% increase
Plant and Machinery	365	263	-102	28% decrease
Elementary Occupations	1561	1682	121	7,8% increase

Source: Author's Analysis (2021)

In the period 2018 to 2019, the banking sector experienced a loss of jobs only in the plant and machinery occupations whilst all the other occupations at the major group level showed an increase in jobs created, even if some of the increases are small.

For the key occupations selected for this study, job changes are presented in Table 8. The data presented compares jobs in 2015 to jobs in 2019 for the Bank Worker, Bank Teller and Bank Manager as well as the change in the job numbers for each occupation.

Table 8

Changes in Jobs for Key Occupations in Banking in SA from 2015 to 2019

Occupations	**Jobs in 2015**	**Jobs in 2019**	**Change**
Bank Worker	18 208	17 260	-948
Bank Teller	10 956	11 049	93
Bank Manager	4 652	4 034	-618

Source: Author's Analysis (2021)

The Bank Worker saw a decrease in jobs from 2015 to 2019 resulting in 948 jobs being lost; the Bank Teller jobs increased from 2015 to 2019, showing the creation of 93 new jobs and the Bank Manager occupation also saw a decrease in jobs from 2015 to 2019 resulting in a loss of 618 jobs. Participant 1 (Bank Manager A, personal communication, July 12, 2020) provides a reason for the decline in the Bank Worker jobs by commenting that:

> *Bank Workers are being replaced with a new occupation, the Digital Banker and banks are also using external freelance consultants who service a portfolio of clients on a flexible client demand model*.

Contrary to the data shown in the analysis, there is a general perception amongst participants that the Bank Teller jobs will decrease. Participant 2 (Bank Manager B, personal communication, July 12, 2020) stated:

> *banks have substantively decreased the number of tellers per branch. At present some of the branches have gone teller-less, meaning there are no tellers at all. Tellers are being replaced with consultants who assist customers with any service they require.*

The adoption of digital technologies has two contrasting effects on jobs; they either result in some jobs becoming obsolete or the creation of new emerging jobs. To understand which jobs were becoming obsolete and new jobs that are emerging, the researcher examined the job specializations

as indicated in the OFO (DHET, 2019). According to the OFO (DHET, 2019), the Bank Worker occupation comprises jobs relating to the Bank Customer Service Clerk, the Personal Banking Consultant, Credit Support Officer, Mortgage Banker and ATM Custodian jobs. Information provided by participants reveals that jobs that are classified as the Bank Worker include Team Leaders in specialized areas, Consultants in different areas, Custodians in different areas and Frontline Officers in different areas. These job titles do not differ substantively from the specialization titles provided in the OFO (DHET, 2019).

On examining the Bank Teller job titles, the OFO (DHET, 2019), reflected three specialization titles of Bank Clerk/Officer, Settlements Clerk and Teller. Data from participants indicate that job titles aligned to the Bank Teller occupation includes Team Leader and Tellers in specialized areas. Once again, these job titles do not differ significantly from the specialization titles provided in the OFO (DHET, 2019).

Regarding the Bank Manager occupation, the OFO (DHET, 2019) shows the Bank or Branch Manager is the only specialization provided and this supports the data provided by participants.

On the future of jobs in banking in SA, participant 1 (Bank Manager A, personal communication, July 12, 2020) indicated that:

> *new jobs that currently do not exist will emerge in the future and will be dependent on the kinds of digital technologies that banks and other players that enter the banking sector will adopt.*

Participant 4 (Bank Worker B, personal communication, August 03, 2020) felt that some of the new jobs that may emerge are for Engineers, Scientists, and Analysts in AI, Cyber, and Credit.

If banks have carried out job forecasting activities, these are not reflected in the reports that formed part of this analysis.

4.3.3 The Use of the OFO in the Banking Sector in SA

The researcher compared the OFO version 2015 with the OFO version 2019 to determine if there were any changes to the occupational data for the three selected occupations over this five-year period. If there were, this would provide an indication of changes to the occupation in terms of changes to the specializations and tasks and responsibilities. The analysis indicated no change to either the occupation titles, descriptions, specializations or the tasks and responsibilities. Based on this analysis one can infer that the three key occupations selected for this study has not changed. The alignment of current jobs to the OFO specializations is an indication that the OFO (DHET, 2019) aligns and captures job titles as Specializations relevant to the firm organizational needs. Therefore, as an Occupational Classification system, the OFO (DHET, 2019) is reflective of what is actually happening in banking in terms of the key occupations selected for this study.

4.4 Work within Banking Occupations in SA

4.4.1 Current Changes to Work in Key Banking Occupations in SA

On examining the tasks and responsibilities of the Bank Worker and the Bank Teller as indicated in the OFO (DHET, 2019), the researcher finds they are exactly the same comprising of five key activities. These activities include changing money from one currency to another; crediting and debiting client accounts; making records of all transactions and reconciling them with cash balance; paying bills and making money transfers on client behalf; processing customer cash deposits and withdrawals, cheques, transfers, bills, credit card payments, money orders, certified cheques and other related banking transactions (DHET, 2019).

The OFO (DHET, 2019) reflects the work of the Bank Manager to involve a wide range of tasks and activities. These include managing lines of credit including loans; conducting financial investigations; coordinating with other branches; relationship management with individual and business customers; managing loan and insurance applications; managing budgets and expenditures; managing the efficient use of resources; monitoring credit extension decisions; overseeing financial information including the preparation of financial and regulatory reports; managing all staff matters for the branch; managing the activities of staff in the branch; and providing advice and assistance to customers (DHET, 2019).

Data analyzed reveals that the following new tasks are performed by the Bank Worker: ensure the verification of clients; ensure client retention and satisfaction; manage the growth of customer self-service usage in bank by increasing client migration to digital channels; deliver exceptional service that exceeds customer expectations; manage and resolve all customer queries efficiently; provide an efficient administration system; maximize channel optimization opportunities; ensure optimum performance of the ATM cash replenishment and maintenance; and convert leads to sales.

Data analyzed reveal that the following new tasks are performed by the Bank Teller: verify clients for authentication using biometric technologies; process customer financial transactions; maintain expert knowledge of all products and services; maximize channel optimization opportunities to encourage move to digital channels; manage the migration of client accounts from transactional to digital; provide international travelers with relevant travel products and services including forex; provide exceptional customer experience by resolving all customer queries efficiently; and identify cross-selling opportunities to generate leads for conversion to sales.

Data analyzed reveal that the following new tasks are performed by the Bank Manager: implement strategies using market intelligence to meet demand; drive a culture of continuous improvement with clear action plans; apply a risk management framework to mitigate and manage risks; structure and align resources and processes to meet customer demand; implement teamwork and agility; maintain customer offerings being sold in branch; develop a high performing team by ensuring that staff have specialist knowledge of products and services; determine and manage training needs for the branch; develop branch performance scorecard with stretch targets; take responsibility for customer experience and resolving customer complaints; and ensure sales targets are reached and increase client acquisition.

The analysis revealed that most of these tasks and responsibilities have changed as a result of the adoption of new technologies in the bank. Bank A reflects that work is influenced by AI, predictive analytics, chatbots, robotic, process automation and other digital technologies (Bank Report 1, 2018). Biometric authentication has changed the activities they now carry out to verify customers.

The use of data analytics and big data has increased cyber risk and the tasks they carry out regarding working with customer data.

The changes in the work of the Bank Teller, Bank Worker and Bank Manager are also due to the reconfiguration of branches. Participant 5 (Bank Teller A, personal communication, August 05, 2020) indicated that banks have changed their layouts and the manner in which they serve customers in the branch. Participant 6 (Bank Teller B, personal communication, August 05, 2020) stated that "although customers come to a branch for help, they are often requested to use digital tools to complete the banking service they require".

4.4.2 Perceived Future Changes to Work in Banking Occupations in SA

The data analyzed revealed that in the future, any change in the digital technology adopted by the bank, will have an effect on bank work. In the future blockchain technology and cryptocurrency may affect work done by the Bank Worker and the Bank Teller. Participant 2 (Bank Manager B, personal communication, July 12, 2020) indicated that at present, banks are working with the SARB to test blockchain technology. Participant 3 (Bank Worker A, personal communication, August 03, 2020) stated that:

> *if banks adopt digital currencies and blockchain technology, this will definitely affect the work of the Bank Teller and Bank Worker as there will be less money to handle in the bank*.

The analysis further reflected that the increased use of robotics in other aspects of the business, the adoption of regulatory technology to manage the banks' regulatory environment, more advanced biometric authentication processes, growth of the use of cloud technologies and further changes to digital channels and the design and constant update of Apps will change the work of the Bank Teller and Bank Worker in the future.

4.5 Knowledge and Skills from Occupational Change in Banking in SA

4.5.1 Emerging New Knowledge and Skills for Banking Employees in SA

The data on new and emerging skills needed in the banking sector were clustered into three categories; skills linked to the WEF top ten digital skills list, skills linked to digital technologies and generic skills. As per Martin's (2017) classification of skills into general skills and specific

skills, this analysis was extended to determine the alignment to the WEF top ten skills required in a digital environment.

The top ten skills that the WEF (2016) indicated as important for the new ways of working in the digital age appeared in the responses received. They include "complex problem solving, good communication, people management, critical thinking, negotiation, quality control, service orientation, judgement, fast decision-making, active listening and creativity".

In addition to the list above, the Banking SSP (2020) indicated that the skills gap analysis revealed management of finance resources, management and leadership, system analysis, time management, advanced IT and software, user experience design, software development testing, cyber security, agility and fit-for-purpose skills as skills gaps for the sector.

Skills linked to digital technologies included advanced IT and software, basic computer, technology design, systems analysis and evaluation, and troubleshooting. However, the detailed technical skills required for the seven digital technologies that emerged were lacking in the data gathered. The data gathered made no mention of specific cloud technology, artificial intelligence, robotic maintenance, biometric technology, algorithms, and other specialized digital technology skills. As indicated in the literature, these skills align to the category of specialized skill.

Generic skills ranging from elementary skills like writing, reading and communication to high level skills like complex problem solving emerged. Given the spread of occupations for the sector, with most employees being in the intermediate skill group, the need for different levels of generic skills is understandable. Given that most of the workers are employed in the intermediate skills level, these types of skills align to the labour market. The emergence of these skills aligns to Wolf's (2002, p.37) argument that:

> *the evidence on skills suggest that employers are after skills that relate to the ability to read and comprehend, write fluently and correctly and do mathematics and that these appear to be more important than ever*.

Bank data reflect the following regarding knowledge and skill required by the banking sector. Bank C (Bank Report 3, 2018, p.15) reflects that:

> *to achieve the culture shift needed to accommodate AI will require investment in both people with the necessary technical expertise and in new ways of working to support more complex thinking, problem solving, flexibility and creativity*.

Bank C further reveals that "creation of new capabilities and roles in IT, including cloud engineering, data science and analytics and cybersecurity are important for digitalization" (Bank Report 3, 2018, p.15). Bank C (Bank Report 3, 2018, p.15) further added that:

> *empowering employees in operational roles to become automation champions, problem solve with speed and build digital skills within particular context within the business are also key skills*.

Bank A supports the need for cyber skills stating that "ongoing employee education on the prevention of cyber-related risks is required" (Bank Report 1, 2018, p.10). Bank C reflects the need for innovation knowledge and skill embedded in "design thinking … the application of design principles which helps improve product development" (Bank Report 3, 2018, p.15).

This analysis has three limitations: firstly, it did not source data specific to the kind of knowledge required by the firm to innovate; secondly, it does not provide an indication of tacit and explicit knowledge as this is important to determine what knowledge is codifiable and thirdly, it does not classify knowledge into know-that and know-how.

4.5.2 Future Skills Required to meet the needs of Digitalization

In terms of future skills, the following emerged: as the need to effectively manage AI increases, skills related to working with AI, ML and robotics will grow. The Banks reported that future skills required will include artificial intelligence and automation, robotics process automation, digital innovation, user experience design, predictive risk analytics, data mining, cyber or digital security, social media client services and client experience management (Bank 1 Report, 2018; Bank 2 Report, 2018; Bank 3 Report, 2018)).

4.5.3 Interventions Implemented to Address Skills Gaps in Banking in SA

The skills gap identified by BANKSETA is articulated in the SSP (2020) and is the focus of the interventions they fund. To address the occupational shortages and skills gap identified, the five skills priority actions articulate the training methodology and defined interventions that the SETA supports. The BANKSETA funding model is demand driven and is based on employer needs. BANKSETA indicated that they implement a range of interventions by opening funding windows and entering into agreements with SETAs, qualifying employers, and skills development service providers to deliver interventions to support the provision of programmes.

BANKSETA further indicated that where a special need arises, a project is conceptualized and service providers appointed through its procurement process. Some of the special projects for unemployed include learnerships, internships and skills programmes. Their internship interventions funded via the public higher education institutions focus on providing work-integrated learning opportunities. BANKSETA commented that regarding the Bank Worker and Bank Teller occupations, they offer two interventions, the Letsema Project and the Kuyasa Project. Regarding occupational qualification development, they have registered a banking stream for the Generic Management Qualification for the Bank Manager and for the Bank Teller occupation, they have registered an occupational qualification with the Quality Council for Trades and Occupations (BANKSETA Official, focus group discussion, October 14, 2020).

BANKSETA also mentioned they have a funding window for employers specific to the reskilling of employees. In the 2019 Annual Report (BANKSETA, 2020, p.23) the SETA reflects that "this specific funding window is open to all employees whose roles have been impacted by restructuring or retrenchments". The aim of this intervention according to BANKSETA (BANKSETA Official, focus group discussion, October 14, 2020) is:

> *to provide funding support to employers in order to upskill for a second chance career or reskill for another job role those workers whose positions have or will become redundant as a result of digitalization*.

The bank reports indicate that they are play an important role in the training of their employees by providing them with access to training courses to develop skills and capabilities required as the

world of work changes. Banks aim to grow a diverse, high performing and innovative culture through education and skills development programmes. Bank C (Bank Report 3, 2018, p.52) indicates that they:

> *encourage and support employees to embrace new ways of working and develop new skills to ensure their future employability as digitization matures*.

4.5.4 Training Methods Applied in the Banking Sector in SA

Bank B (Bank Report 2, 2018, p.39) indicated that:

> *to address skills shortages, we continuously invest in skills development and learnership programmes with digital learning platforms being introduced to enable a future-fit workforce*.

Banks indicated that they engage in and support learning through online learning libraries, graduate programmes, learnership and internships and new employee exchange programmes to build local skills. These various methodologies indicate that both formal and informal learning is supported by banks (Bank Report 1, 2018; Bank Report 2, 2018, Bank Report 3, 2018).

The traditional training method used was face-to-face contact sessions in a classroom. Participant 1 indicated: "in the past training was traditional face-to-face programmes at a formal learning institution" (Bank Manager A, personal communication, July 12, 2020). Regarding new training methodologies used in the banks, Participant 4 (Bank Worker B, personal communication, August 03, 2020) noted that these include a range of methods using digital educational platforms. The participant noted that banks provide employees with access to online learning platforms and these courses are short and informal. Banks in their reports confirm the views held by participants. Bank C (Bank Report 3, 2018, p.54) indicated that they deliver:

> *flexible digital learning solutions, supporting employees in their current role and enabling them to learn new skills, including experimenting with tailored micro-learning digital solutions*.

Bank B (Bank Report 2, 2018, p.72) states that

digital learning is a digital platform solution that allows for self-directed learning. As the need for ongoing reskilling increases, digital learning gives staff the opportunity to learn at their own pace in small modules. Since the digital learning platforms have been introduced, the bank has seen the average hours of classroom learning drop and more people trained through a blended learning approach.

4.6 Shifting Skills Levels of Banking Occupations in SA

The fourth dimension of the occupational analysis covered two aspects relating to changes to the level of skill of occupations in banking in SA. The researcher examined how the levels of skill is changing (low, intermediate and high skills) and the direction of skills change specific to upskilling, multiskilling, reskilling and deskilling associated with digitalization.

Participant 3 (Bank Worker A, personal communication, August 03, 2020) indicated that there is a change to their skills levels in terms of the use of digital technologies by stating that the complexity levels of work have increased, especially in relation to dealing with customer queries and advice sought. Therefore, there is an increase in the skills levels required especially with regards to the products and services, but there is also an increase in the generic skills required to handle different and difficult customers.

Contrary to the comments made by participants, banks indicated that they require highly skilled employees. This comment aligns to Bhorat et al. (2016) who indicate that the SA economy is demanding high skills. This however contradicts the analysis carried out earlier in Section 4.3.1, which indicated that most of the workers in the banking sector are employed in the intermediate level occupation. Therefore, the skills demanded of these employees should be aligned to their skill level as per the OFO. If the banks are correct and they are employing people with high skills, this is an indication of the over-qualification of workers in the banking sector.

Regarding upskilling and reskilling, Participant 3 (Bank Worker A, personal communication, August 03, 2020) indicated that "skills levels are changing to a greater degree towards upskilling and reskilling". The participant indicated that some workers are being reskilled for alternative jobs and that others are being upskilled. However, this information is not openly shared in the

bank. There is also an indication that banks are engaging in multiskilling. Regarding multiskilling, Participant 4 (Bank Worker B, personal communication, August 03, 2020) indicated:

> *there is a growth with multiskilling. One person now needs to know at least three people's jobs at a minimum. This is resulting in jobs becoming more generalist in nature, not specialized*.

Banks in their reports also revealed that they are investing in reskilling and upskilling for new emerging roles within their organization. They indicate that when work is becoming more complex, then employees are being upskilled. Bank B indicated that they are upskilling to enable their digital strategy and are bringing young and skilled talent to infuse creativity and innovation into the bank (Report 2, 2018, p.39). Bank C added that they engage in "reskilling employees to meet demands of rapidly evolving industry" (Bank Report 3, 2018, p.51).

SASBO indicated that they understand the need for upskilling and reskilling, but they are concerned with multiskilling and the deskilling of jobs. With regards to upskilling and reskilling their concern relates to the current lack of adjust to remuneration liked to the increased complexity of the tasks required. Its concern with multiskilling relates to the possibility that workers may be forced to carry the workload of peers who leave; whilst this is beneficial to the bank, it will create stressed employees. Access to upskilling and reskilling should be a fundamental condition in the current and future world of work. SASBO (SASBO Official, focus group discussion, August 11, 2020) commented:

> *All we want is to engage in constructive bilateral with banks to seek solutions by way of proactively identifying affected employees well in advance, time enough to launch well established alternatives to upskilling, reskilling and outskilling programmes*.

The comments made by SASBO and in Bank B, refer to the concept of outskilling (which the researcher had not encountered in literature before). Outskilling when used in these contexts refers to the situation when workers are taught new skills that fall outside of the industry and are being trained for a job in another industry. For example, one of the banks engaged in the training of retrenched employees to become plumbers.

With regards to the shift towards upskilling, the use of new technology requires a higher level of skill and therefore employees needed to improve their skills levels whilst learning the new skills required. Employees must possess the knowledge and skills to use technology intelligently and this requires upskilling. Reskilling efforts on the other hand relate to job and occupational obsolescence and new emerging skills. With regards to multiskilling, the reorientation to the use of cross-functional teams in the bank has influenced the need for multi-skilled employees. Although, there is no current evidence of deskilling, however, this would occur if technology adoption reduces the skills levels required of employees.

4.7 Conditions of Employment in the Banking Sector in SA

The final dimension of the occupational analysis examined employment in the banking sector in SA with specific reference to changes to conditions of employment in banking in SA and the effects of digitalization of the employee-employer relationship. A thematic analysis revealed the emergence of five themes reflected in Table 9.

Table 9

Changes to Conditions of Employment in Banking in SA

Changes to Conditions of Employment in Banking in SA
Changes to Working Hours
Changes to the Place of Work
Increased Stress Impacting Wellness
Decreased Job Security/Stability
The Adoption of Technologies to Manage Human Capital

Source: Author's Analysis (2021)

The first two themes relate to flexible working hours as described in the literature. Compared to the standard working hours, the analysis indicated an increase in the hours that employees now work. Participant 4 (Bank Worker B, personal communication, August, 3, 2020) remarked: "in terms of engagement with clients it has decreased but we work longer hours. We have to still do work after a branch is closed at home". Participant 3 indicated that although they work longer

hours, they are not overworked and are given time off by their managers. This participant indicated that there was a process to ensure that a balance is maintained and that staff were given days off if they worked longer hours (Bank Worker A, personal communication, August 03, 2020). Participants reported that they still fulfil most of their tasks at the branch during office hours but that they were aware of bank leadership making decisions to close branches.

Theme 3 relates to work-life balance as discussed in the literature. Participant1 (Bank Manager A, personal communication, July 12, 2020) reflected that stress comes from the uncertainty of what is happening in the bank especially when they are not kept informed of developments. The Participant further indicated that they often hear of branches closing and retrenchments and are not sure if it is going to affect them. It is now accepted that work at the bank is no longer secure and this creates added stress. Participant 6 indicated: "uncertainly leads us to experience stress and depression" (Bank Teller B, personal communication, August 05, 2020). Bank B confirms the view of the participant and reflected that the "workforce is at the center of a changing and uncertain world. These challenges present high levels of stress" (Bank Report 2, 2018, p.39).

Regarding job insecurity and instability, Participant 2 (Bank Manager B, personal communication, July 12, 2020) reflected that given the new work environment and the large number of retrenchments that have taken place in some banks, they understand that there is no longer this notion that they will work in the bank till retirement. Participant 5 (Bank Teller A, personal communication, August 05, 2020) reflected:

> *previously when you worked in the bank you knew that your job was so secure, now you don't know when the bank will say let's downscale staff. Job security is no longer there in the banks*.

The final theme that emerged related to the way in which human resources are now managed in the bank. Participant 6 (Bank Teller B, personal communication, August 05, 2020) indicted that the use of digital technologies to manage human capital is on the increase in banks. Banks are increasing their use of automated technology and predictive capabilities to manage their teams. Bank C indicated that they use new interviewing technologies to recruit and believe that the system finds the best talent available (Bank Report 3, 2018, p.54).

The banks provided four reasons for the use of digital human resource management systems. The first reason related to the provision of automated systems. The second reason was the new way in which data analytics is being use to inform and manage human resources. A bank responded that "technology allows them to develop an integrated view of all employee data to enable holistic conversations and line management decision-making in respect of employees". The third reason provided is the use of AI solutions in people management. The fourth reason is the use of software programming in the form of the development of App platform for communication with employees.

Regarding the issue of whether digitalization is affecting their membership, the Union indicated that if members are retrenched, and are unemployed or find employment in another industry, they can no longer remain as members of the Union. In this way, digitalization has affected their membership as many banks have engaged in retrenchment activities. The Union further added that "membership loss resulting from digitalization is not our major concern but rather the reskilling of our members so that they remain employable in other sectors" (SASBO Official, focus group discussion, August 11, 2020).

4.8 Conclusion

This occupational analysis was carried out in six sections. Each section explored a dimension of occupational change. On the effects of digitalization on banking in SA, the analysis indicates that banks in SA have started their digital transformation journeys and sector stakeholders are knowledgeable and have invested in research to understand the changes this phenomenon brings to the banking industry itself. The digital technologies that emerged align to those examined in the literature. Regarding their influence on banking practice the analysis provided a broader indication of the changes compared to those covered in the literature. It is important to note that the adoption of digital technologies and the current and future changes to banking practice will be experienced differently by each bank depending on the digital strategy they adopt. This was revealed in the analysis where one bank had not yet changed its business model to embrace digitalization.

On the analysis of changes to occupations and job, the analysis on changes to occupations based on a comparative analysis of the 2015 and 2019 banking occupational data revealed that whilst some occupations have become obsolete, new occupations have emerged. In addition, the sector has also experienced occupational change in terms of the increasing or decreasing number of jobs within each occupation. The trend analysis indicates that the sector experienced year-on-year job gains but at a declining rate of change. If this decline continues, the sector will reach a stage where it may experience net job losses. Whilst the plant and machinery major occupational group experienced job losses, the other seven groups experienced job gains. This is an indication that technological change has a positive effect on jobs in the sector. Whilst the Bank Worker and Bank Manager occupations experienced a decrease in the number of jobs, the Bank Teller showed an increase in the number of jobs. In addition, new jobs that align to these occupations have also emerged. Analyzing the occupational structure of the banking sector provides a good indication of occupational obsolescence, new emerging occupations and changes to jobs. Since most occupations are in the intermediate skills level, this indicates that the banking sector is not a high skill industry. Reflecting on the use of the OFO in skills planning, with specific reference to the key banking occupations, the specializations align and cover broadly all job titles used in the sector. This is a clear indication that the OFO as the occupational classification system is aligned to the labour market structures. However, further criticisms on the use of the OFO for skills planning emerged.

On changes to work within banking occupations, the three key occupations have seen a change in the tasks and responsibilities they performed in comparison to the tasks reflected for these occupations in the OFO (DHET, 2019). These changes are influenced by the digital technologies that are being adopted. An interesting note is that the OFO (DHET, 2019) reflects the same tasks and responsibilities for both the Bank Teller and the Bank Worker occupations. From this, it is assumed that these occupations are very closely aligned. Regarding perceived changes to work in the future, it is likely that the nature of work to be carried out will be dependent on the digital technologies that banks would adopt.

The changes relating to education and occupations, new knowledge and skill have emerged in the banking sector. These are clustered into those that align to the WEF top ten digital skills, generic

skills and specialized skills. Of importance is the necessary design skills that support the knowledge required to enable innovation during the digital transformation of the banks. Most of the skills that emerged were generic skills with little reference to specialized skill. Given that the majority of jobs are on the intermediate skills level, this aligns well with the labour market skills level. BANKSETA described some of the interventions they fund to support the development of skills in the banking sector in SA. Regarding training methods, the analysis reveals that they are changing to align to the new digital trends and a show a shift towards a blended approach for full qualifications or the digital micro-learning methodology.

The next analysis examined the changes to skills levels. Banks indicated that they require high skills in the banking sector; however, the majority of jobs are in the intermediate skills level. This mismatch can either be attributed to the overqualification of workers in comparison to the level of the occupations on the OFO, or that bank employees are performing high skilled work but are not being rewarded accordingly. The second aspect of skills change related to the direction of skills change. Both the participants and the banks agreed that in general, there is upskilling and reskilling of jobs occurring; however, participants also alluded to some level of multi-skilling happening in the banks. Through the introduction of the term outskilling, there is indication that workers are being trained for employment in other sectors. Finally, there was no evidence to suggest that the sector is currently experiencing any deskilling. Much is still to be learned about the direction of skills changes that digitalization will bring in the future.

In the final section, changes to the employment relations were examined. The themes that emerged aligned to the literature. The analysis of data confirms that flexible work that changes where and when employees work, coupled with digital communication technology, can lead to a disruption of the work-life balance and lead to increased stress. In addition, the further development of human resource management technologies has influenced the manner in which banks manage their human capital.

The next chapter summarizes the findings of the research to answer the three research questions posed. The chapter provides recommendation for this study in relation to the framework used for analyzing occupations and a few suggestions on further research related to this study.

CHAPTER 5: DIGITALIZATION, WORK AND EMPLOYMENT IN THE BANKING SECTOR IN SA

5.1 Introduction

This study focused on analyzing the influence of digitalization on occupations in banking with specific reference to the Bank Teller, Bank Worker and Bank Manager occupations in SA. Using a framework for analyzing occupations, it interrogated how jobs, work, knowledge and skills, and employment within these occupations are changing because of or in response to digitalization. It also sought to indicate the anticipated future change digital technologies may bring to banking occupations.

Data gathering techniques included document analysis, focus group discussions and semi-structured interviews. Purposive sampling was used to select the respondents for the study. Semi-structured face-to-face interviews were conducted with these voluntary participants. The data thus obtained were analyzed which entailed searching for similarities, patterns and trends and labelling these according to certain categories and themes. The analysis commenced with the analysis of the semi-structured interviews. This was followed with the analysis of the documentary data. Finally, data from the focus group discussions filled in gaps or enhanced the study further. This research presents an exploration of digitalization, work and employment based on a relatively small sample. It therefore cannot articulate the findings as generalizable outcomes that represent the wider population. However, they are thought provoking and provide an indication of the influence of digitalization on important aspects of current and future skills planning.

This chapter reflects on the research conducted. The intent is to review the key findings with the aim of providing recommendations based on the study that was undertaken. The summary of the findings is presented in three sub-sections, each one aimed at answering the research question posed. The recommendations made align to the analyzing of occupations with specific reference to skills planning for the banking sector in SA. The final section makes three suggestions for further research.

The summary of findings presented in the next section addresses the three research questions posed in this study. The first question related to the key features of digitalization within the banking sector in SA and their implications for banking practice for SA banks. The second question focused on how these trends influence key banking occupations in SA in relation to education, work and employment. The third question examined what these trends imply for patterns of skills changes in banking in SA.

5.2 Summary of Findings

Digitalization, through the adoption of several digital technologies is affecting change in banking practice in SA. The adoption of digital technologies and the changes to banking practice, result in new ways of working within firms in the banking sector. Therefore, digitalization affects jobs and work within occupations. Whilst it may lead to occupational obsolescence, it also results in the creation of new occupations. Whilst, on the one hand it leads to loss of jobs, on the other it creates jobs. These changes also influence the work to be carried out in banking occupations resulting in the creation of new tasks and responsibilities. This in turn, is changing the kinds of knowledge and skill required within banking occupations. In addition, the kinds of knowledge required links to the innovative capabilities of firms required for digital transformation. Relating to the level of skill, digitalization results in the upskilling, reskilling and multiskilling of some jobs in the banking sector in SA. Turning to the external environment, digitalization also affects the employee-employer relationship. However, the influence of digitalization is experienced differently from industry to industry, sector to sector and even amongst firms in the same sector as it is dependent on the types of digital technologies adopted.

5.2.1 Features of Digitalization and their Implications for Banking in SA

Empirical data reveals that seven key features of digitalization emerged from the study. The themes that emerged in the data analysis process aligned to the digital technologies identified in the literature. Banks in SA are using chatbots and other cognitive computing and software prescripts to decrease errors in administrative functions. Regarding cloud computing, banks in SA are moving onto cloud infrastructure to transform their business and grows into new areas. Regarding data analytics and algorithms, banks are using data to enhance client experiences. Regarding blockchain and cryptocurrency, SA has seen a pilot of this technology. Biometric

technology is growing into the creation of digital identities to support authenticated online banking. Regarding digital banking platforms, the development and updates of Banking Apps is the most common banking platform banks are using to migrate clients from branch banking to digital banking. Regarding digital channels, there is also a shift to multi-channel services aimed at simplifying banking for the client and making banking available at all times.

On the implications of digital technologies to banking practice, seven key areas emerged: banking products and services are becoming more digital; banks' operating models are changing especially with the reduction of bank branch models; business models are leaning towards the development and implementation of digital banking strategies; customer or user experience drives changes in banks, and client data insights provide a means to identify customer needs; banks are extending their product offerings to embrace financial inclusion of the unbanked through products that do not require a bank account; cyber risk is growing and the need for cyber security in increasing; and there is increased competition from non-banking entrants including Fintech, big tech and new licensed banks.

5.2.2 The Effects of Digitalization on Work, Education and Employment in SA

How does Digitalization influence Work in banking in SA?

The effects of digitalization affect occupations, jobs and work as these three concepts are closely linked within the framework of the OFO. Regarding occupations, digitalization may result in some occupations become obsolete but also the emergence of new occupations. In addition, whilst some occupations experienced a decrease in the number of jobs, other occupations experienced an increase in jobs. Overall, the banking sector has seen an increase in the number of jobs from 2015 to 2019 but at a decreasing rate. This is an indication that despite the sector experiencing job losses, there have also been more jobs created. There was a clear indication that bank work in general has changed including the key occupations. The work of the Bank Worker, Bank Teller and Bank Manager is showing a shift towards the use of digital technologies in their jobs. Whilst the OFO has remained the same in terms of tasks and specializations, work has changed for the key occupations.

How does digitalization influence Education in banking in SA?

Regarding changes to knowledge and skills, the skills that have emerged align to the WEF top ten digital skills. In addition, a range of generic skills has emerged. These generic skills align to the skills levels of the majority of jobs in the banking sector. Interestingly, the digital skills are not specific to the digital technologies as would have been expected. The data seems to indicate that the greater need in terms of skills acquisition relates to an increased demand for generic skills.

Training methods have shifted away from the traditional face-to-face contact sessions to many versatile digital methods. Blended learning approaches using a combination of eLearning and contact sessions are on the increase. On demand and adaptive learning is growing exponentially. Banks have created online libraries and academies to encourage self-paced learning to address the need for upskilling and reskilling by employees.

How does digitalization influence Employment in banking in SA?

The empirical data emerging from the analysis, reveals five themes relating to changes to conditions of employment in banking in SA. These include a shift to flexible work arrangement, that is, changes to the place of work and hours of work. This has an effect on the work-life balance resulting in higher levels of stress. Jobs in the banking sector no longer offer any type of job stability or job security. The introduction of automated human capital technologies to manage human resource engagement and administration is a new development in the manner that employers manage this employment relationship.

5.2.3 The Effects of Digitalization on Skills Levels in Banking in SA

The skills level of the majority of workers in the banking sector is at the intermediate skills level. The SA banks are experiencing upskilling and reskilling. However, whilst banks remain silent on multiskilling, participants allude to its presence as they are performing a broader scope of work. Currently there is no deskilling of work in the banking sector. However, there is a presence of outskilling, that is, retrenchments where people are being skilled for work in other sectors. Banking employees are reskilled where occupations are becoming obsolete, upskilled where the

complexity of the work increases, and multiskilled where they need to perform a broader range of general tasks.

5.3 A Framework for Analyzing the Influence of Digitalization on Occupations

The research focused on examining occupational change by exploring the various dimensions of key occupations in banking in SA. This provided an understanding of the change digitalization brings to occupations, jobs and work, the knowledge and skills required to perform the job, changes to the levels of skill demanded and changes to the standard working relationship. There is a need to understand how individual key occupations, jobs that make up the occupations and work that makes up the jobs are changing. This will further impact the identification of new knowledge and skills required to inform the development of relevant education and training programmes.

In this study, the researcher analyzed occupations as a way of examining the influence of digitalization on key banking occupations as well as occupations in general. This provided insights into the elements of occupations, that is, jobs, work content, knowledge and skills and the context of work (employment). This exploratory analysis was important because it examined the influence digitalization can have on the current skills development landscape as well as future skills forecasts. This five-dimensional analysis links changes to the context, content, competence, changing skills and conditions of employment to understand occupational change. Understanding occupational change in this way is useful for sector skills planning to obtain an analytical perspective of the influence of digitalization on individual occupations. In carrying out an analysis of selected occupations, the banking sector may better understand current and potential shifts in work resulting in a more accurate determination of current and future skills needs.

The framework suggests a conceptual exploration of five dimensions in carrying out an occupational analysis to measure occupational change. The first dimension refers to the digital technologies changing the context within which occupational work is carried out and the changes they bring to current practice in the firm. The second dimension relate to changes to occupations and jobs brought about by occupational and job obsolescence as well as the creation of new and emerging occupations and jobs. A quantitative analysis of occupational and jobs data is also a relevant indicator of growth or decline in that occupational group. The third dimension examines

knowledge and skill relating to the technical digital knowledge and skills as well as the generic knowledge and skills required given the current demand as well as the future skills that may be required. The fourth dimension refers to the changes to the skills levels. This is an important analysis as an indicator of fair labour practices. It is also a good indicator for the level of education required for new entrants into the sector. The fifth dimension refers to the changes to the employer-employee relationship. This aspect is valuable for skills planning since the development of the correct attributes (characteristics) is an important aspect of life-long learning and adaptive learning traits in the labour force.

5.4 Further Research

There is a need for further exploration of aspects of this study that will benefit different stakeholders. Expanding the knowledge on the effects of digitalization of different aspects of labour and the economy is valuable in its own right and will support the shift towards the Fourth Industrial Revolution. The researcher proposes three areas for further research.

Research Area 1: Extension of the Occupational Analysis Framework

The analysis of occupational change was limited to the data made available by BANKSETA. Further research on occupational change would be beneficial to the sector in determining job losses, job obsolescence and changes to work within the occupations. The current process of analyzing occupations suggested by the DHET involves a focus only on occupations. To obtain a comprehensive analysis of occupational shortages and skills gaps require the process to further deconstruct occupations to jobs and work. Further research on the occupational analysis framework used in this study would be useful to DHET to improve the skills planning process.

Research Area 2: Scenario Planning to Forecast Future Skills

Future skills that may emerge as a result of digitalization, is an important aspect of research relating to occupations. WEF (2018, p.2) explains that

> *... scenarios provide a vison of how the future could unfold, given various factors. They are useful tools when the future does not seem to be a linear projection of the past with many trends making it difficult to predict with certainty what the future will look like*.

Scenario planning is not about predicting the future but to create different versions of the future. This exploratory study provides an elementary examination of some of the new ways of working that is emerging in the banking sector. Perceptions of the possible influence of digitalization on occupations in the future may be examined using scenario planning.

Research Area 3: Changes to Current Labour and Union Regulatory Environments Linked to Changing Conditions of Employment

One unresolved problem that unions face is difficulty in recruiting and retaining members as individuals change employment and occupations. A new approach is needed that will make it easier for individuals to join, remain attached to and be represented and served by a union. This new approach will have to match the nature of today's flexible workforce and the changing economy brought about by digitalization. Prescribed regulations relating to labour is still based on standard employment practices. This study has shown that conditions of employment are changing in terms of flexible working arrangements, remote work and the extensive use of digital technologies that make workers accessible all the time, amongst others. The current labour regulations must be reviewed and aligned to ensure that the labour force is not mistreated by employers.

5.4 Conclusion

This research was undertaken to explore the influence digitalization may have on work and employment. As an exploratory study, the research approach adopted was of a qualitative one, allowing for the gathering of experiences of participants and insights from experts as well as the drawing of information from several documents. As work and employment are embedded in occupations, and occupations serve as the basis for skills planning in SA, the process adopted for this study was an occupational analysis. The literature reviewed on occupations led to the development of an occupational change framework. The five dimensions of the framework provided the structure for the examination of literature and the analysis of the data.

Digitalization, specifically the adoption of digital technologies by banks in SA, changes the setting or the context of occupations, understanding this contextual change provided clarity on the manner in which digital technologies are driving change and the implications of those changes for banking practice in SA. This contextual analysis provided clarity on the current adoption of AI and robotics,

cloud technology, data analytics and algorithms, blockchain, biometrics, digital payments platforms and digital banking channels. The manner in which these technologies drive changes to banking, firstly in terms of the ways it reshapes customer services and secondly in the changes it brings operating processes and systems within the banks, provides the depth of understanding required to further analyze the effects this has on occupations.

By carrying out an examination of occupational data over a period of time resulted in the identification of occupations that have become obsolete and the new occupations that have emerged. It also indicated which occupations have experienced an increase in the number of jobs created as well as the decrease in the number of jobs experienced in the banking sector in SA. Although the sector has, in the last five years, seen an increase in jobs, this has been at a declining rate. An interesting result of the analysis, shows that although the Bank Worker and Bank Manager occupations experienced a loss of jobs, the number of Bank Tellers actually increased. Given the closure of branches, one would have expected to see all three occupations reflecting a change in the same direction.

Examining changes to the key occupations in relation to the work undertaken, indicates the shift in the new ways of working that has emerged because of digitalization. In all three occupations, comparing the data collected with the tasks and responsibilities provided in the OFO (DHET, 2019) reflected many changes. The changing nature of work for the three occupations was determined in this manner. The importance of this information for skills planning was evident as the knowledge and skills required directly relate to the work undertaken in the jobs to be performed.

Turning to the changing educational requirements, the demand for generic skills training is dominant in the banking sector. Further analysis reflects that since most occupations are at the intermediary level, these generic skills align to the skills levels of the majority of the workers. The analysis also reveals the need for design skills signaling the need for innovation in the banks. Given the nature of this study, a limitation of the educational change analysis is the absence of examining the knowledge required by the sector in terms of tacit and explicit knowledge as these directly relate to the codification characteristic of knowledge. In terms of methods of training, the findings reflect a strong move to the adoption of online self-directed learning to support the

acquisition of informal learning, whilst a blended learning approach emerges as the alternative to classroom learning.

The concept of skill was further examined in relation to changes to the levels of skill in the banks since skills levels are an important measure on the OFO. The current banking occupational landscape reveals that most occupations are at the intermediate level, within the clerical support major occupational group. Therefore, the notion that the banks are demanding high skills seems to contrast the data as per the alignment to the OFO. From another perspective, there is upskilling and reskilling of jobs taking place in the banks with the reskilling including the development of skills for the movement of retrenched workers to other industries. At present, there is no evidence of deskilling of work in the banking sector in SA.

Regarding the influence of digitalization on employment, the shift to flexible work arrangements reveals that banking employees are adapting to remote work and a move away from standard working hours. This has presented a challenge on maintaining work-life balance since digital communication technologies imply the expectation of being available to both banking clients and management at all times. This, coupled with job insecurity and instability, may result in increased stress levels of bank employees. Digital technologies have also resulted in the adoption of technology to manage the human capital in some banks.

Using this framework for exploring occupational change resulting from digitalization, has provided a broader analysis in relation to measuring occupational shortages and skills gaps currently undertaken in the skills planning process. It provides clarity on the influence of digitalization on occupations in the banking sector in SA and can add value to the current skills planning process especially with regards to understanding the implications of digitalization on current and future skills needs.

REFERENCES

Abbasi, T. & Weigand, H. (2017). *The impact of digital financial services on firm's performance: a literature review*. New York: Cornell University Library.

Allahar, H. (2014). The Changing Nature of work, jobs of the future, and strategic human resource framework. *Journal of Human Resource*, 2, 1-21.

Allais, S. (2013). Understanding the persistence of low levels of skills in South Africa. In *New South African Review*. Wits University Press: Johannesburg, 201-220

Allais, S. (2015). Livelihoods, sustainability, and skills. In *Education and international Development Practice, Policy and Research.* London: Bloomsbury, 237-256.

Anner, M., Pons-Vignon, N. & Rani, U. (2019). For a future of work with dignity: A Critique of the World Bank development report. The Changing Nature of Work. Global Labour Journal 10(1), 2-18.

Balwanz, D., & Ngcwangu, S. (2016). Seven problems with the 'scarce skills' discourse in South Africa. *South African Journal of Higher Education*, *30*(2), 31-52.

BANKSETA. (2017). *Banking Sector Skills Plans 2018/19*. Retrieved from https://www.bankseta.org.za

BANKSETA. (2019). *Banking Sector Skills Plans 2020-2025*. Retrieved from https://www.bankseta.org.za

BANKSETA. (2020). *Annual Report 2019-2020*. Retrieved from https://www.bankseta.org.za

Barley, S.R., & Kunda, G. (2001). Bringing work back in. *Organization Science,* 12(1), 76-95.

Beaudry, P., Green, D. & Sand, B. (2013). The great reversal in the demand for skill and cognitive tasks. *Journal of Labour Economics*, 34.

Bell, J. (2005). *Doing your Research Project: A guide for first time researchers in education, health and social science*. Fourth Edition. London: Open University Press.

Benner, C. (2002). *Work in the new economy: flexible labour markets in Silicon Valle*y. First Edition. Hoboken, N.J.: Wiley-Blackwell Publishers.

Berger, T. & Frey, C. (2016). *Structural transformation in the OECD: Digitalization, Deindustrialization and the future of work*. OECD Social, Employment and Migration Working Paper. No 193. Paris: OECD Publishing.

Bezhovski, Z. (2016). The future of the mobile payment as electronic payment system. *European Journal of Business Management*, 8, 2222-2839.

Bhorat, H., Cassim, A. & Tseng, D. (2016). Higher education, employment and economic growth: Exploring the interactions. *Development Southern Africa*, 33(3), 312-327

Blackmore, P. (2000). A conceptual framework for approaches to occupational analysis. *Research in Compulsory Education,* 5(3), 289-304.

Botha, E., & Makina, D. (2011). Financial regulation and supervision: Theory and practice in South Africa. *International Business & Economics Research Journal (IBER)*, *10*(11), 27-36.

Bowen, G. (2009). Document Analysis as a Qualitative Research Method. *Qualitative Research Journal,* 9, 27-40.

Bowles, S. & Gintis, H. (1975). The problem with Human Capital Theory – A Marxian Critique. *The American Economic Review*, 65(2), 74-82.

Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology,* 3, 77-101.

Braverman, H. (1974). *Labor and Monopoly Capital. The degradation of work in the twentieth century*. New York: Monthly Review Press.

Broeders, H. & Khanna, S. (2015). *Strategic choices for banks in the digital age*. McKinsey Quarterly Review, January 2015.

Brown, P., Lauder, H. & Ashton, D. (2008). Education, globalization and the future of the knowledge economy. *European Educational Research Journal,* 7, 131-156.

Cappelli, P.H. (2015). Skills gaps, skills shortages and skills mismatches. Evidence and arguments for the United States. *ILR Review*, 68(2), 251-290.

Centre for the Development of Vocational Training. (2013). *The role of qualifications in governing occupations and professions*. European. CEDEFOP Working Paper, No 20. Luxembourg. Publications Office of the European Union.

Cijan, A., Jenič, L., Lamovsek, A. & Stemberger, J. (2019). How digitalization changes the workplace. *Dynamic Relationships Management Journal,* 8, 3-21.

Cocco, L., Pinna, A., & Marchesi, M. (2017). Banking on blockchain: Costs savings thanks to the blockchain technology. *Future internet*, *9*(3), 25.

Coetzee, J. (2018). Strategic implications of Fintech on South African retail banks. *South African Journal of Economic and Management Sciences,* 21, 1-11.

Creswell, J.W. (2012). *Educational Research: Planning, Conducing and Evaluating Quantitative and Qualitative Research.* Fourth Edition. London: Pearson Publishers.

Deloitte. (2018). *Banking Outlook. Accelerating the transformation*. New York: Deloitte Centre for Financial Services.

Denzin, N.K. & Lincoln, Y.S. (2018). *Handbook of Qualitative Research.* Newbury Park, CA: Sage Publishing.

Department of Higher Education and Training. (2013). *Organizing framework for occupations: 2013.* Retrieved from https://www.dhet.gov.za.

Department of Higher Education and Training. (2015). *Sector Skills Planning Framework and Requirements.* Retrieved from https://www.dhet.gov.za.

Department of Higher Education and Training. (2017). *Organizing framework for occupations guidelines*. Retrieved from https://www.dhet.gov.za.

Department of Higher Education and Training. (2019). *Organizing framework for occupations guidelines*. Retrieved from https://www.dhet.gov.za.

Department of Higher Education and Training. (2020). *Occupations in High Demand*. Retrieved from https://www.dhet.gov.za.

DeVaro, J. & Farnham, M. (2011). Two perspectives on multiskilling and product market volatility. *Labour Economics*, Elsevier, 8(6), 862-871.

Elias, P. & McKnight, A. (2001). Skill measurement in official statistics: recent developments in the UK and the rest of Europe. *Oxford economic papers,* 3, 508-540.

Gall, M.D., Gall J.P. & Borg W.R. (2006). *Educational Research: An Introduction.* Eighth Edition. Boston: Allyn and Bacon.

Ghailani, D., Peña-Casas, R. & Coster, S. (2018). *The impact of digitalization on job quality in European public service: The case of home-care and employment service workers.*

Goldin, C. & Katz, L.F. (2008). *A race between education and technology*. Cambridge, MA: Belknap Press.

Guba, E.G. & Lincoln, Y.S. (1982). Epistemological and methodological bases of naturalistic inquiry. *Educational Communication and Technology*, 30(4), 233-252.

Hall, P. (2004). Dynamic capabilities, tacit knowledge and absorption. In J.S Metcalfe and J. Foster (Eds.), *Evolution and Economic Complexity,* Northampton, MA: Edward Elgar Publishing.

Hall, P. & Soskice, D. (2001). *Varieties of capitalism: The institutional foundations of comparative advantage.* Oxford: Oxford University Press.

Hosseini, S.S. & Mohammadi, S. (2012). Review banking on biometric in the world's banks ad introducing a biometric model for Iran's banking system. *Journal of Basic and Applied Scientific Research*, 2(9), 9152-9160.

Indriasari, E., Gaol, F. L., & Matsuo, T. (2019). Digital banking transformation: Application of artificial intelligence and big data analytics for leveraging customer experience in the Indonesia banking sector. In *2019 8th International Congress on Advanced Applied Informatics (IIAI-AAI),* 863-868.

International Labour Organization. (2012). *International Standard Classification of Occupations Structure, group definitions and correspondence tables for ISCO-08: Volume 1*. Geneva: ILO.

International Labour Organization. (2015). *World employment and social outlook: The Changing Nature of Jobs*. Geneva: ILO.

International Labour Organization. (2018). *The Changing Nature of Work*. Geneva: ILO.

International Labour Organization. (2019). *Work for a Brighter Future*. Geneva: ILO.

Lakshmi, S., & Rani, J. (2018). P. Cloud Computing in Banking: An Overview. *Int. J. Multidiscip*, *3*, 802-806.

Jubraj, R., Graham, T. and Ryan, E. (2018). Redefine Banking with Artificial Intelligence. Accenture. URL: https://www.accenture.com/_acnmedia/pdf-68/accenture-redefine-banking.pdf

Kawatra, K. & Kumar, V. (2014). *Benefits of Cloud for banking sector*. Gurgaon, India: Ansal Institute of Technology.

Kearney, A.T. (2013). *Banking in a digital world*. Paris: EFMA.

Kirsimarja, B. & Aino, K. (2013). *Knowledge-based view of the firm: theoretical notions and implications for management.*

Kraak, A. (2004). Training policies under late apartheid: the historical imprint of a low skills regime. In S. McGrath, A. Badroodien, A. Kraak and L. Unwin. *Shifting understanding of skills in South Africa.* Cape Town: HSRC Press.

Kraak, A. (2008). Incoherence in the South African labour market for intermediate skills. *Journal of Education and Work*. 21(3), 197-216.

Kraak, A., Lauder, H., Brown, P. & Ashton, D. (2004). *Debating High-Skills and Joined up policy.* Pretoria: HSRC Press.

Krause, E. (1971). *The Sociology of occupations*. Boston: Little Brown.

Lauder, H., Brown, P. & Ashton, D. (2017). Theorizing skill formation in the global economy. In Warhurst, C., Mayhew, K., Finegold, D., Buchanan, J. (Eds), *The Oxford Handbook of Skills and Training*. Oxford: Oxford University Press, 401-423.

Legere, J. (1978). Occupational analysis for training. *Educational Technology*, 8(3), 27-35.

Levenson, A. & Zoghi, C. (2010). Occupations, human capital and skills. *Journal of Labour Research*, 31(4), 365-386.

Lipton, A., Shier, D. & Pentland, A. (2016). *Digital Banking Manifesto: The end of banks.* Cambridge, MA: Massachusetts Institute of Technology.

Lockwood, N.R. (2003). Work/Life Balance: Challenges and Solutions. *Society for Human Resource Management. Research Quarterly*, 2, 1-10.

Louw, C. & Nieuwenhuizen, C. (2020). Digitalization strategies in a South African banking context: A consumer services analysis. *South African Journal of Information Management*, *22*(1), 1-8.

Makina, D. (2019). The potential of fintech in enabling financial inclusion. In *extending Financial Inclusion in Africa.* Retrieved from https://doi.org/10.1016/B978-0-12-814164-9.00014-1

Martin, C.J. (2017). Skill Builders and the evolution of National Vocational Systems. In C. Warhurst, K. Mayhew, D. Finegold, J. Buchanan, (Eds.), *The Oxford Handbook of Skills and Training.* Oxford: Oxford University Press, 36-53.

Mason, J. (2002). *Qualitative Researching*. Second Edition. Newbury Park CA: Sage Publishing.

Maxwell, J. (2012). *Qualitative research design: An interactive Approach*. Newbury Park, CA: Sage Publishing.

Miles, M. & Huberman, M. (1994). *Qualitative Data Analysis*. Second Edition. Newbury Park, CA: Sage Publishing.

Nair, S., Kaushik, A. & Dhoot, H. (2019). Conceptual framework of a skill-based interactive employee engaging system: In the Context of Upskilling the present IT organization. *Journal of Applied Computing and Informatics.*

National Academies of Sciences. (1999). *The Changing nature of Work: Implications for Occupational Analysis.* Washington DC: National Academies Press.

Nelson, R. (1985). *An evolutionary theory of economic change*. Cambridge MA: The Belknap Press.

Nelson, R. (2007). Understanding economic growth as the central task of economic analysis. In F. Malerba, and S. Brusoni (Eds.), *Perspectives in Innovation.* Cambridge: Cambridge University Press.

Normalini, M. K., & Ramayah, T. (2012). Biometrics technologies implementation in Internet banking reduce security issues? *Procedia-Social and Behavioral Sciences*, *65*, 364-369.

Organization for Economic Co-operation and Development. (2017). *Future of work and skills*. Paris: OECD Publishing.

Organization for Economic Co-operation and Development. (2019). *Preparing for the changing nature of work in the digital era*. OECD Going digital policy note. Paris: OECD Publishing.

Owan, H. (2001). *Specialization, multiskilling and the allocation of decision right*. Working Paper. Washington University.

Pot F., Dhondt S., Oeij P. (2012). Social Innovation of Work and Employment. In: Franz HW., Hochgerner J., Howaldt J. (eds) Challenge Social Innovation. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-32879-4_16

Ratna, R. & Kaur, T. (2016). The impact of technology on job related factors like health and safety, Job satisfaction, performance, productivity and work-life balance. *Journal of Business Finance.*

Reddy, V., Bhorat, H., Powell, M., Visser, M., & Arends, F. (2016). *Skills supply and demand in South Africa*. Labour Market Intelligence Project: Human Sciences Research Council.

Reljic, J., Evangelista, R., & Pianta, M. (2019). *Digital technologies, employment and skills* (No. 2019/36). LEM Working Paper Series.

Schultz, T.W. (1961). Investment in Human Capital. *American Economic Review*, 51(1-2), 1-17

Schwab, K. (2016). *The Fourth Industrial Revolution*. Geneva: World Economic Forum.

Scott, J. (2013). *The nature of social research and social knowledge. Theory and Practice in Sociology.* New York Routledge.

Scott, J. & Marshall, G. (2009). *A dictionary of sociology*. Third Edition. Oxford: Oxford University Press.

Scott, D. & Morrison, M. (2006). *Key Ideas in Educational Research.* Continuum.

Shaikh, A. A., & Karjaluoto, H. (2016). Mobile banking services continuous usage--case study of Finland. In *2016 49th Hawaii International Conference on System Sciences (HICSS)* (pp. 1497-1506).

Shalem, Y. & Allais, S. (2018). *Linking Knowledge, Education and Work: Exploring occupations*. Working Paper. University of Witwatersrand.

Shukla, S. (2014). Analysis of Banking System Performance of Select Global Economies with that of India. *Procedia Economics and Finance*, 11, 383–395.

Stubbings, C. & Williams, J. (2017). *Workforce of the future: the competing forces shaping 2030*. London: Price Waterhouse Coopers.

Svahn, F., Mathiassen, L., Lindgren, R., & Kane, G. C. (2017). Mastering the digital innovation challenge. *MIT Sloan Management Review*, *58*(3), 14.

Teece, D.J. (2009). *Dynamic capabilities and strategic management.* Oxford: Oxford University Press.

Thavanathan, J. (2017). *Process Innovation with Blockchain in Banking-A case study of how Blockchain can change the KYC process in banks* (Master's thesis, NTNU).

Vasiliev, S.A. & Serov, E.R. (2019). *Omnichannel Banking Economy.* EconPapers.

Valenduc G. (2019). New Forms of Work and Employment in the Digital Economy. In: Serrano-Pascual A., Jepsen M. (eds) The Deconstruction of Employment as a Political Question. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-319-93617-8_3

Walwei, U. (2016). *Digitalization and structural labour market problems: The case of Germany*. Geneva: ILO.

World Bank. (2018). *The Changing Nature of Work*. Washington DC: World Bank.

World Economic Forum. (2017). *Accelerating workforce reskilling for the fourth industrial revolution*. White Paper. Geneva: World Economic Forum.

World Economic Forum. (2016). *The Future of Jobs: Employment, skills and workforce strategy for the Fourth Industrial Revolution*. Cologny, Switzerland: World Economic Forum.

Wilcock, A. (1993). A theory of the human need for occupation. *Journal of Occupational Science*, 1(1), 17-24.

Wilson, R., Woolard, I & Lee, D. (2004). *Developing a national skill forecasting tool for South Africa.* Retrieved from https//www2.warwick.ac.uk/fac/soc/ier/publications/2004/safinal report.pdf.

Wolf, A. (2002). *Does education matter? Myths about education and economic growth*. London: Penguin Books.

ANNEXURE 1: INFORMATION LETTER TO PARTICIPANTS

Dear Sir/Madam,

My name is Angie Naidoo I am a student in the School of Education at the University of the Witwatersrand. I am currently reading for my master's degree. In fulfilment of the degree, I am required to undertake research. The aim of this study is to determine the influence of the key features of digitalization on the nature of work, and conditions of employment of key occupations within the banking sector in South Africa; as well as interrogate how skills specific to the Bank Worker, Bank Teller and Bank Manager occupations are changing because of, or in response to digitalization with a view to determining what new competencies will be required in the future. This study will focus on what digital adoption will mean for the banks with specific reference to how it will change the nature of work and employment conditions and ultimately the knowledge and competencies that will be required by employees within the three chosen occupations. I strongly believe that this research is of key importance to future skills formation in South Africa. This research will add to the body of knowledge capable of shifting the skills formation model of the SETA to address the skills mismatches and skills gaps resulting from the disparate skills demand and supply in the sector.

As part of this research project, I invite you to participate in an interview that will take approximately 60 minutes. This activity will involve the researcher asking you a range of questions relating to your job and how it is changing and what kind of new skills you will need because of the changes in your job. With your permission, I would also like to record the interview using a digital device.

You will not receive any direct benefits from participating in this study, and there are no disadvantages or penalties for not participating. You may withdraw at any time or not answer any question if you do not want to. The interview will be completely confidential and anonymous as I will not be asking for your name or any identifying information, and the information you give to me will be held securely in an electronic format in an offline system and will be destroyed between 3-5 years after completion of the project. No information provided will be disclosed to anyone else. I will be using a pseudonym (false name) to represent your participation, in my final research

report. The interview should not in any way cause you distress or discomfort; however, if you do experience any distress or discomfort, we will stop the interview or resume another time.

If you have any questions afterwards about this research, feel free to contact me on the details listed below. This study will be written up as a research report which will be available online through the university library website. If you wish to receive a summary of this report, I will be happy to send it to you upon request. If you have any queries, concerns or complaints regarding the ethical procedures of this study, you are welcome to contact the University Human Research Ethics Committee (non-medical).

ANNEXURE 2: PARTICIPANT CONSENT FORM

Please fill in the reply slip below if you agree to participate in my study Titled: ***The Influence of Digitalization on Work and Employment in the South African Banking Sector***

My name is: _____

Permission to review/collect documents/artifacts	**Circle one**
I agree that my job description can be used for this study only.	YES/NO
Permission to be audiotaped	
I agree to be audiotaped during the interview	YES/NO
I know that the audiotapes will be used for this research only	YES/NO
Permission to be interviewed	
I would like to be interviewed for this study.	YES/NO
I know that I can stop the interview at any time and don't have to answer all the questions asked.	YES/NO

Informed Consent

I understand that:

- My name and information will be kept confidential and safe and that my name and the name of my employer will not be revealed.
- I do not have to answer every question and can withdraw from the study at any time.
- I can ask not to be audiotaped, photographed and/or videotape
- All the data collected during this study will be destroyed within 3-5 years after completion of this research.

Sign_____ Date_____

ANNEXURE 3: GUIDING QUESTIONS FOR DATA COLLECTION

3.1 Semi-structured Interview Schedule for Bank Employees

1. Tell me about your career in banking. How long have you been working in the banking sector?

2. Please describe what you do in your current job. What are some of your main job functions?

3. Tell me about your experiences with digitalization/digital disruption/technological changes at work. What are some of the changes to banking practices that are taking place? What is causing these changes to take place?

4. Has your job profile changed over the years? How has it changed with respect to the tasks you perform and your responsibilities? Why has it changed? What influenced these changes in your job functions?

5. What further changes do you think may happen to your job? What changes in banking practice will influence your job in the future?

6. Have your conditions of employment changed over the last few years? How has it changed? Why did it change? What influenced the changes in your conditions of employment?

7. Do you think that your conditions of employment will change in the future? How will it change and what will influence this change?

8. Have your skills levels changed over the last few years? Has your job required any upskilling, multi-skilling, reskilling or even de-skilling? What influenced the changes to your skills level?

9. What do you think will be the nature and direction of skills change that your current job will experience in the future? Please explain why and what will influence this change?

10. How were you trained for this job? Are new people trained in the same way? Have you had to learn new things since you first started? What new things (knowledge and skills) did you have to learn?

3.2 Guiding questions for Focus Group Discussion with SASBO

1. What does the Union understand digitalization/digital disruption to mean?

2. What is the Union's understanding of global trends with regards to digitalization in banking?

3. Please describe the Unions perspective on digitalization/digital disruption/technological change in banking in South Africa.

4. Has digitalization affected jobs in the banks? How? Do you have data to verify this? Are you aware of how jobs are changing in the sector?

5. Has digitalization affected membership of the Union? How? Do you have data to verify this?

6. What support is the union currently providing to its members who are affected by changes brought about by digitalization/technological changes in the banks, that is, members who have been retrenched or facing possible retrenchments?

7. How is work in the bank changing as a result of digitalization?

8. How have conditions of employment changed in the bank? What has influenced these changes? Do you think that there will be changes in the future and what will these changes be?

9. What is the unions perspective on upskilling, multi-skilling, reskilling and deskilling of jobs in the banking sector? What is causing these patterns of skills change in banking?

10. Have training methodologies in the banks changed over the last few years? How has it changed and what has changed?

11. What does the Union consider to be some of the new skills and knowledge that will be required for a career in banking?

3.3 Guiding questions for focus group discussion with BANKSETA

1. Digitalization is identified as one of the key drivers of change in the Banking Sector Skills Plan. What does BANKSETA consider to be the key features of digitalization that are influencing banking? What is the implication of these for skills planning? What evidence do you have for this?

2. According to the WSP data that BANKSETA collects from the employers in the sector, how has the number of people employed as Bank Tellers, Bank Workers and Bank Managers changed over the last few years and what are the reasons for this change?

3. Did BANKSETA conduct an occupational analysis for the sector to determine occupational trends? What occupations are disappearing and what new occupations are being created in the sector?

4. How reflective is the OFO of what is actually happening in banking in terms of occupations? How useful is the OFO for skills planning? How do the employers feel about working with the OFO?

5. In the SSP, BANKSETA indicates five Skills Priority Actions. How are these skills priority actions delivered?

6. What training interventions does BANKSETA fund for the development of skills for the Bank Teller, Bank Worker and Bank Manager?

7. What SETA accredited programmes does BANKSETA have for the development of the three key occupations?

8. What skills needs have emerged as a result of digitalization in the sector? What programme interventions is BANKSETA funding?

9. What skills development interventions is BANKSETA implementing or planning to implement to support upskilling, reskilling and multiskilling in the banking sector? Why these interventions and on what are they based? What are employers doing beyond their contribution to skills levies?

10. What do you consider to be some of the new skills and knowledge that will be required in the future for employees to remain in a career in banking? How do you know this?

ANNEXURE 4: PARTICIPANT SCHEDULE

Semi-Structured Personal Interviews

Participant Reference Code	Participant Occupation	Date of Interview
Participant 1	Bank Manager A	July 12, 2020
Participant 2	Bank Manager B	July 12, 2020
Participant 3	Bank Worker, A	August 03, 2020
Participant 4	Bank Worker, B	August 03, 2020
Participant 5	Bank Teller, A	August 05, 2020
Participant 6	Bank Teller, B	August 05, 2020

ANNEXURE 5: ARCHIVE OF DOCUMENTS

Archival Code	Source	Reference
Bank Report 1	Bank A	Bank A, (2018) Integrated Report
Bank Report 2	Bank B	Bank B, (2018) Integrated Report
Bank Report 3	Bank C	Bank C, (2018) Integrated Report
International Benchmark Study	BANKSETA, Unpublished internal document	BANKSETA International Benchmark Study Report, 2018