Gordon Institute of Business Science
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Implications of technological unemployment in financial services in South Africa

by

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Abstract

The study was conducted to understand how technological unemployment is affecting financial services companies in South Africa. Technology investment is seen as creating and building competitive capabilities for companies and Countries, however with further investment in technology it may result in displacement of workers through automation of jobs. Considering the high unemployment, South Africa should be understanding the impacts of technology investment and developing responsive strategies to improve the unemployment problem.

The research is grounded on technological unemployment theory which is the displacement of workers as result of technology advancement. The study included a review of skills development strategies which have been identified by various studies as key response to reducing the displacement of workers. It also included a review of how technology is changing company business models with the implementation of artificial intelligence and blockchain technologies in the financial services sector.

The data collection followed qualitative research approach where interviews were conducted with Senior Leaders in the industry to understand their strategies and outlook on the future both unemployment and technology advancement.

Keywords:

Unemployment, Technological Unemployment, Automation, Artificial Intelligence

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DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

Kingsley Maloka

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1 Chapter 1: Introduction to Research Problem

1.1 Introduction

This chapter introduces the research problem broadly including the research purpose and relevance. It includes discussions on the literature gap that exists for which the research intends contributing additional knowledge. The business relevance of the research is also detailed. In brief, the foundation of the study is considering the contribution of technological unemployment to the high levels of South Africa's unemployment and the dilemma for financial services companies investing in worker displacement technology to remain competitive.

1.2 Research problem

The United Nations Sustainable Development Goal (SDG) number eight is to "promote inclusive and sustainable economic growth, employment and decent work for all" (United Nations, 2020). According to the SDG Goal Tracker (2020), with regards to goal eight, South Africa tracks and promotes policies to support job creation and growing enterprises; reducing youth unemployment and providing universal access to banking, insurance and financial services (Goal Tracker, 2020). South Africa through the 2030 National Development Plan (NDP) has committed itself to the United Nations Sustainable Development Goals (National Planning Commission;, 2020). According to the NDP, South Africa faces urgent development challenges such as poverty, unemployment and inequality (National Planning Commission;, 2020).

Unemployment data reveals that a high percentage of people who are unemployed have a matric certificate or less as a qualification. Therefore, they have a low probability of finding employment without any work experience (Statistics South Africa, 2020). Quarter two of 2020's unemployment rate is around 30%, while the target was 14% in 2020 according to the NDP goals (Statistics South Africa, 2020; National Planning Commission;, 2020). The gap to target is around 16% where the country is behind its own plan, creating further urgency resolve the unemployment challenge.

The technology revolution has also brought dynamism into the unemployment challenge faced by the country through the automation of work, resulting in displacement of workers (Eberhard, et al., 2017). This phenomenon is referred to as technological unemployment, being the displacement of workers by technology advancement (Frey & Osborne, 2016). Sorgner (2017) emphasises that the risk is that as more jobs are automated through a process of technology advancement, the greater the potential for displacement of workers adding to unemployment.

(Jandric & Peters, 2019. p.1) summarise these points succinctly: “Accelerating technological unemployment will likely be one of the most challenging societal issues in the 21st Century. Never before in history are so many industries being simultaneously upended by new technologies. Though ‘creative destruction’, in which lost jobs are replaced with new ones, will be a factor, our newest technologies have the clear potential to eliminate many more jobs than we create. With technology advancing at a geometric pace, robotics, artificial intelligence, 3D-printing, and other innovations with enormous disruptive potential will soon hit the mainstream. Billions of people worldwide are currently employed in industries that will likely be affected—and billions of new entrants to the workforce will need jobs at The World Technology Network in 2015”.

The above was the opening discussions at the World Summit in 2015 on the subject of technological unemployment. The acceleration of technological unemployment was seen as contributing to the greater unemployment as long as new work was not being created as quickly (Jandric & Peters, 2019). The dilemma for South Africa is that technological advancements cannot be halted and their impact on unemployment cannot be changed. Therefore the country may need to choose between its technology strategies and unemployment targets. Technology brings competitive capabilties in the market and the country (Amankwah-Amoah, Osabutey, & Egbetokum, 2018). While employment creation would alleviate poverty and inequality in the country (National Planning Commission;, 2020).

1.4 Research Purpose and Objectives

The study aims to add to the body of knowledge regarding the implications of technological unemployment in the financial services industry in South Africa. This is in the context of initiatives to reduce unemployment whilst balancing the need for sustainability in a global competitive environment as per the National Development Plan (National Planning Commission;, 2020). The research provides insights into investment priorities for employment creation and to highlight the implications of sustained unemployment on economic growth.

The research objectives are therefore to:

1. Gain an understanding of technological unemployment in the context of South Africa.
2. Determine the impact of technological unemployment on financial services industry.
3. Determine the response strategies which can be employed by various stakeholders to mitigate the negative effects of technological unemployment.
4. Determine how the industry may be able to achieve both technological advancement and employment using international studies.
5. Determine the changes in business models for financial services companies.
6. Determine whether current skilling initiatives are adequate to reduce unemployment.

1.5 Gaps in Literature

Ayentimi and Burgess (2019) argue that the literature on the impact of the fourth industrial revolution are largely written for developed economies with limited focus on the challenges of developing countries such as the sub-Sahara region. From literature review, limited literature exists for an economy like South Africa which is trying to solve for the existing unemployment challenge and the upcoming technological displacement. Additionally, Frey and Osborne (2016) discuss how technological progress will replace future roles and how the offshoring of skills-based tasks will change. Kim, Kim and Lee (2017) model which jobs are likely to be automated and provide responsive strategies. This study follows similar objectives that of Kim et a. (2017), but includes a perspective of sub-Sahara Africa, which provides more nuances than in a developed country context such as in Europe and the USA

Given that technological displacement occurs, Dengler and Matthes (2018) determine which tasks are likely to be automated, with their focus on how the probability of unemployment can be reduced. Their study was done in a German context, which highlights the challenge in terms of South Africa's low skill levels where even though the country is still in its infancy on automation of tasks compared to developed economy, automation is inevitable. Moreover, Bai (2017) argues that digital infrastructure such as internet speed is critical to create a digital economy which will allow for new internet industries. Again, this highlights South Africa's plight in terms of its high inequality levels low internet adoption(National Planning Commission;, 2020).

The literature focuses primarily on the link between automation of jobs and resulting unemployment (Peters, 2017). There is however, limited literature on the future skills gap as result of technological unemployment in developing countries such as South Africa. As technological developments occur, additional skills will be required for current jobs (Jandric & Peters, 2019), which could result in displaced workers. The literature details that not all workers will be able to be re-absorbed (Nica, 2016). Limited viewpoints, however, exist from developing countries. In particular, the existing unemployment challenges for South Africa warrant research to understand the role of technological unemployment.

A final contribution of the study is to provide insights to the formation and founding objectives of the Centre of Excellence in Financial Services (COEFS) (@019) identifies gaps in the understanding of how the fourth industrial revolution will impact (or already has impacted) the industry(COEFS, 2019). In addition, on a country-wide level, this study supports the Presidential Commission on the fourth industrial revolution's task tol develop a proposal on how the government must respond to the societal changes (including skills development) brought about by fourth industrial revolution (South African Government, 2020).

1.6 Conclusion

Considering the importance and urgency of the topic of unemployment in South Africa as shown in the NDP, additional insights are warranted. This study contributes to the literature on technological unemployment through the the context of South Africa, which provides an interesting dilemma as companies need to remain competitive by investing in technology but such investment can contribute to the country's already high unemployment rate.

In the following chapter, a criticalreview and and assessmet of the literature review is provided.

2 Chapter 2: Literature Review

2.1 Introduction

This chapter details the literature review on the main constructs of the study which are unemployment, technological unemployment, technological advancement, skills development and business models in the financial services industry in South Africa. The chapter details new technologies which are driving both worker displacement and changes in business models. This is done to provide detail on the literary context of the study as stated in chapter one and the research questions which are detailed in chapter three.

The literature review section seeks to bring together literature to explain technological unemployment. It starts with a theory foundation on technological unemployment which has been around since the industrial revolution at the beginning of the 20th century. As such, it includes perspectives of both classical and neo-classical economists as their views on the existence and impact of technological unemployment were not aligned. The theory section provides a starting point into the current literature and provides macro-economic perspectives upon which the key sections of the chapter are based. In the literature, unemployment is analysed to understand the drivers and the impact to the economy, and this is localised to South African environment.

2.2 Theory of Technological Unemployment

The displacement of human labour by technology was coined as technological unemployment by (Keynes , 1930). Keynes (1930) referred to this as “discovery of means of economising the use of labour outrunning the pace at which we can find new uses for labour” (p.325). Keynes (1930) argued that this is a threat which would develop throughout time and will become pervasive in human existence. Recent definitions of technological unemployment have defined it as the displacement of human labour by computers (Chomanski, Massive Technological Unemployment Without Redistribution: A Case for Cautious Optimism, 2018). In the definition, Chomanski (2018) states that the permanence of the displacement of labour should be included in the definition remove any temporary unemployment as result of workers being repurposed or reabsorbed. Standing (1984)

argues that technological unemployment has been subsumed under structural unemployment hence the challenges around its definition.

In the following sections the research contrasts definitions of technological unemployment from both classical and neo-classical theories. Boerger and Roos (2016) argue that classical theory is concerned with the market self-regulating itself based on natural laws such as supply and demand, whilst neo-classical theory would focus on the allocation of scarce resources and their optimal use. The contrast of the two theory perspectives is important in firstly understanding the origination of technological theory and which market conditions prevailed for the development of the theory to understand present challenges as well as how labour supply ultimately affecting unemployment is analysed.

2.2.1 Classical Economic Theory

Standing (1984) argues that technological unemployment had various meanings in the classical economic era. The premise theory was the labour displacement theory which refers to the displacement of human labour as a result of mechanisation in agriculture and manufacturing (Kahler, 1935). The socialist views were that increase in investment in machinery will drive an increase in unemployment (Kahler, 1935). Neisser (1942) argues that the debates have been a result of lack of statistical data linking technological unemployment to permanent unemployment, and these continued through recession and prosperity economic periods. According to Kahler (1935), unemployment is more evident during a depression, when income levels are low and there is pressure on price of goods, due to the long period's workers remain unemployed. Keynes (1930) in his "Essays in Persuasion" highlights that it is quicker for technology to displace workers and then it takes longer time for those workers to find other employment or new employment to be created.

In "Wealth of Nations" Adam Smith discusses how division of labour leads to technology displacement. According Smith (2000), the division of labour is more pronounced after the implementation of technological changes. This division of labour created specialisation which hindered workers developing any innovation (Smith, 2000). Smith (2000) argues that the division of labour developed more repetitive tasks leading to reduced skills for workers

over time and reducing their growth potential, this was supported by Rosenberg (1965). The result being that when machinery is introduced in the production process, the skills of the workers are automatically made redundant (Smith, 2000). Machinery allowed companies to increase production to meet demand with less labour (Rosenberg, 1965). This encourages more investment in the production process and raw materials whilst retaining reduced labour levels (Standing, 1984).

In his “Traite d’economie politique” Jean-Baptiste Say argued against the permanence of technological unemployment. Say (2000) argued that the introduction of machinery, whilst replacing workers in the short-run in the long-run the market forces would lead to their reabsorption. The decrease in unit cost of goods after the introduction of machinery would lead to reduced prices increasing demand, leading to the reabsorption of the displaced labour (Say, 2000). Alternatively, the savings would drive increased investments in other products thereby leading to absorption of the displaced labour in the new factories (Say, 2000). Say argued in what was to be known as “Say’s law of markets” that the aggregate demand of goods will always equal the aggregate supply and therefore there cannot be over-production (Say, 2000) .

The gaps in Say’s theory are in the assumption of how savings will be utilised by companies, and that demand will remain constant or increase after the displacement of workers who are also consumers. The other assumption is on demand for new products being equal or more to be able to consume the displaced workers. These assumptions are in line with classical economic theory that the market will return to equilibrium through natural forces.

In his “Principles of Political Economy”, John Stuart Mill discussed the demand for labour in relation to demand for commodities. Mill (2000) argued that increased demand for commodities would not necessarily lead to increased demand for labour. This appears to contradict Say’s findings on demand for goods increasing demand for labour. The efficiencies realised in the production process are to meet the current demand cost effectively (Neisser, 1942). Both Say and Mill argue that over supply of labour would not necessarily equate to oversupply of skilled labour (Neisser, 1942). Standing (1984) argues

that the limitation of labour consumption is based on the availability of capital to spend on that labour. The limit in the labour demand would then be on capital available (Mill, 2000).

Ricardo, another classical economist, argued that technological changes altered variable capital into fixed capital through machinery investment (Ricardo, 1992). Companies looked for opportunities to increase revenue with limited capital, hence the focus on increased output with reduced costs (Ricardo, 1992). The result being revenue staying the same and costs reducing, which would then lead to an increase in profit but less money for wages due to reduced costs (Ricardo, 1992). Ricardo also aligned with Say in that technology increased production at a reduced cost, leading to lower unit costs, which would ultimately increase profits leading to rising employment, potentially back to the previous levels (Standing, 1984). The overall view was that to maintain employment at the same levels, markets would require increasing investments which would be encouraged through increasing profit rates (Standing, 1984).

Senior (1836) argued against technological unemployment on the basis that investments in machinery would come out of profits and not from the wage bill. Senior (1836) argued that the profit opportunity would drive the impetus to reinvest profits rather than redirect costs. Mechanisation leads to increased profits through a larger reduction in the costs of production, thereby enabling further investment without the necessity of displacing labour (Senior, 1836). The gap in this view is that it assumes that labour demand remains the same through this process, whilst an increase in demand is supported through employment of machinery. One of the challenges to this view is that it negates the drive of companies to maximise profits.

Karl Marx argued that the focus of the topic of labour displacement should be on the capital structure changes, the trend is for capital to change from being variable to fixed, due to the investment in mechanisation (Marx, Aveling, Engels, & Moore, 2001). The capital released from displacing labour becomes fixed through the purchase of the machinery and is therefore not available to reabsorb displaced labour (Standing, 1984). The consequence, according to Marx et al., (2001), is that displaced labourers would either need to be reemployed by new investment somewhere else or in alternative industries. The

consequence of the division of labour impacts the skills which these labourers have, meaning they may not have the requisite skills for the available employment and therefore would be at a disadvantage in negotiating income (Marx et al., 2001). This will lead to a reduced workforce in the industry in the long run or to reduced wages which would drive down prices due to weakened demand (Marx et al., 2001). The trend is for profit accumulation to happen through cycles of production, these cycles would either be contractions or expansions, providing different opportunities for capital (Marx et al., 2001).

Marx's views on capital motivation being directly linked to profit rate improvement are relevant in that they drive the mobility of capital investment (Marx et al.,2001). If, in the long run there is greater potential for increasing profits, then capital investment would increase investment in production (Marx et al.,2001). The researcher's interpretation is that the view is not holistic as it lacks an assessment of the contribution of technological advancement on improving profit rates and thereby driving capital flows. In addition, the view also follows all the classical views on the cyclical nature of the unemployment, as this assumes the reabsorption of all displaced labour. If capital investment is driven by increasing profit rates, then the reduced costs would not be re-invested without an opportunity for bigger profits.

In summary, classical economic theory on technological unemployment provides insights into what was included in the definition of technological unemployment and the factors which drove the dispute on validity of the phenomena. In the following section on neo-classical theory, the research contrasts the views of economists on technological unemployment and whether those have progressed further with time

2.2.2 Neo-Classical Economic theory

In this section, the neo-classical approaches to technological unemployment is reviewed. Neo-classical economic theory is primarily concerned with the allocation of limited productive resources, and which resources will facilitate the expansion of production of goods and services (Corporatefinanceinstitute, 2020). Neoclassical economics focuses on demand as a key driver of value of a product or service (Corporatefinanceinstitute, 2020).

Neisser (1942) argued that the major difference within the neo-classical views are around the use of temporary versus permanent technological unemployment. Neisser (1942) questioned whether the market equilibrium leads to reabsorption of displaced labour in the long run or to further displacement. The adjustment lags between demand and supply throughout any specific period would create inconclusive data (Standing, 1984). Overall the challenge with technological unemployment rested on the data available to validate its existence due to cycles in supply and demand.

In neo-classical economic theory, Standing (1984) argues that there are four sources of contention around the existence of technological unemployment and its validity in the context of unemployment. These are factor price rigidities, the feasibility of factor substitution, the industrial structure and the pattern of demand (Standing 1984). Factor price rigidity considers the pressure on wages during a depression, being sustained period of economic downturn. The implementation of technological changes during a depression would worsen unemployment and therefore put more downward pressure on wages, which would result in wage cuts and the weakening of unions' ability to support continued employment (Standing, 1984). The consequence of this would be the impact of reduced wages on the demand for products, and ultimately, on the demand for labour. Reduced wages impact the domestic market as a result of reduced money flow. Further, reduced wages may also result in inefficiencies and reduced productivity due to reduced income motivations (Standing, 1984). Contrarily, technological change is likely to occur during high demand (of a business cycle expansionary phase), due to increased demand for labour, shortages are therefore addressed through technology (Standing, 1984). However, during this period labour has a strong bargaining position and would counter any measures that could potentially lead to a reduced labour demand (Standing, 1984). Furthermore, during a depression where there is reduced demand, labour's bargaining position is weakened, and it may be an opportune time for the implementation of technological change, ultimately this would be driven by available capital investment (Kahler, 1935). Wicksell (2016) argued that technological investment is reliant on real interest rates otherwise such investment would be limited in only arising from savings and this limits labour displacement. Market interest rates are the result of monetary policy and would also have an impact on available investment, and real interest rates limit investment to savings (Wicksell, 2016).

Price rigidity looked at capital infrastructure and labour substitution and the periods in which this is most likely to occur (Standing, 1984). The level of wages and processes for wage negotiations considering whether the market is in a depression or prospers period (Standing, 1984). The debate is on whether labour demand would be restored at market equilibrium if its displaced through technological unemployment.

The feasibility of factor substitution could also result in technological unemployment. If all factors remained rigid, then the elasticity of demand for labour would be zero (Standing, 1984). This refers to the demand of labour not changing irrespective of any factors which are substituted. It would not matter whether wages are reduced, as employment would stay the same (Standing, 1984). The reduction of wages would change the purchasing ability of labour - impacting consumption and thereby impacting investment.

The industrial structure of perfect price competition involves the response of monopolies to technological change (Freeman, Clark, & Soete, 1982). According to Standing (1984), monopolies stifle price adjustments and accelerate mechanisation. This would be to improve their profit rate whilst maintaining unchanged price levels (Standing, 1984). However, they may also stifle technological change in that it may create a redundancy in capital infrastructure, thus creating a gap for new entrants. Slowing innovation retards progress and as such, reduces employment growth (Freeman et al. 1982)

In summary, neo-classical theory is concerned with the validity of technological unemployment due to the cyclical nature of economic performance. This included whether the nature of technological unemployment is permanent or temporary, because if its temporary then it would be result of cyclical changes rather than technology. As neo-classical economics is concerned with supply and demand, the debate is also on the natural forces of the market driving labour demand and labour potentially getting reabsorbed when market returns to equilibrium. In the following section, unemployment is reviewed to understand causes flowing from the theory discussed around market factors.

2.3 Unemployment

Unemployment in South Africa has two definitions, which are termed narrow and broad definitions. The narrow definition is all job seekers who are looking for work and have done so recently, while the broad definition includes job seekers who have stopped actively looking for work but are available (Kingdon & Knight, 2007). According to Kingdon and Knight (2007), South Africa has adopted the narrow definition for reporting unemployment. At the time of the research, South Africa's unemployment rate was around 30% (Statistics South Africa, Statistics South Africa, 2020). Festus et al. (2016) argue that the main causes of unemployment in South Africa is the low level of education of majority of the job seekers. The skills which job seekers have do not match those required by the market. Festus et al. (2016) argue that the problem grows as more school leavers enter the job market annually. The following sections analyse the contributing factors to unemployment which for the purposes of this research are the skills gap and economic growth.

2.3.1 Impact of low skills on unemployment

One of the key contributors to unemployment in South Africa is the low skills levels. The intention of this section is to establish the current skills levels within the unemployment population and how these manifests through unemployment levels in the country. This section provides the basis for the data collection process on the impact and remedies to the financial services sector. The research also unpacks how technological unemployment has been deemed part of structural unemployment through the analysis of causes of unemployment in South Africa.

The following provides a graphical representation of skills levels within the unemployed population in Figure 13.

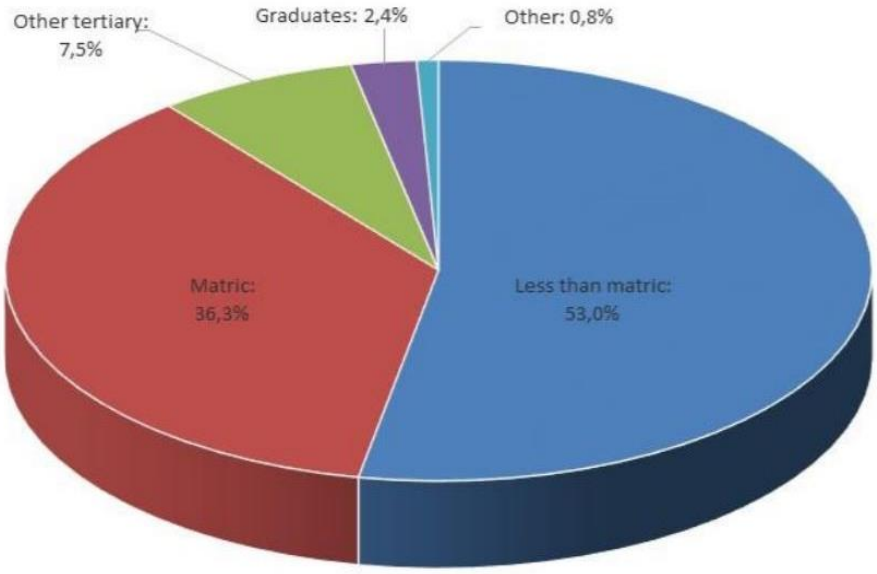

Figure 1: Proportion of the unemployed by education level, Q2:2020

Source: Statistics South Africa, 2020.

The proportion of the low skilled unemployed population is reflected in Figure 1, showing that those with matric or less than matric make up 89% of the unemployed population (Statistics South Africa,2020). Rogan and Reynolds (2016) argue that the low levels of education are a result of education inequalities in the country, which is driven by schooling background and race. Furthermore, Francis and Webster (2019) argue that the inequalities in the country are a result of lack of priority on addressing unemployment by those with the authority, both the public and private sector. The low education levels have a negative effect on the speed in which those who are unemployed can be transitioned into employment (Rogan & Reynolds, 2016). This creates a large portion of the population who may never be employable, as more new jobs require higher levels of skills. A person is considered to be long-term unemployed if they have been unemployed for longer one year continuously and short-term unemployed if less than a year (Nonyana & Njuho, 2018). According Nonyana and Njuho (2018), the longer a person stays unemployed, the less likely they are to exit unemployment, which has negative social impact on the country.

The challenges with low skills within the unemployed have been indicated to be the result of education background and inequality in the country. These are structural in nature in that they require investment and strategies at a macro-level. The scope of this research is to understand how automation of low skilled work negating any efforts to reduce unemployment and whether that is a significant issue for the country. In the next section, the lack of growth as a factor contributing to unemployment is assessed.

2.3.2 Impact of economic growth on unemployment

Nonyana and Njuho (2018) argue that lack of economic growth is a key driver to unemployment as result of reduced labour demand. This can be linked to Say's theory that increased demand for products will lead to increased demand for labour to produce those products (Say, 2000). According to Nonyana and Njuho (2018), economies with low economic growth over time, tend to see deterioration of unemployment levels. Festus et al., (2016) argue that South Africa has had prolonged low economic growth since 2009 which has negative effect on employment. According to Statistics South Africa (2020), the Gross Domestic Product (GDP), which is a measure of economic production in the economy had declined by -0.1% in the first quarter of 2020. Brencher and Gross (2017) argue that when capital and unemployment are complements to each other then there would economic growth which would benefit both. This would mean if companies are able to consume low skilled workers, these workers would increase economic activity that wouldultimately benefit these companies (Brencher & Gross, 2017).

Mkhize (2019) argues that based on Okun's law, the relationship between unemployment rate and economic growth rate is in the ratio 1:3. One percentage increase in unemployment results in three percentage points drop in real growth output. Conversely one percentage increase in growth output results in 0,3 percentage drop in unemployment (Mkhize, 2019). The correlation between unemployment and the economic growth rate supports the earlier theory by Say on demand of products and services increasing demand for labour. Von Fintel (2017) disagrees by stating that due to the inequality levels in South Africa, economic growth does not necessarily result in employment. Von Fintel (2017) argues that new employment is being created in the financial services sector which requires

higher skills levels, whereas the primary and secondary sectors which could absorb low skilled workers in mining and manufacturing have continued to reduce employment.

The unemployment problem in South Africa has a short and long-term impact on companies operating in the sector, where the effects will materialise at different times. In developed economies, high unemployment has been dented through the expansion of finance, business and professional services sector (Mkhize, 2019). In South Africa, the financial services sector has grown employment in the past few decades as the manufacturing sector employment declined (Statistics South Africa, 2020). However, the financial sector is a dependent on the performance of the primary and secondary sectors and therefore negative growth in those sectors affects it (Mkhize, 2019).

In summary, addressing unemployment requires more than economic growth, specifically for South Africa due to its large unemployed population. Minimum skills requirements in employment appear to be growing (Festus et al., 2016), with time creating an increasing number of job seekers who will remain unemployed for the foreseeable future. The longer someone remains unemployed, the more likely they will remain unemployable due to their lack of relevant skills (Nonyana & Njuho, 2018). Economic growth creates opportunities for increased labour demand (Mkhize, 2019), however growth is benefitting those in skilled employment (Von Fintel, 2017). Skills development would be required to improve the prospects of those unemployed. At the same time, technological advancement continues to grow as result of the fourth industrial revolution increasing the level of skills required in employment (Burger, 2017).

2.4 Technological Unemployment

In the earlier sections, Keynes (1930) referred to technological unemployment as the automation of work happening faster than we can develop alternative or new work for the displaced workers, while Chomanski (2018) added that it includes the displacement of workers by computers and should include permanence. Standing (1984) argued that technological unemployment has been subsumed within overall unemployment. In understanding technological unemployment in a country such as South Africa with high

unemployment, it required an initial review of overall unemployment. In the following section the research goes further to understand the technological unemployment portion of unemployment and its related causes. The section examines the different technologies driving the displacement of workers. In the previous section on unemployment, Von Fintel (2017) concluded that increasing technological advancement has meant that low skill level jobs are being automated at a faster rate than high skill jobs, and this is how the section starts.

2.4.1 Automation of Jobs

In determining the possibility of a job being automated, Sorgner (2017) referred to splitting jobs into two categories: routine and non-routine, where routine tasks are generally considered repetitive but require cognitive and physical skills. These tasks can easily be translated into a computer programme language and are therefore likely to be automated (Sorgner, 2017). The increasing number of routine jobs being completed by computers has added to the reduction in employment opportunities for humans (Frey & Osborne, 2016). This is especially concerning as these jobs can easily be performed by low skilled job seekers (Frey & Osborne, 2016). Mankiw (2014) argues that because technology can perform routine tasks faster than human labour, it has created the opportunity to achieve more output with less human labour. This unfortunately continues to reduce opportunities in the un- or low skilled routine work categories.

Non-routine tasks include manual and abstract tasks which require greater technological power to be able to be executed, these tasks occur mostly in changing environments and require a high degree of adaptability, thus the required technology complexity may be too high relative to the benefit of cost saving (Sorgner, 2017). Coombs et al. (2020) argue that in time artificial intelligence (AI) will have the ability to enable machines to perform more non-routine tasks. The more complex the tasks, the more complex the programming required (Frey & Osborne, 2016). The growth in AI has meant that technology is able to move up the scale of work complexity, potentially creating more automation risk for mid-level skill jobs (Frey & Osborne, 2016).

Jung and Lim (2020) argue that the implementation of robotics suppresses employment growth and that this occurs in greater proportion for low skilled labour. Repetitive low skilled work is highly likely to be automated through simple computer programming, resulting in less jobs which require low skills. Contrasting this with the current low skill unemployed population in the country, it highlights negative risks for reducing unemployment if people are not adequately skilled. In Figure 2 below, the probability of automation based on complexity of work is depicted to provide context of substitution levels.

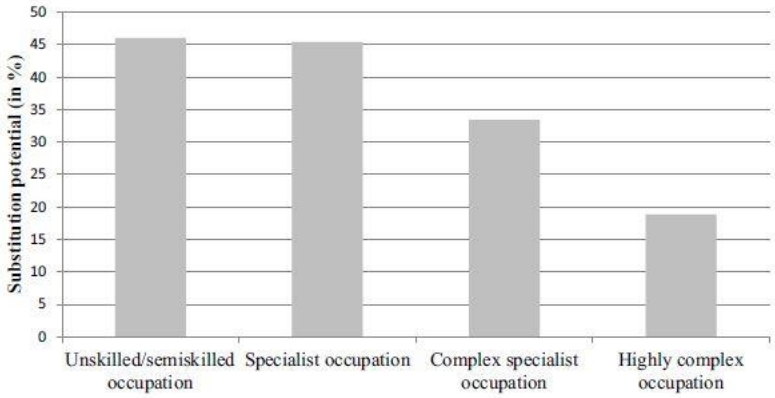

Figure 2: Average weighted substitution potentials by requirement level

Source: Dengler & Matthes .(2018, p.307)

Dengler and Matthes (2018) state that automation reduces as the work activities increase in complexity. The increase in complexity would require more skills and vice versa for low complexity work. This is reflected in the above Figure 2 showing potential technology substitution. In the same study, Dengler and Matthes (2018) found that financial services work activities are more likely to be complex, however where the activities were low complexity and specialised it was found that they have a 50% probability of automation. This is in line with Smith's (2000) theory on the division of labour leading to faster automation. According to Kondratyuk (2018), researchers have identified 702 jobs which can be automated and through automation, replace current specialists in the fields of telephone sales, administrative assistants etc. PricewaterhouseCoopers (2017) found that in developed economies, 30% of jobs in the United Kingdom will be automated by the early 2030s and 38% in the United States in the same period.

Outside of AI, work automation is concentrated in low skilled less complex work, these are easily translatable into programme coding. A job with greater routine tasks is also likely to be automated. It follows that as lower skilled, less complex work becomes automated; the repurposing of displaced workers becomes important in the reduction of unemployment strategy. The more complex the job is, the less likely it will become automated; however, these jobs require higher skill sets. Moreover, as technology advances specifically through digitisation and AI, computers are able to perform more complex.

2.4.2 Digitization and Artificial Intelligence

According to Chang and Huynh (2016), technology advancement has brought about the introduction of disruptive technologies such as AI, the internet of things and robotics. Coombs et al. (2020) argue that the development of AI has extended to knowledge reasoning, machine learning and natural language processing, allowing this technology the human traits of learning and improving over time. In combination these technologies, internet and robotics have allowed for the introduction of automated teller machines (ATMs), online banking and social media platforms (Brown, 2012). Kim et al. (2017) argue that the development in technology through the internet and AI has fostered engagements between multiple technologies, negating the need for a human intermediary. The technologies engage through a multitude of servers that allows for more participation in the customer journey, such as Google maps and voice recognition software (Kim et al., 2017). Chang and Huynh (2016) discuss the increasing use of digibots which are digital robots that can communicate through intelligence recognition software, they are able to engage directly with customers and are most prominently used in call centres.

The participation of intelligent technology in the workplaces increases the displacement of workers, and in this case, the middle and higher skilled jobs (Kim et al., 2016). Makridakis (2017) argues that the internet has increased the connectivity of people worldwide, and with the addition of AI utilising Big Data this, the traffic between geographies and global competition is intensified. The ability of people to consume services anywhere in the world will be facilitated through digitisation providing benefits to those leveraging these

technologies (Makridakis, 2017). Makridakis (2017) also argues that these technologies will also contribute to the displacement of workers and requires repurposing strategies. Gruetzemacher et al. (2020) forecast high labour displacement as a result of AI, although this will probably only have benefits productivity in the future.

In summary, digitisation and AI are expected to displace workers in the future including those performing some of the complex tasks discussed earlier. Technological unemployment and how it occurs, through automation of low skills jobs and the digitisation of complex jobs was discussed. The implementation of AI is forecasted to increase technological unemployment as it automates those jobs which were thought to be only for human capabilities.

2.4.3 Impact on South Africa and other developing economies

Chang and Huynh (2016) argue that developing economies are at greater risk of experiencing a negative impact of job automation due to low levels of skills as result of poor education. Sithole and Buchana (2020) argue that employment growth in sub-Sahara African countries is negatively impacted by process innovations for both manufacturing and services sectors. Khayyat and Lee (2015) argue that investment in skills development as response to automation to equip people with future-required skills and thereby increasing the competitiveness of these economies. As discussed earlier, a large portion of the unemployed population has low skills levels and low qualifications (Statistics South Africa, 2020). Investment in skills development creates more demands on the country's fiscus, however without this investment the country would be uncompetitive (Khayyat & Lee, 2015).

Kondratyuk (2018) argues that developing countries will find themselves competing for skilled resources with developed economies. This would increase the burden on developing countries such as South Africa to balance retaining skilled workers whilst skilling a large portion of unskilled unemployed group. The demand from developed economies is driven by aging populations which forecasted to increase demand for skilled workers (Kondratyuk, 2018).

In summary, the automation of certain jobs in South Africa will result in a reduction in the employment of low skill jobs. Due to the high number of low skills levels in South Africa, investment in future-skills is necessary to ensure adaptation to technology changes. Technology will continue to change, as the drive for technological development is propelled by globalisation and digital developments that are changing production and consumption patterns (Boyd & Heuttinger, 2019).

2.5 Future Skills requirements

The result of the previous sections is that skills development is key to ensuring a competitive economy. Technological advancement is increasing the need for skills development as current work is becoming obsolete through automation requiring workers to be repurposed. Considering the low skill levels in developing countries skills, development strategies are a necessity. In the following section, skills requirements which have been implemented in developed economies and those recommended for economies like South Africa are assessed.

2.5.1 Skill biased Technology

Jung and Lim (2020) argue that technological advancement will reduce low skilled jobs however it will also complement high skilled jobs. Technology is being used to enhance productivity levels of skilled workers as tool for delivery (Jung & Lim, 2020). The skill-biased technological change hypothesis states that new technology leads to increased demand for skilled workers, resulting in increased wages which in turn increases inequality between skilled and unskilled workers (Pi & Zhang, 2018). Increasing technological implementation would create further inequality in developing economies due to their low level of skilled workers (Lee & Wie, 2015).

As technology advances, there is increased skill development as workers move to higher skilled work (Jung & Lim, 2020). Wanga, Dinga, Guana and Xia (2020) argue that new industries are being created with technology, such as the digital economy of China which contributes 36% to the country's GDP. Employment from the digital economy can only be realised through higher internet connectivity and speed (Bai, 2017). Aubert-Tarby, Escobar

and Rayna (2018) argue that a country would then realise increased income levels as result of reduced cost of production. Technology will drive skills development as consequence, which should benefit those that are displaced and those looking for work (provided they are adequately skilled). The increasing use of technology in work environment results in further skilling due to technology performing low skilled work and leaving higher skill activities for humans, thus skill biased technology (Jung & Lim, 2020).

2.5.2 Knowledge development

Hu (2020) argues that economies that realise greater benefits from technological advancement also have knowledge development programmes which grow in alignment with the technology. Knowledge creates the base for innovation developments which in the fourth industrial revolution are most likely to be technologically linked (Hu, 2020). Economies can realise benefits from external markets in addition to their own markets when knowledge development links into technology, creating knowledge spillovers (Hu, 2020). A knowledge economy relies heavily on knowledge capabilities to produce and provide services to customers (Yeo & Lee, 2020). Such an economy relies more on intellectual capabilities, rather than physical capabilities (Powell & Snellman, 2004). The increasing automation of low skilled jobs is resulting in a higher number of high skilled jobs, leading to economies which are heavily weighted towards knowledge (Yeo & Lee, 2020).

Technological advancement is increasing the education requirements of work (Jandric & Peters, 2019). Jandric and Peters (2019) described how the minimum requirements for a job increase with further technological advancement, and as technology is deployed for basic routine activities within a job, these become less relevant requirements for a job. AI technology is ever developing, learning how to do more of the job, eventually being able to do the complete job (Jandric & Peters, 2019). The result of the development being technological unemployment as the computer can do the complete job without the involvement of human.

Peters (2017) argues that the evolving for process for minimum job requirements creates more demand for higher education in the marketplace. Technology also broadens the future

learning capabilities through recorded learning, which can be assessed at convenient times, especially for workers seeking to collect skills (Peters, 2017). There are opportunities for an economy to develop and produce more graduates in order to gain an advantage (Jandric & Peters, 2019). Countries with more graduates with innovative and critical thinking skills are starting to take up different opportunities in the digital world (Jandric & Peters, 2019). However, Jandric and Peters (2019) agreed that education without new opportunities will not reduce technological unemployment, it will merely create an exclusive group of workers.

2.5.3 Skill Development strategies

The continuing digital developments create the need for skills assessment and development strategies. PwC (2017) states that around 30% of jobs will become automated in developed economies and investment in skills development is required to increase the adaptability of workers. As economies become more knowledge based through the automation of low skill jobs, future required skills become important to map and develop in order to avoid continued jobless growth (Eberhard, et al., 2017). As such, technological advancement is changing the makeup of the employment market in that it creates the need to constantly develop new skills which are not within the realm of automation (Eberhard, et al., 2017). Hu (2020) argues that economies which skills development programmes realise greater benefits in the long run from technology advancement.

Developed economies have initiated large programmes in response to the impact of the knowledge economy on their population as result of the fourth industrial revolution (Eberhard, et al., 2017). For example, Germany has been looking at future competitiveness in the production of high-tech products, China and India have been registering more technology patents and the United States has invested in advanced manufacturing (Eberhard, et al., 2017).

Globalisation has resulted in greater inter-connectedness of world economies, which places a greater need for developing economies to also keep up with developments to remain relevant (Holloway, Triyanti, Rafliana, Yasukawa, & de Kock, 2019). This further creates the need for human capital development to create resilience in the markets for a constant

changing future (Holloway et al,.2019). Ayentimi and Burgess (2019) argue that the reduction in operational costs due to technology may create an oppurtunity for multinationals to consider re-shoring work which was previously offshored to low labour countries. The skills being developed should be future ready to ensure relevance and effectiveness to the market.

South Africa has initiated the Fourth Industrial Revolution Commission (4IR) which will investigate related impacts of the 4IR on the economy (South African Government, 2020). The commission is mandated to advise on skills development and the future of work (South African Government, 2020). The commission has also been tasked with advising on the required future skills and how the education system should be updated to support (South African Government, 2020). This work follows the work done in developed economies to understand the impact of 4IR on the competitive and skills resilience of the country (Eberhard, et al., 2017). Oluwajodu, Blaauw, Greyling, and Kleynhans (2015) argue that the graduate unemployment problem in South Africa is a result of mismatch of skills acquired in learning institutions relative to what the market requires. The high unemployment rate is partly a result of lack of skills and includes skills mismatch with what the economy is demanding (Quarterly Labour Force Survey, 2020). The objective being to solve the unemployment problem through developing skills which are required in the market and are future-proofed.

Table 2.1: Required skills and groupings

Skill Group	Skill description
Cognitive Skills	Active learning
	Speaking
	Active listening
	Critical thinking
Interpersonal Skills	Negotiation
	Persuasion
	Social perceptiveness

Strategic Skills	Visioning
	Identification of key causes
	Solution appraisal
	System evaluation

Source: Adapted from Guzman, Muschard, Gerolamo, Kohl, & Rozenfeld. (2020). Characteristics and Skills of Leadership in the context of industry 4.0, 543 – 550. P.548

Table 2.1 above has been adapted from the leadership skills lists compiled by (Guzman et al., 2020) in their research on skills for leaders in the fourth industrial revolution. The key groupings of skills which they identified were cognitive, interpersonal and strategic skills (Guzman et al., 2020). According to the authors, leaders require all these skills when leading organisations in the 4IR era if they are to achieve their strategic objectives (Guzman et al., 2020). Guzman et al. (2020) argued that in the cognitive grouping, communication is critical to share information, whereas the most highlighted skill in the interpersonal grouping is negotiation in order to create agreements for the benefit of the organisation (Guzman et al., 2020). The authors conclude that within the strategic skill grouping, visioning is critical (Guzman et al., 2020).

In reviewing skills development strategies, its necessary to assess the work done on skills development in South Africa. Van Den Berg (2019) proposes changes to how knowledge can be acquired in the new digital world. Van Den Berg (2019) recommended a blended learning experience which can be both online and face to face, where the learning needs to provide students with an opportunity to develop solutions for the development of innovation skills. It must include business style learning to allow for learning from real life scenarios; must include free design learning; allow for journal reflection which encourages the documentation of learnings, what has not worked and what can be improved upon; experimentation so that students can develop own conclusions and partnerships with industries for relevant learning (Van Den Berg, 2019). Van Den Berg (2019) noted that the skills required in the future are: collaboration and communication, problem solving and critical thinking, creativity and innovation, information and communication technology (ICT)/digital skills, to name a few.

The ability to learn and respond to changing market conditions becomes a critical skill of the future, including the ability to combine multiple skills for a useful purpose (Kondratyuk, 2018). Employees will need to have both intellectual abilities and an understanding of how to leverage those abilities. In this section the research assessed how technology is driving skills development. This is leading to the development of knowledge economies as the level of skills required is raised. This lead to an analysis of skills development strategies necessary in economies like. However, skills development is a consequence of the technological advancement period, therefore both countries and companies should have skills development strategies to remain competitive.

2.6 Changes in Business Models

This section analyses literature related to how business models are changing and how competition and technology are driving that change. Technology has changed how business processes work and who performs tasks in companies leading to how services and products are sold to customers. The relevance of business models in the research provides an outlook on the future of employment and the opportunities to improve unemployment levels. In reviewing business models, the section provides a view on whether technological unemployment will continue and to what extent. Amankwah-Amoah, Osabutey, and Egbetokum (2018) argue countries and companies are investing more in emerging technologies to increase the competitiveness of their markets.

2.6.1 Technological foresight

Technological foresight is a methodology of determining technological developments in the future through collaborative vision sessions (Miles, 2010). Understanding the changes in technology provides an understanding of the direct changes of business models that change as result of technology.

In their study on technological forecasting, Mao, Koide, Brem, and Akenji (2020), performed a survey of various experts, across multiple countries, to understand how technology is expected to change daily activities including work. Mao et al. (2020) argue that technological forecasting allows for the building of multiple scenarios about how technology

and innovation will change social and work environments. This would in turn change the way business is done, thereby changing business models. Figure 3 draws on Mao et al. (2020) to show what is considered high impact technology changes.

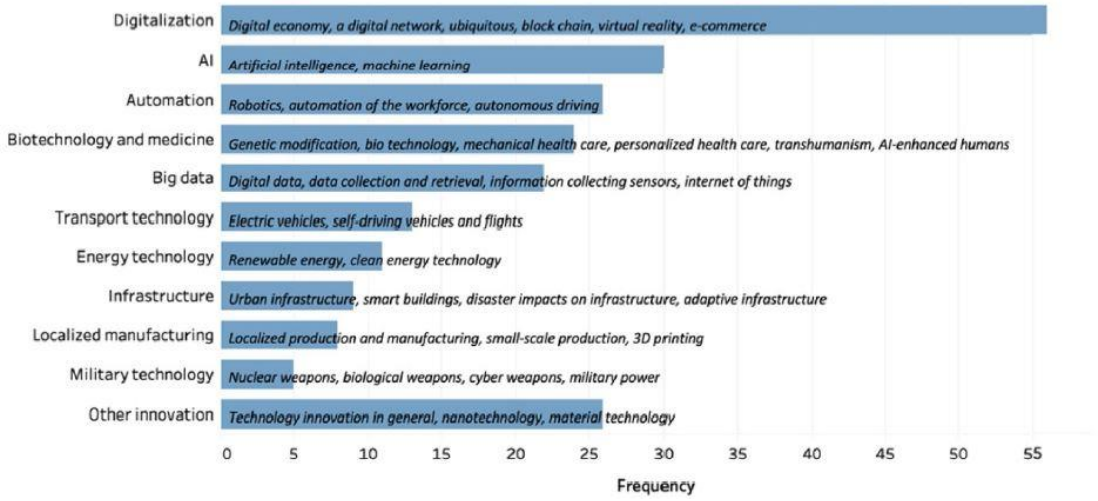

Figure 3: Changes in technology reported by respondents

Source: (Mao et al.,2020. p5)

From Figure 3 digitization is seen to have a high impact on changing daily life by higher number of respondents (Mao et al.,2020). For purposes of this research, some of the drivers of digitization are analysed to understand their impact on business models, specifically in the financial services sector. In the earlier sections, the impact of digitisation on employment was analysed and it was found that it will contribute more to the displacement of workers as technology develops. In addition, AI and robotics were previously noted as contributors to technological unemployment through the automation of work processes. Figure 4 confirms that digitisation, AI and robotics will change the way business and customers interact, and that this change will be continual as technology improves.

2.6.2 Blockchain

Block chain is noted in the top four position in Figure 4 and is one of the most disruptive technologies especially in the financial services sector (Kimani, Adams, Attah-Boakye, Ullah, Frecknall-Hughes, Kim, 2020). Blockchain is data stored and arranged in a distributed ledger system publicly available on digital blocks, where each block contains a

digital signature and timestamp making the blocks unchangeable (Kimani, et al., 2020). Block chain has led to the growth of cryptocurrencies which have disrupted financial services (Dai & Vasarhelyi, 2017). This greater use in financial transactions has created an alternative to utilising traditional banks as financial transaction mediators (Dai & Vasarhelyi, 2017). The change has facilitated new entrants into the financial services industry and is changing how customers are consuming banking services. This increase in competition is driving changes to how banks offer services to customers (Dai & Vasarhelyi, 2017). This also illustrates how business models in the financial services sector are being driven to change

2.6.3 Aritificial Intelligence

One of the key technological developments noted in Figure 4 that is also creating tension on business models to change is AI (Mao et al,. 2020). Bianchini, Pellegrini, Rossi, and Saccani (2018) argue that companies should capitalise on technological change to review their business models so that they are more circular in order to realise benefits in the environmental, social and economic spheres. As an example, AI allows for remote working at the convience of both the customer and the worker. In updating their business models, companies could leverage the environmental benefits of reduced travel from remote working whilst meeting social demands of customers.

Königstorfer and Thalmann (2020) argue that commercial banks are increasing investments into AI as they are seeing value through improved credit risk, fraud monitoring and customised marketing. The increased use of AI will drive the change in business models as companies utilise more interactive computers in their business processes (Königstorfer & Thalmann, 2020). Davenport and Kirby (2016) argue that organisations can use AI to perform work previously done by high skilled workers and then assign those workers to more complex roles. This creates more capacity for complex tasks with limited resourcing, such as review and authorisation.

2.6.4 Fintech

The consumption and provision of services to customers have changed and technology is driven as much by customers' digital demands as it is by companies' efficiencies (Jung & Lim, 2020). As customers become more digitally adopted and expect to interact digitally with financial services companies, the latter are finding that they need to change how they do business to respond (Makridakis, 2017). These digital demands have not grown to the levels of developed economies but have resulted in job displacements at some local banks (Musgrave, 2019). Musgrave (2019) argued that these technologies bring modernisation to the industry, and even competition in some respect. Mogaji, Soetan and Kieu (2020) argue that the implementation of AI has increased targeted marketing using data analytics and has increased the inclusion of unbanked customers. Financial inclusion is important in high unequal societies, and this is one of the priorities of the South African government through the National Development Plan (South African Government, 2012).

In South Africa, the financial services industry has seen an expansion of financial technology (fintech) companies using technology platforms to compete with established financial institutions (COEFS, 2019). Fintech's are technology-driven financial processes which can replicate traditional banking processes (Vasiljeva & Lukanova, 2016). Fintech companies have triggered a digital disruption in the industry thereby creating an impetus for a review of how current processes will become digitised (Musgrave, 2019). This type of technology creates more opportunities to improve existing processes through the introduction of digital technology using intelligence through algorithms (Wanga et al., 2020).

2.7 Conclusion

This chapter reviewed the literature and theories related to technological unemployment. It analysed the key constructs of the research being unemployment, technology and skills development to understand how they are inter-related and contribute to technological unemployment. This was done to understand the factors driving unemployment specifically in South Africa in relation of technological advancement.
In the next chapter, the research questions, derived from the literature review, are detailed.

3 Chapter 3: Research Questions

3.1. Introduction

This chapter is a continuation of the previous chapter, which looked at the current literature and theory on technological unemployment and its impact on industries, including a review of South African industry. The previous chapter also contrasted how technological advancement may potentially lead to the displacement of workers in the absence of relevant skilling. This chapter provides details on the research questions, looking at how technological advancement has impacted financial services in South Africa

3.2 Research Question 1: How has technological unemployment affected financial services in South Africa?

The question intended to establish how the high unemployment rate in South Africa has impacted the performance of the sector. Further, it aimed to establish whether financial services companies are considering technological unemployment as a key contributor to the unemployment challenge in the sector. The two main concepts that were discussed and established in this question were unemployment and technology. These constructs are linked, as technological displacement through automation processes (unemployment) is the result of the implementation of technology in an effort to pursue efficiencies and vice versa (Kingdon & Knight, 2007; Frey & Osborne, 2016; Coombs et al., 2020; Sorgner, 2017)

3.3 Research Question 2: How will technological labour displacement change skills demand in financial services?

As established in the previous chapter, increasing technology investment leads to increased levels of job automation, especially in the low skilled jobs. This results in less low-skilled jobs available in the future and more high-skill jobs being left for humans. Increasing skills requirements in the industry may change the landscape of skills and skills development programmes. This is depicted in figure 3.1 below. The intention of the research question

was to establish what connection exists between technological displacement and skills demand driven by a reduction in low skilled jobs. In addition, the question sought to determine the effect of skills development on reducing unemployment (Jandric & Peters, 2019; Jung & Lim, 2020 ; Yeo & Lee, 2020)

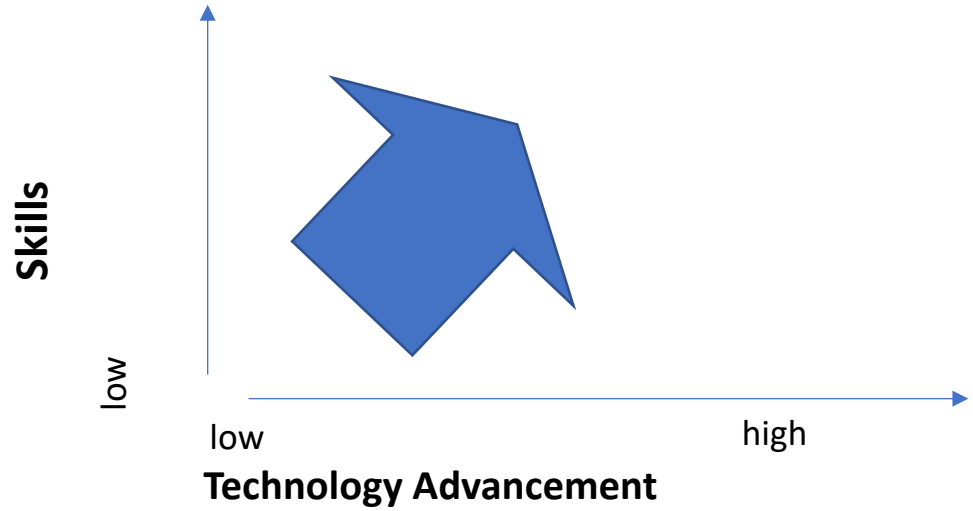

Figure 4: Depiction of the relationship between technological advancement and skills demand

Source: Author's own summation

3.4 Research Question 3: How is technological advancement changing business models in financial services?

As technology continues to become more advanced, its use in providing services and products to customers increases. Companies continue to leverage technology to achieve cost competitive strategies, which are changing how they are organised to deliver on customer expectations. There are increasing levels of skills demanded, as the automation of low-skilled jobs are changing the make-up of workforces in organisations. As a result, the organisations' business processes, technology and workforces are changing as a result of technological advancement, potentially resulting in new business models. The intention of the research question was to establish how organisations are changing their business models in response to the advancement in technology. In addition, the question intended to establish the opportunities to improve unemployment levels from the new business models (Dai & Vasarhelyi, 2017; Coefs, 2019 ; Mao et al., 2020)

Chapter 4: Research Methodology and Design

4.1 Introduction

This chapter provides details of the research paradigm and the methodology used. It includes the unit analysis, the population and the sample size, and an explanation of how the sampling was conducted. In addition, the chapter shows how the data was collected and analysed, including the quality control processes and any limitations encountered.

4.2 Research Design

The purpose of the study was to establish how technology advancement has contributed to unemployment in financial services. Investment in technology is linked to the growth and sustainability of businesses but is primarily driven by strategic business choices. It was important in answering the research questions to establish from decision makers what their outlook and foresight on these matters were. This drives their technology decisions in considering the impact of unemployment on the financial services industry. The researcher engaged through interviews with financial industry leaders to gain insight on their experience and outlook to determine the impacts of technology advancement.

Bryman and Bell (2014) stated that research can be interpretive if it attempts to understand the focus of the study through the meanings that participants have assigned. The researcher should consider the social context from which the meanings are associated and document multiple viewpoints to ensure that principles of interpretative research are achieved (Bryman & Bell, 2014). Interpretive research design is centered on how participants make sense of their environments, and that sense making is contextual rather than general (Punch, 2014). Therefore, the research should also concern itself with the environment of the participants (Serhun, 2013). In the interpretative paradigm, the phenomenological approach seeks to engage in in-depth discussions with a limited number of participants, as more participants do not necessarily yield more information (Sanders, 1982). This paradigm is suitable for interpreting responses of a limited number of senior leaders in the industry on the phenomena of technological unemployment.

The design strategy selected for this research was exploratory, thus intending to discover new ideas on the topic of technological unemployment. Swedberg (2018) described exploratory research as a process of discovery for something new or interesting, creating the impression that the result is unknown. This study endeavoured to understand what technological advancement means to the current unemployment reduction efforts, considering the likelihood of technological unemployment as a potential outcome (Swedberg, 2018). The exploratative technique allowed for a review of how unemployment, contrasted against technological advancement, would impact the financial services industry.

The research methodology chosen for this study was qualititative in nature. Qualitative research consists of three data collection methods: 1) in-depth open ended interviews; 2) direct observation; and 3) written items (Creswell, 2014). Qualitative research is concerned with gaining an in-depth understading of a subject, rather than a broad view (Boddy, 2016). The appropriateness of qualitative research is based on the objective to understand real life problems from those being interviewed (Lee Y. A., 2014). In-depth interviews were conducted with industry partipants with sufficient knowledge on how the industry operated based on their experience levels in years. Semi-structed interviews were conducted to collect in-depth insights on how the participants viewed the phenomena, being technological unemployment in relation to their industry. The results would provide greater understanding of how the industry was responding to the phenomena.

4.3 Population

The population represents a complete group which could be engaged for purposes of the study (Saunders & Lewis, 2018). The complete population for the study was individuals in senior management roles in all financial services companies in South Africa. These included both insurance and banking companies that had been operational for longer than five years. The intention was to achieve coverage in the financial services industry in line with case study approach (Creswell, Hanson, Plano Clark, & Morales, 2007). This ensured that the data collected would provide an adequate coverage of insights from experienced professionals in different companies.

4.4 Unit of analysis

Saunders and Lewis (2018) referred to the unit of analysis as a subject to be studied in order to determine the results. It looks at what or who will be counted to answer the research questions (Bryman & Bell, 2007). For this research, the unit of analysis was the senior managers or executives working in the financial services industry. The study was aimed to derive their views on the impact of technological advancement on unemployment levels. The study also included participants' views on the impact of unemployment on their respective areas of expertise in the financial services industry and outlook for the technological future.

4.5 Sampling method and size

A non-probability sampling method was used as this allowed for selection of the participants broadly due to the size of the selection (Bryman & Bell, 2007).The type of non-probability sampling was convenience sampling, which was based on the accessibility of participants (Bryman & Bell, 2007). According Boddy (2016), sample sizes are based on the type of research being conducted and the sample size is adequate if each segment being assessed is represented. The sample of participants consisted of 15 executives who have worked for 10 years or more in the financial services industry. The selection of participants covered the majority of the segments in the industry as depicted in table 3 below.

Table 4.1: Sample of participants and experience level

Role	**Years' Experience Sector**	**Organisation type**
Chief Executive	+ 10 years	Insurance Life Company
Chief Executive	+ 10 years	Consultancy
Deputy Chief Executive	+ 10 years	Bank - A
Managing Executive: Non-Banking Services	+ 10 years	Bank - A

Managing Executive: SMME Services	+ 10 years	Bank - D
Managing Executive: Transformation	18 years	Bank - A
Executive Head: Legal Services	10 years	Bank - C
Executive Head: Merchant Services	15 years	Bank - B
Executive Card and Payment	13 years	Bank - E
Executive Head Strategic Clients	17 years	Asset Management
Head of Card Issuance	20 years	Bank - A
Head Equities and Derivatives	13 years	Stock Exchange
Head of Technology	15 years	Bank - A
Head Retail Investments	15 years	Bank – E
Head Commercial Business Insurance	20 years	Insurance Company

Source: Author's own.

4.6 Measurement instrument

Measuring instruments are the methods which are used to collect the data from the research participants. There are multiple instruments for collecting data and the appropriate one depends on the nature of the research (Yaya, 2014). The measurement instrument used for this study was semi-structured interviews. According to Bryman and Bell (2014), semi-strcured interviews give the researcher more flexibility in posing interview questions. When conducting semi-structured interviews, the researcher relies on an interview guide, which is comprised of consistent set of pertinent questions at are linked to the objectives of the study (Creswell et al., 2007). In this regard, interview questions were prepared beforehand as presented in table 4 below. The interview questions were developed with a sole purpose of getting as much data from the research participants as possible. They are linked to each of the research questions and are grounded in literature.

Table 4.2: Interview guide

Research Questions	Interview questions	Supporting literature
Research question 1: How has technological unemployment affected financial services in South Africa?	1 What is the impact of unemployment on Financial Services in South Africa? 2 How would a lack of technological change affect the financial services sector? 3 What is the impact of growth in artificial intelligence performing cognitive tasks on both employment and provision of financial services? 4 What, in your opinion, would grow the South African economy faster, technological advancement (productivity) or increased employment (high income), and why?	Kingdon & Knight, 2007; Frey & Osborne, 2016; Coombs et al., 2020; Sorgner, 2017
Research question 2: How will technological labour displacement change skills demand in financial services?	5 In your view, do technologically displaced workers eventually get re-absorbed into the workforce? 6 Which key skills would be required for future work i.e. ten years or more in future? 7 How can skills development be used to reduce unemployment resulting from technological advancement? 8 What does the future of work look like?	Jandric & Peters, 2019; Jung & Lim, 2020 ; Yeo & Lee, 2020
Research question 3: How is technological advancement changing business models in financial services?	9 How can financial services companies improve their competitiveness against global companies? 10 How can technology be used to address high unemployment? 11 What are the changes to business models?	Dai & Vasarhelyi, 2017; Coefs, 2019 ; Mao et al., 2020)

Source: Author's own.

The semi-structured interviews were utilised to collected data. The semi-structured interviews allowed participants to answer based on their different contexts and experiences, thereby enabling the researcher to gather rich detailed data (Punch, 2014). The interviews also allowed the participants to express their thoughts on the research subject (Hughes, Hughes, & Portier-Le Cocq, 2020). The prepared questions were used to guide the discussion, whilst follow-up questions were also posed based on the specific responses received.

4.7 Data gathering process

It is important to collect data systematically, hence the prepared open-ended questions guide the interviews (Creswell & Creswell, 2017). The interview questions were developed to answer the research questions and were clustered to allow for the generation of themes related to the research questions. Hughes et al. (2020) stated that data from a qualitative interview can be used to tell a story about society which provides greater insights into the period in question. The interview questions, outlined in table 4 above, were open-ended, allowing for variations and extensions as the participants gave alternative perspectives.

The researcher intended to conduct interviews face to face, however, due to Covid-19 health protocols, all the interviews except one, were done through video channels. Although this interview method was not what the researcher intended, it made the scheduling of time more convenient for participants as the interviews could be conducted where they were without solving for travel time. This was in line with the convenient sampling processes originally intended. One participant requested a face-to-face interview at a venue located close to the participant's home.

Furthermore, semi-structured interviews allow for the combination of structure and flexibility of discretion on the sequencing of questions and the discussion (Creswell et al., 2007). At the onset of each interview, the researcher asked each participant to give consent to participate in the study and have the interview recorded for ease of reference. Thereafter, the researcher provided a brief of the research purpose and the reason for invitation to the participants. Even though the researcher had prepared an interview guide, semi-structured

interviews for flexibility in posing questions. As such, some follow-up questions were posed as and when the researcher deemed necessary. However, the researcher ensured that interview questions and responses were guided in line with the research questions. This was to ensure that the overall responses were able to be collated into research questions at the point of data analysis. Where the responses were not deemed adequate, in-depth questioning was done to allow for another opportunity to respond to the interview question. Interviews lasted for around an hour with the shortest being 48 minutes and the longest being 70 minutes.

All participants signed a consent form acknowledging that they agreed to be interviewed and gave permission for the use of the information gathered. The interviews were recorded with the explicit permission of the participants, in line with Saunders and Lewis (2018). The sessions were conducted professionally, and notes were taken of some key points that allowed for follow up questions and summation of responses relative to each section.

4.8 Analysis approach

The data analysis process followed an inductive process as the research was initiated based on research questions without any hypothesis pre-work required (Creswell et al., 2007). The inductive method allows for the process of data collection and analysis without predetermined outcomes (Saunders & Lewis, 2018). The objective of the analysis approach was to make sense of the data collected and to group codes and themes per each of the research questions. The data analysis included certain activities running parallel, such as interviews being conducted with data analysis from previous interviews completed next (Creswell & Creswell, 2017).

The process of transcribing interviews was conducted in parallel to the interview process to ensure efficiency of the research process as well as a review of the recordings. Transcribing of interviews was outsourced to a competent transcriber who was able to deliver transcriptions within the agreed timeframe.

The data analysis process was conducted according to the following steps. Firstly, Tthe interviews were transcribed from audio files into Microsoft (MS) Word, indicating clearly the

researcher and the participant responses. Secondly, the transcripts were reviewed again whilst listening to the audio files to ensure accuracy. Thirdly the transcripts were then imported into the ATLAS.ti tool for coding. Fourthly, each transcript was coded, observing the emergence of new codes. Fewer codes were recorded as more transcripts were coded. Finally, the codes were grouped into categories and key themes began to emerge. The themes were then linked to the three research questions.

At the point of saturation, winnowing data (a process of determining which data will not be) was effected (Creswell & Creswell, 2017).The data coding included the date, time and place of data collection. Each interview script was saved as a separate file.

4.9 Validity and Reliability

Various quality control measures were put in place in order to ensure validity and reliability of the findings. Despite that data was collected through semi-structured interviews, which are subjective in nature (Saunders & Lewis, 2018), quality was achieved through various measures which include: strict adherence to sampling criteria when selecting participants for the interview; the prepared questions which brought direction to the discussions, and; the checking of the primary data collation against the research questions. In addition, the interviews were recorded to allow for complete transcribing (Saunders & Lewis, 2018). Participants were not limited by the research questions in their responses.

Furthermore, the following quality controls that Creswell (2014) recommended were put in place. Firstly, two external auditors were enlisted to assist with ensuring consistency and logical flow of the report. While one focused on the compliance with the required academic standard, the other worked on improving language and grammar. Secondly, transcript checking was done once all the interviews were transcribed. The researcher took time to preview each of the transcripts, making sure that mistakes were corrected. This was beneficial in the data analysis stage and made the coding process seamless.

The disclosure of the relationship between the researcher and the participants provides credibility to the information collected as it provides context on why participants responded in

the manner which they did (Taylor, Bogdan, & DeVault, 2015). The participants were selected based on the criteria in the research and based on the professional network of researcher. In some cases, the participants were introduced by a common network of both the researcher and the participant. The network is based on common professional forums.

4.10 Limitations of the Study

The limitations of the qualitative research methodology arise due to the reliance on interview data to make conclusive findings (Saunders & Lewis, 2018). It is important to be aware that through the explorative nature of the semi-structured interviews, there were opinions which formed part of the data collected (Saunders & Lewis, 2018). This was expected, as the participants were selected based on their expertise and experience. During the coding process, there could have been variability of groupings, thereby presenting a possible limitation of the study.

The subjective nature of quality research created an impetus for the researcher to provide validity of findings reported (Taylor et al., 2015). Therefore, researcher bias is also acknowledged as a possible limitation. As a professional in the financial services sector, the researcher bias cannot be completely ruled out. Furthermore, Creswell, (2014) highlights that the presence of the researcher during interviews may lead to bias responses from the participants. Although the interviews were conducted tactfully, some of the participants were not well articulate in their inputs.

5 Chapter 5: Presentation of Results

5.1 Introduction

This chapter shows the results of the research questions as documented in chapter 3. These were answered through the semi-structured interviews of senior leaders in the financial services sector via virtual channels to comply with Covid-19 health protocols. The virtual interviews were conducted through MS Teams and recorded on both MS Teams and the interviewer's cellphone to ensure that a backed-up copy existed. During the transcribing phase, technical challenges were experienced in retrieving the MS Teams recordings, and therefore transcribing was done through the cellphone recordings. One interview was conducted face to face as was the participant's preference, and no noise interference was encountered. The interviewer found that the virtual nature of most of the interviews allowed for better accessibility to participants, as they only needed to accommodate for the requested time, which was 45 minutes to an hour. The interviews were structured around the interview questions with follow up questions asked which were based on the responses received (and taking the literature review into account). In some instances, where the literature explored nuanced viewpoints of which the participant was potentially an expert, additional questions were asked.

5.2 Description of Sample

Fifteen participants were selected from the financial services sector. The criteria for these participants were that firstly, their official roles in their respective organisations had to be on a senior/executive level. Secondly, they had to have worked in the financial services sector for more than five years to be able to provide insightful feedback on the performance of the sector. Thirdly, in selecting the participants, it was important to ensure that they were able to provide insights into the research through their experience, and therefore it was important to ensure variation in both their current occupations and in their organisations' business offerings. For that reason, participants were selected from the banking sector, insurance, asset management, consultancy and the Johannesburg Stock Exchange (JSE). Table 5 list the participants according to their official title, years of experience as well as the type of organisation they are in.

Table 5.1: Sample selected

	Role	Years' Experience Sector	Organisation type
1	Deputy Chief Executive	+ 10 years	Bank - A
2	Executive Head Strategic Clients	17 years	Asset Management
3	Managing Executive: Transformation	18 years	Bank - A
4	Head of Card Issuance	20 years	Bank - A
5	Head of Technology	15 years	Bank - A
6	Managing Executive: SMME Services	+ 10 years	Bank - D
7	Head Retail Investments	15 years	Bank – E
8	Head Equities and Derivatives	13 years	Stock Exchange
9	Chief Executive	+ 10 years	Consultancy
10	Executive Head: Legal Services	10 years	Bank - C
11	Chief Executive	+ 10 years	Insurance Life Company
12	Executive Card and Payment	13 years	Bank - E
13	Managing Executive: Non-Banking Services	+ 10 years	Bank - A
14	Executive Head: Merchant Services	15 years	Bank - B
15	Head Commercial Business Insurance	20 years	Insurance Company

Source: Author's own.

Bank A consisted of five participants in the sample, however the researcher ensured that the participants were from different business units within the bank and that their experience was varied as evidenced through their titles. The participants did not represent the organisation's views - only their insights based on their experience in the sector. The seniority of the participants also ensured that they were strategy formulators or led strategic initiatives for their respective organisations.

5.3 Point of Saturation

Figure 5.1 Point of saturation for new codes

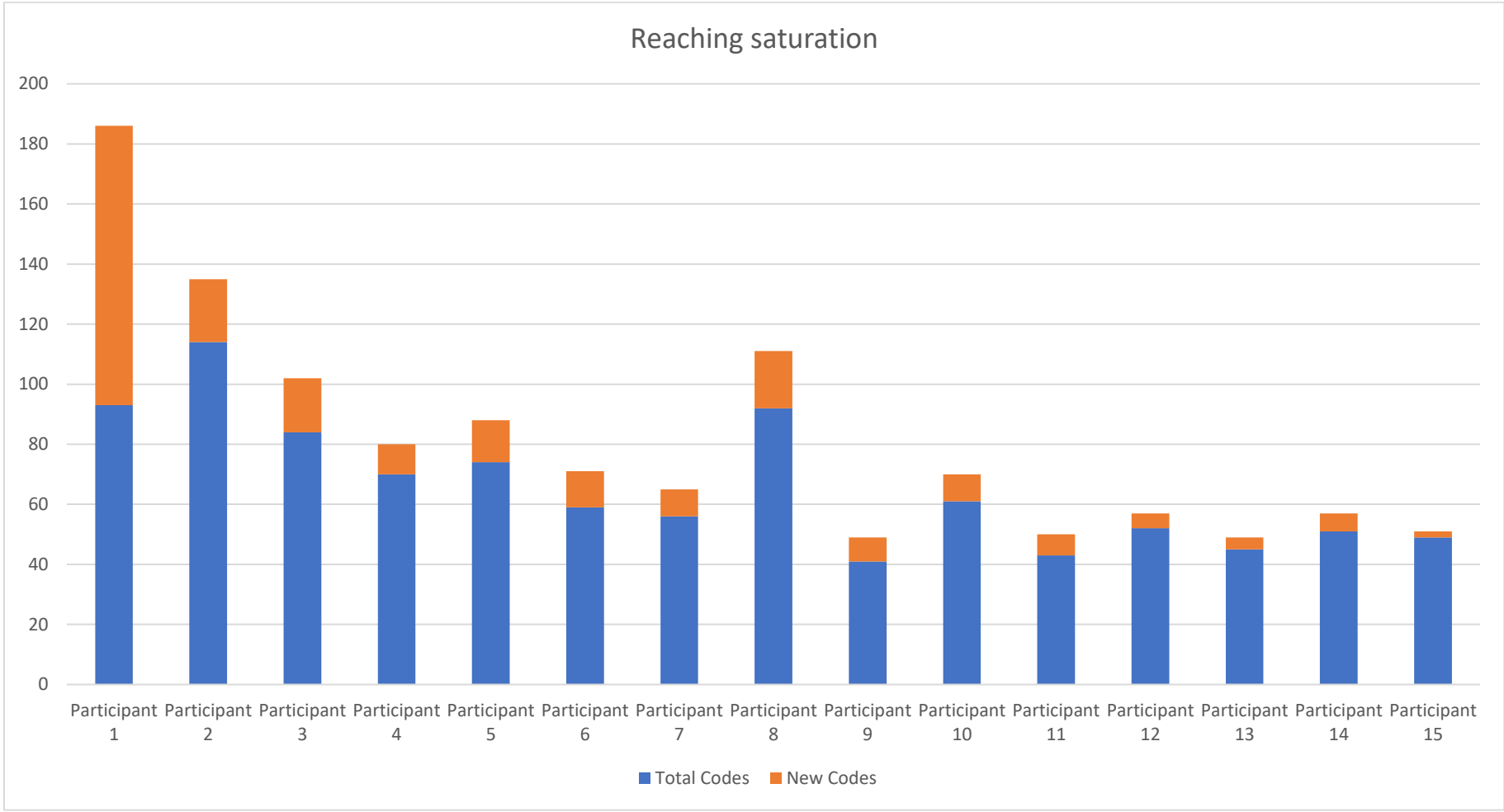

Table 5.2: Interview Questionnaire

Research Questions	Interview questions
Research question 1: How has technological unemployment affected financial services in South Africa?	12 What is the impact of unemployment on financial services in South Africa? 13 How would a lack of technological change affect the financial services sector? 14 What is the impact of growth in artificial intelligence performing cognitive tasks on both employment and provision of financial services? 15 Which, in your opinion, would grow the South African economy faster, technological advancement (productivity) or increased employment (high income), and why?
Research question 2: How will technological labour displacement change skills demand in financial services?	16 In your view, do technologically displaced workers eventually get re-absorbed into the workforce? 17 Which key skills would be required for future work i.e. ten years or more in future? 18 How can skills development be used to reduce unemployment resulting from technological advancement? 19 What does the future of work look like?
Research question 3: How is technological advancement changing business models in financial services?	20 How can financial services companies improve their competitiveness against global companies? 21 How can technology be used to address high unemployment? 22 What are the changes to business models?

Source: Author's own

5.4 Presentation and Analysis of Results

5.4.1 Research Q1: How has technological unemployment affected financial services in South Africa?

The question intended to establish how technology and unemployment are connected in the financial services industry, considering high unemployment levels in South Africa, as established in chapter 2. This was done through establishing an understanding of how unemployment in South Africa has affected the performance of the financial industry. In addition, the importance of technological advancement in the industry was also enquired upon. In connecting technological advancement and unemployment, the objective was to determine the consequence on unemployment levels through technological unemployment, which refers to displacement of workers by technology. In establishing that, detailed interview questions were then asked of which the results are summarized below.

5.4.1.1 Impact of unemployment on Financial Services

The intention of this question was to investigate the impact of South Africa's unemployment rate on the sector's performance, considering that financial services' performance is directly linked to the performance of the economy. In the interview, the interviewer allowed participants to discuss both sector unemployment and country unemployment, as these were considered to directly impact the sector. Part of the investigation was to collect data on the participants' perceptions of current unemployment levels, and whether they considered this an important factor when making strategic decisions or deciding on priority initiatives. Finally, considering the demands of the technological revolution, which are the investments that must be made to improve unemployment.

Initially when positioning the study there was confusion in the first interviews (Participant 1, 4, 14) around whether the first interview question was referring to technological unemployment or broad unemployment. After this was clarified, the interview continued uninterrupted. A follow up question on the impact of unemployment on the sector was asked.

The results show that participants were concerned with the consumption of financial products being impacted by unemployment (Participants 1, 2, 6, & 12). The means and accessibility of financial products would be limited by lack of income (Participants 2, 4, 7, & 8). The reduction in the consumption of products would consequently lead to reduced revenue levels for the industry and ultimately impact the country (Participants 2, 3, 4, & 6). Unemployment overall has a negative effect on the performance and growth of the sector (Participants 1, 2, 5, 6, & 7). The sector was also noted as being leading in employment creation, although this has slowed down as economic performance has slowed (Participant 2, 4, & 8).

The participants reflected on the negative impact on the growth of the sector as result of unemployment. Access to financial products is limited as result of unemployment potentially creating a large population of financial excluded people (Participant 1, 4)

> *"People can only access financial services offerings when they have some form of income. When people are unemployed or underemployed or don't have the opportunity to move up the value chain from an employment perspective, it will always have a direct impact on the financial services environment"* (Participant 1).
> *"The more people that have income, the more liabilities we create on our books and assets, creating loans to assist customers achieve their goals. There's an impact on corporates that rely on those customers transactions, if there is less money in the economy"* (Participant 4).

The negative impact on pension funds membership was highlighted showing how unemployment has an negative impact on the asset management businesses in the industry

> *"If you don't have members coming into the pension fund, only coming out, then the volume of what you do is shrinking, that eats up earnings, there's no growth. It is a net negative contribution when you have high unemployment rates in the country"* (Participant 2).

Job absorption rates for the industry were highlighted as reducing which is impacting youth employment

> *"The financial services* [are] *generally, or used to be, good at absorbing…those who have just left university or college or even those that have just matriculated. If you look at what is happening now with regards to digitisation of services, particularly at the branch level, you really begin to see that technology is creating* [a] *stronger barrier to entry for the youth"* (Participant 8).

Overall, the results showed that the market size is reduced by unemployment and the potential to sell into a large market is impacted. This creates increased competition within r a reducing market, which enhances to need to innovate. Market growth prospects are hampered by unemployment in many forms, for example reducing pension fund sizes and medical aid, and for banks, the size and performance of their lending books. The low economic activity results in less capability to increase employment and therefore the inability to contribute to the country 's economic priorities. Linking to the research question, it details the negative impact of the existing high unemployment on financial services companies.

5.4.1.2 Impact of Lack of Technological Changes on the sector

In this question, the researcher attempted to establish the reasons for pursuing technological changes in the sector. This question was also used as a scene setting tool to delve deeper into the technology strategies of different companies in the sector, which allowed for inferences to be made at an industry level. The question enquired after the benefits of technology for the business, the sector, and the overall economy. It also assessed whether there was a broader understanding of the interconnectedness of other industries to the financial services sector.

The participants provided various reasons as to why it was critical to invest in technology. The key reasons noted was that its driven by Customer demand to interact more digitally with businesses. In remaining relevant to Customers, investment in technology is required (Participant 1, 4 , 8)

> *"Our customers expect it of us, the world is moving on. Whether it's banking or just the world in general, it is becoming more and more digitised. If you don't invest you will become irrelevant, given where the market…is moving to. I think we are following the market from a technology perspective. The cost of running banks is massive.* [This has] *a lot to do with the fact that we've got these archaic systems in our physical infrastructure"* (Participant 1).

Costs of running operations was highlighted as key driver of investment in technology (Participant 3, 6, 10). The continuity of businesses is reliant on improving how they do business and technology is key to the survival of the business (Participant 3, 6, 10). While Fintech's entrance into the market was highlighted as risk which is being mitigated through technology investment *"Impact is competitiveness, it would open up the space for Fintech's to close down on those gaps and begin to compete far more with banks"* (Participant 4, 12).

> *"If you're not evolving your technology, you're running obsolete old data methods. It's prone to few risks, one being high costs. Obsolete technology is expensive in many layers in that your clients find the experience clumsy and unbearable and they can walk away from you"* (Participant 10).

> *"I think that the financial services industry would die if it didn't continue investing in technology. You have to evolve, the only way to evolve is to keep up with technological changes…be in line with other financial services and industries across the globe"* (Participant 6).
>
> *"The impact on traditional companies if they don't move with the technological times, you're presenting a very fertile opportunity for auxiliary companies or fintechs to come and deliver those technological innovations"* (Participant 12).

It is evident that cost and continuity are considered key drivers of decisions to keep investing in technology:

> *"One of the things for me is that technology is lowering the barriers to entry into the banking sector. We are seeing more competitors coming now than at any other point in time. The banks will literally sit with very high fixed costs. It would really put the banks in a difficult position from the jaws ratio point of view and therefore the margins"* (Participant 8).

When the economy is not growing, participants 3, 6 & 8 felt that an opportunity to reduce costs arised, which would be achieved through investment in technology. The investment in technology by financial services companies has become imperative to address high costs of doing business, leading to continuity strategies (Participants 2, 3, 6, & 8). Increasing customer demand for digital services has added to the demand for technology investment to be able to acquire clients in a competitive environment (Participant 1). Technology has also created opportunities for non-traditional financial companies to enter the financial sector and offer financial services (Participant 6). The increasing competition further exasperates the need for continued technological investment to remain relevant and to be able to compete. Increased competition in the sector is for example evidenced by Fintech companies who are able to digitise more established financial companies (Participants 4 & 14). In relation to the research question, further investment in technology results in further displacement of human labour through automated jobs. The result is a deterioration of the unemployment problem in the country.

5.4.1.3 Impact of Artificial Intelligence on employment and provision of services

Artificial intelligence has become synonymous with the digital age and continues to grow exponentially with regards to its multiple uses in business and day to day life (Participant 7, 9). It has the ability to learn and grow through data collection mimicking human trait development (Participants 3 & 5). This creates increased competition for human workers as artificial intelligence grows and learns faster and can perform more cognitive tasks than ever before (Participant 5). The benefits for business are increased efficiencies including a reduction in costs and the ability to provide services to customers faster and via more channels without the interruptions or delays (through, for example humans' need for periodic rest) (Participants 2 & 5). Customers are also consuming more digital services and expect to engage with financial services companies through digital channels, as these are

marketed as convenient and cost-effective (Participants 5, 9, & 11). There is also the question of which services still require a human touch, creating the collaboration between humans and AI to provide certain services (Participants 1 &15). As more artificial intelligence is consumed through various services, the makeup of employment and labour demand in financial services changes (Participant 5,7).

A number of the participants (Participants 3, 5, 6, & 7) agreed that technology will replace low-skilled repetitive work. This will contribute to the unemployment problem, however, reskilling is considered an option that can address the problem in most instances. In contrast, one response provided an example of where the the implementation of AI has increased the consumption of such services, but did not lead to a large-scale job reduction:

> "*When we started getting into online banking, everyone said we are going to close down branches, the reality is that we've reduced branches. This is different from Capitec which is actually increasing the number of branches that they have, and they have lots of customers on digital channels. So I do think that in as much as it comes to things that are mundane and repetitive, it will replace some of those things. I'm a little skeptical of a review that says AI is going to completely wipe out employment*" (Participant 1).

Increasing benefits for customer value proposition through efficient service delivery. The reduction in manual tasks which consumed significant hours is reduced through the use of artificial intelligence (Participant 2, 5).

> "*So what it does is it replaces* people who *were having multiple spreadsheets and they were trying to do this manually, and now you have robots or AI that have been used. It sources information from multiple websites, multiple databases, and it summarises with an outcome which is useful. I think it improves productivity, it reduces risks around the accuracy of data from human error, and honestly speed and cost-efficiency. So, AI is very productive for financial services*" (Participant 2).

Whilst some benefits of using artificial intelligence are easily identifiable, there are further opportunities once the technology is considered outside of current roles (Participant 3). Considerations of future applications of artificial intelligence was highlighted as key per below

> "*It looks like AI is going to replace human labour the more advances we have in it in the context of some* of *the roles that human beings play in service delivery and the like. The roles as we know them today, the roles that people play in the process that we have conceived them, will be taken over by AI as that gets better. On the flip side of this, which I don't think we're fully applying our minds to, not only as financial services, but also I think, from* [an}*overall economy perspective, is that we're not looking at what the future roles of people could be because there's some stuff that AI will take a while before it can do*" (Participant 3).

Participant 4 mentioned the benefits of the digital world for customers, as it allows for services on demand that are not limited by aspects inherent to human labour such as working hours. How customers are serviced is changing as result of the technology, and this is now being done at the convenience of the customer rather that old operating hours, further highlighting benefits to customers (Participant 4), reflected in the following:

> "*It also has benefits for the customer because if you think of what artificial intelligence is, its capabilities such as chatbots, where in the past you would have to run very expensive call centres that run 24 /7 and put staff at risk when they travel at night. From that perspective it creates the ability for a bank to be* always on and assist *customers who could be overseas in different time zones*" (Participant 4).

In developing economies the implementation of artificial intelligence has an impact on employment initiatives and therefore should be balanced with employment creation efforts as highlighted by Participant 6:

> "*From a South African point of view, we are a developing country, as much as artificial intelligence is what is happening globally and we need to catch up, the*

reality is that we need to find a balance between productive sectors using manual labour rather than robots. South Africa requires a balance of ensuring that we still create jobs and not confine ourselves, I don't think we can be hundred percent automated" (Participant 6).

The need to address unemployment in the country was noted as a priority in as much as investment in digitisation is (Participant 8). There is a view that displacement as result of AI is in its infancy in South Africa due to the nature of the market being a developing economy, and therefore the displacement may not yet be clear (Participants 1, 2, 9, & 13).

"*It's not an area where we are going to shed jobs. The reason for that is because there's a high-end skill of digitisation pyramid. This is in relation to looking at the PhD level or master's level for data science students or professionals who are working with AI type of machine learning. The question at large is whether we have the requisite skill set in the numbers that we are going to need"* (Participant 8).

"*If you think about customer retention and customer growth, I think its creating significant opportunities in that now with some simple model, you can start predicting the next best actions for customers, in terms of what are the next best things that we can do based on their behavior, you can predict accurately. It's a complement and it works very effectively in the credit world that you are not able to within a certain level of confidence predict times where customers can or will show signs of distress by filling in multiple variables*" (Participant 12).

There are those participants as per the above who felt that the implementation of AI presents endless opportunities within the sector (Participants 8 &12). The focus should be on developing those opportunities which will grow the skills base and customer retention (Participant 8, 12, & 14). These would lead to new jobs being created which will address the unemployment challenge in the country (Participant 5, 7, & 8). The overall reflections and themes were that AI, although potentially impactful in how it will change employment and how services are provided to customers, is still very much in the early stages. Moreover, the size of the South African market slows implementation (Participants 1 & 11). All Participants

acknowledged that as AI is implemented, it will displace a certain number of workers. However, the volume of that displacement is not quantifiable, hence the reduced concern on displacement.

5.4.2 Research Question 2: How will technological labour displacement change skills demand in financial services?

The intention of this question was to establish how the technological displacement of labour is likely to results in an increased demand for a minimum skill level in the economy and how workers, and potential new workers, may be impacted. The increasing skills level in the sector raises the level of entry as well as the minimum skill levels for continued employment, which would contribute to unemployment if these skills are lacking. Furthermore, as investment in technology continues to result in the automation of certain jobs, especially low-skilled jobs, only higher-skilled jobs may become available to People (Boyd & Heuttinger, 2019). Mundane and repetitive tasks in the financial services sector are easily automated through simple computer programming (Chang & Huynh, 2016).

5.4.2.1 Re-absorption of technologically displaced workforce

This interview question set to establish whether displaced workers inevitably get reabsorbed back into the workplace. The unemployment period determines whether technological displacement contributes to long term unemployment in the country if the displaced workforce is not reabsorbed. Moreover, the question intended to establish whether there are strategies in place to proactively address the displacement of workers by identifying other opportunities for them, as well as whether there are any skills development programmes which would reduce the likelihood of displacement. The responses indicated no clear strategies across most of the participants as evidenced below:

> *"Yes and no, I think there are those who can adopt or adapt. I think the younger you are, you probably are more likely to be absorbed and easy going. It then gets easier to learn. So how do those people get involved unless we take chunks of them and put them through skills development programmes, and actually try and absorb them into what we're doing and teach them pretty quickly? So I think younger people have a better chance"* (Participant 7).

In essence, adaptation of workers in the technological world becomes a critical skill for continued employment. The ability to be comfortable with change in a dynamic environment will allow for skills accumulation (Participant 5).

> "*It is a significant part of their change management processes where they say, we know that these are the jobs that are going to be impacted, how do we either upskill these people or reskill them and move them into other professions where you typically have vacancies etc.? It doesn't mean that everyone that's been displaced by technology is going to have some form of work in the new world. Which is why ensuring that people stay ahead of their own personal development is important"* (Participant 9).

Companies' strategies should include upskilling workforces to equip them for the changing work environments. These should be part of change plans which are being implemented (Participant 9). However, the responsibility to reskill and upskill rests on the workers. They have to be proactive in driving their own development.

> "*No, skilled employees I think…would be able to serve in a better capacity. However, unskilled employees, it depends on various factors. The new barriers to entry are so high, people that come into financial services are going to have to have a matric qualification at least in addition to the regulatory exam hurdle. There is not enough growth and opportunity for them to be reabsorbed*" (Participant 11).

> *"Not necessarily, from my experience they actually get lost. Primarily because I don't think adequate effort is placed around reskilling them. If a worker is displaced by technology, the same effort of displacing that worker is not being spent around reskilling them and because of that, they easily get lost into oblivion"* (Participant 5).

The observation from the above responses is that the barriers to entry for workers with low to no skills are becoming a norm in the financial services industry (Participants 5 & 11). This reemphasises that displaced workers must ensure that they meet the minimum

requirements (Participant 11). Organisations are not putting the same effort into upskilling displaced workers as they are in implementing technological initiatives (Participant 5). This may indicate low motivation factors to drive investment in developing skills. The result being that, as technology investment continues, more workers who are displaced are likely to not be reabsorbed unless they possess the skills for alternative or new opportunities (Participants 5 & 11)

5.4.2.2 Skills for the future of work

Technology is changing the working landscape and creating new jobs which require different and, in some instances, higher-skills. An understanding of the skills requirements for the future of work can support a roadmap to reducing the permanent displacement of workers. This section intended to establish which skills should be considered in the future of work development programmes. Ideas based on various business demands and strategies resulted in the following responses.

> *"*[The] *ability to learn quickly and apply learning in practice is critical. Every six months, you need to be reinventing yourself. That is a skill you need to learn because with technology you are already a dinosaur if you can do a skill that is two to three years old"* (Participant 5).

Learning agility of workers is a future fit skill which would ensure that they are able to be repurposed if the need arises:

> *"I think there'll be a real need for people who understand process automation and artificial intelligence to be able to interpret it and to be able to enhance it. There'll be a need for customer experience skills to create the flow and customer journey and map it out, it requires both digital and process skills"* (Participant 11).

Opportunities for humans lie in tasks requiring skills that cannot be performed by machines such as creative work. Further opportunity of course, also lies in the oversight of machines (Participant 9, 15). Machines will require monitoring that they are executing work effectively

and correctly , and this presents work opportunities for People in the future (Participant 9,15). In addition, in financial services advice is skill which will probably still be done by humans and sales execution automated (Participant 13, 15)

> *"Cybersecurity experts, analysts and fraud detection specialists, and those people who can pick up irregular patterns in the data* [will play important roles in the future}*. Process engineers and RPA and API skills* [will also be valuable]*"* (Participant 9).
>
> *"Advisory component is quite key, I see that as more than just a factor. It might come in different shapes and forms. It is what is referred to as the human being behind everything. Technology is speeding up the process of sales, it requires an individual to be more diverse in terms of their skill set because it's no longer good enough to discuss one product line, it should be a complete picture"* (Participant 15).

There are multiple roles which will be created once technology is implemented alongside the technology which will allow for the reabsorption of displaced workers. The upskilling will need to occur before hand to ensure that they are able to perform the new work

5.4.2.3 Using skills development to reduce unemployment

The displacement of the workforce would be mostly at a lower skill level, and therefore if those workers are reskilled, they may be afforded the opportunity to become employed in higher-skilled work. This would reduce the likelihood of permanent displacement. Skills development may create an opportunity for the reduction of unemployment. The responses collected concurred that skills development would be effective in addressing unemployment (Participants 1, 6, & 12). Some of the feedback related to how skills training should work in the digital world with regards to how quickly the training should be consumed. Some of the participants (Participants 3, 5, & 8) challenged the current education systems in the country and felt that the current Sector Training Authority was not effective in meeting the demands of the technology-enabled industry. When skills development occur is equally important. The collected responses from some of the participants are shown below:

> *"I think wanting to address skills development once people are unemployed is a bit late. It has to start with the primary education that we offer in this country. Teaching people maths, exposing them to technology early on, so that they go out with that muscle…I think that if you're going to expose people to these sorts of things much later, it's a bit late. A lot more needs to go into developing the right skill sets, that would lend them relevant in the new economy"* (Participant 1).
>
> *"It starts at schools. We need to find a way of influencing government and the Department of Education to change the curriculum such that it includes skills that are required for the future. It starts with the education system and making sure that skills development is evolving for the future, so that we are taught things that are going to help us in the future. Technology and entrepreneurship are just examples of where I think we need to update the education system"* (Participant 6).

Early education capabilities should include alignment to technological advancement to ensure that future workers are equipped with the appropriate skills (Participant 1, 5). The distribution channels of education will improve with technology and these are currently not being capitalized on. Current skills may not be adequate once technology is implemented and therefore companies should be investing in skill programmes (Participant 12)

> *"None of the financial services companies in my view have tools that offer free online courses for people to upskill themselves in areas where they would to grow into. Which means that by the time the wave of technology catches up, they are armed with other skills that doesn't afford them opportunities that are beyond their current work. Technology could be used as platform to offer training virtually anywhere anytime*" (Participant 12).

Technology allows for a wider distribution of training content. Additionally, offering skills development courses online allow people to complete these at a time that is convenient for them. This then facilitates greater skill development which would equip workers for alternative opportunities (Participants 9, 10, & 13).

As a result, unemployment can be addressed through skills development. Moreover, skills focused on entrepreneurship are critical to develop businesses, especially in terms of leveraging the cost-effectiveness of technology to reduce capital requirements.

5.4.2.4 Future of work

Technology is changing business processes and how services are provided to customers. As a result, job requirements are updated in terms of the skill requirements related to those jobs. In some instances, technology is displacing workers where business processes are being fully automated, resulting in certain services rendered by machines. Indeed, the growth in AI has created opportunities where interactive services are possible between machine and customer. This interview question was intended to establish whether there will still be work in the future and, if there is still work, what participants think it will look like. This relates to the identification of the type of skills that will be required to ensure that proactive, relevant reskilling occurs in order to reduce the possibility of unemployment.
The future of work is changing and the management of work also. Work will not be done in central locations and distributed workforces will become the new normal in the future and Managers need to learn how to manage in that future (Participant 6, 8)

> *"During the COVID-19 pandemic, things that we thought were not possible became possible. The use of technology has been very important to make sure we are able to work anywhere and still produce results. Managers who were used to micro-managing and managed physical presence were quickly made redundant as workers became more self-managed due to working remotely. This has changed the investment strategy in buildings, employers are no longer seeing the need of having a big building"* (Participant 6).

> *"We have been pushed with companies coming to terms with the fact that you don't need people in the office to do the work you need done. So the distributed workforce… that's the next area where we are headed to as firms, where companies could have pockets of certain skills sitting in certain regions where it's profitable for them. Marketing skills…you're always going to need localised skills to understand*

the market and products. If you look at other areas such as IT or law services firms and others, you don't need skills sets in the country" (Participant 8).

The change in work locations has meant that workforces can be distributed with only some skills needing to be local (Participants 8 & 13). As a result, the management oversight responsibilities in the company change as technology has allowed the delivery of results from remote locations (Participants 6, 8). Distributed workforces are also globally competitive, as companies are able to do work where it is cost-efficient for them (Participant 6).

5.4.3 Research Question 3: How is technological advancement changing business models in financial services?

Technological advancement is changing how customers consume services and products which is pushing businesses to reconsider how they are providing those services and goods (Makridakis, 2017). Increased competition and cost-efficient business models as a result of technology investment are also creating the need for companies to review how they are organised (Makridakis, 2017). The increasing skill level due to the automation of low-skill work is potentially creating a more skilled workforce, which may require compensatory working conditions and remuneration (Dengler & Matthes, 2018). These factors would have an impact on companies' business models. The intention of this question was thus to assess this particular impact and how it related to technological unemployment. Technology continues to change geographical borders through global connectivity. This has meant that global companies are able to provide services to local customers, thereby increasing local competition (Thompson, Strickland, & Gamble, 2018). Moreover, for the demand for skilled workers also increase, as these workers are employed by global companies whist still residing in their home countries (Vasiljeva & Lukanova, 2016). In responding to these competitive forces, local companies will need to review the adequacy of their operating models. Below are data points raised by some of the participants in relation to this.

5.4.3.1 Improving competitiveness against global companies

The question intended to establish the competitiveness of local companies relative to global companies, which are increasingly starting to offer services locally. The strength of the local financial companies equates to employment creation and sustainability and therefore has an impact on unemployment. In responding to global competition and how global companies are structured, local business may opt to change their business models. LINK. The responses referred to trust as big decision criteria:

> "*Trust is a big issue in financial services. Even though these new parties are coming to the table, they are focused in the payment space. Once you start playing in an environment where people have to entrust you with their money, it becomes a little more difficult. I do think that financial services are slightly different in the sense that people are still a little more comfortable, at least that's the context in South Africa, with names that they know. New players tend to go for niche areas*" (Participant 1).

> *"So, you've got to choose which area you have strength in or have* [a] *greater probability of winning in, to compete globally. There needs to be a natural strategy that's very focused around technology at a macro level, at the company level, I think there needs to be more interaction between universities and the private sector specifically in South Africa"* (Participant 2).

Customer confidence in financial services is a part of the selection process when customers choose who they do business with. In most instances, the nature of the products handled in financial services may require engagement and trust development due to the fact that customers' financial goals are being dealt with (Participants 1, 2, & 4). As a result, the impact of global competition on the local market may be reduced. The skills available in the market to provide those financial services also support the performance of local companies (Participants 3 & 8). The ability of local companies to compete with globally experienced companies will depend on the skills they have in the organisation (Participants 3 & 8). In that regard, macro skill development strategies are important to the sustainability of companies in the sector.

> *"The ApplePay and digital payment solutions that are starting to come into our world...could get local companies disconnected from end customers when they can't actually afford to…especially when regulation changes. Because right now, I think we are all hiding behind the regulation which is preventing foreign companies doing certain activities. Most large organisations buy any new technology which threatens them, now the first real competitors that have changed the game is when other big players with big pockets are coming into the space from nowhere. Once you've got an Apple phone, you don't need an account because the back end allows you to use ApplePay. It may sound like a cliché but it's important to disrupt yourself before some [one else] does"* (Participant 3).

> *"South Africa is comfortably ahead of Europe when it comes to financial services. In South Africa it's the incumbent financial companies who are leading the market and disrupting themselves. So that's one of the ways in which local financial companies can compete, by disrupting themselves. The challenge is these disruptions are not always transferrable. What really works here in South Africa, is not going to work when you go to Austria or Russia. We lag behind in terms of payment services, however COVID-19 has kind of forced the use of those services"* (Participant 8).

The size of the global competition companies in terms of balance sheet makes a difference in how much they can invest to penetrate the market. Existing large technology-oriented financial services companies have the ability, through technology, to disrupt local financial services companies unless those companies disrupt themselves; (Participants 2 & 8). There are alternative views in terms of competitiveness of companies based on the already existing technology and that with fewer financial institutions, disruption is occurring in the large companies only (Participants 8 & 14). Continuous improvement in technology means that local companies can compete and even have a competitive advantage against global entrants (Participants 8 & 14). Therefore, without investment in technology the ability of companies to compete diminishes. The dark side is, however, that such investment contributes to technological unemployment.

5.4.3.2 Using technology to address high unemployment

Technological advancement as documented earlier will continue for various reasons, this question intended to establish how unemployment can continuously be reduced whilst technological advancement occurs. The question intended to further investigate the opportunities for the economy to create employment, which would be able to address the unemployment. In particular, what opportunities exist for the unemployed as a result of technological displacement. This provided insights on which work opportunities may be available in the future and how workers can ready themselves for these opportunities. The following data points were collected:

> *"If you look at a case study for a country like China, they're a technology driven economy, but the majority of the activities do not necessarily require a PhD or advanced degrees for people to do. The majority of their workforce* [is] *employed in the manufacturing of the…said technology, which is inversely an anomaly that we have in the country. The problem we have is that* [the] *majority of the technology we have is imported, if we were to manufacture our own laptops and technological equipment, then you create employment using technology at the low end. So even in the advanced layer, there are many jobs that sit there, where, without having to go through long training the unemployed population could be trained to do"* (Participant 5).

The financial services sector performance is directly linked to the performance of other industries, and therefore increasing manufacturing employment will create more customers for financial services (Participants 2 & 8). Technology in manufacturing will benefit both sectors and allow for an increase in employment in both sectors.

> "*Target young people's curiosity…the benefit of our economy is that we have high numbers of youth. The good thing with technology is that you don't have to move from where you are to do work. The labour market is not geographically bound with technology, and therefore the spatial development challenges of the past are able to be addressed through technology. Young workers do not need to struggle with*

transport money and moving closer to work when this can be done from wherever they are, we need to unearth these markets" (Participant 8).

"Examples like Uber where technological advancement creates a platform for businesses to plug in and grow. Previously you had people who would be sitting in cars doing nothing, now they are working and possibly are the owners of those cars. So, it actually added to employment. Alibaba is another example where you could plug into the platform and sell your products on a platform that uses AI, it's creating employment. There are many economies that have proven that it's not an 'and 'or', but skills can move within the economy and provide different services. This is dependent on the skills available, and the retraining and repurposing of people" (Participant 4).

New employment has been created in other countries using technology and these examples can be copied in South Africa (Participants 5 & 8). However, in order to capitalise on the opportunities which result from technological advancement, potential future workers should be prepared through skilling programmes (Participants 3, 6, & 8).

"Starting with upskilling, we can now start using technology to get people access to whatever upskilling that they need in order to be productive in this new world. You can do that on a just in time basis, meaning you can study when you need it, which helps unlock something quite practical. The changing economy has introduced part-time work in the gig economy. This is where work is going to go, the nature of work will be about 'you got to deliver this, these are the resources. For anyone that wants to do anything now, you don't need to employ people on a full time basis, because if you've got a platform you can open the job to anyone with the skill capacity and access who can do the work and move on" (Participant 3).

Technology is changing the way people are being employed. For example, through the gig economy and technological access, people are able to do multiple types of work through different companies depending on their skill and capacity (Participants 3 & 5). This change in employment structures will change companies' business models where they may not

need any permanent employees but operate by offering gigs or projects with finite timelines (Participants 3 & 5). This reduces overhead costs and the need for human resource policies including pension scheme structures.

5.4.3.3 Changes in Financial Services Business Models

Business models are impacted by the changes that technology brings. These changes require an assessment of how they will impact unemployment. The results of the business model changes will indicate to what degree financial services companies are being pushed to update their business models as the ways of doing business and customer preferences change. Increasing competition and the need for survival has created the impetus to invest in technology, which is leading to changes in business models according to the data reflected below:

> *"You've got a strategy where you then build an organisational model on the back of that strategy. You design roles and then fill those roles with people that deliver on your strategic objectives. In filling the roles, you look for certain competencies. Fast forward into the future, you are becoming more technology driven, which means you now need to assess what does that mean for your structure and the people in the structure. Do they just suddenly acquire competencies which they didn't have when you hired them? Organisations need to assess how do they become digitally literate to be able to operate in the digital world, and that's where skills development comes in. Digital channels are going to become more and more prevalent. In the new business models, channels are going to be how businesses [are] lead"* (Participant 3).

A review of previous company strategies and alignment of operating models to the refreshed strategies will be critical if companies want to continue being successful in the financial services sector. Therefore, capability building through skills development of the workforce to become more technologically literate, will be necessary as more business processes become digitally enabled. Ultimately customer preferences will be key to

achieving business objectives through meeting customer needs according to distribution channel requirements.

> *"Some key projects which will change how financial services companies are looking, such as the democratisation of payments. The ability of people to pay across the board not only at franchise. Small businesses, tuck-shops will be able to take payments digitally through scanning QR codes or using USSD to leverage the high mobile penetration. It allows banks to grow and creates opportunities for Fintechs to come in and provide services in terms of money transfer. In addition, regulations are changing in Europe where banks are being required to open their databases to Fintechs to regulate them better. This may mean that banks will become more platform providers and civil organisations with large memberships, such as churches, are able to white label transactional and credit cards for their members"* (Participant 4).

Established financial service providers may, through technology, potentially become platform providers and not interact directly with customers (Participant 1 & 5). This then opens up more opportunities for other businesses to provide financial services through which current regulatory requirements are unable to do so (Participants 4 & 5). There are increasing capabilities being built through small companies who interact more regularly with customers to be able to do financial services at the point of transaction for customers (Participants 1 & 5). These opportunities create new industries, such as digital industries, which should create more employment opportunities.

> *"The extent to which the sector still requires physical presence given the advent of digital banking. The financial services sector offerings are being driven through digital platforms and our engagement with clients is actually through those digital platforms. There's the big piece around cloud and the role that it's going to play as we move away from physical infrastructure to cloud which actually initially presented quite a big challenge for regulators.* [As seen with] *the likes of Amazon, coming into the country and actually setting up physical shop and servers to host data within the country. Therefore, increasingly banks are finding themselves being pushed to the*

low end of the value chain as international players come into the market" (Participant 1).

The increasing competition is driving which services companies can offer, especially if global competitors with large capital are entering the market (Participant 3). As banking moves into the digital space, the opportunity for international companies to penetrate the market is created, forcing local companies to relook how they are setup (Participant 1, 3 & 5)

5.5 Conclusion

The results of the interviews conducted as per research methodology provided in chapter 4 were presented. The consumption of financial products is negatively impacted by unemployment according to the data results. Whilst the skills development strategies at both macro and micro level require updating as they deemed inadequate for the technology changes. Competition is increasing as result of technology reducing barriers to entry, which in turn is driving changes to business models.

The next chapter discusses the results from this chapter together with the literature to provide insights on holistic research findings

6 Chapter 6: Discussion of Results

6.1 Introduction

In this chapter the results of the findings in chapter 5 and the literature in chapter 2 are integrated to answer the research questions detailed in chapter 3. Through the integration of chapters 2, 3 and 5 the research answers the research purpose, which looked at how technological advancement in the financial services industry is impacting unemployment. South Africa's high unemployment rate has a negative impact on the financial services sector performance, as it is directly linked with country economic performance (Festus et al., 2016).

6.2 Research Question 1: How has technological unemployment affected financial services in South Africa?

The first research question endeavored to answer how unemployment as a result of technological displacement has affected the financial services industry. An in-depth review was conducted to understand unemployment and its related impact on the industry's performance, considering how closely linked the performance of the industry is to the economy. Moreover, the research also sought to understand the primary drivers of technology investment in the industry. Finally, as part of the research question, key future technologies were investigated and how they are transforming labour practices.

6.2.1 Impact of unemployment

The interview question intended to establish how unemployment has affected the performance of financial companies, including to what extent unemployment is considered in some business decisions. South Africa's unemployment levels are high relative to other countries, and is, at the time of writing calculated at above 30% (Statistics South Africa, 2020). The unemployment levels have continued to deteriorate over the last decade, creating more pressure on social spending for the country (Festus et al., 2016).

Mkhize (2019) argued that the growth of the economy is inversely linked to the increase in unemployment because, as unemployment grows, economic growth is impacted negatively. Von Fintel (2017) had an alternate view and argued that economic growth alone cannot

reduce unemployment in South Africa, as the current economic growth is only creating higher skilled jobs whilst low skilled jobs are being automated. The automated jobs, the author argued, are increasing unemployment levels for low skill workers (Von Fintel, 2017). Skills requirements in new jobs are increasing as result of automation and this will potentially increase unemployment levels for new job seekers without the minimum skills (Festus et al., 2016)

The results of the primary data collection process of this study were a confirmation that unemployment has a negative effect on the performance of the financial services industry (Participants 1, 2, & 6). One of the key themes that arose was that unemployment impacts the size of the market, as less participants in the market are able to consume financial products (Participants 1, 2, & 4). The increasing unemployment levels have led lower to revenues and growth opportunities, thereby forcing companies to focus on cost reduction in operations through technology investment (Participants 2, 3, & 5). In part, this then leads to automation of jobs resulting in the displacement of some workers and a further increase of unemployment (Participants 5, 7, & 9). The results also revealed that growth in the sector is directly linked to growth of the economy and, due to reducing economic activity, growth has continued to decline (Participants 5, 7, & 9).

Furthermore, the findings indicated that unemployment has a negative effect on the growth of the financial services sector (Participants 1, 2, & 4). This then increases the automation of low skill jobs, as companies look to operate more efficiently. As such, the development of technological efficiencies contributes to the unemployment problem in the country. Skills requirements are increasing, potentially creating higher barriers to entry. The result is that technological unemployment negatively affects the financial services sector (Participants 1, 2, & 4).

6.2.2 Technological Changes in the sector

Following from the previous question around the negative effects of unemployment on the financial services sector, this section seeks to determine what the impact of reduced technological investment would be. The importance of technology on the sector and the

benefits realised would determine to what extent such investment would continue. Technological unemployment is the result of technology investment resulting in displacement of workers through automation of work (Kim et al., 2017). However, Musgrave (2019) argued that technology advancement brings modernisation to the industry, which is essential for growth and innovation. Additionally, customers seek to increase the use of technology for various services and therefore expect to be able to interact digitally as it is more convenient and cost effective for them (Makridakis, 2017).

Companies are investing in technology, especially AI, in service and knowledge work to gain strategic opportunities (Coombs et al.,2020). Coombs et al., (2020) argued that there are benefits to investing in technology, such benefits include improving market performance and business processes as AI technology grows and leverages Big Data. Davenport and Kirby (2016), however, stated that organisations can substitute AI capital for high-skilled labour and then reassign those workers for even more complex work.

The data collection process confirmed that customers are driving the increased use of technology as a means of interaction with the financial services companies (Participants 1, 4, & 8). The themes from the financial services interviews were that to engage with customers in any other mechanism potentially creates risk of loss of customers (Participants 1, 4, & 5). In addition, replacement of legacy infrastructure was driven by reducing cost to operate initiatives, due to increasing competition in the sector (Participants 1, 2, & 3). Participants in the research indicated various benefits of investment in technology, ranging from cost efficiencies and customer digital demand (Participants 5, 7, & 8). Some indicated that technology is linked to business continuity due to increasing competition as result of technology, which reduces the cost to entry into the market (Participants 2, 10, & 13). The result being that technology investment was not looked at as an option, but rather as a business imperative if the companies wanted to continue operating (Participants 1, 5, & 7). Moreover, the reducing market size due to unemployment contributed to pursuit of cost efficiencies as revenue opportunities declined (Participants 4, 12, & 14).

In summary, technology investment is critical for the continued growth of the financial services sector and brings about innovation and cost benefits. The technology investment

ensures future fit businesses due to the rapid change in technology. This also aligns with changing customer behavior as another key driver of technology investment that is then able to ensure customer value proposition.

6.2.3 Artificial Intelligence in the sector

The intention of this section was to establish how AI is changing how services are offered in the industry. AI is seen as big disruptor of current business processes due to the fact that it can combine cognitive ability and robotic processes (Makridakis, 2017). As such, the changed service offerings have implications for labour demand, potentially resulting in further displacement of workers as more jobs become automated as previously discussed.

6.3 Research Question 2: How will technological labour displacement change skills demand in financial services?

Technological labour displacement has mostly been concentrated in low skilled work through the automation of repetitive work. The intention of this research question was to establish how skills demand in the workplace is changing as result of the automation of low skilled work. As workers who perform low skilled work become more displaced by technology, skilling becomes a remediation to equip them for higher skilled jobs, which may then lead to increased skills levels in the industry. This may mean that technology advancement is leading to increased skills levels as consequence of technological displacement.

6.3.1 Reabsorption of displaced workers

Automation of work results in displacement of workers who were performing that work. The research investigated whether these workers are eventually re-absorbed. If workers are not reabsorbed, then their unemployment was not temporary which implies that technological unemployment has long term effects. Neisser (1942) argued that evidence of the permanence of displacement of workers as result of technology was lacking and therefore technological unemployment could not be long term. Chomanski (2018), however, argued that technological unemployment is long term and possible solutions to this are for example

creating charitable work (witn nofinancial value), unemployment insurance, and the provision of a basic income grant. From the participants interviewed, the general sense was that workers are eventually reabsorbed based on their skills at the time of displacement (Participants 1, 5, & 14). However, those requiring reskilling are likely to remain unemployed due to low investment focus in reskilling programmes (Participants 1, 5, & 14). Generally, participants saw the income grant system not effective tool for employment creation, which is already in existance in the country as a mechanism which sustains long term unemployment. Another finding was that minimum entry levels are rising with the increased skills requirements creating more of a barrier for people without skills to get into financial services (Participants 1, 5, & 14).

The findings were that workers which are displaced by technology are likely to become reabsorbed into the workforce again depending on the skills which they have,. One participant referred to this as how repurposeful they are (Participants 5). In absence of that, displaced workers would then form part of unemployment, which confirmsthat technological unemployment contributes to unemployement in the long run in certain circumstances (Participants 5, 7, & 9). The findings also showed that not all workers are reabsorbed as new employment is not created quick enough, creating at minimum temporary unemployment for repurposeful workforce.

6.3.2 Skills for the future of work

Following from the increased demand for skills in the industry as technology displaces low skilled jobs, it was important to understand what those future required skills would be. This identifies gaps within the current workforce that contributes to unemployment. This is to understand which skills are required in the industry what will contribute to increased competitiveness as well as provide insight into which skills should be invested in by companies and governments. This is in line with Khayyat and Lee (2015) who noted that development in skills which are required in the future increases the competitiveness of an economy. Kondratyuk (2018) found that the following (outlined in Figure 5 below) are required skills for the future of work, which was matched to what participants indicated would be required in the industry:

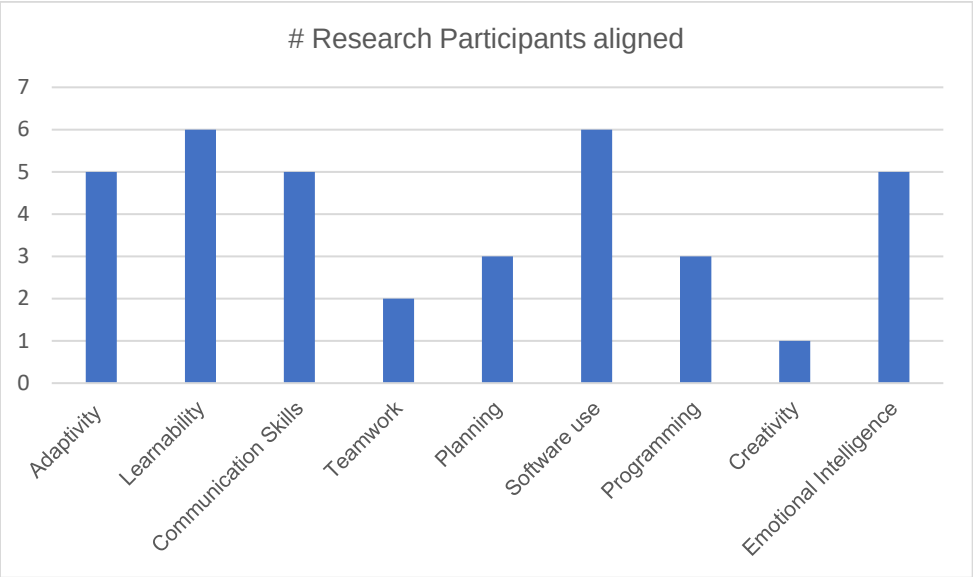

Figure 5: Skills vs. Number of Participants

Source: Author's own, adapted from Kondratyuk, T. V. (2018). Fourth Industrial Revolution: What competencies are necessary for employees? *Strategic Decisions and Risk Management, 108*(3). p. 66.

Figure 5 above indicates which skills, as identified by Kondratyuk (2018), would be required in the future based on the number of participants who identified that skill. Adaptivity, learnability, software use and emotional intelligence were selected by most participants as skills required in the future, these are soft skills and can be developed. Khayyat and Lee (2015) noted that development in skills which are required in the future increases the competitiveness of an economy.This is supported by Hu (2020) who concluded that economies realise great benefits when they have knowledge development programmes which are aligned to technology investment.

The findings thus confirmed that skills required in the future will be a hybrid of technology awareness together with human linked skills. The gap in which humans will operate will be where machines are unable to perform work. The findings also confirmed that skills development is important to equip future workforces with the appropriate skills which are future proofed and would continue to be relevant. The investment in skills development would provide benefits to improving unemployment levels, or at least reduce further displacement of workers.

6.3.3 Using skills development to reduce unemployment

The intention of this section was to consolidate the previous sections in terms of what is required to reabsorb displaced workers . The aim being to determine how skills demand is being changed by technology advancement. The premise of this question was based on the benefits of skills development as a means to reduceunemployment. Festus et al. (2016) argued that one of the key drivers of unemployment in South Africa is the low level of education. According to Statistics South Africa (2018), 89% of unemployed people have a matric or less as a qualification. Further, graduate unemployment is a result of a mismatch of skills acquired with the skills needed by the financial services sector (Oluwajodu et al.,2015).

Collectively, the participants interviewed were of the opinion skills development programmes in the country were inadequate and did not address current business focus areas (Participants 1, 4, & 8). A portion of the participants iterated that early development programmes at primary and secondary school levels required foundational principles linked to a technology aligned future (Participants 1, 4, & 8). Some highlighted that the Sectoral Education Training Authorities (SETA) in the current format was unable to create programmes which were relevant to business and should include research into technology required skills (Participants 1, 4, & 8). This then highlighted that institutions tasked with the development of skills were not seen to be responding to the changing future, and thus were viewed as unable to skill workforces adequately (Participants 1, 4, & 8).

In summary, the findings illustrate that although skills development is seen as driver to reducing unemployment, the challenge for South Africa is how that skilling will be implemented. The findings also confirmed that lack of skills or surplus of irrelavent skills are key drivers to unemployment. Skilling of potential workforces should include technology based skills, and these should form part of skills development programmes. These skills development programme should, howeverbe effectively executed by learning instiututions in order to make a difference. This would allow for skills development contribute in the drive to reduce unemployment in the country.

6.3.4 Future of Work

The future of work assessment intended to understand what kind of work will be available in the future, given that technology is changing current work patterns. In understanding which types of work will be available, the skills identified in the previous section was correlated to ensure an improvement of technological unemployment. In addition this gave insights into how labour demand would unfold in a future filled with technology. The automation of jobs is on the rise and understanding which work will be available and what the skills requirements are will support employment initiatives

PricewaterhouseCoopers (2017) reported that on average around 30% of jobs will be automated in developed economies by early 2030s, and investment in skills development and vocational training should be initiated to increase the adaptability of workforces. Boyd and Heuttinger (2019) argued that the rapid development of AI has made it possible for further automation of work than previously anticipated. Increased digitisation of work through AI means less future work for humans compared to the current situation (Boyd & Heuttinger, 2019). Frey and Osborne (2016) found that work that has the following characteristics cannot be programmed easily and is thereforeless likely to be automated: perception and manipulation tasks (due to inability of technology to replicate human perception); creative intelligence tasks (because human creativity cannot be specified), and; social intelligence tasks (hese varies and include tasks in negotiations).

The results of the data collection process found that most of the participants felt that South Africa, compared to developed economies, is lagging in that the digitisation progress of the economy (Participants 5, 7, & 13). The participants indicated that due to high income inequality and unemployment levels, digital adoption is still relatively low compared to developed economies. The data also confirmed that digitisation is indeed taking place, however in relation to the size of the population it is limited to mainly employed and wealthy individuals (Participants 1, 5, & 6).

Although the literature shows that the skills required for future are being developed inSouth Africa, the findings of this study indicate that they are being developed at low levels. This

affords South Africa an oppurtunitity to implement skills development programmes for existing workforces. The future of work skills would also support efforts to improve unemployment levels by ensuring the alignment of industry needs to skills development.

6.4 Research Question 3: How is technological advancement changing business models in financial services?

The research question intended to collect and analyse information on how business models are changing in the financial services industry as result of technological advancement. In the previous sections, the necessity of technological investment was noted as being driven by cost, customer value proposition, and increasing competition. The result being a change in infrastructure, channels, and how services are offered to customers . The change in business models give insights into how businesses are changing to provide a view of how labour would be demanded in the future. In addition, technology has reduced the cost to entry into markets resulting in increased market players in the financial services industry (COEFS, 2019). The increasing competition from both local and international companies has meant that South African companies should have competitive strategies.

6.4.1 Improving competitiveness against global companies

This section interrogated how local financial companies are responding to increased competition from global companies as result of technology. Technology has reduced global borders, and companies are able to operate in extended jurisdictions (Musgrave, 2019). The unemployment levels in South Africa results in a reduced market, which increases competition between the companies operating in the financial services sector.

Frey and Osborbe (2016) argued that more companies will enter the financial services sector as productivity is high and cost of operating is low due to technology, thus presenting oppurtunity for capital. Kondratyuk (2018) argued that the demand for labour will cross borders and skills will migrate to those who may have large funds, which can be at the expense of developing economies. Countries and organisations are investing in emerging technologies to create innovation, improve their global competitiveness and ensure survival

(Amankwah-Amoah et al.,2018). Ayentimi and Burgess (2019) argued that in some sub-Saharan African countries, advanced technologies are only in sectors where multinational companies are operating. Technology helping in reducing the cost of operations may result in multinationals re-shoring work to their developed economies at the expense of cheap labour in sub-Saharan Africa (Ayentimi & Burgess, 2019).

The data collected through the interviews found that trust is a strong factor for decision making in the financial services sector, and that this trust is driven by local companies that are familiar in the market (Participants 1, 2, & 4). The nature of some of the financial transactions are large and are built on relationships. Customers are therefore less likely to make a decision based on the effieciency of the technology only without considering the relationships (Participants 1, 2, & 4). Local companies are able to use this to compete with international companies locally.

The results also showed that competition in the market was driven through niche product offerings, including transaction facilitation services. The Covid pandemic was noted as driving the global distribution of, which increasesd competition of labour across borders as people are able to provide services remotely (Participants 3, 6). The South African financial services sector was seen as being competitive against global competitors relative to its neighbours due to its mature financial sector (Participants 2, 4, & 8). Some data revealed that South African financial companies were better equipped technically and were spending more on technology advancement relative to their peers in developed economies (Participants 2, 4, & 8). This was seen to be driven by the number of competitors in the industry relative to the size of the market . The financial sector is relatively competitive, as a result of investment in disruptive technologies by incumbant financial companies in comparison with developed economies having more specialist banks (Participants 2, 4, & 8).

The findings of this section confirmed the literature in so far as it relates to competition as a driver of global labour demand and was found to be in its infancy in South Africa driven recently by the changes from Covid pandemic.

6.4.2 Using technology to address high unemployment

Technology advancement and investment is continuing and, as was established earlier, in some parts this is resulting in the displacement of workers. The intention of this section was to establish which oppurtunities technology presents to address high unemployment. The research has established the negative effects on unemployment on the financial services sector and the reasons for the pursuinance of technology development, therefore its relevant to understand how employment could be created from technology which would benefit the sector. These oppurtunities would also provide insights into new operating models for companies as a result of technology.

Wanga et al., (2020) argued that with new industries being created, employment levels can be improved through technological advancement, considering that China's digital economy now contributes 36% to its Gross Domestic Product (GDP). Technology creates oppurtunities for new industries to open, thereby creating new employment. Bai (2017) further argued that higher internet connectivity levels and speed correlate to higher employment creation levels as they facilitate the digital economy. The better digitally connected customers are, the more the financial industry can improve its digital infastructure as documented earlier. Increased digitisation leads to increased income levels as the cost of production reduces, thereby driving increased income levels in the economy (Aubert-Tarby et al.,2018).

The data collection process further confirmed that digital adoption is on the rise in South Africa in the financial services, creating potential new industries (Participants 5, 8, & 11). From the data analysis it was revealed that oppurtunities are in abundance in the digital space to create new employment, however, the infastructure still requires significant inivestment (Participants 4, 6, & 9). Some of the challenges raised focused on digital inequality and its potential to hamper the consumption of job oppurtunities (Participants 1, 2, & 4). Further to that, the costs associated with connectivity were seen as a stumbling block in mirroring what China has done around digital economy. The spillover benefits were raised in that its important for primary and secondary sectors to become digitally active to

ensure that they can consume financial products. This is because the Customers of financial services come from these sectors.

In summary, technology can be used to create employment and such employment oppurtunities require capabilities and infastructure. Added to this, inequality is another stumbling factor due to low income levels in the country which may slow the process due to lack of digital accessibility. There are multiple examples shown where new industries created by technology have resuled in employment, such as Uber (Participant 2,4) . There are oppurtunities to leverage technology in creating employment.

6.4.3 Changes in Financial Services Business Models

Changes in business models in the financial services sector provided outlook on employment prospects in the industry and which new opportunities were being created. In addition, such changes gave insight on the range of potential impact technology advancement has on business models, as well as the provision of services. In earlier sections, it was established that digital inequality is hampering business technology growth relative to developed economies, and therefore business model changes should consider customer adoption.

Bianchini et al., (2018) argued that companies should use the transformations brought about by technological changes to review and update their business models in order to be more circular and thus realise benefits in the environmental, social and economic spheres. Business models developed with a circular economy in mind, and that leverage the benefits of technology will increase efficiences through the reuse of inputs and full value chain understanding (Bianchini et al., 2018).

Mao et al., (2020) raised the concern around the affordability of the new technology which may hamper adoption. For example, Fintech companies are offering more specialised transactional services and competing with established financial services companies, changing how some services are offered (COEFS, 2019). This has resulted in increased competition in the credit supply and payments processes where financial companies

previously were offering these services through fixed infastructure e.g Branches (COEFS, 2019). In remaining competitive, established financial services companies are changing how services are offered through new technology, matching that of Fintech companies and potentiallu reducing their physical footprint.(COEFS, 2019). This forced digital migration may not be affordable to all Customers.

The data collected showed that financial companies are changing their business models in response to competition driven through technological advancement (Participants 1, 5, 6). Organisations will need to review their business strategies in order to ensure that their business is still relevant in the technology era (Participants 3, 6, 7). Such a review should include an update of their structure and processes (Participants 5, 10, 14). These changes will mean the reskilling of personnel for the new operating model to ensure that capability is built (Participants 3, 8, 12). Some of the collected data revealed upcoming regulatory changes which will allow greater participation of Fintech companies in the sector to better regulate them, which may lead to greater division of labour between financial services companies and Fintechs (Participants 2, 4, & 8). As such, traditional financial institutions may become infastructure providers whilst new entrants would own the direct relationship with customers (Participants 1, 4, & 5). The sector is also shifting to offer more services digitally, negating the need for physical presence.

In summary, business models are changing in financial services sector and these changes are being driven by customer demand, increasing competition, and effieciences. Updating business models is becoming a new normal for financial services companies in relooking at their structures and business processes. This is so that they can remain competitive in an ever changing market. The inequality levels would also determine whether low income customers are able to consume the new services , which is a factor to be considered.

6.5 Conclusion

In conclusion, the findings have achieved what the research intended to establish through the research questions. The research questions showed how technological unemployment is impacting financial services and the reasons for key drivers of technological

advancement. The research determined that although technological advancement may result in the displacement of workers leading to technological unemployment, the drivers of technological investment are inevatible and therefore it is a business imperative. Data collected from the sample of participants revealed that South Africa, although similar in some respects to the developed economies upon which most literature is written, has nuances which have different outcomes in some of the forecasted technological changes.

7 Chapter 7: Conclusion

7.1 Introduction

This chapter concludes on the main findings of the research. This is done by integrating chapter one with chapter six. It includes, based on the findings, recommendations for business, a discussion on the limitations of the research and suggestions for future research.

7.2 Principal conclusions

The research intended to understand how technological unemployment had affected the financial services sector, as a primary focus. In addition, it set out to understand how skills demand and business models were evolving as a result of technological advancement. The outcome of this research was to provide suggestions for business and government on responses to technological unemployment whilst continuing to pursue technological competitive strategies. The pursuance of technological advancement is considered a critical component of competitive strategies both at a macro and micro level. The principle findings are described in the following sections.

7.2.1 The impact of technological unemployment on financial services

South Africa's persistently high unemployment levels pose significant challenges for the country. In particular, it impacts the performance of the economy. The economy is impacted on multiple levels. For the financial services sector, these include a reduction in the market size and fewer customers of financial products, according to results presented in chapters five and six.

Technological unemployment is increasingly contributing to the unemployment problem in the country as workers become displaced as a result of the automation of work (Frey & Osborne, 2016). At the same time, technology advancement, as driven by the fourth industrial revolution, has created impetus for companies and governments to invest in technology to derive efficiencies and remain competitive at both macro and micro level (Boyd & Heuttinger, 2019). Overall unemployment has negative impact of the sector as

detailed in the previous chapter, in addition technological unemployment has the same effect if displaced workers are not repurposed. It was also found that it will continue to increase as more investment is made in technology.

Education is an important tool with which to increase the quality of labour, especially when technological unemployment occurs. The challenge of South Africa' low education levels will hamper the country and the financial sector's ability to leverage the capabilities that new technologies bring, which will impact their competitiveness. (Hu, 2020). Therefore, skills development strategies were found both in the literature and findings as being critical in responding to technology advancement (Khayyat & Lee, 2015).

7.2.2 The change in skills demand as result of technological displacement

As mentioned, the low education levels were found to be a hinderance in the realisation of technological advancement benefits (Hu, 2020). In addition, the automation of work is highly concentrated in low skilled jobs displacing more workers at that level (Sorgner, 2017). Therefore, the requirement for higher skills levels is increasing as advanced technology is implemented (Jandric & Peters, 2019). The study's findings showed that technology is in fact bringing continuous change at a faster rate than previously experienced and therefore the ability to learn and adapt quickly is as important as learning technical skills (Kondratyuk, 2018). The study's findings revealed that adaptability, learnability and emotional intelligence were considered important skills for the future alongside software skills.

Artificial intelligence was found to also be leading to increasing skills demand as result of displacing mid-level complex roles, pushing the minimum skill level required further upwards (Davenport & Kirby, 2016). The minimum requirements for most roles in the financial services continues to increase as result of technological advancement. The result is that increasing skills demand create further challenges for addressing the backlog of unemployment in South Africa, which are exacerbated without a skills development strategy.

The study also found that blended learning experience is recommended for both online and face to face learning (Van Den Berg, 2019). This should include real life scenarios learning and journal reflections to document learnings, and these can be done through partnerships with industries and relevant learning institutions (Van Den Berg, 2019). Technology facilitates new ways of learning which allows for greater reach and convenience to the learners.

The research found that technological advancement is changing skills demand by increasing the upskilling of workers. The upskilling is taking place albeit not proactively but in response to technology implementation

7.2.3 Technology advancement changing business models

The study's findings showed that technology continues to break down geographical borders, allowing customers and suppliers in different countries to transact (Musgrave, 2019). This has resulted in increased competition at a local level whereby companies need to ensure that they are operating optimally to face both local and global competition. The data collection process provided insights on the competitiveness of local financial services companies relative to their competitors in developed economies. The more customers consume digital services, the more they expect suppliers to be able to provide services digitally, thus driving a change in business services (Jung & Lim, 2020). In addition, companies are increasingly pursuing optimum operating models to leverage technology to achieve cost efficiencies.

Fintech's, blockchain and AI were found to have the biggest impact on the business models of financial services companies (Wanga et al., (2020). The study's findings revealed that Fintech's (using blockchain technology) can provide single line service offerings at a far cheaper level than large financial companies. This increases competition at a transactional level for established companies due to their full-service offerings which cost more due to infrastructure costs. This is creating impetus for established companies to leverage the capabilities of AI to change their operating model (Königstorfer & Thalmann, 2020).

In short, the research found that technology is changing the business models of financial services companies, which will also have an impact on their employment patterns.

7.3 Implications for business and other stakeholders

Technological unemployment occurs as result of technological advancement which is necessary for the competitive continuance of financial services companies. This creates a dilemma for these companies, as unemployment has negative consequences for growth prospects due to the market size being reduced. South Africa's high unemployment levels also create an additional burden for unemployment reduction initiatives as result of the starting point. These challenges are as a result of low education levels for the majority of the unemployed population and the length of time a person is unemployed reduces the chances of becoming employed, resulting in permanent displacement.

Business leaders should consider upskilling workforces that have a higher probability of becoming displaced by technology as part of their technology implementation plan. This would ensure that those displaced workers are easily repurposed to other jobs to avoid permanent displacement. This should, however, be part of the change plan before the implementation of new technology. Government leaders should consider a skills development strategy aligned to the demands of the fourth industrial revolution including digitisation which spans early childhood education to tertiary education. This should include long term development in skills which are deemed in demand for the future of work.

Government together with business should consider further investment in development of digital economy similar to China, to create work opportunities for the unemployed. This will require increasing access to internet and technology to drive digital entrepreneurship.

Government should also continue with regulations which protect local firms especially in the financial services industry to ensure continuity of employment creation. Technology allows international financial companies to operate remotely from overseas which may not provide employment opportunities locally.

7.4 Implications for Theory

South Africa's economy has been reported as combination of both developed and developing economies. Technology unemployment theory is applicable to South Africa however the limitations are in nuances of poverty, inequality and unemployment. Literature reviewed did not provide for those nuances in describing the impact of technological unemployment, in addition the literature is limited in industry analysis for financial services.
"many of the discussions of the 4IR and its impact are focused on developed and advanced economies and how they will develop skill sets" (Ayentimi & Burgess, 2019, p.642)

7.5 Limitations of the research

Sample size was presented as a fair representation of companies in the financial services industry. However, this may be limited as the data collected was limited by the point of saturation and there are opportunities to engage wider in the industry than just with only 15 Business Executives.

Interview bias is another limitation because both the participants and the interviewer work in the financial services industry, as a result there may be a bias of common thinking. Efforts were made to reduce this through the quality check process by both the supervisor and the editor.

Generalisation is possible due to the nature of the study, as the topic of unemployment is broad and technological unemployment research in the country is limited. In connecting these there is however a risk of generalising findings although every effort was made to reduce this through comprehensive literature review.

7.6 Suggestions for future research

Further research should be considered in the field of skills development to address technological displacement. Although highlighted by this research, deeper investigation in

this area should provide insights to eventually form a detailed roadmap that can be used in skills development strategies. Additionally, further research should be considered in the field of Future of Work, to understand the full spectrum of the new jobs of the future. In this research what was established was the needs of business leaders, for future research this could be investigated further in line with Future of Work studies.

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9 Appendices

9.1 Consistency Metrics

Questions	Literature Review	Data Collection Tool	Analysis
Research question 1: How has technological unemployment affected financial services in South Africa?	Kingdon & Knight, 2007; Frey & Osborne, 2016; Coombs et al., 2020; Sorgner, 2017	Interview questionnaire: Question 1, 2, ,3,4	• SA Unemployment • Technological unemployment • Automation • Artificial Intelligence
Research question 2: How will technological labour displacement change skills demand in financial services?	Jandric & Peters, 2019; Jung & Lim, 2020 ; Yeo & Lee, 2020	Interview questionnaire: Question 6, 9, 10, 5	• Skills development • Future work
Research question 3: How is technological advancement changing business models in financial services?	Dai & Vasarhelyi, 2017; Coefs, 2019 ; Mao et al., 2020	Interview questionnaire: Question 11, 7, 8,	• Business models • Competitiveness

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Topic of work: …… Implications of technological unemployment in financial services in South Africa ……..

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1 December 2020

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9.3 Invitation and Consent Form

Dear Participant

I am currently a student at the University of Pretoria's Gordon Institute of Business Science and completing my research in partial fulfilment of an MBA. I am conducting research on the impact of technological unemployment on financial services of South Africa .

Our interview is expected to last between 45 minutes to an hour . **Your participation is voluntary, and you can withdraw at any time without penalty**. All data will be reported and stored without identifiers.

If you have any concerns, please contact my supervisor or me. Our details are provided below.

Researcher name
Kingsley Maloka

Email
04989890@mygibs.co.za

Research Supervisor Signature
Marianne Matthee

Email
mattheem@gibs.co.za

Signature of participant: _____

Date:

Signature of researcher: _____

Date:

9.4 Ethical Clearance

Gordon Institute
of Business Science
University of Pretoria

Ethical Clearance Approved

Dear Kingsley Maloka,

Please be advised that your application for Ethical Clearance has been approved.
You are therefore allowed to continue collecting your data.
We wish you everything of the best for the rest of the project.

Ethical Clearance Form

Kind Regards

9.5 Code List from Atlas.ti

Name	Groundedness	Categories
Access to technology	12	Inequality
Human learning ability	2	Agility
Speed of Operationalising Strategy	8	agility
Becoming irrelevant	4	Business Continuity
Business continuity and survival	6	Business Continuity
Technology changes to business models	21	Business Models
Continuing industries	2	Continuing Industries
Customer Brand loyalty	2	Customer Value Proposition
Customer expectations	2	Customer Value Proposition
Customer preferences for Humans	6	Customer Value Proposition
Customer types	2	customer Value Proposition
Customer value propositions	24	customer Value Proposition
Need for financial products	4	customer Value Proposition
Trust as factor of business	1	customer Value Proposition
Changing competition landscape	22	Dynamic competition
Changing market participants	5	Dynamic competition
Competition from Fintech's	8	dynamic competition
Global competition	25	dynamic competition
Local Competitiveness	6	dynamic competition
market dynamics	1	dynamic competition
Niche bank offerings	2	dynamic competition
automated back-end processes	3	Efficiencies
automation of processes	11	effiecinces
Driving cost efficiencies	7	efficiencies
Opportunity cost of disinvestment	4	efficiencies
uncompetitive infrastructure	6	efficiencies

Limitations of technology	6	Human opportunities
Ability to consume financial products	12	Income and means
accessibility to financial products	7	Income and means
Alternative incomes	1	Income and means
impact of lack of income	1	income and means
income inequality	4	income and means
reduced consumption of financial products	3	income and means
Inequality in technology	4	Inequality
technology accessibility	6	Inequality
Global Labour competition	3	Labour Demand
Labour market growth	3	labour Demand
new employment with new technology	19	labour Demand
Opportunities to create employment	18	labour Demand
Country Technology strategy	16	Macro strategies
Grant system	2	income and means
Labour intensive industries	1	labour Demand
Macroeconomic ecosystem	13	Macro strategies
Policy intervention requirements	1	macro strategies
Protectionist policies	3	macro strategies
Regulatory changes	4	macro strategies
Social spending responsibility	5	macro strategies
Spatial economics	1	macro strategies
Taxable workforce	2	macro strategies
technology investment dilemma	6	macro strategies
Trade Agreement opportunities	1	macro strategies
entrepreneurship opportunities	6	Market Opportunities
market growth opportunities	28	Market Opportunities
Market new entrants	2	Market Opportunities

Market trends	1	Market Opportunities
Payment process changing	2	market Opportunities
Performance linked to Economy	9	market Opportunities
potential market	2	market Opportunities
Technology new industries	12	market Opportunities
Agile working environment	5	New ways of work
Change in business practices	14	new ways of work
Changes in Business locations	9	new ways of work
Changing work environment	5	new ways of work
Gig economy	4	new ways of work
Managing distributed workforce	1	new ways of work
Work flexibility and rotation	3	new ways of work
Continuous learning environment	11	Skilling
Delivery of training content	2	skilling
Displaced worker skilling	11	skilling
Early skills development	6	skilling
Education strategies	7	skilling
Future analysis skills required	7	skilling
Future Executive skills required	8	skilling
Future skills	1	skilling
Future soft skills required	2	skilling
Generalists skills in demand	2	skilling
Global Technology skilling	1	skilling
High Skill set	2	skilling
Highly Skilled Capacity	1	skilling
knowledge economy	1	skilling
misalignment of education system	6	skilling
Multi-skilled workforce	8	skilling
Opportunity identifying skills	2	skilling
Period of skills development	4	skilling

Primary school technology development skills	7	skilling
Proactive skilling	2	skilling
Relevance of skills to economy	4	skilling
reskilling potential	3	skilling
Reskilling requirement	12	skilling
skilling for new employment	39	skilling
Skilling for opportunities	4	skilling
Skilling unemployed	2	skilling
Skills to be dialled up	1	skilling
Technology skills required	6	skilling
technology specialised skills	3	skilling
AI and Work displacement	10	technology displacement
automating low skilled jobs	13	technology displacement
automating low skills	1	technology displacement
technology displacement	19	technology displacement
AI good for Business and Customer	8	Technology value proposition
Cloud storage	1	Technology value proposition
Customer facing technology	4	Technology value proposition
customer technology frustrations	2	Technology value proposition
Digitisation of services	8	Technology value proposition
Efficiencies from technology	18	Technology value proposition
Efficiency in Service offering	5	Technology value proposition
Fintech offerings	9	Technology value proposition
growing digitisation	5	Technology value proposition
growth of artificial intelligence in SSA	2	Technology value proposition
Human & Technology partnership	22	Technology value proposition
Human AI collaboration	9	Technology value proposition
Legacy costly systems	7	Technology value proposition
No geography limits with technology	1	technology value proposition

Technology consumption	1	Technology value proposition
Technology in daily activities	2	Technology value proposition
technology self - disruption	2	Technology value proposition
Technology to white label	2	Technology value proposition
Uses of AI	4	Technology value proposition
Using AI analytics in Fraud prevention	2	Technology value proposition
using AI for advice services	7	Technology value proposition
using AI for Customer Analytics	14	Technology value proposition
Using AI with Big Data	6	Technology value proposition
impact of unemployment on financial services	24	Unemployment
long term unemployment	3	unemployment
Replacing Humans	1	unemployment
Societal impact of unemployment	18	unemployment
Youth unemployment	3	unemployment