

The Fourth Industrial Revolution and high Unemployment Rates in South Africa: A Youth Context

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Abstract

This paper is conceptual and uses a desktop survey to gather literature about the Fourth Industrial Revolution (4IR), its advantages and disadvantages, and its impact on the South African job market. The paper intends to uncover the impact of the 4IR on the South African job market. In an attempt to deal with one of South Africa's triple challenges (poverty, inequality and unemployment), namely unemployment, South Africa finds itself in the introduction of the 4IR, with which it must acquaint itself. It is, however, worrying when looking at the year-by-year escalation of South Africa's high unemployment rate. When looking at the dire status and escalation of the unemployment rate (which is affecting South Africans, most particularly the youth), it is not ironic that South Africa is inadequately prepared and inept to embrace the changes that the 4IR brings. While the country is making amendments in the education sector in terms of preparing the youth for the skills that will be relevant to the changes and give them access to employment, this has come a bit late to be able to address the high unemployment rate. There is already a high rate of retrenchments within the banking sector, which is cause for concern in terms of labour unrest that the country is (in)famous for.

Keywords: Fourth Industrial Revolution (4IR); unemployment; technologies; youth; education; job market; South Africa

Introduction

The Fourth Industrial Revolution (hereafter 4IR) refers to a developing environment in which technologies and trends such as the Internet, robotics, virtual reality and artificial intelligence are changing the way societies live and work (Wisskirchen et al. 2017). It is alleged that the transition from a traditional pattern to a technological way of life may



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cause negative disruptions, while at the same time bringing new changes that will make life much easier. The inevitable change in developing countries, brought about by the 4IR, seems to have a negative aftermath when compared to the alleged benefits for society. According to literature, the 4IR is driven by countries with very strong economies (Manda and Dhaou 2019). The benefits, as argued, will then be felt by those countries with very strong economic powers, rather than third world countries such as South Africa. The most important aspect of the 4IR is that it will increase production for labour intensive markets. While this is true and exciting for such countries, it has been perceived to be a contributing factor for major job losses in South Africa. Various companies in South Africa, such as Steinhoff, Multichoice, Distell, Tiso Blackstar, the South African Broadcasting Corporation and Telkom, as well as the banking sector amongst others, are believed to have been pushed into a corner for retrenchments; mainly owing to the 4IR. A relative majority of the companies are retrenching workers because consumers in the technological era use digital self-services that result in a diminished need for walk-ins to be serviced (Peters 2017). Thus, it could be argued that the retrenchments contribute massively and strongly to the increase and escalation of an unabated unemployment rate in South Africa. The question is: Can the fourth industrial revolution be embraced in the current situation of high unemployment rates, which seem to be a concern in South Africa?

On the one hand, the crux of this paper is prompted by an erratic, unstable and unabated high unemployment rate in South Africa, while on the other hand, it is motivated by the technological advancement in the name of the 4IR, which is introduced and encouraged for embracement. Technically in South Africa, the 4IR is to be positively considered, while at the same time, the issue of unemployment is becoming dire and unbearable. Ironically, in South Africa, there are still social inequality issues such as digital inequality and the lack of skills to utilise technological gadgets. These issues need to be dealt with prior to embracing the 4IR, particularly in deep rural areas (Choung and Manamela 2018; Dittrich 2016). As a result, the paper provides a conceptual underpinning of the 4IR and the high unemployment rate in South Africa. The paper specifically explores the digital inequality that unevenly affects the abilities and capabilities of a large part of the population in utilising technological gadgets. Moreover, the challenges in respect of unemployment and the impact of the 4IR are debated for the purpose of the paper's argument.

Framework and Methodology

This is a conceptual paper that utilises a desktop study for an analysis of the literature about the 4IR and its impact on unemployment in South Africa. Accordingly, the paper's premise is based on a literature review approach. The paper conceptually analyses secondary data as the pillar of its methodology, framework and structure. It means that the paper has assembled and analysed data using a literature-based approach in respect of the 4IR in relation to high unemployment rates in South Africa. This paper considers the ideas and writing of other scholars to validate the main aim and premise

of the study. The paper’s aim, argument, purpose and conceptual framework are driven by the crux and gist of literature, considering scholars’ opinions, notions and views about the 4IR and its influence on high unemployment rates in South Africa.

Conceptual Underpinnings

Industrial Revolutions Defined

The acronym of the term Fourth Industrial Revolution is 4IR, and it was coined by Klaus Schwab, the founder and executive Chairman of the World Economic Forum (Schwab 2016). It refers to “current developmental environment in which disruptive technologies and trends such as the Internet of Things (IoT), robotics, virtual reality and artificial intelligence are changing the way people live and work” (Dimitrieska, Stankovska, and Efremova 2018). Trade and Industrial Strategy Policies (TIPS 2018) define industrial revolutions as “periods in modern human history where technological innovation resulted in a drastic shift in the socio-economic status of people.” Most researchers refer to the 4IR as automation that has resulted in driverless cars, pilotless drones, Uber taxis replacing traditional taxis, Airbnb challenging hotels and motels, amongst others (Dimitrieska et al. 2018; Schwab 2016; Xu, David, and Kim 2018).

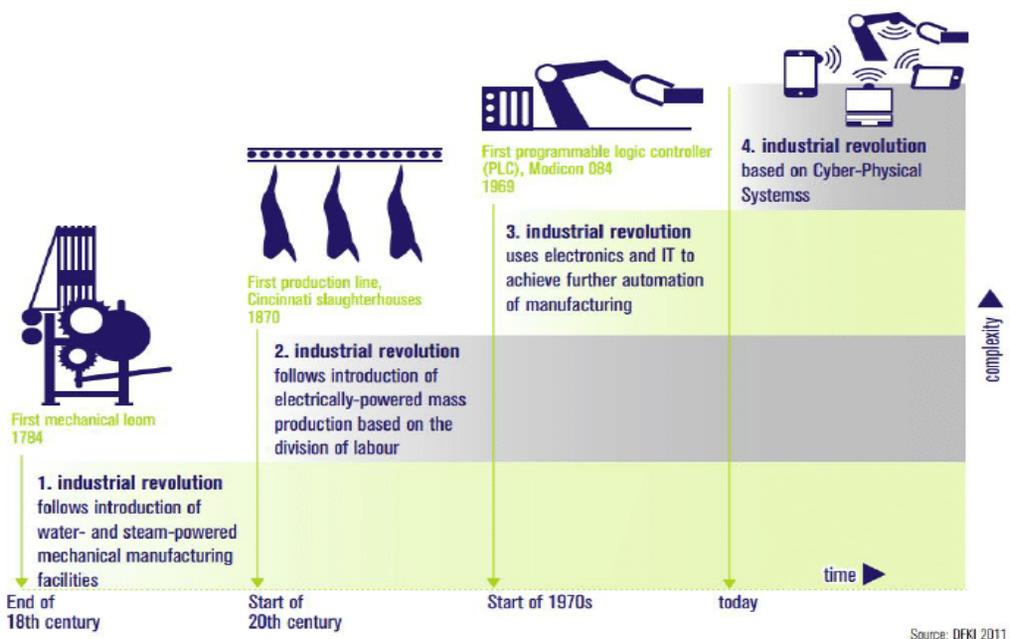


Figure 1: Illustration of the time frame of the four major industrial revolutions

The first industrial revolution is said to have started in 1760 with the invention of the steam engine. During that period, coal was the main source of energy and trains were used as the main mode of transportation (Dimitrieska et al. 2018). Textiles and steel

were also the main industries creating employment. The second industrial revolution began around 1900 with the introduction of oil and electricity for mass production (x-rays and the improvement of the conveyer belt) (Dimitrieska et al. 2018). The third industrial revolution (also termed the digital evolution era or computer and internet era) began around 1960 (Schwab 2016). This is the era when information technology was introduced for production. While the fourth industrial revolution (4IR) is perceived and alleged to be building on the third industrial revolution, it seems to be more sophisticated as compared to the others due to being more technological in advanced artificial intelligence. It is the current industrial revolution and uses computer-generated mass production (Dimitrieska et al. 2018; Schwab 2016; TIPS 2018; Xu et al. 2018).

The difference between the revolutions is that, in the first two, people used physical strength for mass production, whereas during the last two, they use artificial intelligence for mass production, and this gets more sophisticated and advanced. According to Xu et al. (2018), the 4IR is about maximising potential so that people are innovative and become complex problem solvers. Schwab is quoted as having concerns that countries might miss the opportunities brought about by the 4IR if those countries fail to regulate and capture new technologies. Manda and Dhaou (2019) argue that the 4IR can only benefit countries with strong economic powers. This might aggravate inequalities in societies as developing countries are expected to have strong economic powers to embrace the benefits of 4IR. Moreover, developing countries are expected to first empower their societies with technological skills that may have lagged behind due to digital inequality (Choung and Manamela 2018; Dittrich 2016)—that is, to take advantage of the benefits brought about by the 4IR. This then translates to better economies for the world, according to Adendorff, Lutshaba, and Shelver (2018).

Unemployment in South Africa

Generally, unemployment has increased drastically in South Africa; evidently, young people are more at risk as compared to adults (Mlatsheni and Rospabé 2002; Stats SA 2017). Cross-country comparisons regularly affirm that South Africa's unemployment rates are among the highest in the world (World Bank 2013; International Labour Office [ILO] 2015). According to Statistics South Africa (Stats SA 2017), there were more than 8 million unemployed people in June 2014, of whom 5.1 million were unemployed youths at that time (Stats SA 2017). Unemployment is a very disturbing social problem in South Africa, with the youth topping the list at a higher rate than adults at an average of 13.4% in 2008, rising to 15.6% in 2014 (Stats SA 2017). Accordingly, one can argue that the rise of youth unemployment from 2008–2016 has increased and is still gradually increasing. Statistically, the rates of unemployment were recorded as more than half of the youth population during 2008–2019. This could be an indication that youth unemployment might still increase, as this population group is also likely to increase in the next five to 10 years.

Unemployment is perceived to be a continuous scourge that poses significant challenges and difficulties to be eradicated in developing countries, including South Africa. It could

be argued that the unemployment rate remains increasing and escalating in South Africa; thus, there is no drastic change in terms of the alleviation or eradication of unemployment. The general unemployment rate in May 2019 is said to have been at 29% in South Africa (Stats SA 2019). Stats SA (2019) reveals that the unemployment rate has increased from 27.6% in 2018 to 29% in the second quarter of 2019. This is an increase of 1.4%, which is worrying. Concomitantly, the Statistician-General, Risenga Maluleke, released the rates of unemployment in 2020, which showed that in 2019 the unemployment rate rose to 29.1%, with real chances of increasing and escalating from that percentage.

Within this context, there is an alarming increase in unemployment percentages on a yearly basis as the youth complete tertiary education and try to enter the job market (Stats SA 2019). It can be safely assumed that, as more young people graduate from tertiary institutions, the percentages might continue to escalate. South Africa has 38.4 million people of working age, who are between the ages of 15 and 64, and out of the 38.4 million, only 23 million are employed, while the remaining 15.5 million are said to be unemployed (Stats SA 2019). According to literature, in terms of statistics of unemployment, one can argue that South Africa's unemployment rate is unabated and growing rapidly in the post democracy period. It is, therefore, questionable that harnessing the 4IR (with its alleged benefits) can assist in alleviating and eradicating unemployment in South Africa. This is despite several development programmes of the South African government, such as the 2030 Agenda for Sustainable Development and the National Development Plan (NDP), to create jobs for South Africa's people. Furthermore, a National Infrastructure Plan was adopted in 2012 by South Africa as a measure of transforming the economy while creating jobs (Manda and Dhaou 2019). Accordingly, a Strategic Integrated Project (SIPS) was then developed to implement the National Infrastructure Plan. This article contends that, despite all these efforts and government interventions, South Africa finds itself in a conundrum of creating jobs, while at the same time technological advancement (artificial intelligence) is creating problems in terms of people losing employment.

Challenges for South Africa in Terms of 4IR

While most countries are said to have adopted the 4IR at a very fast pace, South Africa is argued to be moving very slow in this regard (Sutherland 2020). It is argued that foreign companies and consortiums in South Africa are advocating for a rapid embrace of the 4IR, despite the existing reluctance and debates about adopting the 4IR (Aulbur, Arvind, and Bigghe 2016). Other foreign consortiums and businesses are rapidly adopting the 4IR, while South African businesses are moving very slow. Arguments around South Africa's readiness indicate that the country is not ready for the 4IR because of limited ICT infrastructure and a workforce perceived to be lacking in literacy, competence and skills to accommodate and embrace the 4IR. There might be some truth in this argument, as is evident from the long queues experienced during the registration at tertiary institutions. This could indicate a lack of proper ICT

infrastructure and skills and the inability of students to register online (Choung and Manamela 2018; Dittrich 2016).

Accordingly, one of the areas of concern was to address the problem of lacking infrastructure, including ICT, which is meant to provide broadband coverage by the year 2020 (Choung and Manamela 2018; Manda and Dhaou 2019). Progress on this is very slow because there is just not enough ICT infrastructure, especially in rural areas. It thus becomes imperative that South Africa, as a matter of urgency, sets up institutional mechanisms that will be able to deal with training, education and ICT infrastructure. When it comes to high unemployment rates among the youth, it is alarming to see that young people can, in fact, easily master the technology that would enable them to search and find jobs. According to various scholars, in the modern era, young people are presumed to be early adopters of technologies, and some have the skills and capabilities to make use of these technologies (Bakker and De Vreese 2011; Halewood and Kenny 2008). Ironically, with the introduction of the 4IR, where robotics will be considered for providing services, unemployment of the youth might continue as people are being replaced by robotics.

The 4IR is being experienced globally, but a difference is perceived in terms of its impact and aftermath. The impact and aftermath are felt differently by various countries, depending on their state of development. The 4IR might benefit some countries through the creation of new jobs in the field of ICT, engineering, knowledge management, marketing and production as labour-intensive work. Contrarily, in the African context, the 4IR replaces indigenous knowledge of human potential. The very same situation (which transpired in the 1980s when globalisation replaced import substitution industrialisation (ISI) in the name of high yield production through technological advancement) can be perceived in the near future if 4IR technology becomes the main production method in South Africa (Manamela and Molapo 2019). Higher productivity is another characteristic of the 4IR because it is envisaged that more will be produced with less, and goods and services will be acquired at a faster pace and at a lower price (Dimitrieska et al. 2018; TIPS 2018; Xu et al. 2018). The use of robotics is assumed to be making life easy because more can be achieved in a shorter period, as portrayed by advocates of the 4IR. Evidence of this new technology (making use of “robotics”, not people) can already be seen in countries like Rwanda, where technology is deployed to reduce travel costs and time to deliver medicine and attend to medical emergencies. The South African National Blood Services is said to follow suit in terms of using drones to deliver blood in emergency situations (Sutherland 2020).

Youth Unemployment and Digital Inequalities: Issues and Challenges

Young people in South Africa are faced with a dire and unpleasant situation. In 2008, the official rate of youth unemployment was recorded at 45.18%. From the year 2008 onwards, youth unemployment gradually increased up to 52.85% in 2018. Within that 10-year period, although there was an unstable youth unemployment rate with increases and decreases in different years, respectively, it could be argued that instead of the youth

unemployment rate being reduced, the only trend that can be perceived is an increase. From 2008 to 2018, it is indicated that there was an increase of 7.67% in youth unemployment within 10 years (Stats SA 2019). While data show that the highest increase of youth unemployment between 2008 and 2018 was 53.41% in 2016, that declined to 52.85% in 2018. However, in the third quarter of 2019, youth unemployment rate rose significantly to 58.2% (Stats SA 2019).

Possible causes of the escalation in high youth unemployment rates could be informed by the expanded definition of unemployment, which includes young people who are not actively looking for a job (Cassim and Oosthuizen 2014). There are many factors that contribute to high unemployment amongst the youth, namely a lack of education, lack of skills, and limited job availability, amongst others. Ironically, in the era of the 4IR, there is still high and escalating youth unemployment in South Africa, which points to a possible negative aftermath thereof. Youth unemployment is a scourge and a social and economic concern in South Africa. South African statistics (Stats SA 2015) revealed that in 2015, out of 51.8 million of the South African population, 25.5% (including the youth) were unemployed. In 2015, more than 65% of the youth population was unemployed, including those who were not actively searching for jobs and those who had given up (ILO 2015; Stats SA 2017). Additionally, youth unemployment has remained extremely high and, looking at the previous years, it has never been below 40% (Cassim and Oosthuizen 2014).

Stats SA (2017 and 2019) posits that unemployment seems to be prevalent amongst the youth in possession of higher education qualifications. Accordingly, it seems to be difficult for the youth in possession of higher education qualifications to find jobs. It is highlighted that, on average, unemployment among the youth with secondary education or above is three times higher than among those without such education (Stats SA 2017). To develop the quality and reach of services for the youth, an increasing need for turning to ICTs, particularly the Internet, becomes a key component for job seekers (Choung and Manamela 2018). However, there are concerns that the expansion of services delivered through ICTs leaves behind the most disadvantaged (Stevenson 2008). Considering the issue of the high unemployment rate among the youth and the patterns of unequal access to digital technologies that explicitly portray that digital inequality exists, it is, therefore, a compromising factor for the youth in searching for employment.

Education System and the Fourth Industrial Revolution

South Africa is argued to have a good higher education system, but the country is inefficient with vocational training, which is then seen as a gap for the country to mitigate the impact of the 4IR on the job sector. It is again argued that South Africa has a shortage of highly skilled workers, which will have a negative impact on the job sector because it will increase the unemployment rate. An attempt was made in South Africa to revive Technical and Vocational Education Training (TVET) colleges; thus, an increased number of youths opted to register at TVET colleges. Registration at TVET colleges has doubled as compared to previous enrolments, although the preference of

choice for learners remains universities. Hence, there is a need for the South African education system to be transformed in order to meet the demands of the 4IR and thus mitigate what is postulated as the negative impact of the 4IR (Dimitrieska et al. 2018; Peters 2017; Xu et al. 2018). Universities need to reposition themselves to meet the market demands in terms of offering courses and modules that will equip the youth to meet the new skills demand. One of the demands to equip the youth is vocational education and training. Vocational education and training are argued to be the best solutions to close the gap between the available skills and the ones needed by the 4IR for providing services (Aulbur et al. 2016; Manda and Dhaou 2019). South Africa will need to re-skill or up-skill the existing workforce, offer continuous learning and development, and change the mindset of the labour force to accept and adapt to change. In order to achieve this, the number of vocational training institutions must be increased. Furthermore, South African universities need to work with industries to understand the required skills and to align university training with vocational training (Global Business Coalition for Education 2018; Penprase 2018).

Retrenchments in South Africa

In view of the numerous retrenchments that seem to be a scourge in South Africa, it is reasonable to question the adoption of the 4IR. It is only fair to highlight that South Africa is still profiting from the surplus of low-skilled workers, as compared to the advancement of technology in some other countries. Hence, labour unions fight against the retrenchment of employees in various companies. Moreover, adopting the 4IR seems to cause a fiasco in respect to employment opportunities; people are retrenched from their work and are being replaced by machines and robots due to technologies introduced by the 4IR (Naudé 2017). Workers have remained at risk of being replaced by machines since the inception of the 4IR (Wisskirchen et al. 2017). It could then be argued that the increased unemployment caused by various issues may lead to a mass revolt. As highlighted, various companies in South Africa, such as Steinhoff, Multichoice, Distell, Tiso Blackstar, the South African Broadcasting Corporation and Telkom, as well as the banking sector, amongst others, are believed to be pushed into a corner for retrenchments due to the 4IR. Big companies such as Standard Bank, Bidvest, and Multichoice have retrenched thousands of workers since the inception of the 4IR (De Villiers 2019). A relative majority of companies are retrenching because consumers in the technological era use digital self-services, which diminishes the need for walk-ins to be serviced (Peters 2017). It could be perceived that although the 4IR seems to bring massive and exciting opportunities, that does not mitigate the fact that it poses a major threat to the workers regarding employment opportunities. While the opportunities emanating from the 4IR are true and exciting, it is perceived that the 4IR is a contributing factor for major job losses in South Africa. Thus, it could be argued that retrenchments contribute massively and strongly to the increasing, escalating and unabated unemployment rate, predominantly amongst the youth in South Africa.

Discussion

Countries are required to develop policies, strategies and plans to meet the demands of the 4IR in order not to be left behind. The South African Minister of Communications, Ms Stella Ndabeni-Abrahams, has indicated the need to co-ordinate all spheres of government, private and civil society so that they all have the same view. A commission called the Presidential Commission on the 4IR, to be chaired by the State President, has been established and will be responsible for the development of a national action plan in response to the 4IR. The plan will advise on research to advance the 4IR, measure its impact and develop institutional mechanisms to coordinate 4IR programmes, amongst other things. Since it is envisaged that the 4IR will bring opportunities, the Presidential Commission on the 4IR will have to work hard to ensure that policies, strategies and action plans will position South Africa in such a way that it is able to compete globally (Sutherland 2020). It will be crucial for South Africa to invest in research as a matter of urgency, so that the country finds its niche in the digital revolution. The need for research is also buttressed by the research undertaken by Aghimien, Aigbavboa and Matabane (2021), which found that most companies interviewed about their readiness for the 4IR indicated research as the most important factor for countries to mitigate the impact of the 4IR.

The challenge is whether countries are ready to meet the demands of the 4IR, and it is argued that most countries, especially developing ones (South Africa included), are not ready since people do not have the necessary skills, especially in terms of digital infrastructure (Aulbur et al. 2016; Global 2018; Manda and Dhaou 2019; TIPS 2018). The automation that is brought about by the 4IR is said to be bringing drastic change in the job market. Some skills will be completely obsolete while others will be replaced by machines, thus needing fewer people for the same job (Adendorff et al. 2018; Dimitrieska et al. 2018; Hirschi 2018; Tan and Wu 2017). The loss of jobs for countries such as South Africa will leave many workers in turmoil as this will be adding to the already mounting unemployment rate the country is battling with. It is also argued that more jobs will be created through automation in the near future, which will increase the quality of products and generate more need for goods and services (Butler-Adam 2018; Penprase 2018; Peters 2017).

It is postulated that the skills needed for the 4IR are more cognitive skills, system skills, complex problem-solving skills, the ability to utilise and operate robotics, amongst others, instead of physical skills (Wisskirchen et al. 2017; Xu et al. 2018). These skills are perceived to be demanding, to create employment, and to eliminate the unabated high unemployment rate. The 4IR is said to bring a change to monotonous jobs and bring along ergonomically challenging jobs that will force workers to utilise their cognitive skills rather than physical ones (Aulbur et al. 2016; Dimitrieska et al. 2018; Xing and Marwala 2017; Xu et al. 2018). It can then be argued that only people with highly specialised skills will be sought for employment. Accordingly, the question is how rapidly will people be trained and certified as experts in that regard. Hirschi (2018)

predicts that people might find themselves working several jobs in different companies rather than spending the whole day with one company.

Xu et al. (2018) and Schwab (2016) ask the questions: How can the 4IR bring maximum potential to people in becoming innovative and solving complex issues, while advocating and vouching for artificial intelligence? Where is the convergence of the two ideas, considering that artificial intelligence will be replacing human labour? It is thus significant to reemphasise that the difference between history's revolutions is that in the first two, people used physical strength for mass production, whereas during the last two, they use artificial intelligence for mass production, and this gets more sophisticated and advanced. The question is: How long is it going to take to endure the aftermath of the 4IR in relation to unemployment? This question is informed by the fact that the benefits of the 4IR in creating jobs and eradicating high unemployment rates are to occur only after a few unpredicted years have passed since its implementation.

South Africa is said to be one of the most unequal societies in the world, especially regarding the gap between the rich and the poor (Manda and Dhaou 2019). Unemployment creates and exacerbates inequality, and with the advent of the 4IR, it is predicted that the gap between the rich and the poor will continue to widen at an alarming rate. This will cause labour unrest as job losses will be resisted (Dimitrieska et al. 2018; Manda and Dhaou 2019; Peters 2017; Schwab 2016; Tan and Wu 2017; Xu et al. 2018;). That is exacerbated by the fact that South African labour cost is said to be expensive (Aulbur et al. 2016). Companies lose a lot of revenue during labour unrest, and it has a negative impact on investment, as foreign companies become reluctant to invest in South Africa. There is also continuous pressure on companies and organisations to maintain their positive revenues and profits. They attempt this cost saving through retrenchment. On the contrary, various South African unions such as the National Union of Metalworkers of South Africa (Numsa) and the South African Cabin Crew Association (Sacca), amongst others, have filed an urgent application in the Labour Court to interdict South African Airways (SAA) and other companies from going ahead with any retrenchments. This is a frustrating situation because the unemployment rate keeps on rising while the country finds itself in a conundrum to circumvent the challenges of the 4IR, which seems to bring about a replacement of the manual labour market with artificial intelligence.

Conclusion

It is evident that the challenges of unemployment in South Africa have put the country in a predicament. Do we embrace the 4IR regardless of the fact that it may first lead to job losses before benefits of new job creation can be seen in the long term? This ambivalence dominates when making attempts to deal with these challenges. It is also stipulated in the Constitution of the Republic of South Africa that unemployment should be dealt with through the creation of employment. However, the efforts are superimposed by the introduction of technological aspects that result in failure and lack of progress in job creation. The 4IR advocates and vouches for artificial intelligence at

the expense of hard labour. This results in a conundrum where high and escalating unemployment rates should be dealt with. Looking at the statistical reports, which reflect the non-reduction of unemployment, there is a long way to traverse an ideal path in the quest to deal with the high unemployment rate, which is escalating and remains unabated, predominantly amongst the youth. Because there is no agreement on whether to embrace artificial intelligence or to retain and maintain hard labour, a recommendation can be made about the re-skilling and up-skilling of the existing workforce to meet the demands of the 4IR; however, that might take a while. Furthermore, amendments of the curriculum in both basic and higher education can be considered, but that could also be a challenge as swift transformation is required to equip students for the changing labour market.

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