



MANAGERIAL ECONOMICS: DISTANCE 2020

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INTRODUCTION

During the 4th industrial revolution changes are occurring and how individuals, companies and the government react to these changes will have an influence on the labour market. The question to be answered is: “Given South Africa’s high unemployment rate and poor education system, what should the government do to avoid further job losses against the backdrop of the 4th industrial revolution?”

4TH INDUSTRIAL REVOLUTION

The 4th industrial revolution defined by Schwab (2016) as: “Unprecedented and simultaneous advances in artificial intelligence (AI), robotics, the internet of things, autonomous vehicles, 3D printing, nanotechnology, biotechnology, material science, energy storage, quantum computers and others are redefining industries, blurring traditional boundaries and creating new opportunities.”

Thus, during the 4th industrial revolution the manner in which we live our lives, perform our work and relate to one another will change. During this revolution the way technology and society coexist will also change radically (Schwab. 2016). These changes will also include the way in which the virtual systems and physical systems interact as these systems will cooperate with each other. As part of the 4th industrial revolution technology will fuse with and change physical, digital and biological areas of life (Skilton et al., 2018).

Philbeck et al. (2019) argue that technology is the driver of transformation in all the industries and all the different parts of society during this period of time. The 4th industrial revolution will bring great change, these changes will include new opportunities and definitely possible threats for individuals, industries and nations. Two components of this period include digitization and smart automation (Chou. 2019). Production and manufacturing improved in the first 3 industrial revolutions; this improved the efficiency of companies while the 4th industrial revolution is a bit more complex revolution and maybe take over human roles in order to be more productive (Philbeck et al., 2019). Thus the 4th industrial revolution will alter jobs as we know it, the changes in the labour market will be fundamental and drastic (Chou. 2019). Many jobs will be replaced by artificial intelligence, robots, smart systems (Chou. 2019).

According to Drombrowski et al. (2014) human and machine collaboration will be an essential part of the 4th industrial revolution resulting in socio-technical production system changes. The 4th industrial revolution should be seen as an industrial and digital revolution both (Chou. 2019) and individuals, companies and countries should be innovating and use these revolutionary changes to their advantage.

ADVANTAGES OF ARTIFICIAL INTELLIGENCE IN JOBS

Artificial intelligence (AI) can be defined as the ability of a computer system to mimic the human mind, way of thinking, learning capacity, reasoning capability etc. The main goal of AI is to engineer machines that are intelligent in operational and social accounts, it is important to note that not only does AI strive to match human traits, in some cases advancements have superseded human abilities.

AI is impacting the work environment in various ways; different applications of AI have been employed in the day to day activities of the different work industries. Some of the applications of AI include;

- Games- AI plays a pivotal role in games technology, because of heuristic knowledge, the machine plays better than a human.
- Expert system- a novice will be able to perform a task the same way as an expert senior employee would have.
- Vision systems- enhanced decision making
- Intelligent robots- these can be employed to complete certain tasks in the manufacturing sector
- Handwriting recognition- can be used in the education sector during the marking of exams
- Speech recognition- can be employed in the medical field

The advantages of having AI in the workplace are enormous as AI solves most of the problems that humans have been failing to solve because of their weaknesses and limitations. Below are some of the advantages:

- Decrease in errors in the workplace ie random error reduction
- Solve/ perform complex tasks ie big data analysis
- AI robots can work in areas which are too dangerous for humans ie radiation laboratories

- Slower rate of tiring or wearing out i.e. machines can work every day of the year
- Medical tasks i.e. personal assistance to the sick/paralyzed
- Shorter decision-making time due to the high processing speed
- No bias in data analysis

The benefits of employing AI in jobs are very diverse depending on the field of application, they can be summarized as increased productivity, higher efficiency and an increase in accuracy. The aforementioned three main benefits have ripple effects in the business where in turn there is increased profit, higher throughput, increase in quality reproducible products etc.

DISADVANTAGES OF ARTIFICIAL INTELLIGENCE IN JOBS

The most feared downside of the fourth industrial revolution is the potential of job losses. These fears are not new (Wladawsky-Berger, 2017). Embedded to this is the issue of a fast-paced technological advancement that goes far ahead of skills development to operate them (McAfee & Brynjolfsson, 2011). This means the impact lies between new technology developed and the requisite skill to operate or monitor it. For example, flying drones to inspect the condition of physical assets would require licensed personnel to do so. In the absence of such a skill the drone solutions for insurance companies will not be enjoyed. Presently there are more drones than there are licensed drone pilots.

The second pitfall of artificial intelligence is the potential of net jobs reduction. Intellectual tasks that were previously performed by humans can now be done by robots and computers (Fenech, 2018). Furthermore, jobs or tasks that were done by more than one person can now be done by one machine. On the same drone technology example, the manufacturing and programming of such technology will create some jobs but will take away more because insurance companies will no longer hire assessors across the country. One person will fly the drone and analyse the data collected for all areas the drone has been to. Unlike previously, various assessors in various geographic locations of the country would collect and analyse data themselves.

In addition, the industrial revolutions have taken away most of repetitive tasks to automation. The fourth industrial revolution has further widened the scope of intellectual tasks performed by humans into artificial intelligence (Fenech, 2018). For example, data collected by drones will no longer be processed or analysed by humans. Computers will now analyse the data collected

through artificial intelligence and sophisticated algorithms. This technology has a potential of a serious job displacement for car assessors in the insurance claims industry.

The fourth industrial revolution with artificial intelligence embedded into it has a potential to only empower few industry role players. This is due to high capital costs to start up a data and internet connection business. Vodacom and MTN are major role players in this industry and have invested a lot on infrastructure for this. Telkom has for example decided to rather sign a roaming deal and leasing of infrastructure with Vodacom (Sharenet, 2018). Clearly, it would have been costly for them to set up new infrastructure for this. This is despite Telkom being the sole provider of the telecommunication services in the past. This emphasizes the impact of industry role player replacements not just jobs per se. This situation confirms the notion that “once empowered is always empowered”.

JOBS THAT ARE AT RISK

As the scope of work enters into a dimensional shift, economists have predicted the type of impact the 4IR will have in regards to unemployment in South Africa. It is expected that the labor market will be affected by an estimated 5 million job losses by the end of 2020, as a result of inappropriate or outdated training and an inability to meet the skills gap needed to combat the impact of the 4IR. According to the World Economic Forum Report, there are 10 crucial skills which employees need to have or learn in adjustment to the revolution. These skills include creativity, critical thinking, emotional intelligence, negotiation, judgement & decision-making, coordination, people management, complex problem solving, cognitive flexibility and knowledge in services. As automation comes into effect, according to Fin24, it is the low-income and low skills jobs and workers that will most likely be affected first and mostly by this revolution.

In June 2019, it was reported that as a result of digitization, Standard bank retrenched a total 1,200 employees. (SABC,2019). In the near future, legal, data- entry, cashiers, postal-service, accounting, recruitment, finance and insurance clerks & secretaries, telemarketers, van and car drivers and some low & semi- skilled jobs in agriculture are namely just a few titles facing redundancy. (WEF,2019) The 4IR rises with a sprout of new job titles in addition to the ones existing in the broad fields of communications & media, technology and creative arts, healthcare & social as well as the business fields.

There are some managerial, educational and IT related work positions, including chief executives, managing directors, sales representatives, data analysts, finance and investment advisors, high tertiary school, healthcare and social skilled jobs that will remain steady in the labor market during the revolution. In addition, as the 4IR paves way to the future, and new technologies arise, the need for further skills training and development will become hastened and the scope of work will evolve giving birth to new work tasks and titles which some are futuristic and do not yet exist. Although the prospects of unemployment leave many feeling uneasy, South Africa sees an estimate of 2 million jobs as a result of the 4IR.(Eltringham) However, the task of training the low skilled & unskilled with relevant skills in order to close the labor market demands lies at the threshold of reducing unemployment.

UNEMPLOYMENT RATE IN SOUTH AFRICA

Most recently South Africa held an unemployment rate of 29.1% at the end of 2019, according to data released on Tuesday, 11 February 2020 by Stats SA (South Africa, 2020). This comes into the equation as the highest number that South Africa has seen over the last 11 years. Declines in employment could be seen in the trade and manufacturing industries as well as the utilities sectors. This decline could also be the result of load shedding. The unemployment rate can be further expanded to include people who have halted their search for work. This brings the total number up to 38.7%. This is probably an unrealistic number as there are plenty of farmers in rural areas who have never looked for a job in their life (Kwach, 2019).

Furthermore, Stats SA announced that manufacturing production dropped a further 5.9% from the previous year in December. This is another massive decline, the biggest since July 2014 (Trading Economics, 2020). In the motor vehicle sector, which is one of South Africa's largest 'job makers', there was also a decline of almost 25% (South Africa, 2020).

President Cyril Ramaphosa has recently declared a national crisis as the youth unemployment rate hit an all time low in South Africa. The unemployment rate in the country casts a shadow over a possibly forgotten reputation of South Africa being the most advanced African economy. In the first quarter of 2019, South Africa's unemployment rate for youths, aged between 15 and 24 years,

escalated to 55.2% and had a further decrease in the third quarter to 56.4% (Kwach, 2019). The 2020 youth unemployment rate is severely unreliable because of the outbreak of COVID-19 but it is likely to worsen towards the end of the year if no measures are implemented.

The fourth industrial revolution as well as technological advancement are mere examples of how ever changing the job market is for most young people in South Africa and it could be drawn back to the fact that our young citizens lack the skills and experience required by employers. A contributing factor to unemployment can also be a low-grade education system that cannot contribute towards career demands. This is evident with 55.9% of all “unemployed” people not having a matric certificate (Kwach, 2019). Apart from the youth unemployment, the working-age population is also increasing, according to Stats SA (South Africa, 2020). This means that the labour market does not have any space opening up for new entrants.

With the introduction of technology to reduce costs in South Africa, it will eliminate tons of opportunities for unskilled or low-skilled workers. Luckily in South Africa, unskilled labour is still very cheap, but this may alter over time as business costs will still be saved by the introduction of technology. It is already evident in the mining sector where machines over people are becoming the norm wherever geology allows. Mining was already a saving grace for workers with low-skill and may now face further job losses. The farming sector is also adopting technology that requires fewer hands on the land (Stoddard, 2020).

SOUTH AFRICA EDUCATION SYSTEM PITFALLS

The National Curriculum Statement (NCS) is the curriculum used by South African schools for Grades R-12 which gives expression to the knowledge, skills and values worth learning. This curriculum aims to ensure that children acquire and apply knowledge and skills in ways that are meaningful to their own lives. Studying the curriculum which includes the purpose, principles and aim reflects no clear mention made to prepare our children for the 4th industrial revolution.

In order for our schools to prepare for the 4th industrial revolution a revamp on our education system is required. In Dubai the education system allows for various curriculums to be chosen by parents offered by schools which allows for skills and expertise to be unique per child. South

Africa has a single curriculum which is thought in all schools limiting flexibilities of acquiring various skills and knowledge.

Today, the citizens of every country face a world transformed by technology, in which the Internet, cloud computing, and social media create different opportunities. These are basic tools required to enter into the world of technology. Unfortunately, in South Africa a minority of the population has access to such basic technology. In recent weeks schools in South Africa has been closed due to Covid19. This was a good assessment to identify if schools in South Africa are ready for the 4th Industrial Revolution. Schools in Dubai closed and immediately commenced with online schooling. South Africa on the other hand has a minority of schools practicing such.

The 4th Industrial Revolution will dramatically change the way we relate to one another, live, work and educate our children. Robotics, automation, big data are the common themes when unpacking the 4th Industrial revolution. In order to prepare our children in equipping those with skills and expertise to compete in the economy there are certain basic tools they will require while in school. Access to the internet is a basic necessity to educate our children in school so that they are familiar of what is expected globally. Currently such a necessity is a luxury in South Africa. The cost of data is high which is privileged for the elite. In South Africa due to the high poverty and unemployment rate, basic needs of communities such as water and sanitation are not available, the requirements for 4th industrial revolution is improbable.

American philosopher John Dewey said, "If we teach today's students as we taught yesterday's, we rob them of tomorrow." Currently, education serves to prepare people to take on the tasks of a job or discipline to "do" something. As we move further into the future, education will need to support children to develop the skillset and mindset to do anything in their future rather than a particular "something." Technical skills will be a prerequisite to enter the job market.

Preparation for the 4th industrial revolution will require a revamp of the School curriculum in South Africa. Emphasis on of our education system requires more focus on science, technology, engineering, innovation and mathematics. Artificial Intelligence and coding need to be introduced into our education system. Currently the required passed mark in our schools to move to the next grade level is below 40%. In order for our children to compete with students from other countries our standards are much lower.

For our children to be prepared to engage in a world alongside smart machines, they will need to be educated and assessed differently than in the past. In a company in South Africa which I am part of we have already started implementing automation where robots are built to complete mundane tasks. The skills required to code for these tasks were brought in from other countries. This resulted in some jobs becoming redundant.

Not only is there the reality that machines will take over jobs humans do today, according to a [Dell Technologies and Institute for the Future \(ITF\) report](#), 85 percent of the jobs in 2030 don't exist yet. Structured education can no longer end after leaving school or college. Education must become a lifelong endeavor, and sources for education need to evolve to provide those opportunities. Attributes such as creativity, curiosity, and design-thinking will be essential for the future workforce. People will no longer start a career path and only grow with one role, so nurturing competent lifelong learners becomes essential.

Current learning environments in South Africa do not accommodate learners to explore their world through hands on experience that emphasize collaboration and creativity. Schools need to provide learning environments that enable learners to be professionals using a wide variety of physical and digital tools. In a digital, interconnected world, employees of the future will need to have a global mindset. Schools and educators must adapt learning to take this into account.

GOVERNMENT INITIATIVES TO PREVENT JOB LOSSES WITH REGARD TO THE 4TH INDUSTRIAL REVOLUTION

Presently the fourth industrial revolution will displace most tasks that can be automated. Most economists however, do not agree on the number of jobs that may be displaced (Fenech, 2018). However, a survey was conducted to assess areas of work that would be affected. It has found that in the United Kingdom (UK) alone about 30% of jobs could be displaced by 2030 (Fenech, 2018). The solution therefore is that the government should conduct an assessment early to identify potential areas of work that could be affected. The assessment would be designed to provide accurate information on jobs and industries that are probable to be hardest hit by the fourth industrial revolution. The data collected should be sorted per "employment sector, geography, age group, gender and education attainment" (Fenech, 2018).

The economy should be positioned to embrace new opportunities brought up by these new developments. New technologies create new opportunities for new entrepreneurs and the early

adopters are likely to become the 21st century economic winners (Cerf, et al., 2019). While the likelihood of job displacements and losses rises, the government should transform the country's education sector so that it can provide skills required in the new era (Cerf, 2019). While some jobs are likely to be displaced, the education sector should be able to supply the market with the requisite skills that reciprocate the new jobs created. The school curriculum for example should be reinvented and be adopted faster at schools including upskilling the present generation of workers. Otherwise the risk of job losses would be inevitable. As McAfee & Brynjolfsson (2011) puts it, new technology outpaces the skills required. The present members of the labour force should be prepared for this and this is the role the government is responsible for in order to minimise the eminent risks identified.

The government should also develop a national framework that is particularly aimed at addressing imminent job losses (Fenech, 2018). The framework would contain strategies and regulations that will regulate the development of new infrastructure, industries and manage research and development initiatives (Cerf, 2019). The framework will provide a structured approach to the creation of new market opportunities that are open to the country's labour force. As new technologies emerge the government would be at the forefront to identify potential risks. The new inclusive national strategy will also map out further investment opportunities and subsidies for emerging small, medium, micro enterprises (SMME's) that will be formed to exploit the new market opportunities. The strategy will provide effective means of addressing job displacement by creating new job opportunities.

In consequence, given the disruptive potential of the fourth industrial revolution to the labour market, the government needs to play a decisive role and not leave everything else to the market forces. In order to avoid the risk of job displacements and or job losses, the government should devise means of addressing the inherent risks that have a catastrophic impact to the labour market by developing a national strategy of framework and get the education sector ready in order to meet the demands of the new order. This is despite the fact that, presently, its impact to employment and unemployment cannot be adequately quantified or is not well understood (McAfee & Brynjolfsson, 2011).

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