

# Exploring the Impact of Technology on the Economy in the Republic of South Africa

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**Abstract:** The impact of technology has been the focus of extensive scientific, economic, and political discussion in South Africa. Technology has always had the potential to both make lives easier and harder. This article gathers information from the economists in higher education institutions in Limpopo Province, and an interpretive qualitative study with a case study was used, along with semi-structured individual interviews and focus groups. The Connectivism and Engagement theories served as the theoretical frameworks underpinning the paper. Purposive sampling was used in this study to select ten participants. This article used the thematic data analysis technique. The results of this study include massive job losses from automation; the effects of digital transformation; lack of appropriate skills; slow productivity growth; and the rising income inequality in most major economies. This paper aims to investigate how technology has affected the economy in Limpopo Province in the Republic of South Africa. The study suggests that the state plays a crucial role in creating an environment that makes technology use and access possible.

**Keywords:** Digitalisation, Economic growth, Impact, Technology

## 1. Introduction

Since its inception, technology is equally capable of making lives easier and harder. It depends pretty much on how people use it (Paterska, 2021). According to Numba (2017), South Africa is lagging its emerging markets as well as the world's technical and knowledge leaders. Automation and technological advancements, according to Celik, Kose and Ohnsorge (2020), cause a shift in the labour demand away from regular low- to middle-level skills and toward higher-level, more advanced analytical, technical, and management skills. According to Celik *et al.* (2020), workers are not equipped with skills that complement the new technologies resulting in a hindrance to the broader diffusion of innovation within economies. In the same vein, Zhang, Dai and Vasarhelyi (2018) assert that industries require upskilling to remain relevant in the digital world. Similarly, Gray (2016) adds that those working in sales and manufacturing should need technological literacy skills. Holzer (2022) resolves that more workers need reskilling or upskilling whether on the job or in higher education institutions both public and private. In addition, Moritz (2022) claims that employers need to embrace upskilling for their workers to future-proof their business and reduce societal polarisation. Celik *et al.* (2020) assert that education and training have been losing the race with technology.

The province of Limpopo's economy is harmed by technology. At the moment, technological advancement hasn't helped the economy or productivity much (Qureshi, 2020). It has exacerbated income inequality and raised concerns about the possibility of a few "robocalypses" – massive job losses brought on by automation (Qureshi, 2020). According to Qureshi and Woo (2022), employees who can increase their education and training, either on the job or in other settings, can pick up new skills or become better suited to work alongside machines. The fear of people being replaced by machines is cited as a challenge of significant technology breakthroughs in society by Shoki (2019). According to Celik *et al.* (2020), there has been a growth in income inequality throughout the majority of developed countries, and in some cases, such as the U.S., the increase has been very apparent. Technological change can be disruptive by nature and involve challenging transitions. Although policies are essential, they have been slow to respond to the difficulties of change.

Furthermore, Lacity, Khan and Yan (2016) and Liu and Aron (2014) argue that digital technology has transformed the way firms operate globally. Again, Zhao, Wallis and Singh (2015) assert that it has also revolutionised how people communicate and the way governments engage with citizens through e-government platforms. Bukht and Heeks (2017) reveal that "datafication" and "virtualisation" have

been facilitated by digital technologies. De', Pandey and Pal (2020) add that the significance of digital technology has rarely been greater understood than during the 2020 global economic shutdown as a result of the COVID-19 pandemic. Digitisation can play a pivotal role in assisting policymakers to spur economic process and employment. Elding and Morris (2018) contend that digital technologies also change how firms do business and interact with their customers and suppliers. Again, due to a continuous digital divide, which includes a lack of digital skills, a lack of ICT infrastructure, and expensive structures, African countries have once again struggled to benefit from the economic success associated with digitalisation (Banga & Velde, 2018; Melia, 2020; Yoon, 2020). According to Counted and Arawole (2016), millennial digital entrepreneurs faced significant difficulties as a result of internet inequality in Africa. Structural unemployment has been one of the negative effects of digitalisation (Rifkin, 2015; Bühler & Hagist, 2017; UNCTAD, 2017; Valenduc & Vendramin, 2017). Furthermore, without separating the effects of individual, company, and government ICT usage in a comparative context, Evangelista, Guerrieri and Meliciani (2014) and Counted and Arawole (2016) suggested that ICT usage, rather than access, is what matters for the economic process.

Technology drives the economic growth of countries, regions, and cities. The impact on productivity more widely across firms has been weak although firms at the technological frontier have reaped major productivity gains. The unemployment rate in South Africa is still among the highest in the world (Bloomberg, 2021). Lack of technical skills is adding to the ongoing skills gap in Limpopo Province, which is negatively affecting employment across various industries in the world. Therefore, a lack of skills may prevent investment, innovation, and business. Once more, the South African economy, and the economy of Limpopo Province in particular, is in decline. The researcher aims to investigate how technology is affecting the economy in Limpopo Province in the Republic of South Africa.

## 1.1 Research Questions

This study answered the following main research question:

- What are the effects of technology on the economy in Limpopo Province in the Republic of South Africa?

### 1.1.1 Sub-Questions

- How is technology affecting the economy in Limpopo Province in the Republic of South Africa?
- How can the Limpopo Province deal with the effects of technology on the economy in the Republic of South Africa?
- In what good ways might technology boost Limpopo Province's economy in the Republic of South Africa?

## 1.2 Objectives of This Study

The objectives of this study are to:

- Identify the effects of technology on the economy in Limpopo Province in the Republic of South Africa.
- Explore how technology is affecting the economy in Limpopo Province in the Republic of South Africa.
- Determine what can be done to address the effects of technology on the economy in the province in the Republic of South Africa.
- Identify the positive ways that technology can benefit the economy in the province in the Republic of South Africa.

## 2. Literature Review

### 2.1 Technology Drives the Economic Growth

The development and adoption of technology have helped societies in increasing productivity, and enhancing overall well-being. The world of technology evolves at a lightning-fast pace and its potential for improving our lives and businesses is exciting (Kang, 2022). Technology has the power to help level the economic playing field in South Africa, facilitating more and better access to money and access to jobs (Moed, 2018). Technology drives the economic growth of countries, regions, and cities. Noumba (2017) discovers that harnessing South Africa's untapped potential for innovation could help create jobs and reduce poverty reduction by commercialising better goods and services. Noumba (2017) asserts that innovation can play a task to make jobs, through increased productivity, and improve the lives of the poor, through providing

better products and services in South Africa's low growth environment.

## 2.2 Technology' Detrimental Effects on the Economy in Limpopo Province

Qureshi (2020) asserts that productivity growth has slowed as digital technologies have boomed. The impact on productivity more widely across firms has been weak although firms at the technological frontier have reaped major productivity gains. Dominant firms have acquired more market power, market structures became less competitive, and business dynamism has declined. Qureshi (2020) points out that weak productivity growth and investment have reinforced one another and are linked by similar shifts in market structures and dynamics. Digital transformation affects companies' sales, prices, productivity, and employment, as well as the expected overall direction (Elding & Morris, 2018). The most obstacles to the adoption of digital technologies are the issue of adjusting the organisation of the corporate and also the have to recruit and retaining highly skilled ICT staff. The take-up of digital technologies at the companies is extremely high, with big data and cloud computing being the foremost widely adopted.

## 2.3 Addressing the Detrimental Effects of Technology on the Economy in Limpopo Province

Governments can lessen the effects of employment losses brought on by automation by making infrastructural investments that will encourage job growth. Additionally, they can invest in human capital by assisting educational institutions in meeting future demands by enhancing the study of science, technology, engineering, and mathematics, particularly in primary education (Magwentshu, Rajagopaul, Chui & Singh, 2019). Magwentshu, Rajagopaul, Chui and Singh (2019) make the same argument that new career-development and training initiatives are required to help people reposition themselves for future demands. In order to repurpose and reskill our workforce and help them become better employees and people overall, technology must be utilised. It's also crucial to invest in vocational training. Examples from nations that have successfully made the switch to digital technology demonstrate the importance of providing low-friction access to courses that advance key skills. In the interim, people must embrace lifelong learning and develop

their entrepreneurial, behavioural, and mind-set skills in order to be ready for the workplace of the future. People can take on higher-level work, decision-making, and critical thinking when technology frees them from mundane, repetitive tasks (Magwentshu, Rajagopaul, Chui & Singh, 2019).

## 3. Theoretical Frameworks

The 21st-century society is demanding a lot of its members due to the rapid changes in the political, cultural, social, economic, and technological situations (Moloi & Mhlanga, 2021). According to Magout (2020), personal computers, social networks and platforms, and cell phones have a massive impact on the culture of society and it is very difficult to live without them. Millions of youths are unemployed due to the growing mismatch between youths' skills and employers' needs, while employers have jobs they cannot fill (Deloitte Global Business Coalition for Education, 2018). If unaddressed, the matter will likely intensify with the speed at which the technology is happening.

Reaves (2019) points out that the kind of skills students require to be prepared for the 21<sup>st</sup> century is different from what they needed 20 years ago. The concepts of lifelong learning and its role in building a knowledge society are on top of the agenda (Moon & Seol, 2017). There is an urgent need to devise new ways of teaching and learning the government prepares workers to live, work and prospers in the 21<sup>st</sup> century. New educational technologies become available, and re-thinking conventional practices around teaching and learning are of paramount importance as resources diminish and demand access to better quality higher education increases. Investigating the influence of the technological revolution on skills development and the general preparedness of the working sector in skills development is of vital importance. The Connectivism and Engagement theories are the two theories that were relevant for this study.

### 3.1 The Connectivism Theory of Learning

The Connectivism theory has to explain the effect of technology on how people learn, live, and communicate (Downes, 2014). The use of technology makes people interact with one another. The Theory of Connectivism combines relevant elements of the many learning theories, social structures, and technology to return up with a robust theoretical

construct for the digital age. Siemens (2006) argues that some knowledge will reside in machines while some will reside in humans. Due to the explosion of technology, learning is no longer in the control of the student; technology performs many operations like storage of information and retrieval which were the duties of students (Kop & Hill, 2008). The challenge which faces lecturers is to design instruction for machines and humans (Downes, 2014). Siemens (2006) believes that learning is more than the general acquisition of knowledge but rather must be structured with the flow of knowledge in the networks.

The theory of Connectivism is justified and relevant for this study because key features of the technology in South Africa came forth with the principles of Connectivism which include, learning and knowledge that rest in a diversity of opinions, learning as a process of connecting specialised nodes or information sources, and learning that resides in non-human appliances, capacity to know more that is more critical than what is currently known among others as suggested by Downes (2014). Again, the theory of Connectivism can be applied in this study because it can connect the knowledge from technology and the knowledge from people.

### 3.2 Engagement Theory

In addition, engagement creates intrinsic motivation in students to learn on account of the nature of the environment created and its activities. As indicated by Magout (2020) technology helps to facilitate all aspects of engagement in ways, which are difficult to attain without technology. This theory is justified and relevant to this study because it uses online discussions, conferencing, emails, chat, and video conferencing, and it can create an environment where engagement among all participants becomes easy and creative. This theory can be applied in this study because workers are engaged in the technology, economy, and development in South Africa. According to Reaves (2019), Engagement Theory is among the new paradigm of theories for teaching and learning in the information age which emphasises the positive role that technology can play in human interaction and evolution. Concerning Magout (2020), this theory is related to the concepts of constructivism, situated learning, and experimental learning as this focus more on collaborative efforts and project-based assignments that end in creative, meaningful, and authentic.

## 4. Methodology

The qualitative approach and interpretivism were adopted as the underpinning paradigm for this study. Qualitative approach allows for interaction with the participants in real settings where they can express their views, perceptions, or beliefs on their actual experiences about exploring the impact of technology on the economy in their settings (Andersson, 2018). Hence the researcher's exploration and description of the phenomenon took place through detailed, in-depth data collection methods, involving semi-structured individual interviews, and focus group discussions. The interviews enabled the researcher to collect data that was soft, and rich in descriptions of economists from higher educational institutions. The population in this study comprised all economists from higher educational institutions in the Limpopo Province of South Africa. The selection of the Limpopo Province was based on the locality and accessibility of the research sample by the researcher.

In this study, the researcher employed a case study research design to study the impact of technology on the economy in the Republic of South Africa. The study was limited to two selected higher educational institutions in the Limpopo Province of South Africa. The researcher chose to interview participants purposefully, taking into account the experience and knowledge they have about the impact of technology on the economy in the Republic of South Africa. Purposive sampling was used in this study to select the economists in two educational institutions in the Limpopo Province that have the relevant information required. According to Cohen, Morrison and Manion (2011), for a qualitative research study to produce the desired results the sampling population must be relatively small. Ten participants were selected for this study. The semi-structured individual interviews were conducted with five participants from higher educational institution in Limpopo Province. One focus group was organised. The focus group discussion was conducted with five participants from the other higher educational institution in Limpopo Province. This was done for the researcher to get the experiences of economists regarding the impact of technology on the economy in the Republic of South Africa. The results may not be generalised, but the focus is on the in-depth information and data provided by the participants. Participants made informed independent decisions to either participate or not in the research.

## 5. Data Collection

Semi-structured individual interviews and focus-group discussions were used in this study. The semi-structured interview is an exploratory interview used most often in the social sciences for qualitative research purposes (Magaldi & Berler, 2020). Focus group discussion is frequently used as a qualitative approach to gain an in-depth understanding of social issues (Cho, Song & Lee, 2018). Semi-structured individual interviews were conducted with five participants (Senior Economists in the Faculty of Economic and Management Sciences) from higher educational institution in Limpopo Province and the focus group comprised five participants (Senior Economists in the Faculty of Economic and Management Sciences) from another higher educational institution in Limpopo Province. The semi-structured individual interview was found to be suitable for this study because it allowed the participants to express their experiences about the impact of technology on the economy in the Republic of South Africa. Focus group discussion was also used as a qualitative approach to gain an in-depth understanding of the experiences about the impact of technology on the economy in the Republic of South Africa. With consent, the interviews were captured on audio recorder. The semi-structured individual interview enabled the researcher to identify and develop the themes that emerged from the paper and made comparisons between the various interviews that were used in the study.

## 6. Data Analysis

This study used the thematic data analysis technique. Thematic analysis is a widely used qualitative analytical method due to its flexibility. The inductive data analysis approach was employed in this paper. As a prerequisite to analysing the recorded data, Braun and Clarke (2013) recommend transcription of audio data, that is, play a recording in very short bursts and type up what the researchers hear. All recorded interviews were transcribed verbatim after the interviews have taken place. The transcriptions were carefully and attentively read and re-read to be familiarised with the content thereof. The transcripts were read several times, and notes were taken, sorted, and organised according to the objectives of the study to identify important themes that emerged from the research. Based on this initial reading, a clarification system for major themes was developed. To protect the identity of the participants and their universities and for ethical reasons, codes

were used. To code the data, the researcher looked for small and large chunks of data that potentially addressed the research question of the study. The data were coded into themes from the patterns, categories, and emerging concepts. The data were coded and categorised so that repeated themes emerged. The researcher reviewed themes by double-checking the coded data and making sure that data were used. The researcher wrote the report that involved choosing examples of transcribing to illustrate elements of the themes. The more frequently a concept occurred in the text, the more likely it was considered a theme of the study.

## 7. Results and Discussion

The following themes emerged from the results.

### 7.1 Theme 1: Massive Job Losses from Automation

Findings from semi-structured individual interviews indicated that workers lost jobs massively from automation. It emerged from the study that the use of machines to do work that was previously done by people was the order of the day. On the contrary, findings from the focus group emphasised the good work the machines are doing. The following participants accounted for their experience as follows:

*UNIA1: "Machines replace workers. Many workers are retrenched due to technology. Those who are dependants of workers suffer."*

*UNIB: "Automation is a challenge to workers."*

*UNIA2: "Workers voice their dissatisfaction because the machines replace them and do their jobs. Although technology is good it is also a threat to workers."*

The responses above indicate that Automation is a problem. Shoki (2019) points out the fear of humans being replaced by machines as the challenge of major technological advancements in society. It appears that workers lose their work due to automation. It is an arguable fact that workers are retrenched and their dependants start to suffer.

### 7.2 Theme 2: Lack of Appropriate Skills

Findings from semi-structured individual interviews indicated that in South Africa, people suffer from

skills deficits that are much more fundamental than the ones people are being urged to address ahead of the technology. It emerged from the study that workers are not equipped with skills for technology. Findings from the focus group revealed that the required set of skills is significant to achieve the goal of obtaining the best results from new technology. To validate the above assertion, participants reported:

*UNIA1 (Economist in semi-structured individual interviews) in higher educational institution): "Technology comes in a hurry and South Africans are ill-equipped."*

*UNIB (Economists in Focus group in higher educational institution): "We lack technological expertise."*

*UNIA2: "Skill gaps exist."*

The aforementioned enlightenments point to the fact that there is a lack of appropriate skills. According to Celik *et al.* (2020), workers are not equipped with skills that complement the new technologies resulting in a hindrance to the broader diffusion of innovation within economies. Banga and Velde (2018), Melia (2020) and Yoon (2020) emphasise digital skills shortages. It is an arguable fact that there shall be no economic growth due to a lack of appropriate skills. Similarly, Gray (2016) adds that those working in sales and manufacturing should need technological literacy skills. Arguably, people need skills to be conversant with technology.

### 7.3 Theme 3: The Effects of Digital Transformation

All the participants agreed that the effects of digital transformation played a vital role in the economy. Findings from the focus group indicated that digitalisation was regarded as a technology shock that affects the main economic aggregates. Findings from semi-structured individual interviews revealed that the adoption of digital technologies brought many challenges to South Africa. The views of the participants were encapsulated in the following statements:

*UNIA2: "Technological change is inherently disruptive. It has profound effects on labour markets."*

*UNIB: "The importance of digital technology has rarely been greater understood than during the 2020 global economic shutdown as a result of the COVID-19 pandemic."*

*UNIA3: "Technology poses new challenges for the economic convergence. The effects of digital transformation are felt by the South African economists."*

The preceding responses above indicate that digital transformation brought challenges to South Africa. Elding and Morris (2018) contend that digital technologies change how firms do business and interact with their customers and suppliers. Lacity *et al.* (2016) and Liu and Aron (2014) reveal that digital technology has transformed the way firms operate globally. In the same vein, Bukht and Heeks (2017) add that digital technologies have also facilitated "datafication" and "virtualisation". It appears that the effects of digital transformation are felt in South Africa.

### 7.4 Theme 4: The Rising Income Inequality in Most of the Major Economies

Findings from semi-structured individual interviews revealed the rising income inequality in most of the major economies. It emerged from the study that the rising income inequality in most of the major economies was the order of the day. Findings from the focus group emphasised the income inequality that has been rising within many countries. The following participants had to say:

*UNIB: "The widening income disparity that has been observed in numerous businesses."*

*UNIA2: "There is economic disparity across most major economies."*

*UNIA5: "Big economies are not similar."*

From the responses above, it is clear that the rising income inequality in most of the major economies occurred. Celik *et al.* (2020) denote that income inequality has been rising in most major economies. It appears technology has pushed income inequality higher.

### 7.5 Theme 5: Slow Productivity Growth

Findings from the focus group discussion revealed slow productivity growth. Findings from semi-structured individual interviews indicated that productivity growth is very slow in South Africa. It emerged from the study that slow productivity growth exists. In support of the above introduction, the subsequent comments are given as examples of what the participants said:

UNIB: "We cannot talk of production growth."

UNIA2: "It is believed that the economy is in a poor state."

UNIA5: "No one is happy about the productivity growth."

The evidence from participants in the quotations and responses above suggests that there is slow productivity growth in South Africa. According to Qureshi (2020), technological change currently has not boosted productivity and the economic process. Again, Qureshi (2020) argues that weak productivity growth and investment have reinforced one another and are linked by similar shifts in market structures and dynamics. It appears that slow productivity growth is the order of the day.

## 8. Conclusions, Recommendations and Implications

This paper set out to report on the impact of technology on the economy in the Republic of South Africa. An interpretive qualitative study using a case study was used and data collection techniques involving semi-structured individual interviews and focus group discussions were employed to collect data from the economists of the higher educational institutions in the Limpopo Province of South Africa. The two theories that were taken into consideration for this paper to investigate the problem around the impact of technology on the economy in Limpopo Province in the Republic of South Africa were Connectivism and Engagement. Massive job losses from automation and higher unemployment rate negatively impact the development and economic growth in South Africa. It is suggested therefore that workers need reskilling or upskilling whether on the job or in higher education institutions both public and private. High-quality training in high-demand sectors of the economy should be provided.

Again, this article revealed lack of appropriate skills that leads to slow productivity growth which negatively impacts economic growth. It is suggested therefore that workers should acquire appropriate skills for innovation to help create jobs and reduce poverty and those who work in sales and manufacturing should need technological literacy skills in South Africa. The effects of digital transformation should be revisited and relooked into in South Africa and nation-states should align their national workforce

per the demands of a brand new digital landscape. Moreover, slow productivity growth leads to market structures becoming less competitive, business dynamism declining and weak investment in most major economies. Fast productivity growth should be put into practice to have an economic boom in South Africa and the state should provide an enabling environment for technology access and usage. It is suggested therefore that the rising income inequality in most major economies should be reduced in South Africa and industries should require upskilling to remain relevant in the digital world.

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