Preparing African youths for the future of work

The case of Rwanda

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Abstract

This study explores the far-reaching changes in the world of work due to the emergence of the digital economy against a background of rising income inequality, concerns about job losses and high levels of unemployment, particularly in Sub-Saharan Africa,

More specifically, it explores the issue of how African governments and other stakeholders are preparing young people for the future of work. It comprises a case study of Rwanda. Data was collected from documents and in-depth semi-structured interviews, and analysed with MaxQDA. Rwanda has sought to become a knowledge economy, and has therefore developed a comprehensive policy framework and several programmes for equipping young people with digital skills. There are also more than 20 incubators and hubs fostering digital start-ups in Kigali. Several international organisations have started training programmes in support of the Rwandan government's vision.

The study finds that digitalisation could help to resolve sub-Saharan Africa's employment problems through freelancing, labour outsourcing, and start-ups. However, there is a need for deliberate policies and programmes to prepare young people for the future of work. Rwanda is doing well in this regard, and other SSA countries should evaluate its model.

Keywords: Digitalisation, Gig Economy, Future of Work, Youth, Sub-Saharan Africa, Rwanda, Qualitative analysis, Government.

1 Introduction

The world of work is changing rapidly -- digitalisation, globalisation, and demographic changes are profoundly affecting the labour markets and the well-being of individuals, families, and societies across the globe, but with varying impacts in different regions. Headline-grabbing assessments of the Future of Work oscillate between optimism and pessimism. That digitalisation is already having a far-reaching effect on labour markets is beyond question. Given the bulging youth population in Sub-Saharan Africa (SSA), it stands to reason that the youth labour markets are affected most by these technological advancements, and that this is where governments and other stakeholders should focus their attention.

More than 60 per cent of SSA's population is below the age of 25 (UN 2019; Rocca and Schultes 2020; Kariba 2020), and experts estimate that by 2030 this region will be home to more than a quarter of the world's population under 35 (UN 2015). All those people will need

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jobs. According to Altenburg et al (2018), in order to accommodate labour market entrants, SSA will need to create 18 million jobs every year until 2035. Abdychev et al (2018) also posit that the working age population in SSA will increase by 20 million a year for the next 20 years. The central question is: how to create jobs for all those people?

In his preface to the 2018 World Economic Forum (WEF) report, Klaus Schwab, WEF founder and executive chairman, wrote:

> The emerging contours of the new world of work in the Fourth Industrial Revolution are rapidly becoming a lived reality for millions of workers and companies worldwide. The inherent opportunities for economic prosperity, societal progress, and individual flourishing in this new world of work are enormous, yet depend crucially on the ability of all concerned stakeholders to instigate reform in education and training systems, labour market policies, business approaches to developing skills, employment arrangements and existing social contracts. Catalysing positive outcomes and a future of good work for all will require bold leadership and an entrepreneurial spirit from businesses and governments, and an agile mindset of lifelong learning from employees (WEF 2018).

Schwab (2016) notes that skills development has to be a shared effort among businesses, governments and employees themselves. Any programme to create employment for young people in the digital economy has to be closely aligned with digital skills capacity-building. In this context, Rwanda has emerged as a leading country in training and capacitating its young people with the digital and other skills that will make them an able workforce of the future.

This article addresses the question: what are African governments and other stakeholders, notably development partners, doing to ensure the participation of young people in formal and informal employment in the digital economy? It builds on the existing literature which shows that despite digitalisation having adverse effects on some forms of employment, as highlighted by Frey & Osborne (2017), it can also create new jobs, and that this is the case in SSA as well (Manyika et al 2013; Altenburg et al 2018; Melia 2019).

African governments and experts like the WEF president, Borge Brende, believe Africa can leapfrog into the Fourth Industrial Revolution (4IR). Given that by 2030 Africa will house the world's youngest population, African governments, development partners, and other stakeholders both inside and outside Africa must commit themselves to financial and material investments in education and skills development that will have real value in the evolving labour markets, and prime African youths for the future of work. Given the ageing populations in other world regions, it is vital for SSA governments and other stakeholders to join forces in addressing this challenge.

Against this background, this study examines the case of how Rwanda is preparing its young people for the future of work – or, in the words of Paula Ingabire, the Rwandan minister of ICT and innovation, how 'Rwanda is not just preparing Rwandan youth for the future of work, but is creating solutions for the entire African continent'.

It is inspired by the frequently quoted McKinsey Global Institute (MGI) report titled *Lions Go Digital* which states that 'If (Sub-Saharan) governments and the private sector continue to build the right foundations, the Internet could transform sectors as diverse as agriculture, retail, and health care, and contribute as much as $300 billion a year to Africa's GDP by 2025' (Manyika et al 2013), as well as the African Union's pinpointing of digitalisation as

the solution supporting employment creation and new socio-economic opportunities for the continent's young people (Bellucci and Otenyo 2019).

Furthermore, Professor Emmanuel Nnadozie, executive secretary of the African Capacity Building Foundation (ACBF), has stated that the lack of progress in defeating youth unemployment is due to a mismatch between higher education and the needs of the African labour market, which requires a sustainable policy direction, especially in terms of effective program design and intervention (AfDB 2018).

The following section will review the literature on the impact of digitalisation[1] on labour markets and the implications for preparing African youths for the future of work. Section 3 describes the methodology, and section 4 traces the various ways in which Rwanda is preparing its youth for the Future of Work. Conclusions and recommendations are presented in section 5.

2 Overview of the SSA labour market

Since the turn of the millennium, SSA has shown remarkable economic growth (McKay and Thorbecke 2015). Following a contraction in 2020 primarily due to the Covid-19 pandemic, the IMF predicted that the sub-Saharan economy was set to grow by 3.7 per cent in 2021, and 3.8 per cent in 2022 (IMF 2021). If this trajectory continues, the sub-Saharan economy will double by 2030. According to the WEF, income levels as well as the diversification and complexity of economic activity have increased, notably in Nigeria, Ethiopia, Tanzania, Kenya, Uganda and South Africa, which also happen to be among the most populous countries in the region (WEF 2017).

Despite the impressive growth in the SSA economy, levels of unemployment remain high according to the ILO, in 2019, the unemployment rate in SSA was 6.8 per cent (or almost 34 million of an active labour force of 489.7 million people) which was higher than the global average rate of 5% (ILO 2020).

Of this number, 12,2 million (36%) were young people between 15 and 24 years (ILO 2020). About 11 million youths enter the SSA workforce each year, but only 3.1 million jobs are created, leaving more than 70 per cent unemployed. Furthermore, of Africa's nearly 420 million youths in the 15-35 age range, a third are unemployed; another third are vulnerably employed (i.e., employed but in non-permanent jobs); and only one in every six is in wage employment (AfDB). According to the International Labour Office (2017), 95 per cent of young people are employed informally.[2]

The ILO also states that more than half of African youths are underemployed (2012), and the World Bank (2013) estimates that by 2030 about 263 million young people in Africa will not have a stake in the economic system. Filmer and Fox (2014) argue that Africa should move beyond simple unemployment and take rapid steps to address underemployment, which affects African youths particularly badly. A lack of adequate social safety nets in Africa will compel youths to work at abysmal wages, and face even more impoverished working conditions in order to survive. Of the 73 million new jobs created in Africa between 2000 and 2008, only 16 million, or just 22 per cent, went to people aged 24 years and below (Dalberg 2013). A 2015 UNECA report found that employment in Africa grew between the years 1991 and 2001, but at a lower rate than population growth (UNECA 2015).

Indeed, the ILO's Africa Bureau has claimed that much of the economic growth in Africa has been jobless (ILO 2015). Scholars like McAfee (2012) have argued that this mismatch between labour and economic growth is a result of labour decoupling, a phenomenon seen in the United States in the 1990s and early 2000s, in terms of which economic growth was accompanied by declining employment (Friederici, Ojanperä and Graham 2017).

Accurate and up-to-date data on skills and sectoral employment of youths in SSA are also lacking. However, in its 2020 report on employment in Africa, the ILO claims that most young people in Africa are employed in agriculture, followed by construction. It further notes that employment has grown in the services sector. Unfortunately, jobs in the digital economy are lumped with other services jobs, which makes it difficult to determine how many young people are employed in the digital economy.

However, according to the WEF, the SSA exhibits a high-skilled employment rate of just 6 per cent, against a world average of 24 per cent (WEF 2017) This finding supports the notion that the region has an untapped high-skilled employment potential, which could be taken to include digital skills. All this points to the need to equip African youths with the skills to access jobs in the digital economy.

Moreover, given the reality that SAA is facing a significant youth unemployment crisis, and scholars such as Altenburg et al. (2018) postulate that SSA has to create at least 18 million jobs annually until 2035 in order to accommodate all the youths entering the labour market, any conversation about economic growth has to revolve around employment creation. Abdychev et al. (2018) echo these sentiments, noting that, that in the next two decades, about 20 million African youths will enter the labour market.

3 The impact of digitalisation on SSA

It is widely agreed that digitalisation has a profound impact on jobs and the job market, both positively and negatively (Schwab 2016; Chui, Manyika and Miremadi 2017). Opinions are divided on the actual impact of digitalisation on jobs, with some (Chang et al 2016; Frey & Osborne 2017; Frey & Rahbari 2016; Krueger 1998; Ugura & Mitra 2017) arguing that this will result in low-skilled employees being replaced by machines. Indeed, Frey & Osborne (2017) suggest that 70 per cent of jobs in the global economy are susceptible to automation.

As far back as 1995, Jeremy Rifkin predicted, in his acclaimed book titled *The End of Work*, that the advance of robots and technology in the United States would lead to a jobless future (Rifkin 1995). Other scholars such as Acemoglu and Restrepo (2019) have also argued that at the current rate of digital advancement, especially Artificial Intelligence (AI) and machine learning, even middle to high-skilled jobs are not safe. Most of these studies have not been conducted in SSA, but in other regions.

Friederici et al (2017) argue that most African governments are overly optimistic about the economic potential of digitalisation. Gaus & Hoxtell (2022) observe that most African jobs are in the agricultural sector and may therefore remain largely unaffected by technology. However, the wider use of tractors and other agritech may threaten this. Due to Africa's low industrial base and high levels of subsistence and informal work, the threats of automation and job replacement by machines remain very low.

Melia (2019) disputes the pessimistic findings by Friederici et al. (2017), arguing that of the 27 studies used, 15 had positive outcomes, some relied on outdated data, and others were not empirical. In a comprehensive review of the available literature on Africa, Melia argues that there is much evidence to support a positive view of the impact of digitalisation on Africa's labour markets. These findings are also consistent with Dalberg (2013), World Bank (2016), and the WEF (2017, 2018).

The 2017 WEF report on 'The Future of Jobs Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution' forecasts that digitalisation will create jobs in computer science, data analysis and many other STEM Fields. This echoes the findings by Page and Shimeles (2015) and Ramalingam (2016) that there would be growing demand in Africa for personnel with the ability to combine digital skills and traditional skills. Others have also argued that the Future of Work will require abstract thinking, creativity and analytical skills, which can only be provided by humans and not by computers (Wilson and Daugherty 2018; Agrawal et al 2019). According to Diamandis and Kotler (2020), digitalisation will permeate all economic sectors, even agriculture and the informal sector Also, technology can simultaneously replace labour and create new jobs (Acemoglu and Restrepo 2019). This corresponds with Baldwin (2019) who argues that digitalisation will even lead to the creation of new and more productive and fulfilling jobs than previously. He also points to the building of skills that allow for survival in a world where 'tele-migrants sitting in one country can do tasks in another country'.

3.1 What digitalisation means for Africa's labour market

Digitalisation means that employees of the future will need new skills sets (Ambrose et al 2010). This means that African governments and other stakeholders will have to rapidly figure out a way to capacitate youths with the relevant skills sets. In his seminal work on *Educating for the Fourth Industrial Revolution* (2019), Peters argues that traditional forms of education are no longer adequate for doing so. One vital need of the Future of Work is close collaboration between industry and training institutions (Aoun 2017). Drawing on examples in Asia, Lewis & Rupp (2016) have suggested liberal arts education as a viable way of preparing young people for the Future of Work. Erik Brynjolfsson and Andrew McAfee contend that there is a need to create employees capable of creative thinking, who could therefore be described as 'valuable knowledge workers' (Brynjolfsson and McAfee 2014).

In a 2017 report, Accenture argued that the digitalised workspace would require a versatile workforce that was not limited to rigid titular roles and functions, but could rapidly adapt to the needs of the market. Clearly, this will require substantial investment in providing such a workforce with the necessary knowledge and skills. Numerous scholars have argued that workers of the future need to be creative and adaptive critical thinkers (Barrett and Moore 2010; Ambrose et al 3010; Drake and Long 2009). By contrast, traditional education systems fall victim to what Paulo Freire Freire (1993) famously described as 'the banking concept of education', in terms of which teachers assume students are blank slates which need to be filled with education.

This approach falls short of the demands of the Future of Work, in which problem-solving skills and adaptability will be more important than 'crammed' knowledge – the more so because automation is taking over most 'memorisation' functions (Brynjolfsson and McAfee 2014). Commenting on Asian higher education institutions, Hussain et al. (2007) extolled the benefits of problem-based learning in preparing workers for the digitalised workplace.

In March 2022, speaking to CNBC at the launch of the Centre for the Fourth Industrial Revolution, Paula Ingabire, the Rwandan minister of ICT and innovation, stated that due to the 4IR there was a huge demand for talent, and therefore the need for the creation of a Pan-African talent development system. This talent gap also existed beyond Rwanda. As a country that intended to be a leader in the knowledge economy, it was essential to bridge the talent gap with local solutions developed with a global focus.

In the decade to 2019, economic growth averaged 7.2% a year, far more than the average for SSA, while per capita gross domestic product (GDP) grew at 5%.However, this has still not led to adequate job creation for the young people entering its labour market. At just 4 per cent, the formal youth unemployment rate is lower than those of most or all other SSA countries. However, underemployment remains a serious problem, especially among the 65 per cent of informally employed people (UNCDF 2016). As a result, the Rwandan government is emphasising the need to create decent employment for young people, among others via skills training as well as the formalisation of the informal economy.

4 Methodology

Given its subject matter, this is a qualitative study, focused on the case of Rwanda. Primary and secondary research was conducted. Secondary research comprised a desktop review of documents published by influential organisations and experts on the subject of digitalisation and labour markets in SSA, as well as published material pertinent to the case study, namely Rwanda. This included policy documents and other material published by the Rwandan government. Most of the documents were available in the public domain, and others were available upon request from the relevant authorities. The primary research comprised 15 interviews conducted with key role players in Rwanda.

A coding system was used to capture claims and assumptions about the impact of digitalisation on labour markets in SSA; whether the impacts were positive or negative; the implications of those impacts; and methods used to prepare young people for the future of work. This system also captured whether those efforts were policies, agreements, or tangible and verifiable activities.

5 Rwanda's preparation for the Future of Work

Rwanda is making a concerted effort to prepare young people for the Future of Work.[3] The activities in the country are threefold: direct and indirect initiatives undertaken by the government itself; initiatives in partnership with private organisations and development agencies/organisations; and initiatives undertaken by private organisations and development agencies/organisations independent of the government.[4] According to the Rwandan minister of education, Valentin Uwamariya:

> Africa has reached a crossroads. Now we face a choice. Let us seize the moment and take advantage of the best chance we will ever have as a continent. That means waking up to the opportunity that ACFTA represents for all Africans. It means making the most of the fact that Africa has a dynamic, youthful, growing population - a real reservoir of human resources and talent. It means planning, cooperating and investing in technology-assisted learning and training so that we can spread the benefits of education and provide the new

> skills that are vital for the workforce of the Future. Failing to focus now on education, training, and technology would be unforgivable (eLearning 2022)

According to Kevine Bajeneza, founder of the Natcom Training Centre, a private institution in Kigali offering ICT skills to private individuals, organisations, and government personnel from various departments:

> With the advent of digitalisation and the Fourth Industrial Revolution, it is no longer business as usual in how young people are trained for the job market.

An outline follows of the multiple ways in which the Rwandan government as well as other stakeholders are working to create a future-ready workforce, not just for Rwanda but for the entire African continent and beyond.

5.1 A comprehensive policy framework

The Rwandan government has developed a comprehensive policy framework for bolstering youth employment, particularly in the digital economy. These policies all deal with the issue of job creation for young people, and emphasise skills development as a vital feature. They include:

- The Vision 2020 document, which outlines Rwanda's vision to transform Rwanda from an agrarian economy into a knowledge economy;
- The ICT-led Socio-Economic Development Policy and Plan 2001-2005 whose goal was to 'modernise the Rwandan economy and society using information and communication technologies (ICTs) as an engine for accelerated development and economic growth; national prosperity; and global competitiveness';
- The Economic Development and Poverty Reduction Strategy (EDPRS2) 2013-2018 with four thematic areas, one of them being focused on the development of appropriate skills among youths, with the aim of moving 50 per cent of the workforce away from farms and creating 200 000 new jobs annually;
- The Smart Rwanda Master Plan SRMP(2015-2020) which focuses on increasing Rwanda's ICT skills and to increase professional ICT certification courses;
- The National Youth Policy which had a several priority areas, one being to improve the access of young people to quality education and training so as to improve their employability;
- The National Strategy for Transformation (NST), 2017–2024, which outlines a vision for the transformation of the Rwandan economy into a knowledge-based economy capable of competing at the global level;
- The National Digital Talent Policy, which aims to increase the quantity and quality of digital literacy skills of Rwandans across the board, thereby setting the tone for the creation of a knowledge economy;
- The Revised National Employment Policy (NEP 2019), whose main objective is 'to create sufficient and productive jobs in order to reduce labour underutilisation and enhance productivity and competitiveness'; and
- The National Skills Strategy and Employment Promotion (NSSEP), 2019–2024) whose main thrust is to develop a workforce that has market-relevant skills in order to access quality employment.

All these policies build upon one another, and some, like the National Transformation Strategy, have clear targets such as ensuring that by 2024, 100 per cent of all youths and 60 per cent of adults will be digitally literate, and 1.5 million decent jobs will have been created. The National Digital Talent policy complements this by setting up four main policy areas, namely providing digital literacy for all; building a digitally savvy workforce; setting up an IT elite corps; and coordinating digital literacy initiatives.

The first policy area focuses on training five million Rwandans, starting with those in primary school, and with a specific focus on youths. The second focuses on retraining and upskilling to enhance digital adoption, focusing on secondary and tertiary education as well as those already in the workforce. The focus is on training one million Rwandans. The third focuses on developing 10 000 ICT experts in order to transform the country into an exporter of ICT services and products. The fourth focuses on creating digital literacy standards and providing coordination mechanisms for the implementation of the NDTP. These policies have also led to activities and programmes such as the Rwanda Coding Academy, the Digital Ambassadors Programme, the One Smartphone per Household programme, and the digitalisation of government services through the creation of the Irembo platform.

Besides the creation of a clear and comprehensive policy framework, a respondent from the Ministry of Labour also explained:

> In Rwanda there is a very clear policy coordination, every person either in government or non-government but who intends to work in Rwanda has to be aware of the policies in their area. This is important because the person or organisation then identifies where they fit in the policy framework and how they can help the government achieve its goals. The president also provides very strong leadership and as a result all the ministers are aware of all policies and hence find ways of making their different polices combine, for example most of our digitalisation projects focus on youth which means two ministries or even three if we include ministry of education. That means all these ministries have to collaborate.

5.2 Focus on education and training

The Rwandan government has made the education and training of young people a priority. This has played out through government-supported initiatives, mainly through the Ministry of ICT and Innovation and the participation of non-government institutions, ranging from small and local enterprises like Natcom and SolveIT to large and international ones like Carnegie Mellon University. The education and training is formal, informal and on the job, and involves incubators and hubs. Speaking to eLearning Africa, a global network of professionals working in ICT-supported education and training, Paula Ingabire, the Rwandan minister of ICT and Innovation, summarised what digitalisation means for Africa, and what Africa needs to do to prepare its young people for the Future of Work:

> Africa is now at a crucial moment in its development. The creation of ACFTA, the African single market, is an unprecedented opportunity to transform the fortunes of our continent and its people. We can leapfrog other countries and regions. We have a chance to bring real prosperity to Africa. But we have to take the necessary steps to prepare ourselves and our people. Above all, this means investing in the combination of Education and ICT. And in ensuring that our people have the skills necessary for the markets of the Future.

> Information and Communications technology can spread the benefits of education and training to the remotest parts of our continent. In the wake of the Covid pandemic and an economic downturn, every African Government should now focus relentlessly on its Education and ICT strategy. That is what will make the African Union's 2063 Vision a reality.' (eLearning Africa, 2022)

According to an official from the Ministry of Education, Rwanda has also signed a memorandum of understanding with Zimbabwe about importing Zimbabwean teachers, in a bid to boost Rwanda's education system:

> Following the President's request to President Mnangagwa of Zimbabwe that we need Zimbabwean teachers to come and teach English in our schools. The MOU has now been signed and as we speak about 300 teachers in English and STEM subjects have arrived in Rwanda. Actually we expect many more, who will teach in our health sector as well as TVET.

The Rwanda Coding Academy

The Rwanda Coding Academy is a specialised vocational coding school focused on training young people who have completed lower secondary school in software development, embedded systems and cybersecurity. The school is a Rwandan government initiative comprising a partnership among the Ministry of Education, Ministry of ICT & Innovation, Rwanda Information Society Authority, Rwanda Education Board, Workforce development Authority and Rwanda Polytechnic. The school was established in 2019 as a result of the Digital Talent Policy. The Rwanda Coding Academy is focused on producing highly skilled software developers who can fill this gap in the national economy.

Digital Ambassadors Programme

Also building on the National Digital Talent Policy, the Digital Ambassadors programme is an initiative by the Rwandan Ministry of ICT and Innovation aimed at increasing the number of digitally literate citizens and promoting citizens' use of e-Government and e-Business services. The programme is implemented by Digital Opportunity Trust (DOT) Rwanda, an organisation focusing on supporting youths to become innovators and apply digital solutions to serve their communities. The Digital Ambassadors programme focuses on training and deploying 4 900 young people as Digital Ambassadors by the year 2024, who will, in turn, train 8 460 000 citizens in digital literacy. Dr Emmanuel Nzeyimana from DOT Rwanda has explained that:

> We are more than confident that the DAP programme will be able to reach its target of equipping 8,5 million Rwandan citizens with digital skills while creating employment for 5 000 young people (Digital Ambassadors). This is because, in the pilot phase between 2017 and 2018, we trained and deployed 50 Digital Ambassadors to five districts, and they trained over 17 000 citizens in turn. We have refined the model and deployed even more ambassadors, and the evaluations we carry out keep showing us great results.

Carnegie Mellon University Africa

The Rwandan government invited Carnegie Mellon University, a top-ranked American university, to open a campus in Rwanda. The Carnegie Mellon University in Rwanda is focused on 'Educating the next generation of African tech leaders and innovators'. It offers masters programmes that are practical and oriented toward developing top talent in ICT skills and management relevant to Africa's digital transformation. According to a respondent, The Carnegie Mellon University was the result of an explicit invitation by President Paul Kagame, aimed at securing high-quality training for ICT leaders in industry and government not just for Rwanda but Africa as a whole.

Initiatives by the Mastercard Foundation

After consultations with the Rwandan government, CSOs, the private sector, and young people in Rwanda, the Mastercard Foundation launched the 'Young Africa Works' strategy in Rwanda in 2018. Its main objectives are to equip 30 000 young people with they skills they need to be employed in the hospitality industry, and to improve teaching and learning in secondary schools. To achieve these goals, the foundation set up two projects, namely Hanga Azaza and Leaders in Teaching. These two projects align with the Rwanda Vision 2020 document and the National Transformation Strategy.

Hanga Azaza

Hanga Azaza, which means 'creating the future' in Kinyarwanda, is a $50 million, five-year initiative focused on providing 30 000 young people with skills suited to the tourism and hospitality sector as well as to create small businesses that could employ other young people in the tourism sector in turn. The initiative will offer training in communication, customer service, business development skills for entrepreneurs, and ICT and digital literacy skills. The Mastercard Foundation will work with 13 other partners, namely the African Management Initiative, Cornell University, Dalberg Limited, EF Education First, ESPartners Ltd, GroFin SGB Fund, Harambee, Horwath HTL Interconsult Ltd, I&M Bank (Rwanda) Plc, Inkomoko, Question Coffee and Vatel Rwanda.

Leaders in Teaching

The Leaders in Teaching programme is premised on the fact that while African secondary school enrolment has been on the rise in the past couple of years, the quality of education remains low. Given the projection that by 2030 Africa's workforce will have grown to 375 million people, it must be prepared for the future now, starting with school-going children. The Mastercard Foundation argues that the poor quality of education in secondary schools means that millions of young people cannot progress to further training and education, or successfully transition into the workforce. The Leaders in Teaching project has two components, namely country-level programmes, and Pan-African Centres for Innovation.

The country-level programme is focused on improving the quality of secondary school teaching, thereby helping to ensure that learners are given the skills and competencies they need to access economic opportunities in the future. The initiative trains and supports

secondary school teachers throughout their careers and provides them with high-quality and high-tech equipment. The Pan African Centre for Innovation, also called the Centre for Innovative Teaching and Learning in ICT, is a five-year initiative focused on fuelling innovation in the use of ICT in secondary education. At its core, the Centre seeks to close the gap in access to quality education, evaluate the ICT for education methods, and create an active network of EdTech leaders across the African continent.

Initiatives by the German Agency for International Cooperation (GIZ)

Perhaps the most significant contributor to the Rwandan government's efforts to preparing its youths for the Future of work is the German government through its Agency for International Cooperation (GIZ). The GIZ has undertaken numerous initiatives in Rwanda, including the Digital Transformation Centre, the Make-IT in Africa project, the Special Initiative on Training and Job Creation: Job partnerships and SME promotion in Rwanda, Digitalization for sustainable development, the Centre of Excellence for Information and Communication Technology in East Africa,[5] and Equal Opportunities through Digital Learning with Atingi. For the purposes of this study, however, only the Digital Transformation Centre, Make-IT in Africa, and Equal Opportunities through Digital Learning with atingi were considered, as they specifically relate to the preparation of young people for the Future of work.

Equal opportunities through digital learning with Atingi

This project falls under the GIZ's Global Project on Digital Transformation. It focuses on providing innovative digital learning opportunities to people from different educational backgrounds in order to capacitate them with relevant skills that will enable them to find decent employment. The project uses the 'Atingi' digital learning platform to reach poor and disadvantaged people with high-quality learning and training. It focuses explicitly on girls, women, and people in rural areas. The high-quality learning material on Atingi are free for all. Through collaboration between government, the academic community, businesses, and the civil society, it is designed to equip leaners with skills relevant to their local labour markets.

The Digital Transformation Centre

Digital Transformation is a joint initiative between the GIZ and the Rwandan Ministry of ICT and Innovation to promote digital transformation in Rwanda. Through this project, GIZ supports the MINICT and the Rwanda Information Society Authority (RISA) in promoting the adoption of digitalisation as well as capacitating all Rwandans, particularly those in rural areas, with digital literacy skills. IT also supports technocrats in the MINICT to come up with digital solutions to challenges faced by Rwandans. The Digital Transformation Centre hosts events and training sessions for people in the digital space, particularly young people, and offers training courses to support Rwanda in carrying out the Smart Rwanda Master Plan vision. It supports tech start-ups by creating exchange platforms, relevant training and access to finance, and networking opportunities. It has also set up an innovation studio where young people work to produce impact-driven solutions closely aligned with the Sustainable Development Goals.

The Make-IT in Africa project

The Make-IT in Africa project is housed at the Rwanda Digital Transformation Centre, and is also funded by the European Commission. It seeks to strengthen African Innovation ecosystems in three main ways: 1) Supporting start-ups to align their business models with market conditions as well as creating regional and international partnerships; 2) Innovation promotion through capacitating hubs and incubators, aimed at offering high-quality services to entrepreneurs; and 3) Facilitating the cross-border sharing of innovation among African countries as well as establishing environments that are conducive to innovation. Make-IT in Africa also helps to connect digital ecosystem players in Rwanda with players in other African countries as well as with players from Europe. This is done through the African-European Digital Innovation Bridge (AEDIB), an initiative of the European Commission and several European Union member states.

While many Africans are seeking to develop digital solutions for African problems, they lack the access to financing, high-quality and relevant training, as well as conducive innovation policies they need to take these ideas to scale. The Make-IT in Africa project seeks to create this environment. According to a respondent from Make-IT in Africa:

> One of the most important aspect of our programming here is that we are Pan African in nature. While this organisation is located in Rwanda, it is focused on creating solutions for the entire African continent and not just Rwanda. In that case we are open to solutions to Africa from African people even located outside Africa, as long as they can prove that their solution is for Africa.

Tech entrepreneurship hubs and incubators

Rwanda has a very active Tech start-up ecosystem, with more than 20 hubs and incubators, most of them registered during the past five years. Hubs and incubators play vital roles in Rwanda's efforts to prepare young people for the Future of Work, as they provide young entrepreneurs in the digital space with the skills they need to develop viable businesses that can employ other young people. The hubs and incubators in Rwanda work with tech entrepreneurs at different stages from ideation to proof of concept to scaling. They also offer co-working spaces, private offices, internet connection and equipment such as computers, internet and 3d printing machines, advisory services, networking events, and seed funding. Prominent players in the Kigali ecosystem include Westerwelle Start-up Haus, Norrsken House, KLab, Impact Hub, 250StartUps, and StarAfrica. Some were established locally, and others are foreign entrants. However, the objectives of both are aligned with Rwanda's vision 2020 and National Strategy for Transformation.

Incubators like Westerwelle Start-up Haus operate on cohorts, with entrepreneurs joining for a particular period. However, if they fail to scale up, or need further training, extensions are possible on a case by case basis. Klabs, the oldest incubator in Rwanda, offers co-working spaces which are not dependent upon cohorts.

Huawei ICT Academies in Rwanda

In October 2021, 6he Ministry of ICT and Innovation, the University of Rwanda and Rwanda Polytechnic signed a memorandum of agreement with Huawei, a Chinese multinational technology corporation, about establishing Huawei ICT Academies at these two institutions. The Huawei ICT Academy aims to provide students with the latest ICT knowledge as well as skills that are relevant to industry needs. The agreement will result in Huawei delivering its training and certification programmes to the University of Rwanda, Rwanda Polytechnic through the Huawei ICT Academy programme. Huawei will also provide the Huawei Certification Academy Instructor (HCAI) training service for teachers at these two institutions.

Digital and Innovation promotion project

The Rwandan government, through its Ministry of ICT and Innovation, has also entered into a technical agreement with the Japan International Cooperation Agency (JICA) on a four-year Digital and Innovation Promotion Project. Its objective is to 'establish market creation for an innovation model for a vibrant ICT sector in Rwanda, and support Rwanda's journey of becoming an ICT hub in Africa'. The project is set to buttress the advances already made by Rwanda in creating an innovative ecosystem in the country as well contributing to the realisation of the Smart Rwanda Master Plan. This project will also result in continued support by JICA of youth hubs such as Fablab and KLab, thereby contributing to the capacitation of young people in the digital space.

GIGA Initiative

The GiGA initiative is a project between GIGA and the Rwandan government aimed at providing internet access to about 1 800 schools. This will enable them to benefit from digital initiatives. The unconnected schools are just 30 kilometres away from fibre, and the GIGA initiative is aimed at providing last mile connectivity

6 Discussion

Digitalisation has varying impacts on labour markets, which have not been sufficiently researched. This is true for the earlier forms of digitalisation as well as the more recent 4IR technologies. Despite the misgivings of some, analysts, policy-makers and planners remain optimistic that digitalisation will lead to employment creation for young people in SSA, which is set to have the world's youngest and largest workforce by 2030. Digitalisation in Africa has grown exponentially, especially during the COVID-19 pandemic. One thing that both optimists and pessimists agree on is that Africa has a severe skills shortage and a bulging youth population, and if young people are to be given decent work, investment in digital literacy skills is urgently needed.

The Rwandan government has prioritised the creation of a knowledge-based economy, and education is a vital pillar of this vision. The design of a conducive environment, particularly in respect of digitalisation, has attracted various development partners which are willing to work with the government in developing a future-ready workforce. Conversations with key

role players in the ICT sector, both in government and the private sector, highlights how Rwanda's tragic history has helped to create a sense of resilience, initiative, enterprise and eagerness to learn, all which are prime conditions for the creation of a populace equipped for a digital economic future.

Rwanda has emerged as a leading country in SSA in terms of preparing young people for the Future of Work. Its initiatives in this respect are all buttressed by a comprehensive policy framework and a strong culture of policy implementation. The National Digital Talent Policy has led to the attraction of numerous international organisations such as the GIZ, Mastercard Foundation, Carnegie Mellon University, African Leadership University, Westerwelle Haus and Norskken House which have invested in education initiatives to build a future-ready workforce. This conducive environment has also led to an increase in innovation and creativity by Rwandan youths, who have launched several start-ups as well as hubs and incubators like KLab and Fablab in order to support other young tech entrepreneurs. In his book *Robot-Proof: Higher Education in the Age of Artificial Intelligence* (2017), Joseph Aoun argues that universities should be utilised to develop valuable ecosystems for entrepreneurship, and the partnership between Rwandan universities and start-up incubators such as StarAfrica which is located at the University of Rwanda medical campus is one way of putting this into effect. This also true of the Huawei ICT academies at the University of Rwanda and Rwanda Polytechnic.

The revision of the National Employment Policy shows that the Rwandan government is learning and reacting to the changes in the world of work. Notably, it provides a more structured institutional and policy coordination framework for creating decent employment for young people. Rwanda's policies and programmes for preparing young people for the Future of Work are buttressed by extensive investment in its digital infrastructure – inter alia, the entire country is covered by Fibre Optic Internet.

Rwanda has been described as a competitive authoritarian state. This makes it a rather special environment, which eases the implementation of government strategies. Evaluation of the Rwandan political system falls outside the scope of this study. However, the fact that numerous respondents cited 'strong leadership' as a main driver of the country's recent developmental progress seems to acknowledge that the relative lack of political contestation and need to negotiate compromises allows faster policy formulation and implementation. As Kevine Bajeneza puts it:

> Strong leadership is indeed a key pillar behind the success of Rwanda. As a country recovering from a terrible tragedy (genocide against the Tutsis and moderate Hutus) there was a need for strong leadership, and President Kagame has provided this strong leadership. He has also inculcated strong values of independence and problem solving in the people, which explains why so many young people are opting to become start-up founders. Also products like Irembo are by local Rwandese finding solutions to their local problems.

A significant weakness is the lack of a clear framework to measure the efficacy of the different policies and programmes, both by government and non-government actors. Another area of concern is how most policies seem to focus on digital entrepreneurship rather than wage employment. While entrepreneurship is commendable, not all youths can be business owners. Unfortunately, information about the number of tech start-ups in existence was difficult to access, with only the success stories featuring.

Learning points produced by the Rwandan case study include the following:

- **The importance of political will**: All the policies and programmes referred to above enjoy high-level government support and commitment, among others from the president, the minister of ICT and Innovation, and other government role players.
- **A clear and focused vision:** Rwanda has declared that it seeks to become a knowledge economy and a proof-of-concept country for digital innovation. Government policies, programmes and statements show that this is clear vision, incorporating a close focus on its achievement. Periodic policy reviews, including turning Vision 2020 into Vision 2050, is a typical example.
- **Policy implementation and coordination**: Rwanda has a sophisticated system for harmonising and coordinating government policy, notably its policies for entering the digital economy. Therefore, all role players, in government and the private sector, are aware of the contents of the policy and what they need to do to help implement it.
- **A conducive environment**: The Rwandan experience demonstrates that creating a conducive environment for the participation of development partners plays a vital role. Thus the government has accompanied invitations to foreign companies to invest in Rwanda, by setting up start-up ecosystems, supporting young digital entrepreneurs, and investing in digital infrastructure. Another example is training all citizens in digital literacy through the Digital Ambassadors Programme, which not only empowers citizens but also widens the market for digital products.
- **Focusing on practical solutions**: Rwanda has identified practical needs and set up practical solutions, for example by offering ICT training to young people, as well inviting teachers from other countries such as Zimbabwe to improve the quality of its education.

7 Conclusion

It is common cause that digitalisation will have a profound impact on jobs and job creation. Authorities such as Klaus Schwab, who is credited with coining the term 'Fourth Industrial Revolution' have claimed that the new world of work is rapidly becoming a lived reality for employees and employers around the world. Therefore, the issue is no longer theoretical, but is already being experienced in organisations and society – in other words, the era of the 4IR has already begun. Given this, SSA needs to rapidly equip its young people with digital and problem-solving skills, and create an environment for lifelong learning.

Rwanda's efforts to prepare African youths for the future of work are commendable. It is too early to assess its success; however, it is clearly on the right path. SSA faces formidable challenges in respect of creating jobs for young people flooding on to the labour market. However, there is justified optimism that, if properly organised, SSA can leapfrog other world regions into the 4IR, and Rwanda seems to provide an excellent example which other SSA countries would be wise to study and seek to emulate.

8 References

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Endnotes

1 Scholars often use the terms Digitalisation and Digitisation interchangeably because both have similar effects at times, and it is difficult to ascertain where one ends and the other starts. According to Brennen & Daniel Kreiss (2016) and Fabunmi et al. (2009), digitisation is the first stage, followed by digitalisation. Hess (2016 argues that the introduction of digital technologies leads to socio-economic change, whether this is introduced for the first time, in the form of conversion (Digitisation), or it at a later stage, which is transformation (digitalisation).

2 This study uses the ILO (2013) definition of informal unemployment as 'all employment arrangements that do not provide individuals with legal or social protection through their work, thereby leaving them more exposed to economic risk.' This definition also includes jobs in the formal sector which lack social and legal protections

3 The Rwandan government, through consistent pronouncements by the president, Paul Kagame, the minister of ICT and Innovation, Paula Ingabire, and the minister of education, Valentin Uwamariya, have insisted that they are seeking to prepare not only Rwandan youths but all African youths for the Future of Work.

4 In Rwanda, as in many other countries, all organisations have to register with the government. Therefore, in this instance, independence means that their interaction with government is limited to licensing.

5 This project has been established in Tanzania. Information on how it benefits Rwanda is not currently available.