McKinsey & Company

The future of work in South Africa

Digitisation, productivity and job creation

By Nomfanelo Magwentshu, Agesan Rajagopaul, Michael Chui and Alok Singh

Harnessing technology for growth and jobs

South Africa needs to reignite growth and job-creation

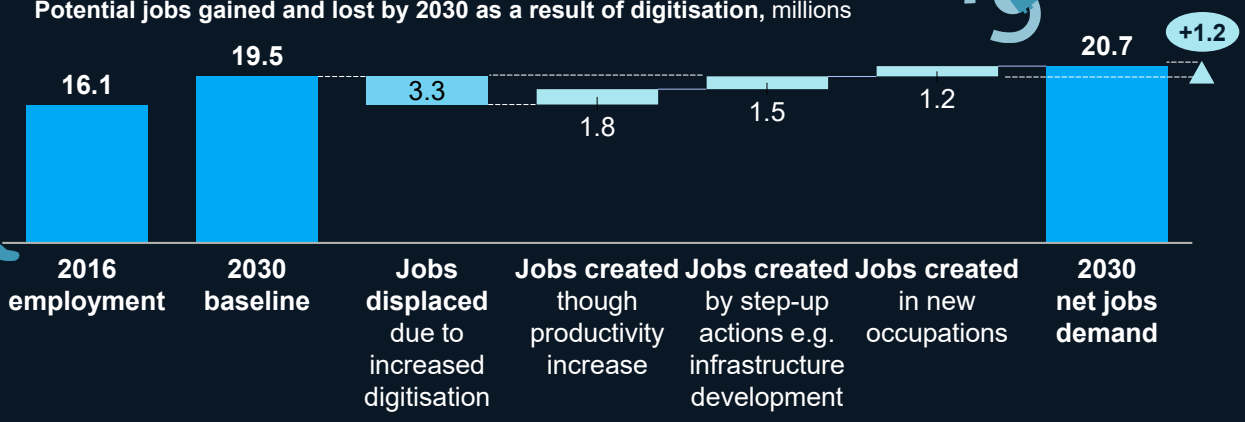
2% average GDP growth rate 2006–2018 – a 43% decline on the previous decade

29% unemployment in 2019 – highest in a decade

Digitisation could provide a major economic boost

Digitisation could result in a net gain of more than 1m jobs by 2030

Potential jobs gained and lost by 2030 as a result of digitisation, millions



New opportunities for women

Digitisation could create **1.6m** jobs for women – and boost empowerment

New demand for graduates

Tech-enabled jobs will require higher skills, resulting in demand for an additional **1.7m** graduates

To seize the opportunity, action is needed by government, business and individuals

National

Embrace digitisation

Invest in human capital

Mitigate jobs impact of automation

Foster a step-up in job creation

Business

Rethink strategy

Upgrade workforce planning and reskilling

Embrace new ways of working

Individuals

Focus on skills, not just certification

Embrace lifelong learning

Target high-growth sectors and roles

Find opportunities for entrepreneurship

The future of work in South Africa

Digitisation, productivity and job creation

By Nomfanelo Magwentshu, Agesan Rajagopaul, Michael Chui and Alok Singh

How can South Africa embrace the Fourth Industrial Revolution (4IR) to rekindle economic growth and transformation, revitalise skills, and create high-quality jobs in large numbers?[1] And how can the country mitigate the risk that the 4IR will lead to job losses – given that unemployment today stands at 29 percent, its highest level in a decade?[2]

These questions have been top of mind for leaders from across the public, private, labour and education sectors – and are the focus of the Commission on the Fourth Industrial Revolution appointed by President Cyril Ramaphosa.

This paper is intended as a contribution to the national conversation about the 4IR and the future of work in South Africa. The paper focuses on the elements of digitisation, machine learning and automation and draws on key findings and insights from McKinsey's research on the future of work in an age of rapid technology adoption – both in South Africa and across the globe.[3] It also benefits from interviews with several leading businesspeople, education providers and social-sector leaders.

Building on this evidence and these insights, our research suggests that while the advance of technology could be disruptive, it primarily represents a substantial opportunity. South Africa can harness technology to reignite productivity, growth, and job creation. But, to seize that opportunity, concerted action will be needed from businesses, government, labour organisations and educational institutions.

The case for taking such action is compelling, given South Africa's high levels of unemployment and the need to accelerate inclusive economic growth. One key challenge is that the country has been slow to nurture the skills needed for companies to compete and grow in an increasingly technology-driven world. That matters for the millions of young South Africans struggling to build their own futures.

Let's consider the dreams and struggles of three such South Africans – Amanda, Bulelwa, and Chris. Although their stories are fictitious, they are representative of many young South Africans. They also provide a human lens through which leaders across sectors can rethink the future of work in their organisations and across society. (See Box: A human lens on the future of work.)

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1 The Fourth Industrial Revolution (4IR) refers to the multitude of new technologies that are blurring the lines between the physical, digital and biological worlds to disrupt industries and economies around the world. These technologies range from artificial intelligence to robotics and 3D printing and are changing the business models that have underpinned many industries for decades.
2 Statistics South Africa, Quarterly Labour Force Survey, Q2:2019.
3 For example, McKinsey has published papers on this topic focused on Australia, Europe, India, the Middle East, New Zealand and the United States.

A human lens on the future of work

Amanda, a 21-year-old BCom graduate, faces a struggle common to many young South Africans: despite her years of study and sacrifice, she has not been able to find a job since leaving university at the end of 2018. Bulelwa, a 16-year-old grade 10 student, wants to study further and build a good life, but is confused about which path to follow. Chris, a 40-year-old, has a vocational qualification and works in a factory. He knows he is lucky to have a job, but is not satisfied with his pay, working conditions or advancement prospects. He dreams of more.

What Amanda, Bulelwa and Chris have in common is a passion to improve their lives. Amanda and Bulelwa are also enthusiastic adopters of all things digital. Like most other young South Africans, that makes them optimistic about their ability to adapt to technology-driven changes in the workplace. Indeed, a 2017 McKinsey survey found that, among South Africans aged 16–24, nearly two-thirds of respondents believed they had, or could learn, the skills needed to secure work in the future. Only 13 percent of respondents said they were worried they might not be able to learn the skills needed for the future of work.

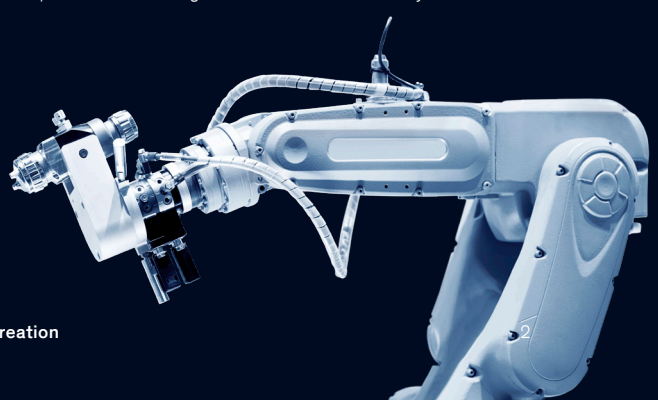
Alongside this positive energy and future-orientation, however, these South Africans are keenly aware of the obstacles in their paths. They know all too well that the country's economy is growing slowly, and many of their friends and family members are among South Africa's growing ranks of people without work or in precarious jobs. Let's consider the perspectives of each of them:

— Amanda, like many university graduates, is frustrated at the lack of job opportunities – and the fact that her studies have not fully prepared her for the jobs that are available. The statistics underline her concern: barely a third of students from South African tertiary institutions find a job after graduation. As a woman, Amanda knows she faces further obstacles – not just in getting a job, but in advancing her career. McKinsey's Women Matter research backs up that worry: it found that, in African companies surveyed, women make up 45 percent of the workforce but receive just 36 percent of promotions. Only 5 percent of African CEOs are women. [4]

— Bulelwa, too, knows it will not be easy to get ahead. She is determined to make it through matric, but she has already seen many of her classmates drop out of school. Even if she qualifies for tertiary education, South Africa's low graduate conversion rate means she has a one-in-two chance of dropping out before she completes her degree or diploma.[5] Bulelwa also worries that her education is not preparing her for the future: for example, her school puts little focus on digital skills. What she doesn't know is that her school's failure to teach life skills like adaptability, resilience and entrepreneurship is leaving an even greater gap in her future toolkit.

— Chris has a job, unlike 29 percent of South Africans. But his work in the factory is repetitive, physically strenuous, and potentially dangerous. It doesn't pay well, and although he is keen to learn and advance to a management position, his employer has offered little skills training. Chris has already seen some co-workers retrenched and replaced by machines, and he fears he could be next. The research profiled in this paper shows that anxiety is not unfounded: across South Africa, more than 500,000 jobs in manufacturing alone could be displaced by automation by 2030.

4 *Women Matter Africa*, McKinsey & Company, August 2016.
5 "How many South African students graduate?" Africa Check, 9 May 2017. *https://africacheck.org/factsheets/factsheet-many-south-african-students-graduate/.*



Why technology is an opportunity to reignite growth and job creation

The advance of technology – including machine learning, artificial intelligence and advanced robotics – is rapid and unstoppable. Although their impact will be disruptive, these technologies represent an enormous opportunity to reignite productivity, income and economic growth in South Africa. As our analysis shows, they have the potential to create millions of high-quality jobs, improve operational efficiency in both business and government, and help deliver better outcomes for customers and citizens.

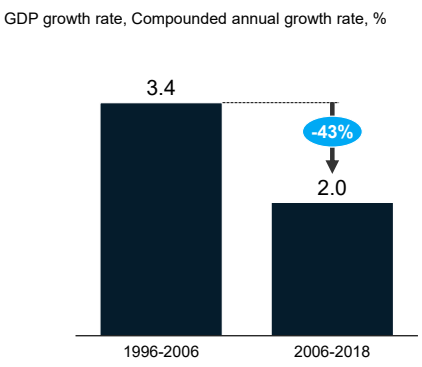
No South African needs reminding of the country's need to reignite growth – but it is worth underlining some stark numbers about the country's economic performance over the past decade (Exhibit 1). In the period between 2006 and 2018, annual GDP growth averaged 2 percent per annum, down from 3.4 percent in the previous decade. One key factor in that economic underperformance is South Africa's stagnant productivity: growth in productivity fell close to zero in the past decade, a big change from the previous decade's steady improvement in productivity. In this environment, joblessness has remained very high and wage growth has been depressed. High unemployment, in turn, contributes to South Africa's very high level of inequality.

By comparison, several other emerging economies have achieved strong growth over this period. A recent study by the McKinsey Global Institute analysed the performance of 71 developing economies over the last 50 years, and identified 18 outperformers that had sustained rapid GDP growth over decades. Those countries provide valuable lessons for South Africa. They have driven a pro-growth agenda of productivity, income, and demand. As a core element of that agenda, they have fostered productive companies and highly competitive industries. By leveraging technology to improve productivity and innovation, South Africa has the opportunity to emulate these economies.[6]

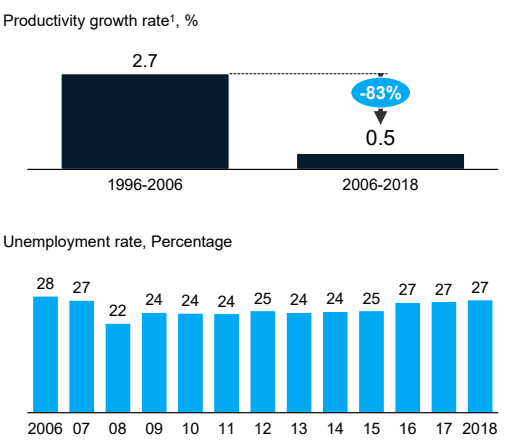
Exhibit 1

Over the past decade, South Africa has experienced a significant decline in economic growth and an increase in unemployment

South Africa's GDP growth rate has declined by 43% over the past 12 years...



...on the back of declining productivity and near constant high unemployment



1) Productivity growth is the growth in GDP per person employed
NOTE: Numbers may not sum due to rounding.

SOURCE: Stats SA, ONET, World Bank, BLS, Oxford Economics, McKinsey Global Institute analysis

6 *Outperformers: High-growth emerging economies and the companies that propel them*, McKinsey Global Institute, September 2018.

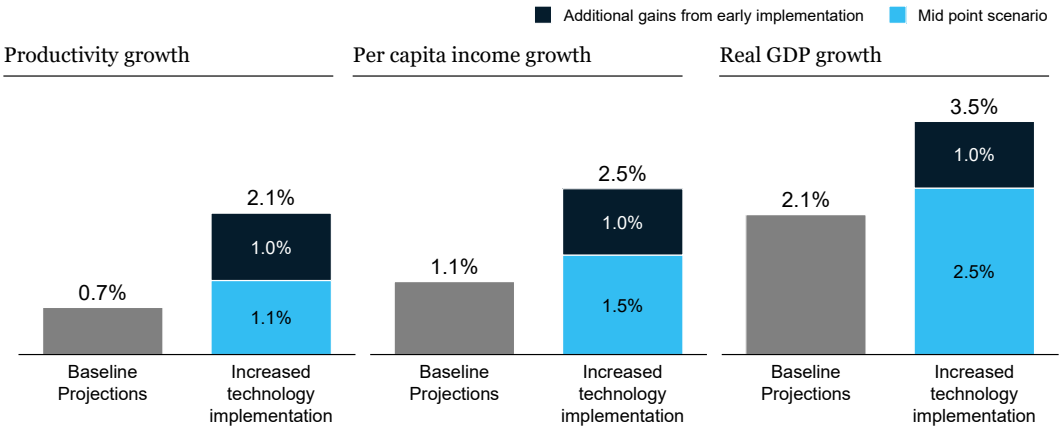
Our research, including analysis by the McKinsey Global Institute and a survey of about 70 South African leaders, finds that technology could reverse these trends by unlocking greater productivity across many sectors of the economy. In metal beneficiation and fabrication, for example, robot-assisted production can reduce human error and greatly increase efficiency. In mining, underground mine automation can improve safety and reduce costs. In financial services, digitisation can improve customer experience and drive greater efficiency.

Such productivity gains from digitisation and machine learning have the potential to drive substantial improvements of individual businesses – and the entire South African economy. We estimate that these technology-related gains could triple South Africa's productivity growth, more than double growth in per capita income, and add more than a percentage point to South Africa's real GDP growth rate over the next decade (Exhibit 2).

Exhibit 2

Increased digitisation and faster pace of technology implementation could provide a major boost to South Africa's future economic prosperity

Projected real growth rate (compound annual growth rate) by automation scenario, 2016-2030



NOTE: Numbers may not sum due to rounding. Model assumes labour displaced joins back into the economy and are at least as productive as 2016
SOURCE: Stats SA, ONET, World Bank, BLS, Oxford Economics, McKinsey Global Institute analysis

A closer look at three key sectors of the South African economy – mining, retail and banking – shows how important it is that companies and sectors embrace these technology opportunities.

Consider mining, the historic bedrock of South Africa's economy. It directly contributes more than R300 billion to GDP, directly employs more than 450,000 people, and is the economic anchor of many communities around the country. But McKinsey's analysis shows that the productivity of South African mining operations for key commodities has declined over the past five years, even as mining companies in other regions have made rapid gains in productivity. Automation is a significant part of the solution: our analysis shows that South African mining companies can drive real gains in productivity within the space of a few years if they step up technology adoption, with the potential to increase margins by 15 percent in some commodities.[7] One global mining company, for example, has already adopted autonomous haul trucks – which operate an additional 1,000 hours a year, and at 15 percent lower cost than comparable conventional haul trucks. Another mining company raised productivity by as much as 30 percent by using technology to improve location awareness of its underground fleet.

7 *Putting the shine back into South African mining:* A path to competitiveness and growth, McKinsey & Company, February 2019.

In retail, South African companies face increasing margin pressure in a low-growth economic environment, along with the threat of e-commerce disruption. They also face new demands from their customers to improve their shopping experience. Again, accelerated adoption of technology will be a key strategic move that could lift retailers' margins significantly. Retailers can introduce digital technologies and automation into their operations to reduce costs and enhance customer experience. They can turn e-commerce from a threat to a growth opportunity. And they can embrace digital tools and advanced analytics that allow retail teams to work more smartly and make decisions that are more fact-based. For example, leading global retailers have harnessed data and analytics in merchandising decisions, yielding margin improvements of 2 percentage points.

In banking, South Africa's leading players are already starting to automate to improve customer experience, reduce operational costs and increase their share of the customer's wallet. If they continue and accelerate that journey, we estimate that they could reduce their cost-to-income ratios on average by at least 10 percentage points by 2030. Early adopters across retail banking in other African countries are already seeing operational performance improvements through end-to-end digitisation of customer journeys and automation of back-office processes. One bank harnessed digital channels and advanced analytics to increase the number of new loan disbursements twentyfold – and reduce loan-processing time from three days to 60 seconds.[8]

8 *Roaring to life: Growth and innovation in African retail banking*, McKinsey & Company, December 2017.

Digitisation will create more jobs, not fewer

Kuseni Dlamini,
Chairman, Massmart

It's an inescapable fact of life that technology is driving change across the world, across industries, across economies. But my view is that there will be more jobs, not fewer, as a result of digitisation. Just one example is a company called Dada, which operates as the Uber of e-commerce in China – delivering online orders within 24 hours. It employs six million people, and all those jobs are a result of the rise of e-commerce in China. In South Africa, I believe we really need to accelerate the pace with which we embrace digitisation and technological change. That will enable us to push back against our high unemployment.

We must recognise that certain jobs are going to be disrupted. So employers must manage the transition and help their employees transition from their current skills or roles to the jobs of the future. New training and career-development interventions will be needed to enable people to reposition themselves for the demands of the future. We should embrace technology as a catalyst to repurpose and reskill our people, enabling them to be better employees and better human beings.

Technology will transform industries faster than people expect

Johan van Zyl, Chairman, Sanlam

Technology is transforming industries much faster than most people expect. One example is banking. When I was a director at Absa 20 years ago, we put in simple teller machines, replacing the human teller. A lot of people bet that those machines would be white elephants, but they were wrong. I wouldn't be surprised if in three years, just about all bank teller jobs will be gone. Banks won't need all those bricks-and-mortar branches and hundreds and thousands of staff. Digital banking models will become increasingly scalable.

When you look at the institutions of this world, very few are more than 500 years old. And most of those are education institutions. They've been able to survive for so long because they didn't change – but they'll all be dead if they don't change in the next 20 years. They need to understand the fourth industrial revolution and its implications for training, and they have to face up to the changes in the world of work. We have a whole layer of students at university today who still have this outdated notion that you get trained for a single job for life. We'll have to change that notion – and fast.

Jobs lost, jobs gained: the impact of technology on employment and skills

Much of the public debate about automation in South Africa and globally tends to focus on fears that technologies such as machine learning, artificial intelligence and advanced robotics will destroy more jobs than they create. But our research suggests that, while new machines will disrupt the world of work, overall, it will create more new jobs than those it destroys. A glance at history shows that technology has created large shifts in employment, but the increased productivity it ushers in generally creates many more jobs. For example, the introduction of personal computers from the 1980s destroyed an estimated 3.5 million jobs in the USA (for instance, among typists), but created 19 million new jobs right across the economy.[9]

In South Africa, we estimate that digitisation, machine learning and automation have the potential to create 1.8 million new jobs purely as a result of improved productivity – which in turn could increase income levels, consumer spending, investment in construction and infrastructure, and spending on education and health care (Exhibit 3). An additional potential of 1.2 million new jobs could be created in as-yet-unknown occupations created thanks to technology advancement. As we discuss below, these technology-driven job gains could be complemented by 'step-up' policy decisions that bring South Africa's infrastructure development levels to global benchmarks and boost real-estate development. [10]

In total, South Africa has the potential to create up to 4.5 million new jobs across many sectors as a result of productivity improvements, strategic policy implementation and the evolution of technology. We estimate that there could be a net gain of more than 570,000 jobs in the healthcare and social-assistance sector alone, and a net gain of more than 260,000 jobs in construction (Exhibit 4).

But these gains imply significant workforce transitions in South Africa. Against the 4.5 million potential new jobs created, we estimate that these technologies could displace 3.3 million existing jobs by 2030.[11] When estimating job displacement, we looked at jobs at an activity level. Our analysis of work activities indicated that there are few job types that are 100 percent automatable.[12] For example, in data-processing roles such as payroll officers and transaction processors, 72 percent of activities are potentially automatable. Jobs in these roles will, therefore, not be completely replaced – but they might decline in number as fewer people are required to perform the same roles.

9 See *Jobs lost, jobs gained: Workforce transitions in a time of automation,* McKinsey Global Institute, December 2017. As this report points out, the impact of technology on employment is likely to differ significantly between countries.

10 For detail on our methodology for calculating these figures, please refer to the McKinsey Global Institute report, Jobs lost, jobs gained, op. cit. In brief, we examine potential labour demand created between 2016 and 2030 as a result of several trends, and compare that to the amount of work that could be displaced by automation. We capture direct and indirect jobs that could be created from rising incomes and consumption, especially in emerging economies, and a range of other drivers of labour demand such as rising spending on construction, energy, and technology. We also take into account the decline in hours worked per person, and factor in globalisation of work. For each occupation and sector, our incremental labour demand nets out automation and other productivity gains. We then compare that incremental labour demand with the reduction in labour demand due to automation against a projected 2030 baseline of employment.

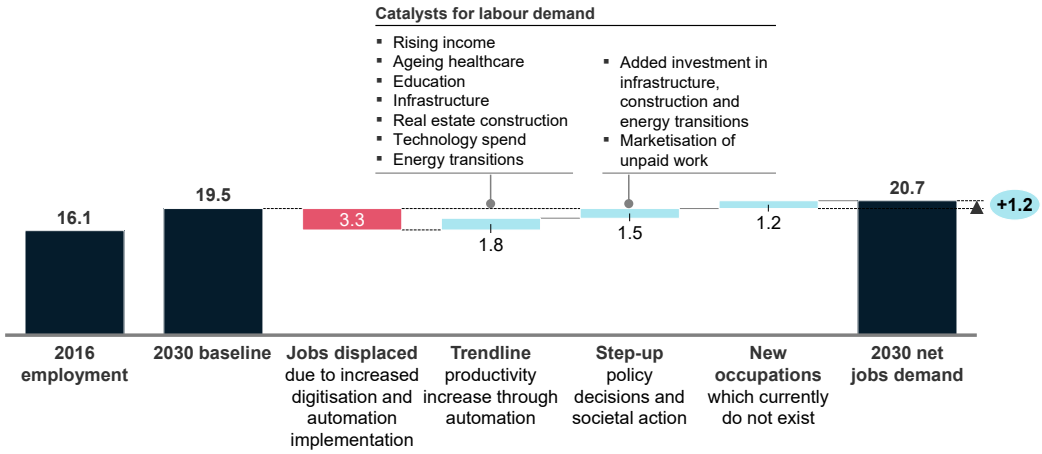
11 In the McKinsey Global Institute's midpoint automation adoption scenario.

12 Worldwide, McKinsey Global Institute analysis finds that 60 percent of occupations have at least 30 percent of constituent work activities that could be automated. *Jobs lost, jobs gained*, op. cit.

Exhibit 3

Digitisation and automation could result in a net gain of up to 1.2 million jobs by 2030

Jobs gained and jobs lost by 2030 as a result of automation, millions, mid-point scenario

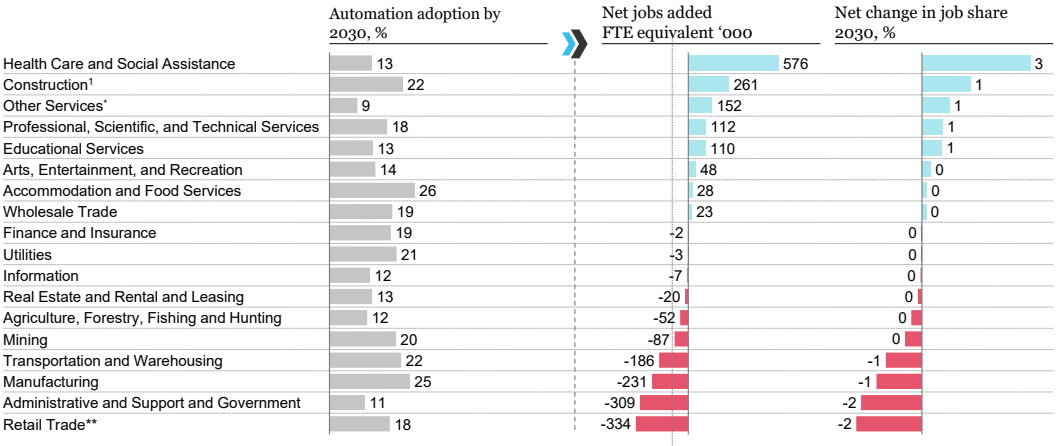


SOURCE: Stats SA, ONET, Oxford Economics, McKinsey Global Institute analysis

Exhibit 4

Digitisation is expected to create more jobs than it displaces, but in different industries

Step-up labour demand and mid-point adoption scenario, 2030



* Includes private households with employed persons, and exterritorial organisation
** Includes Sale, maintenance, repair of motor vehicles/cycles and sale of auto fuel
1 Construction boost in step-up scenario assumes country has increased its infrastructure and structures' stock to the global benchmark level. This increase in spending, along with a general high job multiplier in the sector, leads to higher jobs creation
2 Study has shown that on average, 0.5 percent of the workforce has been working in "new jobs' every year (Lin, Jeffrey, "Technological adaptation, cities, and new work," The Review of Economics and Statistics, issue 93,May 2011)

SOURCE: Stats SA, McKinsey Global Institute analysis: MGI Automation Model March 2019, Jobs Lost Jobs Gained December 2017

The potential for technology-driven gains in employment – both the number and the quality of jobs – is substantial. But in sectors such as manufacturing and retail, the jobs lost are likely to outnumber the jobs gained. In a worst-case scenario, those job losses would come on top of about 900,000 jobs lost through unemployment 'momentum' – in other words, the continued increase in unemployment if current trends in population growth and employment levels continue.

We should also emphasise that the new, technology-enabled jobs will require higher skills levels than most of the jobs displaced. As a result, while automation will cause the demand for employees without matric to fall substantially, it will increase the demand for graduates (Exhibit 5). We estimate that there

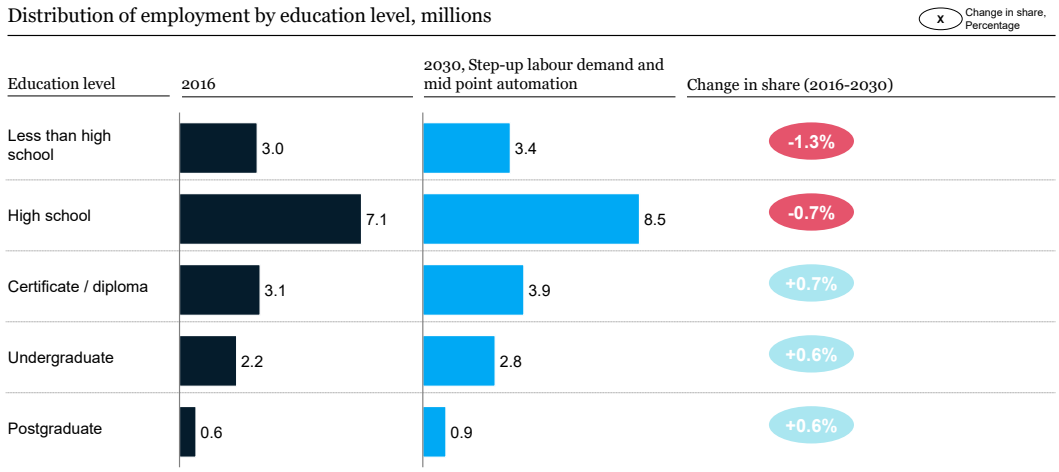
will be a demand for an additional 1.7 million employees with higher education by 2030. Unless South Africa's graduate conversion rate improves, much of that demand will go unmet – resulting in a serious skills shortfall across the economy.

These numbers pose big challenges for South African decision-makers. If workforce displacement from automation is not managed effectively, and the graduate conversion rate is not improved, the result could be a significant increase in overall unemployment.[13] That in turn would reduce South Africa's tax revenues and increase spending on social support. South African businesses would be hurt by both a slowdown in consumer demand and a shortage of critical skills.

The implication is clear. South African decision-makers across sectors need to take bold steps to ensure that there is sufficient reskilling to help reabsorb workers into the workforce. They also need to strengthen the education system to generate the new technology-related and life skills needed at sufficient scale. Only with these actions will South Africa successfully manage the massive workforce transition ahead. Indeed, these steps are essential if the country is to seize the potential of technology to unlock inclusive growth, improve lives and reduce the country's unacceptably high unemployment levels.

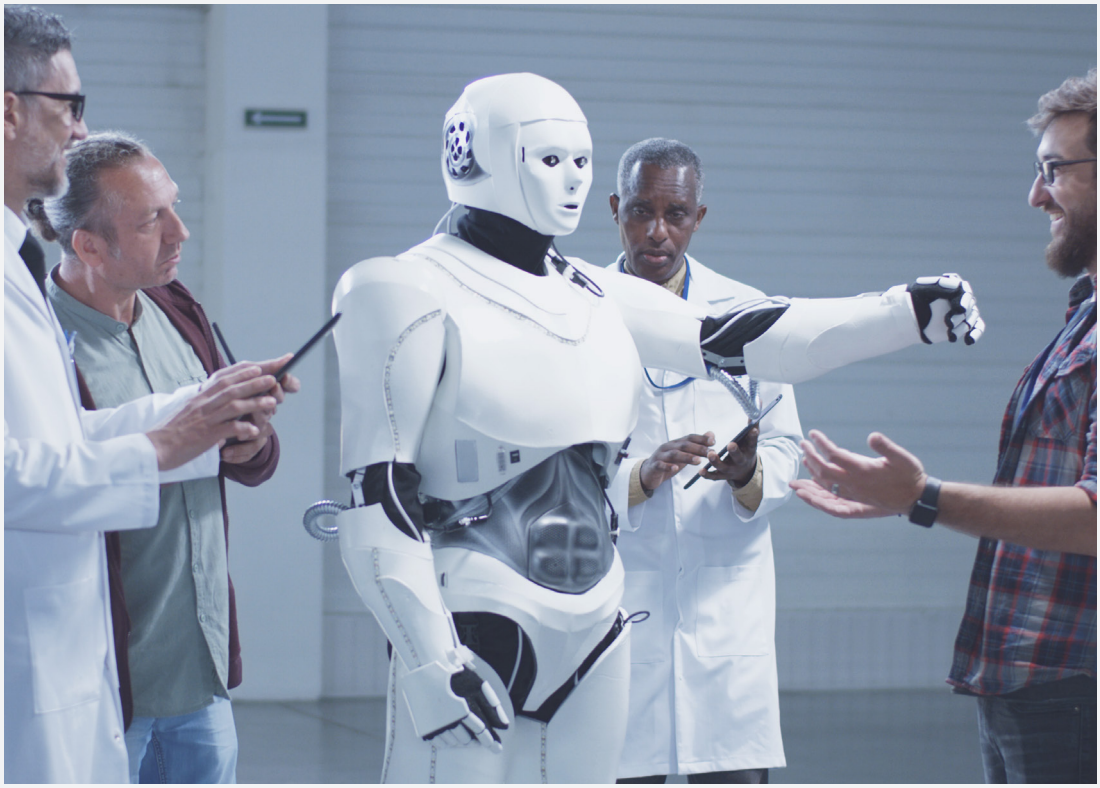
Exhibit 5

An increasing percentage of jobs is expected to require diploma and higher educational levels, with a decline in opportunities for those with high school education or less



SOURCE: ONET skill classification, MGI Automation Model March 2019, Jobs Lost Jobs Gained December 2017; McKinsey Global Institute analysis, Australia's automation opportunity March 2019 , Statistics on Post-School education and training in South Africa: 2016

13 The graduate conversion rate refers to the percentage of Grade 1 learners who end up qualifying from tertiary institutions. Currently, only 35 percent of Grade 1 learners complete matric and qualify for tertiary education – but two-thirds of tertiary students drop out before completing their qualifications. As a result, South Africa's conversion rate from Grade 1 to tertiary graduates stands at only 11 percent.



People and robots can have a complementary relationship

Professor Tawana Kupe, Vice-Chancellor, University of Pretoria

I don't believe that robots are just going to eat up people's jobs. Instead, there can be a complementary relationship. Technology can free people from routine, repetitive work and enable them to take on higher-level work, decision-making and critical thinking. In our library, for example, we've introduced a new employee called Libby – and she's a robot. Libby assists staff, students and researchers by answering repetitive questions and helping them find resources. And she eases the workload for our staff, enabling them to focus on higher-order work.

The pace and the progress of technological change is remarkable. It is transforming not only the way we work, but also the way we communicate, the way we enjoy ourselves, and even the way in which we exercise. But I'm concerned that in South Africa we are not yet producing technologies ourselves – we're largely importing them. We need to unlock the ingenuity that arises when we try to solve problems in our own context. One example is solar power. How could we innovate in that space and create technologies that are more affordable and resilient? How could we harness the African sun to bring solar power to villages across the continent?

Digitisation could trigger a breakthrough in women's empowerment

Women could take on a big share of the new jobs created through digitisation. McKinsey's analysis estimates that technology adoption could increase the percentage of women in South Africa's workforce to 45 percent by 2030 – nearly two percentage points higher than today – and create 1.6 million new jobs for women.[14] In part this is because factors traditionally considered physical barriers to women's participation will be removed; on the factory floor and in mining, for example, people will work alongside robots. In addition, the new jobs created will involve greater application of expertise and management and development of people, while repetitive manual tasks are more likely to be automated.

However, this positive outcome could be challenging for many women to secure. According to the McKinsey Global Institute report, *The future of women at work: Transitions in the age of automation,* to navigate these labour-market transitions successfully, women will need different skills and more education, mobility to switch jobs easily, and access to technological capabilities that will not only be in demand, but can also open up new ways of working and new sources of economic opportunity. Women face persistent challenges on these three dimensions that will be needed to thrive in the automation era; these long-established structural and societal challenges have already slowed women's progress toward gender equality in work. According to the report, the good news is that the forces of technology and innovation that characterise the automation age can also pave the way for more gender equality in the workforce. Digital and internet technologies offer women a way to break down barriers by making reskilling more accessible and enabling flexible working, for instance. Moreover, private- and public-sector leaders have a huge opportunity to support women as they navigate impending transitions.

Phumzile Mlambo-Ngcuka, Executive Director, UN Women

The fourth industrial revolution represents a big opportunity to drive a breakthrough in women's empowerment. In the previous industrial revolutions, gender equality was not on the table. But we need to move away from just discussing the problems and come up with solutions. We need to bring together hardcore 'techies' with people in the social sciences to unleash innovation that strengthens gender equality and advances the needs of society. When new algorithms are developed, we need feminists in the room who can see what needs to be done right from the start.

As we prepare for the future of work, the foundation must be to ensure universal access to quality public education. Right now we have too many young people who do not get that foundation, and we lose the rich pipeline from whom to build the future. Also, the introduction of digital skills at an early age has become quite urgent. If we delay introducing digital skills in the learning and teaching environment, young people will be left behind. Africa is a young continent with great potential for a demographic dividend – but that dividend will only become reality if we nurture it.

14 These figures assume that today's occupational gender ratios persist.

Embracing technology for growth and jobs – action needed now

As technology changes the world of work in South Africa, leaders in both the public and private sectors need to take action and adapt. Individual South Africans, too, need to think differently about their future careers.

A national plan of action

With foresight and a commitment to act, South Africa can capture the opportunity offered by technology, manage the risks and ensure that the gains are broadly shared. We suggest four core priorities for a bold national plan of action that is co-owned by government, business, labour and educational leaders.

First, South Africa can shape a smart approach to **embrace digitisation** for the benefit of all citizens. The plan can help define the country's digital agenda, including prioritising industries where South Africa has or can develop a competitive edge in technology-driven solutions, such as mining and manufacturing. The national plan of action can also scope and size the risks that digital automation poses to jobs and the economy; as we discuss below, it can also help develop the necessary mitigation plans.

Second, South Africa can take decisive steps to **invest in human capital**. The plan we suggest could help rethink the country's education and learning ecosystem to foster broad participation in the work opportunities of the future. It can create transparency on the skills that the economy will need in future, and help educational institutions plan to meet that need. It can trigger a review of South Africa's basic education system, to strengthen the focus on teaching quality, literacy, and STEM subjects - science, technology, engineering, and mathematics. It can promote a stronger technical and vocational education and training (TVET) system to ramp up the development of technical skills. And it can help drive improvement in the graduate conversion rate of South Africa's education system.

Just as important in strengthening South Africa's human capital, the plan can help guide both public- and private-sector organisations to create 'retraining engines' to enable lifelong learning. That will entail several fundamental shifts in the country's current approach to education and training. For example, we might need to shift from a focus on once-off degrees to discrete certifications in specific skills. We might develop a new taxonomy of certified skills to enable workers to 'brand' themselves for specific capabilities. And, to help training providers rise to the challenge of large-scale reskilling, the plan could define a clear accreditation framework and recommend new quality-assurance processes that focus on application of skills rather than theoretical understanding.

Third, the plan can set out a national strategy to **mitigate the jobs impact of automation**. That would include identifying jobs that will not be portable, and identifying ways to reintegrate displaced workers into the workforce. For example, South Africa can increase investment in SMEs to boost employment opportunities. That can include providing focused support to SMEs that are producing products for export or import substitution in sectors such as advanced manufacturing and agro-processing, and which have prospects for rapid growth. South Africa can also develop support for individuals moving from formal employment into the 'gig' economy. Last but not least, the plan can propose ways to rebalance social-support funds and mechanisms to support displaced workers who cannot be reintegrated into the workforce.

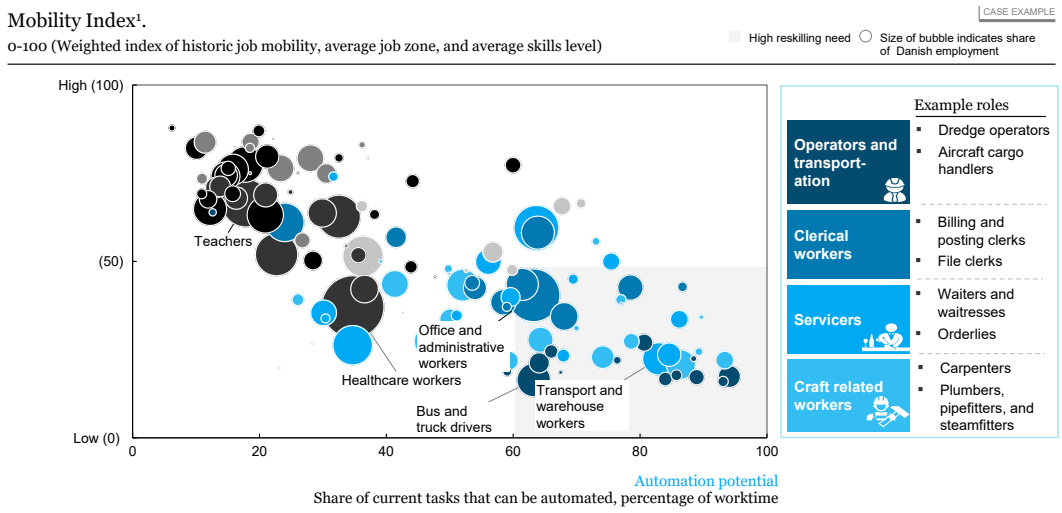
Fourth, the plan can help **foster a step-up scenario**, where job creation increases over and above a trendline scenario as a result of societal and policy choices enabled by increased productivity and economic growth. For example, infrastructure systems have not kept up with demand and housing shortages persist in many countries – including South Africa. Closing this infrastructure and housing-need gap will need increased levels of investment in the South African economy and could be a major source of labour demand in years to come. A further opportunity is embracing the transition to clean energy, including increasing the share of renewables and making buildings, transportation, and

technologies more energy-efficient. The plan can also encourage the 'marketisation' of unpaid work done in households – from childcare to cooking and cleaning – which is disproportionately performed by women.[15]

In helping shape such a national plan of action, South African leaders can draw on the work undertaken in other countries. For example, Denmark created a Disruption Council to facilitate the transition to the future of work; the Council was made up of experts from government, business, trade unions, academia and youth organisations. It conducted an exhaustive analysis of the occupations most at risk of displacement and with low mobility, which were therefore at risk of long-term unemployment and in need of deeper interventions for reskilling (Exhibit 6). The Council's recommendations included specific plans for upskilling affected segments of the workforce, and adjusting the unemployment benefits system. It also proposed boosting the economic potential of 'platform' ecosystems, including recognising work for platform companies such as Uber as employment for the purposes of social benefits.

Exhibit 6

Denmark identified the occupations most at risk of displacement and with low mobility, therefore at risk of long term unemployment and in need for deeper re-skilling



1 Job mobility refers to share of workers changing jobs between two years; average job zone refers to the length of education and/or experience requirement in the occupation group, and average skill levels is an average of Digital and Basic Skills from OECD's PIAAC database

SOURCE: Statistics Denmark, OECD, Danish Ministry of Employment, McKinsey analysis

15 By 'marketisation' we mean the potential to pay for services that substitute for currently unpaid and primarily domestic work. This trend is already prevalent in advanced economies, and rising female workforce participation in South Africa and other developing economies could accelerate the trend globally.

In the future, learning will be agile, flexible and continuous

Fred Swaniker, Co-founder, African Leadership Group

Today we live in an era of ubiquitous information – and this is drastically changing how companies and their workforces learn. Companies can now draw from a universe of online learning resources and develop their own, customised programs for their staff. And their staff can personalise their learning, work in peer groups and study the specialist content they need. So we're moving from highly structured, finite learning models to decentralised, agile, flexible, continuous learning and thinking models. Those models will put the learner at the centre and empower them to curate their own learning resources and keep learning just in time as they need it, as the world evolves.

Only 10 percent of a person's skills are typically developed in the classroom; 20 percent comes from developmental relationships with mentors and your peers, and 70 percent comes from experience. You learn best when doing! Yet most education institutions today are focused on the 10 percent in the classroom. What's required, I think, is a new type of institute that is designed specifically for skills.

Action for businesses

Alongside this national plan of action, individual companies can and should move ahead with plans to shape the future of work in their own organisations. Based on our work with such companies across South Africa and the world, we suggest three key areas of focus.

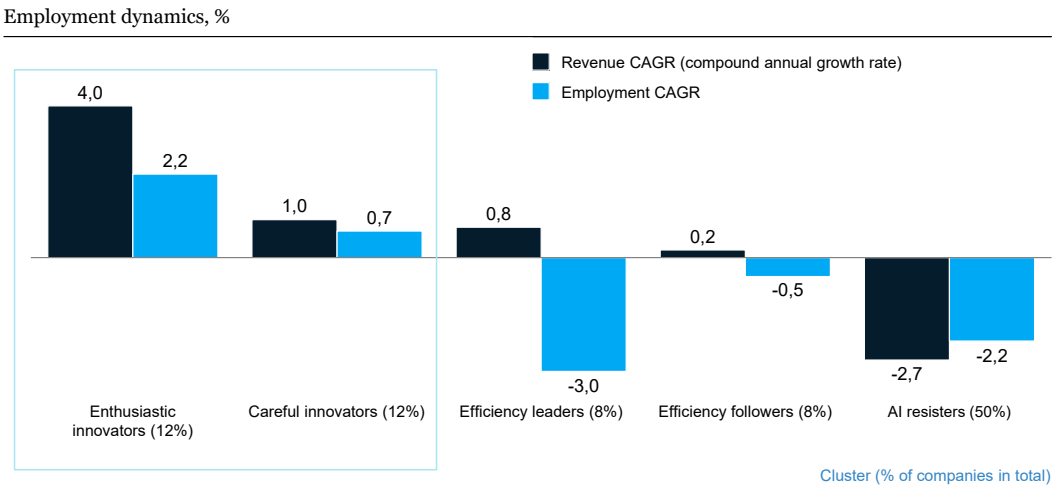
First, **future strategy.** Many companies need to rethink their business strategies fundamentally, given the technology-driven transformation under way in their industries and markets. Companies have the opportunity to use new technologies not just to cut costs but to grow their businesses – and jobs – by innovating their products, services and business models. Analysis of companies worldwide shows clearly that those who enthusiastically embrace technology to drive innovation generate much greater revenue and employment growth than firms that simply use technology to improve efficiency (Exhibit 7).

Second, **future skills**. Most firms need to upgrade their strategic workforce planning to become much more data-backed and business-led. They will also need to reskill and upskill existing employees at scale; most companies simply cannot hire or contract in the quantity of new skills they require. Reskilling is no simple matter: to get it right, companies must harness the latest adult-learning science, rigorously track return on investment, and build employee buy-in for the change. In their workforce planning, companies need to take a long-term view on how technology will impact on their workforces over the next five years and beyond – and they need to adopt smart approaches to reskilling in the next two to three years, before job changes occur.

Third, **future ways of working.** To 'future proof' their investments in reskilling and hiring, and maximise the productivity of their workforces, companies will need to adapt to evolving employee expectations and ways of working. Those include greater focus on meaningful work, flexibility and autonomy, continuous growth and connection. To make the shift needed, companies can build greater agility into their organisations and use people analytics to understand what drives employee engagement.

Exhibit 7

Companies that use technology to grow create higher revenues and more jobs



SOURCE: MIT Sloan Review

The shifts required are far-reaching, but companies don't need to implement them all at once. Consider the example of a major consumer-goods company. Its executives understood that they needed to rethink the company's workforce skills and ways of working to take advantage of new technologies and deliver operational improvements. The company kicked off its future-of-work initiative by assessing a group of key advanced-analytics roles – and found it would need to improve its job culture, management style and work-life balance to attract and retain talent for these roles. That prompted executives to rethink the employee valuation proposition, and pilot a set of new approaches to engage analytics talent. Based on the lessons from that pilot, they built a detailed plan to replicate and scale the future-of-work approach to the next group of 3,000 employees, and then to the whole company. South African companies in any sector can adopt similar approaches – and there is no time to be wasted in getting started.

Action for individual South Africans

South Africans like Amanda, Bulelwa and Chris – the characters we introduced at the beginning of this paper – are eager to learn, embrace technology, and build better lives for themselves, their families and communities. Companies that get smart about tapping into this future-focused energy stand to accelerate productivity and innovation, grow their businesses, build new-generation jobs at scale, and contribute to realising South Africa's true economic potential. But what are the actions that individual South Africans can take today to prepare for the future of work – and shape the skills needed to build successful careers in a world of accelerating technology adoption?

We suggest three key steps for individual workers, work-seekers and students.

First, **embrace lifelong learning** and be ready to reskill yourself constantly. Plan your career for the sectors that are poised for future growth, and the roles that will see demand grow. Also, consider that some jobs that will be in demand ten years from now may not even exist today. So you'll need to be able to learn rapidly and adapt to new jobs. One way you can do that is by tapping into the myriad of digital training opportunities available.

Second, **develop skills that drive outcomes and engagement.** Not only will you need to build technical skills, you'll also need hone behavioural capabilities and mindsets such as people leadership, problem-solving and communication.

Third, **be an entrepreneur.** That might mean starting or expanding your own business – harnessing technology to capture new growth opportunities to provide goods and services to customers in South Africa, the rest of Africa, or the world at large. Or it might mean adopting an entrepreneurial approach to your career in larger organisations – being ready to take the initiative, foster innovation, and move roles or companies when the time is right. Fewer and fewer South Africans will find themselves in static roles or jobs for life.

•••

The advance of technology will bring far-reaching change to the way South Africans work. That change could be disruptive, but more than anything it represents an historic opportunity to rekindle productivity, growth, and job creation. If leaders in the public, private and education sectors work together in bold and imaginative ways, they can harness digitisation to catalyse a skills revolution in South Africa – and create millions of a new, high-quality jobs. And if individual South Africans renew their own skills and adapt to the future of work, they can unlock new opportunities to build meaningful, rewarding careers.

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Nomfanelo Magwentshu and **Agesan Rajagopaul** are partners in McKinsey & Company's Johannesburg Office, **Michael Chui** is a partner at the McKinsey Global Institute in San Francisco, and **Alok Singh** is a senior research analyst in the Gurgaon office. This paper benefitted from the insights of several leaders across South Africa and beyond, to whom the authors are extremely grateful. They include Kuseni Dlamini, Chairman, Massmart; Professor Tawana Kupe, Vice-Chancellor, University of Pretoria; Phumzile Mlambo-Ngcuka, Executive Director, UN Women; Fred Swaniker, co-founder, African Leadership Group; and Johan van Zyl, Chairman, Sanlam. The authors are also grateful for contributions and assistance from colleagues at the McKinsey Global Institute, including Gurneet Singh Dandona. Last but not least, the authors thank colleagues in McKinsey's Johannesburg office who contributed to the paper, including Dolly Makhwaza, Oratilwe Komati, Jarryd Thomas (alumnus), Ignus Rocher, Ismail Alli and Zandile Hlatywayo.

About the research:

This paper is part of a global research initiative by McKinsey on the future of work, focusing on how governments, businesses and members of the workforce can take action and adapt as digital technologies change the world of work.

The paper draws on the methodology and findings of the McKinsey Global Institute reports *A Future that Works: Automation, Employment and Productivity* (January 2017) and J*obs Lost, Jobs Gained: Workforce Transitions in a Time of Automation* (December 2017). A full methodology of that work is detailed in the reports' technical appendices.

In brief, our methodology rests on two central elements:

1. **Expected jobs displacement:** To analyse a range of potential scenarios for the pace at which automation could affect activities and employment, we constructed a model that synthesises the effects of technical feasibility, development and deployment of solutions, labour market dynamics, economic benefits, and regulatory and social acceptance into four timing stages. We estimate when automation technologies will reach each level of performance across 18 capabilities, the time required to integrate these capabilities into solutions tailored for specific activities, when economic feasibility makes automation attractive, and the time required for adoption and deployment. We use these findings to size the number of jobs that could be automated by 2030. We assume that each hour of work that could be automated will result in proportional job loss.
2. **Labour demand drivers:** Our work examines the labour demand created by seven catalysts. We selected these seven catalysts from a shortlist of 20, after conducting high-level sizing calculations to estimate their potential to create labour demand by 2030. The seven catalysts are: rising incomes, healthcare and ageing, development and deployment of new technology, infrastructure investment, residential and commercial buildings, energy transitions and efficiency, and marketisation of currently unpaid work. Detailed descriptions of these catalysts and the calculation approach can be found in the technical appendix of Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation. We capture direct and indirect jobs that could be created from each catalyst, take into account the decline in hours worked per person, and factor in globalisation of work. Our model offers a static view of the potential labour demand that could be created from the seven drivers and does not factor in supply-demand dynamics and feedback from factors such as changes in wage levels.

Our analysis draws on McKinsey's Global Growth Model, as well as a wide range of occupational and macroeconomic data sources. These include O*net, Statistics South Africa, BLS, Oxford Economics, the World Bank, United Nations World Population Prospects, among others.

In addition to the two McKinsey Global Institute reports cited above, this paper draws on an extensive library of related McKinsey research reports, several of which are profiled on the following page.

Related McKinsey research

1. **The Future of Work in America: People and Places, Today and Tomorrow (July 2019)**

   The health of local economies today will affect their ability to adapt and thrive in the automation age. Local business leaders, policy makers, and educators will need to work together to chart a new course.

2. **The Future of Women at Work: Transitions in the Age of Automation (June 2019)**

   Concerted and creative solutions are needed to enable women to seize new opportunities in the automation age; without them, women may fall further behind in the world of work.

3. **Tech for Good: Smoothing Disruption, Improving Well-being (May 2019)**

   How can technology adoption strengthen innovation, lift GDP growth, and improve welfare? What are the implications of this change for governments, society and business leaders?

4. **Navigating a World of Disruption (January 2019)**

   The disruptions wrought by globalisation and digital technologies may seem daunting. Yet the opportunities that they generate are equally compelling and are already creating new prosperity for those quick to harness them.

5. **AI Adoption Advances, but Foundational Barriers Remain (November 2018)**

   The adoption of artificial intelligence (AI) is rapidly taking hold across global business. How and where can organisations deploy AI to generate value – and how will these changes affect the workforce?

6. **Skill Shift: Automation and the Future of the Workforce (May 2018)**

   Demand for technological, social and emotional and higher cognitive skills will rise by 2030. How will workers and organisations adapt?

7. **AI, Automation, and the Future of Work: Ten things to Solve For (June 2018)**

   There can be work for everyone, even in a future with automation. Yet tomorrow's work will be different from today's, requiring new skills and a far greater adaptability in the workforce.

8. **Jobs lost, jobs gained: What the future of work will mean for jobs, skills, and wages (November 2017)**

   In an era marked by rapid advances in automation and artificial intelligence, this research assesses the jobs lost and jobs gained under different scenarios to 2030.

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