

“The role of the Fourth Industrial Revolution in advancing Gauteng’s Transformation and Sustainable Development Agenda”: Keynote Address by Premier David Makhura at the 11th International Conference of Technological Higher Education Network South Africa (THENSA), Johannesburg.

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Professor Tinyiko Maluleke, Vice Chancellor of Tshwane University of Technology, our host for this 11th International Conference;

The Chairperson of Council and Chancellor of TUT in absentia;

The Chair of the Board and the leadership of THENSA;

Vice Chancellors and Deputy Vice Chancellors of member universities;

Distinguished academics, CEOs of SETAs and government entities;

Business leaders and Industry representatives;

Student leaders and representatives of trade unions;

Ladies and Gentlemen:

Please allow me to first express my deep gratitude for the opportunity to address the 11th International Conference of the Technological Higher Education Network South Africa (THENSA).

It is such an honour to address a gathering of thought leaders who are at the cutting edge of the development and deployment of Science, Engineering, Technology and Arts innovations for the world-of-work and overall socio-economic development.

Undoubtedly, universities and technology institutes have played a catalytic role in helping countries to transition and transform from underdevelopment and poverty to sustainable development and relative prosperity. This matter will receive my attention as an integral part of this speech.

I understood the invitation from Professor Maluleke as an instruction to share my thoughts about the following: “The role and place of the Fourth Industrial Revolution (4IR) in advancing Gauteng’s Transformation and Sustainable Development Agenda”.

In this speech, I will endeavour to answer the question: What is the role and place of the 4IR in the transformation and sustainable development of Gauteng Province?

In so doing, I will put forward four propositions that underpin Gauteng's approach and work on the vexed question of the 4IR – its promise, prospects, and potential perils.

The **FIRST PROPOSITION** to put forward is that the rapid technological change or the digital revolution is not the only dominant mega trend facing humanity in the 21st century. There are other dominant mega trends and existential threats to human progress and peaceful co-existence of the diverse peoples of the world who share a common humanity and solidarity. The 4IR intersects with, influences and is influenced by such mega trends and other social, cultural, and political processes that drive transitions and transformations that will profoundly reshape the future of humanity.

In this regard, I will briefly outline other mega trends that have a potential to drive the kind of tectonic shifts, evolutionary transformations and transitions which have a profound impact on the future of humanity, human progress, and human civilisations.

It is my contention that the public discourse on the 4IR should be located within the context of other mega trends and driving forces of major transitions and transformation that deserve equal attention from policymakers, industry leaders, the academia, and the media. What are the other mega trends that warrant serious attention?

- **The escalating intensity of the climate crisis:** Climate change is not fake news. It is a real and urgent problem that poses a serious existential threat to human existence in the 21st century. Environmental justice and protecting our planet is a serious matter that requires global and local leadership. Climate disasters are becoming more frequent due to the impact of greenhouse gas emissions and poorer countries have no infrastructural and institutional capacity to mitigate climate disasters. We need a major 'civilisational shift' in lifestyle to save our planet and make it habitable and sustainable for future generations. We need to deploy scientific knowledge and direct new technological innovations to solve this existential problem urgently. Universities have a critical role to play in this human endeavour.

- **The threat of epidemics and pandemics:** In the past few decades of the 21st century, developed countries began to think that the outbreak of life-threatening diseases is a problem confined to the developing and poor countries. We know from history that pandemics can fundamentally alter the way we live our lives. COVID-19 reminded us that pandemics remain a serious threat that can shut down the entire world economy and cause severe damage and disruptions to people's lives and livelihoods, in both the rich and poor countries. Scientists are predicting that climate-induced pandemics may become more frequent, and they advise that public health systems, communities, institutions, and infrastructure need to be pandemic-proof and pandemic-ready. South African universities have earned their place as world-class institutions with cutting-edge research capabilities to contribute to the global common good in the fight against the COVID-19 pandemic.
- **Perennial conflicts and wars:** State sponsored conflicts and war remain a many in developing countries, and regions in the Global South are the playground of conflicts and wars that are generated and sponsored by imperialist countries in the Global North. While wars and conflicts cause enormous damage to people's lives, livelihoods, and infrastructure, manufacturing such conflicts and wars has become part of the mechanics through which some imperialist countries assert their geo-political and the global economic dominance and even test their new 4IR weapons and bolster their military industrial complexes. Some start wars and conflicts to make profits, like those who may want to profit from pandemics and the climate crisis. Wars and violent conflicts cause incalculable damage to people's lives and livelihoods and further undermines human progress and peaceful co-existence. It is better to maintain the principled stance that all conflicts should be resolved through peaceful negotiations and reject the notion that "you are either with us or you are against us".
- **The rapid rate of urbanisation that the future is urban:** United Nations Population Fund asserts that "the world is undergoing the largest wave of urban growth in history". It is estimated that by 2050, two-thirds of the world's population will be living in cities and towns. Most of the urbanisation will come from Africa and

the Global South. Whereas urbanisation and urban ecosystems was synonymous with prosperity and a better life through access to better infrastructure and better incomes, the new wave of urbanisation is synonymous with growing informality, inequalities, urban poverty, crime, and grime. Although cities have become drivers of the global, regional, and national economies, most cities in the Global South cannot cope with the pressures of rapid urbanisation from an infrastructure and economic opportunities point of view. New smart and green solutions are required and there is no doubt that our universities of technology are best placed to lead the quest for a more inclusive, just, equitable and sustainable urbanism.

- **Unprecedented levels of socioeconomic inequalities:** Writing about threat or opportunities of globalisation, the International Monetary Fund (IMF) argues that by the end of the 20th century, the world had experienced unparalleled economic growth, with global per capita GDP increasing almost five-fold (IMF, 2002). The IMF also acknowledges that this remarkable growth has been characterised by unprecedented levels of inequality between the rich and poor countries and between the rich and poor within countries and regions. Thomas Piketty, the author of *Capital in the Twenty-First Century* (the best-seller economic magnum opus dedicated to the study of inequality), has placed the question of inequality of income and wealth at the centre of public policy debates and inter-disciplinary as well as transdisciplinary academic discourse. From our own experience, we know that despite all efforts and policy interventions of the post-apartheid government, levels of inequality have increased in South Africa. When we deal with critical debates on matters such as the 4IR, climate change, war and conflicts, rapid urbanisation, and the COVID-19 pandemic, we cannot shy away from the stark reality that inequality intersects, permeates, and accentuates the challenges that humanity faces in each of these areas. Highly unequal societies are unstable and unsustainable as they always gravitate towards violent and conflict-ridden polity.

To sum up the first proposition: we must resist the temptation to think of the 4IR as the be-all and end-all, and it is always better to locate the 4IR in the broader context of other social trends and struggles that human species face in the constant evolution, continuous quest for progress and sustainable development.

The **SECOND PROPOSITION** is that the 4IR is not inherently an empowering, emancipatory, and inclusive revolution. We must avoid an over-simplification that presents the 4IR as an inimitable and inherent force for good and a panacea for social and economic problems faced by humanity. It is not given that the 4IR will achieve sustainable development or inclusive growth. A political economy perspective appreciates that industrial revolutions and technological transformations are more complex processes whose outcomes and impacts are subject to contestation by various social forces who seek to maximise the benefits of such processes. These processes can produce winners and losers as well as beneficiaries and victims.

In this regard, the 4IR is not only about technology. It has vast socio-cultural, economic, and political consequences and must therefore be shaped by conscious public policy choices.

Addressing the World Economic Forum in 2016, Klaus Schwab boldly asserted:

“We stand on the brink of a technological revolution that will fundamentally alter the way we live, work and relate to one another. In its scale, scope and complexity, the transformation will be unlike anything humankind has experienced before. We do not yet know just how it will unfold, but one thing is clear: the response to it must be integrated and comprehensive, involving all stakeholders of the global polity, from the public and private sectors to academia and civil society...The Fourth is building on the Third and is characterised by the fusion of technologies that is blurring the physical, digital and biological spheres...its velocity, scope and systems impact has no historical precedent”.

Schwab, the man who coined the term “fourth industrial revolution” acknowledges the paradoxical nature of the 4IR as an era of “great promise and great peril”.

The potential opportunities and prospects offered by the 4IR as the “fusion, convergence or confluence of multiple technologies that blur the physical, digital and biological spheres or systems” exist side-by-side with the dangers that must be navigated. Whether the 4IR will contribute to sustainable development and inclusive growth is contingent upon the type of developmental state interventions or public policy

measures that promote inclusion and empowerment, rather than inequality, exclusion, and elitism.

Uzair Younus, an analyst at Albright Stonebridge Group, underscores the necessity for conscious intervention to prepare society and enable mass participation:

“If developing economies are to grow, they must implement policies that equip people with the skills required to operate and develop new technologies. Basic reading and writing skills will not be enough; the workforce of the fourth industrial revolution must know how to write and read computer codes and work in conjunction with sophisticated hardware and software. The fourth industrial revolution is like a bullet train coming and it is up to policy makers to prepare and enable the masses to either get on board or risk being a casualty in its path.”

Prof Tshilidzi Marwala, Vice Chancellor of the University of Johannesburg and Deputy Chairperson of South Africa’s Presidential Commission on the 4IR, has written extensively about the implications of the 4IR for Africa and South Africa:

“The Fourth Industrial Revolution has already begun. This revolution is not based on a single technology, but rather on a confluence of multiple technologies like Artificial Intelligence, Internet of Things, Machine Learning, Big Data, 3D Printing, Cloud Computing, Virtual and Augmented Reality, etc. There is a growing sense of urgency to grapple with the far-reaching impacts of the 4IR and to prepare ourselves for the future”.

Marwala calls for strategic leadership and urgency on the part of the developing countries, in order to prepare for and anticipate the future, taking full advantage of the opportunities offered and mitigating the dangers posed by new digital technologies.

Professor Robert Shiller, the Economics Nobel Laureate, sounds a warning about the danger of massive dislocations which must be prepared for, pre-empted and prevented by investing in infrastructure and upskilling the population so that no one is left behind or left out:

“You cannot wait until a house burns down to buy fire insurance on it. We cannot wait until there are massive dislocations in our society to prepare for the Fourth Industrial Revolution.”

The essential task of preparing society for the future requires major public and private sector collaboration and partnerships so that there are no losers and victims in the digital revolution. These partnerships should focus on digital inclusion and citizen empowerment programmes such as rolling out digital infrastructure to the urban poor and rural areas, massive upskilling of the current workforce and youth in general, introducing public e-services and data affordability.

Without proactive public policy to address the already existing digital divide, the 4IR will increase digital inequalities and accentuate the exclusion of the rural masses and urban poor whose precarious existence could escape the promise of a better life offered ostensibly by both the fourth industrial revolution and urbanisation.

To sum the second proposition: the 4IR is not inherently good and empowering. It can increase inequality by excluding billions of people in the developing world and millions of workers. To ensure that the 4IR lives up to its promise and mitigate the perils inherent in it, developmental and entrepreneurial states need to drive investment agenda in digital ecosystems that will empower citizens to join and participate in the digital world - infrastructure, R&D institutions, upskilling, entrepreneurship, digital government, and e-public services.

The **THIRD PROPOSITION** is that, in the context where South Africa is, Gauteng is taking the lead in preparing for the 4IR. Our province has been bold and imaginative in positioning itself as the hub of the digital revolution and the digital economy.

President Cyril Ramaphosa fully understands the economic significance of the digital revolution and its broader implications. He established the 4IR Commission in 2018 to help position our country to take full advantage of the promise of the 4IR and navigate the perils that could accentuate historical challenges of unemployment and poverty as well as the spectre of racial and gender inequalities.

The world is changing rapidly and unpredictably. Any public policy hesitancy and delays in decision-making can be very costly. The World Economic Forum estimates that 65% of children entering primary school will find themselves in occupations that today do not exist. We in South Africa are fast moving to a future in which 41% of current jobs will be rendered obsolete by automation. In a not-so-distant future, 35% of skills that are considered important in today's workforce would have changed beyond recognition.

South Africa cannot be left behind. In fact, there is evidence that the South African economy is transitioning to knowledge intensive industries, although not at a fast-enough pace. For instance, the average ICT intensity of jobs in South Africa has increased by 20% over the past decade.

Gauteng province has always aspired to be a smart, innovation-driven and knowledge-based province that deploys scientific knowledge and new technologies for service delivery, socio-economic transformation and sustainable development.

In 2014, the Gauteng Provincial Government became the first government in the Republic of South Africa to set up a separate Department of e-Government, whose main mandate is to rollout digital infrastructure and digital platforms for the delivery of public services.

The provincial government has also established the 4IR Advisory Panel of experts who are driving the implementation of the digital economy strategy which focuses on building partnerships on the rollout of digital infrastructure, development of digital skills, promotion of digital entrepreneurship and digital government.

In line with our vision to be a leading economy in the continent on innovation, R&D and technology, key sectors of the Gauteng economy are increasingly becoming digital, and knowledge based.

Since 2017, most Foreign Direct Investment projects have been tilting towards technology, innovation-driven and knowledge-intensive sectors. Software and ICT

services firms attracted the most FDI, benefitting 104 firms involved in 110 projects. This is followed by 57 communication firms involved in 64 projects.

This province's ambition is to become a 100% digital government and drive an industrial and economic strategy that promotes innovation and knowledge as the key drivers of growth in our ten priority sectors of the Gauteng economy.

We have been shifting government services to online and digital platforms so that citizens and residents can access public services at the convenience of their homes and offices. Currently, more Gauteng residents can access over 100 public services on digital platforms without having to walk to a government office where they may come face to face with a public servant. We have invested hugely in rolling out ICT in schools.

Of course, the introduction of some of these changes are met with resistance. For instance, there has been some resistance to online school applications and bookings for driver's licenses. Some of the resistance is born out of the fact that technology takes a while to deliver on the expectations. It is also not easy to adapt to new ways of doing things. Some of the resistance is born out of the fact that technology improves governance and corrupt elements would not want to embrace it.

To deal with the matter of broadening access, the Gauteng Provincial Government has invested hugely in the rollout of broadband to the townships and rural areas of the Gauteng City Region. We will co-invest with other partners in implementing broadband network extension, targeting townships and rural areas, whilst creating demand for and facilitating technology adoption to bridge the digital divide and digital inequalities.

In the past six years, the Department of e-Government has upgraded 6 core network nodes and provided Wide Area Network (WAN) connectivity to 1 224 sites. It has also provided Local Area Network (LAN) connectivity at 652 sites, enabled Voice Over Internet Protocol (VoIP) at 287 sites and provided 37 Wi-Fi breakout points.

Our e-Government Department is working with municipalities to develop common standards on e-public services and promote interoperable information technology systems across the Gauteng City region.

With regard to upskilling employees and broadening digital skills among the youth, the Gauteng Department of Education and the Department of e-Government are working in partnership with technology companies to train and empower public servants and young people who are not in employment, education and training institutions (NEETs).

In this regard, we have prioritised the rollout of skills development initiatives to 6 610 youth, 6 976 GPG staff and 221 township-based entrepreneurs.

Our long-term goal is to have the 622 000 youths benefitting from ICT skills development programmes through ICT Action Lab, by 2024. Within the same target date, we also aim to have at least 100 000 GPG staff benefitting from ICT skills development programmes.

At the core of our vision is the need to establish Gauteng as Africa's major hub of the fourth industrial revolution skills and a Centre of Excellence for the development of digital hardware and software and the growth of the knowledge economy.

To sum up the third proposition: Gauteng is taking the lead in ensuring that we create a more inclusive and equitable digital ecosystem that will harness the opportunities of the 4IR and mitigate the negative potential perils. We have highlighted some examples that demonstrate our efforts to ensure that the digital economy is more inclusive in spatial and demographic terms, especially by taking infrastructure to the townships and ensuring that more young people have access to digital skills.

This brings me to the **FOURTH AND FINAL PROPOSITION**: The Gauteng province would move much quicker to achieve its vision and developmental ambition of becoming the Silicon Valley of Africa Technology Innovation Hub and Boston-Massachusetts Knowledge Hub only if the universities of technology in particular and the higher education sector work more closely with the provincial government and municipalities on all urban development and long-term planning.

We need ‘a new deal and a new model of collaboration and partnership” on service delivery, infrastructure development and human resource development so that we can implement our provincial development plan, Growing Gauteng Together, GGT2030.

This requires that we strengthen the role of our universities in driving the economy, especially in the various innovation and knowledge corridors. The provincial government also needs to take an active and keen interest in the inventions and innovations coming out of our universities, especially universities of technology.

I am truly humbled by the opportunity to speak to you this evening and learn more about what you are doing to prepare for the future. I know that some of our universities of technology are too shy to tell the world about their outstanding work.

For instance, last year I attended the launch of TUT’s Institute for the Future of Work which will be doing ground-breaking research and skills development for workers and prepare young people for the changes that are bound to come as the digital revolution gains momentum.

I will honour the invitation to come to the TUT Main Campus for the discussions on the Future of Work and for me to also see other major innovations of the university.

The University of Johannesburg has not been shy on the work they are doing on the 4IR. They have recently launched the Institute for Future Knowledge to do future-oriented research on the changing nature of knowledge and ‘ways of learning and knowing”.

The University of Johannesburg has also struck a new partnership with our Department of e-Government on the management and recycling of e-Waste, with an objective of creating a circular economy and new economic opportunities born out of the reality that 55% of the 300 000 tonnes of e-waste generated annually in South Africa comes from Gauteng.

I think universities of technology such as TUT would be the perfect candidates for the partnership on the management of e-waste. You are just too shy to talk about your strengths, capabilities, and achievements.

I am also aware of the scientific endeavours of different Gauteng-based universities on future-oriented R&D on specific initiatives such as electric vehicles; solar energy; hydrogen economy; agriculture and food security; advanced manufacturing; medicine and health sciences; economic development; public policy and governance.

Notwithstanding the above, I still think most of our universities are either too comfortable or too shy to play a more assertive developmental role in regional and local governance. In particular, universities of technology need to come out their comfort zones to showcase their future-oriented research capacity and industrial-scale innovations that can catapult our country and province into a globally competitive hub for the digital and knowledge economy that creates new jobs and new enterprises in which black people, women and youth are included.

To sum up the final proposition: Gauteng's transformation vision and sustainable development ambitions articulated in "Growing Gauteng Together, GGT2030", could be realised faster through closer collaborations and more comprehensive public-private partnerships between Gauteng-based universities, the private sector, provincial government and municipalities.

Programme Director, allow me to conclude this address by restating the obvious. The 4IR is upon us. However, it is not obvious that everyone will benefit from the digital revolution because it is a period of great promise and great peril.

Those nations, regions and localities that are well prepared will harness the opportunities of the 4IR and navigate its potential perils to achieve optimal outcomes that are transformative and developmental for their citizens, civil society, public institutions, and the private sector.

I throw this challenge to all the Gauteng-based universities and other training, technology, research, and development institutions to join hands with us in promoting

a more inclusive agenda for the 4IR and an integrated response to all the mega trends to which we have referred.

Thank you so much for your attention.