The Smart City Initiatives in South Africa and Paving a Way to Support Cities to Address Frontier Issues Using New and Emerging Technologies[1]

1. **General Comments and Observations:** The general concept of "Smart Cities", well intentioned as it may be, needs serious review and reconsideration:

1.1. How does the "Smart City" concept relate to all technology-related (especially ICT) national aspirations, policies, plans, programmes, institutional arrangements, etc., all of which are aimed at providing all variants of ICT infrastructure and services to the whole population of South Africa? The "whole population of South Africa" includes the nation's businesses, commerce, industry, administrative and specialized institutions, civil society, etc., all of which are built, operated, and composed of South Africans, citizens and residents. The central component of the country as a whole, and therefore the smart city component under consideration, should therefore be the citizen population, irrespective of age, gender, race, wealth or poverty. The "smart city" concept must therefore be centred around people, not the physical city infrastructures - bricks and mortar, tarmacadam, technology, which seem to dominate most discourse on the subject.

1.2. Is the "Smart City" concept a competitor to these national aspirations and initiatives, including the National Development Plan? Is it a replacement for all or parts of the national/municipal strategies to use technology for safety, security, and economic and human development?

1.3. With South Africa's massive triple threats of inequality, poverty and unemployment, which position the nation amongst the global leaders in these highly destructive social phenomena, will the focus on the smart city concepts as currently defined deliver fully against these massive societal challenges? The core reasons for South Africa's present undesirable and unenviable reputation summarised by the triple threats include further global leaderships in educational under-achievement, poverty levels above 50% of the population, extremely high levels of violence against women and children, and xenophobic disturbances that dominated recent international and national media. Will the significant investments in "smart city" technologies reduce the triple threats and their multidimensional causes? How can the "social returns on investments" implied be measured to justify the comparative efficacy of the smart city projects compared to direct investments in citizen development?

1.4. Will the benefits of large investments in smart cities "trickle-down" to rescue the nation's +30 million citizens from their poverty traps in time to avert a socio-political catastrophe?

1.5. Will investments in smart city technology by municipalities free the South African citizen depicted in the adjoining illustration so that he is better positioned to educate and feed his family, and find the time to acquire the skills he needs to read to his young children if he has any? This latter observation derived from STATS SA's most recent household survey which found that "*Almost one-half (46,8%) of parent or guardians never read books with children while 43,1% never drew or coloured with the children*".

Photo source: In Daily Maverick 21 October 2018: EPA/JON HRUSA

1.6. Will smart cities compliment or supplement the disastrous educational achievement which leads to 80% of the nation's grade 4 learners unable to read for meaning in any language, including their "mother tongue" languages? Educational achievements of this nature are more likely to position 4IR technologies as threats to sustainable social cohesion,

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development, and socio-political stability, instead of the vital support of social cohesion, development and stability that such technologies promise.

1.7. Instead of investing in smart cities as currently defined or perceived, what would it cost municipalities to implement, enforce, and utilize the existing policy provisions such as the "Rapid Deployment Policy", the proposed reorientation of the *Universal Service* and *Access Fund* (USAF), and to pressure institutions such as Broadband Infraco (BBI) to deliver fully against their assigned mandates, all of which will provide the resources, technologies, and services that form the smart city objectives?

1.8. In conclusion, how can SALGA and its members influence vital national decisions that fully support the outcomes of smart city projects – e.g., the judicious positioning of the "digital dividend" and other high demand radiofrequency spectrum bands to deliver the requirements of smart cities as part of the national development process, instead of isolated projects working in silos that could potentially disrupt the aspirations and stated intentions of national policy? How can SALGA and its members influence the vital decisions to leverage the invaluable exceptionally cost-effective broadband capacities and wayleaves available on national infrastructures such as those owned by Eskom and Transnet, and local governments?

How can SALGA influence its local government members to invest in technological appropriation by its citizens, by promoting and supporting SMME participation and inclusion in the delivery of 4IR technologies which form critical components of smart cities? Such support may be as simple as allowing the use of under-utilized accommodation for such SMME operations; free or affordable access to all local government wayleaves, including all high-rise buildings and similar infrastructure for wireless ICT infrastructure reticulation; and use of wayleaves on low/medium voltage power lines for low-cost optical fibre broadband infrastructure built and operated by SMMEs. All these initiatives and support mechanisms must target economically marginalized citizens, especially the ≥60% of the nation's children who live in poverty, as part of their 4IR-linked Early Childhood Development imperatives. The wealthy segment of the national population is already well served by the prevailing and seemingly preferred free market economic ICT growth models.

There are numerous examples of alternative modes of application of the smart city concept, that can be studied from developing, newly developed, and fully developed nations, many of whom have already well-established relationships with South Africa. These include the BRICS community, most Scandinavian nations, and numerous successfully emerging African, Asian, and Latin American peer group countries. A classic example is the newly industrialized nation of South Korea, a global broadband leader which used all its available natural and man-made resources such as broadband wayleaves on powerlines and street lamps, sewers and water reticulation systems, to achieve nearly 100% household broadband penetration by 2012, while South Africa has stagnated at approximately 10% over the years 2011 to 2019. South Korea did not discuss or define the concept of smart cities – they just built smart cities using national policy and all available resources to position South Korean citizens at the centre of the smart city philosophy.

The measure of South Korea's success is easily quantifiable. In the 1960s, South Korea's GDP per Capita was US$158, compared to South Africa's US$433: South Korea's telephone penetration was less than 0.5 per 100 inhabitants, compared to 4 per hundred in South Africa. By 2018, South Korea's economy had grown to US$31,363 per capita, household broadband penetration to nearly 100%, while South Africa's economy grew to US$6,340, and its household broadband penetration to 10.4%. South Korea's strategy was very simple – provide fixed line telephony to every household by the mid-1970s, which provided an entry point for ubiquitous broadband via ADSL, followed by a national strategy to upgrade this ADSL to 1Gb/s fibre by 2012, whatever it cost. South Korea's success was driven by technologically empowered citizens, not by the technology itself.

The above ideas and statistics are summarized in the document "*The role of ICT in tackling South Africa's Sustainable Development Challenges*", and an associated presentation "*ICT4SDG: Can ICT help to deliver South Africa's Sustainable Development Goals?*", both prepared for the recently held ICT Infrastructure 2019 Conference and Expo. These documents, representing a very small sample of a very large local and international bibliography on South Africa's developmental challenges, suggest that the smart city

conversation should be refocussed towards people first, and achieving the Sustainable Development Goals (SDG). If the SDGs are achieved, all the objectives of the smart city concept will have been realized, without the social and spatial divisions and silos implied by many of the smart city conversations taking place at present.

2. **Comments on the Background Briefing Notes for the IID Smart Cities Seminar of September 3, 2019:**

2.1. **World Bank Development Report 2016**: The background briefing note circulated in the 21 August 2019 communication refers to the 2016 "World Bank Development Report: Digital Dividends", to promote the "Smart City" concept. In the "Smart City" discussions on page 240 of this report, the World Bank observes the following:

> **Sector Focus on Smart Cities**
> - Most city leaders struggle to understand how to best invest in intelligent infrastructure and connectivity to deliver long-term value.
> - In addition, the concept of a smart city has grown somewhat controversial. Proponents argue that smart city innovations offer a genuine revolution in city management. Sceptics see empty hype that risks wastefully distorting the investments of resource-constrained governments as they prioritize "fancy" technology over less exciting but more important foundational investments.
> - While evidence of sustained impact remains elusive, governments allocate significant sums on smart city projects, including in the developing world.

The 2016 World Bank Report concludes with the following statements:

> **Inclusion—to ensure everyone benefits:**
> - City leaders should focus smart city efforts on the needs of all residents.
> - First, *use data to target the most vulnerable*.
> - Develop a comprehensive geographic database of socioeconomic and physical indicators to prioritize housing and slum upgrading investments.
> - Open up data to promote accountability, including grassroots initiatives such as the mapping of facilities, pollution, and community needs.
> - Tap mobile connectivity to expand civic participation, for participatory budgeting, and for crowdsourcing the identification of smoke-belching vehicles.

The above sentiments are highly relevant to the South African situation – the extremes of inequality, poverty and unemployment that afflict the nation add to the complexity of prioritizing technology over people-centred interventions. A few well publicised financial scandals involving ill-conceived smart city projects have appeared in South Africa's media, suggesting the vulnerability of smart city ICT projects to actual and perceived abuse. Other South African media coverage includes reports of poverty-driven damage and vandalization of key ICT infrastructure that is critical for smart cities, e.g., mobile telephone base stations (battery theft), ICT cable theft (copper cable for commercial gain, optical fibre to create trinkets for sale), and even violence against infrastructure contractors in the demand for localization of construction jobs.

South Africa's social crises, which are highly visible through often highly destructive public protests, brutal or murderous xenophobic attacks on "foreigners", for perceived "theft of jobs and women", and the tragic poverty- and ignorance-driven gender and child violence that tarnishes the international and local reputation of South Africa. These social challenges must be the primary targets of any smart city initiatives and strategies.

2.2. **World Development Report 2019: The Changing Nature of Work[2]:** Three years is a very long time in the 4IR world of rapid technological changes – the contrasts between the two World Bank reports (2016 and 2019) are stark:

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[2] World Development Report 2019: The Changing Nature of Work: https://www.worldbank.org/en/publication/wdr2019

- There is no mention or reference to "smart cities", the "Fourth Industrial Revolution (4IR)", "Industry 4.0", or any other term related to technological advances, besides those directly related to jobs and work, in the 2019 report.
- The dominant themes of this report, superficially derived through a quick word search, are employment, jobs, work related references (325); social challenges (276); income (235); children (205); and technology in relationship to jobs (120).

While this very superficial review of the two key World Bank Development Reports (2016 and 2019) is informative, a much deeper analyses of the key issues raised in connection to the "smart city" discourse is necessary.

Employment, employability, jobs, and the related future skills needs, are central themes in the 2019 World Development Report, which has attracted significant criticism from labour-related international and national organizations:

- International Labour Office expresses concern about World Bank report on future of work: The ILO believes that the proposed policy solutions fall short of the ILOs objective of reducing inequality through job creation and existing job protection, education and skills development for future jobs, and salary protection;
- Oxfam criticises World Bank for backing deregulated labour markets: Oxfam said the report's main message was that governments should abandon labour market regulation and rely instead on low levels of welfare to prevent workers falling into extreme poverty;
- Education International: World Bank World Development Report 2019: Once again, the "cure" is worse than the disease;
- Basic Income Earth Network: "The 2019 World Development Report from the World Bank calls for a New Social Contract, and Universal Basic Income Could be Part of It".

While deep analysis of both World Bank Reports is beyond the scope of this short opinion piece at this time, it is vital that the reports are analysed and considered in detail as South Africa seeks to protect its future from the potentially disastrous impacts of the 4IR changes to the nature of work. Work and income from salaries has become the de facto mode of survival in this post-agricultural revolution era, any disruption of this will have devastating impact on socio-economic-political stability and survival.

South Africa's deep inequalities, high levels of poverty, and exceptionally poor educational outcomes, renders the country vulnerable to the negative impacts of the technological revolution. South Africa's vast population of generally poorly skilled labour will not stand for massive job and income losses, which are already at a threatening level without taking into account the full impacts of the 4IR.

The World Development Report of 2019 recognises these threats, the near impossible task of up-skilling poorly educated and trained population groups in time for the major 4IR societal changes, and recommends income-securing safety nets such as the Universal Basic Income (UBI) system, while South Africa prepares its future generations (children) to fit into this new world, capable of leveraging fully the significant advantages of the technological evolution.

2.3. **The World Development Report 2019** poses the following highly relevant question: "***What can governments do***"?

The analysis suggests areas in which governments could act:

- Investing in human capital, particularly early childhood education, to develop high-order cognitive and socio-behavioural skills in addition to foundational skills.
- Enhancing social protection. A solid guaranteed social minimum and strengthened social insurance, complemented by reforms in labour market rules in some emerging economies, would achieve this goal.
- Creating fiscal space for public financing of human capital development and social protection. Property taxes in large cities, excise taxes on sugar or tobacco, and carbon taxes are among the ways

to increase a government's revenue. Another is to eliminate the tax avoidance techniques that many firms use to increase their profits. Governments can optimize their taxation policy and improve tax administration to increase revenue without resorting to tax rate increases.

The concluding remarks of this section of the report are profound:

> *The most significant investments that people, firms, and governments can make in the changing nature of work are in enhancing human capital. A basic level of human capital, such as literacy and numeracy, is needed for economic survival. The growing role of technology in life and business means that all types of jobs (including low-skill ones) require more advanced cognitive skills. The role of human capital is also enhanced because of the rising demand for socio-behavioural skills. Jobs that rely on interpersonal interaction will not be readily replaced by machines. However, to succeed at these jobs, socio-behavioural skills, acquired in one's early years and shaped throughout one's lifetime, must be strong. Human capital is important because there is now a higher premium on adaptability.*
>
> *Solutions are available. For example, to prepare for the changing nature of work countries must boost their investment in early childhood development. This is one of the most effective ways to build valuable skills for future labour markets. Countries can also boost human capital by ensuring that schooling results in learning. Important adjustments in skills to meet the demands of the changing nature of work are also likely outside compulsory schooling and formal jobs. Countries can, for example, utilize tertiary education and adult learning more effectively.*
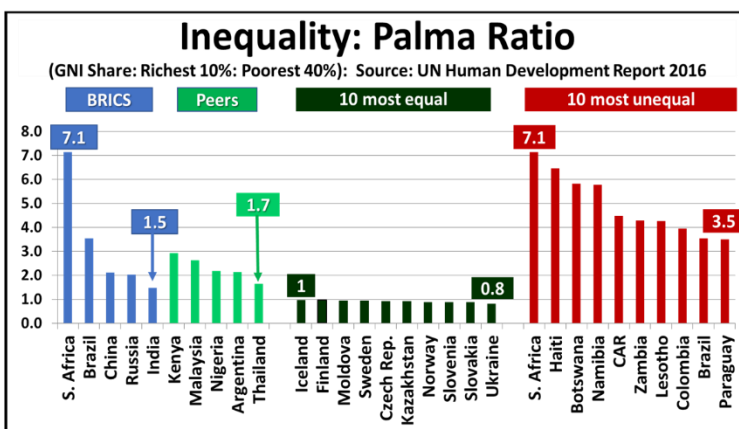
Author's note: The use of the term "human capital" is of concern to the author. An economically popular yet "dehumanizing" term equating the value of human workers to "valuable head of cattle" as per the original Latin definition and usage, and to "chattel" as translated into the French language. Both terms were used extensively in slavery. "Human capital" is of value to business, like cattle are of value to farmers. "Human capital" is a "business resource" that can be traded, can be depreciated, and in the 4IR automated world of work, can be dispensed with and replaced with more efficient lower operating cost machines. Like cattle or chattel whose monetary value exceeds their dietary values. Like slaves whose labour output, entertainment and recreational values exceeded their humanity.

3. CONCLUSION:

The objective of this hastily prepared opinion piece is to raise awareness of alternative views concerning the discussions of the potentially costly "*Smart City Initiatives in South Africa and Paving a Way to Support Cities to Address Frontier Issues Using New and Emerging Technologies*". The opinions expressed are those of the author alone, drawn from the authors own experience, and from the expert opinions of concerned international and national institutions, and the local participants in the IID Seminar series.

The four charts below, prepared for a South African ICT Industry think tank, suggest priority areas for smart city investments instead of the perceived focus on smart technologies alone.

"*There should exist among the citizens neither extreme poverty nor, again, excessive wealth, for both are productive of great evil.*" – Plato, about 400 BC

Inequality: Palma Ratio
(GNI Share: Richest 10%: Poorest 40%): Source: UN Human Development Report 2016

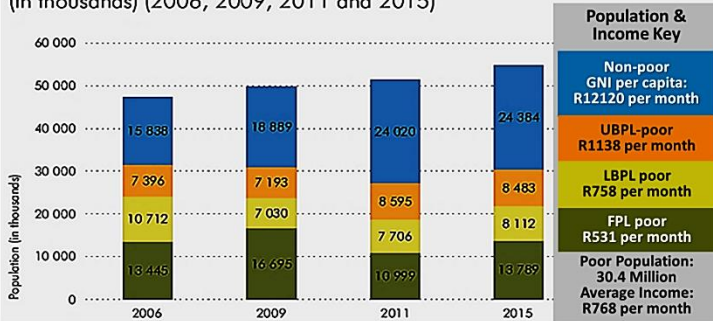**Probably the most dangerous social phenomenon facing humankind**

- Major trigger for wars throughout history
- Linked directly to the Apartheid "Civil War" that nearly destroyed S. Africa
- Major trigger for current and future Xenophobic Violence
- Close links with Inequality in Education
- Has a dangerously strong Ethnic & Racial component

ICT Can/Must help: How can OUR services secure a stable future?

Poverty Trends in South Africa
An examination of absolute poverty between 2006 and 2015

Figure 2.2: The number of poor and non-poor persons in South Africa (in thousands) (2006, 2009, 2011 and 2015)

Population & Income Key

Non-poor GNI per capita: R12120 per month	
UBPL-poor R1138 per month	
LBPL poor R758 per month	
FPL poor R531 per month	
Poor Population: 30.4 Million Average Income: R768 per month	

STATS SA
STATISTICS SOUTH AFRICA

[STATS SA Report-03-10-06 2017](#)

NDP 2030

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More than 50% of South Africans are poor, living below the International Poverty Line of US$5.50 PPP per day, or ZAR918 per month (2019 rate)

- In 2015, 30.4 million South Africans lived below the national poverty line.
- Their total monthly expenditure averaged R768 per month.
- At 5% of income or expenditure, their ICT affordability was R38.40 per month.
- What developmental quality and quantity ICTs can they purchase at this price?

South Africa's poor majority cannot afford the ICTs they need for self, family, and community development

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Unemployment (% of total labour force)
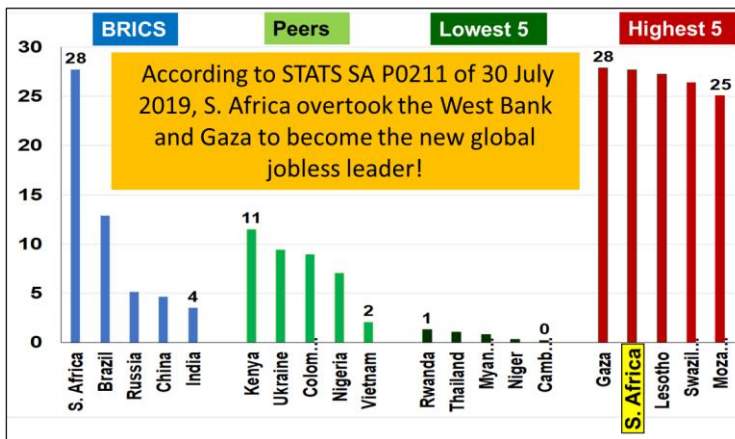
According to STATS SA P0211 of 30 July 2019, S. Africa overtook the West Bank and Gaza to become the new global jobless leader!

Source: https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS?view=chart

South Africa's Achilles Heel?

South Africa ranked 190th out of 191, behind the West Bank and Gaza in 2017. In 2019, South Africa overtook West Bank and Gaza to lead the global unemployment ranks, for those countries that can and have compiled statistics.

As SMEs, WE may not need high labour volumes, but a large population of very poor and poorly educated unemployed masses will limit OUR market & trash OUR business environment……

Youth Unemployment: 15-24 years (%)
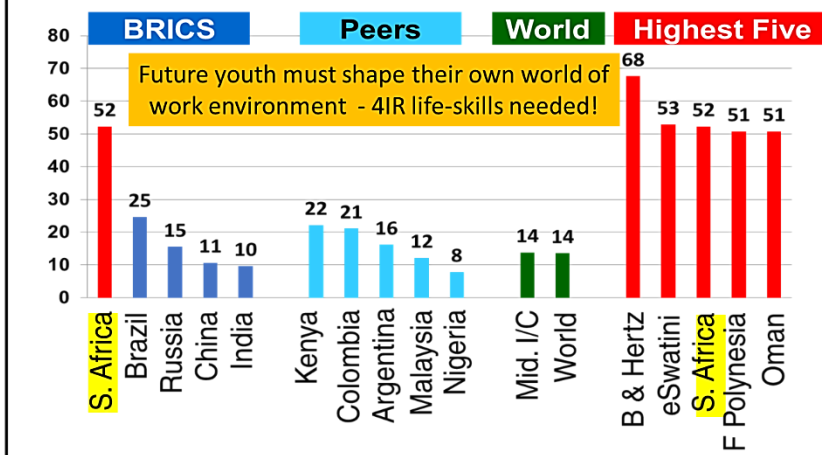
Future youth must shape their own world of work environment - 4IR life-skills needed!

Source: https://data.worldbank.org/indicator/SL.UEM.1524.ZS

A Dim 4IR Future?

- The 4IR is about youth – they must be educated to fit into the unknown work (or workless) *Homo technologicus* age!
- Failure to do this will change the 4IR from friend to foe – and a disastrous future for S. Africa.
- Youth unemployment is fueled by ineffective educational systems.

ICT MUST help - With the current ineffective educational performance, inadequate access to information via ICT for lifelong self-driven learning, South Africa faces a grim future.