ICT FOR A SUSTAINABLE WORLD #ICT4SDG

Why ICTs are critical for sustainable development*:* By Dr William Lehr, Massachusetts Institute of Technology (MIT), USA: ICT4SDG May 3rd 2018:
"Information and communication technologies (ICTs) are accelerators, amplifiers, and augmenters of change. They make it feasible to more flexibly and dynamically reconfigure, and hence transform all aspects of how resources are produced and used, fundamentally restructuring economies and redefining how we interact with each other and the world around us".

A SOUTH AFRICAN-SPECIFIC PERSPECTIVE:

The above statements and the detailed discussions that follow them, invaluable as they may be, are not new. The forerunner of today's SDGs, the Millennium Development Goals (MDG), were supported by the same kind of thinking that in turn led to the development of a massive body of knowledge linking ICTs to development. The Final report of the United Nations Information and Communication Technologies Task Force created in 2001 (2003 final report here) recognised that that the ICT sector is not just another economic and/or social development sector, ICTs cut across and enable the success of all other development sectors through the provision of the information and knowledge needs necessary for such success. The current discourse on the role of ICTs in the achievement of all 17 SDGs is merely a continuation and expansion of our knowledge and understanding of these critical linkages in the face of immense scientific and technological developments that define today's ICT industry. The rapid scientific and technological advances also provide enlightenment of the role of shared information and knowledge in human development that extends all the way back to the birth of our species some 300,000 years ago:

Humans evolved by sharing technology and culture[1]: "*Our early ancestors, Homo sapiens, managed to evolve and journey across the earth by exchanging and improving their technology*". South African archaeologist Christopher Henshilwood and his research colleagues from the Universities of Bergen in Norway and Witwatersrand in South Africa propose that the sharing of cultural and technological information and knowledge has been the success criteria for human evolution and its successful migration from its African origins to the rest of our inhabited world.

The technologies that enable information and knowledge sharing across all human constituencies and geographic barriers have always been highly prized: the evidence left behind by our early common ancestors some 100 000 years ago in South Africa's Blombos, Howieson's Poort and Sibudu Caves so that modern scientists like Christopher Henshilwood and his colleagues could "unearth" them to serve 21st century civilizations, is profound. Human history is littered with more evidence of the value of ICTS for sustainable human development even, and perhaps especially, during natural and man-made disasters including conflict and wars. The 2+ millennium-old description of a 350 BCE era "telegraph" is a classic example of the very high value assigned to the technologies that enable information and knowledge sharing during the search for peace during conflict and war. These vital tools for sustained human development have evolved over time to today's highly sophisticated tools that drive the Fourth Industrial Revolution (4IR), or "Industry 4.0", the nomenclature preferred by many academics.

The question South Africans should be asking themselves is how ICTs of any generation can be positioned to diffuse the immensely high economic, political and social costs and risks of inequality, poverty and unemployment, instead of debating the merits of ICTs in sustainable development. The very rich ancient cultural and technological history of South Africa should inform us that technologies of any sophistication have zero inherent risks - the only risks to humanity associated with technology

[1] Technology of our ancestors: https://www.uib.no/en/news/95420/humans-evolved-sharing-technology-and-culture

is the abuse and/or lack of use of such technologies. South Africa's own history of extreme inequality and poverty demonstrates clearly the extremely high risks of these societal phenomena, which often lead to highly destructive use of technologies originally designed to foster sustainable human development, not to destroy it.

The links between ICT and all 17 SDGs presented in this section of this discourse are based on the above understanding. The primary focus of attention will be on those SDGs that have direct, immediate, and local impact on the wellbeing of South Africa's economically and socially marginalized population. These include SDGs 1 to 4, 8, 10 and 17. The remaining SDGs are equally important but the processes required to reduce their negative impacts on development are global in nature - there is little that the most vulnerable South African population groups can do to protect themselves from the impacts of these phenomena, or to contribute directly towards the mitigation of their most harmful effects.

THE CRITICAL LINKS BETWEEN EACH SDG AND ICTS

The human desire to generate new knowledge about itself and its environment, and to share such new knowledge with other members of the species, has evolved along a historical continuum from the dawn of human consciousness thought to be some 300 000 years ago to today's complex networks of information processors and interconnected devices. These ICT networks have become ubiquitous, changing in very fundamental ways how humans learn, live, work and play. Mass replacement of traditional forms of manufacturing and production, and therefore the use of labour, are expected. By 2017, the Internet of Things (IoT) – electronic sensor devices embedded in any personal device, machine or "thing" useful to humankind, exceeded the total human population of 7.5 billion people by 1 billion units. The quantity of IoTs is expected to reach 7.5 trillion by 2020, one million times more than today's total human population. And yet as long ago as 2004, a lifetime in the cycle of ICT growth, the United Nations Task Force on Science, Technology and Innovation, noted the massive disparities between the "information haves and the information have-nots", and commented as follows:

> 246TF10 Report Final Draft (page 60): This central paradox – the persistence of scarcity in an age of superabundant capacity – is the greatest single challenge to the networked economy and society. This chapter argues that not only are the means to meet this challenge already within reach, but because of the sheer pace of technological progress and innovation, failure to urgently and meaningfully exploit these available means may consign many developing countries, particularly least developed countries (LDCs), to harmful and even permanent exclusion from the network revolution.

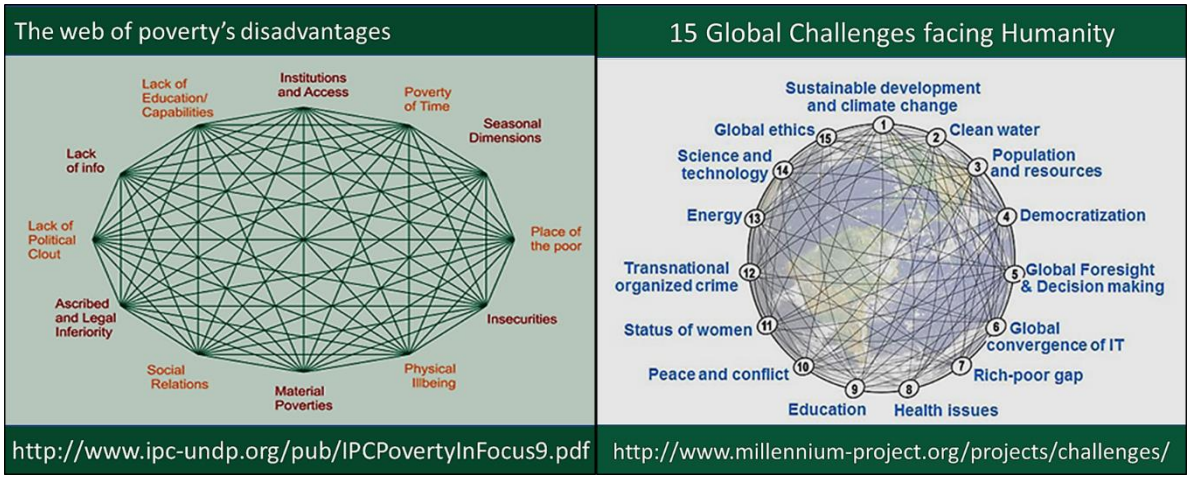
South Africa is not an LDC, but the population percentage living in poverty, and therefore unable to afford the full transformative benefits of ICT, represented 55.5% of the total population in 2015. This massive population segment may thus become victims of the above warning given by the United Nations Task Force almost a decade ago, and must therefore be central to any initiatives aimed at achieving the SDGs through the use of ICT.

MULTIDIMENSIONAL COMPLEXITY OF ICT AND SDG RELATIONSHIPS:

Dealing with SDGs as a whole, and the potential of ICTs to achieve the desired results, is extremely complex. In the South African context, the central challenge is poverty, 55.5% of the population, and more than 65% of its children, live in poverty. An excellent discussion of the multi-dimensional complexity of this challenge alone is provided by the United Nations Development Programme's International Poverty Centre, available in the 2006 UNDP document "Poverty in Focus[2]". Additional insights into the level of multidimensional complexity is provided by the Millennium Project's "15 Global Challenges for Humanity", introduced in 1996 and updated annually in the "State of the Future"

[2] UNDP International Poverty Centre 2006: http://www.ipc-undp.org/pub/IPCPovertyInFocus9.pdf

reports. These two insights, summarized graphically below, will be used as guidelines to ensure that the multidimensional complexity for each SDG intervention are fully accommodated, providing guidelines for all parallel research programmes that may be deemed necessary, but without complicating the actual implementation programmes which must be simple, understood by the target community, and rendered in a reductionist mode for ease of project management and control.



Quantitative indicators derived from Statistics South Africa (STATS SA) reports will be used extensively to set intermediate targets for project management, monitoring and control. These will be complimented and supplemented by relevant global statistical publications such as the United Nations Human Development Reports[3] for international benchmarking and comparisons.

THE SOUTH AFRICAN ICT4SD IMPLEMENTATION MODEL:

The United Nations Millennium Summit of year 2000 led to the United Nations Millennium Declaration, which in turn led to the development of the Millennium Development Goals (MDG), which were revised and updated to the SDGs launched in 2015 after the expiry of the MDG target date. The UN Millennium Declaration, adopted by 189 world leaders during the summit also led to the introduction of the World Summit on the Information Society (WSIS) to focus on the utility of ICTs to enable the delivery of each MDG, and now each SDG. The WSIS process led to the development of the ICT Development Index (IDI), a global quantitative database of ICT development indicators used to steer global ICT development and to monitor the progress of such development.

South Africa was a signatory to all the above declarations and agreements, but the nation's ICT progress, as measured by the IDI, has been less than satisfactory for the nation's comparative level of economic development. South Africa ranked 92 out of 176 countries in the 2017 IDI, declining from a higher rank of 88 in 2016[4]. South Africa's relatively poor IDI ranking can be attributed to the nation's deep economic and social inequalities, which render more that 50% of the population unable to afford, and therefore use the full range of ICT products and services for individual and community development.

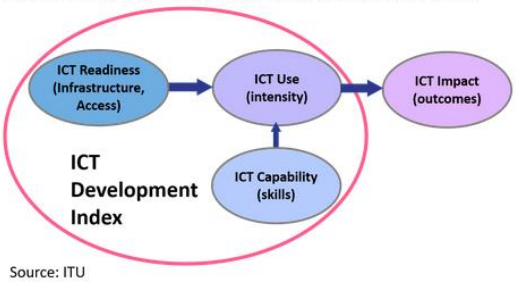
The IDI comprises "three stages in the evolution towards an information society". South Africa does relatively well in the ICT Readiness (Infrastructure, Access) stage, the national ICT industry is well developed by developing country standards, especially its near-ubiquitous mobile networks and services. The ICT Use, ICT Capability (skills), and ICT Impact stages are comparatively poor due to the deep income and educational inequalities. These stages must be the major focal areas for development towards the achievement of all 17 SDGs. The ICT4SDG implementation plans will be designed to reduce the deficiencies of each stage of the IDI, and thereby improve the quantitative

[3] UNDP HDR Database 2018 updates at: http://www.hdr.undp.org/sites/default/files/2018_statistical_annex_all.xlsx
[4] ICT Development Index for 2017: Results summary at http://www.itu.int/net4/ITU-D/idi/2017/index.html

indicators for each stage, as recorded in the global "Measuring the Information Society Reports[5]" for each year. These IDI indicators will be used to set interim targets for development, monitoring and evaluation in a virtuous circle mode of project management.

The ICT Development Index (IDI)

Figure 2.1: Three stages in the evolution towards an Information Society



Source: ITU

Key ICT4SDG focal areas that need attention.

1. **ICT Readiness (Infrastructure, Access):** Reasonably well-developed mobile ICT services with poorly developed fixed infrastructure (copper and optical fibre backbone, backhaul and last mile connectivity) especially in the rural areas.
2. **ICT Use:** Poorly developed intensity of use for the economically and educationally marginalized majority, especially children living below the national poverty lines.
3. **ICT Capability (skills):** Deep inequalities in educational opportunities and outcomes severely limits this performance indicator – only the middle- and high-income population segments of South Africa, which number less than 50% of the population, are able to benefit from the full range of existing ICTs. The 55% South African citizens living below the nationally defined poverty lines are excluded from these benefits.
4. **ICT Impact (outcome):** Two factors combine to render this critical indicator less than adequate: affordability and skills capability. The deep income inequalities ensure that most developmental ICT services remain unaffordable for the majority of the nation's citizens, and deep educational inequalities ensure that most citizens are limited to very basic ICT user skills.

Each of the above deficiencies must feature prominently in the ICT4SDG implementation programmes. The performance deficiencies are well known, fully acknowledged and understood by the nation's political and business leaders, and the public at large, however corrective programmes through traditional policy and regulatory interventions remain ineffective. The ICT4SDG programmes must address these deficiencies by developing creative, proactive, and potentially disruptive strategies to supplement current efforts centred around policy and regulatory interventions.

A detailed discussion and localization of the critical links between ICTs and South Africa's triple threats of inequality, poverty and unemployment, and each SDG, are being developed in http://www.sakan.org.za/SDG.html.

[5] Measuring the Information Society Report 2017: https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2017/MISR2017_Volume1.pdf