SDG 1: POVERTY

ORIGINAL: There are still more than 2 billion "unbanked" people in the world. Now, thanks to digital financial services, many are participating in the digital economy for the first time; and access to financial services has proven to be a pivotal step in helping people lead out of poverty. In addition, timely and accurate information services will help ensure equal rights to economic resources and market insights that can benefit all.

A SOUTH AFRICAN-SPECIFIC PERSPECTIVE:

HOW CAN INFORMATION AND COMMUNICATION TECHNOLOGIES HELP CREATE A SOUTH AFRICAN NATION/SOCIETY FREE OF POVERTY?

SUMMARY

The UNDP Human Development Report for 2016 ranks South Africa's poverty level of 53.8% of the 56 million population at 74th out of 90 countries, between Mexico ranked 73rd, and Mozambique ranked 75th. The same report positions South Africa as the nation with the highest level of income inequality, with a Palma Ratio of 7.1:1, compared to a ratio of 1:1 in the five most equal nations on earth, which include high income Nordic countries, and the developing countries of Kazakhstan, Slovenia and Ukraine (before the current political crisis). Directly related to the nation's inequality and poverty challenges is the unemployment level – at 27.5% at the official rate, and 37.3% at the expanded rate which includes persons who have given up seeking employment. The country has the second highest unemployment level (at the official rate) after the West Bank and Gaza, according to the International Labour Organization (ILO) and World Bank employment data for 2017. These alarming statistics are clearly a consequence of South Africa's Apartheid political history, but they need urgent attention irrespective of their causes, if the nation is to prosper and remain stable in its new democratic dispensation.

This document discusses and reviews South Africa's poverty challenges in relationship to the role of ICT in achieving the global Sustainable Development Goals (SDG), specifically SDG1 - the eradication of poverty. The analysis recommends a practical solution of how ICTs can help to reduce South Africa's poverty. These analyses will be extended to all other SDGs using the known role of ICTs as a potent tool for the achievement of all human development challenges as enshrined in the Sustainable Development Goals initiative. The analyses draw on related statistical analyses and solution proposals outlined in a parallel study documented in the online portal http://www.sakan.org.za/.

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POVERTY IN SOUTH AFRICA: ACHIEVING THE FIRST SUSTAINABLE DEVELOPMENT GOAL

HOW CAN INFORMATION AND COMMUNICATION TECHNOLOGIES HELP CREATE A SOUTH AFRICAN NATION/SOCIETY FREE OF POVERTY?

Banking and related financial services are clearly necessary factors in economic and social inclusion, vital for poverty alleviation. However, before the 2 Billion plus "unbanked" global citizens referred to in the generic link between ICT and the SDGs can access banking and related digital financial services, they need to acquire the most basic inputs needed for all these services – money. The traditional method of obtaining money for economic inclusion is work, the production of goods and services that are exchanged for money. This simple statement raises numerous extremely complicated issues, especially for the poor:

a) The simple discussion above needs to be qualified and quantified – (a) the goods and services produced must be "wanted" by the "buyer(s)" who is (are) willing to exchange money to acquire and/or own those goods and services; (b) the money received from the transaction must be enough to sustain the producer's (worker's) existence with enough left over to participate in the economy that offers the banking and financial services, at a cost.

b) The worker(s) must have the skill sets needed to produce the goods and services wanted by the buyer(s), and the costs of producing those goods and services must be significantly lower than the money that the buyer is willing to pay for them.

c) The demand for those goods and services must exceed the cumulative capacities of all producers (workers) engaged in their production: (a) the demand (market) for the goods and services must be enough to generate monetary returns on the labour invested by each worker engaged in production and supply of the goods and services; (b) the number of participating workers needed to satisfy the market for the goods and services produced must be small enough to ensure that the demand for the goods and services exceeds the supply, thus ensuring sustainable incomes for the producers.

The above simplifications mask extremely complex relationships between poverty, work, labour, skills, technology, and the global/national markets for goods and services. This complexity is discussed briefly in the introduction to the relationship between ICTs and all 17 SDGs provided in http://www.sakan.org.za/Docs/ICT4SDG.pdf. A detailed discussion of these complexities is beyond the scope of this simple introduction of the relationship between ICT and SDG1. The key challenge facing humanity today is that technological advances are changing the very nature of work that poor people the world over depend on to sustain life and to participate in the current global knowledge and information-driven economy. Global/national solutions are needed urgently to overcome this dilemma.

1. The reality of POVERTY in South Africa.

The following paragraphs provide statistical summaries of the size of South Africa's poverty challenge, from which directly focussed strategies for poverty alleviation can be crafted. The statistics offer a way of setting quantitative targets for all interventions, and the statistical tools needed for monitoring progress, evaluation, and refinement of these strategies. The use of statistics also supports a wide range of quantitative and qualitative research into the poverty challenges themselves, from which improved strategies and implementation models can be designed and managed in virtuous circle models for continuous sustained development.

The statistics that follow are derived from South Africa's own statistical databases and reports compiled and disseminated by Statistics South Africa (STATS SA), supported by global databases compiled by national statistical bureaus in most countries, which are managed and disseminated by global multilateral agencies such as the United Nations and World Bank families.

1.1. **Food Poverty Line: 13.8 million** (25% of the 2015 population) South Africans live at or below the Food Poverty Line (FPL) of ZAR531 per month[1]. By definition[2], this FPL is the minimum local monetary level needed by families and individuals to avert hunger. People living at or below this poverty line will experience hunger, with all the physiological and social damage this entails. Thus for 25% of the South African population, there is no monetary excess to participate in the digital economy through online banking and other financial services, let alone to pay the costs of access to such services.

1.2. **Lower Bound Poverty Line: 8.11 million** (15%) South Africans live at or below the Lower Bound Poverty Line (LBPL) of ZAR758 per month, and above the FPL. This defines households whose total consumption is at or close to the FPL, and who must therefore sacrifice some basic food needs in order to meet essential non-food requirements. These essential non-food requirements often include the costs of very low-level participation in the digital economy (mobile phone ownership and airtime), transport, accommodation etc. Without these non-food essentials, the acquisition, and therefore the availability of the basic foods defined in the FPL are often threatened; the cycle of poverty is therefore perpetuated.

1.3. **Upper Bound Poverty Line: 8.48 million** South Africans (16% population) live above the LBPL and at or below the Upper Bound Poverty Line (UBPL) of ZAR1138 per month. Some food sacrifices for essential non-food requirements which include basic ICT services are necessary for life sustainability and acquisition of the income levels defined by this poverty line.

1.4. **SUMMARY: 30.38 million** South Africans (55.5%) were categorised as poor in year 2015, surviving on an average household expenditure of approximately ZAR768 per month (population-weighted average value of the three poverty lines). Some, especially those that live below the FPL, are obliged to "sacrifice" a portion of their already inadequate food budgets for critical ICT services: indigent rural and urban dwellers are obliged to seek help from their wealthier working extended family members scattered throughout the urban centres of South Africa – they need to communicate with them using mobile phone services to obtain the very basic income and other support they need to survive. They are obliged to "manage distance" as a barrier to survival, as so clearly described in the Eastern Cape researches undertaken by Skuse and Cousins[3]. This ICT dependency has been verified by several ethnographic studies wherever extreme poverty exists, including a highly relevant Kenya study "*Mobile Usage at the Base of the Pyramid in Kenya*"[4] undertaken by the World Bank's InfoDev division in partnership with several Kenyan and other development agencies. Poor people are very often obliged to sacrifice basic food budgets for mobile telephone services in order to secure those same basic food budgets. This dilemma illustrates the complex relationship between ICT and poverty: ICTs are a known to be highly potent tools that can/do alleviate poverty, but in extreme cases of poverty, the ICT dependency can exacerbate and perpetuate the cycle of poverty.

1.5. **International measures of South Africa's Poverty:** The multidimensional nature of poverty is extremely complex, as indicated briefly in the introduction of the relationships between ICTs and all SDGs at http://www.sakan.org.za/Docs/ICT4SDG.pdf. Recognition of this complexity is vital for research purposes which must lead to multidisciplinary approaches in the design of poverty alleviation strategies. But for each strategy, there is a need for simplification; a reductionist approach to project design and management. A statistical foundation for such simplification is provided by the World Bank[5] in its development of a single international "absolute" poverty line, and a series of "relative" poverty lines adjusted for each economic

[1] 2015 values from Figure 2.2 page 27 of 141 in http://www.statssa.gov.za/publications/Report-03-10-06/Report-03-10-062015.pdf

[2] For South African definitions and inflationary adjustments of poverty lines, see: http://www.statssa.gov.za/publications/P03101/P031012018.pdf , published on 31 July 2018.

[3] Managing Distance: the Social Dynamics of Rural Telecommunications Access and Use in the Eastern Cape, South Africa: Skuse and Cousins: https://assets.publishing.service.gov.uk/media/57a08c88ed915d622c0013eb/R8232-ISRGWP1.pdf

[4] World Bank (InfoDev) study on mobile usage and poverty in Kenya: http://www.infodev.org/sites/default/files/final_kenya_bop_study_web_jan_02_2013_0.pdf

[5] World Bank 2017: *A richer array of international poverty lines*: http://blogs.worldbank.org/developmenttalk/richer-array-international-poverty-lines

cluster within which the target poor live. Different definitions of relative poverty have been set for different levels of economic development. It is necessary to use these international poverty indicators to benchmark South Africa's poverty levels against the nation's developed and developing country peers. Such global benchmarking verifies South Africa's participation in the competitive "global village", hence the strong recommendation in South Africa's National Development Plan (NDP) to a use international benchmarking against the nation's peers for monitoring progress, and learning from the successes and/or failures of these peers in both the developed and developing world.

The following statistical analyses are approximations due to exchange rate volatilities and the use of different databases where necessary in the absence of exact data for each indicator and each country selected for the analyses. All US$ values are based on the US$ Purchasing Power Parity (PPP)[6] value of the relevant local currency, also referred to as "the International Dollar".

The international "absolute" poverty line, a representation of location-neutral extreme poverty, is set at US$1.90 per day (in International Dollars or US$PPP), approximately ZAR11.50 per day. The median poverty line for an "upper middle-income economy" like South Africa is set at US$5.50 per day. South Africa's poverty statistics using this latter international indicator of poverty are:

1.5.1. **Non-poor South Africans** (population 24.4 million or 45.4% in 2015): For this analysis, the World Bank published GNI/capita (PPP) value of US$13090 (2017 value, approximately. ZAR221 or US$36.4 PPP per day is used as a proxy for household consumption expenditure. Thus, non-poor South Africans are approximately seven (7) times richer than the international poverty line of US$5.50 per day set for the country's level of economic development.

1.5.2. **All 30.38 million (55.5%) poor South Africans** survive on a population-weighted average of ZAR768 per month or US$4.21 PPP per day, approximately 77% of the international poverty line set for the country's upper-middle-income economic classification.

1.5.3. **8.48 million South Africans (16%)** live between the UBPL and the LBPL, an average household consumption and expenditure level of ZAR948 per month, ZAR31.6 per day or US$5.20 PPP per day. This is a close approximation to the international poverty line set for upper-middle-income economies, verifying South Africa's own classification of this population segment as poor.

1.5.4. **8.11 million South Africans (15%)** live between the LBPL and the FPL, an average household consumption and expenditure level of ZAR644.5 per month, ZAR21.5 per day, equivalent to US$3.54 international dollars per day. Thus, 15% of South Africans survive on 65% of the relevant international poverty line.

1.5.5. **13.8 million South Africans (25%)** live at or below the FPL, an average household consumption and expenditure level at or below ZAR531 per month (ZAR17.7 per day). This translates to US$2.9 in international dollars per day, 53% of the international poverty line relevant to South Africa's economy.

1.6. **Impact of Poverty on Children and Youth[7]:** The impact of poverty on children and youth can have devastating impact on South Africa's future sustainable development with social stability if it is not addressed:

1.6.1. **Statistical Summary**: (i) 18.6 million (34% of the population) South Africans are children aged 18 years and under (2015 data); (ii) More than 62% of South Africa's children live below the UBPL (this estimate based on 2015 UBPL of ZAR965 per month, revised upwards to ZAR1138 in 2017); (iii) 29% of South Africa's children live below the Food Poverty Line, currently set at ZAR531 per month; (iv) 31% of South Africa's children that live in poverty reside in households

[6] Purchasing Power Parity (PPP) conversion rates: https://data.oecd.org/conversion/purchasing-power-parities-ppp.htm
[7] South African Child Gauge 2017: http://www.ci.uct.ac.za/ci/child-gauge/2017

without a working adult; (v) 42% of children have experienced some form of maltreatment (whether sexual, physical, emotional or neglect).

1.6.2. **Impact of Poverty on Children and Youth**: "*Chronic stress from growing up in poverty can physiologically impact children's brains, impairing their working memory and diminishing their ability to develop language, reading and problem-solving skills, reports a new Cornell study*"[8]; Numerous related neurobiological researches have established a close link between young children living in poverty and their cognitive development.

1.6.3. **Impact on knowledge acquisition:** South Africa's comparative educational achievements in the Science, Technology, Engineering and Mathematics (STEM) subjects has been disappointing. In the most recent (2015) Trends in International Mathematics and Science Study (TIMSS) in which South Africa participated, the nation's grade 9 learners ranked 38th out of 39 countries in MATHS achievement, and global last in Science (international assessments were at grade 8, South Africa used grade 9 learners). Similarly, the "*Progress in International Reading Literacy Study (PIRLS) 2016 report paints a disturbing picture of primary school reading literacy in South Africa*": 78% of the nation's grade 4 learners cannot read properly in any language, including their "mother tongue". Deficiencies in the national basic educational systems are clearly contributory factors, made worse by the neuroscientific relationship between poverty and brain development. With more than 62% of the nation's children growing up in poverty, the nation's dismal educational achievement as measured by the PIRLS and TIMSS assessments should not be unexpected, and could lead to future socioeconomic growth stagnation and/or societal instability.

1.6.4. There exist a significant number of excellent schools and specialist training institutions in South Africa today[9]; they match and/or exceed most global standards of excellence. Are these institutions enough to reverse South Africa's extreme inequality, poverty and unemployment levels? Are they scalable and sustainable enough to steer South Africa's children and youth away from a socioeconomically debilitating future? Numerous reports suggest that the highly desirable successes of such institutions are likely to exacerbate the nation's challenges further by fuelling the growth of inequality, unless they scale up to meet the nation's total high-quality educational needs[10].

The cycle of poverty in South Africa will continue unabated, or expand if the nation does not focus attention and direct action on the educational, physiological, and societal needs of the nation's children and youth. ICTs are vital tools in this process, South Africa's challenge is how ICTs can be positioned and used to deliver measurable and visible successes from the many action programmes currently in use or planned.

2. **How can ICT contribute to Poverty Alleviation?** South Africa has always known and recognised the role of ICT in development in general, and in alleviating the nation's triple threats of inequality, poverty and unemployment in particular, but the nation has struggled to find ways of positioning ICTs to do this. South Africa has significant technological skills, managerial capacities and competencies, know-how, and all the basic factors needed for rapid technological appropriation at the national level, but the strategies for extending such technological appropriation to the poor has remained elusive. There appears to be strong ideological barriers that stand in the way of equitable distribution of ICT access and usage and therefore effective technological appropriation throughout the nation:

[8] Cornell University: 2009: http://news.cornell.edu/stories/2009/04/poverty-changes-brain-reduces-childrens-learning AND: http://news.cornell.edu/stories/2016/12/kids-poverty-means-psychological-deficits-adults

[9] (1) Technology related innovation hubs: https://www.dr-hempel-network.com/digital_health_contact_lists/17-key-innovation-hubs-in-south-africa/ ; (2) Youth-focused business incubators: https://www.youthvillage.co.za/2014/08/10-business-incubators-know/ .

[10] See e.g.: https://hechingerreport.org/schools-exacerbate-the-growing-achievement-gap-between-rich-and-poor-a-33-country-study-finds/

The dominant economic philosophy in South Africa is the free market economic model adopted by most successful western countries. The comparatively highly developed local ICT industry believes that only a free market growth model is appropriate for national ICT development, and that the benefits resulting from this model will "trickle-down" to the economically excluded population groups in time. The national ICT industry holds the view that it is the state's responsibility to develop ICTs for the 55.5% population that are currently excluded from the full benefits of ICT access and use, and that the state should build the ICT infrastructure in economically deprived areas, and thereafter exit and handover the ICT business to the competitive ICT industry once the provision and operation of ICT services in these areas become commercially viable. This model of development is not "wrong"; it has successfully driven the nation's macroeconomic development to continental leadership, but it has failed to deliver equitable ICT services to the whole nation throughout the 160-year history of telecommunications in the country. Government does not have enough expertise, capability or capacity to provide all the ICT needs of the poor, and the highly competent national ICT industry at present has no intention or will to do so. Any ICT4SDG1 strategy must seek to bridge this ideological stalemate, balancing the nation's free market economic model with a socialist-leaning philosophy that addresses the information needs of the poor.

3. The many attempts to bridge South Africa's Information Access/Use Divides:

Since the advent of democracy in 1994, South Africa has strived to develop solutions to bridge the massive ICT access and use divides that perpetuate the nation's high levels of inequality, poverty and unemployment. The following timelines provide a brief summary of both the recognition of the need to bridge these information access and use deficiencies, and the high-level strategies adopted or attempted to do this:

1994: The Reconstruction and Development Programme (RDP)[11]: **2.8.3:** "*The telecommunications sector is an indispensable backbone for the development of all other socio-economic sectors. An effective telecommunications infrastructure which includes universal access is essential to enable the delivery of basic services and the reconstruction and development of deprived areas*"

1996: Telecommunications Act of 1996[12]: Chapter VII of the Act established the Universal Service Agency (USA, later renamed USAASA) to steer the country towards the RDP objective of Affordable Universal Access to ICTs for all South Africans. Chapter VIII of the Act introduced the Universal Service Fund (USF), a fund derived mainly from levies on licenced ICT operators and service providers to pay for activities undertaken by the USA (USAASA) as defined in section 66. (1) of the Act, and which are directly related to the objective of Universal Access for all.

1996: As part of South Africa's ICT sector reform strategy, Telkom was granted a 5-year exclusivity period before the introduction of competition in the fixed line ICT sector. During this period of exclusivity, Telkom was assigned a critical role as the primary provider of universal service and universal access. A Universal Service Obligation (USO)[13] to provide 1 676 000 new telephone lines in defined underserviced areas (2.69 million new lines total) was imposed on Telkom in exchange for the exclusivity period. Telkom was unable to meet this target fully, and was obliged to recover a significant number of installed lines after the expiry of the exclusivity period. Most rural dwellers were unable to pay the commercial rates set for the telephone services provided. Telkom elected to pay the regulatory penalties rather than continue providing uneconomic services to the target underserviced areas.

1998: USA (USAASA) begins construction of Telecentres[14]. There is a wealth of documentary evidence and reports that extol the virtues of telecentres, and just as many that provide evidence of their failure. The three references provided in footnote 14 are just a small sample of a huge

[11] The Reconstruction and Development Programme (RDP): https://www.sahistory.org.za/sites/default/files/the_reconstruction_and_development_programm_1994.pdf

[12] Telecommunications Act, 1996: http://www.internet.org.za/telecoms_act.html#Universal_Service_Agency

[13] Universal Service and Universal Access: Mandla Msimang 2006: https://www.wits.ac.za/media/migration/files/cs-38933-fix/migrated-pdf/pdfs-5/telelaw10.pdf

[14] Telecentre reports: (1) Telecentres and poor communities in South Africa: What have we learnt? Heidi Attwood and Einar Braathen: http://www.chronicpoverty.org/uploads/publication_files/attwood_braathen%20_telecentres.pdf (2) Telecentres, Access and Development: Experience and Lessons from Uganda and South Africa: Sarah Parkinson: https://idl-bnc-idrc.dspacedirect.org/bitstream/handle/10625/30414/IDL-30414.pdf (3) A global perspective: *"Telecentres are not "Sustainable": Get Over It!"* Mike Gurstein (1944-2017): https://gurstein.wordpress.com/2011/05/18/telecentres-or-community-access-centres-or-public-interest-access-centres-or-community-technology-centres-etc-etc-are-not-%E2%80%9Csustainable%E2%80%9D-get-over-it/

bibliography covering the telecentre experiences of numerous developing countries and regions. The limited publications concerning USAASA's telecentre investments and resulting performance paints a dismal picture:

> USAASA telecentre fail revealed: Johannesburg, 31 Aug 2012
>
> In a 2012 report to parliament by the then Minister of Communications, the record of telecentre achievement by USAASA was stated as:
>
> - Of the 160 established centres so far, only 96 are operational.
> - In the 2006/7 financial year, USAASA aimed for 32 centres, but completed 14; in 2007/8 it targeted 20 and completed none; it achieved all 30 targeted centres in 2008/9 and, in 2009 to 2011, it targeted 100 per year and achieved nothing;
> - The Minister, commenting on the poor delivery of telecentres, suggested that this may be attributed to a lack of adequate skills capability to deliver on projects of this nature, including ICT project management in some cases: *"It is my view that this may be at the centre of the problem. Also, over the past six years, USAASA has had over three CEOs and CFO, with unstable management leadership core. This suggests there has been instability at the agency over the years."*

2004: Under-serviced Area Licenses (USALS)[15]: Following revisions of the Telecommunications Act of 1996, and related to liberalization of the ICT market, the Department of Communications embarked on a programme to license small businesses to provide ICT services in under serviced, mainly rural areas. Following a complex licensing process with numerous revisions and policy amendments, 27 USALS licenses were awarded to new entrant SMMEs from historically-disadvantaged communities. A complex compendium of errors led to costly failures of the strategy, discussed in detail in the report of footnote 16 prepared by the South African Institute of Race Relations in 2016[16]. Details and causes of failure are beyond the scope of this document, but offer vital lessons for the ICT4SDG1 programme of action.

2005: Cost to Communicate: Since the dawn of this 21st century, numerous stakeholder conferences, colloquiums, hearings and roadshows on ICT affordability were convened by the Department of Communications, Parliament's Portfolio Committee on Communications (PCC), ICASA, ICT Industry Associations and Forums, and others. All recognised that ICT affordability was the main barrier to South Africa's full participation in the Information Society. Two examples of this series of activities, with presentations and submissions by key stakeholders, are provided in footnote 17[17]. In 2017, the price of 5GB of mobile data per month for the poorest population quintile was estimated at 71% of their monthly income.

2010: ICASA Call termination regulations: Over the past decade, several regulatory interventions have been proposed to reduce the costs of communications so that South Africa's 55.5% poor citizens can afford to include themselves in the Information Society. The 2010 regulatory intervention is available at https://www.icasa.org.za/uploads/files/Call-Termination-Regulations-33698.pdf, and the amendments of 28th September 2018 are available at https://www.ellipsis.co.za/wp-content/uploads/2018/09/gg41943-Amendment-of-the-Call-Termination-Regulations-2014.pdf. This latest attempt to reduce the costs of communication has raised several objections, and threats, from key ICT industry players, e.g. "*Telkom CEO warns of job losses due to regulation changes*".

2018: The most recent attempt by South Africa to reduce the "Digital Divide" comprised a lengthy public consultation process, the 2014 National Integrated ICT Policy Green Paper[18], which led to further consultations, finalization and adoption of the National Integrated ICT Policy White

[15] Under-Serviced Area Licensing in South Africa: Alison Gillwald: https://itidjournal.org/index.php/itid/article/download/208/78
[16] Under-serviced Area Licenses (USALS): the SAIRR: http://www.polity.org.za/article/telecomsusal-2016-01-25
[17] PCC stakeholder conference November 2012: https://pmg.org.za/committee-meeting/15324/ : Public Hearings Report on Cost to Communicate: Posted by Ellipsis at https://www.ellipsis.co.za/wp-content/uploads/2013/07/Report-of-PPCC-Public-Hearings-on-Cost-to-Communicate.pdf
[18] April 2014: National Integrated ICT Policy Green Paper: posted online by Ellipses at https://www.ellipsis.co.za/national-integrated-ict-policy-green-paper/

Paper on 3rd October 2016, and the Electronic Communications Amendment Bill of 2018. The processes, reports, and final documents have been published online by Ellipses, and are available for download with access to a broad list of stakeholder submissions and presentations in footnote 19[19]. The key components of this national policy-making process with direct relevance to ICT4SDG1 are:

a) Four objectives[20] directly related to SDG1: Objective 1: Affordability of access to all ICT products and services for all South Africans; Objective 2: Accessibility for all, including persons with disabilities; Objective 3: All South Africans must benefit from ICT as enablers of social development and human wellbeing: Objective 4: ICT support of economic growth for all beyond "triple-down" limitations of prevailing economic philosophies. The remaining 2 objectives on ICT investment and security are important but less directly relevant to SDG1.
b) Institutional: The creation of a Wholesale Open Access Network (WOAN) with specific focus on spectrum usage to ensure that the available radiofrequency spectrum resources are used to enforce the policy objectives summarized above beyond the "trickle-down" assumptions of development;
c) Dissolution of USAASA and the Universal Service and Access Fund (USAF, formerly USF): **5.5.1**: "*USAASA will be dissolved and the USAF will be transformed into a new Digital-Development Fund (Digital-DF)".* The current Electronic Communications Act will be revised to enable these changes, which will include the possibility of raising the ICT industry's contributions to this Digital-DF to an unspecified level above the current level of 1% of annual revenues. An amendment to the Electronic Communications Amendment Bill of 2018 to enable these changes has yet to be initiated.

4. Summary and concluding comments on South Africa's ICT4SDG1 Strategies:

The short timelines of South Africa's strategies to bridge the nation's information divides, also popularly referred to as the "Digital Divide" demonstrate the nation's understanding and commitment to finding solutions for the divisive challenges. Each national strategy, from the statements in the RDP of 1994, to the current round of policy and regulatory interventions enshrined in the National Integrated ICT Policy White Paper and the resulting Electronic Communications Amendment Bill of 2018 are logical, have a firm theoretically basis, and are clearly well intentioned. The strategies are not "wrong", but they have been and will continue to be largely ineffective in bridging the nation's massive digital divides. Poverty levels in the country are far too deep for traditional policy, regulatory, and institutional frameworks to rectify. Affordability of transformational ICT services form the greatest barrier to poverty alleviation through ICTs in South Africa. Until this affordability barrier is breached, the well-known contribution of ICTs to national economic growth will not trickle down to the poor:

Cost of ICT for South Africa's poor: In 2014, the Broadband Commission recommended a price target of 5% of GNI for entry level broadband[21]. This represents approximately ZAR340[22] per month, equivalent to 44% of average monthly expenditure for all 30.38 million South Africans living below the UBPL, rising to 65% for the 13.8 million South Africans living at the FPL.

If ICT services are to contribute towards the upliftment of South Africa's poor, the Broadband Commission's recommended prices targets should be revised to cover all the transformational ICT needs of the poor, i.e. the usage of broadband by the poor must expand beyond the entry level proposed, keeping pace with the rapid technological developments and user capacities with prices

[19] National Integrated ICT Policy White Paper; Electronic Communications Amendment Bill 2018, posted online by Ellipses at: https://www.ellipsis.co.za/national-integrated-ict-policy-white-paper/ AND https://www.ellipsis.co.za/electronic-communications-amendment-bill-2018/

[20] See summary and comments of the White paper objectives at https://www.ellipsis.co.za/wp-content/uploads/2018/03/Mr.-Walter-Brown-ECA_Bill_2017_Presentation.pdf

[21] Broadband Targets for 2015: https://www.broadbandcommission.org/Documents/Broadband_Targets.pdf. Also see page 7 (9 of 70) in the ITU report ICT Prices 2017: https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2017/IPB2017_E.pdf.

[22] Derived from World Bank data at https://data.worldbank.org/indicator/NY.GNP.PCAP.CD?end=2017&locations=ZA&start=1962

remaining at 5% of disposable incomes of the poor, ZAR38.4 per month in South Africa. This price target is particularly critical for the nation's economically marginalized children and youth who must acquire the digital skills necessary for inclusion in the high technology demanding Fourth Industrial Revolution (4IR or Industry 4.0), and who must in future contribute towards the nation's economic growth instead of being a drain on growth as they are at present.

Clearly, the pro-poor price target of ZAR38.4 per month or less is beyond the capability of even the best national ICT policies and regulatory systems, or the best efforts of USAASA or its successor institution under the current economic growth model. New highly creative and potentially disruptive ICT growth strategies are therefore needed if the nation's digital divides are to be breached, and the ICT4SDG1 objectives realized. The concluding section below presents some guidelines for the development of such strategies.

5. Guidelines for a renewed strategy for ICT4SDG1

5.1. The Objective of SDG1 is "**NO POVERTY**": The strategy must aim directly at the poor, raising income levels in the immediate short term, and improving opportunities for children and youth for long term sustainable defeat of poverty. The key features of the strategy must include:

5.1.1. Massification and Scalability of ICT4SDG1 initiatives. If these two factors are not realized, any limited success will fuel inequality further and deepen poverty. The success of a few over the failure or stagnation of many is a historically proven recipe for poor economic growth and societal instability;

5.1.2. As an ICT4SDG1 initiative, it must use technology, but without being technologically deterministic. Technology must be the tool used to defeat poverty, not the objective of the strategies developed. Old, modern, and future technologies must be strategically positioned and leveraged; use what is available immediately and leverage technological changes and opportunities aggressively for future growth;

5.1.3. JOBS: The strategy must create jobs in an environment where technology tends to decimate jobs through automation for efficiency and productivity increases. The first priority will be a "bottom-up" job creation strategy which targets community members as formal and/or informal SMME owner/operators of the poverty alleviation strategies and resulting infrastructures. Business models must be simple yet profitable – revenues derived from use of the services by the poor within the community must be enough to cover overheads and enable incomes for the facility owner/operators that are above the prevailing poverty lines for the target communities.

5.1.4. The business and technological models must be sustainable: they must recognise the hostile environment for SMME sustainability in modern South Africa, in which start-up failure rates exceed 75%. High turnover of these SMMEs must be anticipated and accepted, with maximum flexibility for ownership changes, and growth through business collapses and renewals, mergers and acquisitions fully tolerated and even encouraged as a growth strategy. All barriers to entry must be reduced as far as possible, and an environment that fosters and welcomes creativity, innovation and entrepreneurship developed. The very high SMME failure rates prevalent in the country should be used as learning tools, lessons must be derived from such failures – this will require close monitoring and continuous evaluation, activities best provided by specialized public sector institutions or dedicated private/public partnerships.

5.2. Invaluable lessons can/must be derived from the successes, partial successes, and failures of South Africa's efforts to promote ICT4SDG1, together with the successes and failures of similar initiatives in South Africa's developed and developing nation global peers. South Africa's ICT successes lie in the impressive growth of the national ICT industry; the nation's failures are its inability to provide the full range of transformational ICT services to the poorest majority of the population. The proposed strategy will begin with deep analyses of all South Africa's historical and current attempts to bridge the elusive Digital Divide, emulating or repeating the successful

elements where possible, and ensuring that lessons are drawn from the historical failures so that they can be avoided in future programmes of action.

> **Notable South African Successes:** Besides the rapid expansion of mobile ICT services since their introduction in 1994, the growth of Internet Service Providers (ISP) is a notable success story in the country. The Internet Service Providers Association (ISPA) with approximately 190 members, provides mainly (but not exclusively) fixed line Internet access, while the Wireless Access Providers Association (WAPA) with approximately 280 members of various categories, provides mainly wireless based Internet services (WISP). The majority of members in both industry associations are small and even micro-businesses, but collectively, they have been at the core of South Africa's Internet user growth and sophistication. These vital ICT operators have not been able to breach the nation's massive Digital Divides. Can the business and technological models that ISPA and WAPA members thrive on be amended to meet the needs of South Africa's poor majority and their children? The possibilities are immense, but they need serious and highly focussed (on pro-poor applications) research, development and direct application as part of the ICT4SDG1 strategy.

5.3. One of the most fundamental flaws of all South Africa's ICT4D strategies to date has been the affordability of ICT access and services for all:

5.3.1. **Access: Individual versus Public**: The standard model of ICT access, individual access, is beyond the affordability of all 30.38 million South Africans living below the UBPL. Any policy or regulatory intervention that attempts to balance the national cost-to-communicate targets under the free market national growth model will not reach the affordability limits of the poor. Can a mass public access model similar to the public telephone systems that catapulted telephony to today's near ubiquitous level be amended and updated to enable broadband connectivity for the poor? Individual connectivity at a price target of ZAR38.4 per month for all required ICT services cannot be met by any ICT operator under the current preferred national ICT operator model, nor can the target be met through policy or regulatory interventions under the prevailing free market economic model. If mass public access to broadband is the only model that can possibly meet the above price target, then such a model must be developed and implemented as a matter of urgency.

5.3.2. **Telecentre Limitations:** The telecentre model, a preferred national response over the last 20 years, has failed to bridge the Digital Divide. In 2008, the cost of access and use of telecentres was more than the target communities could afford (see section 5.4 on page 12 of footnote reference 14, the eMpumalanga telecentre: (a) A 30-hour computer literacy course cost ZAR600 (ZAR1092.43 in 2018), 142% of the average monthly expenditure level for 30.38 million citizens; (b) ZAR20 per hour for internet use, ZAR36.41 after adjusting for inflation to 2018, represents 142% of the 2018 daily consumption level for this population group. The report observes as follows:

> *"there are many times when a person would have spent all their money on transport and cannot pay for the photocopy, so what do you do? You can't turn them away, so they don't pay":* eNyakatho telecentre manager, 2009.

5.3.3. The telecentres were economically unviable and unsustainable for their operator/owners and their users. In addition, the services telecentres offered were not attractive to users, especially children and youth. The telecentres and their architects failed to empower the poor so that they could define their own relationships with technology and its benefits, especially children and youth. This aspect is well documented in an excellent ethnographic study by Brazil's David Nemer, now with University of Kentucky[23].

5.3.4. **Cost of user terminals:** As indicated in the reports of footnotes 3 and 4 in section 1.4 above, poor people are already sacrificing a significant proportion of their meagre incomes just to communicate. Any new ICT4SDG1 intervention must improve the quality of this communication while ensuring affordability for the target communities. The cost component is two-fold – cost

[23] See Brazilian study: *"Rethinking social change: The promises of Web 2.0 for the marginalized"*: David Nemer: http://firstmonday.org/ojs/index.php/fm/article/view/6786/5516

of access and cost of ownership of user terminals. User terminal costs range from the equivalent of one month's available consumption for the 8.48 million South Africans that live within the UBPL (low cost smart phones), to seven (7) times the monthly expenditure capacity for PCs and Laptops. The effectiveness of small screen handhelds against larger screen PCs and laptops for learning purposes is an important consideration that needs further consideration, analysis and research. Most ICT4SDG1 initiatives, including the "Free Wi-Fi" municipal models gaining favour, do not take this critical factor into account, which must therefore be built into the public broadband access model to be developed for South Africa.

5.4. **Focus on Children:** Any pro-poor public broadband access strategy must focus on the poorest children first. Children from wealthy families easily acquire digital literacy skills through the high performing schools they attend, and through home connectivity and ownership of appropriate user terminals. Poor children are excluded from this opportunity – the schools they are able to attend are generally dysfunctional[24]. It will take many years before all schools in the country become equal and able to deliver the same high-quality education as former "model C" and private schools. And yet, digital literacy acquisition even in early childhood education (ECD, below age 8 years) is known to impart critical thinking skills vital for this information age. There is a wealth of knowledge of how digital learning and technological appropriation can begin in early childhood. Excellent research references are provided in footnote 25[25]. The public broadband facilities must be designed for play with learning for young children, and for productive use by youth and adults from poor communities.

5.5. **Connectivity and coverage**. Connectivity and coverage at the national level is increasing under the national free market economic model of development, but much slower, if at all, in the rural and economically challenged urban areas of the country. High quality fixed broadband access in the form of FTTx, and fixed wireless (LTE) connectivity is increasing in the wealthier urban commercial and residential areas, with virtually zero increase in the poorer rural and urban areas. This fact alone will fuel the growth of inequality – the wealthy segments of the population will benefit from the rapid technological advances of e.g. 5G with its near unlimited broadband capacities and qualities, while the poor strive to pay for inferior connectivity at much reduced qualities. The numerous policy and regulatory instruments in place and under consideration will not meet the price target for the very poor; ZAR38.4 per month (5% of average disposable incomes) for all transformative ICT products and services. New innovative solutions are required if the ICT4SDG1 targets are to be met.

5.6. **Integration of many ICT4SDG1 initiatives**. The national recognition of the threat of poverty has spawned numerous initiatives in the national ICT sector. Directly focussed state initiatives such as the Small Enterprise Development Agency (Seda); the Department of Small Business Development (DSBD); private/public partnerships such as Project Isizwe (latest information available as a podcast at https://iono.fm/e/617871) and Zenzeleni.net; ICT-focussed academia-driven innovation hubs such as the Wits University supported Tshimologong Digital Innovation Precinct, and many more. Most of these operate in silos – overcoming the "Not Invented Here" syndrome in South Africa continues to be a major challenge, presenting near-insurmountable barriers to effective collaboration and sharing of experience and knowledge.

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[24] See "Inequality: An Introduction" and the referenced video at: http://www.sakan.org.za/

[25] (1) Swedish preschool teachers' conceptualization of digital media: https://www.idunn.no/dk/2016/01/we_have_to_be_professional_swedish_preschool_teachers_

(2) European Union 2018: "Young Children (0-8) and Digital Technology": http://publications.jrc.ec.europa.eu/repository/bitstream/JRC110359/jrc110359_young_children_online.pdf

(3) New Education Policies and Practices in South Korea: UNESCO: https://bangkok.unesco.org/content/new-education-policies-and-practices-south-korea

(4) World Bank recommended online learning games: http://www.worldbank.org/en/topic/edutech/brief/evoke-an-online-alternate-reality-game-supporting-social-innovation-among-young-people-around-the-world

(5) David Nemer: Digital Favelas: What Cities of Tomorrow Can Learn from the Slums of Today: https://www.epicpeople.org/digital-favelas/

Zenzeleni.net - translation: "Do It Yourself": A public/private partnership engaged in community ICT development through a self-provision (cooperative) strategy conceived at the 10th Internet Governance Forum (IGF) held in Brazil, 2015. During this IGF, the "Dynamic Coalition on Community Connectivity (DC3)" was formed to develop the concept. The concept was reinforced at the 11th IGF (Mexico 2016), during which a full report with detailed implementation strategy was tabled (Download the 4.2MB 205-page book here). The South African initiative is supported by the Department of Trade and Industry (DTI support for cooperatives), researchers from the University of the Western Cape, the Association of Progressive Communications (APC), and the Right 2 Know Campaign. The network is located in the Eastern Cape rural community of Mankosi, with approximately 100 000 inhabitants, 93% unemployment, and 90% with less than high school education. The major challenge is scalability – can this ambitious initiative reach sustainability and scale beyond the pilot study at Mankosi? A full description of the initiative is available at https://www.ellipsis.co.za/wp-content/uploads/2018/03/Zenzeleni-ECA_Bill_2017_Presentation.pdf. The major problems, challenges and complexities of ICT4SDG1 in South Africa's impoverished rural communities are presented in a highly informative video documentary about the Zenzeleni.net initiative available to view at: https://www.youtube.com/watch?time_continue=927&v=YxTPSWMX26M

Poverty is a global challenge recognized by virtually all nations and their national and international development agencies and institutions. In its October 2018 report[26], the World Bank observes that while global poverty has declined steadily over the past 25 years, this decline is slowing down, and sub-Sahara Africa, including South Africa, remain regions of great concern with stagnant or increasing levels of poverty. In a critique of the World Bank report, a leading South African media company noted as follows:

The World Bank's optimism about global poverty misses the point: Mail & Guardian, 29 October 2018:
"*World Bank poverty estimates have come in for a lot of criticism. For example, Jason Hickel, an anthropologist at the London School of Economics, has pointed out that there's often a large gap between national poverty lines and the international poverty line stipulated by the bank. For example, more than 55% of South Africa's population lives below the country's upper poverty line, of R1 138 a month. But, according to the World Bank, only 18.85% of the South African population lives in poverty. This suggests that the international poverty lined touted by the World Bank systematically underestimates the extent of global poverty*".
The article proceeds to acknowledge the World Bank's most recent changes in its definition of international poverty lines, linking them to the respective national economies and therefore the variable poverty challenges that citizens face. For South Africa, this poverty line is US$5.50 PPP as used in section 1.5 of this analysis, leading to the conclusion that 55% of South Africans are poor. This conclusion aligns well with the final conclusion of the World Bank that *"almost half the world's population lives below the $5.50 a day poverty line"*.

Given the global concerns briefly outlined above, the experiences of nearly all developing countries, and an increasing number of developed economies facing rising poverty and inequality levels, it is logical that the proposed collaboration should extend globally. Such extension need not be confined to financial or other material forms, it can be limited to the vital sharing of experience and knowledge without loss of value. Such a global collaborative reach is suggested in the South African Knowledge Access Network (SAKAN) site under development; a full list of potential partners is provided at http://www.sakan.org.za/Partners.html, and efforts to build partnerships with them all, and with other like-minded international collaborative efforts, is at an early stage of development. The BRICS partnership of Brazil, Russia, India, China and South Africa holds immense promise for such collaboration. The global collaborative process has already started – the UNDP supported International Policy Centre for Inclusive Growth (IPC-IG), which has established an online collaborative platform as its principal output[27]. This is a vital tool for information and knowledge sharing, similar to the information sharing strategy under development at http://www.sakan.org.za/.

6. The Proposed ICT4SDG1 strategy for South Africa:

The proposed ICT4SDG1 intervention for South Africa is based on an expansion of the Internet Café model, which was introduced by South Korea in 1988 to bridge the ICT accessibility and affordability gap that arose with the introduction of Internet services. This access model is said to have helped the country overcome the 1997 Asian Economic Crisis, and catapulted the nation to

[26] Decline of Global Extreme Poverty Continues but Has Slowed: World Bank 2018: https://www.worldbank.org/en/news/press-release/2018/09/19/decline-of-global-extreme-poverty-continues-but-has-slowed-world-bank
[27] IPC-IG Progress Report on the implementation of outcome 1: http://www.ipc-undp.org/pub/eng/Progress_Report_Brazil_Africa.pdf

Rank#1 in the global ICT Development Index (IDI) for most years since measurements and analyses began in 2010. Even after becoming the most connected nation on earth in terms of broadband internet penetration, speed and quality, approximately 25 000 "PC Bangs" remain in operation in South Korea[28]. They have graduated from low cost connectivity places to community places providing high value interactive online gaming services to the digitally-literate citizens of the country. The global online gaming industry had an estimated value of over US$100 billion in 2017. The United States of America followed South Korea's Internet Café model three years later in 1991, followed by virtually all nations that have experienced high economic growth, especially during the early stages of Internet evolution when access to both connectivity and terminals was limited, and prices were therefore high.

The Internet Café model is not new to South Africa; the concept has been in use since the introduction of the Internet in 1988. South Africa's deep income inequalities, and therefore the massive Digital Divide, have effectively restricted the concept to the wealthier segments of the nation, depriving the 55% population living below the current poverty lines, of the full benefits of the Information Society. South Africa's peer developing nations, especially those in the BRICS partnership that includes South Africa, have benefited greatly from the concept, both intentionally and unintentionally. The Internet Café model, appropriately named "LAN House" in Brazil after South Korea's "PC Bang" (loosely translated to PC House) from which it was derived, has contributed greatly to the nation's digital and social inclusion strategies.

In South Africa, Internet Cafés proliferate the middle- and high-income shopping complexes, but with typical user prices of ZAR60 per hour to surf the Internet, and the transport costs required to reach them, they are not positioned to contribute towards achievement of the nation's ICT4SDG1 objective. They are even more remote for the children of the poor who need them most. These children, and their parents living in poverty, lack the requisite ICT user skills to benefit from modern ICT technologies – the Internet Café model can go a long way to enabling the acquisition of these vital 21st century skills, thereby bridging the nation's massive knowledge divides. The target user prices for the Internet Cafés proposed lies between ZAR3.00 to ZAR5.00 per hour. Subsidies for children through tokens as part of the nation's social grant poverty alleviation systems are possible.

The Internet Café model is on the decline globally, a decline driven by increased access to affordable user terminals and broadband connectivity by the wealthy and growing middle class income groups. The underlying business models are being replaced by high value online gaming strategies, preferred even by relatively wealthy users with excellent connectivity and user terminals in their homes, but who prefer the social interaction and community spirit of the public facilities. Many users prefer their Wi-Fi connected smartphones to access the Internet, but for many poor families, the only access to Wi-Fi is found at or near Internet Cafés, or at or very near public Wi-Fi hotspots. Brazil's Internet Café model welcomes smartphone users and provides the connectivity they need. Many young users use both – their smartphones and the LAN House PCs.

The Internet Café model is also not the only model available for the ICT4SDG1 objective - it is just one of many strategies each with their own strengths and limitations; they all need to be implemented, evaluated and refined to breach South Africa's yawning digital divides. ICTs as a whole are not a panacea for the reduction of poverty, they are invaluable tools in the arsenal of tools suitable for achieving the ICT4SDG1 objective. The Internet Café model remains important as one of the transit paths towards full population inclusion in the global Information Society, especially for nations like South Africa with very deep economic and digital divides.

[28] 6 Things That Surprise Foreigners About Korean Internet Cafes: https://www.koreaboo.com/lists/kyletitle-6-things-that-surprise-foreigners-about-korean-internet-cafes/

Can South Africa reposition the Internet Café model to drive digital and social inclusion for ICT4SDG1 success? A brief survey of the world's Internet Cafés, and a concept paper outlining the process[29], suggest that the model can and should be so positioned.

6.1. **The size of the ICT4SDG1 Challenge:** The chart below, derived from STATS SA GHS 2016 by ICASA, presents the first quantitative challenge for the proposed ICT4SDG1 proposal. With just 9.5% of households connected to an "always on" or 24/7 Internet connection, irrespective of the technology used, this represents the greatest barrier to achieving the ICT4SDG1 objective. Whole families need 24-hour Internet access on demand, for entertainment, learning, social inclusion, informed access to public services, and for security. 53.9% household Internet access using mobile devices is welcome, but not enough from a quality, availability, and affordability perspective – children's learning opportunities, and their ability to call for help in the event of emergencies, are severely limited by the reliance on mobile broadband only.

Without fixed internet connections at home, the next best solution for learning, digital skills acquisition, technological appropriation, and social inclusion for whole communities is the Internet Café, located within communities and easily accessible to children, youth and adults alike. The current household penetration of 9.8% for public broadband access is clearly inadequate. The public Internet Café model provides an elegant, affordable and vital interim solution that is easily scalable to meet the needs of whole communities, villages, and even whole provinces or municipalities.

The table below should be the starting point for the development of an effective ICT4SDG1 strategy that meets the needs of South Africa's poor. The multidimensional complexities of ICT4SDG1 discussed in http://www.sakan.org.za/Docs/ICT4SDG.pdf can be easily accommodated in the Internet Café model, which not only provides the connectivity needed, but also the research and development platforms that this complexity demands.

Table 1: Households' access to the Internet by place of access, geotype and province, 2016

Place Internets accessed	Geotype	Province (per cent)									
		WC	EC	NC	FS	KZN	NW	GP	MP	LP	RSA
At home	Metro	27,3	6,8	NA	8,2	9,0	NA	14,9	NA	NA	15,2
	Urban	16,6	5,8	6,3	4,7	6,7	6,6	13,8	5,4	5,2	8,3
	Rural	16,6	0,7	3,5	2,4	0,8	0,6	17,3	6,3	0,5	2,0
	Total	**23,6**	**3,9**	**5,5**	**5,4**	**5,2**	**3,5**	**14,7**	**5,9**	**1,6**	**9,5**
At work	Metro	25,0	20,9	NA	12,2	21,4	NA	25,4	NA	NA	23,9
	Urban	14,0	12,8	14,8	10,4	20,5	12,0	22,5	12,6	15,4	15,3
	Rural	9,0	2,5	4,6	2,7	4,4	3,4	25,4	5,4	2,7	3,9
	Total	**20,9**	**10,9**	**12,0**	**9,9**	**14,5**	**7,6**	**25,0**	**8,5**	**5,5**	**15,8**
Using mobile devices	Metro	64,5	67,0	NA	62,6	52,8	NA	62,2	NA	NA	61,6
	Urban	45,1	55,4	57,2	50,0	57,6	59,9	73,1	63,3	55,7	58,0
	Rural	25,8	29,9	39,4	41,0	35,5	45,2	58,8	50,0	35,5	38,3
	Total	**56,9**	**48,0**	**52,2**	**52,4**	**47,1**	**52,4**	**63,6**	**55,8**	**40,0**	**53,9**
At Internet Cafes or education al facilities	Metro	12,6	10,8	NA	6,8	15,9	NA	16,8	NA	NA	15,1
	Urban	11,3	9,0	3,5	8,5	8,9	5,4	14,7	5,9	3,7	8,5
	Rural	1,1	1,3	4,3	6,0	4,8	3,0	9,3	4,2	1,9	3,2
	Total	**11,6**	**6,2**	**3,7**	**7,7**	**9,9**	**4,2**	**16,4**	**4,9**	**2,3**	**9,8**

Source: ICASA's report on the state of ICT sector in SA - 6 - March 2018 (page 8/88)[30]

[29] (1) Global survey of Internet Cafés (7.4MB download size) is available at http://www.sakan.org.za/Docs/SA-LAN.pptx, (2) Concept paper is available for download at http://www.sakan.org.za/Docs/Concept%20Paper%202017.pdf.

[30] ICASA State of ICT Report 2018: https://www.icasa.org.za/uploads/files/State-of-ICT-Sector-Report-March-2018.pdf

7. Key features of the ICT4SDG1 Strategy: Success criteria for the proposed Internet Café model:

7.1. **Bottom-up ownership and operation**, top-down design, implementation and support, and multidisciplinary research that combines or coordinates the major research methodologies in order to directly and immediately apply the research results directly to the resolution of the ICT4SDG1 challenge. The Brazilian LAN House model has demonstrated the capability of this model as platform for pro-poor qualitative, quantitative, applied, and problem-oriented researches on how best to achieve the ICT4SDG1 challenges in the shortest possible time.

7.2. **Direct job creation:** This vital objective must be positioned at the core of all strategies and programmes designed to meet the ICT4SDG1 target. Job creation must be a direct outcome of the strategies to ensure sustainability and scalability. Four major barriers stand in the way of sustainable mass job creation using Internet Cafés as proposed:

7.2.1. **Efficiency and productivity gains** are the raisons d'être of all technologies, including the ICTs. Job creation is not therefore a natural outcome of technological advances - on the contrary, human labour reduction is a design objective and a natural consequence of the technological advances, especially in this age of artificial intelligence and its mass automation possibilities. The most immediate albeit temporary short-term job creation possibilities are those jobs required during the network construction phases, but even these are being progressively automated. The operations and maintenance processes needed by the networks and their operators are themselves being automated rapidly, however, direct assistance and support to users at an early stage of technological skills acquisition will be needed in the near future. The Brazilian LAN House model has demonstrated how the LAN Houses themselves can facilitate such job creation – LAN House owners taught themselves, through internet access, the rudiments of network and user equipment repair, maintenance, and other support services which were available only in the wealthy suburbs at much higher cost. The most valuable and sustainable jobs are those that arise from the use of ICTs in areas often outside the ICT industry itself, a vital and well-known feature of the ICT industry. These latter jobs must be actively promoted and developed through targeted research, especially in this Fourth Industrial Revolution era.

7.2.2. **Affordability** of all the components of Internet Cafés remains a challenge in need of solutions. This includes all hardware and software, overheads such as furniture and premises rental, backhaul connections to the Internet, and the support personnel needed to operate the facilities. Various models have been used by South Africa's peers to reduce the capital costs of the model. The Brazilian LAN House model, in which the state and municipalities assisted in the supply of LAN House hardware and software as part of their poverty alleviation strategies, has been particularly effective. A full description of the Brazilian strategy is provided in the links of footnote 30[31].

7.2.3. **Backhaul access costs:** High speed and high capacity broadband connections to the national broadband infrastructure are costly, and have often discouraged the establishment and sustainability of Internet Cafés. These barriers are not insurmountable, they can be easily overcome through policy, regulatory, and industry support. The National Integrated ICT Policy White Paper of 2016, and the related Electronic Communications Amendment Bill of 2018 currently being finalized, offer elegant solutions for judicious allocation of spectrum for ICT4SDG1 applications. The lower frequency UHF spectrum bands are particularly suitable for remote rural applications, many developed and developing nations have used these frequency bands to extend broadband services to remote rural areas. Internet Cafés tethered to the terminals of point-to-point and point-to-multiple point high capacity UHF links, using e.g. Wi-Fi local distribution, are eminently possible but need policy and regulatory support. One

[31] Presentation by the Brazilian Technical Team accompanying the Brazilian President during a state visit to South Africa in 2010: Slides 23 to 26 in http://www.sakan.org.za/Docs/MultiStakeholder_Forum.ppt (7.46 MB file)

immensely valuable policy intervention is the proposed Digital Development Fund – this fund can be positioned to provide the vital rural broadband backhaul infrastructure, and assist new SMME entrants to develop the end user Internet Café-based services.

7.2.4. The industry too can contribute greatly by extending their networks to the areas of greatest need, sustaining such extensions even through commercial charges for the services so provided. Massive sharing of the broadband connections so provided can reduce the affordability challenges faced by the proposed new entrant SMME owners and operators. For example, Vumatel, an FTTH service provider, recently publicised a strategy to connect poor households to 100Mb/s fibre at ZAR89 per month. This service charge can be easily met by the SMME operators charging affordable fees to hundreds of users within their communities, even after sharing the backhaul capacities beyond the 20:1 contention ratio proposed by Vumatel in its business model. Where fibre connectivity is not possible, fixed wireless (LTE) access even at the commercial rates currently in the range of ZAR100 to ZAR149 per month for 1GB usage could provide entry level services (see ICASA tariff report of 15th October 2018), but bandwidth caps need to be increased or removed altogether, and prices need to fall further, if such connectivity is to provide sustainable businesses for the new entrant service providers.

7.2.5. **SMME Churn:** The failure rate of SMME start ups in South Africa is higher than 75% (many analysts believe it is higher than 90% if informal SMMEs are included). This failure rate will increase with the increasing automation as the 4IR unfolds. This factor must be accepted as an inevitable occupational risk of progress, but it can be minimized. Numerous bureaucratic and institutional barriers to SMME success join the multitude of corporate cultural traits, educational shortcomings, work ethics, and rapidly changing technological and natural environmental changes, to add to the complexity of SMME success. These challenges are not insurmountable, but their reduction demands major shifts in the socio-economic-cultural-political environment in the country, a very lengthy and complex process. It must start with the provision of knowledge to the currently excluded population groups, through tools like the modified Internet Café model proposed in this document.

7.3. **Public support for new SMME service providers:** Most developing nations tolerated the introduction and growth of Internet Cafés during their early introductory stages, preferring instead state interventions through telecentres. Some countries still consider internet Cafés to be illegal enterprises hosting illegal activities such as gambling, outlets for illegal drug dealers, and worse. South Africa tolerates the presence of Internet Cafés by including them as a statistic in all household connectivity surveys and references, but has yet to raise their status as important elements of the nation's ICT4SDG1 strategy.

7.4. Some of South Africa's BRICS partners continue their hostility to Internet Cafés, with attempts to shut them down or restrict their activities through rigid regulatory systems. Brazil is an exception; after early suspicion and hostility, the nation recognised the value of LAN Houses in promoting their digital and social inclusion agenda in the economically marginalized favelas and rural areas, and their contribution to the expansion of vital SMMEs. The Brazilian LAN Houses, referred to as the "LAN House Phenomena" by the Brazilian Government and numerous multidisciplinary researchers, began life with the same level of government suspicion and hostility, but this soon changed to active support once the nation recognised the invaluable service such facilities contributed towards the nation's digital and social inclusion agenda. This "phenomenon" is well documented; the references in footnote 30 in section 7.1.2 above, and a more recent ethnographic study listed in footnote 31[32] below, are small examples of this research.

[32] Digital Favelas: What Cities of Tomorrow Can Learn from the Slums of Today: David Nemer 2015: https://www.epicpeople.org/digital-favelas/

7.5. What lessons can South Africa draw from the nation's BRICS partners, on both the value and the risks of Internet Cafés? They may be the best or only solution for digital inclusion by very poor communities, and especially their children, in modern South Africa.

7.6. **Inclusion of Children:** Numerous studies, national and international assessments, and a flood of media coverage paints a dismal picture of South Africa's basic education system, and therefore the higher education system which it serves. One of the most profound commentaries on the deep educational inequalities that plague the nation is the documentary video "Some Children are More Equal than Others: Education in South Africa". The internet links to this troubling documentary, and other similar documented video evidence, are provided in footnote 32[33] below.

7.7. The complexities of South Africa's educational challenges are clearly beyond the scope of this ICT4SDG1, they will be addressed in a similar manner in the section ICT4SDG4 – Quality Education. The proposed ICT4SDG1 strategy offers immense potential to reduce the ICT4SDG4 challenge, by enabling digital appropriation and imparting digital skills to South Africa's e-excluded children from a very early age. The Brazilian LAN House experience suggests how this can be done – very young children acquiring digital skills from the favela-located LAN Houses, supported by a large quantity of empirical evidence, some of which is listed in footnote 25 in section 5.4.

7.8. As discussed by Brazilian researcher Dr David Nemer in his ethnographic studies of Brazil's favelas[34], digital literacy acquisition must not be the sole responsibility of the education systems available to the poor – the raising of educational outcomes and standards in poorly developed basic education systems is far too complex and long-term to produce useful results in time for the 4IR inclusion. Poor children must be encouraged to "play and learn" with technology in Internet Cafés as part of the Early Childhood Development programmes (ECD) while the formal school system and its educators are developed to provide such training over time. To counter access and security concerns, it would be preferable to collocate such child-friendly Internet Cafés with junior schools, and/or with unemployed mothers as Internet Café owner/operators, who will also use the facility to help bridge their own vast knowledge divides. These possibilities will be discussed further in ICT4SDG4.

7.9. **Security Concerns:** Cyber Security challenges are a growing global concern, far too complex for full coverage in the scope of this ICT4SDG1 discussion. They must however, be central to the design of the Internet Cafés and their operational systems and business plans. Concerns over security issues must not detract from realizing the full value of ICT4SDG1, they must support the ICT4SDG1 tools, strengthening them through focussed research on the impact of cyber security threats on the lives of poor children, youth, and even adults. The researchers must focus on rapid digital literacy acquisition with security, and not allow security concerns to undermine that digital literacy acquisition. Some related lessons can be learned from the Brazilian experience, e.g. the United Nations Entity for Gender Equality and the Empowerment of Women (UN Women) introduced an online tool to Brazilian LAN Houses to tackle violence against women and girls in Brazil's favelas[35].

7.10. The global cyber threats have veered dangerously towards the socio-political domains – massive malevolent algorithms and botnets, fake news and "alternative facts", destructive and disruptive Internet viruses, all geared to derail national democratic processes and economic

[33] South Africa's educational challenges: (1) Some Children are More Equal than Others: Education in South Africa: https://www.youtube.com/watch?v=hiEUu-Is0Ao (2) Summary of South Africa's educational challenges: http://www.sakan.org.za/ and specifically: http://www.sakan.org.za/SAEducation.html

[34] Rethinking Digital Inequalities: The Experience of the Marginalized in Community Technology Centres: https://scholarworks.iu.edu/dspace/bitstream/handle/2022/20349/Nemer%202015.pdf

[35] UN Women tackle violence against women and children in Brazil's favelas: http://www.unwomen.org/en/news/stories/2013/6/rio-de-janeiro-apps-to-end-violence-in-favelas

growth. Specific ethnographic/technological researches are needed to define the critical division between safety and security through knowledge and numbers, and rigid controls often used that undermine the good intentions of technological advances which have benefitted humankind throughout its evolutionary history. A fine balance between the constructive elements of ICT and the destructive and illegal elements, especially the impact of both on children and young minds, needs to be struck, through highly focussed and intensive multidisciplinary research.

8. **Conclusions:** The human ability to create new knowledge, and share it with fellow humans using various communication devices that include language and technology, has been the key driver of human evolution and development throughout human history. These knowledge creation and information sharing devices and processes have advanced to today's massive information and communication technology infrastructures that are influencing and shaping the same humans who created them, both positively and negatively. Vast information and knowledge divisions between the information haves and information have-nots have developed, fuelling even greater divisions between all aspects of human endeavour and existence. The Sustainable Development Goals represent vital global initiatives to narrow these divisions, enabling the development of fully inclusive societies that benefit equitably from all the fruits of technological advances.

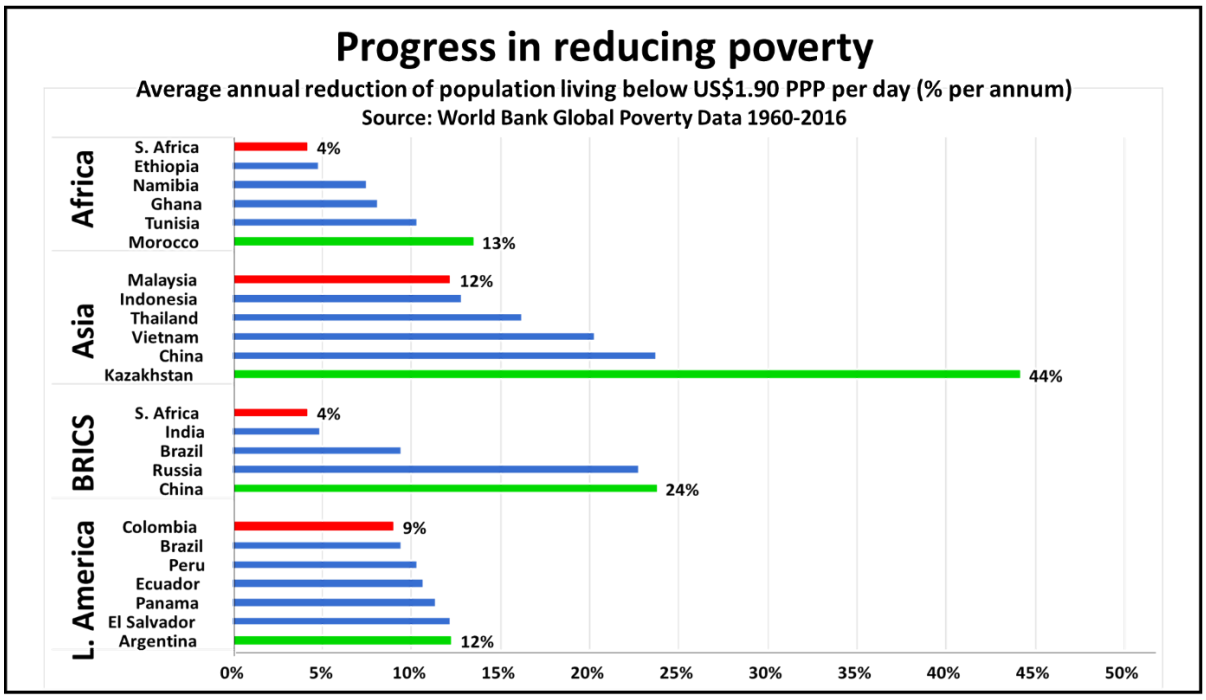
   This ICT4SDG1 initiative addresses the most fundamental human challenge of all – extreme poverty in a world of plenty. If allowed to grow unchecked, this division will most likely derail much of the advantages that humans have derived from technological advances. South Africa is particularly vulnerable: the highest levels of income inequality in the world; unemployment levels reaching global records; and poverty levels for 55.5% of the population that ranks them alongside the top twenty nations with the highest population percentages living below national and global poverty lines. All this in one of the wealthiest nations with the highest level of technological skills available on the African continent. Clearly, this massive inequality poses a threat to the nation's development with socio-political stability.

   The ICTs that form the core of the ICT4SDG1 strategies are themselves tools to combat this seemingly insurmountable barrier. Many developed, newly developed, and developing nations have overcome or are in the process of ameliorating this challenge – the ICTs present a vital path to the knowledge and understanding of these peer country experiences that is necessary for the development of local solutions. The documented success of developed economies such as the Nordic group of countries and some East European and East Asian countries which have reversed extreme inequalities and poverty in their earlier histories, can offer vital lessons for South Africa's development. A classic example is how Sweden overcame its underdevelopment history through direct focus on the threats of inequality, poverty and unemployment[36]. Can South Africa emulate the success story of Sweden?

   This analysis of South Africa's progress in meeting the Sustainable Development Goal of defeating poverty provides a timely reminder of the need for urgent and intensive action.

[36] 2011 Swedish Example: The rise, fall and revival of a capitalist welfare state: what are the policy lessons from Sweden? http://www.ifn.se/wfiles/wp/wp873.pdf

Annex 1: South African poverty benchmarked against selected developing countries.



Source: World Bank poverty data: http://api.worldbank.org/v2/en/topic/11?downloadformat=excel

NOTES:

1. Poverty data based on International Poverty Line of US$1.90 PPP per day.
2. The International Poverty Lines have changed to adjust for differing levels of economic development, and therefore cost of living (see section 1.5 in this document for more details). A single international "absolute" poverty line applicable to low income countries, and a series of "relative" poverty lines adjusted for each economic cluster within the range US$3.20 for lower-middle income countries, US$5.50 for upper-middle income countries, and US$21.70 per day for high income countries. The World Bank has yet to publish global poverty statistics based on these poverty lines, as per Recommendation 16 (page23 of 263) of the "*Monitoring Global Poverty*"[37] report of the Commission on Global poverty. Applying these revised poverty lines will reduce the rate of poverty reduction for each country – more people falling into the poverty trap as economies grow and inflation drives up prices.
3. In addition, poverty reports from all countries differ in the levels of detail and the reporting frequency. For example, Brazil's poverty alleviation strategies are based on annual measured poverty statistics, whereas the data for South Africa is updated less frequently, and are therefore less useful for monitoring and evaluating poverty alleviation strategies.
4. The estimates of annual poverty reduction rates provided in the chart are based on calculations using the oldest and most recent poverty data reported for each country – the periods covered for each country are therefore different, depending entirely on the reported statistics available for each country included in the analysis.
5. In spite of the above shortcomings, the comparisons above provide vital early warnings of deficiencies in national poverty alleviation strategies. Correcting such deficiencies must result in improved data collection and analyses that lead to better monitoring, evaluation, and strategic adjustments.

[37] Monitoring Global Poverty: World Bank 2017: https://openknowledge.worldbank.org/bitstream/handle/10986/25141/9781464809613.pdf