SDG 5: GENDER EQUALITY

ORIGINAL: ICTs can provide great opportunities for gender equality by enabling everyone to have access to the same online resources and opportunities. They enable women to gain a stronger voice in their communities, their government and at the global level. ICTs can also provide new opportunities for women's economic empowerment by creating business and employment opportunities for women as owners and managers of ICT-accessed projects, as well as employees of new business ventures. Yet, over 250 million fewer women are online than man. The gender gap in access to ICTs needs to be urgently addressed if the benefits of ICTs to gender equality and gender empowerment are to be achieved.

A SOUTH AFRICAN-SPECIFIC PERSPECTIVE[1]:

HOW CAN INFORMATION AND COMMUNICATION TECHNOLOGIES HELP RESTORE GENDER EQUALITY AMONGST HUMANS?

Contents:

[1] First draft compiled by Walter Brown, Johannesburg 21st May 2019. Comments and suggestions welcome, email to: walter@sakan.org.za

1. INTRODUCTION

"*Women must be at the forefront of nation building to bring the South African citizenry together and therefore develop a whole new ethos of human co-existence*." – Steve Biko, 1947 to 1977.

"*The recent killing of women in our country bears testament that the chains that bind them find expression in the patriarchal society. The sad reality is that the women of South Africa will remain trapped within the confines of this society unless we truly apprehend and conceive the words of Steve Biko*". – Opinion by Zweli Mkhize, 18 September 2017.

The two significant personalities in South Africa's political history quoted above have both understood the tragedy of gender discrimination in South Africa, and the world in general. Both recognised the illogical and irrational social construct of Patriarchy as a root cause of this human tragedy. The quest for solutions that will resolve the challenges of SDG5 – Gender Equality, must therefore begin with an examination of the root causes of gender inequality – patriarchy, followed by a closer look at the specifics of the phenomenon. There is a wealth of empirical evidence linking patriarchy to gender discrimination, and the consequential rise of violence against women and children. This empirical evidence positions patriarchy as a relatively recent social construct that spread to virtually all the world's societies, becoming the dominant social format that shaped nearly all economic, legal, political, religious and social philosophies and systems across the globe. A popular definition of "patriarchy" is "*a social system in which men hold primary power and predominate in roles of political leadership, moral authority, social privilege and control of property*". Its origins are traceable to the transition from mainly egalitarian nomadic "hunter-gatherer" social structures and lifestyles that lasted more than 90% of humanity's estimated 350,000-year evolutionary history, to the current complex sedentary post-agricultural revolution societies largely defined by materialism and competition for material resources.

Patriarchy is therefore nearly as old as the modern post-agricultural society, about 12,000 years. During its early formative years, it was reinforced through political and religious edicts that concentrated economic, political and social authority and power in the masculine half of the species. This was done to ensure that material possessions acquired as a result of the emerging materialistic culture remained in the hands of the male descendants of the property owner after his demise, a patrilineal system of inheritance. To guarantee further the desire for patrilineal inheritance, it became necessary to ensure that male offspring were indeed patrilineal. The role of women in the evolution of our species was, as a result, drastically redefined, leading to the gender discrimination that we know today.

In the search for explanations of the above patriarchal phenomenon, new gene-centred theories of evolution and natural selection have emerged, including those described by Richard Dawkins in his "Selfish Gene" theory, in its simplest explanation, a way of protecting or preserving an individual's own genetic lineage. Richard Dawkins recognised that even if this theory holds true, humans can amend it through social engineering and re-engineering:

> "*Let us try to teach generosity and altruism, because we are born selfish. Let us understand what our own selfish genes are up to, because we may then at least have the chance to upset their designs, something that no other species has ever aspired to do*." Richard Dawkins quote from "The Selfish Gene, 1976"

This ICT4SDG5 discussion document expands Richard Dawkins' advice "*to teach generosity and altruism*", using empirical evidence from ancient human history (the hunter-gatherer egalitarians) where the practice of "upsetting the selfish gene" were applied without question or thought. We need to understand the causes and effects of the successor post-agricultural revolution era where the selfish gene phenomena returned in full force. Such understanding can/must lead to the design of a future where humanity, with the help of technology, upsets the selfish gene designs yet again to defeat gender inequality and all its anti-social aspects.

The ICT4SDG5 strategy is embedded in the 2030 Agenda for Sustainable Development, adopted by all 193 member states of the United Nations in 2015. This agenda divides all human development challenges into seventeen Sustainable Development Goals (SDGs) that focus on key aspects of all global challenges, ranging from *SDG1 - End poverty in all its forms everywhere*, through *SGD5 - Achieve gender equality and empower all women and girls*, to *SDG17 - Strengthen the means of implementation and revitalize the global partnership for sustainable development*. A core component of all seventeen SDGs is the Information and Communication

Technology (ICT) sector. ICTs enable the vital critical access to, and sharing of, all knowledge related to all seventeen multidimensional, interrelated, and interdependent SDGs, across all geographic, cultural, linguistic and knowledge boundaries that influence their existence and severities. ICTs also enable and enhance the critical global, regional and national collaboration and coordination efforts that are essential for the achievement of all SDGs. In drafting this ICT4SDG5 document, the first line of research was to review the global targets and indicators of SDG5[2]. The next research phase was to examine all relevant international databases[3] to seek those with specific relevance to the unique situation in South Africa. This was followed by analyses based almost entirely on local South African data sources and research publications, following the recognition that not all international data and statistics were relevant to the unique South African social dynamics of gender discrimination and the violence against children and women that results.

2. Global use of ICT for Gender Equality: A South African Perspective:

There is much more to gender inequality than equitable access to information, online resources and the opportunities such access presents. Human history is awash with records of gender-based discrimination that are so deeply entrenched in cultural, religious and societal dogmas and norms that even the most equitable access to all online resources and opportunities will not on its own succeed in helping to reverse the phenomenon. Gender discrimination begins at birth, is reinforced through systematic indoctrination throughout the lives of most children alive today, in their homes, institutions of learning, places of employment, entertainment and worship, and even in the justice systems practiced by many countries. Modern humans pride themselves in their relentless march towards their current definitions and perceptions of civilization, decency and justice, whilst paradoxically tolerating, and in some cases exacerbating, the most extreme breaches of those same definitions perpetrated on more than half the human population, based only on physiological differences between the sexes that defines the species.

The global challenges of gender discrimination are being addressed through the fifth global Sustainable Development Goal (SDG5): *Achieve gender equality and empower all women and girls.* Nine entry-level SDG5 targets with supporting indicators have been developed by the United Nations family, to enable nations to amend or redefine them to suit their specific SDG5 national challenges. This discussion document begins this process of localizing the SDG5 targets and indicators for the unique SDG5 challenges faced by South Africa, with a special focus on the use of ICT. ICTs can and must be positioned and used to foster the achievement of this vital human development goal. Information and knowledge sharing amongst humans, the principal role of ICT, has been central to the development of the human species throughout its ±350,000-year march to today's technologically dependent world. Today's economically-driven technologically-dependant highly productive and too often destructive species may have had a more golden past, we must attempt to find this past and learn from it. In the design of the SDGs, and the Millennium Development Goals (MDG) that preceded them, the ICTs have been identified as vital tools that enable the achievement of all development goals. They are positioned within SDG9 for the infrastructure and industries that enable them, and as implementation tools for all SDGs in SDG17.

This ICT4SDG5 discussion document begins with a very brief statistical review that quantifies South Africa's SDG5 national challenges, supported by equally brief extracts from statements made by government, the media, civil society, and concerned national stakeholders. Besides the statistics, official statements, media reports and anecdotal data that will be discussed, the wealth of anthropological and related scientific evidence of the origins and evolution of violence in general, and gender-based discrimination and violence in particular, will be reviewed as a key component of the ongoing search for solutions to this pervasive human challenge. Some of the evidence that will be presented is extremely disturbing, but must nevertheless be fully acknowledged and understood by all South Africans if the debilitating impact of gender discrimination is to be contained and reversed. The discussion document is open to public access, contributions by experts in the subject, and other concerned individuals, is most welcome.

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[2] Sustainable Development Goal 5 Achieve gender equality and empower all women and girls: https://sustainabledevelopment.un.org/sdg5

[3] (a) UN Gender Statistics: https://genderstats.un.org/#/indicators; (b) WEF 2018: The Global Gender Gap Report: http://www3.weforum.org/docs/WEF_GGGR_2018.pdf: (c) UN Human Development Data (1990-2017): http://hdr.undp.org/en/data

This discussion document retains an informal structure consistent with its intended use as a basis for further intensive discussions. References are presented as hyperlinks within the document, and in full in the footnotes, thus necessitating online perusal if access to all the included references is required.

2.1. Gender Equality in South Africa: Status Summary:

2.1.1. South Africa has excellent constitutional, policy, and legal provisions for the support of victims of gender discrimination and violence. A comprehensive National Development Plan (NDP) that addresses the challenges is also available. Relatively well-defined legal protection, sanction, reparation and retribution provisions are available in various sections of the national justice systems, for use by law enforcement agencies, and by victims of gender abuse and discrimination.

2.1.2. South Africa also publicly acknowledges the poor application and implementation of constitutional and national policy provisions and laws, and the visibly deficient law enforcement processes, which reduce the effectiveness of the excellent constitutional, policy and legal support frameworks.

2.1.3. The national failure to apply the constitutional and national policy provisions, and to effectively apply the law enforcement actions necessary, are acknowledged by the highest office in the country. On 1st November 2018, South Africa's State President Cyril Ramaphosa presented the keynote address[4] at a "Gender-based Violence and Femicide Summit", noting that "*The unrelenting murder of women – for no reason other than that they are women – is steadily corroding the soul of our nation*". He went on to note and make reference to the alarming World Health Organization (WHO) statistics that follow, and South Africa's own law enforcement statistics that suggest an increase of 11% in femicide over the last few years.

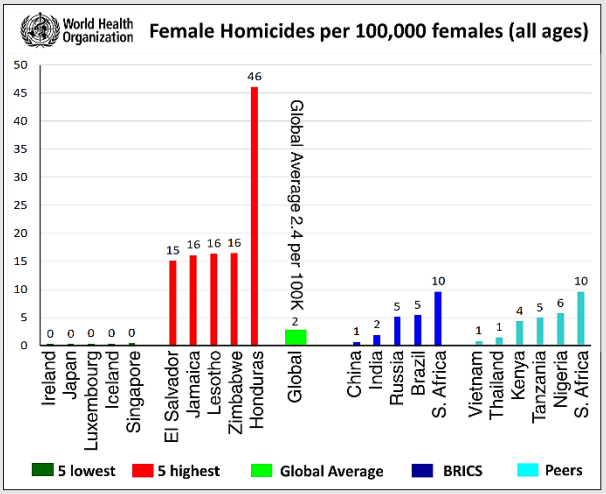
The President also decried the unacceptably high levels of rape that amounted to 138 per 100,000 in 2017, and appealed for direct action that goes far beyond the confines of summits and related high-level "talk shops". The statistical online portal NationMaster, drawing from the United Nations Crime Statistics, positions South Africa as the "rape capital" of the world, ranked 120th out of 120 countries. The actual rape statistics reported for South Africa were 132.4 per 100,000 incidences in 2010, followed by Botswana (92.9), Lesotho (82.9), Swaziland (77.5), and Zimbabwe (25.6). In the SADC region and the world, Mozambique portrays one of the lowest recorded rape prevalence at 0.2 per 100,000 people.

2.2. Female Homicide in 2015:

2.2.1. Global benchmarks

Female Homicide in 2015: South Africa/world benchmarks

- Female Homicide means the murder of women, for ANY reason including Femicide, a narrower definition that is specific to murder of women because they are women.
- Female homicide (all ages) in South Africa has declined by more than 55% since year 2000, but at 9.6 per 100,000 in 2015, remains four (4) times higher than the global average of 2.4 per 100,000.
- Of far greater concern are the levels of homicide in South Africa perpetrated on girls and young women aged 15 to 29 years. WHO data ranks South Africa 158th out of 166 nations in this alarming statistic, 16.7 per 100,000, or five (5) times the global average of 3.3 per 100,000 in 2015.



Source: Download data - World Health Organization

[4] Keynote address by President Cyril Ramaphosa at the Gender-based Violence and Femicide Summit: https://www.youtube.com/watch?v=pY6deDesB60

2.2.2. STATS SA 2019[5]: The murder rate of women in South Africa has declined by more than 50% between years 2000 and 2015, yet remains double the global average (Figure 1 of STATS SA Report No. 03-40-05 June, 2018).

2.2.3. World Health Organization (WHO)[6]: Global murder rate of all women in 2015: 2.4 per 100,000; Global murder rate for women aged 15 to 29 years in 2015: 3.3 per 100,000; **South Africa**: murder rate for all women in 2015: 9.6 per 100,000 (4 times global rate); murder rate for women aged 15 to 29: 16.7 per 100,000 (5 times global rate).

2.2.4. South Africa Femicide Rates: SAPS and STATS SA, BRICS: Comparative studies/reports:

There are numerous excellent research outputs and their publications by highly competent South African academics, and a proliferation of media coverage of Femicide in South Africa:

- **Gender based violence on the rise:** SA Government News: June 19, 2018: "*Violence against women is a serious problem in South Africa. Horrific stories of intimate partner violence have been highlighted in the media since #MenAreTrash went viral. The hashtag has also been sparked by the murders of Karabo Mokeona; Nonkululeko Mpanza and Nompumelelo Mhlongo (in Thokoza); Promise Mthembu (in KwaZulu-Natal) and Unisa student Jabulile Nhlapo*".

- **VIOLENCE AGAINST WOMEN IN SOUTH AFRICA**[7]

A COUNTRY IN CRISIS? *Even with limited data to work from, VAW (Violence Against Women) in South Africa is enduring, and has been described as 'widespread, at a high level and normalised' and as occurring in endemic proportions. Interpol's comparative statistics worldwide suggest that in 2002, South Africa ranked as the world's number one in terms of reported cases of VAW. Recent reports indicate that this situation has not changed for the better. The recorded murder rate of 24.7 per 100 000 females in South Africa is significantly higher than global levels. Considering that a major problem linked to these statistics is gross underreporting, such extreme and high rates remain a cause for concern. Furthermore, prevalence rates of intimate partner violence (IPV) across population-based studies in South Africa put the rate at between one-in-five and one-in-three women reporting experiences of physical IPV in their lifetime, with 40 to 50% of men disclosing having perpetrated physical partner violence. Additionally, nearly one in five women reported having experienced sexual IPV.*

Authors: Nonhlanhla Sibanda-Moyo; Eleanor Khonje; Maame Kyerewaa Brobbe.

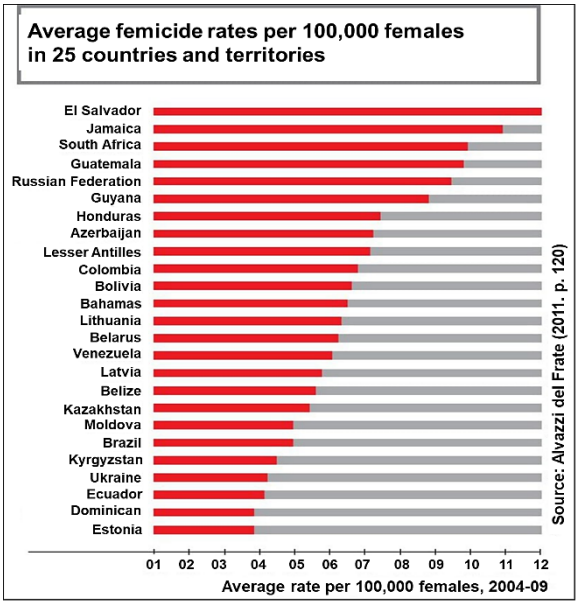
- **BRICS Reports:**

Number of women (18+) murdered in South Africa & the femicide rate:

Year	Number of woman (18+) murdered	Femicide rate (per 100,000)
2013/14	2,354	13.1
2014/15	2,234	12.2
2015/16	2,416	13.0
2016/17	2,639	14.0

Source: South African Police Service and Statistics South Africa

"Research shows that domestic violence against women remains widespread and under-reported, and that victims of violence are not effectively supported by public services. Insufficient "specialised" services for women and children who are victims of violence and the absence of professional services to victims is only a few of the reasons for non-reporting". **South African Government**: *http://www.gov.za/issues/violence-against-women-and-children-0*



Source: http://bricsmagazine.com/en/articles/defending-women

[5]STATS SA: Crime against Women in South Africa: http://www.statssa.gov.za/publications/Report-03-40-05/Report-03-40-05June2018.pdf
[6] World Health Organization Homicide Data by age, sex and year: Microsoft Excel Spreadsheet from: http://apps.who.int/violence-info/homicide/
[7] VIOLENCE AGAINST WOMEN IN SOUTH AFRICA: A COUNTRY IN CRISIS – 2017: https://www.csvr.org.za/pdf/CSVR-Violence-Against-Women-in-SA.pdf

In the BRICS chart above, South Africa ranks third highest out of the 25 listed nations. South Africa is a member of the 5-nation BRICS community that compiled the report. How can South Africa collaborate more effectively with its BRICS partners to reverse this major national challenge?

2.3. Violence against Children, Infanticide:

- ***February 12 2019:*** Durban baby rescued from storm drain a 'miracle' – doctor: *The new born baby who was rescued from a stormwater pipe in Durban on Monday morning is in good health, her attending physician has said. "She has been awake, responsive and crying. Her glucose and sugar levels are good. She is stable enough for [a] transfer to base hospital so the social aspect can be sorted," Dr Timothy Hardcastle told journalists at Chief Albert Luthuli Hospital. He added: "From the medical side, all is sorted. We did what is known as a babygram and found nothing broken and no serious injuries. From our side we are satisfied and happy.".* Source: My Broadband*. (Story and video "went viral" on most social media platforms).*
- ***18th February 2019:*** *Woman arrested over new born baby dumped in Durban stormwater drain: Police spokesman Colonel Thembeka Mbele said the woman was arrested on Monday. "A 27-year-old suspect has been arrested ... while at a local hospital. She was arrested for attempted murder relating to a child found in Newlands East last week."* Source: DispatchLIVE 2019-02-18.
- ***28th February 2019:*** Father of baby dumped in drain wants to raise her in loving home: Durban - The wife of the biological father of the baby who was dumped in a stormwater drain said she was prepared to raise the child as her own. "*When I held the baby in my arms for the first time, she reminded me of my eldest son. They are identical and all I could think about was giving this child a home*." The 33-year-old year woman who cannot be identified spoke to IOL this week saying that it was only God that helped their family survive this ordeal. Source: IOL Daily News / 28 February 2019, 10:21am / Jolene Marriah -Maharaj.

How deep is the challenge of infanticide in modern South Africa? What are the underlying causes and effects? What causes a mother with natural instincts to nurture and protect her baby to behave in this manner? What causes a biological father to avoid, deny or otherwise evade the responsibility of paternity/parenthood? Could the insurmountable challenges of poverty and unemployment, poor education, and a deep sense of hopelessness and social exclusion be the underlying causes of this form of crime? Can constitutional provisions, national policies and laws, law enforcement, reduce and eliminate this devastating national anti-social behaviour on their own? Whilst ICT cannot reverse or eliminate this disturbing national challenge, ICT can provide a platform from which the above questions can be considered, understood, and addressed by all South Africans.

The following extract from a recent study presents just one example of the depth and scope of the national challenge:

> Baby killing in South Africa – uncovering the unthinkable[8]
>
> *South Africa has one of the world's highest reported homicide rates involving babies. A first national study, published this week, finds the annual killing of hundreds of new-borns and infants to be a "serious social and public health problem". Abandoning babies indicates a failure of health services – there is a critical need for intervention to assist vulnerable mothers.*
>
> *Researchers led by Naeemah Abrahams of the gender and health research unit at the South African Medical Research Council in Cape Town estimate the South African rates for neonaticide (killing a child within the first 28 days of life) to be 19.6 per 100,000 live births, and for infanticide (killing a child under one year) to be 27.7 per 100,000 live births.*
>
> *These rates are surpassed only by an estimate for the Tanzanian city Dar es Salaam of 27.7 per 100,000 live births "and are much higher than those reported in developed settings", the researchers write in a paper published on 26 April in the peer-reviewed international open access journal PLOS Medicine*. Source: Medical Brief 2016.

The above research undertaken by Professor Naeemah Abrahams and her colleagues at the South African Medical Research Council is just one of many local and international studies that record the extremities of this SDG5 challenge in South Africa and abroad. The mothers of the infant victims are just as much victims of the

[8] Research led by Naeemah Abrahams of the Medical Research Council of South Africa, published in the PLOS Medicine site, April 26, 2016 at https://journals.plos.org/plosmedicine/article/file?id=10.1371/journal.pmed.1002003&type=printable

societal challenges, irrespective of the children's genders at birth - the preference for male offspring in some countries that leads to gender-biased infanticide is not prevalent in South Africa. The instinctive mother/child caring, love and protection is being eroded by our prevailing social norms and socioeconomic structures. There are no easy fixes or single solutions for this immensely human social challenge, it goes far beyond its focus as a crime within the national justice system, or its positioning as a health/medical challenge as per the referenced study. It is an outcome of all 17 SDGs, each one has an integral impact on this immense national challenge, which therefore demands a holistic solution in addition to the specialized interventions by the experts within each defined SDG.

Law enforcement to combat the crimes of gender and child abuse, discrimination and violence is necessary, but is not enough. The most effective sustainable strategy is mass education that builds the caring knowledge-based societies suggested by Professor Phillip Tobias and other leading scientific philosophers discussed in the following paragraphs. Mass education, especially in a complex society already deeply fragmented along economic, education, gender, race, and religious divisions is extremely complex, and necessarily slow. Every individual, community, social cluster, business and governance clusters, needs re-education and transformation, irrespective of the difficulty entailed, or the status and/or knowledge they already have. Invaluable lessons can be drawn from the human evolutionary story, but the adoption and adaptation of lessons from the past will meet significant resistance from the current generation of Homo sapiens. The transition from Homo-sapiens to Homo digitalis, through Homo economicus and Homo technologicus, terms that are already defined and in use, will probably be even more difficult albeit shorter than ±1 Million-year transition period from Homo erectus to Homo sapiens.

Technology, specifically the pervasive ICT industry with its social media applications that are so freely used, and abused, can be converted to powerful purpose-built tools to reinvent and rebuild society towards a more egalitarian, caring, nonviolent and sustainable future society, the primary objective of all 17 Sustainable Development Goals: or they could be used to exacerbate these human deficiencies and ultimately destroy the species and its living environment. This stark choice rests with the nation's leaders across all knowledge disciplines that define our species and its environment today, and even more with its citizens.

This introduction of the proposed South African ICT4SDG5 process concludes with a final short review of yet another facet of the immense SDG5 challenges that South Africa faces.

Baby Rape in South Africa – Brutality breeding Brutality?

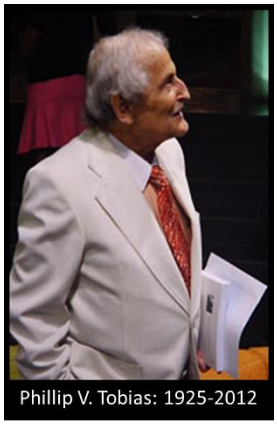
- 2010: Do victims of child abuse and rape become perpetrators of child abuse and rape? Dr Amelia Kleijn, a leading South African social worker and expert in this field, addresses this question in her doctoral thesis "The Demographic Profile and Psychosocial History of Convicted Perpetrators of the Rape of Children under the age of three years"
- Mar 9, 2013: Al Jazeera, "South2North - Behind the global rape epidemic": South African Journalist and media personality Redi Tlhabi searches for understanding of the rape crisis with professionals in law, psychology and sociology, including South Africa's Dr Amelia Kleijn: what causes this immensely inhumane yet very prevalent human phenomenon? India and South Africa share this man-made scourge – can they also share the solutions?
- 13th November 2014: Is a child raped every three minutes in South Africa? **NO! The data is flawed**. Africa Check disputed this recurring claim, noting the flawed data sources and compilation methodologies, the reluctance of South Africa's law enforcement agencies to compile and publish this form of crime. Just "*11.3% of child rapes are reported to the [South African Police Service]*"
- 10 May 2018: Judgment expected in horrific child rape trial. "*Judgment in the case of six family members accused of a string of child abuse and rape charges is expected in the Pretoria Magistrate's Court on Friday - hopefully bringing to an end a seven-year ordeal for the six victims.*"
- 18 May 2018: 41% of rapes committed in South Africa are against children. "*We are aware of the rates of abuse, but people are not disgusted by it enough to take action. Some of these children are killed by the people they know*", Save the Children NGO.
- October 2018: Infant rape in South Africa takes centre stage in a play titled Tshepang: A harrowing stage performance recorded and broadcast by SABC, the national public broadcaster. *Extremely graphic images not suitable for sensitive viewers.*

3. A brief review of the anthropology of gender discrimination and violence:

In our search for solutions for the multitudes of multidimensional challenges that face humanity today, and South Africa in particular, it is useful to examine the historical evolution of these challenges, identifying key points of human behavioural changes[9] that may have triggered their introduction. This discussion document examines the available literature, verifying the underlying assumptions and/or preconceptions that define current understanding of this evolutionary history, to support the search for responsive strategies to today's threats. From such analyses, lessons can be learned, historical best practices identified, and effective interventionist strategies and action programmes developed that balance the best of the historical experience with modern-day challenges and opportunities. The scientific disciplines of anthropology, palaeoanthropology, and modern behavioural science are the lead research areas for this quest for lessons from the past. The whole ICT industry, especially its Information Systems (IS) sub-discipline, presents vital platforms for the information flows and knowledge sharing needed to extract the best lessons from these core research disciplines.

The role of Information Systems in the development of our species is strongly suggested by Professor Richard T. Watson *(Africa's Contributions to Information Systems, 2013)* as a vital tool that promoted a successful "Out of Africa" human migration and first population of the whole world, by Homo sapiens approximately 100,000 years ago. The genetic origins of human violence is suggested by one of South Africa's leading scientists of the modern era – Professor Phillip Valentine Tobias:

"*The human species has a genetic pre-disposition of being extremely violent, and very caring. Culture and environment determine where we are between these extremes. Must we wait 1000 years for genetic evolution to breed out our propensity for violence? If we are helpless products of our genes, then we must. But if we accept that we are a product of our society and our genes, we can change society to reduce our propensity for violence. Society creates us and our behaviour, but we create society, therefore, we are in a position to recreate ourselves and to master our genetic propensity for violence*." (Derived from "Tobias' Bodies"; a 6-episode documentary video, copies available at most South African Universities).


Phillip V. Tobias: 1925-2012

Professor Tobias was right in nearly all counts, we are indeed a product of our genes and our society. But research-based doubt has crept into his conclusion that we are genetically predisposed to being extremely violent. Virtually all pre-agricultural hunter-gatherer societies, those that are now extinct and those that remain in today's world, are being shown to be mostly egalitarian, especially with regards to gender, and much less violent on a sustained per capita basis than their modern post-agricultural descendants.

The following discussions examine briefly humanity's violent, less violent, or non-violent past as a way of deriving knowledge and understanding of today's highly destructive violence in the face of significant gains in knowledge and development. The critical question arising from these discussions is: "*what can we learn from our deep past that will enable us to develop the less violent, caring societies suggested by Professor Phillip Tobias in today's high technology and economically driven world of the Fourth Industrial Revolution?*" Clearly, there can be no return to the lifestyles of our ancient ancestors, but we urgently need to relearn their art of egalitarian survival in this rapidly changing world. Technology can and is replacing traditional socio-political structures in fundamental ways, and could thereby unleash potentially unstable violent societies, or the stability and peace that comes with egalitarian societies.

Numerous highly respected philosophers, researchers and thinkers have painted an image of our pre-agricultural ancestors as being "solitary, poor, nasty, brutish, and short" (Thomas Hobbes, 1660 The Leviathan). These views are misleadingly supported and shared by highly respected and internationally acclaimed modern researchers and scientists like Steven Pinker (A History of Violence and The Better Angels of our Nature), and other well-intentioned philosophers who shared the "Enlightenment" philosophies that

[9] "Human Behavioural Change" discussed in WEF 2018 article "Can inequality be blamed on the Agricultural Revolution?": https://www.weforum.org/agenda/2018/10/how-the-agricultural-revolution-made-us-inequal.

painted a "dark" human history (the Dark Ages), and the "Dark Continent" (Africa). Their extreme views and opinions on sex and violence (see "*Sex and Violence: A Way To Hold Women Down*"), which have to a large degree shaped modern attitudes and responses to gender relationships, are progressively being eroded by a growing number of scientists with lower preconceptions about modern civilization's superiority over older civilizations. In fact, each word in Thomas Hobbes' description has been challenged through evidence-based research:

- **Solitary:** Our ancestors were certainly not "solitary" – all known hunter-gatherers, including the few remaining hunter-gatherer societies today, and even the "archaic hominids" (Neanderthals, Denisovans), live(d) in extended family communities comprising 20 to 50 individuals (see e.g. "How Hunter-Gatherers Maintained Their Egalitarian Ways[10]" and "Hunter-gatherers – Brutish Or Brilliant?"[11]). They gathered edible plants in mostly female groups, and hunted in small mostly male groups. They were very rarely "solitary", they found entertainment, protection and security through group activities.
- **Poor:** Hunter-gatherers were not poor, they obtained all the resources they needed from nature, did not store food or material resources besides tools for survival, they did not need banks, supermarkets, or refrigerators. They did not have, nor did they need, jobs. They shared their survivalist workloads and resources equally amongst the whole community, priority resource allocation to children. When environmental conditions deprived them of the resources they needed, they simply moved to greener pastures – one likely cause of the great "Out of Africa" migrations that successfully populated the whole world. There are numerous anthropological research articles to verify these statements, including "*Intergenerational Wealth Transmission and the Dynamics of Inequality in Small-Scale Societies*" published by the US National Library.
- **Nasty:** Nearly all research evidence contradicts this view of humanity's pre-agricultural societies, most of which portray full egalitarianism and kindness, especially between and within gender divisions. Numerous philosophers have expressed this opinion, including 18th century's Jean-Jacques Rousseau's Discourse on Inequality: "*Nothing can be more gentle than he in his primitive state, when placed by nature at an equal distance from the stupidity of brutes and the pernicious good sense of civilized man*." A 2005 New York Times article reports the discovery in Georgia of a 1.77 million-year-old skull of a very old pre-human hominid, devoid of teeth through ageing. Examination of the skull raised the question "Who looked after, and fed this old man for more than two years until his death nearly 2 million years ago?" Is this an example of high-level compassion even in our pre-human ancestry that disproves the Hobbes and Pinker views of brutal nastiness amongst our deep ancestors?
- **Brutish:** A growing body of anthropological and paleoanthropological evidence[12] (*Inequality: Why egalitarian societies died out*) suggest that brutality amongst humans, including and especially gender discrimination and violence, emerged after the dawn of agriculture, about 12,000 years ago. The change from small egalitarian hunter-gatherer societies and small-scale mixed hunters, gatherers and early horticulturalists, led to rapid population expansions which triggered fixed human settlements that grew into cities and nations. These highly populated close-living communities in turn triggered massive societal stratification and hierarchical divisions of labour, which in turn fuelled notions of inferiority and superiority that drove our species towards internal and external often brutal conflict. Attempts to control or otherwise regulate such conflicts through legal prescripts, ethical and moral or religious codes of behaviour frequently extended such brutality to preserve the perceptions of superiority by the "in-groups" over "the others".
- **Short:** This assumption is simply wrong. Forensic evidence helped by genetic science advances shows clearly that pre-agricultural societies were healthier on average than their post-agricultural descendants. Balanced diets of fresh natural foods, physical activities in the form of community work and play, and adequate sleep patterns bereft of technological influences (e.g. artificial lighting), rendered hunter-

[10] How Hunter-Gatherers Maintained Their Egalitarian Ways: Psychology Today: https://www.psychologytoday.com/us/blog/freedom-learn/201105/how-hunter-gatherers-maintained-their-egalitarian-ways.
[11] Article in Ancient Pathways to a Sustainable Future with extensive references at: http://ancientpathwaystoasustainablefuture.org/1huntergatherers/hunter-gatherers-%E2%80%93-brutish-or-brilliant/
[12] Example: New Scientist 2012: Inequality: Why egalitarian societies died out: https://www.newscientist.com/article/dn22071-inequality-why-egalitarian-societies-died-out/

gatherer populations healthier and taller on average than the majority of modern humans today. There are of course environmentally determined exceptions – the Pygmy communities are very short, the result of genetic adaptations for their chosen living environments, and Homo floresiensis, or "hobbit", thought to have become stunted due to isolation in an environment with very limited food resources. The Pygmies are the descendants of much taller Africans from neighbouring regions with very different natural environments. Pygmies are close genetic "relatives" of the Southern African Khoisan and Tanzanian Hadzabe hunter-gatherers, who in turn are considered by most credible scientists to be the genetic ancestors of all humans in existence today.

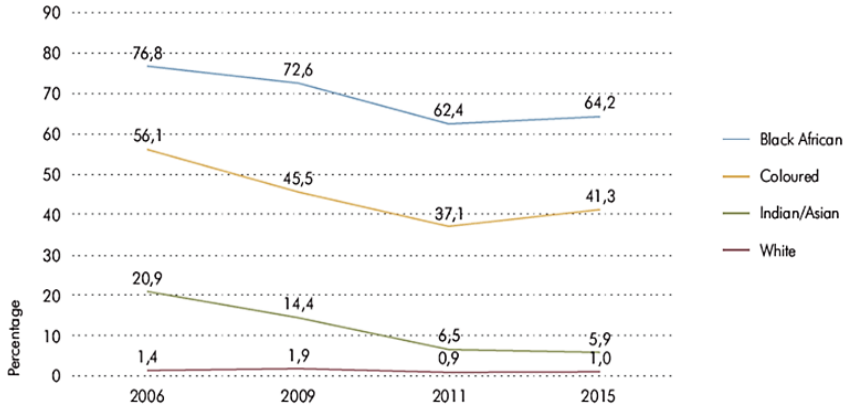
Being short, tall, slim or obese is a genetic adaptation for living environments, diets and lifestyles. Obesity and stunting are modern health and wellbeing threats that challenge all countries in varying degrees, irrespective of their development levels. They are significant challenges for modern South Africa as discussed in the related SDG documents ICT4SDG1, ICT4SDG2, and ICT4SDG3.

3.1. The Racial factor of gender inequality.

Although racism and racialism have been in steady decline since the dawn of South Africa's democracy in 1994, these divisive concepts continue to play a significant role in South Africa's body politic, often spilling over into potentially disastrous divisive national policy decisions. The main reason for the continuation of racial prejudice and stereotypes is that the victims of economic inequality, the huge populations of poorly educated, unemployed and societally excluded citizens, are mostly black South Africans, while the wealthy segment of the population remains dominated by white South Africans. The stark visual differences between the wealthy mostly white minority, and the very poor mainly black majority may be superficial in theory, but it does engender strong highly divisive perceptions of inferiority and superiority, even within nationally defined "race" groups. "Black African" and "Coloured" South Africans are similarly socioeconomically excluded and poor in general, but racial tensions between them remains highly visible due to historical racial segregation. The "racial" characteristic of South Africa's demography provides stark warnings of the severity of this challenge, already spilling over into rigid nationalism in the national political discourse.

3.2. Poverty distribution by Race and Gender: STATS SA 2017 (Page 70 of 141)

Figure 3.2: Poverty headcount by population group (UBPL) (2006, 2009, 2011 and 2015)



The chart above, derived from Statistics South Africa's "Poverty Trends in South Africa[13]" report of 2017, illustrates the stark reality of South Africa's "racial" characteristic of poverty in this modern era. 64.2% of the black South African population live below the national poverty line, compared to 1% of their white compatriots. The "Upper Bound Poverty Line" (UBPL) of ZAR992 per month in 2015 was adjusted upwards for inflation to ZAR1138 in 2017. This revised national poverty line is consistent with the revised World Bank international poverty lines for South Africa's "upper middle income" economic classification. The population-

[13] STATS SA Report 2017: Poverty Trends in South Africa: https://www.statssa.gov.za/publications/Report-03-10-06/Report-03-10-062015.pdf

weighted average household expenditure for all 30.4 million South Africans living below the UBPL in 2015 has been estimated at ZAR768 per month, (page 3 of 19 in ICT4SDG1), equivalent to 77% of the World Bank defined international poverty line for upper middle-income economies like South Africa. Thus in 2015, a total of 55.5% of South Africans lived below the nation's own and the international poverty lines, and the majority of this demographic, 57.2%, were black and female (Figure 3.1 on page 10 of the STATS SA Poverty Report referenced in footnote 13). Poor women are much more exposed to gender violence than their middle or upper-income compatriots:

- "***Rape and physical abuse rates more than double those reported in national studies***": Extremes of inequality, poverty, poor education, and unemployment provide the most fertile grounds for gender abuse and gender/child violence. The majority of economically and educationally poor South Africans are female and black, the principal victims of the 2016 study by Sonke CHANGE trial, in Diepsloot, a particularly poor suburb of Johannesburg. This study, funded by United Kingdom's Department for International Development (DFID), and undertaken with the help of South Africa's University of the Witwatersrand (Wits), found that 56% of men admitted to beating or raping women over the past 12 months, double the national average (STUDY: 56% of surveyed Diepsloot men have raped or beaten a woman in the past year).
- In yet another article published by Professor Edward Webster and colleagues at Wits University, sub-titled "*Gender, race and class - questions of power*", the authors observe that in South Africa, "*the nexus of race, class and gender*" are the principal drivers of national socioeconomic inequalities. "*Gender inequality in wealth and income continues to be pervasive in South Africa. Significantly, black women continue to carry the burden of low-paid work*". The article appeals for more interdisciplinary research on the "*multi-dimensional nature of inequality in all its forms*" so that the "*social and political forces driving high levels of inequality in South Africa are clearly understood*".

More research into inequality and poverty in general, its racial characteristic, and its impact on gender inequality and violence in particular, are most certainly needed. This research must be action oriented, leading to direct early action at the base of South Africa's development pyramid where the horrors of gender violence and child abuse thrive. Numerous research-based real-life evidence, much of it presented in the form of extremely disturbing video documentaries already exist. These studies and documentaries must be used to shape direct action-oriented interventions that complement the numerous institutional and academic research in progress. An example of the video evidence available is the poignant and disturbing short (<4-minute) video documentary about 11-year-old Kelina, told in her own language, about the fears, threats, and disturbing views of her daily quest for education in the poverty-stricken Cape Flats. Kelina strives on a daily basis to avoid the blood and gore left by victims of rape and gang violence as she walks to school each day: "*You have no choice but to see these things!*". This disturbing video must be seen and understood if we are to make any meaningful impact on gender and child violence in the streets of South Africa's cities (click the image of Kelina to access the video).

3.3. A short review of the origins of race, violence, and gender discrimination

The human species did not begin its long evolutionary journey to today with notions of racial differences, gender inequalities, male superiority over females, violence in general, and violence perpetrated by men against women and children in particular. But, the unscientific social construct of race remains a central component of all these features of inequality amongst humans, including gender discrimination. This social construct continues to unleash significant physical, psychological, sexual and other forms of violence related to gender discrimination, inequality and exclusion.

Globally, "race" has had a devastating extremely violent impact on global peace, stability, economic growth, and the full range of human developmental setbacks. Notions of racial and ethnic superiority fuelled the most devastating crime against humanity known to mankind – the African Slave Trade, circa 1540 to 1865. Precise records of the number of African deaths due to slavery were not kept, but estimates by a relatively large

number of historians and anthropologists undertaken as part of the abolition of slavery debates and beyond, suggest numbers ranging from 6 million to 150 million deaths (Death Toll from the Slave Trade ; The African Holocaust). The majority of deaths during slave labour comprised women and children:

Historical Context regarding gender and slavery
"*Even during the last week before childbirth, pregnant women on average picked three-quarters or more of the amount normal for women. Infant and child mortality rates were twice as high among slave children as among southern white children. Half of all slave infants died in their first year of life. A major contributor to the high infant and child death rate was chronic undernourishment*."
Source: The Gilder Lehrman Institute of American History:
https://www.gilderlehrman.org/content/historical-context-facts-about-slave-trade-and-slavery

Slavery was not the only Holocaust of this modern era. The estimated death toll in World War 1 (1914 to 1918) was up to 21 million; World War II (1939 to 1945) ranges from 60 to 120 million; The Chinese Civil War (1929 to 1949) resulted in ±8 million deaths; The Armenian Genocide (1915 to 1917) killed approximately 1.5 million people; Up to 3 million people were killed during the Bangladesh Genocide in 1971; Rwanda's 100-day Genocide in 1994 killed about 1 million people; The controversial Mfecane (aka Difaqane) South African conflicts are estimated to have killed up to 2 million South Africans in the early 1800s; An estimated 470,000 people are known to have been killed in the ongoing Syrian civil war by the end of 2016, mostly women and children as "collateral damage". Counting will resume after the cessation of hostilities in this modern conflict.

In the era of democratic peace in South Africa, approximately 28,000 women and girl children were murdered in 2015 alone (WHO data, footnote 6 on page 5), and yet there was no war of any kind in the country, besides the still nascent "cold war" for justice, peace and equality. Economically and educationally poor black and coloured South Africans continue to bear the brunt of South Africa's poverty-related violent crimes.

The above very brief analysis suggests a crucial insight into human violence – it has no scientifically verified colour, or race. In fact, race does not exist at all in the world of scientific knowledge, race cannot be defined by any field of science, or by any credible scientist. Race is strictly a social construct, created by society and supported by pseudoscientists (e.g. Jean Philippe Rushton, 1943 to 2012). Rushton's "research" in South Africa's universities published in 2005 "proved" that whites have the highest IQ, blacks the lowest, and coloured IQs are halfway between the two! The social construct of race has an economic origin – the perpetuation of power and access to resources held by one group of humans over the "others" for economic competitive advantage.

The social construct of race should actively be "deconstructed" as South Africa's Professor Phillip Tobias has done during his lifetime, and Professor Christopher Henshilwood is doing through his research at Blombos Cave and other South African Heritage Sites. They are joined by Professor J. Craig Venter, a global leader in genetic sciences, as discussed in the text box below.

During his July 2018 exhibition on "Origins of Early Sapiens Behaviour", Professor Christopher Henshilwood, a globally celebrated South African scientist, states categorically that "*there is no such thing as race – if all humans that populate planet earth are direct or indirect descendants of this 'Blombos Community', whose very early innovations progressed systematically to the 4IR technologies that are contributing towards redefining our species today, then race differentials amongst humans cannot be explained or justified by any scientific discipline*". Professor Henshilwood's views on racial differences draws from the researches of his late compatriot, possibly mentor, Professor Phillip Tobias (see Professor Tobias' views on race in the video documentary: Tobias' Bodies – Race). More scientific evidence of "race" as a meaningless social construct has been explained by world-leading biotechnologist, biochemist, and genetic scientist Professor J. Craig Venter (known for creating artificial or synthetic life in his laboratory), who reaffirms this scientific knowledge in his video discussion with young people available at Craig Venter on Race & Science.

The very simple lessons delivered by all these eminent scientists can/will reduce the disruptive and destructive socio-political divisions that arise from racial stereotypes, which also feed into the nation's debilitating gender inequality challenges. The unscientific notions of racial inferiority/superiority will continue to threaten South Africa's development through its body politic if efforts to reverse it are not reinforced. This ICT4SDG5 discussion document represents one avenue to deliver such deconstruction of the race factor amongst South Africans.

Directly related to Professor Henshilwood's continuing research, and to this ICT4SDG5 discussion document, are his views on the ancient African origins of technology. From his excavations at South Africa's Blombos Caves, Howiesons Poort and other South African ancient human settlement sites stretching back some 100,000 years, Professor Henshilwood and his colleagues have built a picture of early human technological innovations that evolved over time to become the most advanced artificial intelligence machines used in today's 4IR. This sentiment is very well stated in his short video documentary "Time Machine - the origins of innovation" – the seeds of the full range of engineering, scientific, technological, and even social science knowledge available today were planted some 100,000 years ago in the cave settlements of Blombos, Howiesons Poort, Sibudu Cave Shelter, and other world heritage sites that proliferate the South African landscape.

3.4. Gender discrimination and violence in Culture and Religion

Introducing religious texts that still influence gender discrimination and gender/child violence:

OLD TESTAMENT*: Numbers 31:13-18: (13) Moses, Eleazar the priest, and all the leaders of the congregation went to meet them outside the camp. (14) Moses became angry with the officers of the army, the commanders of thousands and the commanders of hundreds, who had come from service in the war. (15) Moses said to them, "Have you allowed all the women to live? (16) These women here, on Balaam's advice, made the Israelites act treacherously against the Lord in the affair of Peor, so that the plague came among the congregation of the Lord. (17) Now therefore, kill every male among the little ones, and kill every woman who has known a man by sleeping with him. (18) But all the young girls who have not known a man by sleeping with him, keep alive for yourselves.*

NEW TESTAMENT: *Timothy 2:12-14 New King James Version (NKJV): (12) And I do not permit a woman to teach or to have authority over a man, but to be in silence. (13) For Adam was formed first, then Eve. (14) And Adam was not deceived, but the woman being deceived, fell into transgression*.

Luke 12:45-47: (45) *But suppose the servant says to himself, 'My master is taking a long time in coming,' and he then begins to beat the other servants, both men and women, and to eat and drink and get drunk. (46) The master of that servant will come on a day when he does not expect him and at an hour he is not aware of. He will cut him to pieces and assign him a place with the unbelievers. (47) The servant who knows the master's will and does not get ready or does not do what the master wants will be beaten with many blows.*

Acts 17:26: *From one man He made all the nations, that they should inhabit the whole earth; and He marked out their appointed times in history and the boundaries of their lands*. The last statement of the Act became the Biblical root and justification of the Apartheid philosophy – "racial groups" were to be separated in every way, from places of residence and work to sexual relationships between white and non-white citizens. It was God's "command" that different "nations" (races) must live separately, and miscegenation be criminalized.

THE MODERN ERA: All the world's religions face the dilemma of their ancient historical scriptures dominating the beliefs of large tracts of their modern congregations, whilst the higher echelons and leaders of these religious sects attempt to minimise the historical influences directly or through revised interpretations. One particularly cruel example of this is the resilience of Female Genital Mutilation, a common practice in many parts of Africa and Asia, intended to reduce the libido of women and girls, and enhance the sexual pleasure of their male partners. This cruel practice is not supported by the Holy Quran or any of the major religions, but its mere mention in numerous ancient religious scriptures has led to cultural adherents across most religious sects, supported and perpetuated mainly by women believers.

Much of today's violence in general, and gender-based violence specifically, is fuelled by cultural influences and religious intolerance, sectarianism and bigotry. These are often used as proxies for extreme atrocities and political subjugation conducted in the pursuance of political domination and wealth accumulation. Many modern religions promote within group love, peace and tolerance, yet paradoxically support or actively promote deep divisions and even violence and hatred for "the other" religions. Recent research on the subject suggest that "s***trongly religious people are much more likely to be racist than strongly secular people***" (Secularism, Religion, and Racism, Psychology Today, 2014)[14]. Faith-based violent extremes find prominent coverage in the modern press, these include the seemingly unending Middle East conflicts centred around Israel and Palestine that pit Arabs against Jews and Islam against Judaism; the 9/11 World Trade Centre tragedy; the rise and excesses of the Islamic State of Iraq and the Levant (ISIL) with its African protégé Boko

[14] Secularism, Religion, and Racism, Psychology Today, 2014: https://www.psychologytoday.com/us/blog/the-secular-life/201408/secularism-religion-and-racism

Haram; Myanmar's ongoing brutality against its Rohingya Muslim population; the Charleston church shooting of June 2015; the Pittsburgh synagogue shooting of October 2018, and very recently the Christchurch Mosque Massacres (Friday 15 March 2019). The last three, perpetrated by "lone wolf" white supremacists, drew inspiration from Norway's Anders Breivik's massacre of 77 people in July 2011. All testify to the continuing intolerance between and within religious communities, tainted by notions of racial inferiority and superiority that are often associated with competing religious beliefs. The short list of some historical religious edicts in the sub-paragraph above continue to influence gender relationships today, even after deep fundamental modernization and revisions at the core of the belief systems themselves.

South Africa is not immune, Apartheid is a classic example of such religious-based racial intolerance. The local and global media often dominates the headlines with reports of extreme gender abuse and violence against women and children within church groups, in the Anglican Church, the Catholic Church, and numerous Charismatic Church groups. Reversing the influence of religion on violence in general, and specifically gender inequality and violence within the SDG5 set of challenges, will be extremely difficult. The ancient religious scriptures that dominate most Abrahamic theologies are being abandoned or reinterpreted by theologians of all religious persuasions, but they remain deeply entrenched in the minds of numerus congregants of all religious persuasions. Female Genital Mutilation (FGM) is one such entrenched misinterpretation of theology, practiced as a cultural norm by some South African communities, although the practice has been criminalized.

Indirectly related to FGM is the deeply held South African cultural practice of Ulwaluko, male youth initiation into manhood. The practice is considered by some critics to be a form of male genital mutilation due to the rising frequency of its abuse in unhygienic circumcisions by unregistered and untrained traditional practitioners, which lead to severe injury and death of many South African boys and young men. The cultural practice is supported by the Government of South Africa, albeit with deep concerns over its illegal application. The official South African responses and recommendations available at Male initiations South Africa, provides guidelines on how the practice should be implemented to ensure the safety of the initiates.

There is yet another variation of FGM that is garnering increasing global attention – Breast Ironing, also known as "Breast Sweeping" in South Africa: the practice of "ironing" or otherwise reducing the development of pubescent girls' breasts. This FGM form is perpetrated mainly by women and mothers, supposedly to make the girls less attractive to sexual predators and rapists. The United Nations estimates more than four million victims of this form of FGM. The publicity surrounding this practice in South Africa is minimal, but its existence is discussed in a number of research papers, including those by South Africa's Advocate Mikateko Joyce Maluleke, available at http://www.scielo.org.za/pdf/pelj/v15n1/v15n1a01.pdf.

Understanding the role of culture and religion in gender equality and gender/child violence is vital for the development of effective containment and reversal strategies and programmes, but the subject matter is extremely emotive, complex, and must therefore be handled sensitively. Detailed historical records of the impact of culture and religion on gender (and racial) discrimination in ancient pre-agricultural societies are rare, many tend to be prepared by religious authorities and leaders with perceptibly preconceived and therefore biased notions of their cultural and/or religious righteousness and superiority. Such historical and pseudo-scientific records and opinions have contributed greatly towards some of the extremes of gender and racial brutality that has tainted modern human history. As discussed below, this is changing, as more researchers in South Africa and elsewhere seek insights from the past on how to solve social problems of the present and the future. Questions such as the origins of cultural and religious beliefs, and their impact on human behaviour that influences all aspects of SDG5 in particular, and all other SDGs directly and indirectly, are seldom covered in reports that are simple enough to be understood by those who need such understanding most. Translating as much of the available published knowledge about the nexus of culture, religion, gender and violence into understandable formats that promote direct action by and from the base of South Africa's development pyramid will be central to the ICT4SDG5 implementation in South Africa.

3.5. Egalitarianism, Feminism, Matriarchy, Patriarchy: Key definitions and discussions:

- **Egalitarianism**, Cambridge English Dictionary: *The belief in and actions taken according to the principles that all people are equally important and should have the same rights and opportunities in life.* Modern

anthropological and ethnographic research suggests strongly that the concept of egalitarianism was the norm in most known ancient and some remaining horticultural and hunter-gatherer societies. Any tendencies to assert individual authority or power over others, due to age, gender, capability, or any other reason, are/were actively and peacefully suppressed by the whole community. South Africa's deep ancestral history was egalitarian: the now obsolete philosophy of Ubuntu, and the now obsolescent Khoikhoi and San cultures were largely egalitarian.

- **Feminism**: In the context of this discussion document, and irrespective of all other definitions, "Feminism" is defined as an activity undertaken by mostly female activists with some male participants as they search for absolute gender equality. The concept did/does not exist in most hunter-gatherer egalitarian societies: females and males were always equal: the divisions of labour resulting from physiological differences (e.g. child bearing) were generally welcomed as a function of that equality, not a diminishing factor.
- **Matriarchy and Patriarchy**: The Cambridge English Dictionary defines Matriarchy as *"a type of society in which women have most of the authority and power, or a society in which property belongs to women and is given to children by women rather than men"*. Patriarchy is defined as "*a society in which the oldest male is the leader of the family, or a society controlled by men in which they use their power to their own advantage*". In the most resilient hunter-gatherer communities remaining today, both concepts do not exist. No individual, irrespective of gender, has any authority or power over any other member of the community; nor does any property in the community belong to any individual. A growing body of anthropological researches suggest that "*long before we organised ourselves into hierarchies of wealth, social status and power, these groups* (hunter-gatherers) *rigorously enforced norms that prevented any individual or group from acquiring more status, authority or resources than others*"[15].

  Patriarchy is the dominant social norm of this era, matriarchy is a relatively rare social structure, although it is abundantly clear that matriarchal societies tend to be less violent, especially with regard to the violence perpetrated against women and children. A variant of matriarchal societies is the Matrilineal concept, in which ancestral descent is traced through the maternal lines, and not the paternal ancestry. Unlike matriarchy, women in matrilineal societies do not necessarily head the socio-economic-political lives of a community or country, thus patriarchal and matrilineal social structures can coexist. Some matrilineal communities come fairly close to matriarchy through various levels of socio-political authority assigned to females. For example, in the Chinese Mosuo ethnic group discussed below, household heads are females, control of sex and sexuality is by females, inheritance follows the female ancestral lines, women in general head businesses, but political power is generally held by males.

3.6. Sex and Sexuality

Sex and sexuality have until recently been amongst the least studied human practices and behaviours, and yet they are fundamental defining characteristics of being human. Sex and sexuality must therefore be central to any discussion on gender issues in general, and gender inequality in particular. It is only over the last 150 years of anthological research of homo sapiens that western philosophers and scientists began to seriously address these vital human attributes (see Sex and Sexuality, 2018). The voluminous writings on these, previously and still perceived to be taboo subjects by some societies, tended to reduce sex and sexuality to erotic art and performance (patriarchal openness in ancient Rome, pornography today), jokes, "locker room" topics, or "how to" classics like the Hindu Kama Sutra (400 BCE to 200 CE) and the 12th century Arabic classic "The Perfumed Garden of Sensual Delight". The latter classics, and virtually all other similar historical writings about sex and sexuality, ere anchored on the prevailing moral codes and religious belief systems of the time, most of which were and remain patriarchal in nature. They all emerged from a more egalitarian view of sex practiced before the advent of agriculture about 10,000 years before the Kama Sutra was written. Since then, gender discrimination as we know it today became entrenched in human relationships.

A small number of female anthropologists and activists are raising their voices through research, literature, and feminist activism, to reverse the millennia-old erosion of sexual equality. One of these is Elaine Morgan (1920 to 2013) through her classic "The Descent of Woman", a serious yet highly provocative and humorous

[15] New Scientist, July 2012: Inequality: Why egalitarian societies died out: https://www.newscientist.com/article/dn22071-inequality-why-egalitarian-societies-died-out/

argument that the Bible (and Desmond Morris) got it all wrong – it was Woman who came first, who gave birth to Man. "Womankind" should be the reference point and not, "Mankind". Elaine Morgan refers to our ancestors as "She" throughout her controversial yet highly significant book which is filled with highly imaginative artistic license about sex and sexuality. Elaine Morgan's theme of the "descent" of women has been carried forward into the theme "the Ascent of Woman", a three-part BBC video documentary about Dr. Amanda Foreman's global travels in her study of the experiences and expectations of women living in various societies throughout history. Adding to this global research on gender issues and roles is Professor Sarah Blaffer Hrdy, anthropologist, primatologist, evolutionary psychologist and socio-biologist, and author of the highly acclaimed book "Mothers and Others". The book is also available as a video discussion and lecture at https://www.youtube.com/watch?v=XsuuPMUIMEE.

Yet another formal anthropologist researcher into the origins of sex and sexuality is Dr Camilla Power, whose highly informative research into gender egalitarianism includes her popular video lectures for the Radical Anthropology Group[16], which include "Did Gender Egalitarianism Make Us Human? Or, If Graeber And Wengrow Won't Talk About Sex…" Dr Power presents strong arguments for egalitarian sexual freedoms being the driving force for human collaboration and peaceful coexistence, referencing several modern research findings that explode the myths of sexuality in human evolution. These myths range from "Savagery through Barbarism to Civilization" as proposed by 19th century anthropologists and philosophers like Lewis H. Morgan and Friedrich Engels. Modern male authorities on the subject of sex and sexuality in human development include Dr Christopher Ryan, an American Humanistic Psychologist, who co-authored the highly relevant study "Sex at Dawn: The Prehistoric Origins of Modern Sexuality" with his Mozambican partner Dr Cacilda Jethá, a medical doctor and psychiatrist with extensive experience of deep rural life in Africa. Their video documentaries, e.g., https://www.youtube.com/watch?v=N7vXX33C6Mg, are highly informative and relevant to the South African SDG5 challenges, and highly amusing even in their seriousness. Their theories of human behaviour, both ancient and modern, tackle the modern destructive stereotypes of sex, sexuality and racism that fuel South Africa's gender inequality and violence.

Can these insights lead us to practical solutions to reduce South Africa's gender inequalities and consequential violence against women and children, and create a nation and society based on egalitarian respect and recognition of the absolute equality of the principal genders that make us human?

3.7. Gender Relationships: Discussion with a few examples

Five contrasting views of the different cultural and historical attitudes towards gender relationships, sex and sexuality from different eras, countries and regions are provided below as support for this very brief discussion of a very complex yet vital subject:

- **Ancient Mesopotamia**, circa 3,200 BCE, a polytheistic pre-Biblical culture located in the Fertile Crescent where agriculture was "invented": "*A man could take pleasure from and procreate with any one of his female slaves, concubines or prostitutes without censure, but his wives' infidelity was considered theft of the husband's property, punishable by death through drowning"* (http://mcadams.posc.mu.edu/txt/ah/assyria/hammurabi.html).
- **Hunter-Gatherers of the Amazon Jungle:** *"These are my two wives, and each one has four husbands*": A Zoe Amazon Hunter-gatherer man describing absolute gender egalitarianism practiced by his culture. Children had "many fathers"; security and nurture from a community of caring adults.
- **South Africa:** How many wives does one need? July 2017: "*Men who engage in polygamy are narcissistic and women who acquiesce have a defeatist mind-set that accepts that men deserve more than women in a relationship*": Thuli Madonsela, former Public Protector of South Africa, Professor of Law, Chair in Social Justice at Stellenbosch University.
- **South African Hunter-Gatherers:** Why 'Bushman banter' was crucial to hunter-gatherers' evolutionary success: "*The Ju/'hoansi people of the Kalahari have always been fiercely egalitarian. They hate inequality*

[16] Dr Camilla Power: Did Gender Egalitarianism Make Us Human? Also available at https://vimeo.com/260771955

or showing off, and shun formal leadership institutions. It's what made them part of the most successful, sustainable civilisation in human history".

- **China:** Do women in China face greater inequality than women elsewhere? "*Rapid modernization has enabled China to provide its citizens with improved living standards and increased economic opportunities. Yet this process has yielded uneven gains between men and women.*" Even with this criticism which drew data from the World Economic Forum of 2018, China has one of the most progressive semi-egalitarian non-hunter-gatherer societies in the world today. The Mosuo community are located in the Yunnan and Sichuan provinces close to Tibet. They are a small semi-matriarchal society in which women hold nearly all the reins of economic, political, sexual, and even religious power through a version of Tibetan Buddhism to meet their spiritual needs. Grandmothers and mothers are the heads of family and community, and wield most economic and domestic power, even under male political leadership. Young girls and women have absolute freedom of sexual choice, all children are nurtured by matrilineal relatives which includes brothers and maternal uncles. Males generally welcome the "freedom" this allows them – guiltless sexual activities with reduced resource provider and leadership responsibilities. Marriages and similar pair bonding relationships do occur occasionally, but are deemed unnecessary, with women assuming all responsibility for sexual partner choice, child rearing and nurturing. A video documentary of this exceptional society is available at https://www.youtube.com/watch?v=qMTJt2RnJAk.

Most of Africa has adopted post-agricultural revolution agrarian cultures and lifestyles, the now global models of patriarchy, and the major Abrahamic religions of Christianity, Islam and Judaism. The few remaining egalitarian hunter-gatherer societies are rapidly becoming obsolete, forced to abandon their hunter-gatherer lifestyles and value systems to move into towns and cities with little or no safety nets for this major life-style transition. This massive cultural and lifestyle reorientation is one of the root causes of gender violence - formerly peaceful self-sufficient people find themselves immersed in unfamiliar social structures and lifestyles with little or no preparation, or the economic means of survival in their new environments. Many gradually descend into cycles of despair, alcoholism, substance abuse, violent responses, and prostitution for survival by some women and a smaller proportion of young men and boys. The few remaining African hunter-gatherers are the Pygmies of Central Africa, and the Hadzabe and related groups of Tanzania and neighbouring East African countries. The San people of Southern Africa are well on the way to cultural obsolescence and extinction.

One African ethnic group, the Fulani nomads of north central Africa, have successfully transitioned from a hunter-gatherer lifestyle to a pastoral lifestyle without adopting the full range of post-agricultural values and norms[17]. The Fulani culture is a mix of patriarchal polygamy with an interesting variant of Islamic orthodoxy as their chosen religious philosophy. Husbands are "chosen" for girl children from infancy, however, young girls can have as many sexual partners as they wish before the marriage is formalized, without tribal censure. Once married, wives can be willingly "stolen" from their husbands by other married or unmarried males at any time and for any reason, again without censure. The annual Gerewol festival[18], informally referred to as the "Wodaabe wife-stealing festival", celebrates this sexual freedom by creating spaces for full public transparency. Young males "beautify" themselves to entertain through artistic performances, song and dance, while "predatory" young women circle the festivities to "select" a male partner based on his appreance and performance, irrespective of the marital status of either party. Violence in general, and violence against women and children in particular, was rare until recent times. This is changing – climate change, driving the expansion of farmers encroaching on traditional grazing lands, population growth, and the entry of Boko Harem, a major African humanitarian crisis[19], has introduced a devastating cycle of Violence[20] that begs for solutions.

[17] Fulani: A study of Fulani Art and Life by the University of Iowa: https://africa.uima.uiowa.edu/peoples/show/fulani+
[18] Gerewol Festival video by Professor Christopher D. Roy: Sexual Life of The Wodaabe: https://www.youtube.com/watch?v=cqN_0dxqj7I
[19] UNICEF, the Boko Haram Crisis, one of the world's most severe humanitarian disasters: https://www.unicefusa.org/mission/emergencies/conflict/boko-haram-crisis
[20] Al Jazeera 2018: Amnesty: Farmer-herder clashes kill 3,600 in Nigeria: https://www.aljazeera.com/news/2018/12/amnesty-farmer-herder-clashes-kill-3600-nigeria-181217101114812.html

3.8. Section Summary with additional details and insights

Section 3 of this ICT4SDG5 discussion document very briefly reviews the knowledge we have accumulated over time about human behaviour, and how such behaviour leads to gender discrimination and all its negative consequences including violence against women and children. The review draws from the researches of leading scientists in the disciplines of anthropology and palaeoanthropology, cognitive sciences, psychobiology and psychology, sociology, and the full range of humanities and relevant physical sciences. The views of eminent scientists like South Africa's Professors Phillip Tobias and Christopher Henshilwood, those of eminent evolutionary biologist like Richard Dawkins and his fellow researchers in the scientific disciplines of biology and genetics, and the opinions of internationally celebrated experts on the socio-cultural factors of gender, sex and sexuality, are presented briefly with online links to the original detailed publications. The socio-cultural shifts from the ±350,000 year human history, mostly as nomadic hunter-gatherers, horticulturists, and pastoralists, through the relatively recent ±12,000-year history of the successor post-agricultural revolution societies, to the emerging large-scale technologically driven agriculture and Industry 4.0 age, are briefly reviewed and discussed. The objectives of these reviews and discussions are to craft knowledge-based ICT4SDG5 strategies that support further highly focussed action-oriented research, and evidence-based action programmes that directly address gender inequality and violence, from the base of South Africa's development pyramid.

One of the key insights gained from recent anthropological and ethnographic research on hunter gatherer relationships[21] is sexual egalitarianism and the central role of cooperation between and within communities and individuals. This raises the intriguing "chicken-and-egg" questions of "*did sexual egalitarianism lead to cooperation, or did cooperation lead to sexual egalitarianism*?" It is well known that irrespective of social structure, cooperation between individuals and groups results in significantly reduced violence. It has also been observed that societies with high levels of sexual egalitarianism tend to be less violent and more caring as suggested by Professor Phillip Tobias on page eight of this discussion document: humanity can reduce its violent instincts through social engineering.

One key attribute directly related to hunter-gatherer egalitarianism is cooperative child nurturing by many members of the community, including males in between their perceived "masculine" hunting activities (jobs). As a result of this community-based child nurturing, infanticide and "baby dumping" (e.g. the young Durban woman described in paragraph 2.6 on page 6 above) was rare, bordering on non-existence. Young mothers were not subjected to the modern abnormal societal stresses of poverty and its consequences on survivability, or the shame of pregnancy outside monogamous marriage, that often lead to infanticide. The relatively rare historical records of infanticide practiced by hunter-gatherer communities was associated with basic population control (one child every four years to enable the hunter-gatherer lifestyle), or extreme resource deprivation resulting from environmental changes that led to extreme food shortages. New-born babies were sacrificed in favour of older living siblings with greater survivability. The short extract from the story of "*Nisa: The Life and Words of a !Kung Woman*"[22] explains this phenomenon in an African context very well.

There are numerous historical texts that describe religious-based human sacrificial practices, especially the gender-related homicide of (mainly) virgins to seek favours from Gods. For example, the Greek mythology of *Iphigenia Daughter of Agamemnon*; the Biblical story of Jephthah's Daughter; and the highly publicised virgin sacrifices of the Aztec, Inca and Mayan (young boys, not girls) cultures, are all post-agricultural revolution phenomena, located in the time periods 4,000 BCE to 500 CE. There is very little evidence of similar human sacrifices in pre-agricultural revolution societies. The ancient practices of infanticide have been replaced in this modern 4IR era by the psychosocial pressures of modern life, in South Africa and elsewhere. This ICT4SDG5 proposal is a search for resolution of these modern challenges, using ICTs as one of the many tools available.

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[21] (a) **Psychology Today, 2011**: *How Hunter-Gatherers Maintained Their Egalitarian Ways*: https://www.psychologytoday.com/us/blog/freedom-learn/201105/how-hunter-gatherers-maintained-their-egalitarian-ways: (b) **New Scientist 2012**: *Inequality: Why egalitarian societies died out*: https://www.newscientist.com/article/dn22071-inequality-why-egalitarian-societies-died-out/: (c) **Pacific Standard, 2015***: Sexual Equality and Cooperation, Hunter-Gatherer Style*: https://psmag.com/social-justice/hunter-gatherers-and-sexual-equality: (d) **Phys.org 2018***: Nomadic hunter-gatherers show that cooperation is flexible, not fixed*: https://phys.org/news/2018-09-nomadic-hunter-gatherers-cooperation-flexible.html

[22] Nisa: Infanticide In The !Kung Hunter-Gatherers of Southern Africa: https://applebutterdreams.wordpress.com/2012/06/13/nisa-infanticide-in-the-kung-hunter-gatherers-of-southern-africa/

A leading authority on the discussions covered in this ICT4SDG5 section is Darcia Narvaez, Professor of Psychology at the University of Notre Dame, USA. Professor Narvaez discusses these elements of gender discrimination in her most recent book, "Basic Needs, Wellbeing and Morality: Fulfilling Human Potential", and her highly informative interview available in video format at "Reclaiming Humanity at the Dawn of Posthumanism: Conversation with Darcia Narvaez"[23]. In this video documentary and also in "Self-Actualization: Are You on the Path?", Professor Narvaez draws on Abraham Maslow's *Hierarchy of Needs Theory of Self-Actualization*[24] to discuss the link between ancient human value systems, sexual egalitarianism, and the modern high technology world of the 4IR, commenting on modern-day technological distractions as follows:

> "*Beginning in infancy, millions of children are already immersed in screen technologies, circumventing the messiness and unpredictability of the living world. There was a time when there were natural brakes on our capacity to escape from living in the moment, but technologies increasingly make it feasible to dwell in virtual worlds that place no limits on our flight from reality*" - Darcia Narvaez 2018.

The role of sex in both cooperation and violence is therefore an intriguing study that could provide insights into gender discrimination, violence and abuse in South Africa today.

Virtually all scientific disciplines are involved in the exponential increase of knowledge about our genetic and our societal evolution, and must therefore form part of our discourse on all SDGs, especially SDG5. Maximum collaboration, cooperation and coordination between and within these scientific disciplines, and with all intervention programmes at all top-down institutional and bottom-up grassroots levels, is mandatory, but this will not be easy. The demand for simultaneous highly coordinated horizontal holistic approaches to all SDGs, and vertical (specialist) approaches to each SDG, verifies the complexity of the challenge for this ICT4SDG5 initiative (see ICT4SDG for a discussion of this complexity). But, for practical implementation of the ICT4SDG5 strategy, which must focus on the challenges at the base of South Africa's development pyramid and at the same time retain the links with the high-level institutional and philosophical or scientific factors, a reductionist model of implementation is proposed.

As stated before in this document, technology itself, including the ICTs, cannot contribute directly to resolving any of the 17 SDG challenges, especially the SDG5 challenges. But, the information processing and communication capabilities of ICTs have positioned them as potent enablers of all SDGs, located within SDG9 - *Infrastructure, Industrialization, Innovation* for their provision, and SDG17 - *Partnerships for the goals,* for their capacities to facilitate cooperation, coordination and collaboration within and between all other SDGs. The ten most important 4IR skill sets needed are listed in sub-paragraph 3 on page 8 of ICT4SDG4[25], which include the skills needed for complex problem solving (skill set 3.2.1), the critical thinking skills needed to deconstruct complex problems (skill set 3.2.2), the cognitive flexibility needed to deal with multidimensional complexity (skill set 3.2.10), and of cause the highly creative and innovative engineering design skills needed to build the requisite networks. All will be vital, and must be positioned in the ICT4SDG5 strategy as both core objectives and core design criteria.

As described in the preceding paragraphs, gender relationship challenges are perhaps the most complex of all SDG challenges: (a) they are highly emotional with very strong tendencies towards subjective interpretation; (b) they challenge deeply entrenched cultural and social norms, of which religion and sexuality are major components; (c) they are defined by immense power relationships which often spill over into political and militaristic conflict – the attempt to resolve gender discrimination often leads to the violence that such attempts are designed to reduce. It is for these reasons that the proposed ICT4SDG5 implementation strategy will focus strictly on long-term "bottom-up" interventions beginning at the base of South Africa's development pyramid, where the poorest half of the South African population reside with their children.

[23] December 2018: Reclaiming Humanity at the Dawn of Posthumanism: Conversation with Darcia Narvaez: https://www.madinamerica.com/2018/12/reclaiming-humanity-dawn/
[24] See also the link between Maslow's Hierarchy of Needs and ICT4SDG at http://www.sakan.org.za/Docs/Concept%20Paper%202017.pdf
[25] SDG 4: INCLUSIVE, EQUITABLE, QUALITY, LIFELONG LEARNING FOR ALL: A South African-specific perspective: http://www.sakan.org.za/Docs/ICT4SDG4.pdf

The strategy must/will not compete in any way with any other initiatives or interventions at any hierarchical institutional or civil society interventionist layers. It must seek complementarity, filling in any gaps within and between these layers, and ensuring that even at the highest hierarchical levels, the same messages are imparted to future generations of South Africans. For example, the ICT4SDG5 strategy will be dominated by the need for highly focussed education, drawing from the related ICT4SDG4 discussion document, and from the specific educational needs of all other SDGs. For example, the disruptions of cognitive development and learning imposed by poverty and hunger as discussed in ICT4SDG1, ICT4SDG2, and ICT4SDG3, must be fully accommodated through full participation by expert analytical and educational psychologists and related specialist in the Human Science disciplines. The primary objective will be to develop, build and apply appropriate and highly focussed learning modules suitable for the youngest children from the most vulnerable population groups. Maximum inclusion of parents and community members is vital, so that they too can acquire and apply the skill sets needed to reduce gender inequalities over time.

A brief outline of the ICT4SDG5 implementation strategy is provided in the following paragraphs. A multiple project design approach will be adopted to cater for the complexities discussed in the preceding paragraphs, and to ensure close collaboration, coordination and cooperation between and within the multi-stakeholder multidisciplinary participants and the recipient communities.

4. ICT4SDG5: ICTs positioned to tackle South Africa's Gender Inequalities.

This section reviews the quantitative aspects of ICTs, with less focus on the qualitative values that form the core of the ICT4SDG process. This near technocentric approach to this section alone is necessary – without ICTs that can be used by the victims of the SDG challenges, there can be no ICT4SDG or any other form of development via Information, Communication and Technological infrastructures, products and services.

As stated in preceding paragraphs, ICTs on their own cannot and will not solve the massive challenges of gender inequality, or for that matter, the general inequality and poverty that fuels gender inequality as discussed in section 3.2 on page 10 of this document. But what we do know is that ICTs are the most effective tools available today to build and disseminate the information and knowledge needed to resolve the challenges. ICTs, in their many evolutionary guises, from e.g. the African talking drums of ancient Africa, through the hydraulic telegraph of Aeneas (circa 350 BCE) and Claude Chappe's Semaphores of the late 18th century, to today's Internet, the ICTs have served humanity well. The Internet today is progressively being used to tell the story of the amazing human evolutionary journey so that today's children can learn from history to shape the future they need and want. For further examples, South Africa's Professor Henshilwood begins to tell this story using the modern ICT tool in the YouTube video "*Time Machine - the origins of innovation*"[26], as does the highly informative documentary lecture presented by the Centre for Academic Research & Training in Anthropogeny – CARTA: "*Origins of Genus Homo–Southern Africa and Origin of Homo; Adaptive Shifts; Energetics and Ecology*"[27]. These, and other invaluable lessons from our ancient and modern past must be translated to online learning materials so that they can be delivered to all South African children, especially those who live in knowledge-excluded isolation at the base of the nation's development pyramid. Learning materials in suitable and attractive formats must also be developed for the adults and parents so that they too can understand, and progressively mitigate the SDG challenges they encounter on a daily basis. The challenge for this ICT4SDG5 programme is how to adapt, emulate and present the historical evidence and knowledge for future generations to understand so that they can begin to reverse the destructive challenges of SDG5 and all other sustainable development challenges faced by South Africa.

4.1. Positioning ICTs for ICT4SDG5 support

The first challenge for South Africa's ICT4SDG5 strategy is to ensure adequate access to ICT for all South Africans, especially for women and children. This access enables communities and individuals with inadequate access to use ICT to protect themselves from abuse, socioeconomic exclusion, and violence, and to drive their own development towards an egalitarian future. To date, South Africa has made significant progress in

[26] Time Machine - the origins of innovation: Christopher Henshilwood: https://www.youtube.com/watch?v=G5_JctzoxXA
[27] CARTA - Origins of Genus Homo–Southern Africa and Origin of Homo; Adaptive Shifts; Energetics and Ecology: https://www.youtube.com/watch?v=g5vOgDK3BKs

empowering women and girls residing in the wealthier segments of society, they generally have equal access to all transformative ICTs that that their male counterparts have. But the nation has not been able to provide adequate ICTs to the nation's poor, especially poor women and children, since the country introduced ICTs in their electronic formats approximately 160 years ago. South Africa has always been adept at the adoption of new technologies, and to innovate around them, but the country has failed to deliver equitable ICTs to all its people since the introduction of telegraphy in 1860:

4.1.1. A brief history of ICT in South Africa

- 1860: First telegraph between Cape Town and Simonstown, just 16 years after Morse's 1844 launch;
- 1878: First telephone lines in South Africa, just 2 years after Alexandra Graham Bell's patent;
- 1879: First undersea cable between South Africa and Europe; 89 years later, SAT-1 South Africa to Europe submarine cable launched. Major upgrades 41 years later, Seacom and EASsy submarine cables launched;
- 1898: First RFQ for a wireless telegraph system intended for use in the Anglo-Boer wars of the late 19th century;
- 1994: 96-years later, South Africa becomes a democracy, introduces cellular mobile telephone services;
- 1991: Launch of dial-up Internet services; 22 years later (2016), 9.6% fixed broadband connected households;
- 2004: 106-years after first wireless usage, ICASA publishes Spectrum Band Plan for 20MHz to 70GHz;
- 2019, March 28th: 121 years after introducing wireless technologies, the Minister of Communications reiterates the department's commitment to finalising the policy directive on licensing high demand spectrum;
- 2017: Entry Level fixed broadband price basket was 2.73% of GNI per Capita (Table 4.6 of ITU MIS Report V1 of 2018)[28]; The equivalent price basket for 30.4 million (55.5% population)[29] living below the national poverty lines was approximately 23% of average monthly expenditure, falling to 14% for 500MB mobile broadband per month.
- 2019: MNOs scramble for 5G spectrum fuels "Big Data" price competition: bundle prices for 20 to 50GB "anytime" data per month range from 26% to 66% of average monthly expenditure levels of 30.4 million South Africans.
- 2019: In a renewed attempt to render national ICT prices affordable by the majority of the nation's citizens, the South African Competition Commission published its "*Provisional Report on the Data Services Market Inquiry*[30]" on April 24th 2019. Follow up public discussions and hearings are planned.

The principal beneficiaries of the nation's technological prowess have always been, and still remain, the wealthiest population segments, even before the advent of broadband internet and the emerging 4IR technologies. The "Digital Divide", the gap between the information have's and the information have-nots, has been a perennial concern: the very low returns on ICT investments for the +30 million poor South Africans has always imposed an insurmountable barrier to the development of ICTs to serve this population segment. The most recent response to this seemingly insoluble challenge of pro-poor ICT expansion is an attempt by the national Competition Commission (full report in footnote 30) to fundamentally restructure the national mobile network sub-sector in an attempt reduce ICT prices. While the Minister of Communications and the state ICT regulator ICASA welcomed the Competition Commission's report and recommendations, the response by the key mobile operators and their media support networks were predictably hostile: (a) TechCentral 25 April 2019: "Market Failure not to blame for high data prices"; (b) MyBroadband 25 April 2019: "Absolutely terrible research in mobile data pricing report"; (c) MTN response reported by TechCentral, 25 April 2019: "*MTN has accused the Competition Commission of using outdated information in preparing its report on the data services market in South Africa*".

The brief history of ICT in South Africa, and the statistical data on South Africa's poverty and therefore ICT affordability, suggest that the ICT affordability challenge will remain unresolved until initiatives like this ICT4SDG5 can produce new highly creative and innovative pro-poor ICT ecosystems. This is a major objective of this ICT4SDG5 initiative.

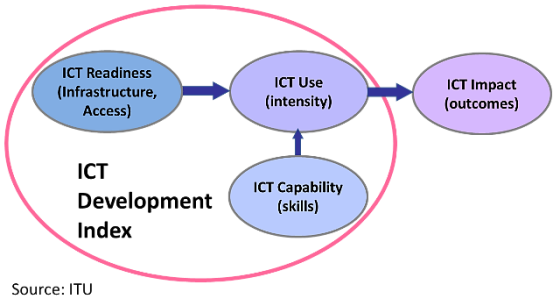
[28] Measuring the Information Society Report 2018 - Volume 1: https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR-2018-Vol-1-E.pdf (Note: estimates based on comparative prices in US$ using exchange rate of 14:1)
[29] Poverty Trends in South Africa: http://www.statssa.gov.za/publications/Report-03-10-06/Report-03-10-062015.pdf
[30] Competition Commission South Africa 24 April 2019: DATA SERVICES MARKET INQUIRY: http://www.compcom.co.za/wp-content/uploads/2017/09/Data-Services-Inquiry-Report.pdf

4.2. ICT4SDG5 links with the World Summit on the Information Society (WSIS)

As discussed throughout the preceding paragraphs, information and knowledge shared through ICTs has always been the principle driver of human survival and development. The exponential expansion in coverage, quantity and quality of ICTs in recent years has led to a global recognition of the need, and sense of urgency, to spread the benefits of ICTs to all the world's citizens. This recognition led to the World Summit on the Information Society[31] (WSIS), conceived through a Declaration of Principles in 2003, verified through the Tunis Commitment of 2005, and addressed through the definition of a series of action lines in support of the SDGs in 2015. A key outcome of the WSIS Process was the development of a global database to measure the progress of ICT in support of the SDGs, the ICT Development Index (IDI). The IDI is updated and published annually for all countries by the International Telecommunication Union (ITU) in the series *"Measuring the Information Society Report"* (MISR). This MISR process developed a useful tool for the visualization of the ICT activities needed to address the ICT4SDG challenges:

The Three Stages in the evolution towards an Information Society: For the purpose of this ICT4SDG5 discussion, the three stages in the evolution towards an information society will be expanded to four stages, separating the "ICT Use" stage from its subordinate "ICT Capability (skills)" stage. Each of the four stages will be analysed and discussed separately due to their relative importance and usefulness in achieving the SDG5 targets. The four stages are linked to the overall SDG initiative as follows:

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



Source: ITU

- ICT Readiness (Infrastructure, Access) will be developed in ICT4SDG9 - Infrastructure, Industrialization.
- ICT Use (Intensity) will be developed as one of the principal objectives of the ICT Readiness stage – the physical/technological networks must be designed for intensive use as a tool for the achievement of all SDG challenges. The intensity of use will focus specifically on the knowledge and social interaction needs of each SDG, e.g. the societal revolutions needed to address the SDG5 gender inequality challenges.
- The ICT Capability (Skills) stage will focus primarily on user skills, extending the specific skill sets needed to embrace all the 4IR skill sets discussed in ICT4SDG4, and for all hierarchical levels, from very young children, through community adults and parents, to infrastructure operators and researchers participating in the ICT4SDG5 process. The key requirements for this element of the ICT4SDG5 challenge extend far beyond the skills needed for effective use of ICTs, they must embrace all the socioeconomic skill sets needed, as well as the risks of abuse and misuse of ICTs, as outlined in the related document ICT4SDG4.
- The ICT Impact (Outcomes) is the end objective of the ICT4SDG overall strategy. The productive use of the information and knowledge generated and disseminated by the ICT Readiness (Infrastructure, Access), ICT Use (Intensity), and ICT Capability (Skills) stages of the Information Society must contribute directly to the achievement of ALL seventeen SDGs.

4.3. Criticism of the WSIS and the MISR Processes as they relate to ICT4SDG

The WSIS process and its resulting statistical analyses and reports (MISR) provide invaluable support for the development of the ICT infrastructures needed to support all nation's evolution towards the desired Information Society. There are however a few fundamental weaknesses in the choice and use of the traditional ICT development indicators as they relate to the SDGs. These weaknesses become clear as soon as attempts are made to use them to reverse societal challenges at the base of the human development pyramid. Detailed discussions of these criticisms are clearly beyond the scope of this discussion document, but must feature prominently in the ICT4SDG design, implementation and operational phases. A very brief summary of the observed difficulties follows.

[31] Information Society: Definition by UNESCO 2004: https://unesdoc.unesco.org/ark:/48223/pf0000152004

4.3.1. Technological Determinism: Nearly all ICT for Development (ICT4D) initiatives and indicators tend towards technological determinism – they focus more on ICTs than on the societal challenges that the same ICTs are meant to address. The prevalent measure of ICT4D success has tended towards technocentric ICT growth statistics – Internet user penetration; geographic coverage and penetration of mobile phones; household internet access patterns; number of Facebook users, etc. The evidence of how ICTs have directly impacted the development of the poor is generally sketchy, limited to anecdotal evidence, e.g. the IDRC study on "African Women & ICTs" notes on page 26: "*Another Manhiça (*Mozambique*) woman, who divides her time between the field and domestic work at home and has a family of ten, told us that when there is no food in the house, they use the mobile phone to contact relatives in South Africa to ask them to send food*". This "survivalist" use of ICTs, prevalent also in South Africa as introduced in the "ICT4SDG2 – Zero Poverty" discussion document, is of critical importance in alleviating hunger, but it raises the question of how empowering or transformative this use of ICT is, especially while the wealthier segments of the African population enjoys uncapped mobile broadband services surging towards 100Mb/s, and soon towards 10Gb/s at about 2% of their monthly disposable incomes, as 5G services enter the ICT market.

4.3.2. ICT Development indicators: The traditional ICT development indicators that form the basis of the annual MISR are invaluable for development of the ICT industry as a whole, and even to put food on the tables of the very poor, but they remain less informative on the actual role of ICTs in ameliorating the broad spectrum of challenges enshrined in the SDGs. ICTs become transformative in human development only if they facilitate the resolution of both the quantitative (deprivation of material and services resources) and qualitative (the psychosocial) factors of the SDG challenges. This criticism has been recognised and acknowledged by the whole international development community, including the International Telecommunication Union (ITU) and its United Nations partners active in the development of the WSIS process:

> *"In 2017, ITU Member States agreed to a revised and expanded set of indicators for the ICT Development Index (IDI). The new IDI, based on the new indicators, promises to deliver an even better understanding of developments, opportunities and challenges within ITU Member States and the ICT industry at large. In order to smoothen the transition for Member States in terms of data collection, the IDI, which is normally included in the Measuring the Information Society Report, will only be launched in 2019*." (extract from the Foreword to MISR Volume 1 of 2018 by Brahima Sanou, Director Telecommunication Development Bureau (BDT) International Telecommunication Union).
>
> A February 2019 summary of proposed IDI revisions is available at https://www.itu.int/en/ITU-D/Statistics/Documents/statistics/ITU_ICT%20Development%20Index.pdf

Other global initiatives designed to refine and update the current range of ICT indicators for improved relevance to all SDG challenges include UNESCO's 2018 report "*Internet Universality Indicators: A Framework for Assessing Internet Development*"[32]. The executive summary of this report describes the role of the Internet well: "*The Internet (is) much more than digital technology; it is also a network of economic and social interactions and relationships. As such, this has shown potential to enable human rights, empower individuals and communities, and facilitate sustainable development*."

If the biggest impact of ICTs in rural Mozambique (page 26 of African Women & ICTs) and rural South Africa (page 2 of ICT4SDG2 – Zero Poverty) is their ability to "put food on the table" and very little more, then the true value of ICTs for empowering and transforming the lives of the poor will be severely understated. Indicators of Internet penetration, mobile phone coverage, broadband data caps and speed, will have very little meaning for the poor: unless and until the expanded and improved ICT ecosystems represented by the ICT indicators, are positioned to empower the poor and transform their lives by resolving the SDG challenges that they face each day of their lives. The wealthier compatriots of the poor do enjoy the empowerment value of improved ICTs: they use the ICTs to create new earning opportunities; improve their knowledge and capabilities to deal with new unfolding 21st century challenges and threats; improve the opportunities of their offspring through better education; minimise the drudgery of their daily routines; access numerous stress-relieving entertainment services for themselves and their families; and much more.

[32] UNESCO's Internet Universality Indicators Project: https://en.unesco.org/sites/default/files/unesco_internet_universality_indicators_september_2018.pdf

If sustainable national development with socio-political peace and stability is to be realized in South Africa, then the ICT Use (Intensity), and the ICT Impact (Outcomes) stages of the path to the desired Information Society must be shared equitably between rich and poor, through initiatives such as this ICT4SDG5 proposal.

4.3.3. **Top-down Interventions**: Nearly all known ICT4D interventions tend to be heavily "top-down": (a) government's ICT development policies, regulatory regimes, and institutions such as South Africa's USAASA and BBI, and soon the WOAN; (b) The ICT Industry's "Supply-side" preferred business development models, also referred to as "Trickle-down Economics", which are aggressively defended through demands for less regulation and policy oversight, more spectrum, and less taxes. All this in the belief that their commercial successes will "trickle down" eventually to empower and uplift the poor; (c) Academics, Research and Development Institutions, technologically informed Civil Society and NGOs, who use their advanced technological knowledge and prowess to "decide" interventionist models (e.g. Mobiles for Development) that they deem will empower the poor and transform their lives.

There are far too few "bottom-up" development initiatives that seek total and effective inclusion and participation of the poor in the design, implementation, sustainable operation and most importantly, the intensive productive use of ICTs even within these ICT4SDG initiatives. The few that are being attempted and implemented, for example the self-provisioning Zenzeleni Network at Mankosi village in the Eastern Cape, hold much promise and must be supported and seriously considered in any ICT4SDG initiative, but even they raise more critical questions than they can answer at their current stages of development:

The Zenzeleni Network at Mankosi[33]

a) Scalability: how quickly can similar initiatives be duplicated in other poor communities to address the needs of all +30 million South Africans residing below the national poverty lines?
b) The Mankosi Village has a population of about 6,000 people (3,500 cooperative members), approximately 70% unemployment, average monthly incomes of R390 per month. How can the self-provided ICT services be expanded at the 5% affordability level of R19.50 per month to begin to match the ICT services enjoyed by the wealthier segments of the South African population? If the rich progress and the poor stagnate, inequality expands.
c) How can the research conducted by Professor William Tucker and his colleagues (see BBC video link in footnote 33) be expanded to begin to address the many immediate and very long-term non-technological ICT4SDG challenges discussed in this document, especially the debilitating SDG5 challenges?
d) How can this project, and similar complementary or competing projects that share the same objectives, be escalated to the national level: be supported fully by all South African and interested international stakeholders: and thereby hasten the achievement of all the SDG challenges, especially the SDG5 challenges with their tragic consequences for women and children in Mankosi and the rest of South Africa?

In the 160-year history of electronic ICTs in South Africa, none of the traditional growth strategies have been effective; the human development challenges have merely been carried over from one technological era to the next. ICT penetration rates have indeed grown exponentially – "SA smartphone penetration now at over 80%, says ICASA"; "Internet User" penetration levels are impressive: South Africa (56.2%) ranks 4th in Africa after Morocco (61.8%), Seychelles (58.8%), and Cabo Verde (57.2%), according to the global data published by the World Bank in Individuals using the Internet (% of population). The apparent contradictions between these two credible statistical reports suggest an important definitional problem – an "Internet User" is defined as anyone of any age who has used the Internet for any purpose from any location using any device at any time during the last three months, while the smartphone penetration is generally derived from device sales statistics provided by ICT operators and equipment vendors. Neither statistic has any significant value on how well ICTs are used to promote human development. This definitional problem is being resolved at the international level as discussed above, but it still obfuscates the reality of ICT4D at the national level. This must/will be addressed as the ICT4SDG initiative described in this series of the ICT4SDG discussion documents unfolds. Other definitions that need to be reviewed or re-interpreted for ICT4SDG to be effective at the base of South Africa's development pyramid are:

[33] The village that built its own wi-fi network - BBC Africa: https://www.youtube.com/watch?v=R9u-hfxAeBo

4.3.3.1: Internet Definition in a converged 4IR ICT World: While all modern ICT networks and services migrate exponentially towards fully converged digital networks, the definition of the Internet itself demands a review. For example, after years of resistance, numerous Voice over Internet Protocol (VoIP) services like WhatsApp, Botim (Middle East), ShareChat (India), WeChat (China), and even emerging products like Voice-over-Wi-Fi, VoLTE, and soon Vo5G(?) are beginning to dominate ICT voice services. The definition of "data" has already been "converged" technologically to include nearly all modes of communication - everything is "data", but the industry continues to protect "voice" revenues by differentiating them from "data" services, often at the cost of economically disadvantaged consumers (no Voice-over-Wi-Fi services yet). In addition to traditional voice communications and short messaging services, basic communications via broadband ICTs have already migrated towards high bandwidth demanding video, virtual reality content, and other remotely controlled or fully automated functionality via the Internet of Things (IoT). The opportunities provided by these "rich-content" services for learning across all socio-cultural-linguistic barriers are immeasurable. The potential for real empowerment and socioeconomic transformation through technology continues to grow in accordance with Nielsen's Law, that Internet speed increases by 50% each year for "high-end" users. The "low end" ICT users, especially those located at the base of the development pyramid, will progressively fall further behind, especially as 4IR-driven Machine-to-Machine (M2M) communications progressively replaces human labour. The capability and quality of all communication is thus converging towards a single measure – bandwidth, which raises the critical question for ICT4SDG – how much bandwidth consumption is enough? The following average mobile broadband consumption per user per month statistics are informative (excludes Machine-to-Machine and IoT):

- OECD 2018: Finland – 15.45GB: Austria – 11.17GB; OECD Average – 2.94GB: Colombia – 1.15GB.
- Asia 2018: China (Taiwan) - 13.1GB; India (Jio) – 10.8GB; S. Korea – 5.3GB; Mainland China: 3GB.
- **South Africa**: Bandwidth consumption data is not systematically compiled or published, however, some insights can be gleaned from published data bundle price lists, e.g. "Best data deals for streaming" published by MyBroadband (an ICT-focussed media organization) recommends 20 to 40GB per month for light users, 60 to 80GB per month for medium users, and 100 to 200GB per month for "streaming junkies". Other published indicators include:
- In 2017 Telkom SA polled its Telkom Community for responses to the question "How much Data is enough per month?" The responses ranged from 10GB per month with 4 votes; 50GB per month with 7 votes; 100GB per month with 24 votes, and 250GB per month with 29 votes.
- In January 2019, Vodacom reported an average consumption of 1.1GB per month per device.

What then is the most appropriate target bandwidth consumption per person per month that will empower the income and information poor +30 million South African citizens, and transform their lives irreversibly? Will the "250MB of free data per device per month" design target of Cape Town's Free Public Wi-Fi Hotspot programme, or the 500MB daily limit of the troubled TshWi-Fi hotspots in the City of Tshwane (see reports "Tshwane free Wi-Fi not canned – metro" and "Wi-Fi hotspots danger for Pta residents") be enough to fuel such empowerment and transformation for the poor? Will this broadband access limitation enable them to "catch up" with their wealthier compatriots who already enjoy up to 100Mb/s unlimited fixed (ADSL, fibre and wireless) broadband access where they live, work and play, and mobile wireless (3G, LTE, Wi-Fi) everywhere else? Will the +30 million South Africans stuck at the base of the nation's development pyramid benefit from the furious industry strive for "5G spectrum" that dominates the current ICT4D discourse in South Africa? This aspect must be seriously researched and considered if the whole ICT4SDG initiative is to avoid yet another failure similar to the well-publicised failure of the predecessor MDGs.

4.3.3.2. Fixed Broadband Penetration: This vital ICT development indicator is one of the most important and significant indicators for all ICT4SDG. Fixed broadband connected homes enable 24/7 access to the full range of online content, including television and radio, for all members of the household, irrespective of age, gender or education. A single high capacity high quality fixed broadband connection can be shared by many, the mobile phone in the pocket too often wonders away from where it is needed most. Mobile ICTs are approaching geographic and population ubiquity, but their sharing capability is severely limited. The fixed broadband measure should therefore be the preferred indicator for all ICT4SDG initiatives. It should be

prioritised and people-centred if it is to serve ALL of humanity – percentage of connected households, human settlements, and/or clearly defined community settlements. Technologically-leaning indicators such as number of broadband subscribers, number of connected premises (including schools, clinics, shops, work places, etc.) must be retained as secondary indicators that enable economic and ICT infrastructure growth, but even these must ultimately be developed to serve people first, profits and technology should become lower level objectives that must be retained to drive competition and investment. The misleading ICT user statistical misrepresentations must change: e.g. 60% Internet users (EWN 2018); 80 million mobile connections serving 37.5 million mobile subscribers (BusinessTech 2017); 80% Smartphone penetration (ITWeb/ICASA 2019). The ICT Impact (Outcomes) stage of the IDI must focus first on the development of an Information Society of **People**, much more than the current focus on ICT, profits, and "Things".

4.3.3.3. The importance of Scalability: Like all other developing and developed economies, South Africa has numerous planned, stated and active programmes in ICT4D, but the historical evidence of ICT growth suggests that most have largely failed to provide empowering and transformative ICT access to the nation's poor. As the nation races towards the next generation of ICT technologies such as 5G to connect both people and "things", the attention should migrate to how these "things" can serve humanity better: AI imparting survivalist knowledge and skills for the poor as automation drives job losses: 4IR technologies providing direct services for ICT4SDG5 and all other SDGs: societal re-engineering for a return to the egalitarian societies of the past within the technological opportunities of today. If people are not positioned at the centre of these technological revolutions, particularly poor people who outnumber the privileged rich seven to one in South Africa (the Palma Ratio is 7.1:1), then they too will revolt – a far more devastating revolution than the technological varieties driving the 4IR. History has enough proof of this form of human response.

As indicated in ICT4SDG4, South Africa has excellent schools, institutions of higher learning and research, and numerous private and state-owned ICT Innovation Hubs[34], but the nation is also plagued with even greater numbers of extremely poor schools and ineffective "Bogus Computer Training Centres" that are nothing more than scams to deprive already poor people of their already inadequate incomes. If socio-political stability with sustainable socio-economic growth in the country is to be maintained, then greater attention with direct poverty alleviating investment must be given to the upliftment of the poor. The wealthy segments of the nation earn enough to invest in their own futures and thus shape their own destinies. The poor must not be pushed into corners where the only escape from their poverty is revolution.

4.4. ICT Readiness (Infrastructure, Access):

Sub-paragraph 4.1 discusses the 160-year history of South Africa's inability to share the benefits of ICTs equitably amongst all the people who live in the country. The most obvious reason for this national failure is the country's inability to invest in pro-poor ICT networks and services that poor people can afford to use. Added to this is the challenge to impart the ICT skillsets needed by the poor so that they can use them for self, community, and family empowerment and transformation. The ICT4SDG5 initiative addresses these challenges, providing the most productive ICTs and ICT user skills for the South African population residing at the base of the nation's development pyramid. South Africa's poorest population cohort, accounting for more than 55% of the population, are far too poor to attract ICT investments that offer the returns that the national ICT industry expects and demands. The national government has far too many developmental priorities to allocate already stretched fiscal resources to this need. The ICT industry is considered by many economic and political leaders to be a high-growth luxury industry that fuels its own growth through profitable free market business models. Most political and economic leaders, especially the Ministry of Communications (see "*Minister welcomes findings in Data Services Market Inquiry*") and the Ministry of Economic Development (see "Data Services Market Inquiry"), believe that policy and regulatory interventions, within the prevailing national economic growth models, are enough to reverse the massive ICT deficits of the poor depicted in the charts that follow. This is clearly not the case. The affordability analysis that follows suggests that neither the

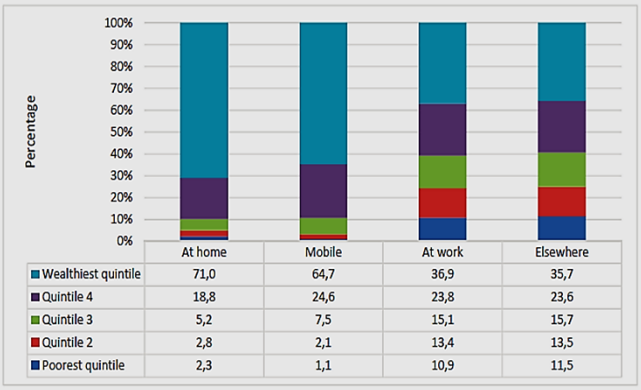
[34] (a) Government of South Africa to develop Africa's largest tech hub: https://businesstech.co.za/news/technology/301502/south-africa-to-develop-africas-largest-tech-hub/; (b) Briefing Note: The State of Digital "Tech" Hubs in South Africa: https://www.wits.ac.za/linkcentre/publications/research-reports/kedama--abrahams-2017---digital-tech-hubs-in-south-africa/; (c) 17 Key innovation hubs in South Africa | Grow your technology, digital health startup: https://www.dr-hempel-network.com/digital_health_contact_lists/17-key-innovation-hubs-in-south-africa/

government, through any policy or regulatory intervention, nor the ICT industry through unsustainable data price reductions, can meet the empowerment and transformative ICT needs of South Africa's poorest population groups. Inequality is far too deeply entrenched for either solution to be effective.

4.4.1. Information Inequalities skewed by income inequalities

Household access to broadband by income quintile

Figure 18: Percentage of households with access to the Internet by type of access and per capita household income, 2013



	At home	Mobile	At work	Elsewhere
Wealthiest quintile	71,0	64,7	36,9	35,7
Quintile 4	18,8	24,6	23,8	23,6
Quintile 3	5,2	7,5	15,1	15,7
Quintile 2	2,8	2,1	13,4	13,5
Poorest quintile	2,3	1,1	10,9	11,5

Source: GHS 2013

http://www.statssa.gov.za/publications/Report-03-18-05/Report-03-18-052013.pdf

- Of the 15 million South African households in 2013, 2 million (71%) in the wealthiest quintile had 24/7 Internet access at home;
- Of the remaining 13 million households, 0.87 million households had 24/7 Internet access at home, about 12 million households (±42 million citizens, 80%) did not.

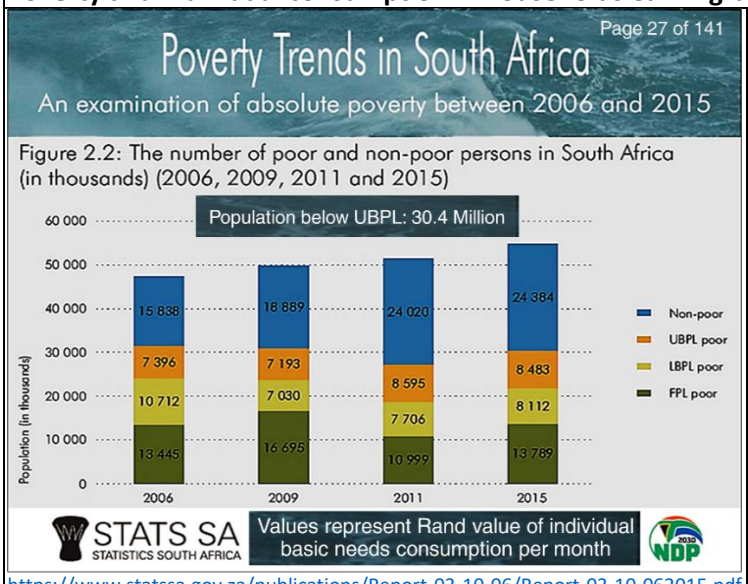
The data for 2016 as reported by ICASA in March 2018 was as follows:

Households with 24/7 Internet Access at home	9.5%
Household members who access the Internet at work	15.8%
Household members who access the Internet via mobile networks only	53.9%
Household members who access the Internet at public spaces	9.8%

The last indicator in the above chart, the number of household members that can access broadband services in public spaces, presents an opportunity that will be examined in the paragraphs that follow. If the South African government, and the South African ICT industry, cannot, for any reason, afford to raise the level of 24/7 Internet connected households from the annually stagnant ±10% towards 100% penetration (South Korea reports 99.2% household penetration), then alternative solutions are urgently needed – public broadband access must be raised from the low value of 9.8% to nearer 100%. The costs of public broadband services can be kept very low through massively shared broadband infrastructure and user terminals.

4.4.2. Poverty and ICT Affordability in South Africa

Poverty and individual consumption in households earning below the national poverty lines



https://www.statssa.gov.za/publications/Report-03-10-06/Report-03-10-062015.pdf

Population & Cost of Basic Consumption Key

- Non-poor: GNI per capita: R12120 per month
- Population within the Upper Bound Poverty Line (UBPL) of R1138 per month
- Population within the Lower Bound Poverty Line (LBPL) of R758 per month
- Population at or below the Food Poverty Line (FPL) of R531 per month

IMPACT:

- Average Consumption Capacity per month for 30.4 million South Africans in 2015: **±R768**, or 77% of the "absolute" international poverty line[35] of US$5.50 PPP per day
- Target cost to communicate at 5% available expenditure: R38.00 per month.
- Lowest cost of 20GB per month (RAIN, 2019): R200.00 or ±5 times target monthly cost of communication.

[35] Absolute International Poverty Line derived from: World Bank 2017 - A richer array of international poverty lines: http://blogs.worldbank.org/developmenttalk/richer-array-international-poverty-lines

The discussions in the preceding sup-paragraph raise the concept of "transformative ICT services", what are these? There are as many answers to this question as there are people needing information and/or knowledge to resolve problems:

- At their most basic level, ICTs continue to offer the original distress call for help that telegraphy introduced to South Africa in 1860. Most of South Africa's poor people were not able to use the "three dots, three dashes, three dots" emergency SOS telegraph signal at its launch in 1860, they can now use their mobile phones to put food on the table when they face hunger. That is, if they have airtime to spare (often up to 20% of their food budgets), a mobile phone terminal, and a mobile signal (some still have to climb trees to receive this). The anecdotal evidence provided in sub-paragraph 4.3.2. on page 23 above, and the introduction to ICT4SDG2 by David Fincham (poor rural women get food from a mobile phone!), show how the "mayday" call has migrated to mobile phones, but is this use really transformative?
- "In Rio de Janeiro's favelas, a new online tool tackles violence against women and girls." In Brazil, sexual violence is a problem, as it is in South Africa. Online tools have been developed to help women and girls protect themselves from these crimes against humanity (see discussion of how at http://www.sakan.org.za/SAKANSolutions.html). But, vital as this use of ICT may be, is it empowering or transformative?
- "23-year-old Yang Fugan, a college student from a poor family in China, used e-commerce from Internet Cafés initially, to help his family and pay for his college tuition". This story illustrates how ICTs can be both empowering and transformative. How can this success story from China be emulated in South Africa today, to empower the nation's poor population, especially its women and children?

Before ICTs can be used to empower and transform the lives of women and children, and all economically challenged people in South Africa, they must be available to do so. The good news is that ICTs, in both their mobile and fixed variants, are indeed becoming ubiquitous globally and in South Africa, but they are not fully accessible for many South Africans. More than 55% of the South African population cannot afford to access the ICT components most suitable for empowerment and transformation. The chart above illustrates this challenge clearly. If ICTS are to be positioned to empower and transform the lives of South Africa's economically marginalized citizens, especially the women and children, they must be rendered accessible on demand. The internationally recommended ICT price target of 5% of available expenditure per month equates to R38 per month for all South Africa's +30 million citizens deemed poor according to the national statistical evidence.

4.4.3. Access and Infrastructure Challenges and Solutions

The charts in sub-paragraphs 4.4.1. and 4.4.2. above suggest strongly that neither high level policy, regulatory provisions, nor voluntary or involuntary data price reductions by the national ICT industry, will be able to reach the pro-poor price target of R38 per month. The 9.8% household access to public broadband offers an elegant historically proven solution to this seemingly intractable problem:

A short history of public access to ICT: *Just three years after the first commercial telephone exchange was launched in Connecticut, USA in 1878, the German Government authorized the opening of a public pay telephone "box" in 1881, to cater for the communication needs of those German citizens who could not afford an individual telephone instrument or connection. This model expanded worldwide, still in operation in many developed and developing countries even after the introduction of mobile phones and the Internet. Following the birth of the Internet in 1969, South Korea, today's leading broadband connected country, launched its Internet Café model, the PC Bang, in 1988 for exactly the same reasons that led to the launch of public telephone facilities approximately 100 years earlier. In 2018, more than 10 million South Koreans used Internet Cafés or PC Bangs. The public ICT access model has served the world's population who could not afford individual connectivity well throughout the history of the technology. And yet, in 2019 South Africa strives to find solutions for affordable broadband access for more than 30 million of its citizens, while continuing to ignore the historically proven model of mass public access.*

South Africa introduced public payphones almost simultaneously with the introduction of the first telephone exchange in 1882. These public ICT access facilities served the nation well until the announcement in 2018 that Telkom "would ditch public payphones". This followed an earlier announcement in 2014 of a feasibility study to replace payphones with Wi-Fi hotspots. There is little evidence to date of the results of the latter feasibility study, although some municipalities have converted public telephone kiosks to public Wi-Fi access facilities.

Given the historical success of public ICT access facilities in all countries, this ICT4SDG discussion document recommends the adoption of this model through an expansion of the Internet Café model (alternative names Cyber Café, LAN House (Brazil), PC Bang (South Korea), modified to suit South Africa's SDG challenges. Some preliminary work on the model is outlined at http://www.sakan.org.za/SAKANSolutions.html, together with a number of reference documents including a downloadable (7.6MB) PowerPoint survey of how other developing and developed countries have used the model to build their Information Societies.

The Internet Café model is not new to South Africa. As early as 2004, the Internet Service Providers' Association (ISPA) promoted the concept as an educational tool, NETucation for the nation™. The concept failed as a mass Internet access facility mainly due to the high costs of connectivity, and business models that targeted the well-to-do, who soon acquired their own terminals and connectivity. The majority of functional Internet Cafés in South Africa are located in mid-to-high income areas, charging on average R60 per hour, nearly twice the affordability price for a whole month of ICT services suitable for South Africa's poor. A few Internet Cafés offering services at prices ranging from R10 per hour to R20 per hour do exist in South Africa today, most of them owned and operated by foreign African migrants. They prove the viability of pro-poor public broadband access business models that provide the required services and sustainable contributions to family incomes.

A modern African example of innovations around the Internet Café model is the Rwanda Cyber Café, located in central Addis Ababa, Ethiopia (a tribute to Rwanda's ICT wisdom?). User prices begin at the equivalent of ZAR8.00 per hour for Internet access with a free soft drink, to ZAR17.70 per hour access via Wi-Fi and own terminal, with a free soft drink and 30 grams of fresh potato chips. The possibilities for South Africa are endless.

4.4.4. Connectivity Challenges and Solutions

The proposed model of positioning modified Internet Cafés as public access broadband facilities focusses entirely on the user infrastructure requirements: Access to terminal and other support equipment such as PCs, printers, scanners, etc.: the basic broadband connectivity necessary for functionality: and Wi-Fi access to customers with their own access equipment such as smartphone, laptop computers, etc. The major challenge for the facilities owners and operators will remain broadband access to the facilities, especially in rural areas. There are numerous solutions for this challenge, however some will require specific national policy and regulatory support through the National Integrated ICT Policy and proposed Electronic Communications Amendment Bill 2018. A short summary of how these challenges can be overcome include:

- Commercial Access to the Internet: There are three modes of access to the Internet that the proposed Internet Cafés can use to provide broadband services to their customers for business sustainability:
  - Fixed wireless access from any willing Internet Service Provider (ISP). User prices range from R800 to R2000 per month for up to 200MB capped services using any of the major mobile networks. Where coverage is unavailable, the large community of SMEs from the Wireless Access Providers Association (WAPA) can provide similar services at similar prices in both rural and urban areas of South Africa.
  - Broadband Fibre Connectivity. Where optical fibre cables are within reach, high speed uncapped broadband installation charges range from free with router, to R2000. Usage fees range from R700 to R2000 per month.
  - ADSL: While this is an obsolescent technology, services can be provided where fixed line copper infrastructure is available, at prices ranging from R700 to R2000 per month for broadband speeds ranging from 20Mb/s to 50Mb/s, limited by physical distances from the telephone exchange that houses the DSL equipment (DSLAMs).
  - Deep rural fibre optical connections are possible for remote rural facilities, but these require policy and regulatory interventions to:
    - Oblige Telkom and other reluctant long-distance fibre cable operators to provide services from their existing installations to rural enclaves passed;
    - Build new fibre optic reticulation on any existing overhead (pole mounted) wired infrastructure to reduce the very high cost of civil works associated with underground fibre optical infrastructure. This will include the very extensive electrical power reticulation grid owned by Eskom (the national electrical power utility), and Telkom's remaining long distance overhead telecoms infrastructure. This model is utilized in numerous developed and developing countries, but the policy and

regularity environment in South Africa has been the major barrier to such cost-effective national broadband development.

- Dedicated spectrum allocation for pro-poor broadband service provision. The Digital Dividend (formerly broadcasting) UHF 450MHz, 700MHz, and 800MHz spectrum bands are eminently suitable for low-cost deep rural backhaul broadband connectivity, with lower cost short range last mile wireless individual and public access multi-node connections provided by cable or wireless, e.g. Wi-Fi technologies, and soon, 5G technologies. The major barrier to this low-cost solution has been the lack of political will by the South African Government and ICASA, shaped by pressure from the national mobile industry to allocate all available spectrum to the highly profitable mobile ICT industry.
- As the nation's ICT industry strives for 5G spectrum, with numerous "trials" in South Africa, e.g.: 10 April 2019 - "*MTN launches indoor 5G network trial*"; and in neighbouring countries (Sept.2018) - "*Lesotho emerges as unlikely testbed for 5G revolution*", the nation remains silent on how 5G can be used to resolve the connectivity challenges of the poor, especially the rural poor:

a) **United Kingdom, April 2019:** "5G Rural First is a call to action. We need to demonstrate the game changing potential of 5G technologies, strategies and new business models to deliver connectivity for U.K.'s rural businesses and communities. **OFCOM concurs**: "*5G and rural connectivity as its top priorities for 2019*"

b) **USA 2018: T-Mobile and Nokia** have achieved the world's first 5G data transmission on 600 MHz spectrum, promising nationwide 5G coverage for everyone everywhere.

c) **USA 2019: AT&T plans to test 5G in rural areas** using its AirGig innovations: using power lines as waveguides to extend the distance that millimetre-wave signals can travel, making it possible to "drop off" 5G services to remote rural areas as long as they have passing power lines.

d) Backhaul is a problem for 5G anywhere, and in rural areas: T-Mobile uses 600MHz spectrum, South Africa has the 700MHz Digital Dividend band: AT&T uses AirGig on powerlines - Google strung its 1Gb/s Kansas City fibre on any utility poles and pipes: Others use wireless backhaul; herewith a list of wireless backhaul equipment vendors

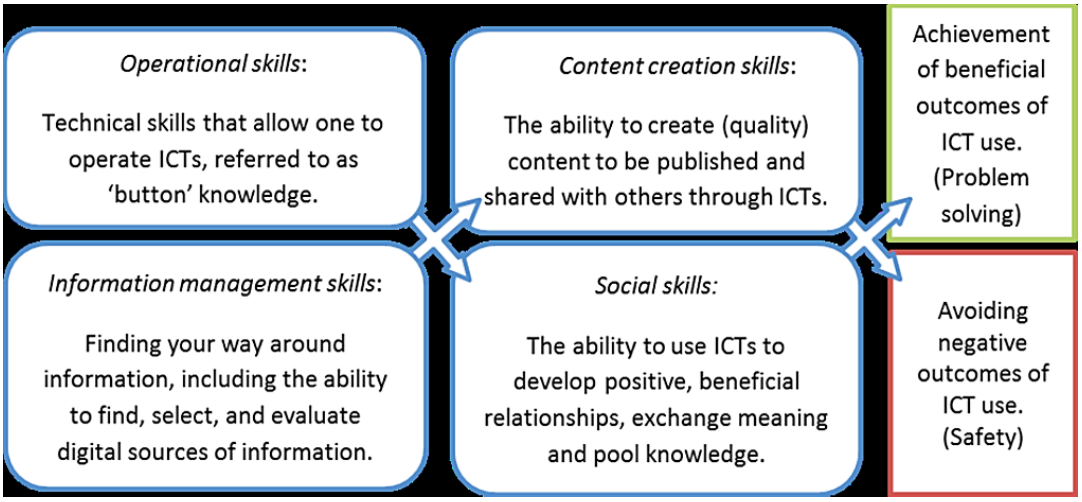
e) Japan, S. Korea, Sweden hung fibre on power utility poles to reach rural and urban areas: Access to broadband at home in 2017: Japan: 77%; S. Korea: 99.2%; Sweden: 83%; South Africa: 10.5%.

South Africa can emulate any and all the above, all that is need is to think, and to "just do it"

With Internet Access prices and the technological opportunities discussed above, sustainable pro-poor business models that can begin to erode all the nations SDG challenges are clearly possible. This ICT4SDG5 search for such business models and intervention strategies is anchored on the WSIS process and the stages of evolution towards the desired Information Society depicted and discussed in WISR 2018:

4.5. ICT Capability (Skills):

Figure 2.1: Different digital skills, their definition and role in societal participation



(Derived from Chapter 2. ICT Skills for the Future, page 37/204 of WISR 2018)

Vital as the need for 24/7 ICT access may be (connectivity, infrastructure, affordability), it is even more important to keep the end objective of providing this 24/7 ICT access in mind – the ICT Impact (Outcomes) - on humanity's interpersonal social relationships: (a) the means towards the less violent and more caring society suggested by Professor Phillip Tobias on page 8 of this document: (b) the return to an egalitarian society that respects women as equals in every aspect of human existence: (c) a society that does not brutalize women and children. The ICTs are mere tools towards achievement of these goals, and a critical component of these tools is the knowledge and skill sets needed to use them effectively. This ICT Capability (Skills) stage is discussed in that context, using the MISR 2018 report as an anchor for the discussions:

Operational skills: Imparting ICT user skills to everyone, especially children, is relatively simple – give them terminals and they will acquire the basic skills themselves. The rural woman in Mozambique (section 4.3.1 page 23 of African Women & ICTs); the rural mother in South Africa; and the rural children in Ethiopia (page 14 of ICT4SDG4), did not need formal tuition to learn how to use ICTs. Neither do the children of South Africa, many young children from all social backgrounds are known to "teach" their parents how to use their smartphones. The digitally illiterate paedophiles that target young girls in South Africa and the world do not need tuition on how to use social media for their nefarious deeds. It is most unlikely that the Christchurch white supremacist shooter took lessons on how to post his murderous deeds live on Face Book and You Tube.

The 'button' knowledge stage should not pose any challenges, there are enough colleagues, friends, neighbours, children and relatives ready to impart basic ICT user knowledge to those, mainly adults, who need such knowledge. The "**Information management skills**" are a little more complex, but they too can be learned fairly quickly with the help of children and peers. The major challenge is for the users to know what they don't know but need to know. A few explanations and demonstrations on the use of search engines will fairly quickly bring users up to speed, especially when searching government and other public information sites. The difficulty will be evaluating sources of information, and understanding what information or knowledge is genuine and needed, this normally comes with experience and level of education outside the ICT industry.

Content creation skills are much more complex, they range from vital entry level content creation skills for play with learning that targets early childhood development (ECD), to the more professional levels of content creation that form part of professional development. In between is a very large range of self-taught content creation for entertainment and artistic expression. Peer group collaboration, as illustrated by the Brazilian LAN House experience[36], is best for this stage of content creation. The Internet contains potent tools for artistic creation in many formats suitable for lifelong self-learning, e.g. the wide range of video lessons that cover whole academic disciplines, to simpler "how to" lessons, e.g. in web design. Online music streaming[37] for example has helped many artists earn excellent returns on their artistic efforts, from their homes, but they must have affordable access to good quality ICTs to realise such returns. There are, however, some costly risks associated with amateur content creators: many would-be entrepreneurs in South Africa have spent small fortunes from their meagre financial capacities creating APPs without fully understanding the marketing and publicity efforts and costs, or the copyright issues of the content those APPs were intended to access and use. The most valuable aspect of this skill set is the creativity and critical thinking skills that can be imparted to the very young in their early childhood development stages. There are a growing number of ECD ICT learning tools, e.g., "New Strategies to Get Kids to Create Media, Not Just Consume It", but these must be handled with caution given the growing levels of online child abuse briefly discussed in the following paragraph.

Social Skills. Developing or improving social skills lies at the core of human society. The ability to communicate, to share information and knowledge, using ICT or any other means, has always been the principal tool for such social formation, throughout the ±350,000-year history of human existence. Social skills development via ICTs should therefore be the principal objective of the Information Society and its ICT tool. The reality is that the commercial opportunities of ICT, the massive profits generated by the ICT industry for its shareholders, and the natural human fascination with the Science, Technology, Engineering, Maths (STEM) disciplines it uses, have trumped the value of ICTs for social development at the base of the human development pyramid.

[36] Ethnographic Study in Brazil's favelas by David Nemer (2015): http://www.sakan.org.za/Docs/David%20Nemer%20Dissertation.pdf

[37] Online music streaming example: Hard Time Killing Floor Blues (Skip James) - By JR: https://www.youtube.com/watch?v=2g254CZHsC4 . The lyrics of this blues resemble closely the plight of South Africa's poor – "*Times harder than ever been before*".

How then can the ICTs be positioned to develop or improve the social skills that will ultimately reduce and eliminate gender discrimination and all its violent expressions? The question may be simple, but the answer is extremely complex. In the context of this ICT4SDG5 agenda, the complexity covers the whole history of the evolution of human societies discussed in sections 1 to 3 of this document. The complexity is further aggravated by the most pernicious sub-sets of gender inequality: violence against women and children, and the irrational fact that the principal victims of such violence are often also its leading perpetrators and proponents. For example, the cruel practice of Female Genital Mutilation (FGM), and the extremes of ancient cultural and religious philosophies and belief systems are too often practiced, enforced, and promoted by women (see e.g. 2016 WEF Global Agenda: "*The Role of Faith in Systemic Global Challenges*"). Extreme resistance to any socio-cultural changes must be expected, and built into the reform strategies of the ICT4SDG5 processes.

If ICTs are to be positioned to foster the development of social skills for the achievement of the SDGs, the key components must include:

- Every component of every SDG, especially this SDG5, which deprives humanity of the vast intellectual capacities and resources that women possess. Social skills acquisition must be incorporated at the design phases of each SDG intervention. The numerous "unknowns" must be rigorously researched by multi-disciplinary teams, and applied directly and immediately by fully inclusive multi-disciplinary and multi-expertise groups. The latter must range from the highest socio-intellectual levels (Maslow's self-transcendence level), to the lowest physiological base of South Africa's development pyramid.
- Amongst the most important victims of the SDG5 challenges are the children whose cognitive development has been damaged by poverty, and by child abuse, as discussed by Dr Amelia Kleijn in the text box on page 7 of this document; in paragraph 1.6.2. of ICT4SDG1; paragraph 2.2 of ICT4SDG3; page 3 (teen juveniles) and paragraph 3.2.10 of ICT4SDG4. They must receive maximum attention by researchers and ICT4SDG5 implementers alike so that the neurological damage the children and youth are exposed to can be halted and reversed if possible, and future occurrences reduced or prevented entirely. This group of children are direct victims of the SDG5 challenges, and often grow to become perpetrators as suggested by Dr Amelia Kleijn and other authorities and researchers. The children, architects of the future, must be empowered to progressively change society towards Tobias' more caring egalitarian society over the exceptionally lengthy timeframes that such change will require.
- The social skills acquisition must begin with building the laboratories (section 4.4.3 on page 28) where such skills can be acquired and imparted, through ethnographic and other relevant research disciplines in the former, and through applied early childhood development. All technologies are vital tools for this process. An excellent example is the Fab Lab concept discussed in sections 4.4. and 5.2.7 of ICT4SDG4: Fab Lab for 3-year-olds and EMOSILLA in Latin America. These concepts can/must be extended to the poorest populations through the proposed "living lab" public broadband access facilities.
- The pedagogical tools to be developed and used must embrace all the ten most critical skill sets needed for survival and growth in the 4IR world. These are listed and discussed in section 3 on page 8 of ICT4SDG4. The research components must identify, develop and apply new skill sets needed by each SDG.

Social Media: A blessing or a curse in ICT for Social Development?

Social Media is one of the most commercially successful ICT products of this decade. Billionaires like Larry Page (creator of Google, net worth US$55 billion) and Mark Zuckerberg (Facebook, net worth US$68.9 billion), became extremely wealthy as a result of their inventions. Virtually all social media products have captured the imagination of ICT users worldwide, driving ICT take-up and use to previously unimaginable heights. Adults and children alike find the distractions of instant gratification of any mode or content or communication irresistible. Keeping in touch with thousands of Facebook "friends"; downloading You Tube videos for instant gratification; taking thousands of photographs of favourite cats and dogs (and some relatives); playing online games often at the most inappropriate times; all became irresistible preoccupations for adults and children alike. Vital interpersonal communications have largely been trivialized, but ICTs remain vital high value survivalist and developmental tools. The complexity of the impact of social media, particularly its abuses, is

clearly beyond the scope of this ICT4SDG5 discussion, but must feature prominently in the proposed applied research agenda. A few examples of such abuse that must be included in this research are:

- **ICT and social media in education**: While South Africa considers the provision of tablet computers and smartphones to all 8 million plus learners (The South African position as discussed fully in section 3 of ICT4SDG4), the United Kingdom considers policy to join a growing list of fully developed countries that have banned all mobile telephones and similar gadgets in schools. *Research has shown that mobile phones in schools can be detrimental to learning*: Sky News 19 May 2019.
- **Abuse of smartphones and social media outside school hours**: section 3.4.5 of ICT4SDG4 provides a disturbing parallel of smartphone and social media between India and South Africa, on the subject of rape of young girls, and circulation of the crime on social media.
- **Online grooming of young girls**: Sky News (U.K.) March 2019: Instagram grooming of children as young as five triples: "*The number of children targeted for grooming and abuse on Instagram has more than tripled - with some of the victims as young as five years old. Facebook, Snapchat and Instagram were used in 70% of those incidents, with girls aged 12 to 15 the most likely target, but roughly one in five victims were under the age of 11*." Is this a problem in South Africa? SA children face higher cyber risk than most other countries: Cape Town - Nearly 20 percent of South African children between 8 and 12 have engaged in online sexual behaviours. "*64 percent of children who have been exposed to one or more cyber risks, 55 percent were victims of cyber-bullying and 11 percent have chatted with and then met online strangers in person. The study also found that 18 percent of children have engaged in online sexual behaviours, which includes having sexual conversations with strangers and/or searching, downloading, or distributing sexual content online*" - Dr Robyn Whittaker, the Stakeholder Engagement Lead at Symphonia for SA.

General observations on the social aspects of ICT use in gender discrimination and abuse:

- **Identity shaping and gender stereotypes**: "*Whether you played with Barbie dolls or action figures, watched Beauty and the Beast or Power Rangers, you have been exposed to gender stereotypes at a young age. The entertainment and marketing media inevitably use these stereotypes to attract consumers, and send misleading messages about sexual identity that can easily influence young children. Designating toys or fictional characters specifically for girls and boys inflicts gender roles and stereotypes upon young children and hinders the development of their sexual identities.*": http://dailycampus.com/stories/2018/10/17/effect-of-gender-roles-in-the-media-on-young-women. The most egalitarian societies do not shape gender identities and therefore behaviour.
- The Internet has been used to perpetrate and to perpetuate violence against women and children. Many of the victims are fighting back, using the Internet to combat these social crimes. Meera Vijayann survived her childhood sexual abuse to become a powerful voice for abused women and girls. Meera is an independent journalist covering gender-based violence and social entrepreneurship, using the Internet and all other media formats to combat the scourge. Meera's grisly yet moving story can be heard and seen at: https://www.ted.com/talks/meera_vijayann_find_your_voice_against_gender_violence/discussion.

  Joining Meera Viyayann's activism in promoting gender equality and the sexual and reproductive health and rights of women and girls is American actress and Goodwill Ambassador for the United Nations Population Fund (UNFPA), Ashley Judd. Her equally moving video on TED Talk; "*How online abuse of women has spiralled out of control*", uses the very same obscene language that online abusers use, to tell a powerful story that this ICT4SDG5 programme must understand, and address for South Africa's abused women and children (caution, extremely graphic language): "*Online misogyny is a global gender rights tragedy, and it is imperative that it ends*".

Other ICT abuse factors that impact gender equalities: All the financial and related online scams, hate speech, fake news, personal information theft and abuse, have a direct or indirect disproportional impact on women, especially the poorest and most desperate women. SMS scams that promise poor village women great wealth are quickly turned to deprive them of the very little financial resources they have.

Inequality, poverty, and gender discrimination and violence are social crimes against humanity – the ICTs must be positioned to help alleviate them. The ICT Capability (Skills) stage must deal with the social compact that should exist between ICT and the women and children of South Africa.

4.6. ICT Use (Intensity) for SDG5

This stage of evolution towards the Information Society is probably the most important of all other stages – it should seek answers to the question "*how are ICTs used to further human wellbeing in all its complex aspects?*" The multitude of answers to this simple question must lie at the core of all ICT4D discussions, and yet, defining these answers through measurable indicators is a mammoth, perhaps impossible task. For example, in the context of this ICT4SDG5 discussion, we could pose the question as "*how can ICTs be used to reduce South Africa's high levels of female homicide and infanticide?*" The levels of these crimes against humanity are provided and discussed in section 2.5 of this discussion document. We could also ask the question "*what ICT indicators can/must we use to monitor the effectiveness of our ICT4SDG5 interventions in this regard*?" There are no international standard indicators that can help South Africa in this regard, and yet if we are to address this critical ICT4SDG5 challenge, we must develop such indictors and steer the ICT Use (Intensity) stage of ICT development towards resolution of this challenge.

In the most recent "Measuring the Information Society Report Vol. 1 of 2018" (footnote 28 on page 21), the best ICT Use (Intensity) performance indicator comprises quantitative statistics of ICT penetration: Chart 1.1: Global ICT developments, 2005–2018, on page 3 (17 of 204) of the report, traces the growth of mobile phones; individuals using the Internet; traditional fixed line telephony; active mobile broadband subscriptions; and fixed broadband subscriptions, as the only available measure of progress in this indicator. These indicators may be vital for the development of ICTs, but they are not helpful in reducing the prevalence of female homicide in the country through ICT utilization. They cannot halt and reverse the high homicide rate of women aged 15 to 29 years, in which South Africa ranks 158th out of 166 countries. There remains therefore an urgent need to develop new sets of qualitative and quantitative indicators to design intervention strategies, and to measure their effectiveness and progress, if this deleterious human challenge is to be eliminated.

DISCUSSION: Quantitative ICT Development Indicators not suitable for ICT4SDG interventions
A simple illustration of the shortcomings of the traditional quantitative ICT4D indicators (percentage population coverage) is the example of the growth of "things" connected to the Internet (Internet of Things or IoT). In 2016, Cisco, a leading ICT equipment provider, estimated 500 billion devices connected to the Internet by 2030, all serving humanity in one way or another. This equates to an "Internet Penetration" of 5,747 per 100 people. Other competing estimates suggest 125 billion devices, up from 27 billion devices in 2017, leading to a penetration of 1,470 per 100 people. Will such mammoth Internet "use" help to reduce gender violence in South Africa? Alternatively, how can the vast quantity of Internet connected "things", which include automated vehicles, AI machines, robots, drones, etc. be positioned to reduce gender violence in South Africa and everywhere else? This is the kind of question that humanity as a whole should be asking, and seeking answers for a better, kinder world as the 4IR unfolds.

The modified Internet Café model of this ICT4SDG5 strategy offers immense possibilities for the development and use of ICT indicators for SDG5 interventions that directly address this immense human challenge. One example of how this can be done is the UN Women's interventions in the favelas of Rio de Janeiro discussed in http://www.sakan.org.za/SAKANSolutions.html. How can South Africa use the proposed ICT4SDG5 strategies to reduce and ultimately end this human tragedy, and other similarly tragic SDG5 challenges? Besides addressing the immediate SDG5 challenges like female homicide and infanticide, how can South Africa use the ICT4SDG5 model to begin the very long journey towards the egalitarian societies discussed in sections 1 to 3 of this document, and in other related ICT4SDG documents?

The vital ICT Use (Intensity) stage of South Africa's evolution to the Information Society should be intensified urgently so that ICTs may be positioned to directly mitigate the many multidimensional SDG challenges that afflict the nation. This ICT4SDG5 initiative is just one of the many strategies available for such intensification.

4.7. ICT Impact (Outcomes) for SDG5

The simple challenge for this ICT4SDG5 initiative is to reduce, and ultimately eliminate gender inequality in all its forms and consequences. The consequences include gender-based violence and hate speech, female homicide and femicide, infanticide, child abuse, deprivation of opportunity, etc. Most quantifiable indicators of gender discrimination tend to be limited to modern perceptions of "success", the "glass ceiling" factors like gender representation in government, on company boards and senior management, equal salaries for equal work, etc. This limiting definition of gender equality is demonstrated clearly by most popular definitions of the concept: Wikipedia, the first reference point for many young researchers, defines gender equality as: "*Gender equality, also known as sexual equality or equality of the sexes, is the state of equal ease of access to resources and opportunities regardless of gender, including economic participation and decision-making; and the state of valuing different behaviours, aspirations and needs equally, regardless of gender*."

In general, it is only the most economically or socially advantaged women who can aspire to such breaches of the glass ceiling. Poor women in South Africa, who outnumber poor men by a significant margin (16.9% according to STATS SA 2019), have the added highly disproportionate burden of caring for, and nurturing the nation's +60% children living in poverty, in a massively skewed patriarchal social order. The future of the whole nation therefore lies in hands of the nation's poorest women, who are deprived of the same levels of opportunity and access to resources as their male counterparts, because they are poor, and female.

Can the ICTs help to improve the definition of gender equality and inequality, and from this improved definition, to develop the most effective indicators that quantify the challenges, enable improved strategic interventions, and facilitate the evaluation and monitoring of the progress of these interventions? Can the ICT Impact (Outcomes) stage of the ICT4SDG5 process become the final measure of how well South Africa has used ICTs to halt and reverse all SDG5 challenges? This is the central objective of ICT4SDG5.

5. CONCLUSIONS: ICT4SDG5 Challenges and Solutions.

Reversing ±12,000 years of socio-economic-cultural-political formation that has led to the gender inequality extremes that shape South Africa's modern social environment is extremely complex, it demands extremely long timeframes to halt the evolutionary trends, and to reverse them. But the processes required can be simplified to just three critical components that can lead to resolution of the challenges over time:

- South Africa has access to a rich ancestral human history, "unearthed" by some of the best South African and international scientists of recent times, working together in one of the ancestral (original) lands of all humans on earth today. Invaluable lessons can be drawn from this ancient human history, lessons that can help to build an egalitarian society where gender and other pernicious human behavioural traits are avoided and suppressed. This component or stage of recognition and acknowledgement must shape the trajectory of where we need to be in the nearest possible future, and how we get to that egalitarian future.
- South Africa has at its disposal, very clear historical evidence-based records of where, when and how the human species went wrong, how the species created today's iniquitous societies with very wide-ranging variants of interpersonal and inter-gender brutality. This history is laced with numerous examples of how some nations and societies avoided these evolutionary pitfalls, and how other nations and societies overcame them after recognition and acknowledgement of their existence. Today's society can/must learn from the errors and mistakes of the past to create a better future, the objectives of all 17 SDGs.
- South Africa, and the whole world, has access to a very wide range of technological tools that can be positioned to promote the resolution of all the SDG challenges. The ICT tools have served humanity well throughout its evolutionary history, long before ICTs as we know them today, and their modern taxonomies were invented. ICTs have also been abused to fuel the insidious sides of humanity, throughout history and especially in this modern 4IR era. Today, technology promises immense opportunities to adequately feed and nurture the species without damaging its natural environment or itself, and to create the ultimate social freedoms, by re-engineering the human society.

The ICT4SDG5 process enables ICTs to aggregate and integrate all the complex factors discussed in this document, and to provide the ICT access, content and skills derived from such aggregation to the victims of the SDG5 challenges, their mentors and supporters, and to all stake-holders set up to assist them.