Building a Digital Life For All South Africans

Building an ICT ecosystem through an inclusive consultative process

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Abstract

This paper presents that the ICT sector has experienced significant technological advancements over the last decade that have necessitated a comprehensive review of the laws and policy framework governing the sector. Secondly, provides a historical overview of policymaking in the ICT sector over the last century and discusses the need for a new paradigm in modern policy development as the distinction between historically disparate technologies has become blurred in the era of convergence. Thirdly, the policy making process requires extensive and deep consultation along the four pillars identified of: Inter-governmental; demand side; supply-side and international community. Critical to this new policy paradigm is the enablement of ICT policy by all stakeholders, especially those outside of the traditional ICT sectors, e.g. financial services, health, education and local authorities. In conclusion, it is argued that ICT policymaking needs to be overhauled to enable the advancement of digital technologies and a review of the legislative changes to be made is presented.

1. Introduction

Let me start by thanking the Minister for convening this very important gathering of South Africans. As a nation, we have been thirsty for such a meeting. Secondly, let me take this opportunity to personally thank you for inviting me, Minister, to share with you my thoughts. As stated in "Mach's Principle" “the inertia of a body is determined in relation to all other bodies in the universe”. Similarly, the future of the sector is determined by the DOC.

I salute the Deputy Minister, the Chairperson of the Parliamentary Portfolio Committee, the DG and other DOC senior management. I would also like to extend greetings to the ICASA Council, DOC portfolio organisations, state owned enterprises, and leaders of labour, business and civil society present here today, as well as to thank the hosts of the conference for their hospitality in advance

Like a good wine, I have matured with age, and my views may be milder and not as grating as in my early years. In this paper, I have attempted to achieve two objectives: firstly, to try to cover as broad a scope as possible; and secondly, to delve deeper into the policy-related issues that face the information and communications technology (ICT) sector and South Africa. This approach is based on the understanding that, in a constitutional democracy policy-making is one of the key pillars used to prepare our country for future generations. The development of ICT policy is the intersection of politics, economics, engineering, science (physical and chemical) and sociology.

Albert Einstein is quoted as saying: "to raise new questions, new possibilities, to regard old problems from a new angle, requires creative imagination and marks real advance in science" as well as that "insanity: doing the same thing over and over again and expecting different results".

Global financial and environmental crisis

As we gather here today, the world is grappling with issues relating to the future of the economy and environment. In many parts of the world, future generations have been committed to large amounts of debt even before they are born. The global financial crisis has not only made it difficult to project into the future, but also made it challenging for policy-makers to provide leadership. The length of political terms (or, more accurately, the frequent turnover in leadership) contradicts the requirements of long-term policy-making. Similarly, in the private sector short term thinking based on quarter-by-quarter reporting is making it difficult for business leaders to invest in, or

consider, research and development, let alone the future skills needs of their respective work forces. It is against this background that the hope for the future of the world economy is strongly focused on emerging markets.

It is within this context that we need to consider the role that ICTs play in the broader society.

ICTs, GDP and Country competitiveness

An often quoted 2009 World Bank study found that for every 10% increase in broadband penetration in emerging markets, there is a 1.38% increase in GDP growth[i]. This points to the increasingly important role that broadband and ICTs play in society. These findings, supported by a number of independent studies,- including a study on the significant benefits of broadband for emerging markets undertaken by management consulting firm McKinsey & Company - estimated that a 10% increase in broadband household penetration delivers a boost to a country's GDP that ranges from 0.1% to 1.4%. In addition, a study of OECD countries by Booz & Company found that, among high-income countries, there is a strong correlation between average annual GDP growth and broadband penetration whereby countries in the top tier of broadband penetration have also exhibited 2% higher GDP growth than countries in the bottom tier of broadband penetration.[ii] This confirms that the ability of a country to compete globally has a very strong correlation to the state of its ICT sector and, in particular, its ability to facilitate and grow the sector to meet the country and its citizens' needs for affordable, accessible broadband. Of concern is the fact highlighted in the 2012 edition of the World Economic Forum's Global Information and Technology Report that sub-Saharan Africa remains the most poorly connected region on earth, with a distinct lack of access to ICT and a severe lack of skills. South Africa is the third most capable African country – following Mauritius and Tunisia - when it comes to leveraging the benefits of technology to improve the lives of its citizens and grow its economy. However, South Africa is in 72nd place out of a total of 142 countries surveyed with a national readiness index (NRI) of 3.9 out of 7.[iii] In addition, in an OECD study on mobile cost based on a basket of services, South Africa was ranked 30th of 46 countries surveyed in term of the mobile telephony costs (see Figure 2).

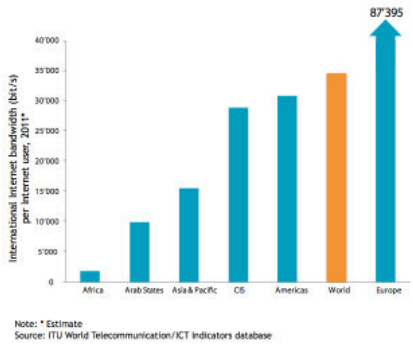
The complexity of policy formulation is a mammoth challenge that South Africa has to get to grips with in order to ensure the long-term sustainability of the economy and sector. Below, in Figures 1 and 2, are indicators that highlight the challenge that both Africa and South

Africa face in increasing penetration and access to quality, affordable broadband.

The significant technology and global regulatory changes currently underway further complicate the process before us. These changes include the digital migration process and growth of data (especially video content) and reach of the Internet (in particular the ubiquity of Internet Protocol as the primary transport medium for voice, data and video). As we prepare to celebrate the achievement of reaching one billion mobile connections in Africa by 2016, we need to engage with other adjacent sectors such as health, education, energy, transportation and many more on the application of ICTs in improving their delivery, reach and efficiency. Our biggest challenge, as a sector, is not only to grow the sector, but also to interface with other sectors of the economy and influence their policies to take into consideration developments such as Big Data, Internet of things and the growth of applications.

In short, the development of a Digital Life will have a significant impact through ICTs on adjacent sectors e.g. financial services, health, transport, energy and many more.

Figure 1



Country Name	Cheapest product from Dominant Operator		Cheapest product in country		% cheaper than dominant
	Rank	US$	Rank	US$	
Mauritius	1	2,39	5	2,39	Dominant is cheapest
Ethiopia	2	2,61	7	2,61	na
Namibia	3	2,74	8	2,74	Dominant is cheapest
Kenya	4	2,85	1	1,90	33,4%
Egypt	5	2,91	9	2,91	Dominant is cheapest
Sudan	6	3,53	6	2,46	30,5%
Ghana	7	3,87	11	3,28	15,1%
Libya	8	3,90	14	3,90	Dominant is cheapest
Rwanda	9	4,28	3	2,16	49,4%
Guinea	10	4,62	2	1,93	58,1%
Sierra Leone	11	5,04	13	3,88	23,1%
Uganda	12	5,51	10	2,94	46,6%
Congo Brazzaville	13	5,63	17	5,63	Dominant is cheapest
Tanzania	14	5,82	12	3,75	35,7%
Algeria	15	6,21	4	2,28	63,3%
Tunisia	16	7,24	18	6,46	10,9%
Senegal	17	8,11	24	8,11	Dominant is cheapest
Botswana	18	8,16	20	7,66	6,0%
Sao Tome &Principe	19	8,21	25	8,21	Dominant is cheapest
Nigeria	20	8,40	16	5,22	37,8%
Madagascar	21	8,45	27	8,45	Dominant is cheapest
Mali	22	8,78	29	8,78	Dominant is cheapest
Burkina Faso	23	8,88	28	8,53	4,0%
Benin	24	9,10	22	7,92	13,0%
Mozambique	25	10,00	33	10,00	Dominant is cheapest
Chad	26	10,14	34	10,14	Dominant is cheapest
D.R. Congo	27	10,37	19	7,62	26,5%
Côte d'Ivoire	28	10,41	36	10,41	Dominant is cheapest
Cameroon	29	10,44	35	10,28	1,5%
South Africa	30	11,07	32	9,83	11,2%
Togo	31	11,18	38	11,18	Dominant is cheapest
Zambia	32	12,05	26	8,22	31,8%
Niger	33	12,30	31	9,77	20,6%
Central African Republic	34	12,33	39	12,33	Dominant is cheapest
Angola	35	12,50	41	12,50	Dominant is cheapest
Swaziland	36	12,87	44	12,87	na
Malawi	37	13,01	45	13,01	Dominant is cheapest
Zimbabwe	38	13,48	43	12,67	6,0%
Morocco	39	13,56	42	12,53	7,6%
Gabon	40	16,11	30	9,09	43,5%
Lesotho	41	16,51	40	12,43	24,7%
Cape Verde	42	18,15	46	18,15	Dominant is cheapest
Gambia	43	na	15	4,33	na
Mauritania	44	na	21	7,77	na
Liberia	45	na	23	8,09	na
Seychelles	46	na	37	11,04	na

Figure 2: January 2012 OECD Low User Basket Cost in USD

Source: Research ICT Africa Policy Brief No.1, Africa Prepaid Mobile Price Index 2012: South Africa, March 2012

The policy process South Africa is embarking upon comes at a time when the ICT sector is undergoing a fundamental and rapid transformation. The development of a new policy paradigm is aimed at ensuring that South Africa repositions itself as a leader in the ICT sector on the continent, serving as an example of visionary and enabling policy development and implementation. The purpose of this paper is not to present a policy position; rather, it is aimed at ensuring that the process that results will create a cohesive, innovative and dynamic policy for South Africa. Based on the complexity of the process, it is clear that the development of a new policy will take some time to complete. Over the next couple of days and as the policy-making process unfolds, it is clear that the process is as important as the policy itself, in which South Africa needs to develop a revolutionary legislative framework.

I have structured this paper as a discussion. It identifies issues to be debated rather than positions of either the companies I represent or myself. The issues raised are in no order of importance and are indicative rather than exhaustive. If I were to go into detail on each of these issues, you would have to be with me for the next three days.

2. The policy process in the 1990s

Post-1994 democratic process

Prior to the 1992 policy process that culminated in the passing of the Telecommunications Act No. 103 of 1996, the most significant pieces of ICT legislation (with many subsequent amendments) that were passed were the Radio Act No. 3 of 1952 and The Consolidated Postal Act No. 44 of 1958. For the 1992 policy process, a considered, yet consultative method to develop new policy and legislative instruments post-1994 was followed in the early 1990s, culminating in the Telecommunications, Broadcasting and Postal Services White Papers and subsequent legislative instruments. The issues at that time were much simpler than today, as the communications market and related sectors were vertically integrated, largely state-owned, with limited or no competition. The focus was on extending the reach of telecommunications, broadcasting and postal services to all South Africans.

Post-1994

The policy development undertaken in the early 1990s to develop new policy and legislation followed the following process:

- The Department, in consultation with sector stakeholders, generated

questions and published these for comment in a Green Paper. The relevant stakeholders responded to these questions and sent their responses back to the Minister for consideration and consolidation.

- Following this, the Minister published a draft policy statement that captured the key policy statements that emerged from the Green Paper process.
- Finally, after receiving comments on the draft White Paper, the Minister published the final White Paper as the policy framework for the sector, used in the formulation of the necessary legislative instruments.

This process, from Green Paper to final White Paper, took approximately 18 months. In addition, the Centre for the Development of Information Technology Policy (CDITP) had embarked on a process that took approximately three years, because it also involved a training and development process within the policy making process. In order for us to understand and frame the anticipated policy- process for South Africa's communications sector, it is necessary to undertake a historical overview of the policy landscape.

3. Historical overview

Pre-1910 [Colonial period]

Before 1910, South Africa had four different postal and telegraph administrations that were unified into a single Post and Telegraph Department in 1911. Towns and major centres were required to deploy their own infrastructure, which was telegraph infrastructure at the time.

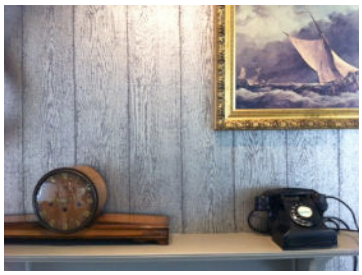
1910 – 1948 [United Party and South African Party]

Subsequent to the formation of the Union in 1910, the South African Party was responsible for the 1917 legislation that allowed for the development of the telegraph. In 1936 the creation of the SABC was brought about through the passing of the Broadcasting legislation.

1948 to 1994 [Emergence of the Nationalist Party]

The Radio Act of 1952 gave the Postmaster General the power to administer electro-magnetic frequency spectrum and, by implication the start of telecommunications. This was followed by the 1958 Post Office

Act, which modernised the Post Office from a telegraph to a telecommunications department. TBVC administrations had a responsibility for certain services within their respective jurisdictions.



Post-1994 [ANC]

The most relevant references we have are the policy processes that were conducted post 1990. These involved participation by the liberation movements, civil society, business, as well as the State. It represented the first truly consultative policy development and formulation process in South African history.

In addition, the ICT policy developed in the early 1990s was developed within the context of ICTs being dominated by voice communications, with mobile communication still in its infancy, and a dominant fixed-line incumbent. Most developing countries were still planning, debating and constituting regulatory regimes. This change was driven by allowing each village or community to have access to a dial tone. There was a commonly quoted statistic presented at every seminar or conference at the time, that there were more telephones in Manhattan than on the entire African continent.

This was based on the penetration of telecommunications in Africa being well below 1%. A country like Nigeria had less than one million telephone lines. Most telephones in South Africa were in white areas, as a result of Apartheid planning and resourcing. In rural areas there were no phones at all, with the exceptions of white-owned farms that had what was called party lines, famously known as "Nommer asseblief". In terms of international telecommunications access, most international circuits linked the former colony with their former colonial countries, in most cases, bypassing neighbouring and other countries en-route.

During the Apartheid era, various Bantustans established their own Post and Telecommunications mini administrations. Namibia was also part of this process. It is only after 1994 that these TBVC state laws were scrapped and incorporated into a single Post and Telecommunications Department. In fact, the final resolution of Namibia Post and Telecommunications was completed only thereafter.

This presented the backdrop to the policy making process of the early 1990s, a process aimed at correcting that past. At that time, and during the Apartheid isolationist years, South Africa did not participate in the ITU or any of the regional bodies. While the Telecommunications Act was passed in 1996, the process started with the National Telecommunication Forum which was established at the FNB centre in Sandton. The CDITP convened a policy conference at the Carlton hotel in 1991 aimed at preparing for the transfer of power after the CODESA negotiations. Similarly, the Jabulani conference took place to discuss and propose the freeing of the airwaves. At the CODESA negotiations, a number of critical decisions were taken with regard to the national broadcaster and the need for an independent broadcasting regulator – the creation of the Independent Broadcasting Authority (IBA) was agreed and implemented prior to the first democratic elections in 1994.

4. Modern policy development in the era of social media

Moving on to the present day, the ITU Broadband Commission indicates in its 2011 report that, "To achieve the expansion of broadband requires top-level political leadership and joint efforts by the private sector and by governments. Most important of all, these efforts should be coordinated across all sectors of industry, administration and the economy. Developing isolated projects or piecemeal, duplicated networks, is not only inefficient; it also delays provision of infrastructure that is becoming as crucial in the modern world as roads or electricity supplies. When a trans-sectoral approach is taken — that shares infrastructure and builds synergies among the applications that use it — investments can yield major multiplier effects that benefit healthcare, education, energy efficiency, environmental protection, public safety, civic participation and economic growth. Such a trans-sectoral approach should lead to the development of smart interconnected and sustainable communities, homes and businesses."[iv]

Within this context, it becomes clear that we need a new policy and legislative framework in South Africa. The reference we have is the process followed in the early 1990s, issuing Green and White Papers followed by the drafting and passing of legislation. Policy directions were instruments designed to refresh some of the policy issues and will be critical to the new policy framework based on the rapid changes experienced in the ICT sector.

The last process of Green and White Papers started in 1994, however, the preparation of that content began in 1990. The process that culminated in the 1996 Telecommunications Act was long and consultative. The ANC and Labour Movement, civil society, women, youth, disabled community, international chambers of commerce, business community and Government participated in the process. Importantly, all formations of society were given an opportunity to contribute. The use of the words Green or White Paper is indicative and should be viewed in that light.

This process will then lead towards policy documents published by the Minister. This could be titled "The digital future for South Africa". I deliberately did not put any year to the title e.g. 2020 or 2025. The reason is simple: we might embark on a review process well before that date, based on our understanding of the speed of change within the sector, we also need to include regular reviews of, and updates to, the policy.

In terms of developing new policy for the ICT sector, it is critical that the necessary consultation framework is put in place. The

colloquium[v] is one such mechanism to initiate the consultation process, including the application of social media in sourcing comments.
The four pillars in modern policy development are:

An inter-governmental ICT policy forum

Including all three spheres of government, government agencies and parastatals coordinated by the Ministry and Department of Communications (DOC). This Forum will assist in coordinating legislation, regulation, investments or finance budgeting, scarce skills deployment, service provision etc. As there are more than 30 amendments to be undertaken by this forum, see section 7, the forum will play a critical role without whose input the anticipated digital life will not be realised

A demand-side consultative forum:

The phenomenal growth of social media driven by user generated content has increased the importance of demand side players in modern policy formulation. This sector comprises consumers, civil society groups, government, urban and rural users, youth, women's groups, the disabled, and NGO community.

A supply-side consultative forum:

This pillar comprises providers of services, such as: labour, OEMs, infrastructure providers, academia, industry bodies and business. Current industry bodies (e.g. SACF, CSSA, ITA, BITF, etc.) are critical to the future of the sector, however there is a need to consolidate and rationalise these to ensure sustainability.

International community:

In addition, there is an important role to be played by the international community. (Details of these organisations are contained in section 8) It is my view that the time has again come for the world to transform the ITU and other similar international institutions (e.g. ATU, PAPU, etc.), as their role has to change, given the changes in the world. These organisations, including the ITU have been overtaken by different, highly specialised, smaller agile organisations, often driven by the private sector. The risk is that Governments may be shut out of the development

process if the international institutions are not reformed.

The function of these forums will be to generate the questions required of the first phase of the policy development process, as well as serving as an ongoing reference group. This phase is aimed at creating the platform for policy engagement through the development of policy questions. These consultation processes are required to run in parallel to ensure that the collation, consolidation and ultimate synthesis thereof is concluded as efficiently as possible. The process needs to be coordinated by the Department and the questions, once received from the various forums through seminars, workshops and town hall meetings are to be collected, published and ultimately condensed into a manageable set of policy questions that will set the foundation for the next round of policy development.

The process of developing these questions with the identified stakeholders will serve to engage and involve these key constituencies in the policy formulation process, thereby skilling up these organisations and most importantly, communities in the policy development process. The timeframe to complete a process of this nature will be no less than nine months.

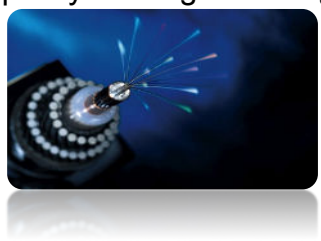
Policy framework – policy development

The development of the policy for the ICT sector will follow the collation of policy questions. It is the responsibility of the various constituencies to undertake a further round of consultation to develop the definitive policy document that will guide the sector for the next five years. This is similar to the White Paper process. A series of seminars and town hall meetings are required for interrogating the policy questions and defining the policy that will result from this next phase in the process.

It is critical that the Department leverages the reach and dynamism of social networking and online media to draw on contributions from all sectors of society in developing this comprehensive policy framework. The DOC should develop a policy application with links to Facebook, Twitter, DIGG, MxIT, etc.

The process of collating and synthesising the various policy questions is to be undertaken by the DOC in arriving at a policy document that can be published for comment. It is critical that the policy document captures the essence of the submissions and provides cohesive policy statement.
This process should be conducted over an 18-month period

Rapid developments of ICTs, specifically the exponential growth of mobile phones in the South African context, has ensured that the world we live in is increasingly interconnected and fast-changing. This hyperconnected digital economy is characterised by a shift from the production of goods to the creation of ideas, underscoring the central role of ICTs in a knowledge-based economy. ICTs, though merely tools, become transformative drivers when effectively utilised, hastening the pace of socio-economic development and bringing about positive change. The increased access to information and knowledge through the development of ICT has the potential to significantly improve the livelihoods of the poor and marginalised, and are essential tools that governments can deploy in their poverty reduction programmes, so as to accelerate growth by promoting inclusive and sustainable development. The World Summit on Information Society (WSIS) has affirmed the immeasurable contribution of ICTs to human development and states that "each person should have the opportunity to acquire the necessary skills and knowledge in order to understand, actively participate in, and benefit from, the information society and knowledge economy". This ought to be the central tenet of policy-making in the digital age.



The World Economic Forum (WEF) ranks South Africa's digitisation as constrained, indicating that the growth effects of digitisation are being impeded by the current market structure. It goes on to state that "the economic impacts of ICTs are patchy and social impacts disappointing' as the country is yet to leverage the potential benefits associated with ICTs. It is thus imperative that we honestly and dispassionately reflect on the role of current policy in the creation of the enabling environment required to 'deliver on national objectives and meet the needs of a modern economy", and how it ought to be

altered to adequately deal with an increasingly digital landscape.

Among the difficulties that governments face in the formulation of ICT policy is that policymakers are often unfamiliar with the technologies they are harnessing for national development. With the ICT landscape changing so rapidly, it is increasingly important for policymakers to have a thorough understanding of what current digital technology is, where it is headed and what this implies for policy-making.

The pace of technology change has created a dynamic policy environment, where policy modelling in this new data-predominant technology paradigm will need to be wholly different from that of the voice era. Whereas, historically, one could distinguish ICTs in terms of their particular features, and develop policy accordingly, this is no longer the case, as distinctions between different technologies have become blurred with convergence now a reality. The variety of interrelated infrastructures that have been converging include: “computing and communications, voice and data, wires and waves, broadcasting and telecommunications, and conduit and content”. This convergence requires a fundamental realignment of perspective in policy-making. Policies that once applied separately to broadcasters and telephone companies, to mobile networks and landlines, and to content providers and common carriers, must be revisited. Additionally, ICT policy can no longer be vertical in nature, but needs to be horizontal to keep apace with the changing ICT landscape.

It is critical that any policy document considers and integrates South Africa’s participation in international organisations, both on a continental and global level. The key issues to be dealt with in the international arena include:

- Spectrum allocation and management;
- IP numbering, especially the transition to IPv6;
- Digital migration and content distribution; and
- Universal service and access

The complexity around policy formulation is primarily the result of an understanding that the ICT sector is no longer driven by voice

communications. Therefore, the policy framework and constituent parts are very different to previous examples. The rise of the Internet as a ubiquitous transport layer has resulted in fundamental changes to the sector, as this has become the primary driver of convergence. Policy questions that arise from this realisation define how we deal with issues such as big data, peering as opposed to interconnection, spectrum for broadband services, social networking, etc. Most importantly we need to consider the implications for adjacent sectors, industries and the broader society – need to develop ENABLEMENT provisions as opposed to the traditional POLICY DIRECTION approach.

5. Enablement provisions in the ICT policy

The Enablement that has been mentioned briefly earlier in the document will be expanded upon in this section. The thinking behind this section is that ICT has increasingly become the fundamental underpinning not only of communications, broadcasting and postal services, but most other aspects of society. Based on this understanding it is important that these non-ICT sectors enable the effective use of modern ICTs within their specific domains. Any policy changes being proposed for the ICT sector needs to understand the impact on these related sectors and vice-versa. The enablement provision in the Policy should consider mechanisms to ensure that there is coordination on the matter between the responsible department and DOC.

The underlying assumption for any new policy for the ICT sector is that the environment has changed from a voice driven sector to an ecosystem that is driven by data and video. In addition, this ecosystem impacts on a number of adjacent sectors and industries. Therefore in order for us to adequately address this broader ecosystem, we need to attend to various pieces of legislation across sectors as diverse as healthcare, finance, social security to domain naming. Below I have included some examples of the required changes we envisage, but more importantly a mechanism needs to be created to ensure that this review is undertaken and implemented.

Below are some examples of the approach required in terms of the legislative review process and enablement provisions within the respective legislative instruments and policy framework.

Some Policy Considerations (these are to be enabled not necessarily included in legislation) include:

Rural ICT: It is critical that the policy consider the mechanisms for the inclusion of rural communities in the policy issues related to the deployment, application and benefit from ICTs.

Women and ICT: The important role of women in ICT needs to be included in the issues related to access, content and skills for the country and sector.

Youth and ICT: ICTs are synonymous with the young, yet they are often neglected in the policy formulation process. They have valuable insights into the rapid uptake

of technology, especially social media. Any policy process needs to offer special attention and consideration to the role of the youth in ICT.

Disability and ICT: The disabled community is often excluded from policy decision and they have an immense role to play in strengthening the sector as well as the benefits from ICTs in improving accessibility.

Children and ICT: ICTs have an important role to play in the education and development of children and their needs have to be taken into account when drafting policy, in particular the enablement provision thereof.

The elderly and ICT: The elderly are often marginalised in society and ICT could play an important role in ensuring their inclusion in the broader society (especially in terms of social media).

The vulnerable and ICT: The vulnerable members of our society need to be considered in any policy framework that we are to develop.

Net neutrality: This principle, which implies that all Internet users ought be allowed to access mobile as well as online sites and services with no difference in quality or pricing dependent on their choices, has begun to take on central importance in the constant and expanding ICT world, with resultant policy implications vis-à-vis pricing by vertical operators.

The digital divide: The resolution of this issue cannot be left to technological evolution alone. The digital divide has been a prominent issue for policymakers for some time and ought not solely be framed as an access problem, but also one highlighting skills disparities.

Future proof infrastructure: Policy considerations arising from the dynamic and fast changing ICT sector include the need to deploy appropriate technology such as the deployment of optical fibre networks in place of copper networks for critical backbone infrastructure.

Policy and regulatory flexibility: The continued evolution of Internet technologies and their use, such as the liberalisation of VoIP requires increasingly flexible, dynamic and adaptable policy and regulatory environments.

Regulated and unregulated spectrum: There needs to be a policy that would govern white spaces, commons and emergent technologies such as cognitive radio. The rise of these and related technology developments point to the increasing importance of spectrum in the development of the ICT sector.

IP infrastructure development: Policy also needs to facilitate the adoption of new technologies and deployment of forward-looking strategies for infrastructure development such as the adoption of IPv6 and sensor networks.

Machine to machine (M2M): The rise of machine-to-machine connectivity will result in the growth of data flows across ICT infrastructure and feed into the big data phenomenon.

Internet of Things: The ability for all devices to be addressed with an IPv6 address creates opportunities for innovative applications of smart technology in all aspects of human activity. Any policy development needs to consider the impact of the growing number of connections to the ICT

networks that need to be flexible, cost effective and available.

Big data: The increase in the storage, processing and availability of broadband creates the environment for big data to emerge. This phenomenon is based on the fact that the world contains an unimaginably large amount of digital information that is increasing rapidly. This makes it possible to do many things that previously could not be done: spot business trends; prevent diseases, combat crime and so on. Managed well, the data can be used to unlock new sources of economic value, provide fresh insights into science and hold governments to account.

The Cloud: The development of Cloud services and infrastructure has created new legal and regulatory issues that include copyright and services. The development of environmentally sustainable models for managing Cloud infrastructure is critical to the future of the ICT sector.

Software as a Service: The development of cloud services, rise of tablets and smartphones has resulted in a significant and fundamental change to the software industry and creating an environment for development of software as a service as opposed to it being a standalone product.

ICT and education: The important and valuable role that ICTs are and can play in the education process requires of any policy to identify the positive application thereof to education.

ICT and health: The lowering of communications costs as well as the increasing availability thereof in all spheres of life, especially in healthcare, creates opportunities for new services and products in this environment.

ICT and environment: ICTs have long been hailed as the mechanism to reduce carbon emissions by allowing remote networking, communications and working. In addition, the rise of green tech will assist in reducing our environmental footprint.

Web 2.0: The rise of social media platforms, online content services and applications have started to realise the often-hyped potential of the Web 2.0 phenomenon. It is a reality that needs to be addressed in policy development for a Digital Life.

Infrastructure sharing and environmental considerations: The growing importance of responsible environmental management by the ICT sector is a key policy consideration, including issues such as facilities sharing, wholesale models and cooperatives.

Sensor networks: The increased prevalence of sensors in our daily lives requires that we consider the management and implications thereof for ICT policy.

Digital identity: if we need to create digital life - we need to recognize digital certificates for birth, marriage or death. Therefore an amendment must be done in those respective laws.

Augmented reality: The rise of always on networks combined with mobility has created opportunities for augmented reality applications.

Electronic and mobile payment systems: if we want to introduce Mobile-Money or E-Wallet, we need to revisit the National Payment Systems Act.

Electronic publications: if we want to introduce E-Books or E-Documents, we need to look at the National Library Act and the Archives legislation.

Managing appropriate content: in the age of Internet and social media and YouTube How do we deal with publications laws and film promotion.

Municipal management: how we deal with energy meter regulations in the age of smart meters? These laws and regulations require amendment or change.

Copyright and intellectual property rights: how to manage copyright laws, trademark laws, intellectual property legislation in the digital and Internet era.

Promoting fibre deployment: as we develop FTTH how should housing laws mirror such developments.

ICT national road infrastructure: the management of roads at national, provincial and local government level is key to rolling out of broadband optic fibre. How can these laws and regulations facilitate ICT broadband infrastructure development? These roads agencies are becoming the main regulators of broadband deployment in the country.

Space resource management: the management of space resources i.e. frequencies and orbital slots is a strategic responsibility. Between SANSA, DOC, Space Affairs Council, there is a need to synchronize all the respective legislation.

Coordination of government broadband services: Between SITA, Broadband InfraCo, SANREN, TENET, Meraka Institute, and Sentech, there is a need to coordinate activities in particular with regard to broadband.

Streamlining regulation: regulating competition, telecommunications, optic fibre deployment alongside roads, consumer issues, content (on television or radio or Internet or video shops) pricing, peering, international communications, reticulation in buildings, and many other areas. Smart metering between ICASA, NERSA, consumer protection agencies, SANRAL, municipal roads agencies, SABS, etc. - defining responsibility and authority.

Streamlining ICT legislation: there are more than 20 ICT related legislative instruments today. The result being that each of the responsible bodies want to expand their roles and responsibilities beyond the original scope. As such new amendments that are passed do not take into account existing legislative instruments. They do this either by amending the legislation or creating a new regulation.

ICT finance and investment: Coordination of ICT financing and investing between IDC, NEF, GEPF, DBSA, PIC and other State finance institutions.

City digital hubs: Consider the creation of city-based digital hubs

Social media: The rise of social media has created a new paradigm in the content industry as users start to generate increasing amounts of content as opposed to simply consuming pre-packaged content. The medium of consumption has also shifted to computers and mobile phones.

The policy issues identified above are not exhaustive, but indicative of the topics and issues that require consideration when determining policy for South Africa. Not all these areas

need to be legislated but at a minimum needs to be enabled by Government.

6. Skills development through policy formulation

There is a need to engage with educational institutions (schools and universities) in the policy process and use the opportunity to build capability through their involvement in this process.

When looking at the broader skills development issues facing the sector it may have value in looking at the development of an ICT university. When the concept of an ICT University was developed at the DOC, it was like baking a muffin, but a pizza came out of the oven. Meraka Institute is that output, based on the need for compromise and to avoid conflict with the university community. When we developed the ICT university concept and took the idea to Cabinet, it was subjected to a long process and ultimately resulted in a very different output. Those of us who conceptualised and wrote about the need for an ICT university were told by some leading professors in our academic institutions that South Africa does not need a specialist university. What we had in mind was an institution that will advance the development of ICT in our society, not only through learning, but also through basic research. This university was to bring together all aspects of ICT: basic science, physics and engineering in areas such as photonics, electro magnetic frequency spectrum, sociology of ICT, economics of ICT, political, environmental and all related fields. This was to be achieved through a multi disciplinary programme that would advance both theory and empirical issues in the ICT sector.

The question we need to ask ourselves is how we should introduce computing as a tool for learning, the same way books and pens are used as learning tools. Today, and in the future of saving trees and the environment, it might be cheaper for Government to consider tablets as a basic learning tool. This should be investigated by conducting a cost-benefit analysis of such transformation: if it will be much cheaper in the long run.

The other aspect is the teaching of ICT as a subject or a course, from pre-school to basic education and above. Against this background, ICT should become an integral part of school curriculum today and in the future. Even language training today, or history or geography, is better understood and applied using computing platforms. It is once again necessary to review the requirement for an ICT university to ensure that South Africa remains globally competitive.

A critical element of the policy is the skills development within the sector including South Africa's participation in international standards setting

and technical organisations e.g. IEEE, WRC, AfriNIC, CTO, etc.
It is essential that South Africa conduct ICT research in areas such as:

- Engineering technology;
- Basic science;
- Social science;
- Economic and business process;
- International relations;
- Defence systems;
- Work ; and
- Services.

We need to identify priority sectors for South Africa. A clear budget must be managed by a focal point using existing centres e.g. CSIR, NRF, Department of Science and Technology, DOC, DTI and many other areas. Importantly, we need to find effective ways to develop PPP projects in R&D.

7. Legislative review

Title	Description	Implications
Electronic Communications Act No. 36 of 2005	To promote convergence in the broadcasting, broadcasting signal distribution and telecommunications sectors and to provide the legal framework for convergence of these sectors; to make new provision for the regulation of electronic communications services, electronic communications network services and broadcasting services; to provide for the granting of new licences and new social obligations; to provide for the control of the radio frequency spectrum; to provide for the continued existence of the Universal Service Agency and the Universal Service Fund	
Telecommunications Act No. 103 of 1996	To make new provision for the regulation of telecommunication activities other than broadcasting, and for the control of the radio frequency spectrum; and for that purpose to establish an independent South African Telecommunications Regulatory Authority and a Universal Service Agency; to repeal the Radio Act, 1952, and the Radio Amendment Acts of 1957, 1962, 1963, 1969 and 1974 and to amend the General Law Amendment Acts of 1957 and 1975, the Post Office Act, 1958, the Post Office Service Act, 1974, the	

	Broadcasting Act, 1976, the Legal Succession to the South African Transport Services Act, 1989, and the Independent Broadcasting Authority Act, 1993	
ICASA Act No. 64 of 2000	o provide for the establishment of the Independent Communications Authority of South Africa; to provide for the dissolution of the Independent Broadcasting Authority and the South African Telecommunications Regulatory Authority; to transfer the functions of the latter authorities to the Independent Communications Authority of South Africa	Consider implications of convergence on regulation. Include issues related to competition and jurisdiction over matters currently regulated by infrastructure entities and local authorities (e.g. way-leaves)
Sentech Act No. 63 of 1996	To provide for the transfer of all the shares of the South African Broadcasting Corporation in Sentech (Pty.) Ltd. to the State; for the conversion of Sentech (Pty.) Ltd. from a private to a public company, Sentech Ltd.	Provide for revised operations of Sentech in terms of the development of spectrum applications and the digital migration process.
Broadband Infraco Act No. 33 of 2007	To provide for the transfer of shares, loan accounts, liabilities and guarantees in Broadband Infraco (Propriety) Limited from Eskom Holdings Limited to the State; to provide for the main objects and powers of Broadband Infraco (Proprietary) Limited; to provide for the borrowing powers of Broadband Infraco	

	(Proprietary) Limited; to provide for servitudes and additional rights in favour of Broadband Infraco (Proprietary) Limited; to provide for the expropriation of land or any right in land by the Minister for Public Enterprises on behalf of Broadband Infraco (Proprietary) Limited; to provide for the conversion of Broadband Infraco (Proprietary) Limited; into a public company having a share capital incorporated in terms of the Companies Act, 1973	
Broadcasting Act No. 4 of 1999	To repeal the Broadcasting Act, 1976 (Act No. 73 of 1976), so as to establish a new broadcasting policy for the Republic; to amend certain provisions of the Independent Broadcasting Authority Act, 1993 (Act No. 153 of 1993); to clarify the powers of the Minister in regard to policy formulation and the Authority's powers with respect to the regulation and licensing of the broadcasting system; to provide for classes of broadcasting activities in the public interest and for that purpose--to provide a Charter for the South African Broadcasting Corporation Ltd; to establish the Frequency Spectrum Directorate in the Department; to establish the South African Broadcasting Production Advisory Body; and to establish a human resource capacity in policy development.	Consider the change in the nature, ownership and application of broadcasting in the age of online and mobile services.
Electronic	To provide for the facilitation	To be updated in line

Communications and Transactions Act no. 25 of 2002	and regulation of electronic communications and transactions; to provide for the development of a national e-strategy for the Republic; to promote universal access to electronic communications and transactions and the use of electronic transactions by SMMEs; to provide for human resource development in electronic transactions; to prevent abuse of information systems; to encourage the use of e-government services	with recent technology developments, especially social media and mobile payment systems.
Postal Services Act No. 124 of 1998	To make new provision for the regulation of postal services; for the operational functions of the postal company, including its universal service obligations; for structural matters relating to postal services as well as the operation of the Postbank and National Savings Certificates; and to consolidate certain provisions relating to the postal company and amend or repeal others.	Postal services to include mapping addresses via GPS coordinates and consider implications of Google Maps and Google Earth applications.
State Information Technology Agency Act No. 88 of 1998	To provide for the establishment of a company that will provide information technology, information systems and related services to, or on behalf of, participating departments and in regard to these services, act as an agent of the South African Government	Implications of changes in market conditions and management of State IT services.
Space Affairs Act No. 84 of 1993	To provide for the establishment of a Council to manage and control certain space affairs in the Republic; to	

	determine its objects and functions; to prescribe the manner in which it is to be managed and controlled	
Film and Publications Act No. 65 of 1996	To provide for the classification of certain films and publications; to that end to provide for the establishment of a Film and Publication Board and a Film and Publication Review Board.	Regulation of content to be increasingly difficult with the proliferation of platforms and mediums to deliver content.
National Payment System Act No. 78 of 1998	To provide for the management, administration, operation, regulation and supervision of payment, clearing and settlement systems in the Republic of South Africa	Online and mobile payment systems to be regulated and enabled by this legislation.
National Film and Video Foundation Act No. 73 of 1997	To establish a juristic person to be known as the National Film and Video Foundation; to determine its objects, functions and method of work; to prescribe the manner in which it is to be managed and governed; to regulate its staff matters and financial affairs.	Inclusion of social networking and online content services (e.g. YouTube, VIMEO, etc.)
South African National Roads Agency Limited and National Roads Act No. 7 of 1998	To make provision for a national roads agency for the Republic to manage and control the Republic's national roads system and take charge, amongst others, of the development, maintenance and rehabilitation of national roads within the framework of government policy; for that purpose to provide for the establishment of The South African National Roads Agency Limited, a public company wholly owned by the State; to provide for the governance and	The regulation of ducting along roads to be formally regulated and consideration given to coordination with DOC in terms of rapid deployment regulations.

	management of that company (''the Agency'') by a board of directors and a chief executive officer, respectively, and to define the Agency's powers and functions and financial and operational accountability, and regulate its functioning; to prescribe measures and requirements with regard to the Government's policy concerning national roads, the declaration of national roads by the Minister of Transport and the use and protection of national roads; to repeal or amend the provisions of certain laws relating to or relevant to national roads.	
Local Government Municipal Systems Act No. 32 of 2000	To provide for the core principles, mechanisms and processes that are necessary to enable municipalities to move progressively towards the social and economic upliftment of local communities, and ensure universal access to essential services that are affordable to all; to define the legal nature of a municipality as including the local community within the municipal area, working in partnership with the municipality's political and administrative structures; to provide for the manner in which municipal powers and functions are exercised and performed; to provide for community participation; to establish a simple and enabling framework for the core processes of planning, performance	Local Government regulations to include the provision of fibre ducting in approvals for property transfers – fibre to be considered a utility such as water, electricity and sewerage. Rapid deployment approvals and management especially regarding the provision of way-leaves.

	management, resource mobilisation and organisational change which underpin the notion of developmental local government; to provide a framework for local public administration and human resource development; to empower the poor and ensure that municipalities put in place service tariffs and credit control policies that take their needs into account by providing a framework for the provision of services, service delivery agreements and municipal service districts; to provide for credit control and debt collection; to establish a framework for support,, monitoring and standard setting by other spheres of government in order to progressively build local government into an efficient, frontline development agency capable of integrating the activities of all spheres of government for the overall social and economic upliftment of communities in harmony with their local natural environment; to provide for legal matters pertaining to local government	
Disaster Management Act No. 57 of 2002	To provide for: * an integrated and co-ordinated disaster management policy that focuses on preventing or reducing the risk of disasters, mitigating the severity of disasters, emergency preparedness, rapid and	Consider the implications of social media and online disaster management tools and services.

	effective response to disasters and post-disaster recovery; * the establishment of national, provincial and municipal disaster management centres; * disaster management volunteers	
National Building Regulations		The inclusion of fibre ducting in the building plans and transfer of properties – conveyancing process to include sign-off of fibre ducting.
Land Survey Act No. 8 of 1997		Inclusion of Google maps/Earth and related online earth observation technologies.
Environmental Legislation		Environmental impact assessment processes and relationship to communications and transmission infrastructure.
The Labour Relations Act No. 66 of 1997	To change the law governing labour relations and, for that purpose to give effect to section 27 of the Constitution; to regulate the organisational rights of trade unions; to promote and facilitate collective bargaining at the workplace and at sectoral level; to regulate the right to strike and the recourse to lock-out in conformity with the Constitution; to promote employee participation in decision-making through the establishment of workplace forums; to provide simple procedures for the resolution of labour disputes through	Addressing the requirements for mobile and remote workers. Consider the application of social media in conciliation and organisational activities.

	statutory conciliation, mediation and arbitration (for which purpose the Commission for Conciliation, Mediation and Arbitration is established), and through independent alternative dispute resolutionservices accredited for that purpose; to establish the Labour Court and Labour Appeal Court as superior courts, with exclusive jurisdiction to decide matters arising from the Act; to provide for a simplified procedure for the registration of trade unions and employers' organisations, and to provide for their regulation to ensure democratic practices and proper financial control; to give effect to the public international law obligations of the Republic relating to labour relations; to amend and repeal certain laws relating to labour relations	
The Regulation of Interception of Communications and Provision of Communications Related Information Act No.70 of 2002	To regulate the interception of certain communications, the monitoring of certain signals and radio frequency spectrums and the provision of certain communication-related information; to regulate the making of applications for, and the issuing of, directions authorising the interception of communications and the provision of communication-related information under certain circumstances; to regulate the execution of directions and entry warrants by law enforcement officers	Need to take into account changes in communications mechanisms such as Instant Messaging, over-the-top applications and related technology developments, consider what role in this environment should be.

	and the assistance to be given by postal service providers, telecommunication service providers and decryption key holders in the execution of such directions and entry warrants; to prohibit the provision of telecommunication services which do not have the capability to be intercepted; to provide for certain costs to be borne by certain telecommunication service providers; to provide for the establishment of interception centres, the Office for Interception Centres and the Internet Service Providers Assistance Fund; to prohibit the manufacturing, assembling, possessing, selling, purchasing or advertising of certain equipment; to create offences and to prescribe penalties for such offences.	
Media Development and Diversity Agency Act (No. 14 of 2002)	To establish the Media Development and Diversity Agency; to provide for its objective and functions; to provide for the constitution of the Board and the management of the Agency by the Board; to provide for the chief executive officer and other staff of the Agency; to provide for the finances of the Agency; to provide for the support of projects aimed at promoting media development and diversity	Consider implications of online media and radio streaming, electronic media etc. cross-border nature of media and content services.
Pan South African Language Board Act No. 59 of 1995	To provide for the recognition, implementation and furtherance of multilingualism	Consider implications of online, mobile and social media in the

	in the Republic of South Africa; and the development of previously marginalised languages; to establish a Pan South African Language Board.	promotion of language diversity.

8. International organisations

Short name	Long name	Geography	URL
3GPP	Third-generation Partnership Project	International	http://www.3gpp.org
ARIB	Association of Radio Industries and Businesses	Japan	http://www.arib.or.jp/english
ATIS	Alliance for Telecommunication Industry Solutions	US	http://www.atis.org
Broadband Forum	Broadband Forum	International	http://www.broadband-forum.org
DMTF	Distributed Management Task Force	International	http://www.dmtf.org
ETSI	European Telecommunications Standards Institute	Europe	http://www.etsi.org
GSC	Global Standards Collaboration	International	http://www.gsc.etsi.org
ICANN	Internet Corporation for Assigned Names and Numbers	International	http://www.icann.org
ICTSB	ICT Standards Board	Europe	http://www.ictsb.org
IEC	International Electrotechnical Commission	International	http://www.iec.ch
IEEE	Institute of Electrical and Electronics Engineers	International	http://www.ieee.org
IETF	Internet Engineering Task Force	International	http://www.ietf.org
ISO	International Organization for Standardization	International	http://www.iso.org
ISOC	Internet Society	International	http://www.isoc.org
ITU	International Telecommunication Union	International	http://www.itu.int
OASIS	Organization for the Advancement of Structured Information Standards	International	http://www.oasis-open.org

OMA	Open Mobile Alliance	International	http://www.openmobilealliance.org
TIA	Telecommunications Industry Association	US	http://www.tiaonline.org
WSC	World Standards Cooperation	International	http://www.itu.int/ITU-T/wsc
WWRF	Wireless World Research Forum	International	http://www.wireless-world-research.org
SABS	South African Bureau of Standards	SA	http://www.sabs.co.za
NIST	National Institute of Standards and Technology	US	http://www.nist.gov
ANSI	American National Standards Institute	US	http://www.ansi.org
ASTM International	American Society for Testing and Materials	International	http://www.astm.org
BSI Group	British Standards Institution	UK	http://www.bsigroup.com
CCSA	China Communications Standards Association	China	http://www.ccsa.org.cn/english
CEN	European Committee for Standardization	Europe	http://www.cen.eu
DIN	German Institute for Standardization	Germany	http://www.din.de
OGF	Open Grid Forum	International	http://www.ogf.org
OMG	Object Management Group	International	http://www.omg.org
RosettaNet	RosettaNet	International	http://www.rosettanet.org
TCG	Trusted Computing Group	International	http://www.trustedcomputinggroup.org
TOG	The Open Group	International	http://www.opengroup.org
TM Forum	TeleManagement Forum	International	http://www.tmforum.org
TTA	Telecommunications Technology Association	South Korea	http://www.tta.or.kr/English

TTC	Telecommunication Technology Committee	Japan	http://www.ttc.or.jp/e
UMTS Forum	UMTS Forum	International	http://www.umts-forum.org
W3C	World Wide Web Consortium	International	http://www.w3.org
CENELEC	European Committee for Electrotechnical Standardization	Europe	http://www.cenelec.eu
3GPP2	Third-generation Partnership Project 2	International	http://www.3gpp2.org
Accellera	Accellera	International	http://www.accellera.org
AFNOR	Association française de Normalisation	France	http://www.afnor.org
Bluetooth SIG	Bluetooth Special Interest Group	International	http://www.bluetooth.com
CableLabs	CableLabs	International	http://www.cablelabs.com
CEPT	European Conference of Postal and Telecommunications Administrations	Europe	
DigitalEurope	DigitalEurope	Europe	http://www.digitaleurope.org
DVB	DVB Project	International	http://www.dvb.org
EBU	European Broadcasting Union	Europe	http://www.ebu.ch
Ecma International	Ecma International	International	http://www.ecma-international.org
FCC	Federal Communications Commission	US	http://www.fcc.gov
IET	Institution of Engineering and Technology	British	http://www.theiet.org
ISACC	The ICT Standards Authority Council of Canada	Canada	http://www.isacc.ca
Kantara Initiative	Kantara Initiative	International	http://www.kantarainitiative.org

Unicode Consortium	Unicode Consortium	International	http://www.unicode.org
WIPO	World Intellectual Property Organization	UN	http://www.wipo.int
XSF	XMPP Standards Foundation	International	http://xmpp.org/xsf
Wi-Fi Alliance	Wi-Fi Alliance	International	www.wi-fi.org
WiMax Forum	Worldwide Microwave Interoperability Forum	International	www.wimaxforum.org
WBA	Wireless Broadband Alliance	International	http://www.wballiance.net

9. Conclusion

Policy modelling in the age of data will be very different from that in the age of dial tone or voice. The world has moved from traditional interconnect, COA-CAM, TDM, PSTN-centric to IP peering, cloud, application, SaaS and a social media environment. We coined the model of POLICY DIRECTIONS in the early 1990s, whereas today we need to think about ENABLERS. Even spectrum is moving towards software based models. Big data is here and we need to enable it. Therefore, ICT policy needs to be developed taking into account the fundamental changes that have happened in the sector, in particular shift from being vertically integrated to an integrated ecosystem. The universality of ICT policy in the age of big data cannot be contested any longer. The development of ICT policy should be in every sphere of Government, in every department, every parastatal, every agency, every sector of the economy, every LSM, both urban and rural areas. All statutes should have an ICT enablement provision that requires the responsible department to consider and implement the required ICT provisions. The policy model of the 1990s was one of a unitary, centrally-controlled approach which is no longer possible in the modern ICT environment. The process of developing this ICT policy should take this into account. If we want to create an enabling environment we must not leave any stone unturned. It is going to be complex and sometimes difficult and challenging, but we have no choice. If we want to take our position in the world of nations, we must be thorough and scientific in the way we do things and provide intellectual leadership in our region, Africa. We are duty-bound to future generations of our society to do this. The structure or model of policy development is the one we need to debate first and then find common ground.

In my paper, I argue that we need a fundamental structural change in our market structure and policy model because things have advanced. I can trace

this model to the book we published for the ITU in the early 1990s entitled "Why, What and How to Regulate". This was done ten years after the break up of AT&T in the USA. Another example was work we undertook at the formation of InfoDev (World Bank agency) to develop a theoretical framework for the separation of policy and regulation developed in 1992. At that time we worked as the international community in transforming the ITU into the structure we see today.. The speed of change today requires a different model in policymaking, not simply one of POLICY DIRECTION, but looking towards ENABLEMENT.

Finally, it is appropriate to draw on a quote by Charles Darwin: "it is not the strongest of the species that survives, nor the most intelligent, but rather the one most adaptable to change".

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