



ZIMBABWE ECONOMIC
POLICY ANALYSIS AND
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digital opportunities for economic growth and development for zimbabwe



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ABSTRACT

The study explores the opportunities for enhancing sustainable economic growth and development in Zimbabwe, through the use of digital innovations. Using data from 2000-09, the paper assesses the growth-enhancing potential of the new information communication technologies (ICTs) of mobile phone, internet, broadband and computers, focusing on diffusion, institutional and regulatory frameworks in the sector and how the new ICTs can positively impact on sustainable economic growth and development. The main objective of the study is to provide evidenced-based policy advice to Government on how the country can leverage on the opportunities for sustainable development through widespread use of ICTs. Valuable lessons are drawn from extensive literature reviews, coupled with interviews with key informants from Government and players in the sector. It is noted that the ICT environment in the country remains challenged, where the average teledensity, mobile access, internet and broadband penetration rates are much lower than the African average. The low levels of ICT diffusion in the country contributes to limiting the potential for digital solutions in enhancing sustainable development. In order to realize the full potential of ICTs in enhancing sustainable development in Zimbabwe, the study recommends that the country's policy and regulatory environment require significant strengthening to address the current inadequate regulatory capacity and promote growth of the sector and innovations that adds value to the providers and end-customers. Furthermore, the need to guarantee security of electronic transactions and ensuring that Zimbabwe does not become a haven of cyber-crime, cannot be over-emphasized. Equally, an enabling policy environment is required for the ICT sector, including coherent national plans that integrate ICT-based development. Strengthening of the policy and regulatory environment remains key imperators in promoting higher ICT investment and diffusion levels, which are the preconditions for enhancing the impact of the new ICTs on sustainable development and help close the digital gap between Zimbabwe and the advanced economies.

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LIST OF ACRONYMS

AfDB	African Development Bank
ATAC	Australian Telework Advisory Committee
ATM	Automated Teller Machine
B2B	business to business
B2C	business to consumer
BAZ	Broadcasting Authority of Zimbabwe
CCS	Central Computing Services
EU	European Union
GDP	Gross Domestic Product
GNP	Gross National Product
GoZ	Government of Zimbabwe
GPA	Global Political Agreement
ICTs	Information Communication Technologies
IDI	ICT Development Index
IT	Information Technology
ITU	International Telecommunications Union
LMDS	Local Multipoint Distribution System
MB	Megabits
MDG	Millennium Development Goals
MIC	Media and Information Commission
MICT	Ministry of Information Communication Technology
MTCID	Ministry of Transport, Communications & Infrastructure Development
NRI	Networked Readiness Index
OECD	Organisation for Economic Co-operation and Development
OU	Open University
PC	Personal Computer
POTRAZ	Postal and Telecommunications Regulatory Authority of Zimbabwe
PPP	Public Private Partnership
PTC	Post and Telecommunications Corporation
R & D	Research and Development
SADC	Southern Africa Development Community
SMS	Short Message Service
USA	United States of America
WSIS	World Summits on the Information Society

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I. INTRODUCTION

Until recently, developing-country governments, development agencies, economists, and academia, alike attached little attention towards digital innovations in the economic growth and development matrix. However, recent developments in the global economy have seen countries embracing digital technologies as key enablers of sustainable growth and national development. In the face of globalization and rapid technological innovation, Information Communication Technologies (ICTs) have grown in importance and are now an essential element of infrastructure underpinning competitiveness, growth and progress towards a global information and knowledge society. ICTs are increasingly becoming integrated into the day to day activities of businesses and lives of households and individuals worldwide.

Accordingly, ICT performance remains crucial not only for developed countries for sustaining and enhancing their innovation potential and long-term competitiveness, but also for middle-income and developing countries in fostering structural transformation, increasing efficiency as well as reducing the digital, economic, and social divides within their territories and vis-à-vis more advanced economies (GITR, 2010). For developing countries like Zimbabwe, ICTs are seen not only as providing new impetus for sustainable growth but are also a prerequisite for these countries to participate in the information and knowledge society. Rightly so, the country's Medium Term Plan (MTP) 2011-2015 acknowledges that ICTs will play a major role in the attainment of the projected average annual growth rates of 7 percent over the next 4 years and propelling Zimbabwe into a knowledge society. This will thus enhance the country's competitiveness in support of sustained economic growth through the systematic application and innovative use of digital technologies.

ICT consists of hardware, software, networks and media for the collection, storage, processing, transmission and presentation of information (voice, data, text, images) as well as related services. Duncombe and Heeks (2002), defined ICT as the electronic way of capturing, processing, storing and disseminating information. For the purposes of this study, we adopted a more or less similar definition to that of the Ministry of Information Communication Technology's (MICT) strategic Plan 2010–2014, which defines ICT as embracing the use of computers, telecommunications, office systems and technologies for the collection, processing, storing, packaging and dissemination of information. In this case, the study looks at the ICT subsectors of telecommunication, internet and broadband, and the respective opportunities for enhancing economic growth and development arising from their increased usage.

The opportunities for enhancing sustainable economic growth, through ICTs can be on account of production or diffusion or both. ICT production refers to the contribution to output, employment and export earnings arising from the production of ICT related goods and services, whilst ICT diffusion relates to ICT-induced development through enhanced productivity, competitiveness, growth and human welfare emanating from ICT adoption and widespread usage in different sectors of the economy and sections of the society (Kraemer

and Dedrick2001). Countries such as the USA, Japan, Korea, India, among others, have benefited immensely from the production and exports of ICT related products. According to Kumar (2000), India is among a group of developing economies widely known for their success in the production and export of ICT software and services. The value of output of India's ICT software and service sector increased by 43 folds from US\$0.83 billion in 1994-95 to US\$36.3billion in 2005-06 accounting for about 4.8 percent of GDP, (NASSCOM 2006). By 2006 the ICT software and service exports accounted for 20 percent of India's exports and even higher than the leading traditional items in India's export basket such as textile and textile products, (Chandrasekhar et al 2006).

Recognising the potential for enhancing competitiveness and growth, governments have initiated national e-government, e-education and e-commerce, whilst donor agencies have made digital technologies a mainstream item in their programmes. The benefits of ICT usage are far reaching and have transformed the face of banking, healthcare, education, government operations, employment and enhanced business efficiencies, thus bringing about increases in national output. On the social front, the benefits of ICTs can be seen in greater social interaction, fostering closer family ties, easy communication, information and knowledge sharing as well as widening people's freedoms. However, notwithstanding the vast opportunities of ICTs in enhancing sustainable growth and development, Zimbabwe's ICT performance, remains subdued mainly due to the impact of the economic problems experienced over the past decade. The harsh macroeconomic conditions resulted in low adoption and usage of ICTs in the country compared to other African countries that, according to ITU (2009), experienced average annual growth rates of about 50 percent in mobile phone usage over the period 2000-07.

The potential for enhanced growth through ICT usage remain limited in Zimbabwe, given that the ICT infrastructure and network is largely underdeveloped and requires huge investment. There are only three mobile telephone operators, operating in the 900/1000 MHz, less than 3 000 base stations, 9 mobile centres, 5 mobile gateways and 5 terrestrial radio links (GoZ 2010). Whilst there has been notable progress with regards to mobile phone investments, broadband infrastructure remains largely underdeveloped. A snap shot of the key ICT indicators is given in Table 1.

Table 1: Indicators of ICT Diffusion in Zimbabwe as at end-2009

Indicator	Subscribers	Penetration Rate
Mobile Phone	2,998,000	31.98
Internet Subscribers	1,442	11.36
Broadband	29,130	0.23

Source: ITU World Telecommunication/ POTRAZ

Notwithstanding the subdued ICT sector performance, adoption and increased usage of ICTs presents the country with massive opportunities for growth and recovery beyond the traditional growth sectors. The two World Summits on the Information Society (WSIS) in Geneva

in 2003 and Tunis in 2005 recognised that ICTs are not only drivers for economic growth, but a key component in addressing development challenges. In many African economies, national strategies on economic growth and poverty reduction, traditionally focused on agriculture, mining, manufacturing, energy, tourism among other sectors, with little attention towards ICTs. For Zimbabwe, the ICT sector has not been receiving much attention until 2009 when the Inclusive Government, launched a full fledged Ministry in charge of ICTs. Rightly so, the ICT sector's contribution to the country's gross domestic product (GDP) was second at 15.2 percent behind the 15.5 percent of agriculture (GoZ 2010). This has corroborated beliefs that the ICT sector has great potential to provide the country, an opportunity for sustainable growth and development.

It is argued that the failure of the South to harness the benefits of the ongoing technological revolution in the North, places developing country populations at an ever increasing disadvantage in a globalising world (Bridges, 2001). However, whilst ICTs are seen as key in closing the digital divide, which is the disparity in ICT diffusion and use, between regions, sectors and societies, others have shown that ICT may potentially have a negative impact on labour markets. This is mainly through the so called labour-saving or skill-bias effects, via the displacement of some unskilled workers due to either reduction or elimination of some of the jobs that do not necessarily require skilled labour, (Khaled, 2006). Some argue that accumulation and diffusion of ICT could have a negative consequence on growth convergence and income inequality across and within countries. In particular, developed countries, which have the vast majority of ICT stock in the world, will have better competitive advantage which could make it harder for developing countries to compete in the global markets for both inputs and outputs. This in turn could hinder the catching up of the developing countries to their developed peers in terms of growth. By the same token, the rapid accumulation of ICT might also have some negative implications on the poor in developing countries and hence aggravate the already-existing issues of income inequality in those countries, (Khaled, 2006).

This notwithstanding, ICT remains vital in the "new economy" in facilitating, motivating and activating communications and fast delivery of goods and services within and across different regions of the world. The World Development Report (1998) argues strongly for the increasing role of information technology in facilitating the production and distribution of a growing number of goods and services. Furthermore, the World Bank (2006) noted that firms that use ICT grow faster, invest more and are more productive and profitable than those that do not. Some studies suggest that GDP and telecommunications growth have causal effects in both directions (Norton, 1992; Alleman et al, 1994). Investment in telecommunications infrastructure is considered part of productive spending, as it has an effect on economic growth and development. The impact of investment in ICT infrastructure is seen to be twice as large in many developed countries that have a substantial network infrastructure, and/or have already achieved universal coverage. This has been substantiated by the work of Quiang and Rossotto (2009) in Chimhowu A, etal (2010), who found out that affordable, high quality broadband and mobile phone services, promotes development across all levels of an economy. Quiang and Rossotto (2009) as cited in Chimhowu A, etal (2010), argued

that a 10 percent increase in high speed internet connections results in an increase of up to 1.3 percent in overall economic growth. Such evidence suggests that embracing new ICTs can enhance growth and poverty reduction if the benefits from such growth are equitably distributed.

Equally, GDP growth is found to have a positive causal effect on ICT investment and growth. OECD (2009), in a study of OECD countries from 1985 to 1997 noted that a one per cent change in GDP corresponds to 8 percent change in telecoms investment, demonstrating their investment sensitivity to the economic climate. Hence, embracing new ICTs by Zimbabwe could bring the country new opportunities for enhanced productivity and growth, over the traditional sectors of mining, agriculture and manufacturing. ICT are thus undoubtedly pivotal for economic growth. By enabling "virtual mobility", ICT provide the means to undertake many of the activities that have so far needed physical transport" (Lake, 2004). Consistent with Lake's (2004) view, the use of email, online banking and e-commerce has significantly cut down on the physical transportation involved in sending mail, banking and buying goods, which as a result, saves money. The success of a number of projects in the delivery of services, creating a market for information dissemination and leveraging competitiveness in developing nations have reinforced the idea of ICT for development, (Ernst et al, 1998).

The study therefore, seeks to undertake an in-depth analysis of the ICT developments in Zimbabwe, focusing on how these can be incorporated in the country's growth and development strategy. The study also examines how the adoption of these new ICTs affects economic growth and the efficiency of firms and how best the country can benefit from ICT usage for economic growth and development. Such an understanding will form the basis for policy formulation aimed at reducing the factors which hinder the effective use of ICTs and growth of the sector for the transformation of the country into a knowledge and information society. Given that Zimbabwe is not a producer of ICT related products and services, this study focus on the other aspects of ICT development in relation to ICT induced growth through enhanced productivity, competitiveness, growth and human welfare on account of ICT diffusion into different sectors of the economy and sections of the society. Moreover, the benefits of ICT using countries/sectors tend to be higher than ICT producing countries/sectors owing to the deteriorating terms of trade for ICT producers (IMF, 2001).The study also looks at challenges affecting sector growth and suggest some policy recommendations to support ICT growth and its contribution to overall economic growth and development.

Objectives of the Study

The specific objectives of the study are to:

- Examine the level of ICT diffusion in the country;
- Explore how adoption of ICTs affects the efficiency of firms and economic growth;
- Identify opportunities for enhanced growth and poverty reduction arising from increased use of these digital technologies;
- Examine the challenges affecting growth of the ICT sector; and
- Provide policy recommendation on enhancing ICT innovations for growth.

Methodology

Measuring the impact of ICTs on economic growth remains a complex task especially in developing countries, whose ICT investments are relatively low. Ngwenyama et al (2006) noted that ICTs can start to have a significant impact on economic growth that can be econometrically estimated if a certain level of ICT investment is attained. Hence, it would be complex to employ some econometric methodologies in examining the impact of ICTs on Zimbabwe's economic growth, given the low levels of ICT investments and diffusion. An alternative way of measuring the impact of ICTs would be interviewing ICT users and assessing their views on the impact of ICTs on production. This approach is based on perceptions and does not guarantee clear objectivity or comparability between countries/ sectors mainly because users certainly believes in the beneficial impacts of ICTs. This methodology could provide some key insights but would still require to be complemented by more quantitative models. Consistent with the foregoing, this study is based on a less theory-dependent approach, which does not rely on econometric analysis, in mapping the potential for ICTs in transforming economic relationships and processes in the economy. The study, therefore, is based on reviews of relevant literature on ICT in general as well as for Zimbabwe. Important lessons are also drawn from those countries that have achieved remarkable growth in GDP on account of ICT diffusion to make some policy recommendations. This is also corroborated by interviews with key informants from Government and players in the ICT sector.

The remainder of the study is structured as follows: Section II focuses on the ICT sector in Zimbabwe and the challenges affecting sectoral growth, whilst Section III gives an assessment of the opportunities and potential of ICTs for economic growth. The study concludes with some policy recommendations in Section IV.

II. OVERVIEW OF ZIMBABWE'S ICT SECTOR

Institutional and Regulatory Framework

The ICT sector in Zimbabwe falls under the Ministry of Information Communication Technology (MICT), whose main mandate includes: developing appropriate policies and strategies that enhance provision of information and communication technological innovations, as well as spearhead the development of appropriate regulatory frameworks that facilitate the promotion of information and communication technologies in the country. Furthermore, the MICT is charged with the responsibility of championing and promoting ICT literacy and utilization in the country in order to enhance the country's regional and international competitiveness.

Notwithstanding the existence of the MICT, the responsibilities for information and technology in Zimbabwe remains fragmented and dotted under various ministries, including the Ministries of: Media, Information and Publicity; Science and Technology; as well as Transport, Communications and Infrastructure Development (MTCID). The Ministry of Information and Publicity is responsible for broadcasting services and oversees the Broadcasting Authority

of Zimbabwe (BAZ) and the Media and Information Commission (MIC). MTCID oversees the Postal and Telecommunications Regulatory Authority of Zimbabwe (POTRAZ), which was established in 2000 to regulate the postal and telecommunications sector. The Ministry of Science and Technology Development was tasked with the development of an overarching National ICT Policy Framework, which was subsequently launched in 2007.

Zimbabwe's ICT sector has evolved over the years since the inception of the Central Computing Services in 1972, which then fell under the Ministry of Finance and was mandated to provide a central computer facility to all government ministries and departments. On the other hand, the Postal and Telecommunications services were provided and regulated under the then Ministry of Transport and Communication. However, following the adoption of the Southern Africa Development Community (SADC) protocol on transport, communications, and meteorology of 1996 that called for member states to harmonize regional telecommunications policy, through de-monopolization and privatization, with the view to achieve universal access to affordable telecommunications, the Government established a sector regulator, POTRAZ in 2000. Furthermore, given the growing importance of ICTs in economic development and in line with the country's national economic development agenda, the Inclusive Government formed a full Ministry to ICTs in 2009. The communications department, previously under the Ministry of Transport and Communications together with Central Computing Services (CCS) previously under the Ministry of Finance, formed the core of the newly formed ICT ministry.

The creation of a dedicated ICT ministry helped resolve some of the overlaps and duplications that existed. However, institutional and operational challenges still remain, given that some responsibilities for ICT policy and regulations remain with MTCID, which oversees the regulation of POTRAZ. POTRAZ is a corporate board established in terms of the Postal and Telecommunications Act [Chapter 12:05] and started operating in September 2001, with the specific mandate of issuing licenses in the postal and telecommunications sector, and setting the terms and conditions for activities in the sector.

The current set up does not work well for efficiency, given that regulation of ICTs falls under MTCID, a non-ICT ministry. In addition, the lack of a clear regulatory framework in the sector continues to hamper growth of the sector. In that regard, work on the draft ICT bill under construction needs to be expedited, as hinted in the MTP (2011 – 2015), to provide a guiding framework for the sector. Strengthening of the policy and regulatory environments are key imperators in enabling ICTs to contribute towards achieving national development goals and transform the country into a knowledge-based society.

ICT Sector Performance

The ICT sector like any other sector of the economy suffered a legacy of disinvestment and a deterioration of infrastructures over the period 2000-08. As a result, the country is lagging behind on key international indicators of sector competitiveness, which put serious constraints on the country's ability to benefit from the vast opportunities for sustainable

economic development brought about by widespread use of ICTs. According ITU (2010), ICT Development Index (IDI), in 2007 Zimbabwe was ranked 126 out of 152 countries with an IDI of 1.46. The IDI gives a holistic picture on the state of ICT development within a country. It allows policy makers to put their countries' achievements into context, by benchmarking them to other countries at similar income levels, or with similar geographic, social or regional characteristics. The 2007 IDI was topped by Sweden, followed by South Korea, Denmark, Netherlands and Iceland, in that order. Libya was the highest ranked African country on number 81, followed by Tunisia (83) South Africa (87), Egypt (94) and Algeria (97) completed the list of African countries in the top 100.

Telephone Sub-Sector

The telephone subsector comprises four main operators, one of which is a fixed operator. Of the four operators, two are private entities, Econet Wireless and Telecel whilst the other two are wholly owned by the Government, that is, Net*One, a mobile operator and Tel*One, which is the only fixed telephone operator. These two state owned operators came into existence following the unbundling of the Post and Telecommunications Corporation (PTC) in 2001, as part of broad reforms in the telecommunications sector. The unbundling of PTC also saw the creation of Zimpost, a wholly government owned company charged with providing postal services to the nation.

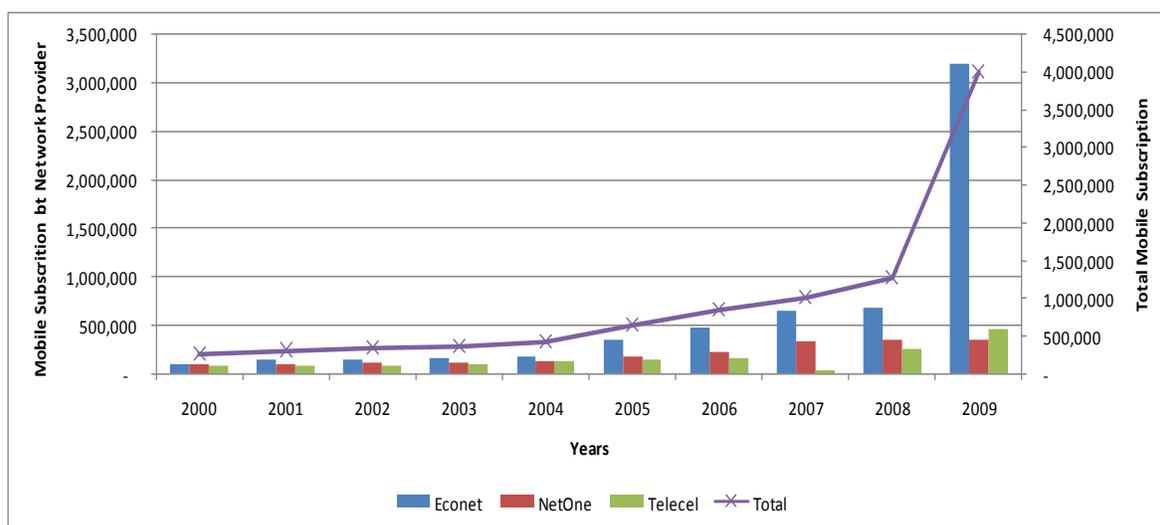
As already alluded to in Section 1, given recent developments in the sector wherein, fixed telephones have been increasingly replaced by mobile phone, hence limiting their role in enhancing economic growth and poverty reduction, this paper will focus on the potential for sustainable economic growth through the use of mobile telephones. The mobile subsector started in 1996 following the establishment of Net*One, with a 100% ownership by the Government. Following the subsequent opening up of the sector, Econet Wireless became the second operator in 1997, which was later joined by Telecel in 1998. Like any other sector in the economy, the sector suffered a legacy of underinvestment during the decade long economic crisis, hence the mobile infrastructure and network is largely underdeveloped and requires huge investment. The three mobile telephone operators currently operate in the 900/1000 MHz, with less than 3 000 base stations, 9 mobile centres, 5 mobile gateways and 5 terrestrial radio links, (GoZ 2010).

In 2000, Zimbabwe's total subscriber base was 264,700 for the three mobile operators, giving a penetration rate of 2.1 mobile phone subscribers per 100 people, which was much lower compared to the regional average of 4.3 subscribers per 100 inhabitants. The sector has, however, continued to grow, albeit at a slow rate. The total subscriber base grew by 60.56 percent to 425,000 subscribers in 2004 before jumping to 848, 000 subscribers in 2006. The slow growth in mobile phone subscriptions is a reflection of the negative effects of the economic crisis on investment and incomes. The crisis, characterized by hyperinflation and acute shortages of foreign currency, created an unfavourable investment climate that subdued network expansion projects. In addition, the hyperinflationary environment eroded consumers' incomes thus decline in effective demand across all sectors of the economy.

The net effect of the crisis in the mobile sector was slow growth, characterized by poor quality of service, especially network congestion and a thriving black market for the few lines that were available.

In overall terms, the sector grew by 1,410 percent since 2000 to 3,998,000 subscribers by end-2009, giving an annual average growth rate of 45.56%. Interestingly, notwithstanding the massive percentage jump of 1,410 percent, the highest growth in subscriber base was recorded in the four years from 2006 to 2009, wherein, 3.15 million subscribers were networked compared to less than 900,000 subscribers over the six years from 2000, Figure 1. The rapid growth in mobile subscribers over the period 2006-9 can be attributed to growing demand for mobile telephone services during the hyperinflationary era when the mobile phone was extensively used in facilitating transaction on the parallel market for foreign currency as well as other goods and services.

Figure 1: Mobile Telephone Subscriptions in Zimbabwe (2000-2009)



Source: POTRAZ upon Request and ITU¹

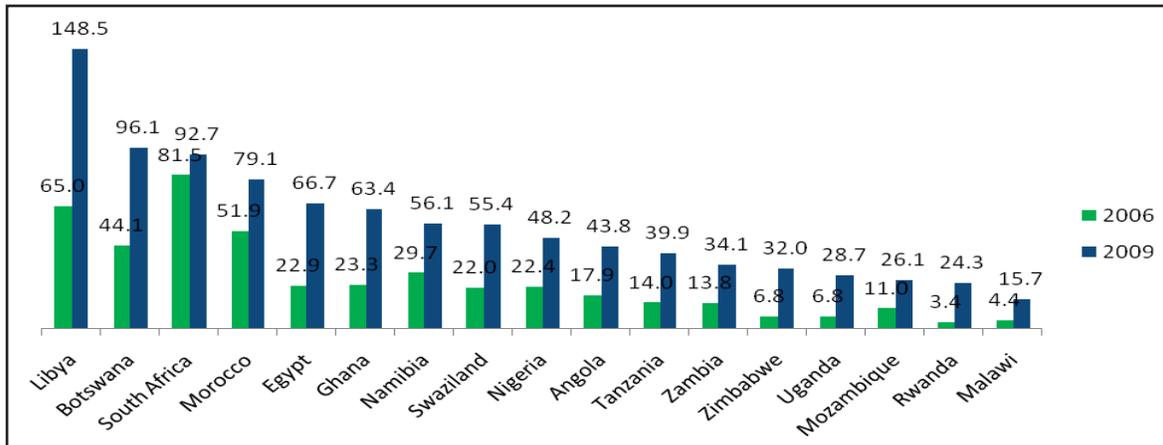
The mobile telephone subsector has been dominated by Econet Wireless, Figure 1. By 2000, Econet Wireless had 35 percent of the market whilst Net*One and Telecel had 34 and 31 percent, respectively. Econet Wireless market share doubled by 2009 to 80 percent, more than the combined share of the other two operators, who trailed at 11 percent for Telecel whilst Net*One had 9 percent of the market share.

Growth in the number of mobile telephone subscribers over the years has also seen a corresponding increase in Zimbabwe's teledensity. Teledensity measures the number of mobile phone users per 100 inhabitants. By 2009, Zimbabwe's teledensity had grown from 2.1 in 2000 to 31.98 mobile subscribers per 100 inhabitants. This means that for every 100

¹<http://www.itu.int/ITU-D/ict/statistics/index.html>

inhabitants, only 32 inhabitants had access to the mobile telephone network. With a mobile phone penetration rate of 32 percent in 2009, Zimbabwe lagged behind a lot of African countries, which goes to show the slow pace of growth in mobile phone subscriptions in Zimbabwe compared to other African countries such as Libya (148) Botswana (96), South Africa (92), among others, Figure 2.

Figure 2: Mobile Phone Subscriptions per 100 Inhabitants in Selected African Countries from 2006-2009



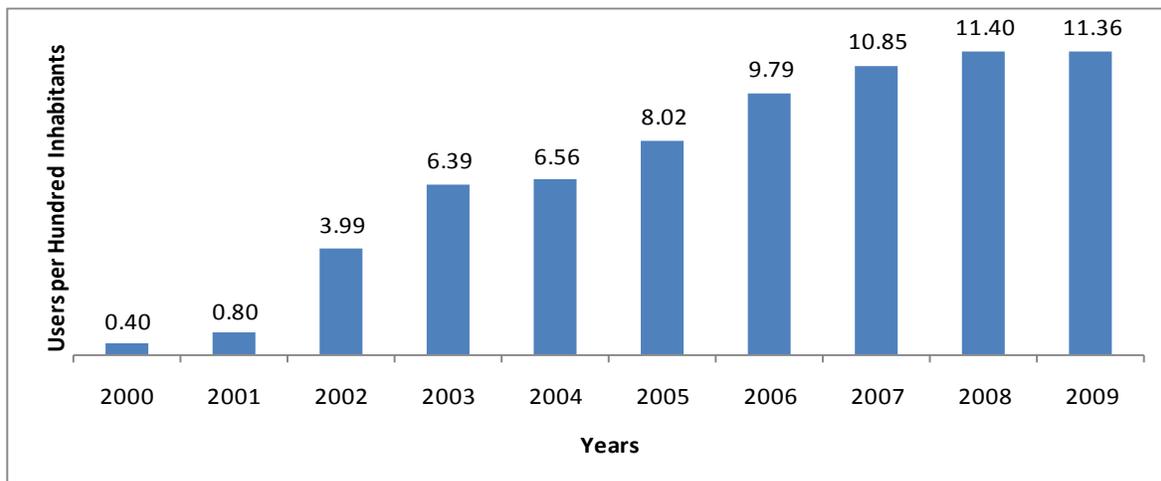
Source: ITU World Telecommunication / ICT Indicators Database

However, recent estimates show that mobile phone subscriptions in the country have grown to over 6 million, giving a penetration rate of 52 percent by end -2010 (GoZ 2010), and is projected to continue on this upward trajectory underpinned by both demand-side factors, such as the increasing popularity of mobile phones, and by supply-side factors, such as regulatory reforms, falling costs and prices, and increased investments by the respective mobile operators. Econet Wireless reports to have invested over US\$100 million for network expansion and upgrading projects over the last 5 years, whilst Net*One with the support of a loan facility from the China Eximbank has embarked on a US\$45 million network expansion project. Furthermore, these expansion projects have been complemented by the scraping of duty on mobile phone imports and other ICT products, in 2010, as a way of encouraging growth in the sector.

Internet Sub-Sector

According to the African Development Bank (AfDB) (2011), internet services were first introduced in Zimbabwe for academic purposes in 1991, whilst commercial service providers were gradually introduced using leased lines through South Africa. In 1997, PTC launched an internet hub connecting directly to the USA. The national internet backbone was upgraded to 2Mb/s in 1998 and expanded to 11Mb/s by 2003, (AfDB 2011). In response to these measures, internet usage in Zimbabwe has been growing steadily over the years. Available statistics from POTRAZ (2010), show that there were around 50,000 internet users in 2000, giving a penetration rate of 0.4 percent. By 2005, this number had grown to 1 million users before recording a 42.2 percent growth to 1.4 million by end 2009 and a penetration rate of 11.4 percent, Figure 3.

Figure 3: Growth in Internet Users per 100 Inhabitants in Zimbabwe (2000-2009)



Source: ITU World Telecommunication/ ICT Indicators Database

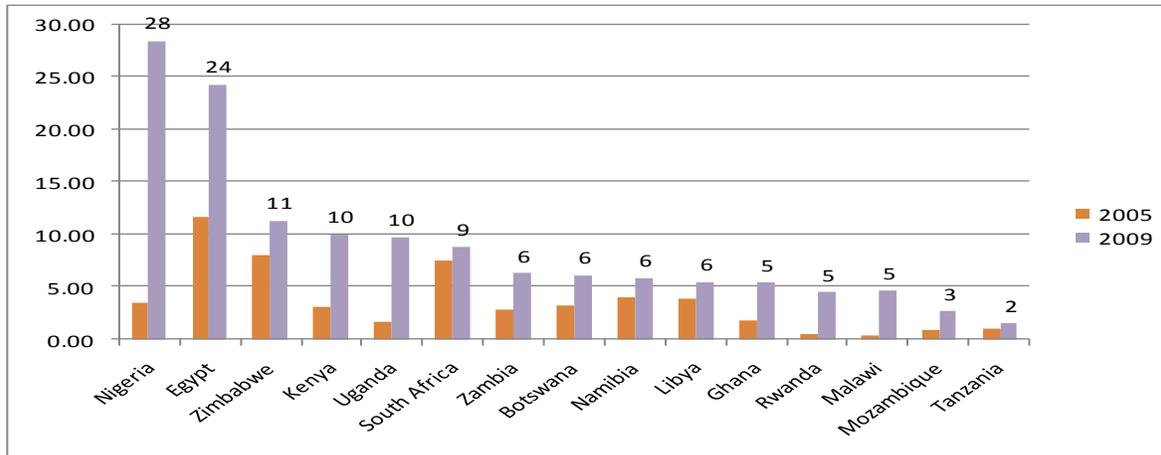
Despite the growth in the number of internet subscribers over the years, internet penetration rate in Zimbabwe and the rest of Africa remains low. With an internet penetration rate of 11.4% by end-2009, Zimbabwe ranked higher than other African countries such as Libya, Ghana, Rwanda, Mozambique and Tanzania, who had a higher mobile phone penetration rate than Zimbabwe as shown in Figure 2. This suggests that the aforesaid economies rely much on mobile phones than internet. It could also explain the level of development in their mobile phone sector as compared to Zimbabwe. Equally, it can be noted that in the absence of an efficient and readily available mobile phone services, Zimbabweans resorted to the use of internet as a way of communication, whilst some countries such as South Africa generally regard their access to mobile phones as an adequate replacement for internet, (Gillwald, etal 2005).

Compared to mobile telephone usage, internet usage in Africa is very low, as reflected by the lower penetration rate of 28 percent recorded in Nigeria, which ranks among the highest. Even countries such as Libya with a high mobile subscriber per 100 inhabitants rate (Figure 2), had a very low internet usage rate of 6 users per 100 inhabitants. The major impediment to internet usage in many developing countries is the exorbitant cost, coupled with a sharp mismatch between the demand and supply of internet services. Most internet service providers in Africa is dial-up, which is more expensive and less efficient as most of the African countries charge for dial-up at conventional voice calling rates. A monthly usage of 20 hours of internet access costs almost US\$50 in Africa, almost twice as much as the next highest region, the Americas, (AfDB 2011).

Internet pricing shows a very wide variation among African countries but, more than one-third of the economies have monthly price baskets of more than 25 percent of per capita income. The price basket for internet per month in Zimbabwe was US\$24.6 in 2007 – much lower than the US\$29.2 average for the lower income countries, and even lower than the US\$43.1 for the Sub-Saharan countries, (World Bank 2009). With a lower price basket for internet

per month, Zimbabwe competes quite favorably in this measure and its penetration rate is even higher than that of South Africa, Uganda, Kenya and Botswana, Figure 4. However, this notwithstanding, the internet penetration rate remains very low at 11 percent making it quite compelling for the Government to institute measures if the country is to reap full benefits of increased ICT usage.

Figure 4: Estimated Internet users per 100 Inhabitants in Selected African Countries (2005-09)



Source: ITU World Telecommunication/ ICT Indicators Database

Internet usage is projected to continue growing given the increased number of personal computers as well as mobile phone internet. AfDB (2011) noted that the number of personal computers per 100 people in Zimbabwe has risen from 1.5 per 100 in 2000 to 6.5 per 100 inhabitants in 2007, which is higher than the average 1.8 per 100 inhabitants for Sub-Saharan Africa. This is also set to increase, given the recent measures by the Government to scrap import duty on computers and other ICT products.

Broadband Sub Sector

Whilst notable progress has been made regarding mobile phone investments, broadband infrastructure in Zimbabwe remains largely underdeveloped, yet it provides one of the fastest and most efficient links to cross border networks. Broadband networks remain key in that they represent the information super-highways of today's online economy. The major challenge that continues to stall progress towards increased use of broadband is the cost. It can be noted that the average price for an entry level broadband (256 kbps), in Africa, is US\$100.00 per month, when the average for the OECD countries is US\$45.00. However, prices for broadband vary considerably, ranging from US\$18.00 per month in Morocco, to US\$40.00 in Senegal to as much as US\$1,000.00 in Zimbabwe, (ITU, 2008).

There is, therefore, need to adopt measures to reign in on the prohibitive cost of broadband to make it ubiquitous and affordable in the country and Africa as a whole. One way of doing it could be by opening up the sector to many players, thus eliminating the current predatory

pricing practices by the oligopolistic providers. Fiscal incentives such as tax concessions or tax holidays could be put in place to encourage entry into the market by many competitive players. In addition, it is hoped that the planned undersea optical fibre projects in Africa, such as SEACOM's undersea cable connecting south and east Africa, the East African Submarine Cable System (EASSY) and the East African Marine System (TEAMS), will lead to a lowering of broadband prices in Africa, (Chimhowu A, etal 2010).

Progress has also been made in Zimbabwe with the recent installation of a fiber optic cable project linking the country to Mozambique as part of efforts to ensure fast and reliable internet connectivity. The installation of the fiber optic cable linking Zimbabwe to an undersea cable at Beira, Mozambique, via Mutare was completed in May 2011 at a cost of \$6.3 million. Further work is underway towards the installation of another fibre optic cable linking Zimbabwe's southern border town of Beitbridge to an undersea optic cable in South Africa at an estimated cost of US\$15 million. The link to the East African undersea cable is expected to improve service provision by the state-run mobile phone operator Net*One and its sister company, Tel*One. The other mobile operator, Econet Wireless, is already connected to the undersea cable connecting Southern and East Africa to the rest of the world. This has facilitated faster connectivity for Econet internet users without going through third parties.

Available statistics on broadband subscribers show that the country had about 771 broadband subscribers in 2001. The number grew to 10,185 in 2005 before jumping to 29,130 by end-2009. Despite the early adoption of broadband in 2001, Zimbabwe still trails behind a number of countries in Africa with regards to broadband subscriber base. By end-2009, South Africa, Tunisia and Egypt were among the leading broadband users in Africa, Table 1.

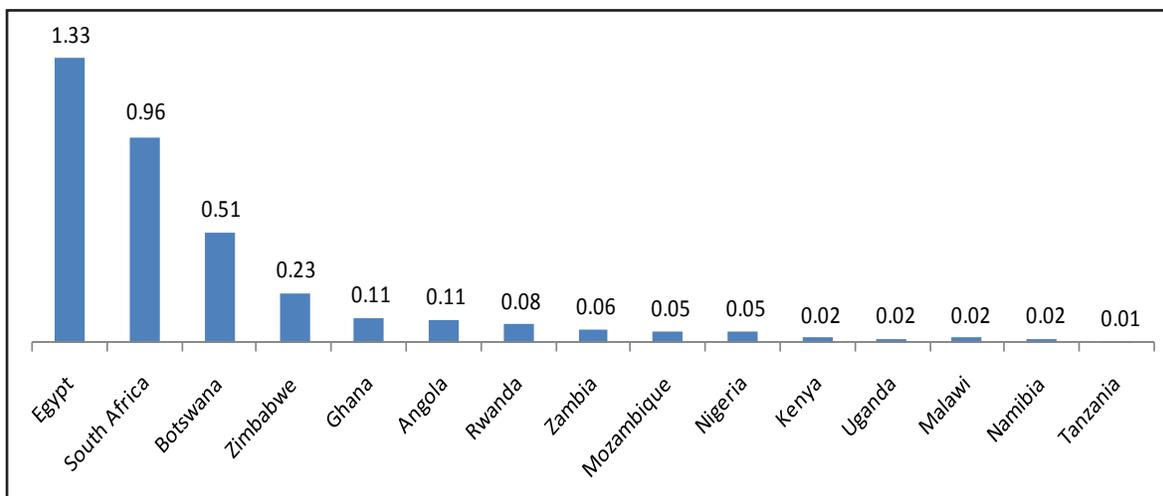
Table 2: Broadband Subscribers for Selected African Countries

Country	2001	2005	2009
Egypt	0	140,999	101,635
South Africa	0	165,290	481,000
Tunisia	0	17,573	372,818
Nigeria	0	500	81,958
Zimbabwe	771	10,185	29,130
Ghana	0	1,904	27,399
Angola	0	0	20,000
Mozambique	0	0	12,502
Botswana	0	1,600	10,000
Rwanda	0	1,180	8,388
Kenya	0	5,399	8,349
Zambia	31	250	8,000
Uganda	0	850	6,000
Malawi	0	404	3,400
Tanzania	0	1,495	2,841
Namibia	0	134	430

Source: ITU World Telecommunication / ICT Indicators Database

With a broadband subscriber base of 29,130 by end-2009, Zimbabwe's broadband penetration rate was 0.23 subscribers per 100 inhabitants, indicating lower adoption of broadband compared to both internet and mobile phone. As already indicated, broadband usage in Africa, including Zimbabwe, is very low for reasons related to cost of installation, coupled with lack of investment. Most of the countries in Africa rely heavily on satellites to manage long distance telecommunications. Broadband subscribers per 100 inhabitants, in Africa, remain very low averaging well below 2 percent, Egypt, South Africa and Botswana being among some of the top users of broadband, albeit at low rates of below 1.5 percent, Figure 5. The majority of African countries' broadband penetration rate, including Zimbabwe, remains very low at below 1 percent as shown in Figure 5.

Figure 5: Broadband Subscribers per 100 Inhabitants for Selected African Countries



Source: ITU World Telecommunication / ICT Indicators Database

Data Management

AfDB (2011) notes that there are currently, four licensed data communications providers in the country namely: Africom, Powertel Communications Pvt Ltd (a subsidiary of Zimbabwe Electricity Supply Authority), DataOne (owned by Tel*One), and Broadlands Networks Ltd. The lack of competition in data management has resulted in limited bandwidth nationally and on the gateway. Substantial opening of the sector to allow more players is thus required. This could assist in addressing the bandwidth challenges as well as reducing access prices. However, there have been several efforts by both the public and private sector companies to invest in national backbone infrastructure that supports bandwidth expansion nationally and on the gateway. For example, Government through Tel*One has completed the laying of a fibre optic cable linking Harare, Mutare through to Beira, whilst the other project linking Harare, Beitbridge through to Durban is under construction. Other supporting investments include: Africom's national and gateway public data network, which uses cable networks and broadband radio frequencies for applications such as internet access, file transfers, and

financial applications such as Point-of-Sale, ATM transactions, as well as the Government's Public Finance Management System (PFMS). Also, Powertel has build fiber optic and copper cables, power line communications and wireless systems linking main cities and towns in Zimbabwe, whilst it has a fiber optic link between Harare, Gweru, Bulawayo and South Africa. Privately owned Telco Internet provides a national integrated voice and data network via a fiber optic cable network with links to the main commercial centers, whilst Broadlands Ltd has installed a LMDS (Local Multipoint Distribution System) wireless broadband data network connecting Harare with Bulawayo, (AfDB 2011).

Challenges Affecting Zimbabwe's ICT Sector

In view of the foregoing, it can be noted that the ICT environment in the country remains challenged, given the low average mobile access, internet and broadband penetration rates obtaining, which are lower than the African average. As a result, the sector lags far behind in the basic requirements for the sector to play a more meaningful and sustained role in economic development. According to Ngwenyama et al (2006), ICT begins to deliver per capita growth only after a certain threshold of ICT development has been reached. Hence, unless that level of ICT investment, diffusion and usage is attained, the country will continue to miss out on the growth-enhancing opportunities of ICTs. In fact, the low ICT investments may not bring the same returns to the country as witnessed in many developed countries. Furthermore, the country remains less-equipped to tap the potential of ICTs to stimulate growth for several reasons such as economic structure e.g. low incomes, dominance of agriculture and other real sectors.

In addition, firms and households' ability and willingness to restructure and reorganize their working methods to take advantage of the new opportunities made available through ICTs, play a crucial part in maximizing the value of ICT investment. In this regard, the country needs to address the challenges that continue to suppress investment in the sector. In interviews with stakeholders in the sector, the following challenges were noted:

- i. Shortage of ICT facilities & ICT skills: The ICT sector in Zimbabwe is characterized by low growth enhancing investments in both infrastructures and human skills, with a dual effect on sectoral growth and its contribution to sustainable economic growth and development. Hence, the need for holistic strategies that addresses both the issue of technological infrastructure and ICT skills. Ngwenyama et al (2006) noted that channeling large sums of investment into ICT initiatives without complementary investments in building adequate education infrastructures would be a recipe for failure of development and could further frustrate millions of people in the developing world. In addition, Gillwald (2005) pointed out that "a certain threshold of national communications infrastructure rollout and skilled individuals have to be in place for the positive network effects of these technologies to reach a takeoff point and multiply through the national economies". It is clear, therefore, that the social capital in a country affects its ability to effectively use its ICT investments for economic

development; hence the lack of it is a major draw back in benefiting from the many digital opportunities for growth within the new economy.

- ii. Limited access to capital: Like any other sectors in the economy, the ICT sector faces limited access to capital, given the liquidity crunch in the economy and limitations with regards to offshore financing due to the country's external payment arrears. Furthermore, access to domestic credit is complicated by the not so conducive lending tenors being offered by the market. GoZ (2010) noted that the average tenor of the lending, though improved from between 30-90 days in January 2010 to levels of 180 days, do not meet long term borrowing requirements for capital expenditures. Such terms and conditions are not supportive of long term capital investments for ICT infrastructures, among others. In addition, when funds are available, they are often prohibitively expensive compared to external borrowing. As of end of 2010 lending rates ranged from 8 to 25 percent per annum compared to interest rates offered by some donor agencies which are concessionary in nature, for example, the World Bank and some government-to-government facilities attract interest rates of below 2 percent over lengthy tenors.

Furthermore, the Government, through moral suasion, is encouraging the financial sector to prioritise lending towards the traditional growth drivers of agriculture, mining and manufacturing sectors. This leaves little resources for sectors such as ICTs, hence limiting sector growth and its contribution to economic growth and development.

- iii. Inadequate power infrastructure: ICTs rely on an ubiquitous power supply, hence the absence and erratic power supply in the country affects the geographical spread of ICTs. Whilst noting the initiatives by some mobile operators to introduce solar mobile phone chargers, the same cannot be said about computer based ICTs. This limits the use and contribution of ICTs in education, health, agriculture and hence overall economic growth.
- iv. Regulatory environment: Although there has been some progress with regards to liberalizing the ICT sector and create effective competition in the industry, a lot more still needs to be done to achieve widespread ICT services at affordable prices. Substantial opening up of the industry would be key in increasing competition. The regulatory environment undoubtedly needs to be improved to ensure that ICT services are readily accessible to all at affordable prices. The palpable overlap and duplication of functions between POTRAZ, MICT and MICD needs to be addressed. In addition, the current ICT draft Bill needs to provide a framework for further liberalization and competition, given that excessive regulation makes it difficult for firms to seize the opportunities offered by ICTs.
- v. Lack of universal coverage: Despite increased private involvement, the potential of the ICT sector is far from being fully exploited. This is especially true for the provision of

ICT infrastructure in rural areas mainly due to low profitability and high investment risks. It is quite evident that ICT coverage is concentrated in urban areas if not Harare, for a number of reasons. Some of the reasons are purely related to both the demand for services and the cost of providing them, whilst some relate to the lack of complementary factors such as power supply and ICT skills, which literally explains why the majority of the rural population remain largely unnetworked and living beyond the range of the available networks. If these digital innovations are to make an impact on the country's economy as witnessed in many developed countries, there is need to ensure universal coverage across all sections of the society and in all parts of the country.

- vi. High access cost: In general, ICT access particularly internet and broadband are typically expensive as evidenced by the tariff for satellite connection, which is as high as \$5,000 per MB per month, (AfDB 2011). Equally, broadband access in Africa, including Zimbabwe is generally very expensive, averaging US\$100 per month for an entry level broadband (256kbps) compared to the average for the OECD countries of US\$45, (AfDB 2011). Mobile phone usage is also expensive at US 24 cents per minute in Zimbabwe, compared to the East African average of US 5 cents per minute. The challenge, therefore, is for the Government to open the sector to more players thereby increasing investments and competitive behavior that creates low cost access of ICT products and services.
- vii. Low investments in Research and Development (R & D): It is trite to say that the level of ICT innovation of any country is a function of its R & D programmes. Hence, a low investment by both public and private sector has resulted in limited ICT products, which in turn constrain sectoral growth and its contribution to growth. There is need for the country to increase its investment budget in R & D not only in the ICT sector, but the economy as a whole to enhance growth and development. Lack of R & D also affects the ability of firms to absorb new technology, such as ICT.
- viii. Lack of a supporting environment. The weak public sector support to ICT has also contributed to limiting growth of the sector. Experiences from other countries show that, Governments have put deliberate policies in support of the ICT sector. For example, in countries such as Egypt, wherein the Government has provided different incentives to attract global IT companies to invest in the Egyptian economy. The incentives include reducing total transaction costs through diffusing more efficient means of inter and intra business communications. Additionally, entry barriers were removed especially for relatively small capital ventures and entrepreneurs, thereby promoting small and medium size enterprises and new entrants as well as allowing the effective management of supply chains leading to better processes such as procurement, inventory control, production, and quality control, ultimately reducing production costs. Through these tax incentives and economic zones, the Egyptian government created a fostering environment for ICT development (Kamel etal 2009).

- ix. Limited bandwidth nationally and on the Gateway: This is closely related to the lack of direct investments in network bandwidth expansion programmes. However, there have been several efforts by both the public and private sector companies to invest in domestic backbone infrastructure that supports bandwidth expansion nationally and on the gateway.
- x. Lack of an ICT producing sector: Having an ICT-producing sector is important for ICT diffusion as it helps firms that wish to use ICT, since the close proximity of producing firms might have advantages when developing ICT applications for specific purposes. In addition, having a strong ICT sector should also help generate the skills and competencies needed to benefit from ICT use. Having an ICT sector can thus, support ICT diffusion, although it is not a prerequisite to benefiting from the technology (OECD, 2001a).

III. OPPORTUNITIES FOR SUSTAINABLE GROWTH THROUGH DIGITAL INNOVATIONS

According to Bresnahan T, et al, (1995), ICTs can be classified as “enabling” or “General Purpose Technologies”, which means their use and their impact are ubiquitous, yet difficult to measure because they are mainly indirect. It is not ICTs as such that make an impact on an economy and society but how they are used to transform organization, processes and ways of doing business. Hence, ICT opportunities for growth and development lie on the level of diffusion and how they are used. This is partly because ICT is a network technology; the more people and firms that use the network, the more benefits it generates. While ICTs allow for new processes and management innovations and generate large productivity gains, they are not effective, nor can they be analyzed in isolation. Instead, ICTs make a change only in conjunction with other factors, such as a new set of skills. ICT investment and higher infrastructure levels alone are not sufficient and a lack of complementary skills will limit the use and benefits of new technologies in enhancing sustainable growth and development.

The potential for growth and development through digital innovations on the economy can be seen in the manner in which the internet and mobile phones have shortened the geographic distances by increasing the speed of communication and increasing productivity. In this regard, ICT should be seen as both a significant sector in the economy and a vital service to business, industry and other users in the economy. ICTs are even more critical for economic development, given their role in the system of national innovation, development of entrepreneurship and public service delivery. Empirical evidence from the East African countries of Kenya, Tanzania and Uganda shows that in 2006, a 10 percent increase in mobile penetration was estimated to have contributed as much as 1.25 percent to GDP (Deloitte, 2007), in Chimhowu A, et al (2010). In another study by Deloitte (2007) covering Serbia, Bangladesh, Ukraine, Malaysia, Thailand and Pakistan, it was found that the contribution of mobile phone technology to GNP amounted to between 4.5 and 6 percent, and had contributed to the creation of 36,000 jobs in Serbia and 244,000 in Pakistan. Mobile

phone subsector contributed as much as 24 per cent of the tax revenue of the countries studied, (Chimhowu A, etal 2010).

As already highlighted earlier, the benefits of ICTs are mainly through two channels of ICT production and ICT using. In this regard, even countries such as Zimbabwe, who are not producers of ICT goods, still stand to benefit from widespread use of ICTs. In fact, much of the current interest in ICT's potential impact on growth is not linked to the ICT-producing sector, but to the potential benefits arising from its use in the production process as well as other sectors and sections of the economy.

Efficiency of Firms

ICTs' impact on efficiency of firms and growth can be seen through gains in labour productivity as well as total factor productivity. As a capital good, investment in ICT contributes to overall capital deepening and therefore helps raise labour productivity. Capital deepening increases capital input per worker, thereby enabling more efficient production that increases labour productivity. Furthermore, pervasive use of ICTs throughout the value chain and different sectors of the economy contributes to improved performance in firms, enabling them in particular to increase efficiency in combining capital and labour ("multifactor productivity"). Moreover, greater use of ICT contributes to network effects, such as lower transaction costs, higher productivity of knowledge workers and more rapid innovation, which will improve the overall efficiency of the economy.

The impact of ICT use on factor productivity may be manifested in more productive firms gaining market share, product diversification, customized services, and that it may be possible to respond more effectively to customer demand or it may help reduce inefficiency in the use of factors of production. Strong productivity growth is evident in ICT-using sectors especially retail trade in the US where firms like Walmart used innovative practices to gain market shares and in turn forced competitors to improve their performance. Also ICTs can facilitate easy access to markets and reduce transaction costs through online purchases.

Revenues

Given that the country is not a producer of ICT goods, reliance on ICT imports can provide the country with a source of revenue, especially in view of the fact that customs duty contributes close to 14.3 percent² of the country's total revenues. In addition, growth in ICT investments and companies can be a major source of corporate tax, thereby enhancing revenues. Countries such as Egypt have benefited significantly from revenue contributions by Multinationals operating in the ICT sector. According to Kamel etal (2009), a number of MTN corporate such as Microsoft, Orange and France Telecom have invested in the Egyptian ICT sector, whilst some local companies are also starting to invest outside Egypt such as Orascom

²See Mid-Term Fiscal Policy Statement Review, page 61

Telecom, which currently owns mobile operators in a number of European, Asian and African markets. All these revenue-generating vehicles contribute positively to the GDP in Egypt.

Private Sector Transformation

While ICTs have provided a lot of opportunities for growth in many different sectors across countries worldwide, the transformation of economic relationships and processes is particularly visible on a large scale in those countries and areas/ sectors that have the highest penetration levels and efficient broadband.

E-Commerce

Countries with relatively high ICT levels have witnessed remarkable increase in B2B (business to business) and B2C (business to consumer) transactions taking up an increasing market share. The 2004 e-commerce survey of business by the UK Office for National Statistics showed that the value of internet sales rose by 81 percent between 2003 and 2004, (ITU 2006). By then, internet sales accounted for about 3.4 percent of the total value of sales by businesses in the non-financial sector. By 2004, 6.7 percent of businesses reported selling online. E-commerce is used primarily to improve supply chains in B2B, (placing orders) relationships. Online sales to businesses represented 75 percent of total online sales and B2B transactions dominate, with over 35 percent of businesses purchasing online. The benefits of online buying to consumers include better price transparency, which allows them to buy at lower cost.

Examples of some of the world leaders in the development of B2C e-commerce are Amazon and eBay. The success of Amazon and eBay highlights the potential of e-commerce, which allows customers to buy at any time, from home, at work and without having to physically go anywhere, (ITU 2006). The benefits to online stores includes: economies of scale to rate well in price comparisons, enjoy a 'trust' or brand image, can take advantage of testing marketing products online and have ubiquitous physical presence to offer 'pick-up-in-store'. It should be noted that efficient broadband is a key imperator to the success of online commerce. Early attempts to do any e-commercial transaction over dial-up connections were often slow and no cheaper than just using the phone, (ITU 2006).

In the Philippines, for example, where financial services and formal banking are limited in rural areas, people can transfer money over the mobile network, (ITU 2006). Mobile users can transfer cash or airtime credits to other users and make payments. The convergence of internet, mobile and computing technologies has brought about innovations in micro-finance, for example, the M-Pesa system used in East Africa to make payments using cell-phones and the ability to make micro-loans to large segments of the population that are not served by traditional banks. In the absence of banking networks in remote areas and stringent formalities for opening an account, mobile banking brings all the benefits of a formal bank, without the hassles and the costs to the poor and previously marginalized and unbanked population. Furthermore, innovations in the banking sector have enabled payments to be made from immigrant workers in different countries to families in their home countries. According to ITU, (2006), more than 5.5 million Filipinos use their cell phones as

virtual wallets, making the Philippines a leader among developing nations in providing financial transactions over mobile networks.

In Zimbabwe, the mobile phone sector has also seen the introduction of mobile cash transfer through Econet Wireless' Ecocash, Net*One's Sikwama, whilst Telecel launched the Zimswitch Ready facility. These facilities can enable subscribers to send and receive money much quicker and easily from cell phones. Thus precluding the hassles associated with the local banking system and for those without bank accounts. Online transactions can also be of great value to the country's agriculture and tourism sectors. In agriculture, marketing of crops particularly tobacco is an eyesore, farmers spend a lot of time and money queuing at the various tobacco auction floors to sell their produce. A well developed online selling system can help farmers "sign in" and get booked online so that they can only come to deliver their produce at the right time hence saving time and money. In the tourism sector, local tourist providers can extensively use the internet to market their services and provide travel information as a way of marketing the country.

Offshore Outsourcing

Companies the world over are increasingly using the information capabilities of ICT to support outsourcing of different business activities. The globalisation of production and the emergence of international production systems reflect the responses of multinational firms to technological change, policy and trade liberalization and increased competition. Production is now characterised by a high degree of specialization along the value chain, with standardization supporting high levels of specialisation and outsourcing. More and more, labour-intensive manufacturing and services activities are shifting to contract suppliers in Asia, while Western Europe and the United States retain the high-end, knowledge intensive stages of the value chain, such as research and product development³. China has become the world's leading exporter of ICT products, partly as a result of outsourcing⁴.

The main difference between outsourcing and international trade more generally is that outsourcing involves the slicing up of the production chain. So, rather than relocating the whole production of a good to another country, the home country where the business is located keeps performing those parts that it has comparative advantage and relocates the others abroad.

Teleworking

Outsourcing moves jobs while teleworking moves people. ICTs enable people to work without leaving home, especially where there is efficient broadband communication links, teleworking provides a viable alternative to working in the office. A number of countries with

³European Commission. E-business Watch. ICT and e-business in the Electrical Machinery and Electronics Sector, 2003, at: http://www.ebusiness-watch.org/resources/electronics/SR11-II_Electronics.pdf

high broadband penetration levels have enjoyed a number of benefits of having people work from home. The benefits of teleworking include improved business efficiencies and cost savings and reduced congestion. Significant savings arise from reducing accommodation and car parking costs. Of IBM's 320 000 workers, 25 percent, worldwide telecommute from home offices, saving the company US\$700 million in real estate costs⁵. Since 1998, AT & T has reduced its office space costs by 50 percent through telework, saving it US\$500 million⁶. British Telecom (BT) estimates that telework has allowed the company to save a total of GBP 60 million per year (Box 1). Another clear benefit is time saved. A report for the UK Home Office estimated the net public loss to the UK economy of commuter time wasted in congested traffic at GBP 20 billion⁷ and during 2002, the average US commuter lost nearly two full days (46 hours) stuck in congested traffic⁸.

Box 1: British Telecom's Experience with Teleworking

By early 2006, 11'000 of the 100'000 employees at British Telecom were working from home. These teleworkers each save the company accommodation costs of approximately GBP 6'000 per annum, have an increased productivity rate between 15 percent and 31 percent, and each average only three days sick leave per annum against an industry average of 12 days. Based on these changes alone, British Telecom estimates that ICT enabled telework allows the company to save over GBP 60 million per year. In addition, BT also has 70'000 flexible (nomadic or occasional home based) workers, which helps the company to make efficiency savings by cutting down on travel costs. In 2001, BT estimated that it had saved GBP of tele/video conferencing. Obviously, there are also environmental benefits. More money is saved in terms of staff retention. According to BT, it has a 98 percent return rate after maternity leave (compared to the national average of just under 75 percent) because of its teleworking program. Based on the fact that on average BT has 2'000 women pregnant a year, and an average replacement cost of GBP 10'000 per person, this saves BT another GBP two million every year. Finally, BT's teleworkers also report that they are seven percent happier than their office-based colleagues and several have turned down other job offers to retain the flexibility of teleworking.

⁴ibid

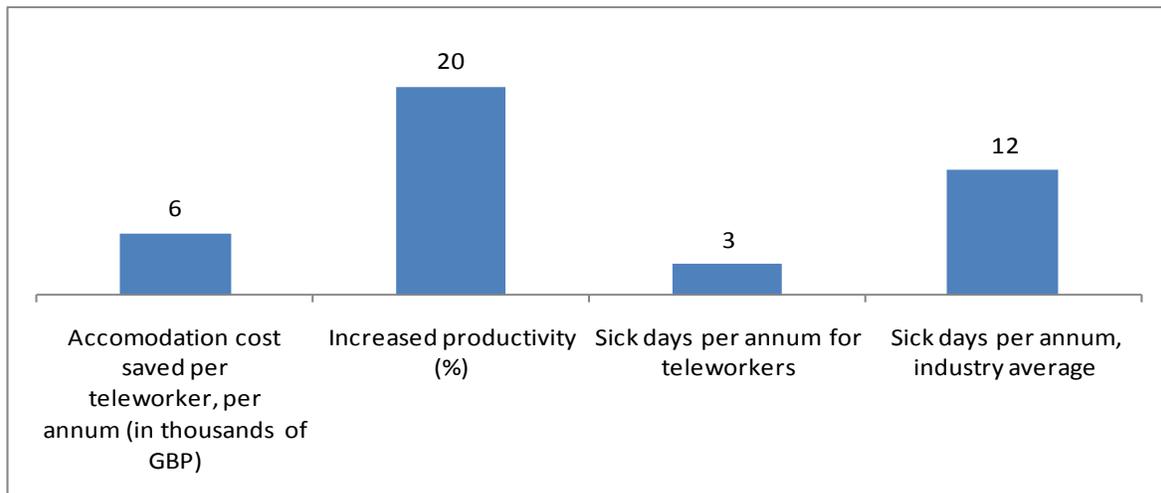
⁵Canadian Telework Association, at: <http://www.ivc.ca/costbenefits.htm>

⁶Canadian Telework Association, at: <http://www.ivc.ca/part11.html>.

⁷Telecommuting 2000: The Costs of Congestion and Commuting, : <http://www.flexibility.co.uk/telecommuting2000/>

⁸Kistner, T. Network World Magazine. 13 September 2004

British Telecom savings through telework



Public Sector Transformation

Adoption and use of ICTs can go a long way in transforming government business and operations. Similar to the private sector, the importance of high-speed internet access cannot be overemphasized. ICT can facilitate speedy, transparent, accountable, efficient and effective interaction between the public, citizens, business and other agencies. This not only promotes better administration and better business environment, but can also help save money in costs of transactions in government operations (IICD 2001). The adoption of e-government has brought notable benefits to a number of countries who have fully embraced the use of ICTs in their government operations for which Zimbabwe can draw key lessons. Some of these benefits include:

Improved quality of information and information flow

The provision of online and electronic information and the direct input of data in electronic format by public services improve information flows externally and internally. Furthermore, the shared use of information and databases made possible by electronic networks improve the speed and quality of data supply. Government agencies can communicate and exchange information easily through electronic means and as well as between governments and its citizens.

Reduction of process time

Digitalization of public services can also significantly reduce the time it takes to process and deliver a service, therefore saving time for both public administrations and their customers. Given that data can be submitted electronically by customers and shared between different organizations, service information can be reviewed online in real time. Furthermore, the availability of electronic data makes it possible to automate key steps of the decision making and service delivery process.

Cost reduction

E-government enables public sector bodies to increase their service processing and delivery capabilities, while requiring fewer personnel. Automation of parts of the service delivery process and use of electronic communication with customers can lead to significant cost reduction. In 2003, the Australia government published the 2003 E-government Benefits Study, which showed that 24 of the 38 government online programs surveyed were achieving cost reductions through a combination of direct savings, lower cost of delivery, and improved internal or business processes, (ITU 2006). Participating agencies were expecting reductions in costs of about AU\$100 million from 24 e-government programs. Similar findings were made by the EU, (2004) wherein, it was noted that it was estimated that online VAT declarations were saving businesses some €30 million. If maximum take-up was achieved, this could translate into annual savings of €330 million across the EU, (EU 2004).

Improved service level

Another key benefit of e-government is the improved service level, more precisely in terms of increased flexibility (24/7 availability, multi-channel delivery, etc.) and the availability of more detailed and complete information about public services. This includes easier and faster processing of standard cases or tasks, and the possibility to customize electronic service delivery. Letting customers serve themselves through self-service electronic counters allows governments to increase service quality by reducing waiting times, and offering round the clock access and more specialized services. It also significantly reduces customer service costs and improves public access to government information or documentation, which traditionally, would require multiple visits and time.

Education

Use of ICTs helps improve the quality of education by making it easier to access vast amounts of information, facilitating presentation of materials using multimedia, hence improving the classroom experience. This notwithstanding, to make effective use of ICT, there is, therefore, need for Government to make additional complementary investments such as investment in teacher training and adoption of a curriculum that accommodates ICTs. The government through, the Presidential Computer Program has distributed computers in rural schools, but without corresponding investments in teacher training and electricity, the intended benefits may not be realized. Furthermore, setting up computer centers at libraries, district offices, colleges using the cyber café approach could be the way to go in enhancing e-education. This has the advantage of also spinning some business to the struggling Internet Service Providers (ISPs).

ICTs facilitates expansion of distance learning allowing, people access to learning and accommodating larger numbers of learners from virtually all places that are connected by ICTs. Going forward, ICTs are set to remove the physical classroom buildings in education, through on-line learning for universities and colleges, thereby accommodating more students. Education through the internet has become a real option in developed countries and is significantly changing the way people learn. A recent US survey of more than 1000

colleges and universities revealed that by 2005, more than three out of five institutions were complementing their face-to-face undergraduate (63 percent) or graduate (65 percent) level courses by online courses, (ITU 2006). The number of online students is increasing at a much faster rate than the overall number of higher education students and online enrollment increased from 1.98 million in 2003 to 2.35 million in 2004⁹. In the UK, the Open University's (OU) supported open learning, also known as 'distance learning', caters for more than 150 000 undergraduate and more than 30 000 postgraduate students that interact with the OU online from home. It employs various new media for teaching but it is the massive exploitation of the internet that has made the OU one of the world's leading e-universities. The OU has also been ranked one of the UK's top universities¹⁰.

Given the shortage of highly motivated teachers and lectures in the country, distance education can have a substantial impact on providing training and education. ICTs can also supplement school teaching, thereby helping to overcome shortages of learning material. At the organizational level, ICTs can bring about major changes to traditional methods of educational planning, management, monitoring and evaluation. Information networks and electronic data storage can help schools improve communication and efficiency by doing more in less time. Education should be using technology not only as an end in itself, but as a means to promote creativity, empowerment and equality and produce efficient learners and problem solvers. To enhance the impact of ICTs in education, there is need for strategies deliberately aimed at improving the following indicators in the country's educational sector: computer-student ratios, the number of schools connected to the internet, the use of ICTs in the curriculum and the level of computer skills of school personnel.

E-health

As recognised by the Millennium Development Goals (MDGs), the provision of health services are crucial elements in a country's development and essential in the public sector's efforts to establish long-term economic stability and social well-being. ICTs have a potentially important role in improving the efficiency with which health services can be delivered. ICTs are increasingly facilitating a two-way information exchange in healthcare and provide isolated communities and officials with access to the latest health information and treatment. Particularly, basic ICT applications (such as email exchanges between health care staff) and administrative use of ICTs, for example to computerize patient information systems can have a strong impact on the health care system. More sophisticated ICT health applications such as telemedicine have been slower to take off in developing countries mainly because telemedicine projects often include the transmission of video and other data-intensive material, which work best with broadband access, a commodity that remains very limited in Zimbabwe and other developing countries. However, a number of telemedicine initiatives have been successful in providing advanced diagnostic methods and treatment to areas that currently have little access, overcoming geographical distances, and reducing travel time and costs from remote areas to hospitals.

⁹The Sloan Consortium, Growing by Degree. Online education in the United States. 2005, at: http://www.sloan-c.org/resources/growing_by_degrees.pdf.

¹⁰See Open University, at: <http://www.open.ac.uk/about/ou/>.

Poverty Reduction

ICTs impact on poverty through their effects on productivity and income generation in sectors where the poor are actively engaged. For instance, productivity increase in the SMEs can have poverty reducing effect to the extent that SMEs gain access to market information (faster and more cheaply), access to information on input prices and output markets and to the extent they strengthen forward linkages to the market, Pigato, (2001) and backward linkages to the domestic suppliers of inputs. Rural based ICTs have the potential to impact on agriculture through increased revenues and diversification of agricultural production, made possible by delivering (short message service) sms-based price and crop information (OECD 2004). Facilities such as the E-Hurudza, which was launched by a local company, are quite useful in enhancing productivity and food security in the newly resettled farms. E-Hurudza is an electronic Farm Management Software Solution, with agricultural information for all regions, tutorial on how to grow crops in specific regions including land preparation, input requirements i.e. seed, fertilizers, insecticide/chemicals, manpower, when to plant, expected yield per hectare as well as comprehensive information for livestock. Such software is handy, given that most of the resettled famers had no prior education or experience in farming.

Also setting up of ICT infrastructures such as base stations and laying of broadband cabling as well as vending of recharge cards in rural areas provides employment and incomes for the poor. Figures from POTRAZ suggest that employment in the mobile subsector increased from 634 in 2000 to 1300 in 2010¹¹. These numbers reflect direct employment and exclude those employed in down-and-up stream industries. Hence, the total impact of the mobile sub sector with regards employment creation is much higher.

IV. CONCLUSION AND POLICY RECOMMENDATION

Conclusion

The study explored the opportunities for enhancing sustainable economic growth and development in Zimbabwe, though widespread adoption and use of ICTs. The study also assessed the institutional and regulatory frameworks in the ICT sector, level of ICT diffusion and how ICTs can positively impact on economic growth. The study notes that the ICT environment in the country remains challenged, where the average teledensity, average mobile access, internet and broadband penetration rates obtaining in Zimbabwe are much lower than the African average. The low levels of ICT diffusion contributes to limiting the opportunities for growth arising from ICTs. As argued by the World Bank (2009), ICTs can have a greater growth impact in developing countries, once critical network penetration levels are achieved.

The study notes that the opportunities for economic growth and development through ICTs are either on account of ICT producing or ICT diffusion or both. Hence, for non-ICT producing countries such as Zimbabwe, the benefits of ICTs are mainly on account of increased usage.

¹¹POTRAZ 2011, data provided upon request

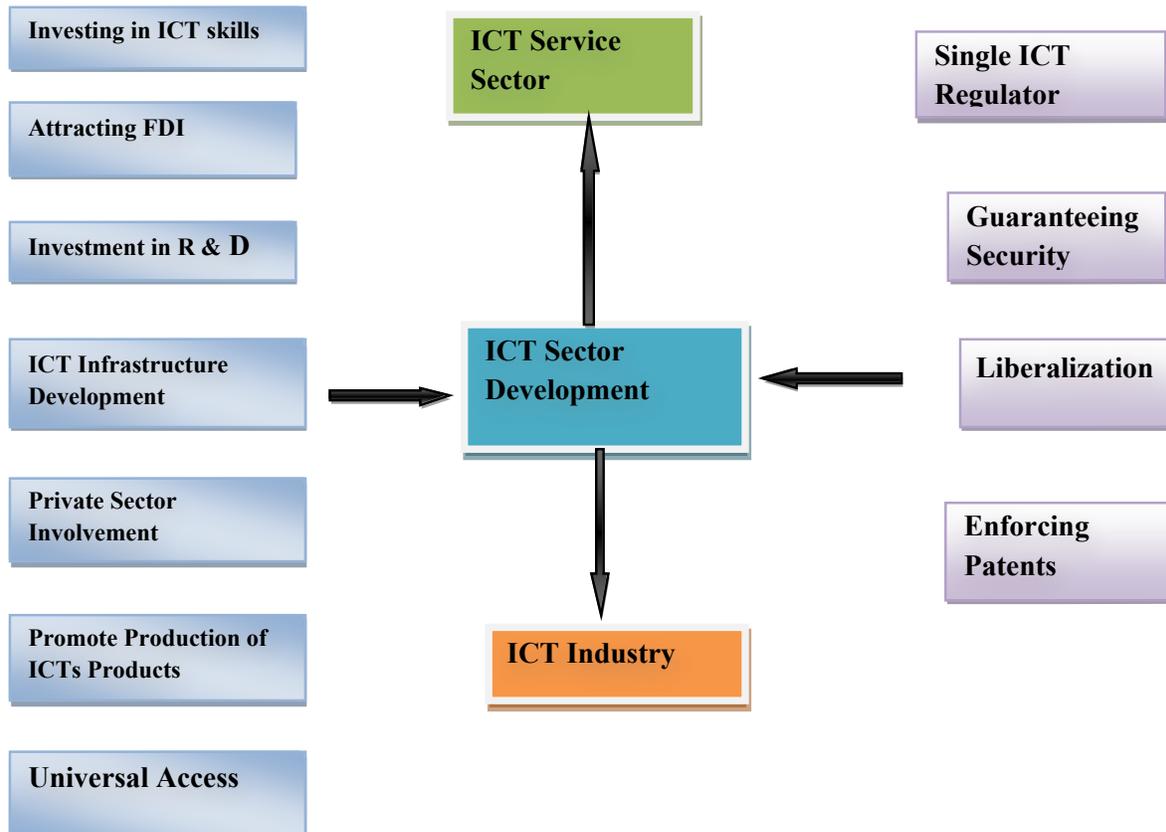
Furthermore, the study notes that as “General Purpose Technologies”, ICTs’ impact on economic growth are seen in the way they are used to transform organization, processes and ways of doing business. These positive effects are quite evident in e-commerce and teleworking which allow companies to reduce costs and increase revenues. Similarly, e-government helps governments save money, increase efficiency and raise transparency in the public sector. The transformation of economic relationships and processes is particularly visible on a large scale in those countries and areas that have high speed internet and high internet penetration levels. Unfortunately for Zimbabwe, the impact of these applications remains largely limited due to inadequate broadband infrastructures, which limits the contribution of ICTs in enhancing economic growth.

While ICTs allow for new process and management innovations and generate large productivity gains, they are not effective, nor can they be analyzed, in isolation. Instead, ICTs make a change only in conjunction with other factors, such as human skills. ICT investment and higher infrastructure levels need to be complemented by sufficient ICT skills to derive full benefits of ICTs in enhancing economic growth and development. The widespread use of ICTs has the potential of creating new jobs and revenues, as well as opportunities for economic growth by widening markets, creating better information flows and lowering transaction costs. The use of mobile phones, in particular, impacts positively on people’s lives through enhanced connectedness and fostering social ties.

The study concludes that Zimbabwe’s ICT sectors continue to face a lot of growth inhibiting challenges. As a result, the sector lags far behind in the basic requirements for the sector to play a more meaningful and sustained role in socio-economic development. This is evident through poor indicators of network connectedness, low ICT investments and other complementary activities. Hence, unless that level of ICT investment is attained and that the country continues to lag behind on ICT development, ICT investments may not bring the same returns to the country as witnessed in other countries. This is mainly because ICT is a network technology; the more people and firms that use the network, the more benefits it generates. In this regard, the country needs to address the challenges that continue to suppress investment in the sector, including: shortage of ICTs facilities & skills, limited access to capital, weak regulatory environment, lack of universal coverage, high access cost, lack of a supporting environment and limited data management capacity.

Policy Recommendations

In order to realize the full potential of ICTs in Zimbabwe, Government interventions should be aimed at attaining the broad objectives of: transforming Zimbabwe into a knowledge society as outlined in the MTP; close the digital divide with developed countries and encouraging ICT investments and hence the sector’s contribution to sustainable economic growth and development. In this regard, the model for developing the ICT sector should focus on attaining high network penetration levels and widespread usage. The model is thus two pronged, focusing on 11 pillars at the policy and regulatory environment, that can position the sector on a sustainable growth path and increase network penetration levels.



ICT Policy

The current National Information and Communication Technology Policy Framework of 2005 provide a solid foundation for ICT development in the country. However, Government needs to show commitment by fully implementing the clearly spelt out policy objectives. The policy framework needs to be reviewed and strengthened to address issues of connectivity and resource mobilisation. There is need for an enabling environment, effective separation of policy and regulatory functions. According to CNN's Tully, (13.1.2003) the success of the IT sector in India contrary to other sectors has been that IT took off without the government noticing it and so escaped the licenses, permits, controls, and other bad habits bureaucrats love. Clearly, not all countries have escaped this. A wider policy reform is, therefore, required that includes a pro-poor ICT policy together with the reforms in investment policy, education and special support to ICT provision in rural areas. The following specific issues require immediate attention:

- i. **Investing in ICT skills:** As already alluded to before, ICT skills are an essential complement to ICTs and are a key element of the national ICT policy. The Nziramasanga Education Commission Report (1999) recommended the introduction and mainstreaming computer-based teaching and learning in schools, colleges, universities and other

institutions of higher learning, not as part of on-the-job training. Lack of requisite ICT skills affects ICT usage and impact on growth. There is, therefore, need to continue investing in building ICT human resource capacities and professionals to help bridge and improve the intra and inter digital divides. Special programmes need to be designed for the public services to enhance public servants ICT compliance in support of e-government. The lack of awareness of the potential of ICTs in all decision-making strata of government, particularly the topmost layers, needs to be addressed.

Support for the development of a critical mass of ICT skills required by the knowledge economy, can as well be achieved through the establishment of a network of ICT Centers of Excellence in the country's 10 provinces and ICT capacity building and training centers at provincial level, with the aim of achieving a broad network of inter-linked physical and virtual centers, while ensuring coordination between academia and industry. To enhance the impact of ICTs in education, there is need for strategies deliberately aimed at improving the following indicators in the educational sector: computer-student ratios, the number of schools connected to the internet, the use of ICTs in the curriculum and the level of computer skills of school personnel. ICT should be mainstreamed in the country's education curriculum.

- ii. **Attracting FDI:** As a way of attracting efficiency-enhancing investment in the ICT sector, there is need to ensure a competitive environment that guarantees profitability. ICT pricing formulas should take into account the need to strike a balance between ensuring overall industrial competitiveness whilst at the same time ensuring service affordability. Furthermore, there is need to develop comprehensive support programs that target increasing the competitiveness of local ICT companies. In addition, some direct incentives, including financial support towards enhanced ICT investments and service delivery to marginalized rural communities are required.
- iii. **Investment in R & D:** The country should draw lessons from countries such as India and Indonesia, who have implemented successful ICT R & D programmes. India and Indonesia have developing their own customized, low-cost IT terminals and devices, (ITU 2006). The Indian Institute of Science has invented an inexpensive Simputer, based on the Linux system to provide internet and email access in local languages and with touch-screen functions, whilst modifications are being made for speech recognition and text-to-speech software for illiterate users. India, Brazil, Thailand and Niger have also developed software for illiterate users, (UNDP 2001). For such endeavors, public financing is required at least at the onset. However, in the long run, it is necessary to develop financing frameworks that attract private investment.
- iv. **ICT Infrastructure Development:** Such investments are key in increasing bandwidth on the national backbone and international gateway systems to enhance speed and efficiency of operations. Also, infrastructure is critical in ensuring equitable access to

ICTs by all citizens including disadvantaged groups and rural communities. Policies need to be put in place to encourage infrastructure sharing, which help not only in realizing economies of scale but speedy progress towards nation-wide coverage.

- v. **Private Sector Involvement:** Given the limited fiscal space available for public sector investment programmes, development of an efficient PPP framework in ICTs can help enhance investments in the sector. Governments and donors must adopt a pro-active role in order to foster private sector-led ICT infrastructure provision. The public sector could employ a number of measures to provide scaffolding for private investments, such as, investment incentives, risk mitigation mechanisms and training measures.

- vi. **Promote Production of ICTs Products:** This is important in ensuring relevance of content and use of appropriate technologies that meet international and local standards/ conditions. Special designs could be made e.g. use of solar or power back-ups to cater for power outages. Furthermore, an ICT-producing sector is important for ICT diffusion given close proximity of producing firms and users. In addition, having a strong ICT sector should also help generate the skills and competencies needed to benefit from ICT use. Having an ICT sector can thus, support ICT diffusion, although it is not a prerequisite to benefiting from the technology, (OECD 2001a). An ICT producing sector would also help in the production of softwares in local languages to enhance widespread usage. Having an ICT producing sector would also help ensure that ICT programs are not just technology-driven but respond to the needs of the poor, when it comes to content, language, skills, design, and price.

- vii. **Universal Access:** This involves mass deployment of ICT, targeting rural and farming communities. No society can claim to be a genuine knowledge society if universal access to knowledge and information is denied. Access in this case implies infrastructure, connectivity, content, affordability, information technology literacy, know how to develop and use information in education and free flow of information, opinions and ideas. There is need for investments in building national and regional internet backbones and community access points; encourage the creation and dissemination of locally relevant content and applications that fit with the cultural and social context, reflecting the linguistic diversity; significantly expanding education and training programs, in general and with regard to ICTs in particular; and help to create a facilitative environment and access to ICT all. Local communities should be involved in the design of universal access programs through consultations, surveys and demand studies. In addition, ICT hardware could be developed in close consultation with the poor, and in line with the country's conditions, responding to various constraints such as lack of main energy supply or interrupted supply.

ICT Regulatory Environment

Globalisation and the pervasiveness of ICTs, particularly the internet has given rise to new types of needs, rights and vulnerabilities. The country's ICT regulatory environment, therefore, require significant strengthening to promote growth of the sector and innovations that add value to the providers and customers, at the same time facilitating security, privacy, intellectual property of all electronic transactions. A transparent, stable, independent and credible regulatory environment that ensures comfort for investors is required, carefully aligning it with regional and global best practices. It is thus envisaged that work on the ICT bill will be completed by end 2011 in line with the MTP. The ICT bill should address the current inadequate regulatory capacity, especially in the face of convergence of networks and services. An enabling regulatory environment is required for the ICT sector and some of the specific regulatory issues that require attention include:

- viii. **Single ICT Regulator:** As already noted, the ICT sector includes telecommunication, broadcasting and information systems, hence the need for convergence in the regulation of all the activities in the sector. The ICT Act should, therefore, consolidate the current pieces of legislation governing the ICT sector into one comprehensive Act that ensures growth of the ICT sector and that Zimbabwe does not become a haven of cyber-crime. Institutional reforms and clarity on the roles of the Ministries of ICT, Transport, Communications & Infrastructure Development and that of Media and Information and Publicity, is required. This would help address bureaucracy and increase commitment to openness and transparency, for smooth functioning of ICT based-development.
- ix. **Guaranteeing Security:** An environment of trust must be created and sustained through strong legal and regulatory apparatus. Cyber-criminals around the world are constantly seeking loopholes through which to perform illegal or illicit businesses. Any country that has inadequate cyber-law is essentially offering a safe-haven for cyber-criminals to act with impunity. Zimbabwe therefore, needs to create and sustain a secure cyber-law environment, in addition to already existing legislation, before any significant new developments can emerge in ICT related services. The regulatory environment also need to be strengthened to address fraud, internet crimes, on-line drug dealings and smuggling, as well as the governing of cyber transactions in digital signatures and contracts made over the internet. Cyber legislation is required to safeguard privacy of citizens and to support paperless administration.
- x. **Continue with the Liberalization Agenda:** This is necessary to increase competition hence, removal of monopolistic behaviours in the sector. Continued public controls within the ICT subsectors, particularly the telecoms will not help in the attainment of the growth objectives. The licensing structure needs to be reformed to allow more operators and enhance flexibility to innovate and compete across a range of services.



According to the World Bank (2001), the experience with the African internet service providers suggests that countries with a highly liberalized telecommunications network had costs of internet access eight times lower than those with a completely closed market. In fact, competition helps lower the costs of ICT, which stimulates diffusion and hence sustainable growth.

- xi. **Enforcing Patents:** Patents are useful to encourage R & D and the development of local ICT softwares and new products, promote local research and development in software and hardware relevant to all sectors of the economy and adaptable to local conditions. Enacting specific and effective legislative instruments on privacy, encryption, digital signatures, copyrights and intellectual property rights is key in enhancing the potential for ICT-led development.
- xii. The Government will also have compelling interest in shielding contents inappropriate for minors or those that promote behavior that might endanger minors and society, hence appropriate legislation need to be enforced.

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