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TRANSFORMING THE SOCIETY THROUGH E-CONNECTIVITY

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ABSTRACT

The rapid development and increasing global distribution of modern information and communication technologies such as PCs, the internet, email and mobile phones have transformed the way economies operate and the way individuals, societies and States interact with each other. ICT is an essential instrument when it comes to reducing poverty, driving social and economic development and supporting democracy and good governance, education and health care. It enables better access to knowledge for sustainable development and opens up new ways of involving large swathes of the population in political decision-making process. The main prerequisite for sustainable economic development are accessing knowledge into innovative products, processes and services. Information and communication technologies particularly the internet, can play an important role in this context. In addition to the aspect of the availability of knowledge, ICT like electricity, is considered to be a general purpose technology that permeates all sectors of the economy. This means that the very use of ICT offers great potential for advancing technology, increasing productivity and reducing costs as well as stimulating product and process innovation. It is against this background that the paper examines how societies have transformed through e- connectivity.

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INTRODUCTION

Gillward and Stork (2010) define ICT (Information and Communication Technology-or Technologies) as an umbrella term that includes any communication device or application encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications. We encounter many ICTs in our everyday lives: at home, work, in the streets, in places we visit for holidays, on business, in public spaces, through conversations and the media. Depending on our activities and network we are more or less likely to be exposed to any particular innovation, and then more or less likely to take notice and be in a position where it makes sense to follow it up. According to Krajcik and Blumenfeld (2006), different occupations and interests make particular ICTs more relevant for some people than others since many are designed for particular types of use or organizations. There are also other more generic ICTs such as the telephone or the PC that are much more flexible in their use, and can be used or configured by users according to their particular interests and activities (Zelenika and Pearce, 2014). All in all, increasing use of ICT means access to opportunities to cope with the trends demanding more flexible persons and organizations.

ICT gives citizen's access to services almost 24 hours a day and offers new opportunities for organizing and living everyday life. The overall aim of this paper is to present a clear outlook of how ICT is constructively integrated into everyday life and to demonstrate how it opens for new possibilities.

National ICT policies: National ICT policies can serve several important functions. Konzma (2003) asserts that strategic policies can provide a rationale, a set of goals, and a vision for how national systems might be with the introduction of ICT and how the general population might benefit from its use. These strategic policies can motivate change and coordinate disparate efforts so as to advance the nation's overall goals. Companion operational policies can set up programs and provide resources that enable these changes. This is not to say that important things cannot happen without national policy. ICT-based innovation can and does occur without there being a close linkage to national policy (Cohen and Hill, 2008). Also, there are often many ICT programs and projects sponsored by NGOs and corporations, apart from national policies and programs. But without the guidance of national policies and the resources of corollary programs, it is less likely that individual innovations will be sustained. Nor is it likely individual effects will accrue across the country to have an overall impact on development. Similarly, without the shared vision of a national policy the efforts of NGOs and corporations may very well go in divergent directions or work

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at cross-purposes and their contributions to the nation's effort are more likely to be marginalized or even neutralized (Kempler, 2005). In brief, without a strategic rationale to guide the national use of technology, ICT policy is only operational. An analysis of most national ICT policy statement reveals that the policies promote the use of ICT to support economic growth or promote social development.

ICT and Economic Growth: A particularly common rationale for investment in ICT is the role it can play in preparing a future workforce and supporting economic development. The key to this policy approach is an articulation of specific ways that the educational deployment of ICT can support these broad economic goals, lest the connections between the two be hollow platitudes. For example, a major economic goal for most countries is sustainable economic growth. Economists attribute such growth to increases in productivity, which can include the absorption or more productive equipment, more skilled and productive workforce, and the creation of new knowledge (Stiglitz and Walsh, 2009). An example of this approach is Singapore where ICT policy has always been strongly linked to the development of human capital (Ashton *et al.*, 2002). The most recent economic development plan in Singapore challenges businesses and workers to move beyond productivity gains resulting from the pervasive use of technology to the development of a knowledge economy, which relies on the development of new business based on research, innovation, and knowledge creation (Economic Review Committee, Singapore, 2003). Another example of economic-based ICT policy is that of Jordan. Faced with persistently high unemployment and poverty, the Government of Jordan created a program of economic and social transformation in 2001 to develop high value-added sectors and to establish a knowledge economy (Ministry of Planning and International Cooperation, Jordan, 2004). The top priority in this program has been the development of the nation's human resource.

ICT in promoting Social Development: Other countries have focused more on the potential social impact of ICT and governments have justified ICT investments with policies that promote their use to share knowledge, foster cultural creativity, increase democratic participation, make government services more widely available, and enable social cohesion and the integration of different cultural groups and individuals with different abilities. As with the economic rationale, the key is to articulate specific ways that ICT can support these broad social goals. Within the European Union, Finland illustrates a national policy that focuses on the social impact of ICT. In its economic, social, and educational policies the Government of Finland places a very high importance on collaboration and knowledge sharing. The Finnish Information Society Program envisions a society "in which knowledge and expertise form part of the culture and also the key factor in production" (Information Science Advisory Board, 2009). The social impact of ICT is also, perhaps especially, a concern among less-developed countries. Chile, for example, has used its ICT policy to address the social inequities in the country. A central part of this policy was the widespread introduction of ICT, the training of teachers in their use, and the development of an educational portal on the Web (Hepp, 2012). Particular attention was given to ICT access for rural schools, most of which are attended by the nation's significant indigenous population, who have been traditionally underserved by the education system.

National Policy on ICT in Kenya: The current national ICT policy of 2006 is the first for the country and was published through a special issue of the Kenya Government Gazette (GoK, 2008). The vision in this policy is of "a prosperous ICT-driven Kenyan society", and its stated mission is to "improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services". This policy is currently under review in light of changes that have taken place in recent years and changes that are impacted. For example, there is a converged legal and regulatory environment; there is new submarine fibre bandwidth; there is an economic blueprint, Vision 2030 (GoK, 2007), that the policy needs to align with: and new Constitution provides a Bill of Rights outlining fundamental freedoms to citizens (some of which require delivery through responsive ICT policy making). In addition, there have been, and will be, many other regional and global changes. There has been an effort to initiate a review of this policy since 2009. There are also indications that an ICT master plan is being finalized by the Ministry of Information and Communication.

International Perspective on use of ICT in retrieving useful Information for Life: The general perception is that people who have access to ICT will benefit from it and those who don't would not. Benefits include theoretically, boundless information sharing, connectivity, decentralization and globalization: those who don't have access to technology run the risk of being marginalized and bypassed. ICT has become widely available to the general public, both in terms of accessibility as well as cost. A boundary was crossed in 2007, when a majority (55%) of households in Europe utilized ICT in their everyday life through internet access. This proportion continued to increase and in 2014 reached 81%, rising by an additional 2 percentage points compared with 2013 (Zelenika and Pearce, 2014). Widespread and affordable broadband access is one of the means of promoting a knowledge-based and informed society. Broadband is by far the most common form of internet access in all EU Member States: it is used by 78% of the households in the EU. According to Sutinen and Tedre (2014), just over three quarters (78%) of all individuals in the EU, aged between 16 and 74 years used the internet. In Europe, the internet is notably used to store files or use software on a server run over the internet. Cloud services are a relatively new phenomenon compared with web applications for social networking, listening to music or watching films.

Hilbert (2015) observes that one in five (21%) individuals aged 16 to 74 in the EU-28 save files on internet storage space, in other words using cloud services. More than one third of individuals in the Netherlands, Sweden, Luxembourg, the United Kingdom and Denmark use internet storage space for saving files. While in Lithuania, Poland and Romania these services are used by less than 1 in 10 individuals for this purpose. While 15% of the EU-28 population uses internet storage space for sharing files in 2014, a greater proportion used e-mail applications. USB sticks, DVDs or Bluetooth or personal websites and social networking sites. Most individuals who are cloud users appreciate the ease of accessing files from several devices or locations. It has also been acknowledged that application of ICTs at different links of the agricultural value chain will result in improvements to the competitiveness of the chain in general. Christoplos and Kidd (2008) observe that in a broad sense, the access to and the management of technological information (price and market information, weather conditions, economic variables,

communication with peers and business transactions, post-sale services, etc.) are very important factors in achieving competitiveness. Several practical benefits have been noted in different food value chains with reference to the use of ICTs to improve market transparency and to reduce transaction costs of intermediaries that will benefit different agricultural production activities and their producers. Specifically, similarly, improvements through ICTs at the primary activities will also have a positive effect on the entire agricultural value chain. Several experiences in the region provide examples to demonstrate how rural communities and specifically smallholder farmers benefited from the use of ICTs (Rizvi, 2011).

According to Hafkin and Taggart (2015), in Uruguay, the CEIBAL Plan facilitates the digital inclusion of small communities. In rural areas, the integrated use of ICT in meteorological centers improves the quality of information provided to farmers, who in this way, are able to plan crop production based on accurate and timely climate information, which ultimately increases productivity: for example, in Chile, REDAGROCLIMA offers weather alerts by e-mail and SMS to mobile phones of producers and farmers. In Central America and the Dominican Republic a platform has been developed, offering market information for fruit value chains in the region. In Costa Rica the interactive platform PLATICAR promotes the exchange of information using ICTs to support knowledge management, offering various online services. The new technological conditions imposed by the market, including ICTs, also lead to the need to change the relationship between the different levels of the agricultural value chain. In Argentina, the National Health and Quality entity (SENASA) uses new ICTs in their systems for traceability and food safety, which leads toward new relationships among stakeholders (Zelenika and Pearce, 2014). Around the world, ICT is used to provide useful disaster management data. According to Venugopal (2010), Geographic Information Systems (GIS) are used hand in hand with the Open Risk Data Initiative (OpenRDI) to minimize the effect of disaster in developing countries by encouraging them to open their disaster risk data. GIS technologies such as satellite imagery, thematic maps, and geospatial data play a big part in disaster risk management. One example is the *HaitiData*, where maps of Haiti containing layers of geospatial data (earthquake intensity, flooding likelihood, landslide and Tsunami hazards, overall damage, etc.) are made available which can be used by decision makers and policy makers for rehabilitation and reconstruction of the country. The areas receiving attention include natural resources information assessment, monitoring and management; water shed development, environmental planning, urban services and land use planning (Karanasios and Allen, 2013).

ICT has also been employed in many education projects and research over the world. The Hole in the Wall (also known as minimally invasive education) is one of the projects which focus on the development of computer literacy and the improvement of learning. Other projects included the utilization of mobile phone technology to improve educational outcomes. According to Parikh (2009), in the Philippines, there are key notes that have been forwarded to expand the definition of ICT for education (ICT4E) from an exclusive high-end technology to include low-end technology: that is, both digital and analog. As a leading mobile technology user, the Philippines have taken advantage of this for student learning.

One project that serves as an example is Project Mind, a collaboration of the Molave Development Foundation, Inc, Health Sciences University of Mongolia, ESP Foundation and the University of Philippines Open University (UPOU) which focuses on the viability of Short Message System (SMS) for distance learning. Pedagogy, Teacher Training, and Personnel Management are some of the subgroups of ICT4E. UPOU is one of the best examples of education transformation that empowers the potential of ICT in the Philippines' education system by maximizing the use of technology to create a wide range of learning. Further, ICT has greatly boosted advancements in healthcare. Graham (2011) explains that the use of ICTs in healthcare is not only about technology but a means to reach a series of desired outcomes, such as: health workers making better treatment decisions: hospitals providing higher quality and safer care: people making informed choices about their own health: governments becoming more responsive to health needs: national and local information systems supporting the development of effective, efficient, and equitable health systems: policymakers and the public becoming more aware of health risks: and people having better access to the information and knowledge they need for better health. In 2003, the World Summit on the Information Society (WSIS) held in Geneva, Switzerland came up with concrete steps on how ICT can support sustainable development in the fields of public administration, business, education and training, health, employment, environment, agriculture and science. According to International Telecommunication Union (2011), the WSIS Plan of Action identified the following as sectors that can benefit from ICT.

- **E-governments:** The e-government action plan involves applications aimed at promoting transparency to improve efficiency and strengthen citizen relations: needs-based initiatives and services to achieve a more efficient allocation of resources and public goods: and international cooperation initiatives to enhance transparency, accountability and efficiency at all levels of government.
- **E-business:** Governments, international organizations and the private sector are encouraged to promote the benefits of international trade and e-business: stimulate private sector investment, foster new applications, content development and public/private partnership: and adapt policies that favor assistance to and growth of SMMEs in the ICT industry to stimulate economic growth and job creation.
- **E-employment:** The e-employment action plan includes the development of best practices for e-workers and e-employers: raising productivity, growth and well-being by promoting new ways of organizing work and business: promotion of teleworking with focus on job creation and skilled worker retention: and increasing the number of women in ICT through early intervention programs in science and technology.
- **E-science:** The plan of action for e-science involves affordable and reliable high-speed internet connection for all universities and research institutions: electronic publishing, differential pricing and open access initiatives: use of peer-to-peer technology for knowledge sharing: long-term systematic and efficient collection, dissemination and preservation of essential scientific digital data: and principles and metadata standards to facilitate cooperation and effective use of collected scientific information and data.

- **E-security:** The number of prevalent crimes online and offline, local and international (terrorism and acts to it) has led to the increased development of arsenals (including ICT) to preempt and enforce proper security measures that lead to it and put public security, peace and order a number one priority.

Regional Perspective: ICTs are rapidly transforming social and economic conditions across Africa. Access to information and use of ICT in Sub-Sahara Africa and ICT diffusion processes are in their early stages but picking up. In recent years, important ICT developments have emerged to provide access to information and other services that would improve agricultural productivity, practices, and farmer livelihoods. In Ethiopia, ICT enables the novel Ethiopian Commodity Exchange (ECX) to transmit commodity price information to farmers in real time-within two minutes of a deal being made at ECX from Addis Ababa. According to the World Bank (2007), market data feeds directly to farmers via electronic display boards in 31 centers spread across Ethiopia as well as on the exchange website. Market data is also provided via text messaging to interested mobile phone users. In Mozambique, CTA (2006) and Jenson et al. (2004) have shown that farmers with access to market information obtain higher farm prices. The Mozambique agricultural marketing service (SIMA) collects and disseminates nation-wide and provincial data on market prices, product processing and availability through a variety of media including text messages, email, internet, national and rural radios, television and newspapers. In Nigeria, cassava growers receive market information through a new initiative called the Integrated Cassava Project. Based on mobile phones and internet and online marketplace Trade Net Africa, the project aims to disseminate market information using the Agri-Business Information Points (market information centers) and trade agents. These services include prices, demand volumes and offers, trade assistance, training, SMS alerts, and technical messages (Pyramid Research 2010). In Ghana, services developed by Esoko, a local company, include placement of buy/sell orders by farmers and traders. Esoko has a network of agents that collect price information on about 20 agricultural commodities in 30 markets in the country. They have a system for providing price information to farmers and others on a subscription basis (Jenson *et al.*, 2004).

In East Sudan the international water management institute launched the mobile services for flood management. According to Senay (2010). These mobile services are considered as a next generation ICT for weather and water information. The tool converts complex satellite sensor information to simple text messages which are sent to farmers informing them about the optimum use of flood water for crop production. The text messages would also warn the farmers about the flood events which would help them prepare their fields and advise on how to mitigate flood damage in estimating the risk of future flood events. The growing field of information and communication technology (ICT) also plays an integral part in supporting efforts to address family planning, reproductive health, and other health needs in Africa through *eHealth*. In Malawi, eighty-three lives in rural areas, and thus family planning/reproductive health and HIV/AIDS services are largely delivered in community health centers and district hospitals located miles from rural villages (Kanter, 2009). To increase access to these services, Malawi's Ministry of Health (MOH) has been working with coordination partners

to revitalize a cadre of volunteer community health workers (CHWs) to bring contraceptives and family planning reproductive health and HIV/AIDS education directly to the rural population. The USAID-funded K4H pilot project promotes family planning/reproductive health and HIV/AIDS information use and exchange, and aims to increase access to up-to-date information on these topics through the use of district health learning centers, electronic health information toolkits and a SMS-based mobile telephone network to benefit managers and service providers at the national, district and community levels (Chiwele, 2011). In Tanzania, health system performance and related family planning/reproductive health outcomes are severely affected when essential supplies and contraceptives are not available on demand at service facilities. Poor supply chain management causing stock-outs or surpluses produce cost inefficiencies and result in poor quality of care for clients (USAID, 2009). In 2010, the project began working with Tanzania's Ministry of Health and Social Welfare to develop a series of technological innovations to address weaknesses in the country's newest supply chain system, the Integrated Logistics System (ILS).

The ILS Gateway is designed as a routine reporting system using SMS text messages and USB-powered bar scanners to scan order forms (Sahim, 2011). In Uganda, the government recognizes that the use of ICT to develop and utilize information systems and services envisions a strategic framework for the future development of the country (Ministry of Finance, 2005). The Ministry of Health has a five-year Health Sector Strategic Plan (HSSP), which is a collaborative undertaking by the ministry, related ministries, development partners and other stakeholders. The plan describes the major technical health programmes and support and support services and their outputs. The programmes arise from the minimum health care package, while the support services include key areas in the health sector such as human resource development and management, policy and planning, health infrastructure, quality assurance, information management system, research and development, procurement of drugs, equipment, supplies and logistics, health care financing and legal and regulatory framework (Ministry of Health, 2008).

Kenyan Perspective: Universal access to ICTs has been identified by the Kenyan government as a major objective of the Vision 2030 efforts (GoK, 2007). The ICT sector has made great advances since its liberalization in 1999 and it is making inroads to become one of the leading ICT industries in Kenya. Small and Medium Enterprises (SMEs) are perceived as the engine of growth in Kenya. Mobile phones emerge as the preferred ICT tool to SMEs due to affordability, ease of use, and a reliable network. More than 95% of SMEs in Kenya own mobile phones with subscription reaching 30.7 million in April 2013 and mobile penetration at 78% (CCK, 2012). This offers SMEs a great opportunity to employ the services of this preferred tool to enhance market access. Mobile phones offer various functionalities that can enhance market access and include communication, enabling market transactions, product promotion, customer relationship, market research and other internet enabled services. Mobile phones offer a quick, efficient and affordable way of communication to SMEs which is essential for initiating and maintaining customer relationship, facilitating market transactions, acquisition of market information and for communicating product information to customers (Ogott *et al.*, 2014). Agriculture is a source of livelihood to a vast majority of people in Kenya.

The Kenya Agricultural Commodity Exchange (KACE) has commodity exchange service through offers and bids, which are prominently displayed on blackboard and which are disseminated via SMS and Internet. KACE collects, updates, analyses and provides reliable and timely market information and intelligence on a wide range of crop and livestock commodities, targeting actors in commodity value chains, with particular attention to smallholder farmers and small scale agribusiness (KACE, 2011). In addition, Farmer Voice Radio (FVR), a radio extension service in Kenya targets smallholder farmers through a show called *Mali Shambani*. Mali Shambani is a weekly hour-long radio program featuring agricultural news and responding to a wide range of topics, including market prices and trends, farming techniques, weather and seasonal issues, financing opportunities, inputs, land use, and quality standards. Each program also offers an interactive call-in component where farmers are given the opportunity to pose agricultural questions to a panel of experts either via phone or SMS (Payne *et al.*, 2010). In order to complement the development of ICT services in all areas, the Communication Authority of Kenya (then CCK) helped the Kenya Institute of Education (KIE) to digitize the Kenya Certificate of Secondary Education (KCSE) curriculum. The objective of this project was to enhance e-learning, as well as incentives both to students and teachers to access ICT services. As a result, the KIE digitized 11 subjects for the Form 1 KCSE curriculum. These digitized subjects were piloted in 20 schools. The CCK donated hardware, software and provided capacity building training to 16 of them and spent around US \$200,000 (CCK, 2012).

Crucial health centers in Kenya have also been computerized. This initiative was executed with a partnership between the Provincial Medical Office of Nairobi (PMO)- dependent on the Ministry of Health-the operator Telkom Kenya. Axesstel, and the Research Triangle Institute (RTI) of the USA and QUALCOMM's "Wireless Reach Alliance" of South Africa. The CCK provided the computer hardware and software in the health centers (Musembi and Kariuki, 2009). The objective of the project was to promote efficiency in health information reporting between health facilities in order to improve overall services especially efficient information and medicine management. The project focused on PMO's health facilities and on the logistics Management unit (LMU). The activities consisted of implementing wireless connectivity in order to solve the antiquated manual process of reporting and ordering the supply of antiretroviral (ARV) for HIV positive patients in 16 clinics in the Nairobi province (Mwaila, 2011). In addition to that, beginning in 2005, the African Medical and Research Foundation (AMREF) and the Nursing Council of Kenya (NCK) changed the traditional classroom-based teaching to a paper-based distance learning effort that eventually transitioned to an e-learning option (Munya, 2008). This provided greatly increased opportunities for nurses to get the training they needed for the registered nurses diploma online. Now, in partnership with the Kenyan Ministry of Health, Accenture, and the Kenya Medical Training College, AMREF and NCK are using elearning with the goal of registering 20,000 Kenyan nurses. Between 2005 and March 2011, more than 7,000 students have enrolled in the program. Program graduates working in Kenya's Kagundo Hospital are reportedly more motivated, knowledgeable, and proactive. They also have enhanced computer literacy skills that directly build their general professionalism capacities (Iheed, 2011).

Finally, new forms of technology, such as social media platforms, have also been found to provide spaces where Kenyans can participate in expressions of civic engagement. According to Ndirangu (2013), researchers are now realizing that activity such as Twitter use among Kenyans, that could easily be dismissed as leisure or mundane should be considered under a broader conceptualization of development research.

Conclusion

The implementation and increasing use of ICTs in most aspects of daily life is irreversible because ICT holds a lot of potential for enhancing livelihoods. Governments should therefore promote policies to reduce the digital divide by opening the telecommunications market, as well as supporting legislations to regulate competition and the development of infrastructure to facilitate ICT access to rural areas. It is essential to promote public policies, programs and innovative public and private initiatives that foster equal access to ICTs and to vital information needed by different stakeholders for making economic, social and environmental decisions, especially the socially disadvantaged groups in isolated and remote rural communities. Several international, regional and local experiences examined by this paper show the importance of promoting public policies and fostering partnership (public, private and civil society) to reduce the rural digital divide and to improve the competitiveness in value chains: while expanding access to communications infrastructure, developing services and content focused on value chains, promoting a "culture" for the appropriation of ICT rural areas and developing "information literacy". Currently, joint efforts among government agencies are developing pilot projects and also provide training in the use of ICTs. The private sector is and will be one of the main promoters of ICTs. The growth and penetration of mobile ICTs in rural areas (especially mobile phones), and innovations in electronic media to support education and training (e-learning), represent new opportunities to increase the development of human and social capital, among other aspects. Mobile ICTs can contribute to the strengthening of relations between stakeholders in the value chain: it is possible to promote the "culture" of the use of ICTs through e-learning, as well as the development of information skills of different stakeholders in chains. Thus, the impact that ICTs have in improving competitiveness around the world, across Africa and in Kenya is very promising.

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