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Analysis of ICT and Management Systems in Driving World Economy

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Abstract

Management Information System (MIS) provides information for the managerial activities in an organization. It provides speedy, in-expensive and convenient means of communication. The main aim of this research is to perform analysis of ICT and management systems in driving world economy. Objectives of the this research includes :the establishment of impact of ICT on Global Economy; to find out how ICT impacts on the composition and structure of knowledge and employment in the world; to establish the implications of information technology for the relative fortunes of nations: to find out how industrial and services organizations have been altered by emergence of MIS in the country and hence establish the impact of ICT on future generations of workers and Global economic prospects .This research adopted a case study research design to obtain data from the respondents of various .Institutions ,Organization , Business Enterprises, manufacturing and service in Kenya . Data sources include extensive desk research through library and different published and unpublished materials.

Key words: Management information system, IT- Information Technology. ICT-Information and communication Technology , Global Economy

1. Introduction

The recent advances in information technology are becoming central to the process of socio-economic development. Information technology offers new ways of exchanging information, and transacting business, changes the nature of the financial and other service sectors. It provides efficient means of using the human and institutional capabilities of countries in both the public and private sectors.

ICT stand for information and communication technologies and is defined, as a "diverse set of technological tools and resources used to communicate and to create, disseminate, store, and manage information." "ICT may also imply the technology which consists of electronic devices and associated with human interactive materials that enable the user to employ them for a wide range of hardware and software components that enables processes or services in addition to personal use.".(Rabah , 2009:2013 , Ogalo ,2012, Michael el at., 2014).

Management Information System (MIS) is basically concerned with processing data into information and is then communicated to the various Departments in an organization for appropriate decision-making. The world is rapidly moving towards knowledge-based economic structures and information societies, which comprise networks of individuals, firms and countries that are linked electronically and interdependent relationships. Computer based Information System infrastructure exposes firms‟ information resources to a no man „s land where anybody could get access if no proper measures are put in place, (Ogalo ,2012). These measures should ensure that no unauthorized staff is allowed to access any of the Trust „s computer systems or information stores; as such access would compromise information integrity, also determination of which individuals are to be given authority to access specific information; levels of access, (Ogalo ,2012).

There is need for integration of IT ,as for in ERP system application so as to run the economy is paramount, hence such include : Net-worked telephony ; computer, processor, printer, fax ,modem, router,(Michael el at., 2014). A lot of time and money are saved and the security of data is ensured .The comparative advantage Economy is man-made and engineered by knowledge through the application of Information system, (Rabah , 2009:2013 , Ogalo ,2012, Michael el at., 2014). Its a subset of the overall planning and control activities covering the application of humans, technologies, and procedures of the organization. Some leaders in cities around the globe are starting to move beyond the physical city; they are conceiving Digital Infrastructures and Information Products as a platform for economic development,(Egger ,2006).

Aim of this research is to analyze ICT and management systems in driving world economy. In an increasingly globalized economy, information technology is one of the key determinants of competitiveness and growth of firms and countries. Firms are becoming more competitive on the basis of their knowledge, rather than on the basis of natural endowments or low labor costs.

Objectives of the this research includes :the establishment of impact of ICT on Global Economy; to find out how ICT impacts on the composition and structure of knowledge and

employment in the world; to establish the implications of information technology for the relative fortunes of nations: to find out how industrial and services organizations have been altered by emergence of MIS in the country and hence establish the impact of ICT on future generations of workers and Global economic prospects.

This research is justifiable since man-made comparative advantage can only be acquired by knowledge and brainpower. Information technology does not only determine the market share and profitability of individual companies in tomorrow's global economy, but it also has a huge impact on future generations of workers and on a country's economic prospects.

To drive the economy easily and quickly the world requires, new technology, which consists of small refinements. Many more people use wireless phones, personal data assistants (PDAs), global positioning systems (GPSs), digital video, and digital photography. Meta-search engines and other search advances have become so efficient that they have replaced a huge amount of paper filing, World Bank (2004).

Further justification of this research is derived from **W**orld Bank (2004), the theme "Transformation-Ready", the growing contribution of ICTs to Agriculture, Climate Change Adaptation, Education, Financial Services, Government Services and Health is explored. In addition, the report highlights the role of ICTs in enhancing African regional trade and integration as well as the need to build a competitive ICT industry to promote innovation, job creation and the export potential of African companies, (Rabah,2009:2013 , Ogalo ,2012, Michael el at., 2014).

ICT will help reduce the income gaps between rich and poor countries. In the words of Negroponte (1998): "the Third World five years from now may not be where you think it is. There have been many theories of leapfrog development, none of which has yet survived the test of time. That's about to change" .This is the missing link in the ecological age and in creating great urban centres for people to live and work in. The adoption and the use of ICT become one of the options for re-energizing business processes. Fagerberg, et al., (2000) argue that what matters for economic growth is the ability to exploit areas of high technology opportunity, which in recent decades have been dominated by ICT, **(**Ogalo ,2012).

According to Raburu . G et al., **(** M a y, 2 0 1 3), Use of ICTs can offer a rich choice of learning experiences that are appropriate to needs, space, pace, aspirations and learning styles .The information system is the mechanism to ensure that information is available to the managers in the form they want it and when they need it . (Flood 2002, Kinuthia 2009, Omwenga, 2011). One of such technologies is use of virtual learning systems (VLS) as an e-learning system. But, virtual learning systems can suffer from severe usability problems such as conceptual disorientation and inability to manipulate objects (Kaur et al. 1996, Squire & Preece, 1996) .Hence Countries that invest in and adopt information technology quickly will move ahead and those that fail to rapidly adopt information technology will be left behind.

An information system is a discrete set of information resources organized for the collection, processing, maintenance, use, sharing, dissemination, or disposition of information. In the context of this publication, the definition includes the environment in which the information system operates (i.e., people, processes, technologies, facilities, and cyberspace).

1.1 Information Technologies

Management Information System (M.I.S.) is basically concerned with processing data into information,(Michael el at., 2014). Data collection involves the use of Information Technology (IT) comprising: computers and telecommunications networks (E-Mail ,Voice Mail, Internet, telephone, etc.).Computers are important for more quantitative, than qualitative, data collection, storage and retrieval; Special features are speed , accuracy and storage of large amount of data. Telecommunications provide the means for one-way or two-way communication and for the transmission of messages.

Information system is a discrete set of information resources organized for the collection, processing, maintenance, use, sharing, dissemination, or disposition of information. The definition includes the environment in which the information system operates (i.e., people, processes, technologies, facilities, and cyberspace).Computer systems can clearly aid organizations in the processing of data into accurate, well presented, up-to-date and cost effective information,(NIST,2011).

According to Raburu .G et al., **(** M a y, 2 0 1 3) ,creating a successful online community, there are two critical components: sociability and usability. In creating a successful virtual learning system one of the critical components is usability of the system. Usability is defined as the extent to which a system can be exercised to achieve specific goals and complete well defined tasks effectively, efficiently and with satisfaction, (Raburu .G , 2 0 1 3).

1.2 Technology Profound Impact on Corporations

Technology has already had a profound impact on the way corporations do business, leading to the creation of global conglomerates that sit atop the 'apex' of massive value chains that span the world. This helps to make those companies more productive through more efficient use of resources, (Nolan,2006).such a city that uses data, information and communications technologies strategically to- provide more efficient, new or enhanced services to citizens • monitor and track government's progress toward policy outcomes, including meeting climate change mitigation and adaptation goals, manage and optimize the existing infrastructure, and plan for new more effectively, reduce organizational silos and employ new levels of cross-sector collaboration ,enable innovative business models for public and private sector service provision. (Nolan,2006),According to NIST(2011),Information technology is widely recognized as the engine that drives the U.S. economy, giving industry a competitive advantage in global markets, enabling the federal government to provide better services to its citizens, and facilitating greater productivity as a nation.

Organization in the public and private sectors depend on technology-intensive information systems to successfully carry out their missions and business functions,(NIST,2011).Information systems can include diverse entities ranging from high-end supercomputers, workstations ,personal computers, cellular telephones, and personal digital assistants to very specialized syste(e.g., weapons systems, telecommunications systems, industrial/process control systems, and environmental control systems).

1.3 Systems Theory and System

System Theory, first proposed by Ludwig von Bertalanffy in 1945 has been used for decades as an analytical approach to understand how complex physical, biological, economic and social systems operate. A system may be, typically defined as a set of several independent and regularly interacting or interrelating units or subsystems that work together to accomplish a set of pre-determined objectives (Michael et al . , 2014).The adoption of these technologies in many countries by different sectors of the economy and have been found to have direct positive impact on the world economy as efficiency and have led to more rapid acceleration of development in these countries, (World Bank, 2004).

In Kenya, however, preliminary investigations show that only a few organizations in the economy have adopted the ICTs, but there has not been formal study to determine the level of adoption and impact on the efficiency of the organizations and the consequent effect on the nation's economy, (World Bank, 2004).MIS provides several benefits to the business organization: the means of effective and efficient coordination between Departments; quick and reliable referencing; access to relevant data and documents; use of less labor; improvement in organizational and departmental techniques; management of day-to-day activities (as accounts, stock control, payroll, etc.); day-to-day assistance in a Department and closer contact with the rest of the world.

1.4 Cloud Computing Will Drive Economy

There is no common definition of the term cloud computing in the literature yet (Velte et al. 2010. p. xiv) Our research ponders the terms and definitions on the understanding reflected in the majority of literature sources and apply it to the area of Information systems. At the basis, we are using theNIST 2009 definition of cloud computing which seems to have gained common acceptance in the literature (Mell and Grance 2009; Iyer and Henderson 2010; Babcock 2010; Vaquero et al. 2009; Buyya et al. 2009). The NIST definition describes different types of services in a layer model (infrastructure, platform, software) and distinguishes private, public, community and hybrid clouds depending on the exclusiveness of the service model.

Cloud computing is a concept that has gained increasing attention over the last years,(OECD Report, p. 27). In many ways it is not a completely new phenomenon as it incorporates elements of IT outsourcing which has been available for more than 10 years (e.g. the provision of software over the Internet or the housing of IT infrastructure for client companies). There are

clear signs that companies' interest in cloud computing services is rising: "Demand for cloud computing services is expected to continue to increase; according to IDC, the market for cloud computing services will grow by around 40% in 2010" (OECD2010, p. 148).

Our research has shown a number of advantages of cloud computing backed by, NIST 2009and (Barnatt , 2010; Velte et al. 2010) . They point out that obtaining computer power over the Internet could have a profound impact on the whole computer industry and rid companies from having to install software on their own internally operated systems. As a consequence, they will not need to purchase or maintain hardware and software that can simply be rented online. Interest in cloud computing is mainly motivated by its potential to reduce capital expenditures and to deliver scalable IT services at lower variable costs." (OECD 2010 , p. 147).

1.5 ICT Supersede Health Expenditure to Boost Economy

Countries in Africa spend significant amounts of their GDP on delivering health services through systems that are often inefficient, costly and lacking in transparency. Information and communication technologies (ICTs) have the potential to transform the delivery of health services across the continent in ways that not only increase efficiency but also improve accountability (World Bank, 2004). The availability and quality of ICT services are growing rapidly across Africa, with mobile network coverage rising from 16% in the late 1990s to over 90% of its population in 2011 , (World Bank, 2004).

Growth in this sector has led to increased investments, decreased costs and rapid growth in technology-enabled services. However, these gains in ICT infrastructure have not as yet benefitted the health sector in a systematic way. Although there are many ongoing projects across Africa that attempt to improve the health sector through the use of ICTs, most remain pilots, few are evaluated and even fewer are designed or assessed for scalability. While a recent World Bank survey of nearly 150 active health projects revealed that a third had a specifically financed e-Health component, few were systemic fixes, and a gap remains in strategy, communication, capacity and available investment regarding ICTs for health system strengthening.

According to World Bank (2004), the theme "Transformation-Ready", the growing contribution of ICTs to Agriculture, Climate Change Adaptation, Education, Financial Services, Government Services and Health is explored. In addition, the report highlights the role of ICTs in enhancing African regional trade and integration as well as the need to build a competitive ICT industry to promote innovation, job creation and the export potential of African companies.

1.6 ICT Across the Economy to Produce "Hybrid Jobs"

The demand for technology jobs has steadily increased. There are now more IT jobs in the United States than there were at the height of the dot-com boom. With an estimated 700 000 jobs in Europe, 800 000 in the US and 200 000 in Brazil alone, the ICT sector will be looking to

hire at least 1.7 million people in the coming years, (Luis.Neves et al,12,2012) . According to ,(Ogalo,2012), the ICT sector has changed radically since the early days of computing – and the 'knowledge economy' is now taking on hitherto unseen dimensions where communication technologies have become forces of social change.

Social media and its participatory formats are as much about the technologies as they are about their applications – bringing the virtual and physical worlds closer together in dynamic ways across several platforms. Bioengineering, power grid informatics, digital media, and social and mobile applications; these are interesting, fun and creative jobs that combine ICT with business of every imaginable field. ICT employment opportunities for women in the post 2008 global economic era include high-speed internet, cloud computing, green ICT goods and services and their "smart" applications as these are presently heavily promoted by governments as a strategic response to the economic crisis,(Luis. Neves et al,12,2012).

The full report provides evidence to prove that a range of initiatives are already underway to support girls and women in the ICT sector as more governments recognize the importance and necessity of taking these deliberate steps. The most important determinant of a country's competitiveness is its human capital and talent - the skills, education and productivity of its workforce, (Luis. Neves et al,12,2012).

Women account for one-half of the potential talent base throughout the world. Closing gender gaps is therefore not only a matter of human rights and equality; it is also one of efficiency and economic productivity. To maximize competitiveness and development potential, skills need to be seen as a key part of an economy's infrastructure, and the stronger infrastructure becomes the more robust and resilient the economy will be in response to opportunities and challenges ,(Luis Neves et al,12,2012).

Our research proposes that for ICT to be well coordinated choices made by policymakers, enterprises and individuals on investment in education and training must strive for gender equality-that is, to give women the same rights, responsibilities and opportunities as men. Business leaders and policy-makers need to work together towards removing barriers to women's entry to the ICT workforce and putting in place practices and policies that will provide equal opportunities for rising to positions of leadership within the ICT sector. Such practices will ensure that all existing resources are used in the most efficient manner and that the right signals are sent regarding the future flow of talent, (Michael ,et al., 2014)

1.7 ICT and the Future of Economical Development

According to eSkills Monitor ,the future is bright for ICT professionals! The IT sector is marked by a pressing need for a wide range of ICT talent. Many countries and regions are predicting a shortage of qualified employees and this bodes well for qualified women in technical fields, (Luis. Neves et al,12,2012).According to a survey conducted by eSkills Monitor, Europe anticipates filling as many as 700 000 IT jobs by 2015in the ICT and telecommunications field; among them such critical areas as security of communications, devices and information, as well

as voice, data, video management, the management of both new network devices, and methods of communication.

In another example, and according to the Brazilian Agency for Promotion and Export of Software (Softex), the Brazilian ICT sector currently employs 600 000 people. It encountered a shortage of about 75 000 skilled professionals in 2010 and expects to run short of about 92 000 professionally trained workers in 2011 and 200 000 professionals by 2013.Before the 2008 global economic and finance crash, ICT sector growth in goods and services expanded steadily. It approached USD 4 trillion in 2008,4having tripled since 1996. The share of ICT trade peaked at 18 per cent in 2000, and fell to 12.5 per cent in 2008.5 , (Luis Neves et al,12,2012)

Long-term prospects for further growth in the ICT sector remain strong despite the 2008 crash-induced fall, as ICTs become increasingly fundamental to the economic and social infrastructure of all economies .The development of new goods and services is expected to drive demand from businesses, households and governments; with replacement ICT investments further boosting continuing demand. Much of the growth of the highly globalized ICT sector comes from the efficiencies gained from the global reorganization of research, development and production to provide new and improved ICT products and services to new and expanding markets. This includes the expanding use of software and extensive application of outsourcing.

Additional ICT growth is expected to come from “green growth” through “smart” applications in buildings, transport, energy, and production which will translate into demand for customized applications .The development of new goods and services is expected to drive demand from businesses, households and governments, with replacement ICT investments further boosting continuing demand. Much of the growth of the highly globalized ICT sector comes from the efficiencies gained from the global reorganization of research, development and production to provide new and improved ICT products and services to new and expanding markets. This includes the expanding use of software and extensive application of out sourcing(Michael and Rabah,2013)

Our research reassures that ICT growth is expected to come from “green growth” through “smart” applications in buildings, transport, energy, and production which will translate into demand for customized applications .As ICTs merge with sector-specific technologies ,as par the research by, Michael and Rabah (2013) on ERP systems being the integration of ICT tools . Then expectation is that the youth will show more interest in opportunities that use their creativity and intuition, for example software application design,

1.8 ICT as a Driver for Kenyan Economy

In the year 2007, the Kenya ICT Board was created to market Kenya as regional ICT hub. It was also selected as the executing agency for the Kenya Transparency and Communication Infrastructure Project (KTCIP) World Bank credit of $114.4 million that was to finance ICT projects in government, universities and colleges, and some selected ICT industries. While it managed to market Kenya as a regional ICT hub and also executed several high-impact projects

in government, judiciary and universities by the year 2012, the execution of e-Government projects created an overlap between the role of Directorate of E-Government and that of the Kenya ICT Board.'In the year 2004, the Government created the Directorate of E-Government under the Office of President to coordinate all E- Government services in the Ministries as well as semiautonomous Government agencies (SAGAs), UNDP (2001).

1.9.1 Economic Sectors to Enhance Growth and Raise the GPD Kenya Needs ICT

ICT can transform the economy to Vision 2030. The economic sectors to enhance their growth, productivity and global competitiveness will specifically rely on ICT and Information systems as tools .The current Kenya GDP is US$ 40.70b, which could go higher if SMEs in the various economic sectors driven by ICT can improve their systems and processes through use of technology,(Michael and Rabah,20013). With ICT as a driver of industry, it is expected that trade will be an outcome of the ICT adoption in the value chain of the various economic sectors arising from the enhanced efficiency and service delivery in the value chain. ICT facilitates the various sectors of the economy resulting to increased knowledge on how the sectors can be improved, (Ogalo,2012).

With ICT as a driver of industry, it is expected that trade will be an outcome of the ICT adoption in the value chain of the various economic sectors arising from the enhanced efficiency and service delivery in the value chain. Energy is one of the key enablers of ICT and has a significant impact on the ability to achieve efficiency in all the sectors. ICT facilitates the various sectors of the economy resulting to increased knowledge on how the sectors can be improved, The Company needed an advanced threat management solution that would take fewer resources to maintain and require limited resources to track and respond to suspicious network activity. The company installed an advanced intrusion detection system allowing it to monitor all of its network activity including any potential security breaches,(Ogalo,2012).

Technology innovation aims at developing a creative and innovative ICT sector. This shall entail creation of appropriate policies and infrastructure necessary to foster creativity and innovation at all levels. The widely recognized Global Innovation Index (GII) categorizes countries and regions according to their innovative capacity. Innovations are the bedrock of entrepreneurship which translates these innovations into businesses, wealth and high standards of living for a country. This is the reason why the top ten countries in the innovation index are rich with high GDPs(world Bank ,2011).

Technology development and use is linked with the business reengineering (BPR) efforts coming on stream in the 1990s. Keen (1991) further discusses measuring the cost avoidance impacts of IT/IS. For him these are best tracked in terms of business volumes without increases in personnel. At the strategy level he also suggests that the most meaningful way of tracking Information Technology/Information system performance overtime is in terms of business performance per employee, for example revenue per employee, profit per employee, or at a lower level, as one example – transactions per employee,(Ogalo,2012)

1.9.2 The Key Forces to Drive Innovation in Kenyan Economy

The ICT sector: There is need for widespread adoption and use of mobile phones by the population. Availability of broadband that covers large parts of the country, including semi-arid a Government commitment to research and innovation through establishment of KENIA, National Research Fund, and National Commission of Science, Technology and Innovation through the Development of the I CT sector, (Basson: 1996).

The Driving Forces For Developing the ICT Sector in Kenya : The proliferation of mobile phones in Kenya and the ease of adoption of mobile based services The introduction of laptops in primary schools will create pressure for local content, the need to set up local businesses for maintenance of laptops and associated school equipment, and local assembly of these gadgets in order to sustainably roll out to all levels of education in both primary and secondary schools,(Michael et al ., July 2014).

Strong Intellectual Property Protection: To drive Economy , by support of systems the Kenya software and information industries depend on a meaningful international framework to protect the industries' intellectual property, including copyrights, trademarks and patents. There is a critical need for an enforcement regime that deters infringement, piracy and counterfeiting, while encouraging local investment and employment Continued Advances in Computer Access and Broadband Penetration. Broadband penetration is critical to the delivery of and access to increasingly sophisticate digital information products and software applications, either through high-speed Internet connections or wireless networks. Kenya must continue to maintain strong broadband penetration and unrestricted access to rich Internet content, (Michael et al ., July 2014).

1.10 Need for African Government to Utilize Information Technology

Economic implications primarily focus on the importance of science and technology (Basson: 1996). Basson stresses the need for African governments to utilize science and technology and compete in commerce and industry. This is in keeping with Rathgeber (2000), who identifies poor infrastructure - including telecommunications infrastructure – and the lack of skilled manpower as Africa's major challenges. Rathgeber observes that newly industrialized Asian countries took on this challenge and offered foreign investors both skilled labour, and an excellent infrastructure. In 1995, ICTs accounted for more than 25% of all exports from East Asian economies (Crede and Mansell in Rathbeger, 2000:3).

According to the World Bank (1998/99:20), this capacity for ICT production has immensely contributed to East Asian economic growth. The World Bank further asserts that the 'knowledge gap' in many developing countries is a contributory factor to poverty. According to their report, there is no better way to bridge this divide than through the use of ICTs. Due to their ability to decouple or separate information from its physical repository, ICTs are excellent channels of communication. This view is supported by Pohjola in Bedi (1999:4), who argues that this decoupling characteristic is 'revolutionary' as large bodies of information can be accessed

by individuals, irrespective of time and space. Bedi (1999) adds that the use of ICT networks enables e-mail access to a vast number of individuals.

One of the most innovative breakthroughs of the 20th Century was the Internet, whose effects are changing how traditional technologies are used, and how wireless technologies are deployed. According to Marker, Wallace and Macnamara (2002: 14), the Internet dramatically reduces the costs associated with making information available to others and accessing global information and knowledge resources. The authors further add that satellites and other advanced technologies make new things possible; i.e., recent innovations in hand-held devices, in mobile telephony, and in satellite communications have led to cutting edge information and communication tools specifically relevant to the needs of the poor. In some developing countries, rural health workers are now using small hand-held devices to record health data from their clients (Punie& Cabrera 2006).

The UNDP (2001:3-16) argues that harnessing ICTs for human development requires raising awareness and constituency building across all levels of society. As maintained by the UNDP, the link between ICTs and many development challenges is not always obvious, especially in countries with high levels of illiteracy, low levels of basic telecommunications infrastructure and electrification, and high levels of debt.

The views on the possible impact of the information revolution on African countries can be grouped in two opposing schools of thought. The first school predicts that as African countries incur an increasing 'technological deficit' the welfare gap between them and the industrialized world would increase, (Punie&Cabrera 2006). This school stresses that Africa risks further reduction in its ability to generate the resources necessary to accelerate its growth rate and reverse the trend of increasing poverty. On the other hand, the secondschool believe that information technology may actually help reduce the income gaps between rich and poor countries, (Punie& Cabrera 2006).

In the words of Negroponte (1998): "the Third World five years from now may not be where you think it is. There have been many theories of leapfrog development, none of which has yet survived the test of time. That's Mauritania, for instance, instituted computer-backed trade-management system with an initial investment of US$1 million. The system reduced transaction costs associated with external trade as customs processing time was reduced from 48 hours to 30 minutes, and the time it takes to declare goods to between one and two days from 5 to 20 days (Talero and Gaudette 1996). The application of information technology also makes it possible to export products to 'disintermediate' middlemen and conduct their transactions directly with exporters or export markets, increasing, thereby, their profitability and incentives to produce. (ADB,1998).

2. Literature Review

2.1.1 ICT Prepels World Economy

Technology is propelling the world-wide advancement of health care offering the greatest opportunity to implement best practices, utilize evidence-based medicine, reduce human error, improve efficiency, compile comprehensive health data sources, and provide minimally invasive care tools (Michael ,Dec 2013), It is removes access to expertise barriers through tele-health and telemedicine. Systems can rapidly convert from analog to digital distribution of information.

In the future, all information and communication will convert to digital format in which the Internet will link millions of providers, services, and settings link seamless web of care,(Michael el at.,2013), As a general statement, it might be said that ICT proficiency will be at the centre of required skills in the future. Integrating ICT literacy will be crucial, as it means harnessing technology to perform learning skills. It must encompass the use of ICT to manage complexity, solve problems and think critically, creatively and systematically towards the goal of acquiring thinking and problem-solving skills,(Michael el at.,2013).

Literacy must also comprise the use of ICT to access, manage, integrate, evaluate, create and communicate information in order to develop information and communication skills (21st Century Skills Partnership). Our research has affirmed that the role of ICT future learning should also be seen in the light of its contribution to emancipation, empowerment and self-fulfillment. Learning objectives such as social competence, critical thinking, and knowledge sharing and cooperation techniques will become more and more important as we move further into the knowledge society. As a result, it is clear that thinking about the future of learning cannot avoid asking the fundamental questions about the objectives of learning, (Punie& Cabrera 2006).

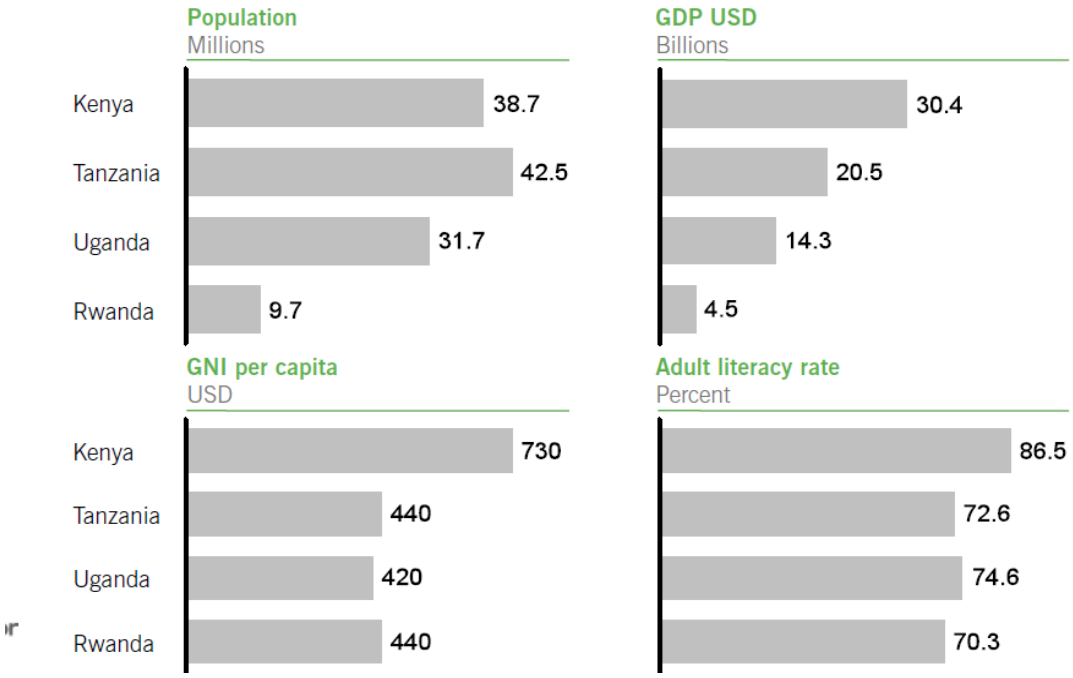
2.1.2 ICT Sector Drives Economic Growth in East Africa

According to McKinsey & Company,(2010) estimates, the overall telecommunications sector in Africa has experienced explosive growth since 2003, with industry revenues growing at a 40% CAGR from 2003-2008. The industry has also seen the overall telecom subscriber base reach over 400 million in 2009 and likely exceed half a billion by 20111.Together, Kenya, Rwanda, Tanzania, and Uganda have a population of more than 120 million people and (Gross Domestic Product) GDP nearing USD 70 billion. However, the combined GDP of these East African countries is much smaller than that of African giants like South Africa (USD 275 billion) and Nigeria (USD 200 billion), McKinsey & Company. The industrial development the entire East Region remains heavily dependent on agriculture, but other key industries such as services, manufacturing and ICT have seen recent increases in economic importance, McKinsey & Company,(2010).

Kenya, which accounts for 32% of the region's population, is the major economic powerhouse in East Africa accounting for more than 43% of the region's GDP and also possesses a

higher(Gross National Income) GNI per capita and adult literacy rate than its neighbors ,World Bank (2010). After a decline in 2008, the modest recovery of Kenya's GDP growth in 2009 can largely be attributed to strong growth in services and construction at 62% and 13% contribution to GDP overall. The Information and communications technology (ICT) sector has been the major driver of economic growth in East Africa over the last decade, growing on average by as much as 40%.To date, growth has largely come from innovation by large multinational and local enterprises, European Commission (2001:3).

Figure 1: Selected World Bank Statistics for East Africa



Source : World Bank Statistics 2010

Kenya is one of the few countries in the world where GDP grew more in 2009 than 2008. The Kenyan ICT Board is committed to further economic growth and specifically in driving the ICT contribution to GDP from 3% to more than 10% over the next three (3) years6. The Tanzanian economy is dominated by the agricultural sector at 27% of GDP. Nearly 80% of the workforce is continues to be employed by this sector. Relative to Kenya the services sector in Tanzania contributes a smaller portion of GDP at 50%, (World Bank, 2010). However, like Kenya, the Tanzanian government has been looking for ways to diversify away from agriculture and into services. Uganda's economy is balanced between agriculture (23%), services (50%) and industry (23%). Rwanda on the other hand remains a primarily subsistence based economy with agriculture still accounting for over 40% of GDP. Rwanda's services sector contributes 42% of GDP, the lowest percentage in East Africa, among the four countries we examined in this project, (World Bank , 2010).

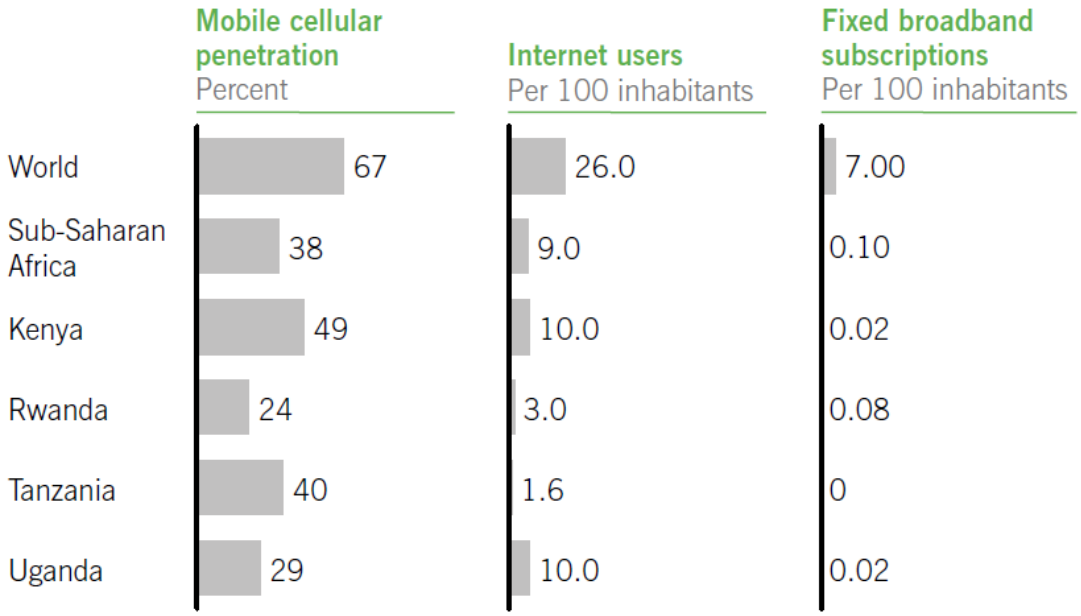
Over the past decade the Information and Communications Technology (ICT) sector has been among the major drivers of economic growth for Sub-Saharan Africa. This sector has witnessed an annual compounded growth rate of 40% within the last five years, the fastest globally, UNDP (2001). In Kenya, for example, the ICT and mobile sectors have outperformed all other segments of the economy, growing on average by over 20% annually over the last 10 years. It is no surprise then that the ICT sector in Africa continues to garner close attention as a potential driver of fundamental change within the continent. Within the sector, mobile telephony dominates, far outstripping any other mode of connectivity excluding, perhaps, radio, and newspapers. On the other hand, Africa has the lowest computer and Internet usage rates of any region, with only 10% of the continent's population having access to the Internet – suggesting a reservoir of untapped market potential, Michael .S. et al.,(2014).

2.1.3 Mobile Banking in East Africa

East Africa is a region that has globally recognized success in building technology-based local enterprises and developing world class innovation. Safaricom, a Kenyan company, has seen the market penetration of its M-Pesa money transfer product grow to over 15 million users within 3 years of launch, (Michael .S. et al., 2014). Mobile service penetration in East Africa is as much as 5 times higher than Internet penetration, such that many applications that are available over the Internet in other parts of the world are available via mobile networks. The launch of three underwater cables in the region is only expected to enhance the availability of bandwidth and decrease prices, though progress has been somewhat slower than expected. Aside from mobile telephony, other emerging areas of interest and investment include technology infrastructure and broadband, software development, local content development.

According to Michael .S. et al.,(2014),the high mobile cellular penetration relative to fixed line subscriptions combine to make East Africa the region with the highest ratio of mobile cellular to Internet users in the world(Figure 1). While the mobile market is far from saturated, East Africa overall has 40% of the population subscribed to mobile telephones, while the rest of the world is at 67%. The annual growth rate has been high in all of the East African countries studied. From 2003-2008, growth was between 50-70% for each country in the region, with Tanzania in the lead at 68% annual growth.

Figure 2: Mobile, Internet, and fixed broadband subscription penetration



2.2 ICT TO Globalize the Economy in African Counties

In an increasingly globalized economy, information technology is one of the key determinants of competitiveness and growth of firms and countries. Firms are becoming more competitive on the basis of their knowledge, rather than on the basis of natural endowments or low labor costs. It is becoming increasingly apparent that the role of traditional sources of comparative advantage (a large labor force and abundant natural resources) in determining international competitiveness is diminishing. The competitive and comparative advantages of countries are gradually being determined by access to information technology and knowledge ECA (1995)..

The comparative advantage that now counts is man-made, engineered by knowledge through the application of information .The views on the possible impact of the information revolution on African countries can be grouped in two opposing schools of thought. The first school predicts that as African countries incur an increasing 'technological deficit' the welfare gap between them and the industrialized world would increase, ECA (1995). This school stresses that Africa risks further reduction in its ability to generate the resources necessary to accelerate its growth rate and reverse the trend of increasing poverty. On the other hand, the second school believes that information technology may actually help reduce the income gaps between rich and poor countries. In the words of Negroponte (1998): "the Third World five years from now may not be where you think it is. There have been many theories of leapfrog development, none of which has yet survived the test of time. That's about to change",ECA (1995).

According to African Development Bank (1997).Information technology offers effective methods to perform these trade promotion functions and address Africa's lack of international competitiveness. For instance, using the Internet, it is possible to access on-line information on

markets, market regulations, prices, potential buyers and many import-export data. The use of computer technology for data processing would speed up delivery time by improving the internal and external networks, export-servicing facilities, customs operations, and reduce transaction costs. Mauritania, for instance, instituted computer-backed trade-management system with an initial investment of US$1 million ,African Development Bank (1997).

The system reduced transaction costs associated with external trade as customs processing time was reduced from 48 hours to 30 minutes, and the time it takes to declare goods to between one and two days from 5 to 20 days (Talero and Gaudette 1996). The application of information technology will also make it possible for export producers to 'disinter mediate' middlemen and conduct their transactions directly with exporters or export markets, increasing, thereby, their profitability and incentives to produceAfrican Development Bank (1997).

Equipping regional trading communities with efficient information technology systems that provide them with accurate and relevant information and exchange mechanism can be a major means of enhancing the growth of inter-African trade. There are already some efforts that have been made towards the attainment of these objectives, African Development Bank (1997).

2.2.1 Africa Utilizing ICT to Develop

With the African Information Society Initiative (AISI).In May 1995, the twenty-first meeting of Economic Commission for Africa (ECA)conference of Ministers, which consists of the fifty-three African Ministers of Social and Economic Development and Planning, adopted Resolution 795 entitled “Building Africa’s Information Highway”3. In response to this resolution, ECA appointed a High level Working Group on Information and Communication Technologies (ICT) in Africa to draft an action framework to utilize the ICT to accelerate the social-economic development of Africa and its people. The outcome of the Group’s work is the document entitled “Africa’s Information Society Initiative” (AISI) which was adopted by all of Africa’s Planning Ministers at the subsequent meeting in May 1996.
The AISI action framework calls for the formation and development of a NICI plan in every African country, driven by national development priorities. The initiative proposes cooperation among African countries to share experiences of successes. The countries that have so far begun the process of developing in-depth national information and communications infrastructure plans are Benin, Burkina Faso, Cameroon, Comoros, Ethiopia, Lesotho, Namibia , Mozambique, Rwanda, South Africa, and Uganda, (AISI,1996).

However, over 40 African Ministers are fully convinced that building AISI will help Africa to accelerate its development plans, stimulate growth and provide new opportunities in education, trade, health care, job creation and food security, helping African countries to leapfrog stages of development and raise their standard of living.
Therefore, these countries have provided high-level endorsement for ICT development policies. In the last few years, a large number of ICT development initiatives directed at African countries have emerged. Many of these are based on the AISI, which is increasingly being regarded as the guiding framework on which to base ICT activities in Africa, (AISI,2000)

In order to develop and upgrade present communication facilities on the African continent, the following programmes are suggested for all the member countries: Developing and upgrading national telecommunication infrastructure. • Continental interconnectivity through the development of national data communication hubs, provision of data communication gateways to link Africa to the rest of the world and establishing the necessary interconnectivity between the telephone and data network in Africa.

2.2.2 ICT and African Ministers of Trade

The African Ministers of Trade, in their Twelfth Session in Tunis, 1993, passed a resolution which requested the UN Economic Commission for Africa Secretariat in collaboration with the Secretariats of the Organization of African Unity (OAU) and African Development Bank (ADB) to study the prospects of establishing a data bank for dissemination of information on trade with the aim of promoting intra-African trade. Since then, a number of sub-regional economic cooperation groupings began to operate their own trade information networks. For instance, the secretariats of economic cooperation groupings-such as the Economic Community of West-African State (ECOWAS), the Economic Community of Central African States (ECCAS) and other regional groupings have already started to set up trade information systems and networks with the assistance of the International Trade Center. These have made some contributions towards building sub regional trade information infrastructures. To date, however, the type of regional trade information which links the countries of the continent with the rest of the world has not yet materialized, African Development Bank (1997).

However, a strong interest in its adoption to provide information services has emerged in recent years in the continent for two main reasons. First, the revolution in Information systems has resulted in computer hardware becoming cheaper and more widely available. Secondly, the substantial utility (value added) of IT in the provision of, and access to information services for improved planning and management, has become more widely recognized, African Development Bank (1997).

Technology diffusion in the recipient country is a multi-stage process which commences with acquisition of the technology and finally, the installation, utilization and assimilation of the technology. Information and Communications Technologies (ICTs) are also transforming our lives. Social media, the internet, ‘cloud’ computing, sensors and mobile phones are creating a ‘smart’ or digital infrastructure that is more powerful every year, allowing us to do everything from communicating with one another to solve problems collectively, to making our electricity grids more efficient, to providing new options for services such as using video conference instead of driving to the office,African Development Bank (1997).

The assimilation process is the most crucial, because it involves adaptation to the local environment, African Development Bank (1997). In the past several decades, the failure experienced by many developing countries, including Kenya, which has imported foreign technology worth billions of dollars, has been traceable to failure in the assimilation process. Hence, our framework is premised on the prevailing environment in Kenyan organizations and

how the technology of electronic networking can be successfully adapted for the effective and efficient management of these organizations,(Nolan,2006).

2.2.3 African Information Society Initiative (AISI)

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The Development of NICI policies and plans is being sponsored by African Governments, ECA, the Carnegie Corporation of New York, and the International Development Research Centre (IDRC) of Canada, through its Acacia-communities and information society in Africa programme. Other partners like United States Agency for International Development (USAID),United Nations Development Programme (UNDP), United Nations Education, Scientific andCultural

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Organization (UNESCO), and World Bank are also supplementing ECA's effort in developing NICI activities in member states .

The 23 countries that are involved in NICI activities are: Benin, Burkina Faso, Burundi, Cap Verde, Cote d'Ivoire, Gabon, Ghana, Guinea, Ethiopia, Mali, Malawi, Mauritania, Morocco, Namibia, Nigeria, Rwanda, Senegal, Sudan, South Africa, Tanzania, Tunisia and Uganda,(NICI ,2000).

2.2.4 NICI Development Activities in Africa has Initiated ICT to Drive the Economy

The following are examples of what has been achieved at country level in the NICI development process in Africa: Ghana's Vision 2020 recognizes the strategic role that ICTs will play in the realization of its objectives. It specifically recognizes that in this modern era, it is ICTs that drive productivity, make possible private initiative and creativity, and bestow competitive advantage to the production of goods and services in an open and liberal economy. Ghana has recently launched an ICT strategic policy for the country, (NICI ,2000).:-

Morocco is setting up the Morocco Wide Area Network (MARWAN) to link via a fibre optic network, all research institutions and universities in the Kingdom and to develop a nationwide virtual library and research laboratory.

Rwanda has put in place an ICT-led Development Vision that aims at modernizing the Rwandan economy and society using ICTs as an engine for accelerated development and economic growth, national prosperity, and global competitiveness.

Senegal is implementing a study entitled "Senegal 2015", which examines a number of issues to which ICTs could provide responses — such as adaptation of the education system, expansion of social communication, strengthening of self reliance, management of the effects of increased urbanization, and revitalization of rural areas.

Tunisia has developed a national strategy with emphasis on information and communication infrastructure by setting up a nationwide Internet backbone with cyber cafes co-funded by the Government and the private sector.

2.3 Nigeria Needs Proper Telephone Infrastructure to Developed the Information Technology

Research shows that poor telephone infrastructure in Nigeria has been a stumbling block to the development of information technology, especially Internet penetration in Nigeria. Internet penetration for Africa is less than 1%, despite a 12% world population; the situation in Nigeria is even worse .However, the emerging technologies such as broadband satellite, VSAT and wireless provide wonderful opportunities for Nigeria to leap-frog into the information society age. These technologies have been exploited in order to accelerate IT development in Nigeria .This plan is still modest realizing that the population of Nigeria is about 120 million people.

The overall target is a teledensity of 10 per 100 people. With the envisaged effective participation of private investors, the achievement is expected to be more than the highlighted plans earlier. The investment requirements are tremendous. In order to achieve this modest teledensity, considerable investment will be required in such areas as local area network, increased digitalization of exchanges and larger bandwidth transmission systems .Information technology has applications in almost all spheres of human endeavour.

Developing a sustainable economy through IT, implies applying information and Communication technology in all the main sectors of the economy. This sectoral application of IT has been recognized in formulation of the IT policy, which involves the development of the following areas of the economy ,Human Resource Development, Infrastructure ,Governance Research and Development ,Health ,Agriculture, Urban and Rural Development, Trade and Commerce, Arts, Culture and Tourism and National Security and Law Enforcement.

2.3.1 Nigeria's ICT Policies to Boost the Economy

Nigeria started implementing its ICT policy in April 2001 after the Federal Executive Council Approved it by establishing the National Information Technology Development Agency (NITDA),the implementing body. The policy empowers NITDA to enter into strategic alliances and joint ventures and to collaborate with the private sector to realize the specifics of the country's vision of, "making Nigeria an IT capable country in Africa and a key player in the Information society by the year 2005 through using IT as an engine for sustainable development and global competitiveness." This vision is yet to be fulfilled. Outlined below are some of the objectives of Nigeria's ICT policy: To ensure that ICT resources are readily available to promote efficient national development-to guarantee that the country benefits maximally, and contributes meaningfully, by providing the global solutions to the challenges of the Information Age-to empower Nigerians to participate in software and ICT development -to encourage local production and manufacture of ICT components in a competitive manner,(NITDA, 2001).

- To establish and develop ICT infrastructure and maximize its use nationwide
- To empower the youth with ICT skills and prepare them for global competitiveness
- To integrate ICT into the mainstream of education and training
- To create ICT awareness and ensure universal access in promoting ICT diffusion in all
- To create an enabling environment and facilitate private sector (national and multinational).
- To encourage government and private sector joint venture collaboration
- To develop human capital with emphasis on creating and supporting a knowledge-based Society.To build a mass pool of ICT literate manpower using the NYSC, NDE, and other platformsas a train-the-trainer scheme for capacity-building

2.3.2 Microsoft and the Nigerian Government

In 2003 Microsoft and the Nigerian government signed a three-year agreement intended to enable Nigeria to deploy ICTs in order to accelerate economic growth. This partnership is to

help Nigeria build its software development industry as well as streamline the government's use of Microsoft software tools. It is also intended to stimulate the private sector and increase Nigeria's global competitiveness, Nigerian National Policy (. To this end Microsoft will provide support to the Computers for All Nigerians initiative and will produce their software in three local languages, Hausa, Igbo, and Yoruba, by the end of 2007, (NITDA, 2001).

2.4 South Africa's Dynamic ICT Sector Influences Rapid Changing Technological and Economic Developments

This research approaches south Africa dynamic ICT sector as a Sector Performance Review on economical trend,that begins with an analysis of global policy and regulatory trends. The dynamic ICT sector is powerfully influenced by rapidly changing technological and economic developments,(WEF). From a technology perspective, the move towards IP (Internet Protocol)-based platforms is revolutionizing the cost of provision as well as the scale and scope of services that it is possible to offer consumers. The convergence of technologies has fundamentally revised the ICT value chain, enabling personalized, bundled multi-play services. According to World Trade Organization (WTO,2010)An analysis of global policy and regulatory trends provides a backdrop for domestic developments in the telecommunications sector.

The South African government continues to emphasize the importance of ICTs and their contribution to the country's economic growth, specifically in the broad framework for economic policy as set out in the Accelerated and Shared Growth Initiative of South Africa (ASGISA). In the current version, the action plan includes the goal to bring down the cost of ICT by developing high-speed national and international broadband capacity. However, South Africa continues, despite the overall growth of the ICT sector, to lag behind in international comparisons, and while the incremental movements down international scales are not dramatic, they certainly indicate an inability by the country to harness the potential of ICTs for economic growth and development as articulated in various national policies and strategies. The World Economic Forum (WEF) presently ranks South Africa at 45th for overall economic competitiveness, having fallen from 40th position (see Table 3 below).

TABLE 3: WEF Global Competitiveness Report 2006a

Country	Rank	Score	Rank 2005
Lithuania	40	4.53	34
Hungary	41	4.52	35
Italy	42	4.46	38
India	43	4.44	45
Kuwait	44	4.41	49
South Africa	45	4.36	40
Cyprus	46	4.36	41
Greece	47	4.33	47
Poland	48	4.30	43
Bahrain	49	4.28	50
Indonesia	50	4.26	69

Source: World Economic Forum, 2006a

The convergence of information technology (IT) and communications technology (CT) is driven by several factors, including the proliferation of web-enabled mobile devices that allow access to cloud computing services. A discussion of the trends in ICT convergence, which are taking place at three levels of technology innovation cloud, pipe, and device—and the adaptations that industry is making to deliver enriched user experiences across industries and the private sector is presented in Chapter 1.2., by Ivan Huang, Roc Guo, Harry Xie, and Zhengxian Wu of Huawei Technologies.

2.5 USA ad ICT Infrastructure in Driving the Economy

The Information Technology Laboratory (ITL) at the National Institute of Standards and Technology (NIST) promotes the U.S. economy and public welfare by providing technical leadership for the nation's measurement and standards infrastructure. ITL develops tests, test methods, reference data, proof of concept implementations, and technical analyses to advance the development and productive use of information technology. ITL's responsibilities include the development of management, administrative, technical, and physical standards and guidelines for the cost-effective security and privacy of other than national security-related information in federal information systems. The Special Publication 800-series reports on ITL's research, guidelines, and outreach efforts in information system security, and its collaborative activities with industry, government, and academic organizations, (WTO,2010).

Organizations in the public and private sectors depend on technology-intensive information systems to successfully carry out their missions and business functions. Information systems can include diverse entities ranging from high-end supercomputers, workstations, personal computers, cellular telephones, and personal digital assistants to very specialized systems (e.g., weapons systems, telecommunications systems, industrial/process control systems, and environmental control systems), (Laudon and Laudon,2006.pg 45)

information systems are subject to serious threats that can have adverse effects on organizational operations (i.e., missions, functions, image, or reputation), organizational assets, individuals, other organizations, and the nation by exploiting both known and unknown vulnerabilities to compromise the confidentiality, integrity, or availability of the information being processed, stored, or transmitted by those systems.(Laudon and Laudon,2006,pg 60).

Since the 1990s, the rise of the Internet and proliferation of information technology (IT) have combined to create a global networked infrastructure. This infrastructure has, in turn, accelerated the development of a new global "knowledge economy," where business models are more often driven by expertise and intellectual capabilities and based on networking, connecting and collaborating. In the global knowledge economy, national economies are, in many ways, inseparable from the larger global economy, and the United States is more dependent on the rest of the world than ever before.

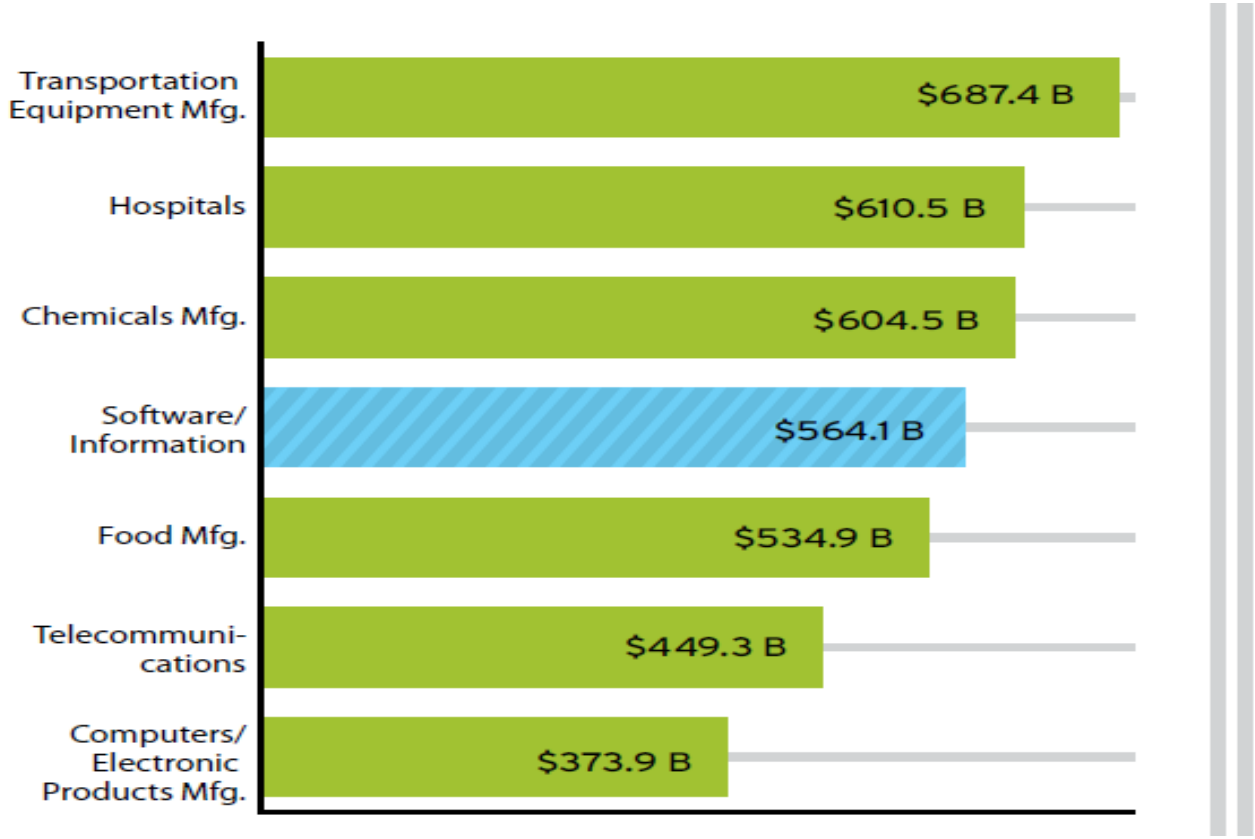
The software and information industries are key drivers of the new global knowledge economy. As such, they are among the fastest-growing and most important industries of the U.S. and world economies, Laudon and Laudon,2006. These industries publish and distribute information: 1 provide software applications ; 2 Related Webbased services and create the needed infrastructure and tools to further today's software and information-based economy ; 3 Well-known firms such as Adobe, Bloomberg, Google, Oracle, Salesforce.com, Sun Microsystems, the McGraw-Hill Companies and Thomson, along with thousands of lesser-known companies, create transformative products and services at the leading edge of innovation. Increasingly, software and information products are converging. Just a decade ago, the software industry distributed its products encoded on disks, while the information industry published content predominantly in printed.

2.5.1 Software and Information Industries Create High-Wage for U.S. Jobs

According to, (laudon and laudon,2006:pg 47),Millions of Jobs for Americans, with Growth Outpacing Many Leading Sectors. The U.S. software and information industries employed more than 2.7 million Americans in 2006. Net employment by these industries grew by 17 percent between 1997 and 2006, adding more than 400,000 jobs. The software and information sectors are among the nation's fastest-growing industries when measured by job growth in comparison to other industries.

The Bureau of Labor Statistics predicts there will be more than two million job openings in software and information occupations between 2006 and 2016.5 For example, the demand for computer software engineers, just one of the key occupations in these industries, will increase by 450,000, with the total number of jobs in this occupation reaching nearly 1.2 million by 2016.

(Figure4): Software and Information Industries Create High-Wage U.S. Jobs.

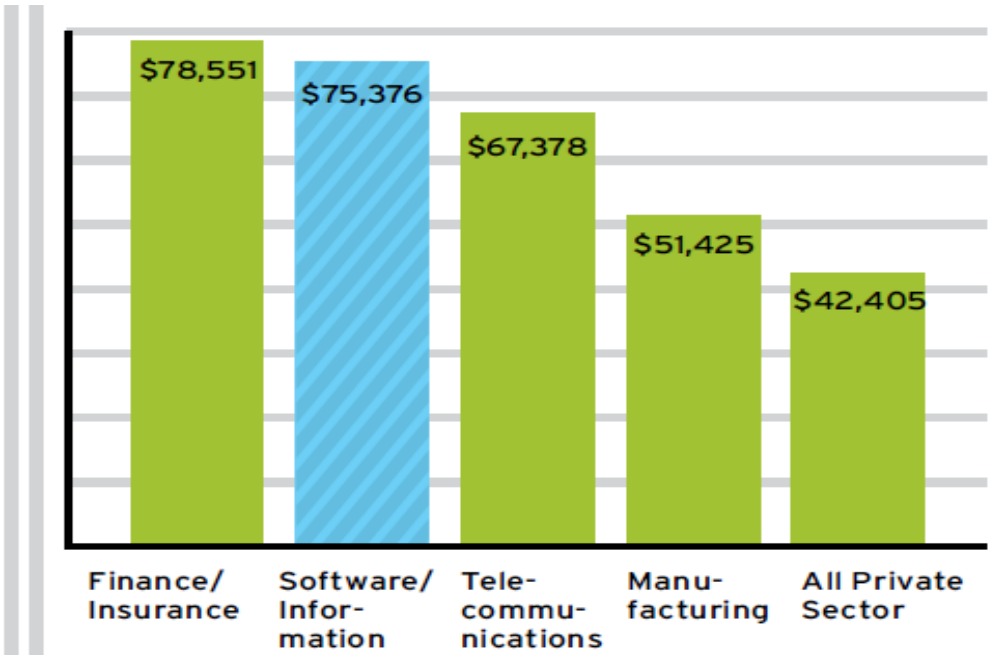


Source: U.S. Census Bureau

Software and Information Industries Create High-Wage U.S. Jobs.

Employees working in the nation's software and information industries are well compensated. They earn among the highest wages in the country, (laudon and laudon,2006). The annual average wage paid in the software and information industries was $75,400 in 2006, 78 percent higher than the 2006 annual average wage for all private-sector workers, which was $42,400. Wages in the software and information industries were higher than wages in other major industries such as telecommunications ($67,400) and manufacturing ($51,400). Nationwide, the statistics also reveal that since 1997, the annual average wage in the software and information industries surged by 18 percent. By comparison, average private sector wages increased by 10 percent, adjusted for inflation, (laudon and laudon,2006)

(Figure 5): Software and Information Sectors by Annual Average Wage, 2006



Source: U.S. Bureau of Labor Statistics

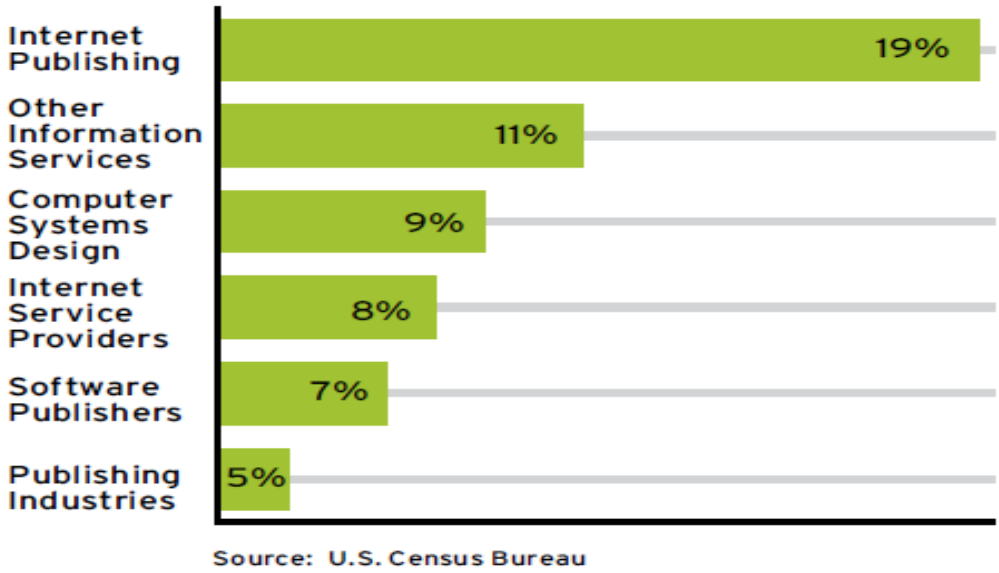
ICT Produce significant job growth in key software and information occupations. For example, jobs for computer software engineers alone will increase by almost 450,000, with the total number of jobs in this occupation expected to reach nearly 1.2 million by 2016. U.S. Economic Growth Experience recent growth nearly three times that of the overall U.S. economy. In 2005, industry growth was up by nearly 11 percent compared with 3.2 percent for the economy as a whole .Generate substantial revenue that ranks among the leading U.S. industries. Software and information generated $564 billion in revenue in 2005, an increase of 7 percent from 2004,(Laudon and Laudon,2006).

Laudon and Laudon,2006 Management Information Systems ,prentice hall © 2006 | azimuth interactive inc. © 2006.Ninth Edition

2.5.2 Growth in The Software and Information Industries Vs. Growth In U.S. Gross Domestic Product, 2005

U.S. economy is ranked among the leading industries by revenue, behind transportation equipment ,hospitals and chemical manufacturing, but ahead of other large sectors such as food manufacturing ,telecommunications, and computers and electronic products manufacturing, laudon and laudon,(2006,pg 45-48) .The software and information industries are producing new technologies and services as firms continue to evolve offerings to meet new demands and trends in a broad array of sectors of the U.S. economy laudon and laudon,(2006,pg 48-50).

Figure 6: Software and information sectors' Revenue Growth,2004-2005



2.6.1 Uk Businesses Across the Economy Making Smart Use of Information Technology and Data

According to laudon and laudon,(2006,pg 48-50),Information economy businesses and the digital technologies provide and have the potential to impact and transform companies and organizations across the whole economy. The benefits from digital technologies come from their adoption by all companies and organizations, particularly those where adoption of technology and best practice has been weakest to date.

In UK, Some business sectors have already been transformed by information economy tools, from news and media gathering, to retailers using real time analysis of customers' shopping habits to transform the services they offer; through to transport and logistics companies monitoring shipments.

Research shows that in UK, other sectors are beginning to embrace the opportunities, for example, the construction sector improving quality and efficiency through building information modeling software. Opportunities for the information economy sector to impact still more deeply include healthcare, FinTech, the creative industries, smart energy and cyber security. All organizations, especially SMEs, can be confident and successful consumers of digital technologies – able to trade online, seize new technological opportunities, and increase their revenues in both domestic and international markets.

Uk like any other country in Europe is also Using data intelligently to provide insight and value has the potential to transform businesses and organizations, and hence to support our strong research base in kentyan economy we can emulate the Uk approach , by driving innovation and economic growth ,(Tim and Lee ,2013). It has gone as far as developments in data analytics and access to scalable high performance computing allow for real time analysis of data. Examples of

this transformative effect include the processing of share price data in support of real-time dealing on the stock market, virtual prototyping which has transformed manufacturing and design, or the insights into customer shopping habits gained by retailers,(Tim and Lee ,2013).
The information economy supports data-driven science, where the UK has some ambitious projects in disciplines as varied as bioinformatics, autonomous systems, and radio astronomy. High performance computing and data analytics can support research and development through virtual prototyping, revolutionizing the way new products are developed and tested. As computers move from being merely programmable to the ability to "learn", and as more data becomes accessible through cloud computing and open data initiatives, new opportunities arise for the combination and analysis of data from disparate sources in ways that are currently impossible,(Tim and Lee ,2013).

2.6.2 UK Will Drives Economy by Means of Square Kilometer Array (SKA)

Research show that the UK research base is world-leading in its efficiency and is ranked strongly in terms of international collaboration,(Tim and Lee ,2013.pg 30). The information economy supports data-driven science, where the UK has some ambitious projects in disciplines as varied as bioinformatics, autonomous systems, and radio astronomy .This is a global project led by the SKA Organization based at Jodrell Bank Observatory in the UK.The Square Kilometer Array (SKA) will be the world's largest and most sensitive radio telescope, consisting of thousands of linked radio wave receptors located in Australia and Southern Africa. The telescope will be used to address fundamental unanswered questions about our Universe, (Tim and Lee ,2013.pg 30),.

According to Tim and Lee (2013.pg 30) ,SKA will be processing the vast quantities of data , such will require high performance supercomputers and analytical techniques far greater than those which exist today. The information economy in the UK can play a key role in developing the software and computing which will enable the SKA to be successful.

2.7.1 China Driving its Economy by Means of ICT Infrastructure

According to KPMG, (2012).It development has hastened the emergence of six new forces shaping the market: (1) synergistic production between enterprises, customers and supplies has blurred the boundaries of the traditional division of labour within enterprises' value chain. (2) new types of enterprises are using it to build communication channels between manufacturers and customers. (3) changes in the capabilities, scope, and cost of information technology will enable the emergence of new forms of b2b. (4) information technology allows content to spread more widely among consumers with coinciding interests who gather on open global forums to share information on products and services, for the purposes of knowledge-sharing and economic self-interest (rather than for commercial profits). (5) information technology allows customers to participate in markets where customers face each other directly, enabling them to collaboratively produce products and services. (6) people can collaborate electronically, allowing them to make consumer decisions cooperatively. Enterprises should understand how these new forces shaping the market will affect their business model, so that they can turn these forces to their advantage, rather than being at their mercy.

Secondly, enterprises are creating new products and services. This not only creates enormous new demand, but also reduces the use of resources, and generates tremendous value. Examples include apple's ipod, iphone, and ipad, amazon's kindle, cisco's telepresence, biopharmaceuticals, general electronics's portable electrocardiogram and ultrasonoscope (which were developed in india and china), and taobao.com'salipay, among others, (KPMG, 2012).. Innovations in products, services, and processes can greatly increase labour productivity. As china moves out of low-cost manufacturing, and its pool of working-age labourers shrinks, rising productivity will be necessary to keep the economy growing apace. Innovation in products and services is essential in this respect. Innovating in products and services requires the capacity to create, rather than following or imitating. Enterprises must therefore place emphasis on collaboration and innovation, (KPMG, 2012)..

2.7.2 Chine's Economy and ICT

While China is undergoing rapid urbanization domestically, the Chinese economy is also rapidly becoming integrated into the global economic system and development of information Technology,(KPMG, 2012).With the widespread use of information technology, many business activities that were once performed face-to-face are now done via the internet, the "Internet of Things", servers, and mobile devices. Each time when there is performance on the internet search, in the blink of an eye, data is exchanged countless times across innumerable servers.

When we order a book, buy a plane ticket, or send a parcel through express delivery, digital information moves through a world of ones and zeros, connecting us across thousands of kilometres at the speed of light, (KPMG, 2012). We no longer need to go to a travel agency to pick up several copies of a paper flight ticket written in red and blue on carbon paper just board a plane. Just as, when we see a person carrying something, we only see his body, his arms, or his legs, but cannot see the brain commanding and coordinating the different parts, we can see a factory, a machine, or a machine operator, but we cannot see the information technology that connects them and allows them to operate efficiently together. Digital technology has created an economic nervous system, driving geometric increases in the efficiency of business activities, (KPMG, 2012).

Chinese enterprises have found themselves being pushed by enormous forces. Wiling or not, they are now face-to-face with the rest of the world. China is the main representative of the newly emerging markets driving the formation of a multi-polar world; likewise, the formation of a multi-polar world has driven the rise of multinational companies in emerging markets. The globalization of Chinese enterprises is a by-product of the new situation. The category is the development of information technology (IT), which is adding greater functionality to an already-useful internet,(KPMG, 2012).

In theWeb 2.0 era, mobile internet has made networks ubiquitous. Expanded network coverage means that individuals can hop online whenever they wish, increasing the time that they spend online. Social networks such as Facebook, YouTube, inter-business collaboration networks, blogs, and micro-blogs allow individuals to communicate and collaborate in unprecedented

new ways. These networks also enable more convenient approaches to production and dissemination. Globalization is particularly significant for developing Chinese enterprises, (KPMG, 2012).

Like enterprises elsewhere, Chinese enterprises are confronting issues of environmental protection and sustainable development. In some senses, sustainable development is of very real, very practical significance for Chinese enterprises, not only because China is one of the world's largest energy consumers and carbon emitters, or because China faces serious pollution and environmental degradation problems, but also because the Chinese economy is still growing rapidly, putting additional pressure on the environment. With network-based cloud-computing services, enterprises are freed from the need to purchase, update, and maintain hardware and software,(KPMG, 2012). These cloud services are charged for on a volume basis, which lowers costs and raises the efficiency of IT services. This alters the way that enterprises go about operations, customer relationships, sales, and marketing, both in form and in content. At the same time, China ranks among the top countries in the world in clean energies, including the manufacturing and use of wind turbines and solar panels,(KPMG, 2012).

2.8 Sweden's Performance Economically with ICT

Sweden's performance is remarkable in every aspect. The country leads four of the 10 pillars of the NRI, namely infrastructure and digital content, individual usage, business usage, and economic impacts; and appears in the top 10 of a further five, while in the last pillar, skills, it ranks a very solid 12th. Second to Sweden, Singapore leads the group of the Asian Tigers, ahead of Taiwan, China (11th), Korea, Rep. (12th), and Hong Kong SAR (13th), which stand at the doorway of the top 10. Compared with Sweden, Singapore's performance is nearly as impressive.

Overall, Europe remains at the forefront of the efforts to leverage ICT to transform its economy and society. Seven European counties are positioned in the top 10 of our rankings, with the Nordic countries, including Sweden at the very top, leading the way. Notwithstanding the overall strength of Europe as a whole, there are important disparities within the region. Four broadly defined groups of countries sharing different ICT development paths and facing different challenges to further leverage ICT can be identified: the Nordic countries, advanced economies of Western Europe, Southern Europe, and Central and Eastern Europe.

The findings of the study uncovered that ICTs play a significant role in the political discourse of all countries. It is obvious that politicians have recognized that well managed telecommunication entities can create benefits for the state as well as for the vast majority of the population. The basic strategy to follow when building an international system is to understand the global environment in which your firm is operating.

This means understanding the overall market forces, or business drivers, that are pushing your industry toward global competition. A business driver is a force in the environment to which businesses must respond and that influences the direction of the business. Likewise, examine

carefully the inhibitors or negative factors that create management challenges—factors that could scuttle the development of a global business. Once you
have examined the global environment, you will need to consider a corporate strategy for competing in that environment.

3. Methodology

The study took a qualitative, multiple case study approach. Secondary Data extracted from Published Journals, Books and magazines .. Data used was multiple case study , collected through secondary sources. Data sources include extensive desk research through library and different published and unpublished materials. We operationalized the study cases using the secondary data from Online-Libraries resources and online survey at a number of the popular exploration and production countries. In our view, this was the most suitable method for dealing with analysis of ICT and management systems in driving world economy

Conclusions

As the global knowledge economy continues to develop, businesses, governments and individuals around the world will adopt new habits and generate new demands for, hardware, software solutions and digital information content and services .As the data and growth projections underscore, companies which have embraced ICT application and information industries are performing consistently well. These ICT and Information Systems have made important contributions to global GDP growth relative to their size and have added tens of thousands of high-wage jobs for workers. while other industries are contracting. The ICT sector have a bright future, because competition in the global knowledge economy requires accurate and timely information and because technological changes lead to new and better products and methods for distributing them.

References

ADGC (1997).The Kenyan Telecommunication Industry. African Development Consulting Group,

ADCGandMacrocon Systems Ltd.

Adeyinka, F. M. (1996). An Exploratory Study of the Structure, Capacity and Capabilities

ofElectronicFirms in Kenya. Kenyan Institute of Social and Economic Research (NISER), Monograph No. 8

A.K. Wafula-Kwake and Dennis. N. Ocholla, 09/2007)The feasibility of ICT diffusion amongst African rural women: a case study of South Africa and Kenya, International Review of Information Ethics Vol.7 (09/2007)

African Development Bank (1997), African Development Report 1997, Oxford University

African Development Bank (1998), African Development Report 1998, Oxford University Press.

Africa's Information and Communication Infrastructure", African Information Society Initiative (AISI),

ECA Addis Ababa, Ethiopia.

African Information Society Initiative (AISI): An Action Framework to Build Africa's Information

and Communication Infrastructure. Economic Commission for Africa. NICI 2000 Workshop CD-ROM

Aiyepeku, W. O. (1992). "Developing Information Technologies in Africa", Presentation to PAN/

NAN Monthly Forum, Nairobi.

Babcock, C. (2010): Management Strategies for the Cloud Revolution: How Cloud Computing Is
Transforming Business and Why You Can't Afford to Be Left Behind, New York et al.: McGraw-
Hill, 2010

Behan, K. and Holmes, D. (1990): Understanding Information Technology. New York: Prentice Hall.

Barnatt, C. (2010): A Brief Guide to Cloud Computing: An Essential Introduction to the Next
Revolutionin Computing, London: Robinson, 2010.

Buyya, R.; Yeo, C.S.; Venugopal, S.; Broberg, J.; and Brandic, I. (2009): Cloud computing and emerging

Brown, R. (1983). "New Technologies in Communication: A General Description", Media Development.

Vol. 30, No. 4.

Deeson, E. (1987). Managing with Information Technology. London: Logan Page.Domatob, J. K. (1991).

"New Communication Technologies and African Culture: Preservation orPulverization?"

CAEJEC Journal.

Dosi, G. et al. (ed.). (1988). Technical Change and Economic Theory.Pinter Publishers, London.Drucker, P. F. (1992). "Where the New Markets are": Wall Street Journal, April 1992, A14.Dunn, P. D. (1987). Appropriate Technology: with a

European Commission, Information Society and Media, "Women and ICT – Status Report 2009, pp. 14-15. March 2010

ECA (1995), "An Action Framework to Build Africa's Information andCommunication

Infrastructure", African Information Society Initiative (AISI), ECA Addis Ababa, Ethiopia.

Economic Research Papers No. 36 Information Technology and the Challenge of Economic Development in Africa Information Technology and the Challenge of Economic Development in Africa

Egger, Determining a Sustainable City Model, 2006 Nolan, Global Business Revolution, Cascade Effect and the Challenges for Catch-up for Large Indigenous Chinese

Enterprises, 2006 Information ,Marketplaces.The New Economics of Cities, http://www.smartgridnews.com/artman/publish/Business_Strategy/Smart-grid-equals-jobs-at-least-for-Silicon-Valley-4128.html

Elsevier. (1996).Yearbook of World Electronics Data,Amsterdam: Elsevier.Ernst, D., L., andGaniatsos,Mythelka (1994).

Factors (Csfs) In Implementation Of Mobile Money Transfer Services In Kenya, European Journal of Engineering and

Frenzel, C. W (1996). Management of Information Technology:Second Edition, CTI, USA.

Freund, B., Konig, H. and Roth, N. (1997). “Impact of Information Technology on Manufacturing”.Technology

Geneva.FOS (1996).The Kenyan Trade Summary.Federal Office of Statistics, Nairobi, Kenya. ISSN0078-0650.

Getao, K. W. and Odhiambo, J W. (1995), "The Potential of Information Technology in the Management of an African Crisis: Computers and Aids", Proceeding of the International Federation for Information Processing International Conference, Cairo, Egypt

IT platforms: Vision, hype, and reality for delivering computing as the 5th utility, Future Generation Computer Systems, 25, January 2009, 599-616, available at http://www.buyya.com/gridbus/papers/Cloud-FGCS2009.pdf.

KPMG , Global China Practice,Advisory (China) Limited, 2012, wholly foreign owned enterprise in China

International Journal of Academic Research in Business and Social Sciences
October 2014, Vol. 4, No. 10
ISSN: 2222-6990

and KPMG Huazhen , a Sino-foreign joint venture in China,

are member firms of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity

Luis.Neves, Joan Krajewski ,Steering , Joan Partner and Jung. Bockemueh,12/2012 Global e-Sustainability Initiativeaisbl and The Boston Consulting Group, IncThe Role of ICT in Driving a Sustainable Future,2020.

Iyer, B. and Henderson, J.C. (2010). Preparing for the Future: Understanding the Seven Capabilities of Cloud Computing, MIS Quarterly Executive, 9 (2), 117-131.

Michael Sanja, Mneria E. Ogoti , July 2014 Tenge, and Bernard Nasiuma , Journal of Emerging Trends in Computing and Information Sciences Investigation of Information Communication Technology in Kenyan Primary Education Sector, Vol. 5, No. 7 July 2014 ISSN 2079-8407,

Michael M S ,2013 Impact of Enterprise Resource Planning System in Health Care,

International Journal of Academic Research in Business and Social Sciences

December 2013, Vol. 3, No. 12 ISSN: 2222-6990.

Michael M and Prof.Kefa Rapah S 2013 ERP SYSTEM solutions for small and medium enterprises in Trans nzoia county – Kenya

Michael .S. M, Steve WasilwaKhaemba and Esau M Mneria , 2, 2014 IA Comparative Study Of

Critical Success

Monitoring eskills supply and demand in Europe, European Commission 2009, www.eskills-monitor.eu/

www.softex.br/softexEn/_about/background.asp

Mell, P. and Grance, T. (2009): The NIST Definition of Cloud Computing, in: NIST Website (National Institute of Standards and Technology), [http://csrc.nist.gov/groups/SNS/cloud-computing/clouddef-v15.doc], 10/07/2009.[Accessed: 05/12/2010].

McKinsey & Company, March 9, 2010. "How to Think About China Differently,"
by "Research Report on Chinese Migrant Workers," State Council, 2006.

Moreno, J.M, Sosale, S. &Sarna, N. (2006) A Review of ICT Components in World Bank Education Projects (2001-2004)Trucano, M. (2005) ICT Components in World Bank Education Projects;
Human Face.London: Macmillan Press Ltd.

NIST-USA March 2011, National Institute of Standards and Technology(NIST)Gaither sburg, MD 20899-8930 Special Publication 800-39,March 2011Managing Information Security Risk Organization, Mission, and Information System View

Nolan, Global Business Revolution, Cascade Effect and the Challenges

For Catch-up for Large Indigenous Chinese

Enterprises, 2006

Nigerian National Policy for Information Technology (IT), National Information Technology DevelopmentAgency. http://www.nitda.gov.ng/document/nigeriaitpolicy

Nolan, Global Business Revolution, Cascade Effect and the Challenges for Catch-up

for Large Indigenous Chinese Enterprises, 2006

http://www.brookings.edu/~/media/Files/rc/papers/2010/03_china_

middle_class_kharas/03_china_middle_class_kharas.pdf

OECD (2010): OECD Information Technology Outlook 2010, in: OECD Publishing,

[http://dx.doi.org/10.1787/it_outlook-2010-en], 2010.[Accessed: 29/11/2010].

Ovum (2010): Planning for Cloud Computing: Understanding the organizational, governance , and cost implications, in: Ovum IT Management and Strategy Report, November 2010.

OECD Information Technology Outlook 2010, p.40 and pp. 66-67.Technology, Vol. 2 No. 2,

2014 ISSN 2056-5860

Ogalo, James Ochieng (Dr),may,2012,The impact of information system security policies and controls on
firm operation enhancement for Kenyan SMEsPrime Journal of Business Administration and Management (BAM) ISSN: 2251-1261. Vol. 2(6), pp. 573-581, June 29th, 2012 www. primejournal. org/BAM

Technological Capabilities.A Conceptual Framework.Chapter 1 of Final Draft. UNCTAD,

Management, Mansell et al., eds. vol. 13(3), pp

Special Publication 800-39 Managing Information Security Risk Organization, Mission, and Information System View

The International Telecommunication Union, ITU (1996), African Telecommunication Indicators,ECA (1995), "An Action Framework to Build

T.W. Oshikoya and M. NureldinHussain ,Information Technology And The Challenge Of Economic Development In Africa

Tim.B and Lee.T , Information Economy Strategy through http://www.intellectuk.org/information-economy at the London . June 2013

RABURU,George ,Kelvin K. OMIENO, Laban OENGA , M a y, 2 0 , 2 0 1 3 Usability Maturity Model for VLS: Conceptual Framework, Journal: INTERNATIONAL JOURNAL OF COMPUTERS & TECHNOLOGY ,Vol 6, No 2 editor@cirworld.com www.cirworld.com, member.cirworld.com

UNDP.(2001). Information communications technology for development. Essentials: Syntheses of Lessons Learned No. 5. [Online]. Retrieved 28 September, 2006 from: http://www.undp.org/eo/documents/essentials_5.PDF

UN Population Division.(2014). UN Population Division database. New York: UN Population Division. http://www.un.org/en/development/desa/population/

UNESCO (2011b).UNESCO ICT Competency Framework for Teachers. Paris: UNESCO.

UNESCO Bangkok.(2011). ICT in Education in Asia-Pacific. Asia-Pacific Regional Forum on ICT Applications 19 May 2011.

Vaquero, L.M.; Rodero-Merino, L.; Caceres, J.; and Lindner M. (2009): A Break in the Clouds: Towardsa Cloud Definition, ACM SIGCOMM Computer Communication Review, 39 (1), 50-55, availableat http://ccr.sigcomm.org/online/files/p50-v39n1l-vaqueroA.pdf

Velte, A.T.; Velte, T.J. and Elsenpeter, R. (2010): Cloud Computing: A Practical Approach, New York Etal.: McGraw-Hill, 2010.

World Bank (2010). Information and Communication Technology for Education in India and South

Asia (Volume 1), Extend summary.Washington.D.C.:InfoDev/ Price Water House Coopers.

World Bank (2004) World Development Report: Making Services Work for Poor

Peoplehttp://www.worldbank.org/wdr

World Bank (2002).Telecommunications and Information services for the poor. Towards a strategy for

Universal Access. [online]. Retrieved 18 March, 2006 from: http://rru.worldbank.org/Documents/PapersLinks/1210.pdf

World Development Report (1998/99). The power and reach of Knowledge.[Online]. Retrieved 15

January, 2006 from: http://www.worldbank.org/wdr/wdr98/ch01.pdf Accessed 15/01/06