Enhancing Human Resource Productivity Using Information and Communication Technologies: Opportunities and Challenges for Tanzania[1]

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Abstract

Information and communication technologies (ICTs) provide enormous potential for enhancing productivity of human resources in both public and private sectors. However, net returns on ICTs capital have been observed to be higher in many of the developed countries than in developing countries. This is because ICTs have enhanced productivity and competitiveness in various organisational processes including management of human resources in both public and public sectors. Using some examples from both developed and developing countries, the paper demonstrates how ICTs can enhance human resource productivity. However, most of the developing countries including Tanzania are yet to catch up with the above productivity enhancement observed in developed countries. The paper discusses some of the prerequisites needed to attain high human resource productivity from ICTs. For example, it is demonstrated that some of the recruitment and selection as well as promotion procedures do not value the ICT professional skills but academic qualifications for specific jobs requiring ICTs skills. The paper ends with some recommendations on how developing countries can raise the effectiveness of deploying ICTs in managing scarce resources including human resource. Some of the recommended measures have potentials through various ICTs multiplier effects to benefit local economies too if managed effectively.

Introduction

Due to the importance of information as one of the critical input in decision making as well as in learning processes, human societies throughout history have had various technologies of processing data to obtain information. These major technological revolutions have super headed socioeconomic development of human societies. These major technological revolutions are as follows:

- Neolithic Revolution (**from**: Nomadic hunting and gathering communities **to**: settled agricultural civilizations)

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- Industrial Revolution (**from**: feudal agricultural societies **to**: industrial urban societies)
- Knowledge/Information Revolution (**from**: "Fordist" industrial organisation **to**: Post-industrial knowledge-driven economy) i.e. ICTs/digital technologies era.

On the other hand, as clearly noted by (Heeks & Duncombe, 2001), human societies throughout history have deployed various technologies to process information. Some of these technologies are as follows:

- 'Organic' technology, based solely on the human body such as the brain and sound waves.
- 'Literate' technology, based on information held as the written word such as books and newspapers.
- 'Intermediate' technology, still based largely on analogue information held as electro-magnetic waves such as radio, television and telephone.

- Information and communication technologies (ICTs) are based on digital information held as 1s and 0s, and comprise computer hardware, software and networks. They coexist – either complementing or competing – with other information-handling technologies.

As societies develop, therefore, technologies of handling information become more sophisticated because a combination of older and new technologies can be used simultaneously. For example, in a first phase of human development (nomadic hunting and gathering communities) the technology of processing information was 'organic'. On the other hand, some of settled agricultural communities invented writing. Writing was invented in Mesopotamia around 3000 B.C., writing was also independently developed in Central America before 600 B.C. The technology that was being used over several centuries was basically hand writing. Despite the fact that movable type was first invented in China in the 9th century AD but did not take off there (Todaro & Smith, 2006). It was Johannes Gutenberg's invention in 1453, of movable printing, that made it practical to manufacture books on a printing press. As categorised above, printed materials represent a literal technology of information handling. The 'intermediate' technologies are basically the inventions of the 19th century. Various authors have detailed how these 'intermediate' technologies influenced societies, for example, (Standage, 1999)); provides a description on telegraphy, and (Fischer, 1992) the telephone). On the other hand, digital technologies are recent inventions, see (Mindell, 2002). Production of digital technologies (products and services) involves issues of hardware and software. While hardware production can be said to be industrial, it is the production of software which is equally marvelling. This is because software is a unique product in the history of humanity. It is extremely valuable in that it is an essential working component of all ICT systems and it requires more labour to produce it. It is therefore the purpose of this paper to highlight how

these digital technologies are influencing productivity of human resource in different parts of the world.

ICTs as Major Contributor to Labour Productivity

The ICTs industry[2] can be divided into producers of products and services and the consumers of such products and services. Therefore, human resource productivity enhancements from ICTs can be divided between producers and consumers of ICTs. While, for historical reasons the design and production of ICTs products are concentrated in a few regions of the world, the consumption is almost spread all over the world. Similarly, while it is relatively easy to get processed data and information on the productivity enhancement wrought by ICTs in some countries, it is quite difficult to access such information in many of the developing countries such as Tanzania. The following section provides an account of productivity enhancement of specific regions/countries so as to demonstrate empirically the role of ICTs in labour productivity.

European Union

In a study released in September 2006, Enterprise Europe revealed that in EU production of information and communication technologies contributed 28% of aggregate labour productivity growth in the EU15 between 1995 and 2003. The study analysed the productivity of ICT manufacturing and service sectors and includes comparisons between the EU, US, Japan, South Korea and Taiwan. During the period studied, the ICT manufacturing industry in the EU15 obtained an average annual percentage growth in labour productivity of 18%, compared to 24.8% in the US and 42.7% in Taiwan. Similarly, In ICT services, the EU15 fared relatively better with an annual labour productivity growth rate of 5.1%, outpacing the 4.9% in the US, but well behind Taiwan's 15.8%.

Australia

The ICT industry is the driving force behind the Australian economy's productivity growth. According to a government report released in March 2006, the ICT industry contributed to some 85% of productivity growth in the manufacturing sector and up to 78% in the services

[2] We follow (OECD, 2000) definition, ICT industries are defined rather broadly to include the manufacture of office, accounting and computing machinery, insulated wire and cable, electronic components, television and radio transmitters and receivers, telephone and telegraph apparatus, sound and video recorders and reproducers, measuring and testing instruments, and process control equipment. They also include both goods related and intangible services such as the wholesale of ICT goods, renting of office machinery and equipment as well as telecommunications and computer related services.

sector in the last two decades. Another set of research findings corroborating the above accounts inform that in the service industry environment, “between 59 and 78 per cent of productivity growth can be attributed to technological factors and between 22 and 41 per cent to institutional reform” (Hart, 2005).

United States

Labour productivity experienced in the US in the 1990s was to a good extent attributed to the growth in ICTs investment. For example, (Oliner & Sichel, 2000) concluded that slightly over 20 per cent of U.S. output growth over the 1996-99 period could be attributed to the use of ICT and approximately 10 per cent to the production of ICT components (computer hardware and semiconductors). Moreover, 37 per cent of labour-productivity growth is attributed to “capital deepening" from the use of ICT. In the same vein, (Jorgenson & Stiroh, 2000) calculated even a higher contribution of approximately 43 per cent to total labour-productivity growth. However, as observed by (Anonymous, 2002) distribution of productivity was not even among all sectors. For example, a study by the McKinsey Global Institute examining the causes of the productivity boom in the late 1990s found only a murky relationship between IT and productivity growth. While IT did have a major impact on productivity in some sectors of the economy, it had virtually no effect in others (Anonymous, 2002). The enhanced US labour productivity was attributed to innovation (including but not limited to, IT and its applications), competition, and to a lesser extent cyclical demand factors, all contributed to productivity growth. On the other hand several other studies such as that of OECD concluded that growth in the productivity is reliant on how the ICT is applied by organisations.

Similarly, other studies have compared the US and EU15 countries in terms of labour productivity enhancement which reveals a difference of composition of the ICT sector in these global economic giants. For example, a recent study (Armstrong & Ford, 2005) concluded as follows:

> The US ICT sector contributed to aggregate labour productivity growth with twice as much as the EU15 ICT sector: 0.8 percentage units compared to 0.4 percentage units. 0.6 or 75 percent of the total US ICT sector contribution can be derived from the ICT manufacturing industries while the EU15 ICT manufacturing and ICT services industries contributed equally to the overall EU15 ICT sectors’ contribution to aggregate labour productivity growth.

Canada

Canada is another country with discernable information on the impact of ICTs on labour productivity. For example, in a study by the Bank of Canada, revealed that over the 1996-2000 period, ICT contributed 0.53 percentage points of the 4.75 per cent growth in business sector output. In other words, approximately 11 per cent of the growth over the latter half of the 1990s can be attributed to an increase in ICT use. In addition, over the 1996-2000 period, capital deepening (implying a lowering of the marginal cost of the capital) from ICT use contributed a little more than one-quarter to total labour-productivity growth (Khan & Santos, 2002).

ICTs and Labour Productivity in Developing Countries

For most of developing countries and more especially for the Sub-Saharan Africa, the data are hard to find as has already been alluded. A few available studies provide more inconclusive and mixed evidence. As can be seen from the above cases, data on improvement in labour productivity attributable to increased investments in ICTs are relatively readily available for most of developed economies, albeit with some contradictions in the studies. For example, (Goldstein & O'Connor, 2002) assert that introduction of ATMs has definitely increased labour productivity but not necessarily the total factor productivity. This demonstrates that effects of computer diffusion on growth were concentrated in a number of industries (OECD, 2003a) . However, other studies in developing countries such as that of (Pohjola, 2001) hypothesise that the inconclusive situation in developing countries could be due to the fact that the networks and organisational changes necessary to take advantage of these technologies take time to implement.

One specific study that was conducted in Tanzania, Kenya and Uganda concluded that the empirical findings suggest that investment in ICT has had a negative impact on labour productivity and a positive impact on general market expansion in small and medium enterprises (SMEs) (Chowdry & Wolf, 2003). The negative impact of ICT investment on labour productivity could be interpreted as over-investment in ICT in the SMEs under study. This negative labour productivity could be partly due to the relatively high costs of ICTs in East Africa and the non-divisibility of equipment in case of small enterprises. The negative productivity could also be because of the fact that in the initial phase, substantial learning on how to deal with the new technology is needed and therefore the labour intensity increases first. However, as already alluded, in some specific industries and professions

levels there is broad empirical evidence for positive impacts of ICT on labour productivity (Bertschek, Fryges, & Kaiser, 2004). Therefore, even in developing countries, for specific industries and professions ICTs can enhance labour productivity which can result into economic growth that can translate into improved socio-economic development and the empowerment of poor communities.

How does ICTs enhance Productivity

One of the gurus in management, Peter Drucker, predicted that like it was the industrial revolution two centuries ago, the ICTs would transform processes that were here all along. He further argues that ICTs have the potential to be to the information revolution what the railroad was to the Industrial Revolution - a totally new, totally unprecedented, totally unexpected development that transformed both the mental and economic geography of companies and communities. Continuing with the same line of argument, Drucker proffered that workers that would be the engine of economic growth will be those who can be categorized as "knowledge technologists", for example computer technicians and software designers. He asserted that these workers are as much manual workers as they are knowledge workers; in fact, they usually spend far more time working with their hands than with their brains. But their manual work is based on a substantial amount of theoretical knowledge which can be acquired only through formal education, not through an apprenticeship. He predicted that just as unskilled manual workers in manufacturing were the dominant social and political force in the 20th century, "knowledge technologists" are likely to become the dominant social—and perhaps also political—force over the next decades (Drucker, 2001).

The impact of ICTs on the overall growth of the economy can be observed by looking at the multifactor productivity factor (MPF) measurement. In OECD countries, MPF coefficients have been found higher in economies and more specifically in sectors with higher investments in ICTs (Irene Bertschek, Fryges, & Kaiser, 2004). The productivity growth by ICTs is usually through two main channels: First, greater investment in ICT, which boosts labour productivity growth by raising the stock of capital available to each worker (capital deepening); and secondly, rapid productivity growth occurring in the production of ICT goods (e.g. computers, mobile phones). This is because the spread of computing power has reduced radically the costs for companies of collecting, analysing, retrieving and re-using information. For example, the growth of voice and data communications means companies are increasingly able to share and spread strategic information at great speed, over long

distances but at a fraction of cost. So as computers continue to becoming cheaper and more powerful, the business value of computers is limited less by computational capability and more by the ability of managers to invent new processes, procedures and organisational structures that leverage this capability.

Thus, in terms of increasing effective management, just as electricity enabled development of the continuous production line processes, the decentralised availability of information through ICTs allows the reduction of hierarchical structures within firms and greater empowerment and capabilities for work teams and individual workers. ICTs can also transform a firm's relations with its customers, providing increased scope to tailor products to individual requirements. ICTs also allow more lean and timely inventory management. In other words, investment appears to have a greater beneficial impact if complemented by organisational changes, greater use of delegated decision-making and improvements in related workforce skills. Therefore, these benefits from ICTs to productivity can be categorized as tangible and intangible (Sheng, Nah, & Siau, 2005, pp. 36-37). The tangible benefits include the following:

- Reduced cost
- Improved productivity (i.e., amount of output produced per unit of input)
- Increased market share
- Savings in labor
- Increased consumer surplus (i.e., the accumulated difference between consumer demand and market price)
- Improved customer service quality
- Improved organizational efficiency
- Quicker response to customers
- Deeper knowledge and understanding of customers

On the other hand, the intangible benefits include:

- Improved decision-making ability
- Superior product quality
- Knowledge/information management and sharing
- Improved coordination/relationships with partners
- Other forms of competitive advantages

As described earlier, for most developed countries there was a definite link between productivity growth and ICTs. But impact of ICTs on growth was non-existent and even negative in some developing countries. This is true because technology does drive growth – but only after a minimum threshold is reached. ICTs penetration and usage needs to attain critical mass before it will have a positive impact on country's economy (in order to

attain optimum network effect alluded to earlier). Similarly, there is a considerable time lag before ICT benefits growth and productivity. The lag represents the time it takes organisations to assimilate and adjust to new technology. Also, ICTs enablers are crucial for technology to work. For example, quality of country's business environment, as well as its attention to specific ICT enablers significantly affect its ability to harness full benefit of technology. Specifically, the ICTs enablers include appropriate education, skills training, research and development (R&D), access to venture capital, affordability of Internet access, security of Internet infrastructure, government support for ICT development, and quality of ICT supporting services (Chandra, 2007). Another equally important enabler is the recruitment as well as promotion processes and recognisition of professional skills attainment. Thus, for ICTs to effectively enhance labour productivity, nations ought to not only invest in ICT infrastructure but also in ICT enablers if benefits from ICT are to translate into higher human resource productivity on sustainable basis. The following section briefly describes ICTs situation in Tanzania so as to evaluate whether the required threshold has been attained for ICTs take-off.

ICTs Situation in Tanzania

While acknowledging the difficulty of getting correct data and information on ICT usage in many countries, especially the developing ones such as Tanzania, the paper cautiously employs some secondary data to present the thesis. These secondary data show that Tanzania not only ranks low in income per capita but also in information and communication technology indices (see for example (SADC, 2002) and (Brainbench, 2002)). For example, the (Brainbench, 2002) study that data mined several databases to determine the 30 most popular IT tests (such as the number of citizens with various certified qualifications such as Microsoft Windows Administration [(for example Microsoft Certified Systems Engineer), Linux Administration (for example Linux Professional Institute Certification – LPIC[3]), Unix Administration, Java, Visual Basic, and C)], Tanzania ranked 87 (with only 53 professionals) of 100 countries in the study, below Kenya (80), Uganda (83) and South Africa (21). In addition, Tanzania ranks low in the knowledge economy (KE) index as compiled by the World Bank. A knowledge economy

[3] Of recent (February 1, 2007), the Linux Professional Institute (LPI), has changed its "Recertification Policy" to ensure that the skills and knowledge of Linux professionals continues to be relevant and current. Candidates who have earned LPIC certifications will have to re-certify every five years or alternatively earn a higher certification status. Previously recertification was only required after ten years (LPI, 2007)

is one that creates, acquires, adapts, and uses knowledge effectively for its economic and social development (World Bank Institute, 2004).

One of the critical requirements for sustained growth in the knowledge economy (KE) is the availability of educated, creative and skilled people who can create, share, and use knowledge well. Others are economic incentives, an institutional regime that provides incentives for the efficient use of existing and new knowledge, the flourishing of entrepreneurship, and a dynamic information infrastructure which usually is dependent on the incorporation of digital ICTs and can facilitate the effective communication. Other factors include dissemination and processing of information, and an effective national innovation system of firms, research centres, universities, think tanks, and other organizations that can tap into the growing stock of global knowledge, assimilate and adapt it to local needs, and create new technology (World Bank Institute, 2004). When benchmarked with other countries, Tanzania is placed at the lower end of the global KE map (1.48, where KE index ranges from 0 to highest 10). Tanzania lags behind its neighbouring countries such as Uganda (1.7) and Kenya (2.29). It also lags behind the Africa's region average (2.03). Comparing it with some of its fellow members in the region such as Botswana (4.96) and South Africa (5.35), Tanzania seems even lower (World Bank Institute, 2004).

The above two indicators suggest that the level of utilisation of modern digital information and communication technologies (ICTs) is still low in Tanzania. The challenge for Tanzania is how to build the conditions for electronic business development. Such modern businesses as shown above are critically dependent on more effective creation, dissemination, and use of knowledge and the underlying and necessary digital ICT structures. In response to the above situation, in 1999 Tanzania abolished a value added tax on computers and some of the allied equipment to encourage the acquisition of more ICTs facilities such as computer systems. It also formulated an ICT policy (URT, 2003) which was released in 2003 after an elaborate consultation with relevant stakeholders. Similarly, efforts to fine tune the legal instruments to align with electronic business requirements are being done through the Legal Reform Commission.

Due to the importance of ICTs in development, several studies have been conducted to determine the extent of ICTs use in Tanzania. A study by (Matambalya & Wolf, 2001) compared several sectors in the use of ICTs in Kenya and Tanzania. It revealed that

tourism small, micro and medium enterprises (SMMEs) in the country were far ahead of other SMMEs in other sectors in using general forms of ICTs such as fixed telephones, mobile phones, faxes and personal computers. The survey compared three leading export industries, namely, food, textile and tourism. However, since the study focused on economic parameters it did not address the knowledge levels of users and specific details of Internet services (technologies). As demonstrated above knowledge levels are critical to the effective use of the Internet for business in a digital economy.

Importance of ICTs Skills

Evidence from several countries suggests that the ICT revolution is skill-biased and increases demand for high-skilled relative to low-skilled workers. For example, (Jorgenson & Stiroh, 2000) point out that high-skilled workers are likely complementary to ICT, while low-skilled workers are substitutable. Higher-skilled workers are more likely to be hired than low-skilled workers (The World Bank, 2006). Equally, it is being now realised that ICT skills are critical to navigate in the complexity of today's world. It has also been observed that some of the production processes of good and services, in societies with higher ICTs, are shifting from developed countries to developing countries. Thus, effective critical knowledge and skills may indeed create some frog-leaping of some economies as was predicted by (Drucker, 1999, p. 158) that:

> "Fifty years from now—if not much sooner—the leadership in the world economy will have moved to the countries and to the industries that have most systematically and most successfully raised knowledge-worker productivity."

With the rapid development in ICTs the evidence of what is taking place in China, India, South Korea, and a few other non-western countries, the above prediction seem to be happening sooner as detailed by another insightful writer of *The World is Flat* (Friedman, 2006). Since countries are made of individuals, to a good extent what is being asserted at national level, equally applies to an individual level too. In the world which is continually getting complex, individuals with skills and knowledge to roam intellectually; to negotiating turbulence; manage ambiguity; understanding and managing connectivity and complexity, and appreciating and managing provisionality and emergence; are the ones who will succeed, see Robertson in (Kamuzora, 2005). All these qualities require quality and relevant system which value these skills through various human resources related processes such as recruitment, promotion and other rewards.

Human Resource Deployment of ICTs in Tanzania

Each period of technological change carries with it high expectations of societal and organizational restructuring of various processes with the aim of increasing human resource productivity. Increasing the productivity is one of the critical prerequisites for socioeconomic development. Despite of lack of specific labour productivity data wrought by ICTs deployment in Tanzania, both anecdotal and direct observation by anyone visiting most of the workplaces in Tanzania would appreciate the ubiquity of various ICTs. This ubiquity has been possible due to drastic reduction of acquisition costs as described earlier as well as user friendliness of the human-computer interface and patterns of human-computer interaction. Since more of the user of ICTs rather than manufacturer, the discussion in this paper is based on the user perspective. As much the OECD definition on ICTs provided earlier embody several facilities, in this paper, personal computers are used as ICTs for discussion.

Information Technology Intensive Users Human Resource

A quick glance in one of the documents detailing various jobs in the civil service (see (JMT, 2002) reveals that there are several categories of human resource in Tanzanian civil service which are either heavy users of IT systems or are employed to facilitate the smooth functioning of the systems (IT). The paper draws two cases to illustrate the main thesis. On the intensive users of ICTs to be discussed is the secretaries and the other group (IT systems facilitators) is the so-called Computer Analysts.

Secretaries

Secretaries (four categories are considered together in this paper, namely, typists, personal secretaries, office management secretaries, and executive assistants) are one of important cadres of workers. Apparently, from direct observation and other documented cases, the majority of secretaries are female. Apart from many other job responsibilities, secretaries are required to type letters (open and confidential), minutes, memorandum, circular, statements, charts, and tables and for the senior ones to independently attend routine correspondence such as acknowledgements. Reforms in the social and economic sector have so propitiated that, IT is one of the best-equal opportunity areas ‘that provide wider opportunities for women to enter and succeed in this industry’ (Suriya, 2003). For example, with the skills of using keyboards, women were the first heavy users of word processors. Visiting the majority of offices in many parts in Tanzania reveals the ubiquity of secretaries behind the computer screens. It is now very rare to find secretaries using the “traditional”

type writers only. Thus, in Tanzania, secretaries seem to be the people with the required threshold in using computers thus it is possible to say the necessary critical mass of deployment of the technology is already there.

One of the required qualifications for employment in this cadre is to have attended a course and attained a certificate in several computer programmes. The specified programmes include Windows, Microsoft Office, Internet, E-mail and Publisher (see (JMT, 2002, pp. 246-251). The same applies to the promotion process. Given the nature of the job done by the secretaries, the author lauds the requirement of having the necessary skills in the above computer programmes. However, the author is not sure if just producing a certificate of attendance is good enough to demonstrate that someone is skilful enough to undertake the tasks required using specific software programmes. Could it be like employing a driver based on presentation of a certificate of attendance of a driving course only?!! This is because, like any other critical skills, computer based skills are more practical than theoretical. Probably a better course of action would be to require one to present a skills-based certificate in complement of academic certificate. For example, there are several skills based tests which indeed require one to have mastered a program sufficiently to pass a module. An example of these tests is the International Computer Driving License (ICDL) which comprises almost all modules required for a scheme of services for the secretaries. As much, the requirement of skill based certificate would ensure that the secretaries can perform relatively sophisticated functions such as Mail Merge, effectively managing long documents, creating table of contents and indexing in a word processor and create visual appealing charts in a spreadsheet, as well as use some basic functionalities in database management system (Microsoft Access as part of Microsoft Office suite) for example.

However, the most enforced requirement for further promotion is acquisition of Shorthand skills. The utility of Shorthand in Kiswahili/English requirement is not certain in this age in the author's judgement. A random interview of secretaries in the public sector for this paper revealed that the shorthand skills learned in various colleges are rarely used at workplace. If this is true, then there is a possibility that a lot of resources are expended to a skill with little utility and this could be a source of frustration to members of this important cadre. One of the interviewed secretaries said

> "my boss types most of his letters and even if he requires me to type something for him he does not dictate at all…. despite the fact that learning the shorthand skills was the most difficult thing in Tabora, [Tabora Secretarial College], I think I wasted my time."

Therefore, given the fact of recent male staff have acquired the typing skills (on computers) which had earlier made female secretaries "famous" at the onset of computers in late 1980s and early 1990s, the secretaries now require to have sophisticated IT skills to be able to cope with the needed trend. This sophistication will definitely require the secretaries to pass professional IT examinations such as International Computer Driving License (ICDL), as already alluded to earlier.

Computer Operators and Computer Systems Analysts

Other direct categories of public services directly employed for their IT skills are the Computer Operators and Computer Systems Analysts. While a relevant diploma is required as a direct entry in computer operators category, a relevant degree or an advanced diploma is required for direct entry in a computer system analyst cadre. Promotions in these cadres depend on diligence at work and in some higher ranks such as Computer Systems Analysts an academic qualification of a Masters degree or Post-graduate diploma can be used as direct entry.

Appropriate job titles and implication of effectiveness

While acknowledging the importance of these cadres in the performance of IT related services the government provides, the author believes that in IT world there are more categories which would be more specific of tasks performed. Some of these categories would be Systems/Network Administrators, Web Design, Webmaster, Web Programmer, Database Administrator, Software Developer, and Information Technology Manager, just to mention a few.

Equally, recruitment and promotion criteria used are not taking into consideration the professional skills. As demonstrated earlier, Tanzania is lagging behind its neighbours in a number of IT professionals with qualifications such as Microsoft Windows Administration [(for example Microsoft Certified Systems Engineer- MSCE), Linux Administration, Unix Administration, Java, Visual Basic, and C. One of the reasons for this could be that contrary to other professional jobs such accountancy, procurement and material management (supplies), and laws where professional qualifications such as certified professional accountancy, (CPA], certified supplies professional (CSP), and legal advocate required to pass the Bar examination, respectively are the basis for employment and

promotion. However, IT based professional qualifications such as Cisco Certified Network Associate (CCNA), Cisco Certified Network Professonal (CCNP), MSCE, Linux Professional Institute Certification, Oracle, etc are not given any mention in the government's publication detailing scheme of services of its workers (JMT, 2002), entitled in Kiswahili as "*Nyaraka za Maendeleo ya Utumishi za Mwaka 2002*."

Some of the information and experience from the field demonstrate that only fewer and fewer Tanzanians are taking these professional tests as time goes. For example, in one of the leading Cisco training centres in the country, the trend of Cisco trainees attempting CCNA/CCNP after completing the training have gradually declined from the peak when almost all individuals engaged in the course would attempt the test. In order words, those trainees who attended Cisco training in few years ago used to go ahead and attempt CCNA/CCNP examinations. Probably after realising that the certificate of attendance was sufficient to meet their job related advancement (getting an employment) the attendees stopped "wasting" their time and financial resource to attempt the professional examinations.

Another experience from the field indicates that those institutions which had paid fees to run as testing centres of IT professional examinations such as ICDL, Cisco and Oracle are finding so difficult to get enough local clients. If one scrutinises the IT related jobs advertised in various newspapers in the country, the symptom of lack of sufficient clients to sit for the professional examinations in IT is similarly observed. Hardly one notes prospective employers making professional qualifications a strong point for an applicant to get a job. The required qualifications are mostly academic. It is important to note here that the civil service scheme of service for IT experts is adhered to by even non public employers. This demonstrates the power of government in terms of influencing professions. Thus, if the civil service was to change its scheme of service of IT professionals as well other heavy IT users such as secretaries, the positive impact would be enormous in the economy. The following are some of the advantages which would arise from such a change.

Advantage of introducing IT skills based qualifications

Apart from the obvious reason of raising the skill levels of employers who will deploy the skills at work for the increased productivity and motivation (from self esteem and enjoying undertaking advanced tasks with ease), some more subtle benefits would arise as briefly described below:

Trainers and testing centre

These include an increase of job opportunities for testing centres as well professionals who will be in training business. Another category which would benefit include writers of books, bookshops, and businesses running secretarial services such as photocopying and bindery.

Writers of supporting materials

Local writers (programmers) of appropriate testing software would benefit a great deal from such a policy. It is undisputed that most of the training software are dominated by international corporations such as ICDL, Cisco, Microsoft, and Linux but the opportunities are boundless for local firms to take advantage of availability of free and open source software (FOSS) to adapt and develop the software testing tools.

More relevance to academic institutions

A recognition of professional qualification in conjunction with academic qualification, as with the Accountancy profession for example, would stimulate further the institutions providing IT training in providing more practical skills. For example, in some specific courses a requirement could be to pass a certain level of professional qualification. For example, 70-270 Installing, Configuring & Administering Microsoft Windows XP Professional or LPIC-1 (101 and 102).

Opportunities and challenges to implement the suggestion

Opportunities of implementing the above suggestion emanates from an ICT multiplier effect. This is because ICT influences growth in all sectors across the economy as described earlier. In turn, this influence causes a multiplier growth effect. In order to measure this multiplier effect, the measurement of multifactor productivity can be used. Multifactor productivity (MFP) represents that part of the growth in output that cannot be explained by growth in labour and capital inputs. Figures for MFP are positive for many of the countries involved in ICTs manufacturing. Examples of these countries include Finland, Ireland, Japan, Korea, Sweden and the United States (OECD, 2003b). Thus, if some of the tests were to be developed by Tanzanian firms/institutions the MFP would be positive since an array of other businesses in the software value chain would benefit. For example, several job opportunities would be created which through a multiplier effect (direct, indirect and induced) would impact positively several other businesses, as already been demonstrated above.

The challenge envisaged is that introducing the IT related professional examinations might be expensive but probably we need to remind ourselves that quality comes at a price, however in the long run the efficiency gained could offset the cost. Similarly, with a good planning, most of the test providers usually provide heavy discounts for schools/universities. In addition, this could be a package which countries such as Tanzania could present to development partners so as to get a subsidised rates for the tests.

Another challenge is the change of mindset of both decision makers and professionals. If employers have been valuing academic qualifications over a combination of both academic and professional qualifications, it would take time for them to change the attitude. However, as it has been pointed above, if the civil service was to adapt the new practice almost the rest of the employers would follow suit.

Conclusion

The paper has demonstrated that ICTs have the potential of increasing human resource productivity. Given the fact that computers have become cheaper and more powerful, the business value of computers is limited less by computational capability and more by the ability of managers to invent new processes, procedures and organisational structures that leverage this capability. However, in order to gain enhanced productivity wrought by ICTs organisations as well societies require to put in place the sufficient enablers. Using specific examples from Tanzanian civil service, it has been demonstrated that, albeit lack of some of enablers, there is a need to adapt some of the recruitment and promotion processes in order to recognise the skills elements. This calls to equally value professional qualifications as much as academic qualifications. Since ICT related functions require more than theoretical knowledge, the recognition of the professional skills will enhance human resource productivity as this will ensure that employees have practical skills to undertake their work more effectively. Equally, important, such adaptation of the suggested system of recruitment and promotion will have several positive spin-off impacts in terms of job creation as well through various income multipliers (direct, indirect and induced). This is because several certified institutions will spring up to provide necessary training and testing services.

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