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Poverty reduction in the Arab world: the use of ICTs

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Abstract

Purpose – The purpose of this paper is to assess and evaluate the role of information and communication technologies as a proposed solution to reduce poverty in the Arab countries and therefore achieve sustainable development.

Design/methodology/approach – In this article, the authors have taken a somewhat extensive review of the different aspects of ICTs in DCs with particular focus on Arab countries. Given the current poor conditions and isolation of Arab countries from the rest of the world, a number of fundamental research questions are addressed.

Findings – Empowering nations with ICTs could increase productivity, promote human development, create knowledge, disseminate information and reduce poverty.

Originality/value – The paper highlights the importance of building ICTs capacity for both promoting human development and enhancing capabilities of people to participate in the economy.

Keywords Poverty, ICTs, Arab countries, Development, Knowledge, Information, Globalization

Paper type Research paper

1. Introduction

Poverty is a product of man's failure to allocate resources in an equitable manner. The objective of economic development is to promote equity through sharing of resources and providing equal opportunity to participate in the economy. Although poverty is a relative concept, in economics, it is measured as the income required to meeting an individual's basic needs. On average, an Arab earns US$4,775 per annum or about half of the world average. This is compared with US$40,750 in very high human development countries and US$8,940 in high human development. Almost one-fifth of Arabs live on $<$US$2 a day reflecting the extent of deprivation and the state of underdevelopment in the Arab world.

In most countries, the poor lack sufficient access to knowledge and information to participate in development and improve their economic well-being. Modern information and communication technologies (ICTs) facilitate socio-economic transformation by improving participation in the process of development. In Arab countries, markets are still governed by various forms of monopolistic barriers and socio-economic imperfections which obstruct participation in the market place. In most developing countries, the poor are suffering acutely from lack of access to market activities and ownership of resources. Such disadvantage reflects the failure of economic theories and models currently employed in development. In recent years, literature on Islamic economics has shown that creating balanced development requires the implementation of the Shari'ah principles to achieve equity and justice (for more details see Al-Roubaie and Alvis, 2009; Al-Roubaie, 2009).

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In modern economies, knowledge plays a decisive role in creating wealth and promoting socio-economic development. The new economy, driven by globalization, is described as a knowledge-based economy in which knowledge and information determine the scope of productivity and foster economic growth. Most developing countries, including Arab states, currently lack adequate knowledge capacity to leapfrog and keep pace with development in industrialized nations. In recent years, globalization has increased access to knowledge and information via internet and telecommunication technologies. Under such access, accelerating economic growth could be induced by external knowledge. This requires building technological capacity to create knowledge and disseminate information.

Rapid changes in technology require continuous learning as well as on-the-job-training. E-learning, knowledge mining, e-commerce, as well as internet and satellite broadcasting are vital for building a knowledge society. In Arab countries, knowledge remains inadequate to promote rapid socio-economic transformation. The main purpose of this paper is to examine the role that ICTs play in poverty reduction in Arab countries. The new technologies could accelerate the process of economic growth by increasing productivity and promoting human development. The paper highlights the importance of digital connection to enlarge people capabilities and participate in development. Digital technologies facilitate communications and access to markets, particularly those live in rural areas and isolated places. Under such circumstances, ICTs could empower the poor by creating new business opportunities and increasing access to markets.

The gulf in the levels of ICT between the developed and the DCs will tend to widen further with the rapid expansion of the internet in the West and the speedy transition to electronic publishing, and this can lead to increased brain drain and dependence on foreign aid of different kinds (see Arunachallam, 2000). Moreover the UK House of Commons Science and Technology Committee (STC) report in 2004 entitled "*Scientific Publications: Free for all*?," highlights the need for further development of ICTs capacity to fully exploit the potential of digital technologies in DCs.

The purpose of this paper is to assess and evaluate the role of ICTs as a proposed solution to reduce poverty in the Arab countries and therefore achieve sustainable development (SD). In this article, we have taken a somewhat extensive review of the different aspects of ICTs in DCs with particular focus on Arab countries. Given the current poor conditions and isolation of Arab countries from the rest of the world a number of fundamental research questions are addressed:

- What are the consequences of poor ICTs infrastructure in the Arab countries?
- To what extent are policy makers in the Arab countries responsive to the current needs of improving ICTs capabilities and infrastructure in their countries?
- What are the opportunities and challenges of ICTs for reducing poverty in the Arab countries?
- What are the policy implications of the answers to the above-stated questions?

2. Poverty in the Arab world

Poverty exists among nations and within nations reflecting largely the inequalities between "poor and rich, women and men, rural and urban, developed and underdeveloped regions and different ethnic groups." Income inequality is largely

linked to access to services among various groups within and among nations. For example in 2008 low income countries representing about 15 percent of total world population received 0.8 percent of the total world income whereas the high-income group accounting for about 15 percent of the world population received about 73 percent of the total global income (see World Bank, 2010).

Poverty is a relative concept and therefore, no adequate definition of poverty can be found to satisfy the meaning of the term. Poverty is a multidimensional problem the solution of which requires institutional process and collective efforts at both local and global levels. However, finding solution to the problem of poverty remains one of the most challenging tasks facing all nations. Almost one-third of humanity lives on $<$US$2 a day reflecting the failure of national and international policy makers to remedy the illness of poverty. Although poverty is due to several factors, it is perhaps the human factor that is responsible for most of the problems related to poverty. The economic dimension of poverty is linked to the inability of governments to redistribute income and promote equity among members of the society. As explained by the United Nations (UN) that:

> It is in the deprivation of the lives that people can lead that poverty manifests itself. Poverty can involve not only the lack of the necessities of material well-being, but the denial of opportunities for living a tolerable life. Life can be prematurely shortened. It can be made difficult, painful or hazardous. It can be deprived of knowledge and communication. And it can be robbed of dignity, confidence and self-respect-as well as the respect of others. All are aspects of poverty that limit and blight the lives of many millions in the world today (UN, 1997).

There are several ways to measure poverty including the use of income to determine man's basic needs and satisfy basic requirements for survival. The World Bank points out that there are six dimensions feature prominently in defining poverty:

- Poverty consists of many interlocked dimensions. Although poverty is rarely about the lack of only one thing, the bottom line is always hunger – the lack of food.
- Poverty has important psychological dimensions, such as powerlessness, voicelessness, dependency, shame and humiliation.
- Poor people lack access to basic infrastructure.
- While there is a widespread thirst for literacy, schooling receives little mention or mixed reviews.
- Poor people's health is substandard, illness is endemic and average life expectancy suffers substantially from such poor health care.
- The poor rarely speak of income, but focus instead on managing assets – physical, human, social and environmental- as a way to cope with their vulnerability (World Bank, 2000).

Income poverty is common in Arab countries reflecting the failure of the economic system to correct market imperfections and reduce income inequalities. For example, in 2008 the share of income of the richest 20 percent in Jordan accounted for 47.3 percent of the total income whereas the share of the poorest 20 percent accounted for 6.7 percent. In Egypt the share of the richest 20 percent reached to 43.6 percent compared

to 8.6 percent to the poorest 20 percent. Similar trends exist in other Arab countries reflecting the widening gaps between rich and poor people in various countries in the Arab world. Inadequacy of the tax system in most Arab countries gives the rich an opportunity to accumulate wealth, most of which is deposited in banks in non-Arab countries. This represents leakage out of the circular flow, which, in turn, weakens the multiplier and reduces the ability of the economy to increase productivity and produce linkages (see UN, 2010).

In most cases, poverty is man-made stemming from greed, injustice, exploitation, inadequate knowledge, unequal opportunity, corruption, social division, gender discrimination, unjust distribution of income, as well as a potpourri of other adverse political, social, environmental and economic factors. Over the years, a vast amount of studies, both theoretical and empirical, have been published on all aspects of human poverty. Unfortunately, not much success has been achieved so far in terms of alleviating the problem and freeing humanity from the degrading blight of poverty. From an Islamic perspective, poverty springs from the failure of Muslims to implement Shari'ah principles concerning allocation of resources as well as to fulfill stipulated religious obligations. Unless Shari'ah principles are effectuated, poverty will remain a shameful scourge for all Muslims (Al-Roubaie, 2004).

Economic diversification and enhanced productivity across multiple economic sectors are important for creating job opportunities. The poor suffer both from high levels of unemployment and from lack of access to rural areas where public services are lacking. In developing countries, including Arab States, governments are more interested in urban development, to which they typically allocate a large share of public expenditure, at the expense of rural initiatives. In the Arab world, almost one-fourth of the population lives in rural areas lacking to adequate services needed to improve their economic status and to enhance their living standards. In this regard, Paul Salem argues that:

> Economic restructuring, rising oil prices, and increasing globalization have limited wealth distribution and increased income disparities, particularly in oil-importing countries. The state has gradually withdrawn from providing welfare and wealth distribution, leaving citizens more vulnerable to market forces. In the entire economies of the region, economic growth has translated into more benefits for those closet to power, not large-scale employment. […] the gap between the incomes of the 'best and the rest' has been growing ostentatiously (Salem, 2010).

Combating poverty requires Arab governments to develop a well-defined national strategy capable of restructuring the economic system and reducing inequalities. As a tool, ICT must be used to address development by encouraging production and increasing services. Arab countries need to benefit from rapid changes in modern technologies by incorporating these technologies into their development policies. Development is about creating conditions in the domestic economy aimed at reengineering production structure, redistributing income, sharing resources and balancing growth among and within regions. Despite the fact that indigenous knowledge is vital for development, ICTs add value by increasing the country capabilities to acquire, apply and create knowledge. During their colonial history, the Arabs either denied knowledge or used western knowledge, which has proven to be inadequate to foster growth and reduce poverty. Western knowledge is useful if customized to suite the local environment and encourage domestic production.

3. Human development and poverty reduction

Investment in the human factor is vital for reducing poverty in Arab countries. Education and skills are necessary for participation in modern economies. High illiteracy rates and inadequacy of educational institutions remain among the most important impediments for development in several Arab countries. The UN classify countries according to an index known as the human development index (HDI). In addition to the performance of the economy, this index measures the state of education, life expectancy and living standards to determine human progress. In all, 40 percent of Arabs fall in the category of medium human development measured in HDI representing values between 0.500 and 0.799. In addition, 20 percent of the Arabs are classified in the category of low human development representing values <0.500. Among the important features of countries with lower human development is widespread poverty and illiteracy. In addition, Arab countries exhibit a gross maldistribution of wealth with the top 20 percent of the entire Arab population earning about two-thirds of the total income (UN, 2009).

Modern education underscores the importance of e-literacy to empower people with the skills and knowledge to make use of modern technologies and benefits from globalization. It is believed that developing countries could utilize ICTs to induce technological change, empower people, increase access to knowledge, reduce poverty and sustain development. Investment in digital infrastructure will enhance the national capacity to adopt and utilize effectively ICTs in the production processes.

The key to transforming a nation into a digital service provider is the development of human resources. Not only e-learning, training and skills facilitate adoption of new technologies, but also induce knowledge creation and encourage innovation. For example, countries such as Singapore, Taiwan and Malaysia have recognized the importance of human capital in the early stages of their development and invested heavily in human resources. The benefit to society has been substantial reflecting the lead that these countries have taken in the deployment of ICT.

Integrating ICT into the national development policy could strengthen capacity building by increasing linkages and creating new opportunities for sustaining development. An effective national policy for human resource development must focus on e-learning and training people to utilize ICT in production and in conducting research and development. Effectively starting e-learning requires the development of curricula for tertiary education and providing fast internet connectivity to schools and universities. The aim should be to spur development through using ICTs as tools for promoting learning. The use of ICTs enriches people's capabilities resulting in innovation and knowledge creation. For example, to a farmer, the benefit of ICT comes from the knowledge acquisition of and information dissemination on biotechnologies having potential to increase agricultural productivity and promote sales.

In the Arab world, building e-strategy driven by ICTs must be integrated into the educational system to ensure that research and development continues to support an enabling environment for ICT. The educational institutions are important in enhancing ICTs capable of addressing the needs of socio-economic development. Advancing the knowledge-based economy underscores the importance of developing software and inventing new techniques capable of solving local problems including poverty reduction.

Another important function of educational institutions is the development of skills necessary for facilitating rapid implementation and use of ICT. Bridging the digital divide depends on the development of digitally literate workers capable of participating in the ICT revolution. Promoting digital literacy requires the

construction of sound educational policy designed to increase investment in vocational skills to meet human capital requirements. Foreign direct investment and technology transfer could also supplement the domestic labor market through training of local workers. Indeed, building ICT capacity invariably makes it more attractive for foreign investors to transfer technology and undertake projects in the local economy. In addition to the transfer of technology, attracting multinational businesses allow the creation of linkages, generate income and expand market opportunities. In Arab countries, low levels of technology and inefficient manufacturing industries impose constraints on economic development by limiting income and employment opportunities. In other words, without moving toward productive activities, the ability of the economy to create job opportunities remains limited.

Capacity building involves broad and comprehensive elements aimed at fostering economic growth and sustaining development. It empowers both individuals and organizations by enhancing the quality of labor and inducing innovation. Capacity building requires substantial investment in human capital to strengthen creativity and inventions. The role of the human factor in building capacity is vital for economic development. Providing general literacy programs by educational institutions are no longer sufficient to meet requirements of socio-economic development. School curriculums should be constructed to include e-literacy and training in the use of computers to enhance connectivity and exchange information.

Because of their large financial endowments, Arab countries are in a position to harness global knowledge via investing in human capital and building infrastructure to close the digital divide. ICT should be considered not just a tool for development but a prerequisite for knowledge acquisition and information dissemination. Knowledge empowers development by increasing productivity and enhancing communications. In most developing countries, networking and sharing knowledge and information is still inadequate to accelerate the process of modernization. However, in the new economy, knowledge accelerates the process of innovation, induces competitive advantage, creates new jobs, reduce inequalities and alleviate poverty.

The contribution of ICT to human development goes far beyond knowledge creation and information dissemination. It enlarges human capabilities to realize human potential and contribute to development. ICT strengthens human development in all its dimensions by promoting social justice, social tolerance, democracy and peace. Historically, human progress has been associated with technological development and innovation. The new technologies driven by globalization are playing an important role in promoting global integration and increasing competitiveness. Thus, Arab countries should take advantage of the new technologies to acquire skills, produce knowledge through access to global markets and enhance human capabilities.

4. Technological poverty

Globalization is about new opportunities driven by ICTs to facilitate knowledge transfer and information dissemination. In the early stage of economic development, poor countries and poor people are not in a position to create their own knowledge and, therefore, access to global markets through the internet could meet domestic market needs to close the digital divide. Such objectives can be achieved through building ICT capacity to enable poor nations to participate in the global economy. In this regard, governments are obliged to invest in building physical and human infrastructures as well as to provide the necessary incentives for people and regions to integrate ICT into their decision-making process.

Many scholars such as Danofsky (2005), Hamel (2005), Mansell and When (1998), Ahmed (2004, 2005, 2007) and Ahmed and Nwagwu (2006) argue that information can lead to knowledge and knowledge is a prerequisite for development. Therefore ICTs can play an important role in accelerating the development process in most DCs particularly Arab countries. Yet, according to a recent study, millions of people in Arab countries have never made a telephone call and without the ability to communicate Arab countries will remain poor and isolated, lacking the means to participate in the global society.

Technological innovation in ICTs and liberalization of the regulatory context of the media and telecommunications sectors have profoundly changed the global communications landscape (Nulens *et al.*, 2001). And although these changes have originally started in the developed countries but they also offering great opportunities for the Arab countries. Early 2005, the UN announced the launch of the "Digital Solidarity Fund" to finance projects that address the uneven distribution and use of ICTs to enable poor people enter the new era of the information society.

Moreover the World Summit on the Information Society (WSIS) held in Tunis (November 2005) highlights the importance and potential of ICTs in improving the socio-economic development of all human beings and that ICTs should not only be seen as a medium of communication, but also as a development enabler to achieve Millennium Development Goals (MDGs). And although there is a growing body of evidence that ICTs have a significant macroeconomic impact, it is not clear to what extent ICTs have helped to directly reduce major development concerns reflected in the MDGs such as poverty, hunger or sickness. Table I outlines some possible impacts of ICTs on the different MDGs identified by researchers.

The ICT revolution is also not without challenges. ICT products and their applications need to be designed in a manner which allows for addressing the needs of disadvantaged communities. Therefore we should examine all issues relating to widening the scope and impact of ICTs in Arab countries and the challenges of connectivity, expansion of infrastructure and reducing disparities in the use of ICT as an enabling tool in rural and urban areas.

Today, countries are increasingly judged by whether they are information-rich or information-poor. For the Arab countries, keeping up with these changes, and

MDGs	Impact of ICTs
1	Increase access to market information and reduce transaction costs for poor farmers and traders
2	Increase supply of trained teachers through ICT-enhanced distance training
3	Deliver educational and literacy programs specifically targeted to poor girls and women using appropriate technologies
4, 5 and 6	– Increase access of rural care-givers to specialist support and remote diagnosis – Enhance delivery of basic and in-service training for health workers – Increase monitoring and information-sharing on disease and famine
7	Remote sensing technologies and communications networks permit more effective monitoring, resource management, mitigation of environmental risks
8	Increase the number of IT graduates and reduce youth unemployment

Source: World Telecommunication Report (2006) and World Telecommunication Development Report (2003)

Table I.
Impact of ICTs on the MDGs

involvement in research, are both vital. Arab countries recognize that much of their economic future will depend upon the understanding of the global technological forces at work and their long-term implications. However, the evidence also shows that the benefits accrued from the utilization of ICTs over the recent years have been inequitably distributed with Arab countries facing the prospect of being marginalized (see Ahmed and Al-Roubaie, 2012). This marginalization has afflicted a new form of poverty, information poverty, within these countries. The world is beginning to divide between the information-rich and the information-poor nations (see Ahmed, 2004; Ahmed and Al-Roubaie, 2012).

In recent years, the rate of internet utilization has become a measure for rapid socio-economic transformation due to its impact on knowledge creation and information dissemination. The digital divide represents technological poverty in terms of the low rate of use of internet and computer applications. Due to low investment and inadequate technological infrastructure, most Arab countries are not major players in the digital world and thus cannot effectively take advantage of the new technology. For example, there are 3.7 people internet users per 100 in low income countries compared to 67.1 people in high-income countries. In the Arab world, internet use remains low reflecting technological poverty and low connectivity. For example in Egypt, users of the internet account for 16.6 per 100 people, in Yemen 1.6 per 100 people, in Sudan 10.2 per 100 people, in Algeria 11.9 per 100 people and in Syria 17.3 per 100 people. This is compared to 86.1 per 100 people in UK, 84.2 per 100 people in Denmark and 77.1 per 100 people in South Korea (World Bank, 2010).

The complex nature of development requires linking all components of society, social, political economic financial, environmental and global. In this regard, communications via ICTs have become instrumental in linking societies and regions together and bridging the digital divide. The term digital divide is used as a reference to the existing inequalities in access to ICT among and within nations. In particular, the internet is viewed as a "manifestation of existing social, economic and political divides at the local, national and global levels." Bridging the divide by itself may not help to meet development objectives unless the people who become accessible to the services provided by the internet. ICT infrastructure could become more productive through greater interaction with the needs of the community. Thus, building ICT capacity to operate on the basis of "link 'em and leave 'em" will not be sufficient to promote socio-economic development. Connectivity without familiarity with the use of ICT does not bring change.

To benefit from ICT, nations need to build strategies and construct polices capable of harnessing modern technologies for development. These policies must be integrated into national planning and long-term vision in order to support leapfrogging and accelerate economic growth. Building such ICT capacity requires national commitment and strong political will to ensure that adequate resources are allocated for building such capacity.

ICT could be employed as a powerful tool in disseminating information and bridging the digital divide. Connectivity and access to knowledge could help developing countries to leapfrog at much cheaper costs. Isolated communities, especially in large countries such as Indonesia, China, India and Brazil, have benefited tremendously from widespread use of ICTs. In the Arab world, promoting the deployment of ICTs and making them accessible to all regions will require governments to invest in human resource development as a prerequisite for building ICT capacity.

In the future, without e-literacy and computer knowledge, it will be difficult for young people to obtain work. In the new economy, networking, information, exchange ideas and access to knowledge are important for increasing productivity and promoting global integration. Similarly, in the information society, digital literacy is essential for communications and sharing of knowledge and information. Digital literacy empowers the poor by enabling them to participate in the economy.

Walsham (2000) argues that the industrialized countries of the world have been the dominant in the production, development and transfer of information technology, and their interest in the use of IT/S in the DCs has often been more concerned with the profitability of their own business enterprises than with any broader goals concerning the development of the receipt countries. Therefore Arab countries are posed with the challenge of either becoming an integral part of the knowledge-based global culture or face the very real danger of finding themselves on the wrong side of the digital divide.

The digital-divide underpins much of the ongoing discourse on whether ICTs can be harnessed for mitigating poverty in DCs with several voices arguing that those who live on $<$\$1 a day have no need for ICTs. The proponents of ICTs on the other hand, however, consider ICTs as tools that can be used to provide the poor economic opportunity and improvement in human well-being (see World Bank, 2001; International Telecommunication Union (ITU), 2012a, b).

Castells (1998) provides evidence and argues that the use of IT in the DCs is deeply implicated in the processes of social exclusion and that the "fourth world," defined as including the areas of social deprivation in the DCs, is increasing in size. The risks for Arab countries are greater simply because they are less developed and are faced with the prospect of having to integrate advanced technologies while their economic development and infrastructure is not yet mature. The workers in these countries are susceptible to greater vulnerability as a result.

Anyimadu (2003) argues that the new ICTs applications are frequently designed without considering the social and environmental realities of the DCs. Mansell and When (1998) argue the same that new ICTs products and applications are frequently designed in ignorance of DCs' realities and fail to address the needs of the most disadvantaged sections of the community.

Bridging the digital gap is vital for narrowing the knowledge gap and sustaining development. Among Muslim countries, the deployment of ICTs has not been even. In high-income Arab countries, on the one hand, substantial progress has been made to take advantage of ICTs. Government support programs and policies have facilitated the proliferation of ICTs in such spheres as trade, government services, health and education. On the other hand, low income countries are still far behind in computer technology and internet communications. Internet service provision is still inadequate to reduce the digital gap and increase productivity. In many countries, internet service provision is further encumbered by governments' holding a monopoly over the telecommunication sector (spanning internet services). The challenge facing several Arab countries is to ensure rapid transformation toward digital activities. Priority should be given to rural areas where most poor people live and also to unprivileged individuals and groups in order to integrate them into the economy.

5. Building ICTs capacity

Economic development is a multidimensional process underlying the importance of knowledge and information in fostering change and sustaining growth. Modern communications and information technologies (ICT) empower the process of

development by allowing greater access to knowledge, skills and ideas which encourage innovation and create employment opportunities. In addition, the digital divide between rich nations and poor nations has been widening in recent years reflecting the inability of the poor to reengineer their economies and make use of modern technologies. Closing this gap is necessary to support the process of development due to the wide range of benefits that ICT provide for speeding up the process of development. Undertaking the task of meeting development challenges will require building ICT capacity to enable harnessing global scientific and technological knowledge and information for development. ICT policies in Arab countries must be designed to address the needs of development spanning poverty reduction, human development, rural development, environmental degradations, climatic changes and SD.

ICTs represent a means for building capacity to absorb and produce knowledge and disseminate information. The knowledge-based economy, driven by globalization, relies on ICTs to strengthen the ability of poor countries to reduce poverty and sustain development. Mohammed Younes of Bangladesh has become known worldwide for his micro-financing using mobile telephone and modern computers to help millions of poor people escape poverty. His innovative program has received worldwide support in both developed and developing countries. Poor people cannot, on their own, improve their lives and emerge out of destitution because of debilitating combination of discrimination, market imperfection, unequal opportunity and lack of political influence.

ICTs enable public services to be delivered to users across vast landmasses to any destination, however, remote, at affordable cost. In addition, the poor can use ICT to raise their voices and demand equal rights to resources and finance. In Arab countries, governments should take the initiatives to integrate ICT into the national development strategy. In this regard, governments should construct e-strategies and invest in building ICT capacities to increase the society human and technological capabilities. Promoting government services through e-government, e-learning and e-business depends on ICT infrastructure and the availability of internet services to all sectors of the economy. An effective ICT strategy for poverty reduction should plug gaps in ICT infrastructure and facilitate access to ICTs. To this end, building digital bridges within and among Arab countries could facilitate knowledge transfer and disseminate information, in particular to poor regions.

A sound ICT strategy must create an "enabling environment," the benefit of which must be inclusive and accessible to all sectors of society. As a process of structural change, development requires opening up opportunities to all individuals. The role of government in the process could be instrumental by ensuring that a proper environment will be accessible to those who are willing to participate in the process. In building ICT capacity, public expenditure is necessary to enhance human capabilities and strengthen physical infrastructure. Thus, decisions governments make relating to IT strategy and policies broadly, and in particular to procurement, the setting and adoption of standards, investment in technology and training and skill development can have grave consequences for the future well-being of their peoples (see Weeratunga, 2004). Moreover, ICTs used are by their very nature, cultural. As noted by Keniston (1998); the content of software is determined not only by the language, but by deep, underlying, usually implicit and unacknowledged (because thought to be natural) assumptions inherent in the software itself. Software carries with it a view of the world, of people, of reality, of time, of the capabilities of users, which may or may not be compatible with any given and social context.

In several Arab countries, the resources available to private enterprises are inadequate to meet capital and educational requirements for facilitating ICTs. In the process, however, marginalized groups and individuals need to be given the opportunity to get engaged in development through equity and participation. In addition, initiatives to create civil society require greater communications and openness in order to build bridges and increase tolerance among various groups of civil society. ICTs enhance communications through the sharing information and the exchange of ideas that advance society. ICTs also facilitate transparency and make government services more efficient. E-government usually allows greater participation in the political process and economic decisions. Freedom of choice and equal participation will strengthen the fundamentals of building civil society by enlarging popular participation facilitating the democratic process.

Poverty reduction mandates a variety of scientific, technological, environmental and cultural knowledge to induce rapid economic growth and reduce unemployment. Particularly, investment in research and development is essential for helping countries diagnose the problems facing poor countries. For building capacity not only funding, but also technical and political support, is important. Teaching modern skills required for successful participation in the global economy mandates adequate facilities to enhance their capabilities to adapt to new technologies and participate in policy construction and decision makings. Capacity building for inducing change requires a combination of economic incentives, institutional change, technological innovation and educational reform.

To promote a technological capacity in Arab countries and make use of it for increasing people capabilities to participate in development, the following steps are important to be implemented:

- make extensive use of ICT at different levels of public and private enterprises;
- invest in building ICT industry to attract foreign direct investment;
- encourage research and development to support innovation as a device for economic growth;
- create suitable environments for people who work in ICT;
- build institutional infrastructure capable of strengthening economic growth;
- invest in human capital;
- initiate programs for lifelong learning using e-learning and internet technologies; and
- make use of ICT to build networks for connecting individuals, enterprises, groups and institutions in the Arab world.

The challenges facing Arab countries are attributed to the inadequacy of technological and institutional capacities capable of absorbing, applying, sharing and creating knowledge. In the new economy, knowledge represents a powerful means for deepening global integration and increasing competitiveness. Without it, countries will remain unable to induce productivity and reduce poverty. Knowledge is not only an important factor of production but also a significant instrument in wealth creation. Future demand can only be met through production and export of knowledge-based products and services. Globalization has changed the pattern of trade by encouraging production and export of knowledge products and services. Traditional industries,

particularly those of agricultural and manufactured-based goods, are no longer key drivers of long-term economic growth. In the case of Arab countries, moving toward production of knowledge products would increase productivity and induce economic growth – ensuring job creation and poverty reduction.

Presently the ICT era is yet to be universalized, and this cannot obtain except all the languages of the world digitalized. Presently, Arabic language, for instance, is yet to make any meaningful input in the internet. As is well known, the internet is overwhelmingly American-based, English speaking and western-focussed. Furthermore the lack of intellectual property (IP) law framework and enforcement is common symptom in most Arab countries as many countries simply failed to enforce IP laws. The result of course has been rampant pirating of proprietary software, thereby creating a false reality of wide availability of proprietary products at no cost. For example, it is common for a new computer to be pre-installed with pirated copies of whatever proprietary software the customer wants. In addition to being illegal, such piracy devalues the economic benefits of open source products by falsely reducing the price of proprietary software. The economic benefit of ICTs and open source products will not be felt until IP is properly protected (see Weerawarana and Weeratunga, 2004 for more details). Another challenge in most Arab countries is issues regarding freedom of information. Access to the internet brings with it free access to information and therefore if the political climate of the country does not permit such access (most Arab countries), then open source cannot succeed in that country.

Capacity building involves investment in human and physical infrastructure for supporting ICT utilization and building technological linkages for allowing Arab countries to increase communication with the rest of the world. In rural areas, where most of the poor live, ICTs enhance government performance in delivering public services. In the face of rapid deterioration of rural life in most Arab countries, ITCs provide easy access to information and knowledge especially in relation to environmental control, water management, family planning and population control, health and daises assessment, agricultural production and skill acquisition. These issues represent pressing challenges that immediate action needs to be taken to tackle them. Knowledge sharing in science and technology increases the capability of both public and private institutions to contribute directly to poverty reduction and sustaining development. Access to knowledge becomes easy through connectivity and building technological capacity.

Arab countries must take the initiative to acquire knowledge through transfers from the rest of the world. Global knowledge has become accessible via modern technologies including internet and electronic mediums. Sustaining development and poverty alleviation depend on the country's ability to build indigenous knowledge (Al-Roubaie, 2010). The capability of Arab countries to absorb knowledge is constrained by weak infrastructure and low investment in education and lifelong learning. Absorbing knowledge is necessary for building capacity to create and apply knowledge. However, western knowledge, while useful, needs to be modified in order to become applicable to existing conditions in Arab countries. Inasmuch as western knowledge contains values and features may not necessarily suitable for non-western countries, the effectiveness of global knowledge, moreover, depends on the ability of the nation to create a culture suitable for the adaptation of world knowledge. Nonetheless, ITC technologies have the potential to reduce substantially the knowledge gap between the Arab world and the West.

Building capacity for ICT must go beyond government initiatives but must involve the participation of the private sector, universities, non-governmental organizations

and international institutions. A comprehensive strategy is the one that involves all societal groups and individuals to ensure full coverage and gain full utilization of ICT. To this end, an effective and productive ICT capacity depends on government vision and its willingness to involve various members of society. Numerous challenges face governments, especially in developing countries, to implement ICT strategy and build national capacity for development. First, there is a need for strong commitment from the political leadership to endorse the use of modern technologies for development. For example, countries such as Malaysia, Singapore, New Zealand and South Korea were pioneers in adapting ICTs as tools for implementing their respective national development plans. Second, establishing legal institutions to enable ICT policies is vital. Third, plans of action, if they are to succeed, ought to be grounded in level-headed reality and have to be implemented rather than merely being impressive tomes that gather dust sitting on shelves (Ulrich *et al.*, 2004).

Development requires implementation of sound ICT strategies and effective policies to ensure that infrastructure, skills and innovation are among the important ingredients of development. Without action, e-strategies for ICT cannot generate sufficient linkages for fostering growth and sustaining development. ICT facilitates socio-economic transformation through the development of skills, people participation, producing and sharing knowledge, disseminating information and empowering the poor in society. Arab governments should lay the foundation by promoting e-readiness and investing in people to increase communications and participation. A successful ICT policy will require a careful assessment of the causes and consequences of such policy through "actions for crafting and then acting upon an e-strategy" (Ulrich *et al.*, 2004, p. 4).

Building capacity for development underscores the importance of public participation in the process of transformation. Endorsing the process means that involvement of women is essential for supporting rapid transformation. In most Arab countries, participation of women in the economy remains inadequate due to the lack of educational facilities provided for them. Government policy must ensure equal opportunity is given to all without bias. The share of women in labor force could increase markedly if they are given access to adequate training facilities. In conservative societies such as the Middle East, ICTs provide opportunities to work out of homes which make it easier for women to participate in development. Bias against women stems from policy rather than from technology, which is gender-neutral. Without enforcement of the rules and promoting equal opportunity to all members of the society, therefore, the contribution of ICT policy to development can only be hamstrung. In agriculture, notably, women account for a substantial share of the total labor force and, therefore, providing ICT access to rural areas will disproportionately empower women economically.

There are several advantages of ICTs:

- Allow greater access to information which can be used to enhance decision making at the levels of consumers and producers. Obtaining information also broaden the range of choices of people to contribute to development.
- Diversify opportunities for people to work, participate and study. In other words, ICT empowers people to participate in the process of development.
- Encourage innovation and invention through access to global knowledge. Arab countries can utilize ICT to acquire knowledge and obtain skills originated

outside the country. External knowledge advances local industries and institutions to innovate and create new products.

- Reduce distance in economic terms. A substantial cost advantage could be obtained through the internet which gives firms in developing countries comparative advantages.
- Provide greater learning opportunities, especially for those with limited financial support to study.
- Reduce the digital divide by helping low income countries with access to knowledge and information used to speed up the process of development.
- Enhance environmental awareness and reduces environmental degradation.
- Increase productivity in rural areas by providing rural communities with up-to-date information about scientific and technological advancement in agriculture.
- Promote understanding among citizens especially in pluralistic societies.
- Advance the use of e-business, e-government and e-trade which facilitate growth through faster and more efficient services providers.
- Allow sharing information and exchange ideas needed for socio-economic development.
- Enhance human development by reducing illiteracy and improving health services.
- Magnify the country's trade potential by increasing global integration and expanding exports.
- Attract foreign direct investment and encourages multinationals to transfer knowledge and technology.

6. Conclusion

An effective ICT policy requires a profound understanding of the applications, uses and limitations of technology in spurring development. Currently, the technology used in Arab counties is not produced domestically, and, therefore, training and learning about the effective use and successful assimilation of imported technology is essential for promoting economic development. A sound policy must also take into consideration indigenous knowledge and try to make use of it to develop environmentally friendly technologies, stimulate job creation and, in turn, reduce poverty.

In this paper, the role that information and communications technology plays in poverty alleviation has been discussed. There are many examples that can be cited as benefits related to the use of ICT. By introducing new technologies communications and information become easy to use for empowering people and improving living conditions. On their own, however, these technologies are not sufficient to reduce poverty. Government support is needed to promote the use of these technologies for information dissemination, wealth generation and knowledge creation. In addition, low levels of literacy, particularly in relation to the use of ICTs, render these technologies inaccessible to a majority of people in Arab countries.

Arab governments should invest in building ICT capacity including educating and training people about the use of ICT. Electricity and communications infrastructure

(fiber optic cables and wireless networks) need to be expanded if nations are in a position to gain access to markets through ICTs. On this level, the remarkable success of Singapore as the most "wired country" is due to governmental educational and infrastructural policies and incentives programs which led to high literacy labor force. Learning from the experience of others could accelerate the process of transformation, foster economic growth and reduce poverty. Financially, the Arabs are capable of combating poverty and improving the economic well-being of all citizens.

References

Ahmed, A. (2004), "Making technology work for the poor: strategies and policies for African sustainable development", *International Journal of Technology, Policy and Management*, Vol. 4 No. 1, pp. 1-17.

Ahmed, A. (2005), "Digital publishing and the new era of digital divide", *International Journal of Learning and Intellectual Capital*, Vol. 2 No. 4, pp. 321-338.

Ahmed, A. (2007), "Open access towards bridging the digital divide: policies and strategies for developing countries", *Information Technology for Development*, Vol. 13 No. 4, pp. 337-361.

Ahmed, A. and Al-Roubaie, A. (2012), "Building a knowledge-based economy in the Muslim world: the critical role of innovation and technological learning", *World Journal of Science, Technology and Sustainable Development*, Vol. 9 No. 2, pp. 76-98.

Ahmed, A. and Nwagwu, W. (2006), "Challenges and opportunities of e-learning networks in Africa", *Development*, Vol. 49 No. 2, pp. 58-64.

Al-Roubaie, A. (2004), "The global dimension of poverty in the Muslim world: a numerical assessment", *Al-Shajarah*, Vol. 9 No. 2.

Al-Roubaie, A. (2009), "Islamic economics in a globalized world: opportunities and challenges for Muslims", in Al-Aidrus, M. (Ed.), *Islam Hadhari*, International Islamic University, Kuala Lumpur.

Al-Roubaie, A. (2010), "Building indigenous knowledge capacity for development, world journal of science", *Technology and Sustainable Development*, Vol. 7 No. 2.

Al-Roubaie, A. and Alvis, S. (2009), *Islamic Banking and Finance: Critical Concepts in Economics*, Routledge, London.

Anyimadu, A. (2003), "Being digital by default", paper presented during the International Conference on electronic publishing and dissemination organized by Council for Development of Social Science Research in Africa (CODESRIA), September 1-2, available at: www.codesria.sn

Arunachallam, S. (2000), "Reaching the unreached: what role can ICTs play in rural development?", paper presented at the Asian Regional Conference of UN ICT Task Force – Media Lab Asia, New Delhi, April 25.

Castells, M. (1998), *End of Millennium*, Blackwell, Oxford.

Danofsky, S. (2005), *Open Access for Africa: Challenges, Recommendations and Examples. United Nations ICT Task Force Working Group on the Enabling Environment*, The United Nations Information and Communication Technologies Task Force, NY.

Hamel, J.L. (2005), "Knowledge for sustainable development in Africa towards new policy initiatives", *World Review of Science, Technology and Sustainable Development*, Vol. 2 No. 3, pp. 217-229.

International Telecommunication Union (ITU) (2012a), *Measuring the Information Society 2012*, International Telecommunication Union (ITU), Geneva, available at: www.itu.int/ITU-D/ict/publications/idi/material/2012/MIS2012_without_Annex_4.pdf

International Telecommunication Union (ITU) (2012b), *ICT Adoption and Prospects in the Arab Region*, International Telecommunication Union (ITU), Geneva.

Keniston, K. (1998), "The politics of copyright", *Economic and Political Weekly*, January 17, Mumbai.

Mansell, R. and When, U. (1998), *Knowledge Societies: Information Technology for Sustainable Development*, UN Commission on Science and Technology for Development, Oxford University Press Inc, New York, NY.

Nulens, G., Hafkin, N., Van Audenhove, L. and Cammaerts, B. (2001), *The Digital Divide in DCs: Towards an Information Society in Africa, Studies on Media Information and Telecommunication (SMIT)*, United Nations Economic Commission for Africa (UNECA), VUB Brussels University Press.

Salem, P. (2010), "The Arab state: assisting or obstructing development?", Carnegie Papers, No. 21, April, p. 14.

Ulrich, P., Chacko, J.G. and Sayo, P. (2004), "Overview of ICT policies and e-strategies in the Asia-Pacific region", in Sayo, P., Chacko, J.G. and Pradhan, G. (Eds), *ICT Policies and e-Strategies in the Asia-Pacific*, Elsevier, New Delhi.

United Kingdom House of Commons Science and Technology Committee (STC) (2004), "Scientific publications: free for all?", Tenth Report of Session 2003-2004, Volume I: Report, HC 399-I, The Stationery Office Limited, London, available at: www.publications/parliament.uk/pa/cmselect

United Nations (UN) (1997), *Human Development Report 1997*, United Nations, New York, NY, p. 15.

United Nations (UN) (2009), *Human Development Report 2009*, United Nations, New York, NY.

United Nations (UN) (2010), *Human Development Report 2010*, United Nations, New York, NY.

Walsham, G. (2000), "IT/S in DCs", in Zeleny, M. (Ed.), *The Handbook of Information Technology in Business*, International Encyclopedia of Business Management, Thomson Learning, London, pp. 105-109, ISBN 1-86152-308-4.

Weerawarana, S. and Weeratunga, J. (2004), *Open Source in DCs*, The Swedish International Development Cooperation Agency (Sida), Stockholm, ISBN 91-586-8613-4, available at: www.sida.se/publications

World Bank (2000), *Voices of the Poor: Can Anyone Hear Us?* Oxford University Press, Washington, DC, pp. 4-5.

World Bank (2001), *World Development Report 2001: Attacking Poverty*, World Bank, Washington, DC.

World Bank (2010), *World Development Report 2010*, World Bank, Washington, DC.

World Telecommunication Development Report (2003), *Access Indicators for the Information Society*, ITU, Geneva.

World Telecommunication/ICT Development Report (2006), *Measuring ICT for Social and Economic Development*, 8th ed., International Telecommunication Union (ITU), Geneva, available at: www.itu.int/ITU-D/ict/publications/wtdr_06/index.html

Further reading

Al-Roubaie, A. (2002), *Globalization and the Muslim World*, Malita Jaya Publishing House, Kuala Lumpur.

Deane, J. and Souter, D. (2005), "Anchoring ICT in poverty reduction strategies", in Rahim, R.A., Waldburger, D. and Siegenthaler, G. (Eds), *Access, Empowerment and Governance: Creating a World of Equal Opportunities with ICT*, Global Knowledge Partnership, Kuala Lumpur.

Lipton, M. (1997), "Defining and measuring poverty: conceptual issues", Human Development Papers, United Nations, New York, NY.

Quinones, B.R. (1999), "Eradicating poverty in the Asia-Pacific region", *Asia-Pacific Development Monitor*, Vol. 1 No. 1.

United Nations (UN) (n.d.), United Nations Development Programme, Human Development Reports, Several Issues.

United Nations (UN) (2010), *Technology and Innovation Report 2010*, United Nations, New York, NY.

World Bank (1998), *World Development Report 1998/99, Knowledge for Development*, Oxford University Press, Washington, DC.

World Information Society Report (WISR) (2006), *International Telecommunication Union (ITU)*, WISR, Geneva, available at: www.itu.int/osg/spu/publications/worldinformationsociety/2006/report.html

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