



WORLD
ASSOCIATION FOR
SUSTAINABLE
DEVELOPMENT

Amer Al-Roubaie¹

Ahlia University, Bahrain

Tariq Shareef Younis

Applied Science University, Bahrain

Building innovation capacity for knowledge creation in GCC countries

¹ **Professor Amer Al-Roubaie**, Dean of the College of Business and Finance
Ahlia University, BAHRAIN
Email: aalroubaie@ahlia.edu.bh

*Building innovation capacity for knowledge
creation in GCC countries*

**Building innovation capacity for
knowledge creation in
GCC countries**

Abstract

Purpose The aim of this paper is to discuss the importance of innovation in building capacity for knowledge creation in the GCC countries. Conversion of their economies into knowledge-based economies will require the creation of an enabling environment capable of providing adequate support and institutional incentives to promote innovation and enhance productivity. Building capacity for knowledge creation is critical for future development in GCC countries.

Methodology This paper utilises descriptive and analytical methods drawn from the literature on the knowledge-based economy. The focus of this paper will be on the importance of innovation in the process of knowledge creation and the role that the innovation system plays in the linkage between creativity and productivity growth.

Findings An insufficient environment encumbered by weak human capital and inadequate institutional infrastructures hinders the ability of the economy to create knowledge and generate linkages. The overall state of knowledge readiness remains inadequate to promote innovation and speed up the process of rapid transformation.

Originality/value Not much literature has been written about these topics and, therefore, the current paper will increase awareness regarding the urgent need of the GCC countries to build innovation capacity and create knowledge.

Keywords Innovation, Development, Human Capital, Knowledge Economy, Research and Development, Arab Countries

Introduction

Knowledge and innovation have substantial impact on the socio-economic development of modern nations. No longer are natural resources and financial endowments alone sufficient for fostering economic growth and sustaining development. Knowledge and innovation are considered key drivers of the new economy, reflecting a need for investment in education, research and development, science and technology and trade. In the developing countries, economic policies should focus on investment in knowledge creation and innovation to ensure rapid socio-economic growth and sustain development. Closing the digital divide is necessary to enhance productivity and catch up with the rest of the industrialised world. Global competition depends on an economy's ability to produce knowledge-based products and services.

In the Arab world, knowledge production remains inadequate to facilitate rapid conversion of resource-based into knowledge-based economies. Arab governments need to devise strategies aimed at restructuring the primary sectors of their economies and increasing economic diversification by investing in knowledge creation, technology diffusion and information dissemination. Similarly, governments need to allocate greater funding for research and development (R&D) to promote innovation and foster socio-economic development. Both public and private institutions and enterprises must be encouraged to conduct R&D to enhance national capabilities for innovation. In this regard, small- and medium-sized enterprises (SMEs) must be encouraged to participate

in the knowledge economy through knowledge creation and innovation. SMEs have substantial impact on job creation and business activities which ultimately add value to the local economy through the development of new products and services. Unfortunately, SMEs in most Arab countries are still lagging behind, adding small value to the total output of the national economy.

Currently the gap between developed and developing countries is widening, reflecting the need to restructure the economic system and diversification productivity to accelerate the process of development. Improving innovation performance increases linkages through investment in new businesses and trade, and by setting up new enterprises driven by spillovers from high-income countries. As a consequence, developing countries must encourage the inflows of Foreign Direct Investment (FDI) to increase trade and enhance collaboration with enterprises from high-income countries. In other words, building capacity for adapting, acquiring and improving technologies is important for promoting innovation and accelerating growth. The development of a national innovation system is essential for linking various actors in the public and private sectors together. Innovation is a product of collective work involving collaboration of productive agents of economies through sharing knowledge and exchanging ideas or through joint projects involving R&D.

The aim of this paper is to highlight the importance of innovation in the new economy and also to identify some of the challenges facing Arab countries

seeking to promote innovation and gain from globalisation. The paper also sheds some light on the role that knowledge creation plays in promoting economic diversification and increasing productivity. In the Arab world, knowledge production remains too weak to generate sufficient linkages and spin-off growth.

The national innovation system

In recent years, national economic strategies and policies have focused on innovation as a mechanism for building knowledge capacity and fostering economic growth. Concomitant with the rise of globalisation and advancement in information and telecommunication technologies (ICTs), innovation is essential for promoting development and speeding up the process of transformation. The components of a national innovation system include both public and private institutions and enterprises interacting with one another to generate linkages and promote development. At the national level, innovation and technological development constitutes a complex set of business transactions aimed at increasing productivity and creating market value by using knowledge and diffusing technology. The importance of innovation in building knowledge capacity is attributed to several factors. First, the new economy is described as knowledge-based, which relies on creativity and innovation for increasing knowledge contents. Second, globalisation has increased global access by providing opportunities for countries to compete in bigger markets. Competitiveness in new markets requires products and services brought by a high level of knowledge and innovation. Third, the diffusion of new technologies, mainly ICTs, has reduced the cost of managing knowledge and sharing information. This has provided an

opportunity for developing countries to gain global access to knowledge, skills and technology. In addition, falling costs has encouraged factor mobility, especially labour, among and within nations. Fourth, trade in goods and services has resulted in common standards which countries are required to meet in order to compete in the global markets. Finally, the internationalisation of science and technology has allowed many countries to increase collaboration and share research projects. As a consequence, there are innovation networks among firms, universities and research centres, which help in speeding up the process of technological learning and ultimately increase production and the export of knowledge-based products and services (see Ahmed and Al-Roubaie, 2012).

Innovation is measured by the share of total expenditure in total GDP allocated for research and development in the national economy. In 2009, the global expenditure on R&D accounted for 1.2\$ trillion, reflecting the importance of innovation in national economic policies worldwide. The countries of the South, including BRIC countries, have increased their share in total expenditure on R&D, taking advantage of the new opportunities brought by globalisation. For example, China, in terms of total global expenditure on R&D, increased from %2.2 in 1993 to %12.8 in 2009. In the same period, the United States alone accounted for one third of the global expenditure on R&D, whereas the Arab world spent the equivalent of only %0.3 on R&D. It is worth mentioning, however, that the share of Arab countries accounts for the lowest among world nations. As stated by the United Nations: "In MENA economies, technological progress is slow, capital accumulation has reached a ceiling, and there is high unemployment. To maintain

employment levels, labour productivity is kept low. In the absence of steady and continuous technological progress, countries retain substitution of capital for labour in order to stabilize employment” (World Bank, 2003).

Innovation is attributed to the value added by the development of new ideas, new knowledge, new technology, new markets and new methods. Inventions of new technologies or processes remain inventions until they are utilised for market purposes or for generating economic and social values to society. A good idea in the mind of the owner becomes innovation only when it is converted into products or services used by consumers in the market place. Thus, innovation can be seen as events brought by adding new value to businesses in the marketplace. It helps enterprises to increase competition and add financial values to business through market transactions. In this respect, innovation is defined as the “Conversion of knowledge into new commercialized technologies, products and processes, and how these are brought to market” (World Intellectual Property Organization, 2013). The World Bank point out that:

Innovation is a new and better product or service or a new and more efficient, or less costly, way of producing, delivering, or using that product or service. Innovation is important because it provides a means for getting more output or welfare from limited resources. Innovation may be new to the world as a whole, new to a country, new to a sector, or new to an individual. These distinctions are important, particularly from the perspective

of developing countries, because of the tremendous amount of knowledge that they are not using. If countries or firms devise better policies for acquiring and exploiting that knowledge effectively, they can greatly improve their growth and welfare (World Bank, 2010).

Innovation is defined in a variety of ways reflecting its multidimensional aspects. Joseph Schumpeter defines innovation as: “the commercialization of all new combinations based upon the application of:

1. *New materials and components*
2. *The introduction of new processes*
3. *The opening of new markets*
4. *The introduction of new organisational forms.”*

This definition highlights the importance of innovation as a means for enhancing market activities and promoting organisational change. It is important to point out that the indigenous or traditional knowledge system must be incorporated in the national innovation system in order to facilitate the exploitation of tacit knowledge and preserve the environment. In the Arab world, most models used in development are borrowed from OECD countries with little or no attention paid to local socio-economic conditions. Upgrading technology and modification of theoretical models to meet local conditions becomes essential for enhancing resource management and fostering economic growth. Arab countries share common social,

economic and environmental features which enhance the capabilities of these countries to build national capacity for innovation. Investment in human capital and technological learning facilitate knowledge creation, technology transfer and innovation (Harhara and Al-Roubaie, 2014).

Collaboration among universities, research centres, industries and national scientific and educational institutions allows knowledge sharing and efficient use of natural and human resources. In this age of digital technologies, joint research and information exchange become easier to conduct. Arab countries must construct strategies to encourage collaboration and share knowledge among key players in their national economies. Building enabling environments for innovation increases the prospect for greater collaboration across national borders through linkage creation and spillover effects. To this end, governments should provide support for creating such environments by allocating more funding for R&D, involving the participation of public institutions in R&D, encouraging small and medium enterprises, building ICT infrastructure and investing in human capital resources.

According to the 2013 Global Innovation Index (GII), among the top-ranking countries in innovation are Sweden, Finland, Singapore, New Zealand and Norway. The success of these countries is attributed to their balanced performance by incorporating both traditional aspects of innovation and the newer ones in the national innovation system. The economies of these countries are largely resource-based with many similarities to the countries in the Gulf region. Lessons can be learned from the success of these countries to build capacity for development in the Arab world. Arab

countries are endowed with adequate financial resources to support building innovation capacity to speed up the process of change and reduce dependence on the production and exports of limited resources, mainly oil and gas (The World Intellectual Property Organization, 2013).

Human capital resources

Human capital is paramount for knowledge creation and innovation. Human capital is a broad term related to the productive potential of labour cultivated through education and training designed to enhance people's capabilities to participate in an economy with concomitant improvement in their living standards. Economic development focuses on human capital as an input used in the production of goods and services. In the knowledge economy, human capital is important due to the role that skills and competence play in knowledge creation and innovation. As a consequence, investment in people is vital in the new economy to ensure rapid transformation into a knowledge-based economy.

The transition into a knowledge-based economy depends largely on people's capabilities, and the encapsulation of their skills and competences for participation in the economy. Accordingly, development of human resources must be given top priority in the process of transformation. In this regard, dynamism in the educational system is essential for enhancing creativity and improving capabilities of students to generate knowledge and create wealth. Rapid changes in the knowledge economy mandate that societies keep up with the pace of change needed to continue to develop new skills and competencies necessary to remain competitive in the face of globalisation. Knowledge workers

exhibit capabilities that qualify them to become more productive, creative and innovative.

Workers in the knowledge economy are encouraged to work in teams using their collective skills to solve problems and make sound decisions. As a consequence, governments in the GCC region must take serious steps and introduce radical reforms involving the integration of the university system into the national economy. The new educational system must involve a high degree of flexibility to adapt to globalisation and meet the challenges of technological changes. The critical skills for the 21st century are identified by the International Commission on Education for the Twenty-First Century to include (1) learning to do, (2) learning to be, (3) learning to relate, and (4) learning to learn (Asian Development Bank, [ADB], 2007).

There has been emphasis in recent years on learning instead of teaching, which allow students to solve problems and develop critical thinking skills as well as providing opportunities for lifelong learning. The knowledge economy is a dynamic process driven by knowledge and innovation. Critical thinking, solving problems and sharing information are important for promoting innovation and enhancing creativity. In an economy driven by entrepreneurship and market freedom, skills and human ideas increase incentives for invention and technological development. Human skills provide the necessary ingredients for knowledge codification, knowledge management and technological learning. In the Arab world, the educational system provides more theoretical and social studies than scientific and technological inputs, which are linked to increased productivity and improved linkages.

In this age of global competitiveness, knowledge workers and lifelong learning empower the economy by strengthening the process of knowledge creation and innovation. Endorsing continuity and change in the Arab world requires restructuring in the educational system to enable the economy to gain access to the knowledge of international best practices and increase spillovers to support the local economy. In most Arab countries, the quality of learning remains inadequate to meet the challenges of the new economy and to enhance global completion. Students are not trained in scientific and technical subjects, which induce technological learning and create the appropriate environment for innovation and knowledge creation. In the Arab world, most educational institutions and vocational and training schools are under public domain with little choices given to private educational institutions to participate in the productivity of the economy.

The skills needed to support the new economy differ from those taught in the traditional school systems. Students in the new school systems are prepared to become integrated into the knowledge economy and participate in creativity and innovation. This is to provide the flexibility that the labour market needs to utilise modern technologies and speed up the process of knowledge absorption and information dissemination. Most universities in Arab countries do not maintain linkages with industry (neither locally nor globally). In most cases, the curricula and the courses taught do not reflect the industry's need for skills and competences. Knowledge-based economies require skills to support creativity and innovation as well as to enhance the creation of knowledge capabilities.

Although Arab countries have increased their share of GDP expenditures on education, the educational system is still not fully integrated into the labour market to support market demand for knowledge workers and skilled managerial personnel. In Arab countries, furthermore, the access of women to the labour market is limited inasmuch as they are discouraged (if not excluded) from obtaining technical training or scientific knowledge. In the Arab world, until recently, the contribution of women to technical studies and scientific research remained far below the world average. Equal opportunity should be given to all if Arab societies are to overcome the gender issue and broaden labour market participation through increasing the share of women in the university system. Such a task will require a changing role of the government in order to provide greater incentives for women to study and participate in the economy. Even recently, although though the share of women in total enrollment has increased, they are mostly enrolled in arts and social studies. In this regard, the role of universities becomes important for enhancing research and development and also for providing equal opportunity to both men and women to participate in development. As the United Nations Educational, Scientific and Cultural Organization (UNESCO), points out: "Universities, in particular, can only produce quality higher education and R&D that responds better to national socioeconomic needs if freedom, democracy and tolerance are allowed to prosper within their walls" (UNESCO, 2010).

Research and development

Research and development represents the backbone of the national innovation system. Conducting research facilitates the creation of new ideas, processes

and products that generate value and increase economic diversification. "Arab countries have not produced a critical mass of fulltime equivalent (FTE) researchers in the majority of disciplines. Moreover, links between universities and research centers remain weak. This leads to little or no coordination at the national level between research communities. Also, even when fresh graduates are ready to become engaged in research, there is often no capacity within the R&D system to absorb them, or even any willingness on the part of senior researchers to mentor young minds" (UNESCO, 2010).

It is estimated that the total number of scientific research articles published by Arab countries stood at 13,574 in 2008, compared to 7,446 in 2000. This number indicates that the average for Arab countries was 41 per million compared to the world average of 147. A similar situation prevails with regard to patents, where most Arab countries are still lagging behind. Small countries such as Finland, South Korea, Singapore and Chile have far surpassed Arab countries in the number of researchers and patents per million. For example, South Korea acquired 84,110 patents in 2008 compared to a total of just 71 patents in the Arab world. There is no doubt that low expenditures by Arab countries on R&D has contributed to low innovation performance. Arab countries spend the amount of %0.3 of their GDP on R&D compared to %3.36 in South Korea, %3.45 in Japan, and 3.96 in Finland. Unfortunately, Arab universities are more teaching- than research-oriented. This orientation has reflected negatively on the capacity of universities to contribute to innovation and creativity in the Arab world. To this end, governments should reorient universities from the latter to the former to enable them to contribute

more effectively to the knowledge economy by providing incentives, facilities and rewards for researchers. They also have to reach out to industry and build collaborative relations to support joint research and enhance economic productivity. As pointed out by the United Nations, "The most important impediment to knowledge acquisition in Arab countries is the deficit knowledge system itself" (United Nations, 2003).

Arab countries should undertake serious restructuring of the educational system to make it more applicable to innovation and creativity. Currently, most Arab countries are dependent on global markets for knowledge, making them consumers rather than active producers of knowledge. Universities should be given full freedom to make choices and engage in conducting research that supports innovation and knowledge creation. The challenges facing Arab countries include high unemployment, especially among young people, widespread poverty, income inequalities, high rates of population growth and high illiteracy. All these problems require an increase in knowledge capacity, which is driven by knowledge creation, creativity, innovation, scientific application and technological learning to sustain socio-economic development. "A successful transition to new patterns of knowledge production is contingent on establishing all pillars of the knowledge society" (United Nations, 2003).

The rise of globalisation has increased the prospect of rapid socio-economic transformation driven by knowledge and information. Globalisation has brought new opportunities and has forced countries to initiate policies and construct strategies to meet the challenges of building capabilities for knowledge creation and innovation. In the new economy, countries are

required to strengthen the knowledge fundamentals by investing in human capital, enhancing institutional regimes, building ICT infrastructure, and building and contributing to the national innovation system. These ingredients represent the driver behind economic growth and sustainable development. In the developing countries the problem is more acute due to lack of political vision, inadequate financial support, inefficient institutions and weak infrastructure. Modern economies require governments to stimulate linkages and create enabling environments to enhance knowledge creation and increase technological learning. In the Arab world, most economies are still laggardly in their readiness to promote knowledge-based development and acceleration of the process of economic diversification. To catch up with the industrialised countries, Arab countries must adopt measures that ensure innovation and knowledge creation become key drivers of economic growth and sustainable development. It is estimated that the Arab countries must create 150 million jobs by the year 2025 to meet labour market demand and provide employment opportunities for young people. Such a scale of employment creation mandates economic restructuring and diversification from a resource-based to a knowledge-based economy (World Bank, 2003).

The transition to a knowledge-based economy

Recent literature on development has identified knowledge as a core factor in production and job creation. Thus, increasing the country's capabilities to create, absorb and apply knowledge enhances the country's ability to compete in global markets and benefit from globalisation. In the new economy, knowledge, information and innovation are key drivers in

sustainable growth and economic diversification. In this regard, the Arab countries must invest in research and development, education, human skills and innovation in order to diversify the economic structure and generate linkages.

Globalisation provides both opportunities and challenges, especially to developing countries, which must be met in order to facilitate global integration and gain benefit from globalisation. By opening up new markets, globalisation increases access to global trade, finance, knowledge, information and skills. Access to world markets induces change through knowledge acquisition and productivity diversification. Currently, the economies of most Arab countries depend on the production and export of a limited number of primary commodities. Such dependence has increased economic vulnerability and created uncertainty about future development in the region. For example, the oil boom played a negative role by “eroding a number of values and societal incentives that would have been helpful in enhancing creativity and the acquisition and dissemination of knowledge. With the spread of negative values during that period, creative abilities were neglected, and knowledge lost its significance for human development” (World Bank, 2003).

Building a national strategy to transform the economy into a knowledge-based economy requires the establishment of four important pillars including a highly skilled labour force, an effective institutional regime, an appropriate innovation system and ICT infrastructure. In most Arab countries, none of these pillars are adequate to support the building of knowledge capacity to transform the economy. In addition, Arab economies are

dominated by the public sector, and, therefore, there is a need for strong government involvement in building capacity for knowledge creation and innovation. The private sector is marginalised by the dominance of family businesses and by a government regulatory environment characterised by intervention in market activities. Initiatives to support private sector participation in the economy by encouraging SMEs as well as multinational businesses to take part in the new economy are feeble to non-existent. As pointed out by the World Bank “The MENA region suffers from an over-large public sector, over-regulation, bureaucracy, and control information” (World Bank, 2003).

A model for knowledge-based development must promote sustainability by supporting the social, educational and environmental systems of the society. Sustainable development is a process of creating a balance between present and future utilisation of resources to support continuity and change. The knowledge economy is an integral part of the knowledge-based development, the aim of which is to enhance economic productivity and foster economic growth. The utility of knowledge is to open new opportunities for the country by meeting the challenges of development including poverty reduction, productivity growth, economic diversification and human development. In short, building knowledge-based development requires the construction of an enabling environment endorsed by good governance, political commitment, macroeconomic stability, private sector participation and well-developed physical infrastructure (Asian Development Bank, 2007).

To speed up the process of conversion, Arab countries need to encourage the use of science and technology

to diversify their economies and reduce dependence on a limited number of primary products. These countries should develop a unified approach to remove constraints on development by adopting policies to diversify the economic structure and introduce measures to implement economic reforms. Development comprises both indigenous and global components which must be taken into consideration in order to realise the national objectives. In this regard, a model for development must balance the indigenous and global forces to strengthen the process of change and promote knowledge creation. The model in Table 1 involves broad-based objectives that serve as a

framework for leapfrogging and sustaining development. Development is a multidimensional process comprising social, political, economic, environmental and cultural elements which need to be incorporated in the model in order to build capacity for development. Governments must be actively involved in building such a capacity by investing in people, innovation, information and communication technologies and technological learning. Knowledge-based development should be integrated into the national economic policies in Arab countries to ensure knowledge creation and technology diffusion.

Table 1. *Model of Knowledge-Based Development (KBD)*

	Economics (KBE)	Social	Natural
Education (development of human capital)	Education for a skilled workforce	Education for total human development	Education for sustainable development
Innovation (Development of structural capital)	Systems, processes and technological innovations	New institutions and protocols for peace, equity and human rights	Environmental technologies, e.g. renewable energy technologies
Building networks (Development of stakeholder capital)	Financial and physical networks, e.g., ICT infrastructure	Social networks, social trust, cultural integrity	Agreements to protect and sustain planetary life support systems

Source: Asian Development Bank, Moving Toward Knowledge-Based Economies: Asian Experiences, 2007

Arab countries must increase cooperation in scientific and technological development to enhance creativity and knowledge sharing. Building a knowledge economy entails a collective approach capable of addressing the socio-economic challenges facing these countries. For example, the small size of the GCC economies does not encourage linkage creation, which in turn reduces the ability of the economy to accelerate the process of convergence to knowledge-based activities. Cooperation and collaboration among public institutions and private enterprises in these countries will strengthen linkage creation by increasing diversification and enhancing productivity. The knowledge-based economies are directly related to production, distribution, application and sharing knowledge and information. Knowledge economies encourage individuals, enterprises and institutions to create and apply knowledge to promote global competitiveness and strengthen productivity.

Table 2 illustrates some of the indicators used for measuring the state of innovation in several countries. Switzerland, Sweden, Singapore and the United States are among the leaders in innovation and creativity. These countries were able to build capacity for innovation by investing in institutions, infrastructure, human capital and knowledge and technology. Among the Arab countries, UAE, Qatar and Saudi Arabia are leading the rest of the Arab world in their readiness to build innovation systems to enable their economies to utilise knowledge and technology for rapid development. Innovation has become a key driver in the convergence toward a knowledge-based economy. In recent years, these countries have introduced regulatory measures and constructed adequate macroeconomic policies to encourage

innovation and foster economic growth.

The importance of institutions and universities

A successful innovation system requires an institutional framework to enhance capabilities and induce innovation. In most Arab countries, the public sector remains dominant over market activities, with little market share given to private enterprises to participate in the economy. The contribution of the private sector is limited to services and small-scale market activities including non-productive business, agricultural produce and transportation. In the knowledge economy, the private sector is to play an important role in R&D, knowledge creation and innovation. Building an effective institutional regime driven by market involvement is necessary for rapid technological advancement and a strong national innovation system.

Governments' strategies should be directed at establishing guidelines that support science and technology programmes and encourage innovation. Economic actors must be provided with greater access to digital networks to facilitate the sharing of information and the exchange of scientific ideas. Universities contribute to innovation by expanding the fields of research and creating value for knowledge. In a globalised economy, knowledge creation leads to the development of new products and new markets. In this regard, human capital becomes vital for utilising this knowledge and adding value to the economy GDP. Another important driver of innovation is the

Table 2. Innovation: key performance indicators for selected countries

Country	Institutions	Infrastructure	Human capital & research	Knowledge and technology output	Creative output	Global rank
Switzerland	87.3	57.0	55.4	61.5	71.8	1
Sweden	89.9	63.1	62.5	54.1	55.6	2
USA	86.0	57.5	61.1	53.6	49.2	5
Finland	95.3	57.5	67.4	50.8	53.9	6
Singapore	92.2	59.2	63.2	48.5	44.6	8
Denmark	95.3	53.9	60.4	41.9	58.8	9
UAE	75.6	49.7	50.0	12.0	47.6	38
Qatar	73.9	46.0	31.9	19.9	48.5	43
S. Arabia	58.4	40.6	39.8	24.8	48.2	42
Malaysia	69.0	43.1	39.7	38.7	45.6	32
S. Korea	76.0	60.7	64.8	47.8	41.3	18
Kuwait	61.4	35.3	31.2	44.7	36.4	50
Morocco	57.7	28.1	30.5	23.2	29.7	92
Oman	71.6	35.9	33.8	20.1	26.3	80
Algeria	47.1	25.7	29.1	17.6	11.6	56
Bahrain	69.9	39.8	27.8	26.1	29.4	67
Jordan	65.0	26.1	36.0	25.4	39.7	59
Syria	48.3	22.9	34.1	6.2	23.1	134
Egypt	43.9	33.7	28.3	18.0	28.2	108

Source: Global Innovation Index 2013

ability to seek knowledge from other countries, which requires government support through ICT infrastructure and the encouragement of private entrepreneurs to participate in the knowledge economy.

Arab countries under-invest in education in general and higher education in particular. For their part, governments should provide incentives for private enterprises to hire young people to gain experience and acquire the skills of technological upgrading. Creativity and innovation are driven by the utilisation of skills, knowledge and information in the production process to develop new methods and create market value. Under such circumstances, modification of school curricula in Arab countries is essential to increase the share of scientific and technological content. Radical educational reform needs to be implemented from elementary education through to higher education. In this age of global competitiveness, higher education is more in demand than ever before. The knowledge economy requires people with high-level skills to participate in capacity building for knowledge creation and technological learning. In the Arab world, universities could serve as change agents by contributing effectively to technological development, not only by training students to participate in an emerging knowledge economy, but also through conducting research, thus generating knowledge to facilitate the transformation from a resource- to a knowledge-based economy.

Unfortunately, universities are politically manipulated and poorly equipped to meet the challenges of globalisation. Most Arab countries are in the early stages of their development and, therefore, the demand for scientific skills and

engineering specialities remains low, with the effect that students eschew studying science and technology. Scientists and engineers will only have opportunities to contribute to technological development if Arab economies diversify beyond being resource-based; for example, in the oil-based economy, there are ample opportunities for petroleum engineers but not for electronic engineers. When there is demand for a technical skill, the temptation is to turn to a foreign-trained expatriate rather than building educational infrastructure, the startup costs of which are prohibitive except for the best-endowed educational institutions. Without substantial government support, universities will struggle to strengthen research and innovation that is able to meet the demands of global competition.

Arab countries, particularly the Gulf region, share several common cultural, environmental, social and economic features. Such characteristics facilitate resource utilisation through linkage creation and cross-border movement of capital and labour. Similarly, collaboration among public and private enterprises increases the prospect of knowledge creation and innovation. Conducting joint research programmes facilitates the sharing of knowledge, ideas and information as well as increasing technological learning. Arab countries need to develop a strategy to increase cooperation in knowledge creation through investment in education, building institutions and interaction with other nations, both globally and regionally. Currently, Arab countries readiness for building a knowledge-based economy is inadequate to speed up the process of knowledge creation and innovation. As pointed out by the United Nations: "A knowledge-based economy refers to the manner in which various high-technology businesses,

particularly computer software, telecommunications and virtual services, in addition to educational and research institutions, can contribute to the economy of a country as individual entities, or by enabling other sections of the economy to function more of knowledge in the production process" (United Nations, 2005).

Arab countries must build ICT capacity to broaden the absorptive capability to create sustainable economies driven by modern technologies and innovation. Initiatives to expand the absorptive capacity comprises several factors including: 1) An understanding of technological needs; 2) An effective identification of beneficial technologies and suppliers; 3) an ability to evaluate appropriateness; 4) technological and organisational skills; 5) An ability to adapt imported practices to local conditions using one's own resources (United Nations, 2005). These countries will be able to enhance the capabilities to innovate and create knowledge which supports leapfrogging by surpassing several developmental stages. In this age of global access, Arab countries can build their knowledge capabilities through FDI by learning from the experience of the industrialised countries. Modern information and communication technologies, including the internet, provide greater access to knowledge and information for development.

Building capacity for a knowledge-based economy must involve restructuring the productive system to increase the spillover effects and create new opportunities for knowledge creation and innovation diffusion. In other words, the Arab countries need to restructure their economies by reducing their dependence on the production of primary products, mainly oil and gas. The new economy offers new opportunities by making

knowledge a key driver in development. Yet the transformation towards a knowledge-based development will require the formulation of an effective strategy capable of stimulating growth through investment in education, knowledge creation and innovation. However, cooperation among Arab countries is critical for promoting change and sustaining development. Poor integration among Arab countries impedes productivity by reducing the effectiveness and capabilities of human and financial resources to support rapid socio-economic transformation. In this regard, governments in the region must play a greater role in restructuring the productive system to encourage the production and use of knowledge in the economy. For instance, access to global markets requires privatisation and liberalisation of the economy to enhance global flows and increase integration in global markets. In all, the government must support the creation of an enabling environment to stimulate knowledge transfer and improve global competitiveness. Universal education, human capital development, innovation and knowledge creation are among the features of the knowledge economy which the government needs to advance. As pointed out by the World Bank:

Innovation should be understood as the dissemination of something new in a given context, not as something new in absolute terms. While economically advanced countries naturally work at the technology frontier, developing countries have considerable opportunities for tapping into global knowledge and technology for dissemination in their domestic context (World Bank, 2010).

Arab countries must invest in the development of human capital resources and in building technological capacity that facilitates knowledge acquisition and technology dissemination. These countries can benefit from global knowledge to diversifying their economies and improve productivity. Governments enhance capacities of economies to acquire knowledge by removing obstacles to innovation through trade liberalisation, providing incentives for R&D, supporting private enterprises and building institutions to increase skills and competences. Innovations depend on a variety of endogenous factors spanning social, environmental, educational, financial and political

dimensions. In this regard, Arab countries need to be selective in their strategies in order to speed up the process of innovation and leapfrog certain steps. Priority should be given to those projects that generate greater linkages to increase economic diversification and enhance productivity through the creation of spillover effects across the economy. Countries such as Finland, Singapore and New Zealand, driven by the power of human skills and creativity, have been successful in transforming their economies into knowledge-based economies. In the knowledge-based economy, knowledge is treated as a means for creating wealth and supporting growth. The Global Innovation Index 2013 states:

A new type of development strategy driven by innovation is needed in Arab countries to cope with the daunting challenges-chief among them unemployment-they face. This new approach calls for higher growth rate regimes sustained by strong innovation and entrepreneurship efforts. Dynamic technology-based sites, such as science parks, industrial clusters, and so on, are key instruments for the success of an innovation-driven development strategy. Inspired by global experience, a number of Arab countries have actively embarked on such sites; there are no less than 50 techno-parks in the region. Most of those, however, have experienced difficulties in 'taking off' and remain essentially real estate ventures (The World Intellectual Property Organization, 2013).

Conclusion

In this paper, the importance of knowledge and innovation in the new economy has been highlighted. The new economy, driven by globalisation, has increased opportunities for developing countries to take advantage of international trade and gain access to knowledge, technology and information. This has helped in accelerating the process of economic growth through the opening up of new markets, which has increased global flows and factor mobility. By enhancing economic productivity and diversifying the economic structure, a few countries (Finland, New Zealand, Singapore, etc.) have managed to build capacity for knowledge absorption and technology, enabling them to transform themselves into knowledge economies. The knowledge economy requires the implementation of four pillars, including human capital development, a well-defined innovation system, ICT infrastructure and a sound institutional regime.

The current capacity for knowledge creation in most Arab countries is weak. The overall state of knowledge readiness is inadequate to allow

these countries to attain the rank of a knowledge economy, given concomitant supply- and demand-side constraints. On the supply side, low levels of education and training of the workforce hinder the process of conversion into a knowledge economy as knowledge and technology are not utilised in a productive and effective way. Lack of skilled manpower also hampers the ability to conduct research and development and promote innovation. On the other hand, constraints on the demand side arise from the fact that the demand for knowledge in most Arab economies remains inadequate to create linkages with manufacturing and educational sectors largely inactive in research and development, stemming from weak demand for innovation in the resource-based local economy. Symptomatic of their inability to enhance capabilities to apply knowledge in their respective economies, Arab governments have largely failed to devise effective strategies for innovation that transcend these supply- and demand-supply constraints.

The content of knowledge in the economies of most Arab countries is relatively low, which inhibits rapid socio-economic transformation. It is urgent for governments in the region to speed up the process of conversion from resource-based to knowledge-based economies. The public sector is still paramount in the allocation of financial and economic resources and, therefore, without the endorsement of the public sector, sustainable development leading to a knowledge-based economy will not be possible given current barriers to linkage creation and knowledge dissemination pervasive throughout the economies of these countries.

The current state of development in most Arab countries is inadequate to meet the challenges of building a knowledge economy. Weakness inherent in the economic structure and a low level of economic diversification hinder economic growth by reducing these countries' capabilities to participate in international trade and benefit from globalisation. Rather than contracting, the knowledge gap between Arab countries and the industrial countries is actually widening, reflecting the need for immediate action on the part of Arab leadership so that the public and private sector can work in unison rather than at cross-purposes, on a regional rather than a national level. The task, though daunting, provides the only viable means to averting future shocks entailing bleak social, economic and political consequences stemming from grid-lock in effectuating the transformation to knowledge economies.

References

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.

Asian Development Bank (ADB) (2007) *Moving Toward Knowledge-Based Economies: Asian Experiences* (Manila: ADB), p. 11.

Harhara, Fahad Saif and Al-Roubaie, Amer, (2014) "Joint Estimation of Economic Growth and FDI in UAE", *International Journal of Innovation and Knowledge Management in the Middle East and North Africa*, Vol. 3, No. 2, pp. -147 177.

United Nations, Arab Human Development Report (2003) *New York: United Nations*, p. 89.

United Nations Educational, Scientific and Cultural Organization (UNESCO), (2010) *UNESCO Science Report* (Paris: UNESCO, 2010), p. 253.

United Nations (2005) *Toward an Integrated Knowledge Society in Arab Countries*, New York: United Nations.

World Bank (2003) *Knowledge Economies in the Middle East and North Africa*, Washington: World Bank, p. 7.

World Bank (2010) *Innovation Policy: A Guide for Developing Countries*, Washington: World Bank, p. 31.

World Intellectual Property Organization (2011) *World Intellectual Property Report*, Geneva, p. 23.

World Intellectual Property Organization (WIPO) (2013) *Global Innovation Index*, Geneva: WIPO.

About the authors

Professor Amer Al-Roubaie is currently the Dean of the College of Business and Finance, Ahlia University, Bahrain. He obtained his PhD in Economics from McGill University in Montreal. He taught economics, finance, international development, Islamic banking and finance and globalisation in Canada, the US and Malaysia before joining Ahlia University in Bahrain. He has written extensively in the fields of development, international business, Islamic finance, globalisation and the knowledge-based economy. His publications include books, research reports and many articles which have appeared in a number of international journals. Prof. Al-Roubaie's latest book is Routledge's Islamic Economics (in four volumes). **Email: aalroubaie@ahlia.edu.bh**

Professor Tariq Shareef Younis has thirty years of teaching and supervision at both undergraduate and graduate level. He is a graduate of Mosul University, Iraq, where he received his BSc in Business and Accounting. He received his Masters in Public Administration from the University of Liverpool, UK, and his PhD from Mosul University, Iraq. Professor Younis specialises in Strategic Management. He is also engaged in research and consultation in the field of Business and Strategic Planning, higher education quality assurance and the National Qualifications Framework. He has occupied several academic leadership positions. **Email: tariq522002@hotmail.com**