Performance Measures for the Knowledge-Based Economy (KBE): A Case of Kuwait

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Abstract: A knowledge-based economy (KBE) is one that utilizes knowledge as the key engine of economic growth and development. Various international frameworks have suggested different approaches to review knowledge management activities to determine the transformation toward KBE. This study reviewed the status of the KBE in Kuwait. The study was carried out in two phases. The first phase focused on selecting the performance measures to be used to collect data on knowledge management activities in Kuwait. Focus group discussions were conducted in this phase with selected experts from the Central Statistical Office of Kuwait and it was concluded that it would be appropriate to use the set of key variables applied in the Knowledge Assessment Methodology (KAM) developed by the World Bank.

In the second phase, a range of comparative data tables, charts and diagrams focusing on the overall KBE position of Kuwait and its component parts were produced using the KAM. Strengths and weaknesses in each of the four pillars of the knowledge economy in Kuwait were identified.

Kuwait has performed pretty well on most of the 14 key variables, except in education where its scores are lower than several countries in the Arab Gulf Region. Findings also showed that Kuwait's Knowledge Economy Index (KEI) is above the average of the Middle East and North African (MENA) region, but it is lower than other A GCC countries except Saudi Arabia. In addition, Kuwait's Knowledge Index is found to be lower than three other A GCC countries (Bahrain, Qatar and the UAE), indicating that production of knowledge in Kuwait is on the lower

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side. In terms of the four pillars of the Knowledge Economy framework, Kuwait is leading in the area of ICT applications, is strong on the Economic Incentives and Institutional Regime pillar, weak on the Education pillar, and Innovation is the weakest pillar.

Key words: Knowledge-based economy (KBE), Knowledge management (KM), KBE performance measures, Kuwait

Introduction

There has been an increasing realization that to take advantage of the opportunities becoming available as a result of new developments in ICT and networks, steps need to be taken toward building a knowledge-based economy. In this new socio-economic model, production and use of knowledge become the central focus. Various international frameworks have been developed to assist countries in this regard. Schwalje (2011) traces the evolution of knowledge-based economic development in the Arab World. He thinks that while many countries in the region have made large state-driven human capital investments, not much effectiveness has been noticed towards knowledge-based development. He also sees a disconnection between the skills developed and skills required in the corporate sector. Such gap, in our opinion, can stall knowledge-based development in the Arab countries.

This paper reviews the status of the KBE in Kuwait. The paper is based on a study that was carried out in two phases. The first phase focused on selecting the performance measures to be used for the collection of data on knowledge management activities in Kuwait. In this phase, several international KBE frameworks were reviewed; and studies that applied KBE measures drawn from the frameworks were used to shortlist indicators for a review of Kuwait as a KBE. Focus group discussions were conducted with selected experts and informal meetings were held with officers from the Central Statistical Office of Kuwait to finalize the list of measures and indicators. These discussions aimed at determining the suitability of selected performance indicators for measuring the status of KBE in Kuwait. It was concluded that it would be more appropriate to use the set of key variables applied in the Knowledge Assessment Methodology (KAM) developed by the World Bank. Since this methodology has been applied in reviewing knowledge management activities in several countries, use of these variables enabled data compilation from secondary sources. It also facilitated Kuwait's benchmarking with other countries.

In the second phase of the study, data were collected on the various KBE variables to determine the status of Kuwait as a KBE and compare it with other countries in different regions. The paper provides an overview of the major frameworks developed by the various international organizations, and reviews different studies that attempted to draw measures and indicators to review the status of knowledge-based economy. After detailed analyses of different aspects of knowledge management activities in Kuwait, recommendations are put forward to fill the gap in knowledge management activities in the country.

The KBE review exercise reported in this paper focused on the following objectives:

1 - To provide an overview of the international frameworks related to the knowledge-based economy (KBE).
2 - To review studies on the application of performance measures aimed at drawing indicators and measures for review of progress of countries and societies toward KBE.
3 - To choose an appropriate set of variables appropriate to investigating the progress of Kuwait as a KBE.
4 - To compile information and data on the key variables of the KBE in Kuwait.
5 - To review status of Kuwait as a KBE, and benchmark its progress with other countries in the region and in the world.

Theoretical Orientation

A knowledge economy (KE) is one that utilizes knowledge as the key engine of economic growth. It is an economy where knowledge is acquired, created, disseminated and used effectively to enhance economic development (Chen and Dahlman 2005). One of the main characteristics of the knowledge economy according to Kenway and Ghany (2012) is the increased expansion of employment in science and technology in all fields of the economy. In addition, a KBE affects experiences, learning ability, organization and innovation in the economic system. It has been found that the successful transition to the knowledge economy typically involves elements such as long-term investments in education, developing innovation capability, modernizing the information infrastructure, and having an economic environment that is conducive to market transactions. Several countries, for example Korea, Malaysia, Finland, China

and Chile, illustrate the rapid progress that can be made over relatively short periods of time by pursuing coherent strategic approaches to building capabilities to create, access and use knowledge.

The various frameworks that highlight the importance of knowledge and related activities are summarized in the next section.

OECD KBE Framework

The OECD defined the KBE as an economy which is directly based on the production and use of knowledge and information (OECD, 1996). The OECD started work in the area of the KBE in the early nineties. The OECD Science, Technology and Industry Scoreboard in 1999 revealed indicators for benchmarking the KBE among OECD economies. The scoreboard developed indicators that examined the investments in intangibles, ICT, and science and technology. The indicators reflect the globalization challenge facing OECD economies, highlighting trends in international trade, foreign investment and internationalization of technology. Its report on the Growth Project (OECD, 2001, 2002) emphasized the importance of a stable and open macro-economic environment with effective functioning markets; diffusion of ICT; fostering innovation; development of human capital; and stimulating firm creation.

The OECD Scoreboard (2003, 2006, & 2007) continued to show a rising knowledge intensity of OECD economies. The growing role of knowledge was reflected in economic performance such as trade patterns and stronger productivity growth in some OECD countries. The globalization of economies continued and was accompanied by greater international mobility especially of highly skilled workers. R&D expenditure had also risen steadily due to higher business investment in the services sector and high technology industries which accounted for much of the increase in R&D spending. New technologies attracted funding from both the public and private sectors. Patent filings rose and the human resource base expanded and became more mobile. A larger proportion of the population entered universities and majored in a multitude of disciplines. ICT technologies diffused widely and countries increasingly adopted broadband technologies. The number of ccomputers in homes and use of Internet increased. However, the categories and indicators from OECD did not present a full picture of what a KBE

should encompass. The indicators came across as general indicators as they had to be used across the board for all OECD countries. The categories used to classify the indicators are primarily geared towards technology, implying that a KBE hinges on high technology industries with workers focusing on R&D.

APEC Framework and Associated Indicators

The APEC framework (2000) was developed as part of a report commissioned by APEC leaders. This report strived to provide the analytical basis useful for promoting the effective use of knowledge, and the creation and dissemination of knowledge among APEC economies (APEC, 2000). It included four preconditions for a KBE derived from the OECD Growth Project report. These preconditions form the basis of the APEC framework and can be summarized in terms of business environment, ICT infrastructure, human resource development, and innovation system dimensions.

APEC indicators for the business environment consisted of three hard or objective measures (service exports, high-tech exports and foreign direct investment) and the rest were soft or opinion measures (APEC, 2004). The indicator "Business usage of ICT index" under the ICT infrastructure dimension used an ICT index scale of 1-7 taken from the World Economic Forum (2003-2004). The ICT index was based on the estimates of an economy's installed business computers, firm-level technology absorption and prevalence of foreign technology licensing. Similarly, indicators in innovation system dimensions also showed a split between "hard" and "soft" aspects. The indicator "Human development index (HDI)" under the human resource development dimension was coined by the United Nations Development Program (UNDP) as a composite of three indicators of human development: life expectancy at birth; education attainment; and GDP per capita.

The APEC framework attempts to present a more holistic view of the KBE, compared to the OECD model, by attempting to develop indicators based on the four dimensions. It included the human resource development implying that people's development is an important part of a KBE. However, the APEC framework still relies heavily on indicators that measure R&D as the only form of innovation in a KBE.

The World Bank Report on the KBE

The World Bank Report (2007a) declared knowledge as a critical resource for KBE and proposed implementation of certain policies to increase knowledge creation, knowledge acquisition, and absorbing and communicating knowledge. The report highlighted that problems of development should be looked upon from a knowledge perspective. It identified two types of knowledge that are critical for countries looking to become knowledge-based economies or societies. The first type includes knowledge about technology, or simply know-how referring to the skills or capabilities to do something. Typically, developing countries have less of this know-how than developed countries. These unequal distributions of know-how are called knowledge gaps. The other includes knowledge about attributes, like quality of a product, diligence of a worker or credibility of a firm, crucial to effective markets. The incomplete knowledge about attributes is referred to as information problems.

The report proposed certain policies to increase both types of knowledge through knowledge creation, knowledge acquisition, absorbing knowledge and communicating knowledge. These include policies for acquiring knowledge (economic incentive and institutional regime); policies for absorbing knowledge (education and human resources); policies for communicating knowledge (information infrastructure); and policies for creating knowledge (innovation system).

The report also emphasized that knowledge is critical for a KBE and implied that in order to become a KBE, policies for knowledge creation, absorption, acquisition and communication should be in place.

Australian Bureau of Statistics

The ABS framework (2002) was developed to measure knowledge in the Australian economy and society. The framework draws on the work of the APEC report (2000) and the OECD model (1996) except that it explicitly includes the concept of a knowledge-based society because of the presumed importance of societal factors and the potential positive and negative impacts on society with the increasing emphasis on knowledge. Hence the ABS framework consists of five dimensions, namely innovation and entrepreneurship, human and social capital, the role of ICT, the fundamentals- economy, society and environment,

economic and social impacts. The ABS framework presented five dimensions, related characteristics and associated indicators.

The ABS framework placed much emphasis on studying the effects of knowledge on society and the changes knowledge has caused to the society, economy and environment. The framework attempts to assign indicators to every economic and social phenomenon that might have been impacted by the increasing emphasis on knowledge. The fundamentals - economy, society and environment and economic and social impacts - revealed characteristics and indicators such as the extent of volunteerism in the society and the tele-working patterns of the workforce. Although some of the indicators are similar to those of the OECD and APEC models, the majority of the indicators primarily target the effects of knowledge on society instead of the measuring of knowledge in society.

New Economy Index

The New Economy Index is aimed at benchmarking the economic transformation in the United States. It was a continuing effort to better measure the KBE. The New Economy Index consists of five categories that capture the environment of the KBE, namely quality of jobs (knowledge jobs), globalization, economic dynamism and competition, transformation into a digital economy and technological innovation capacity. Twenty-one indicators are divided into these five categories that were meant to capture what was new about the KBE. As the indicators were developed to track the economic transformation in the US, some of the indicators were more specific to US state of affairs: For example, the indicator "Internet and computer use by farmers and number of.com domain names registered." The index predominantly attempts to measure the knowledge economic transformation of the US instead of measuring the level of knowledge intensity as does the OECD or APEC. Raw scores for each indicator are calculated for each state. In the composite analyses, the indicators are weighted according to their relative importance so that closely correlated ones do not bias the results.

In addition, to measure the magnitude of differences between states and not just their ranks, scores for each indicator are based on the standard deviation of each from the mean score of all of the states. Main contributions to this framework come from the Information Technology

Foundation (TITF) and the Kauffman Foundation for Entrepreneurship. Five reports on State New Economy Indexes have been published in 1999, 2002, 2007, and 2008 to measure the economic structure of states. The 2010 report focuses more narrowly on a simple question: To what degree does the structure of state economies match the ideal structure of the New Economy? A defining characteristic of the New Economy is that it is global. Therefore, the index uses a number of variables to assess how globally linked a state's economy is. (http://www.itif.org/files/2010-state-new-economy-index.pdf)

Thrust of KBE Models

The review of KBE frameworks in the previous section shows that the OECD model was used as a basis for other models like APEC and the World Development Model. The ABS framework (aimed specifically at Australia) was built upon the work of both the APEC report and the OECD model. Many of the KBE models were built upon the OECD framework, hence there had been many overlaps in the indicators. Because the indicators introduced were specific for OECD countries, applying them directly to measure countries in a different region with different characteristics at a later stage would yield some mismatch. The APEC report also considered the production, distribution and use of knowledge as the main driver of growth, wealth creation, and employment in a KBE (APEC, 2000). The Australian Bureau of Statistics framework (ABS, 2001) was developed to measure knowledge in the Australian economy and society and draws on the APEC and OECD reports to highlight the increasing emphasis on knowledge activities in the knowledge-based society. These various concepts of a KBE suggest an emphasis on knowledge management for achieving successes as a KBE. They all stress that the basis for economies to grow successfully lies in the creation, acquisition, dissemination and effective use of knowledge. A closer look at these frameworks indicates that knowledge management activities are becoming important indicators to review the progress of communities and society toward a knowledge-based economy.

The models and frameworks reviewed in the earlier section have one common trait in that they all give a basic analysis of the environment a KBE should possess. Several organizations have attempted to develop indicators that each felt could best measure the countries that they

represent. The indicators chosen by the OECD had to be applicable to all the member countries in the OECD involved in the study, hence this could be a limiting factor to the indicators chosen. The indicators in the New Economy Index (2002) were specific to the US economy.

The OECD first popularized the concept of the KBE among its member countries and stressed the need for using existing indicators and methods to map a KBE. The OECD rigorously attempted to use existing statistics to give form and a rich empirical content to the KBE (Benoit, 2006, p.19), and defined KBEs as "economies which are directly based on the production, distribution, and use of knowledge and information" (Benoit, 2006, p.20). The OECD identified six priority areas for indicator development: mobility of human resources, patents, innovation capabilities of firms, internalization of industrial research and development (R&D), and government support for innovation and information technology (Benoit, 2006, p.22). The OECD also used or varied the existing and old indicators to fit the scoreboard of indicators to measure a KBE (Benoit, 2006, p.22).

Performance measures for KBE

The frameworks developed by the OECD, APEC, World Bank, and ABS provide a good foundation for measuring the impact of knowledge activities at a national level. These frameworks seek to capture the essence of the KBE; each is purpose-designed and targets a specific economy or group of related economies. Nonetheless, collectively, they form a useful resource which is context-sensitive. These KBE assessment frameworks suggest measurement of activities in four areas of knowledge management: creation, acquisition, dissemination, and use of knowledge. Several studies have been carried out to apply these metrics to individual countries. These studies provide good pointers for the practical application of these metrics but further refinement through empirical research appears necessary. Toh, Tang, and Choo (2002) attempted to map Singapore's economy using the four knowledge activities suggested in the aforementioned KBE frameworks. They attempted to normalize knowledge indices to benchmark Singapore's performance as a KBE with selected OECD countries and to keep the assessment ongoing over the years and usable across larger knowledge economies. Leung (2004) applied these measures to assess the progress of Hong Kong as a KBE.

He concluded that the OECD and APEC frameworks are descriptive and thus use available statistical indicators to describe, understand and measure a KBE instead of doing so through a defined statistical framework. The level of emphasis by different measurement frameworks varies across different knowledge dimensions (for example, APEC places more importance on human development as compared to OECD). This prohibits a strong overlap among these frameworks making it difficult for these measurement frameworks to converge into a single internationally recognized measurement framework. Sheehan (2005) highlighted that traditional tools and approaches do not work to measure knowledge management activities. He emphasized that knowledge intensive organizations sustain their competitive advantage through processes of knowledge creation and direct application of knowledge. Therefore, knowledge is considered more important than other inputs such as human capital and physical or financial capital. It can be concluded from the thrust of this study that knowledge creation, knowledge acquisition, and knowledge application are important indicators for effective knowledge management activities. Chen and Chen (2006) provided a decade review of knowledge management performance evaluation highlighting the need for descriptive statistics in the areas of knowledge management. This study suggests a new metric, knowledge management performance index (KMPI). The authors suggested that a KMPI can be used to determine knowledge management activities from the following perspectives: knowledge creation, knowledge conversion, knowledge circulation, and knowledge completion. The study provided a good measurement framework to enable knowledge assets to be leveraged effectively and efficiently.

Peng (2007) did a comparative study of KBE development activities between China and the US using a set of indicators in selected areas of knowledge creation and application. The author asserted that an indicator model is more appropriate to measure knowledge management than the econometric model and statistical framework. An indicator model was developed with four dimensions such as knowledge input, human capital, ICT application, and innovation performance. Each dimension has several different indicators. The Analytic Hierarchy Process (AHP) is used to give those indicators different weights and to compose them into a compound index in all hierarchies. The model was

used to compare the four dimension index differences of the development of Chinese and American knowledge-based economies. Another study that significantly contributed toward refinement and validation of KM performance measures was done by Sockalingham (2008). Her empirical study focused on exploring the practical application of knowledge performance measures by using data and information from already existing resources. This study attempted to consolidate the measures drawing on earlier studies by Toh, Tong, and Choo (2002) and considering that Fong (2005) focused more on Singapore. The measures examined encompass the four phases of knowledge flow namely knowledge creation, acquisition, dissemination and application. Sockalingham (2008) validated the measures for practical implications and identified the types of sources that can yield relevant information. She concluded that it was easy to validate most of the indicators with certain exceptions due to difficulties faced in finding publicly available data, indicators being more organization-based than country-level measurements, and the irrelevance of some indicators in the context of measuring a KBE of today. There were no significant issues of currency of data as the data used is generally between the years 2005-07. Only five out of 28 indicators could not be considered valid against the criteria used in this study.

Review of KBE models and previous studies of application of these models were useful in this project for refining the research methodology that is described in the next section.

Methodology

Refinement of measures and indicators

We selected the set of KBE indicators used by Sockalingham (2008) as a potential set of variables for compiling information on the KBE in Kuwait. The selected indicators were expected to appropriately measure the current and near-future economic activities in Kuwait. Another consideration in the adjustment was that the list of indicators should not be too lengthy or complicated. It was also considered important that data relevant to the proposed indicators should preferably be available from secondary sources. The main objective of the refinement exercise was to make the measures and indicators more relevant to Kuwait. Focus group discussions were used to seek this input.

After detailed discussions and a thorough review of variables used by the KAM, which is an assessment of the four interlinked knowledge economy pillars, we decided to use the World Bank performance measures and the already available World Bank data and concentrate on analysis and comparison of KBE related information to gain an overall picture of the progress Kuwait has made in the area of a KBE. The KAM employs 109 variables to measure the performance of countries toward a KBE. Variables are normalized on a scale of 0 to 10 relative to other countries in the comparison group. Variables are used in two forms: scaled by population and in absolute values. Fourteen key variables are used to compute a basic KBE scorecard and to compute the Knowledge Index (KI) and Knowledge Economy Index (KEI), which can also be in weighted and un-weighted forms. Using the KAM, the readiness of a KBE is assessed against two indexes: the KI measures a country's ability to generate, adopt and diffuse knowledge and the KEI takes into account whether the environment is conducive for knowledge to be used effectively for economic development.

The KAM focuses on the four pillars of the KE framework:

* An economic incentive and institutional regime that provides good economic policies and institutions that permit efficient mobilization and allocation of resources and stimulate creativity and incentives for the efficient creation, dissemination, and use of existing knowledge.
* Educated and skilled workers who can continuously upgrade and adapt their skills to efficiently create and use knowledge.
* An effective innovation system of firms, research centers, universities, consultants, and other organizations that can keep up with the knowledge revolution and tap into the growing stock of global knowledge and assimilate and adapt it to local needs.
* A modern and adequate information infrastructure that can facilitate the effective communication, dissemination, and processing of information and knowledge.

Four types of metrics can be developed to measure the KBE performance of a country using the KAM. These include a basic score (based on 14 variables); custom scorecards that allow any combination of the 109 variables; and the Knowledge Economy Index and Knowledge Index which present performance scores of all countries on the KEI and KI indexes, as well as on the four KBE pillars, in a sortable table format.

The KAM has been applied to analyze KBE activities in several countries. For example, Kuznetsov and Dahlman (2008) reviewed the transition of Mexico to a knowledge-based economy. Junghee and Chen (2007) reviewed the status of Korea as a knowledge economy. Qatar Planning Ministry (2007) analyzed the potential of a KBE for Qatar and attempted to benchmark Qatar as a KBE with other countries using the KAM.

Data collection and KBE measures

A series of steps were taken for the application of the KAM to compile information on knowledge activities in Kuwait and to review the status of Kuwait for transition to a KBE. These steps are summarized in Figure 1.

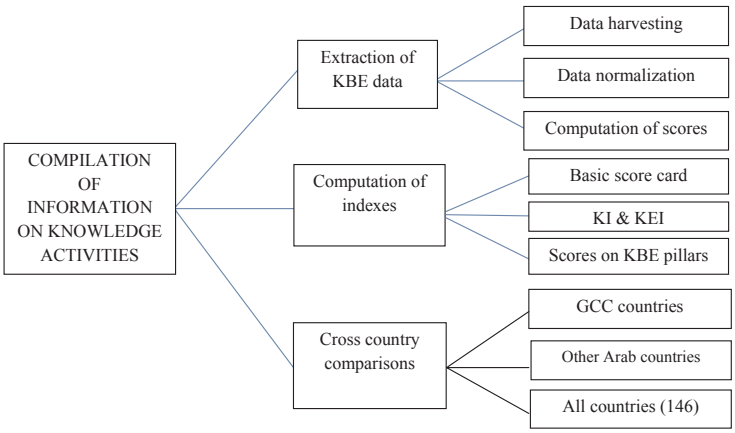

Figure 1: Data Collection Process

Data were harvested from the World Bank database which derived information from a variety of international sources. Extracted data were used to compute several KBE metrics about Kuwait, GCC countries, selected Arab countries and different regions for benchmarking. These data are presented in a number of tables and spider charts. Use of data from secondary international sources makes it easy to compile reports on the various KBE performance measures and saves the tremendous amount of effort required to generate data from local sources. However, it also places some limitations in terms of time-lag. While most indexes

and scores represent 2009, in some cases earlier years, e.g., 2005 and 2007, are included. For historical and comparative purposes, data are available from 1995 and 2000. This is a general problem with all secondary sources of data as it takes time for international agencies to obtain data from individual countries and synthesize into a consolidated form. We have used the most recent years where available. If data were not available for recent years, averages were used to calculate, score and compute relevant indexes.

Different combinations of data were used to prepare 13 tables showing scores and indexes on different aspects of a KBE. In addition, several spider charts have been used to portray the data to facilitate a graphic view and cross-country comparisons. Detailed information on the KBE is presented in the next section, which follows a discussion to highlight strengths and weaknesses for transition to the KBE in Kuwait.

Findings

Basic Scorecard

A basic scorecard was computed for KBE activities in Kuwait using 14 key variables as proxies to the four pillars of the KE. This provides an overview of the performance of a KBE in Kuwait. Variables are normalized on a scale of 0 to 10 relative to other countries in the comparison group. The 14 standard variables include two performance variables and 12 knowledge variables, with three variables representing each of the four KE pillars. The comparisons for the 14 basic scorecard variables can be made for the year 1995 or for the most recent year, which may vary depending on the availability of data from international sources. The 12 knowledge variables used in the basic scorecard are selected on the basis of their ability to proxy the respective KE pillar.

For the innovation variables in the basic scorecard, there is an option to either have the variables weighted by total population (divided by total population measured as millions of persons) or un-weighted (not divided by anything). Innovation variables that are weighted by population indicate the strength of the innovation pillar while accounting for the total population of the economy, which is a commonly accepted norm of presenting macro variables such as GDP per capita or number of births per thousand persons. Innovation variables that are un-weighted indicate the critical mass effect where there tends to be more creativity

and innovation, and the greater number of people within a specific geographical location to exchange ideas.

In Table 1, which shows the basic KBE scorecard for Kuwait, data for 1995 and the most recent year are shown. As stated earlier, this year may vary depending on when the data was updated in the international sources used to derive data for a particular variable. For Kuwait, while most data are up to 2009, for some variables data are for the year 2007. This is in a way a limitation as the situation might have changed for better or worse during the last five years. Also, the data are used in a normalized form. This means that the actual numbers might have gone up since the normalized form provides a view from the perspective of progress made in the region with which the country is compared. The data in Table 1 are normalized compared with all countries included in the World Bank database.

Table 1: KBE Basic Scorecard for Kuwait

#	Variable	Most recent	1995
1	Annual GDP Growth (%)	9.79	9.79
2	Human Development Index	7.90	7.48
3	Tariff & Nontariff Barriers	6.08	7.97
4	Regulatory Quality	5.96	3.59
5	Rule of Law	7.47	7.50
6	Royalty Payments and Receipts	n/a	n/a
7	S & T Journal Articles/Mil. People	7.15	7.66
8	Patents Granted by Million People	7.47	7.31
9	Adult Literacy Rate (% age 15 and above)	5.41	3.64
10	Gross Secondary Enrollment Rate	5.83	4.79
11	Gross Tertiary Enrollment Rate	3.55	5.52
12	Total Telephones per 1000 People	6.37	7.38
13	Computers per 1000 People	7.61	7.54
14	Internet Users per 1000 People	6.92	7.45

As shown in Table 1, KBE performance scores of Kuwait were lower in areas of Regularity Authority, Adult Literacy, and Gross Secondary

Enrollment but still higher than 5, except Gross Secondary Enrollment (3.55). We noticed that no data were available for Royalty Payments and Receipts. In the Gross Tertiary Rate, the score has actually gone down when compared with the year 1995. This represents the ratio of total enrollments to the population of the age group that officially corresponds to the level of education shown. Data available from relevant information sources were up to 2007. A lower score for Tertiary Enrollment is an indication of a slower progress in this important area related to the KBE. However, further information will be helpful in this regard. The actual numbers might have gone up during the last five years.

Kuwait's scores for seven variables out of the 14 key variables are in the range of 7-8, which is a positive sign of transition toward the KBE. Other than the annual GDP, scores are higher or closer to 70 percent for Human Development Index, S & T Journal Articles, Rule of Law, and Computers.

Table 2: Basic Scorecard for Kuwait and other GCC Countries

#	Variables	Kuwait	Bah-rain	Oman	Qatar	Saudi Arabia	UAE	Average ME&NA	All countries
1	Annual GDP Growth (%)	10.00	8.33	2.78	8.89	6.11	9.44	6.03	5.52
2	Human Develop-ment Index	9.44	7.22	6.67	8.33	6.11	7.78	4.58	4.02
3	Tariff & Nontariff Barriers	7.22	5.56	8.89	7.78	8.33	6.67	3.32	4.41
4	Regulatory Qual-ity	6.11	8.89	7.78	7.22	5.00	8.33	5.10	5.37
5	Rule of Law	7.78	7.22	8.33	9.44	5.00	7.22	6.14	5.86
6	Royalty Payments and receipts (US$/ pop.)	n/a	n/a	n/a	n/a	2.00	n/a	7.35	8.28
7	S&E Journal Arti-cles / Mil. People	9.44	5.56	5.00	6.11	3.89	7.22	7.12	7.74
8	Patents Granted / Mil. People, aver-age 2003-2007	8.89	1.67	5.00	7.78	6.67	8.33	8.25	8.32

Cont/ Table 2: Basic Scorecard for Kuwait and other GCC Countries

#	Variables	Kuwait	Bah-rain	Oman	Qatar	Saudi Arabia	UAE	Average ME&NA	All countries
9	Adult Literacy Rate (% age 15 and above	9.44	6.67	4.44	7.22	5.56	7.78	2.71	3.32
10	Gross Secondary Enrollment rate	6.11	9.44	6.67	10.00	8.33	7.78	4.00	3.72
11	Gross Tertiary Enrollment rate	2.94	7.65	4.71	2.35	5.29	3.53	4.53	5.69
12	Total Telephones per 1000 People, 2007	6.67	8.33	6.11	9.44	7.22	10.00	5.43	5.21
13	Computers per 1000 People	9.41	7.65	4.12	8.24	7.06	10.00	5.92	7.25
14	Internet Users per 1000 People	7.78	7.22	2.22	8.89	5.56	10.00	5.79	6.20

In Table 2, basic scorecard variables are presented for all GCC countries. As is obvious from this table, when compared with other GCC countries, Kuwait has the highest score for Annual GDP (10); Human Development and S & T Journal Articles (9.44); Adult Literacy (9.41) and [ownership of] Computers (9.41). Kuwait's scores are comparatively on the lower side compared with other GCC countries on the variables of Secondary Enrollment (6.11) and Tertiary Enrollment (2.94). Kuwait is above the average for the MENA region on all variables except Securities Receipts and Payments (as no data was available for this variable) and for Tertiary Enrollment. Kuwait's average is also lower than the average for all countries included in the World Bank data. Data are available for 146 countries, some of which are very low on the income category and also in several KBE performance measures. Scores presented in Table 2 are weighted scores meaning these are computed in comparative terms. The numbers are different from those presented in Table 1. Even here the score is the lowest for Gross Tertiary Enrollment.

KBE Indexes

Key variables are used to derive two main indices to proxy a country's preparedness for transition to a knowledge-based economy. These include the KI and the KEI. Figure 2 shows the framework that is used to calculate these indexes.

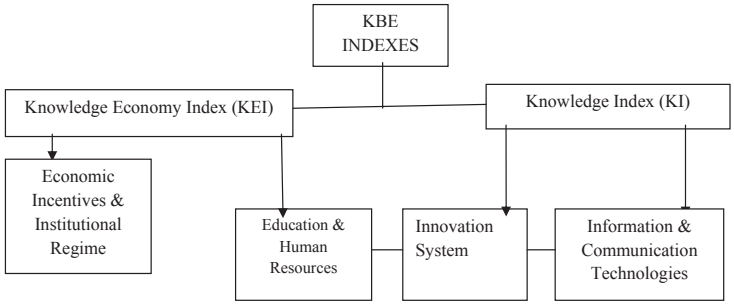

Figure 2: KBE Indexes

The KEI measures a country's ability to generate, adopt and diffuse knowledge and also whether the environment is conducive for knowledge to be used more effectively for economic development. It is an aggregate index that represents the overall level of development of a country or region in the KE and summarizes performance over the four KE pillars. The KEI is constructed as the simple average of the four pillar indexes in the KAM.

The KI measures a country's ability to generate, adopt and diffuse knowledge. It is an indication of the overall potential of knowledge development in a given country. The KI is the simple average of the indexes of the three KE pillars: Education and Human Resources; the Innovation System; and Information and Communication Technology (ICT). It excludes the Economic and Institutional Regime.

The KEI is then calculated on the basis of it being equal to the simple arithmetic mean of the index values for the four pillars. The value of each index falls in the range 0-10 and is an expression of the relative position of a country in comparison with all the countries whose index is calculated. On this basis, the index values of the top 10 per cent of countries fall in the range 9-10, the index values of the second highest 10 per cent of countries fall in the range 8-9.

The KI and KEI average scores for Kuwait along with scores for other GCC countries and average for the MENA region are presented in Table 3.

Table 3: KI & KEI for Kuwait & GCC Countries

Rank	Country	Knowledge Index	Knowledge Economy Index
1	Qatar	6.73	6.63
2	UAE	6.73	6.72
3	Bahrain	6.04	5.80
4	Kuwait	5.85	5.63
5	Oman	5.36	4.77
6	Saudi Arabia	5.31	5.10
	Average Middle East	5.47	5.68

As shown in Table 3, Kuwait's KI is 5.85 and KEI 5.63. It ranks higher than Oman and Saudi Arabia but lower than the UAE, Qatar and Oman. The KI and KEI for countries in the MENA region are 5.47 and 5.68. Kuwait's KI index is slightly higher than the average but slightly lower than the average KEI.

Main KBE Pillars

A unique feature of the KAM methodology is its cross-sectorial approach that allows a holistic view of a wide range of relevant factors. The variables serve as proxies for the four pillars of the KE framework: an economic and institutional regime to provide incentives for the efficient use of existing and new knowledge and the flourishing of entrepreneurship; an educated and skilled population to create, share, and use knowledge well; an efficient innovation system of firms, research centers, universities, consultants and other organizations to tap into the growing stock of global knowledge, assimilate and adapt it to local needs, and create new technology; and information and communication technology to facilitate the effective creation, dissemination, and processing of information. This framework is displayed in Figure 3.

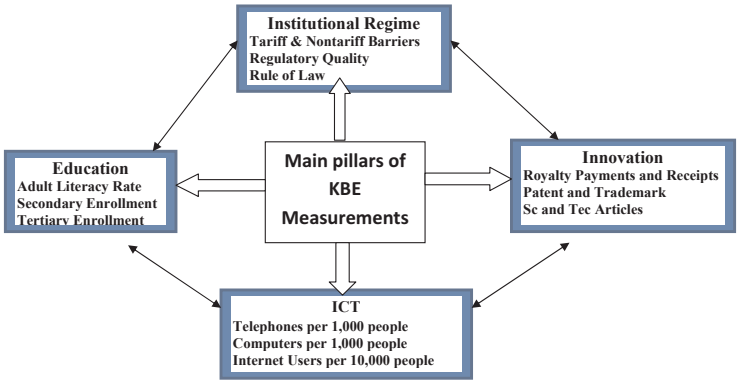

Figure 3: Main Pillars of KBE Measure

Average scores for the four main pillars for Kuwait and other GCC countries are presented in Table 4. The average for the Middle Eastern countries is also included to facilitate comparisons.

Table 4: GCC country scores on main pillars of the KBE

Country	EIIR	Innovation	Education	ICT
UAE	7.41	7.78	6.36	10.00
Qatar	8.15	6.94	6.53	8.86
Kuwait	7.04	6.78	6.17	7.95
Bahrain	7.22	3.61	7.92	7.73
Saudi Arabia	6.11	4.19	6.39	6.61
Oman	8.33	5.00	5.27	4.15
Average for Middle East	4.86	7.57	3.75	5.71

As shown in Table 4, for all four pillars only the UAE and Qatar are higher than Kuwait though Kuwait's scores for all four areas surpass the average of the MENA region. Kuwait is performing relatively well in the Economic Incentives and Institutional Regime and the Information & Communication Technology pillars but less well in the Education pillar, especially in tertiary education. Kuwait also needs to perform better in the Innovation pillar. Kuwait's scores are also compared with other Arab countries. A summary of these score is given in Table 5.

Table 5: Cross country comparison with selected Arab countries

Country	EIIC	Innovation	Education	ICT
Kuwait	6.97	6.78	6.17	7.95
Jordan	6.28	6.39	7.76	4.71
Lebanon	5.98	6.19	6.29	5.48
Tunisia	4.99	6.07	4.55	4.35
Iran	4.68	3.61	4.75	5.68
Egypt	4.43	5.30	5.15	2.83
Algeria	2.75	2.22	3.59	2.42
All country average	5.21	8.11	4.24	6.22

As shown in Table 5, Kuwait's scores are higher than all Arab countries for the pillar of Economic Incentives and Institutional Regime. Its scores are also above the average for all 146 countries included in the World Bank database. However, for the pillar of Innovation, Kuwait is below the average for all countries but still higher than all Arab countries. For Education, Jordan and Lebanon are higher than Kuwait, while Kuwait is still above the average and higher than all other Arab countries listed in the table. In the area of ICT, Kuwait has a clear lead as its average score is higher than all other countries and also above the average.

The KAM also provides for comparison with other countries based on the level of income. In Table 5, Kuwait's performance in the four main pillars of the KBE is compared with countries in the high-income group. A summary is presented in Table 6.

Table 6: Comparisons of Kuwait with High Income Countries

#	Country	E I I R	Innovation	Education	ICT
1	Sweden	9.33	9.76	9.29	9.59
2	Finland	9.31	9.67	9.77	8.73
3	United Kingdom	9.24	9.24	8.49	9.45
4	United States	9.04	9.47	8.74	8.83
5	Switzerland	8.79	9.90	7.68	9.68

Cont/ Table 6: Comparisons of Kuwait with High Income Countries

#	Country	E I I R	Innovation	Education	ICT
6	Australia	8.66	8.88	9.69	8.67
7	Germany	9.06	8.94	8.36	9.47
8	New Zealand	8.79	8.66	9.78	8.46
9	Taiwan	7.42	9.27	7.97	9.13
10	Singapore	9.68	9.58	5.29	9.22
11	Japan	7.81	9.22	8.67	8.00
12	Estonia	8.76	7.56	8.32	9.05
13	France	7.67	8.66	9.02	8.26
14	Korea	6.00	8.60	8.09	8.60
15	Malaysia	6.11	6.82	4.21	7.14
16	Kuwait	6.50	4.98	4.93	6.96
17	Brazil	4.31	6.19	6.02	6.13
18	Turkey	6.98	5.83	4.46	4.92
19	Tunisia	4.04	4.65	4.08	4.88
20	Iran	0.99	4.56	3.80	5.65
Average	High Income Countries	8.02	9.02	7.47	8.42

As is obvious from Table 6, Kuwait's scores on all pillars of the KBE are much lower than the average scores of high-income countries. However, it managed to get higher scores than four countries: Brazil, Turkey, Tunisia, and Iran. Table 7 provides an overall comparison of scores.

Table 7 provides a comparative view of KBE indexes and scores for main KBE pillars. This data is derived from scores for 146 countries. Kuwait ranks 52 in this list. Qatar and the UAE are at a higher position than Kuwait: Qatar ranks 44; the UAE 45, while Bahrain is 49, Oman is 66, and Saudi Arabia is 68. Out of the 146 countries, the top 10 countries are Denmark, Sweden, Finland, Netherlands, Norway, Canada, UK, Ireland, United States, and Switzerland.

Table 7: Overall Comparison of the KBE in Kuwait

Country/Region	KEI	KI	EIIR	Innovation	Education	ICT
Kuwait	5.85	5.63	6.5	4.98	4.93	6.96
Western Europe	8.76	8.78	8.71	9.27	8.29	8.78
G7	8.72	8.91	8.15	9.19	8.75	8.80
Europe & Central Asia	6.45	6.69	5.71	6.99	6.62	6.46
East Asia & the Pacific	6.41	6.71	5.52	8.49	5.00	6.64
All countries	5.95	6.19	5.81	8.11	4.24	6.22
Mid East & N Africa	5.47	5.68	4.86	7.57	3.75	5.71
Latin America	5.21	5.37	4.71	5.31	5.05	5.27
Africa	2.71	2.72	2.68	4.31	1.38	2.45
South Asia	2.58	2.55	2.65	3.29	1.92	2.45
High Income	8.23	8.30	8.02	9.02	7.47	8.42
Upper Middle Income	5.66	5.85	5.08	6.03	5.62	5.89
Lower Middle Income	3.78	4.04	3.01	4.96	3.32	3.85
Low Income	2.00	1.98	2.05	2.52	1.62	1.82

KBE data is also computed for nine regions of the world and four categories of countries by level of income. Kuwait, along with other GCC countries is listed in the MENA region. As shown in Table 7, the KEI and KI indexes for this region are lower than Western Europe, G7, Europe and Central Asia, East Asia and the Pacific regions. Average scores of this region are also slightly lower than the average of the 146 countries. However, this region is higher compared to Latin America, South Asia, and Africa.

When ranked by per capita income and annual GDP, Kuwait is in the category of High Level countries. However, when its KEI and KI are compared with KBE indexes of 8.23 and 8.30 for High Level countries, Kuwait's index scores in both categories are pretty low (5.85 and 5.63). As expected, these are higher for Upper Middle, Middle, and Low Income countries.

Benchmarking the KBE of Kuwait with the Countries of the World

World Bank data sources provide information on the knowledge activities of 146 countries on the 109 variables used by KAM. Table 11 shows Kuwait's rank with 146 countries on the various scorecards, knowledge indexes, and main KBE pillars.

Table 8: Kuwait's ranks on the various aspects of the KBE

KBE Matrix	Kuwait's Rank	All Countries Average	Kuwait's Average	Minimum Score	Maximum Score
Knowledge Index	59	5.63	6.19	0.85	9.57
Knowledge Economy Index	52	5.95	5.85	0.96	9.52
Economic Incentives & Institutional Regime	51	5.21	6.50	0.12	8.44
Education & Human Resource Development	77	4.24	4.93	0.30	9.78
Innovation System	70	4.98	8.11	1.14	9.01
Information & Communication Technology	46	6.96	6.22	0.55	9.68

Kuwait ranked 46th in the list of 146 countries included in the World Bank data and is slightly above the average for all countries. As for the basic scorecard, Kuwait also ranked lower (77) in Education & Human Resource Development. Similarly, for Innovation, which is definitely affected by education, Kuwait's rank is on the lower side (70) compared with its ranking in Information and Communication Technology. Kuwait's Economic Incentives and Institutional Regime appear to be well in place when compared with the average of 5.21 for all countries. However, compared with the maximum average 8.44 (which is held by Singapore, a small country like Kuwait with no natural resources), one would expect a country like Kuwait to do much better on this account.

While its rank in the Knowledge Economy Index (52) is reasonable, it is much lower than the maximum average of 9.57. Interestingly, Kuwait's rank dropped to 59 when benchmarked on the Knowledge

Index. This is in a way obvious, as the Knowledge Index does not take into account the financial aspects only; it focuses more on creation and use of knowledge. While Kuwait's average KI of 6.19 is higher than the all-country average of 5.63, it is much lower than the maximum average of 9.78.

Discussion

As presented in the basic scorecard in tables 4 and 5, Kuwait scored above average for most of the key variables. Kuwait can tap into a number of strengths as it seeks to build a knowledge-based economy. It has presently high macroeconomic stability and growth as well as reasonable political stability and consensus. Economic stability, however, depends on the fluctuation in oil prices at the world market. Even so, Kuwait's score is the lowest for Tertiary Enrollment indicating its unreadiness in the fields of education and human resource development for transition to a KBE. Our understanding is that Kuwait has made considerable investments in the area of education. Kuwait is also seeking to establish a sustainable knowledge economy by diversifying its economy and being less dependent on importing knowledge and skills. There are, however, several issues that would need to be addressed in order for Kuwait to turn into a competitive knowledge-based economy. Kuwait can learn from the UAE's and Qatar's efforts of transforming their education systems to respond to the challenges of the digital age: They are introducing computer education and Internet provision on a massive scale to strengthen general and higher education This is particularly important, as the readiness of Kuwait, Qatar and the UAE is not significantly different.

The Knowledge Index and Knowledge Economy Index for countries in the MENA region are 5.47 and 5.68. Kuwait's KI and KEI are higher than Bahrain, Oman, and Saudi Arabia but lower than the UAE and Qatar. Kuwait's KI is slightly higher than the average but slightly lower than the average KEI. This trend appears to be in line with other developments in the GCC region. For example, an analysis of e-government readiness in GCC countries indicated that Qatar and the UAE were leading in e-government applications followed by Kuwait (World Economic Forum, 2010). Qatar has also made considerable efforts and investments to enhance its e-government project. Qatar has

finalized a partnership agreement with the InfoComm Development Authority of Singapore to improve its ICT status (AWCR, 2007).

Kuwait has made good progress in the area of ICT, with its average score of 6.95 higher than the average of the Middle East, Asia-Pacific, Europe and West Asia regions. But this does not yet appear to have had any influence on the fields of education and innovation. It is important to investigate what could be done to exploit the potential of ICT in Kuwait so as to improve the rating of the other three pillars. Mia and Dutta (2007) highlighted this in a different context. They reported that the capacity of IT applications consists of many elements such as the availability of human skills to use ICT and the access and affordability for companies and governments to own and use ICT for services and processes.

In the area of Innovation, Kuwait's score of 6.78 is lower than the average of the MENA region (7.57). It indicates that the quality of the workforce, education system and innovation capacity needs to be improved significantly. An in-depth analysis of the challenges that Kuwait faces in strengthening these pillars will be helpful to propose specific steps for strengthening relevant policies. Brinkly et al. (2012) suggest that Kuwait create what they term an innovation ecosystem to support the transition to a knowledge economy. The main elements of this proposed system is the interlocking role of publicly supported research generating the original intellectual capital that supports firm formation and entrepreneurship as the driver of original innovation. For other KBE pillars, Kuwait has higher scores than the MENA region average and also higher than Bahrain, the UAE, Qatar, and Oman. This is a good indication for transition to a KBE. It is also important that Kuwait attempts to exploit the potential of socio-cultural factors in the country. It is well known that formal departments of government are influenced by the existence of the traditional system exemplified by the institution of Diwania (UAE Yearbook, 2006). Such informal structures constitute networks of relationships that co-exist with the formal bureaucracy and cannot be exploited for the various knowledge management activities.

While Kuwait's score for Economic Incentives and Institutional Regime are higher compared with some other GCC countries, these could be further improved. It is important for a country like Kuwait to

entertain conditions conducive to entrepreneurship, risk taking, and the expansion of small enterprises. Academic and research institutions have to exchange information and labor markets have to be flexible enough to enable the deployment of the workforce. The ways people receive relevant knowledge and the incentives for them to use it are also affected by the institutional structure of a society. These interactions are affected by rules and procedures, social conventions, and corporate and public sector organizations. In Kuwait, steps need to be taken to minimize rigidities and the bureaucratic styles of management. With the introduction of an e-government system in Kuwait things appear to be improving in this regard, but much more needs to be done to inculcate a pro-innovation culture.

Like the basic scores in the area of Education and Human Resources, Kuwait's score for economy (Innovation) is the lowest. Though it is still above the average of the MENA region, it scores lower than most of the GCC countries (Bahrain, Qatar, Saudi Arabia and the UAE). As stated earlier, among other things, steps need to be taken to take full advantage of the potential of ICT. Singapore and Taiwan are good examples to follow in this regard.

Serious attention needs to be paid to those areas significant to the KBE, e.g. education. A report on the readiness of Qatar for transition to the KBE pointed out that the UAE, Qatar and Kuwait (which have similar profiles) do best on the factor-driven indicators and less well on efficiency-driven indicators, especially on innovation-driven indicators. In contrast, India does relatively well on the innovation-driven indicators. India has a critical mass in research capacity, well-educated scientists and engineers and a number of well-driven companies that compete at the global level, for example, in information technology services. However, India scores relatively low on the factor-driven indicators (Qatar Planning Council, 2007).

On the innovation benchmark, Kuwait fares poorly compared to other countries in the GCC countries, several Arab countries, and with the overall average. To create and adapt new knowledge requires universities, research centers, and policy think tanks. The mere existence of these organizations, however, is not enough. More important is how effective they are in creating, adapting, and disseminating knowledge to

those who put this knowledge to use. This will require flexibility in research grants and incentives for creating and sharing knowledge.

Kuwait's lower scores for education and human resources are not a good reflection. Education is the basis for creating, acquiring, adapting, and using knowledge. Basic education increases peoples' capacity to learn and use information. However, higher education, particularly in science and engineering is also necessary. The production of new knowledge and its adaptation to a particular economic setting are usually associated with higher-level teaching and research. According to Brinkley et al.(2012), reason for scoring low in education could be attributed to the legacy of four decades of buoyant oil revenues. This has firmly embedded a notion of citizens' entitlement among Kuwaiti nationals. Aspirations and incentives to invest in human capital at primary, secondary and university levels have been dulled. The pay-offs from simple supply-side interventions - for instance, boosting the provision of finance or improving teacher quality - will not bear nearly as much fruit as they should unless they are complemented by both pressure and demand for them. On the basic scorecard, Kuwait scored fairly well on adult literacy. It also scored well on secondary enrollment but poorly on tertiary enrollment rates, which is below the average of the MENA region and well below some GCC states. This appears to be a real concern and requires serious attention.

Kuwait can draw on its potential to nourish creativity and innovation by introducing a system based on merit for all levels. Suitable policies and flexible procedures to relax bureaucracy should be implemented to create an environment conducive for knowledge creation and sharing, which is crucial for innovation. The UNESCO Science Report (2005) rightly stressed that interaction between universities and research centers with relevant industries and economic institutions needs to be increased in Arab countries. Kuwait is no exception to this situation.

Kuwait's score for Information and Communication Technology is higher than the average of the Middle East but lower than the UAE and Qatar. Even so, Kuwait scored pretty well in the area of ICT, the backbone of the knowledge-based economy. Kuwait's high scores on the basic scorecard ensure access to ICT. Availability of a good information infrastructure consisting of telecommunication networks and the policy

and legal framework is pretty encouraging. But lower scores on education and their possible effect on innovation capabilities suggests that to take full advantage of the potential of ICT, skilled human resources are needed to use the infrastructure for knowledge applications. Kuwait's lower scores in the aforementioned areas were also reported in the Arab Knowledge Report 2009 that evaluated the knowledge activities in the Middle East and North African region US-Arab Tradeline (2010). Initiatives taken by Qatar and Oman to expand the education sector provide good example of for possible changes in the education landscape in Kuwait. As reported by Brandenburg (2012) these two countries have taken different approaches to achieve the same objectives. Qatar collaborated with foreign universities and built campus of reputable American universities in Qatar to expand its education sector while Oman made use of the indigenous potential and allowed introduction to various private universities supported through Government assistance.

Conclusion and Recommendations

This study provides a preliminary assessment of readiness of Kuwait for transition toward a knowledge-based economy. As indicated by the basic scorecard and the various knowledge indexes, Kuwait has made impressive strides towards becoming a KBE. However, some crucial and important areas such as education and innovation need to be improved to further strengthen the knowledge activities in the country. As a matter of fact, these areas need immediate attention. At the same time, steps need to be taken to maximize the availability of ICT and the e-government initiative.

Kuwait's higher scores for annual GDP indicate that Kuwait has plenty of economic resources and opportunities to develop a diversified knowledge-based economy. Kuwait's basic scorecard for most of the 14 variables indicate that it is well prepared for turning its economy into a knowledge-based economy compared to most GCC countries except Qatar and the UAE. A KEI of 5.58 is above the average of the MENA region but lower than other GCC countries except Saudi Arabia. A KI of 5.85 is lower than three other GCC countries (Bahrain, Qatar and the UAE). If a lower KI score is an indication, production of knowledge in Kuwait needs to be improved, though on scientific and technical journal articles Kuwait's score is on the higher side. On the KEI as a whole,

Kuwait does not compare well with countries outside the GCC region. It is even behind a couple of countries in the GCC region. In terms of the four pillars of the Knowledge Economy framework, Kuwait is leading in the area of ICT applications; it is strong on the Economic Incentives and Institutional Regime pillar; but pretty week on the Education pillar.

This project has identified strengths and weaknesses in the four pillars of the knowledge economy in Kuwait. The results of this study lay a foundation for further research in this area. Further research will help address issues in more specific terms in order to define concrete steps that will facilitate the strengthening of a knowledge-based economy. The data that was used to compute indexes for this study were derived from international secondary sources. Data drawn from local sources may provide a more up-to-date picture about knowledge activities. This is particularly important in the areas of education and innovation, as Kuwait's scores were the weakest in these areas. Further research may also preferably focus on specifying actionable policies, plans, and projects targeting education.

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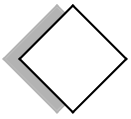

مقاييس الأداء للاقتصاد القائم على المعرفة
حالة الكويت

ليلى معروف*
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ملخص: الاقتصاد المعرفي هو الاقتصاد الذي تكون فيه المعرفة هي الأساس للتقدم والتطور الاقتصادي. عدة إطارات دولية عرضت اقتراحات مختلفة لمراجعة أنشطة إدارة المعرفة لتحديد التحول إلى الاقتصاد المعرفي. هذا البحث درس وضع الاقتصاد المعرفي في الكويت على مرحلتين. في المرحلة الأولى ركزت الدراسة على اختيار المقاييس المناسبة لدراسة أنشطة إدارة المعرفة في الكويت عن طريقة المقابلة الجماعية مع متخصصين في الإدارة المركزية للإحصاء في الكويت. كنتاج لهذه المقابلات توصل الباحثين إلى أن استخدام مجموعة من المتغيرات الرئيسية المستخدمة في منهجية تييم المعرفة (KMA) المطورة من قبل البنك الدولي هي الحل الأمثل. في المرحلة الثانية توصل الباحثون إلى وضع الكويت بالنسبة للاقتصاد المعرفي وعرضت النتائج على شكل جداول مقارنة ورسوم توضيحية باستخدام منهجية تقييم المعرفة (KMA). عرضت نقاط القوة والضعف بالنسبة للمحاور الأربعة للاقتصاد المعرفي في الكويت. من إحدى النتائج الرئيسية هو أن الكويت أداءها جيد في معظم المتغيرات الأربعة عشر ما عدا التعليم؛ حيث إن الكويت جاءت بمرتبة أقل من معظم الدول في الخليج العربي. بينت النتائج كذلك أن الفهرس الاقتصادي المعرفي للكويت هو فوق المتوسط مقارنة بدول الشرق الأوسط وشمال أفريقيا، ولكنه أقل من عدة دول في الخليج مثل البحرين، قطر، الإمارات العربية المتحدة، وأعلى من السعودية مما يدل على أن الإنتاج المعرفي بالكويت قليل. من ناحية المحاور الأربعة الرئيسية للاقتصاد المعرفي تتقدم الكويت في محور تكنولوجيا الاتصالات والمعلومات ومحور الحوافز، وضعيفة في محور التعليم ومحور الابتكار.

المصطلحات الأساسية: الاقتصاد المعرفي (KBE)، إدارة المعرفة (KM)، مقاييس الأداء للاقتصاد المعرفي.

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