

Omar E. Khalil

Laila N. Marouf

Kuwait University
Kuwait

A CULTURAL VALUES UNDERSTANDING OF NATIONS' READINESS FOR KNOWLEDGE ECONOMY⁽¹⁾

Keywords

***Knowledge Economy;
National Wealth;
National Culture;
Innovation; Information
and Communications
Technologies.***

Abstract

National culture could be a key factor in explaining nations' readiness for knowledge economy (RKE). This study extends Khalil and Marouf's (2015) investigation into seeking a cultural values-based understanding of the variation in RKE across nations. Using a data set on 59 nations, nine hypotheses were tested and national wealth's mediating effect on the national culture-RKE relationship was explored. Results indicate that the cultural values of uncertainty avoidance, future orientation, institutional collectivism, and in-group collectivism have the most negative influence on RKE, respectively, whereas humane orientation has a positive influence. When national wealth is controlled for, uncertainty avoidance is the most influential cultural determinant of RKE. These findings could provide a foundation for culture-based policies and strategies aimed at enhancing RKE across nations.

Introduction

Driven by the convergence of information and communications technologies (ICT), an information revolution has molded the global phenomenon of a knowledge economy (KE) (Chen and Dahlman, 2005; Al-Rahbi, 2008, p. 36; Khalil and Marouf, 2015). This revolution has sidelined the significance of basic natural resources, labor, and capital in economic development and has instead placed knowledge as its true driver. In a KE, value is created by the application of knowledge and enhancement in productivity and innovation (Drucker, 1994; OECD, 1996, Khalil and Marouf, 2015). The challenge that nations currently face,

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however, is how to properly manage the creation, dissemination, and utilization of knowledge across their different (and unique) economic sectors in order to achieve and sustain economic growth and competitiveness (Grewal et al., 2002).

Nations differ significantly in their readiness for a knowledge economy (RKE) (World Bank, 2012a, 2012b). A number of frameworks (e.g., OECD, 1996, 2001a; APEC, 2000; ABS, 2002; World Bank, 2012a) have been developed to identify the areas (or drivers) considered essential for managing knowledge across economic sectors and to benchmark progress toward fully achieving a KE (Khalil and Marouf, 2015). Although the proposed frameworks vary, researchers agree that economic incentives and institutional regimes, innovation systems, educational and human resources, and ICT infrastructure are important KE drivers (OECD, 1996, 2001a; Chen and Dahlman, 2005; Al-Rahbi, 2008, p. 45; Khalil and Marouf, 2015). A holistic development approach toward these four drivers is essential for achieving the desired result of knowledge-based economic development (OECD, 2000, 2001b; APEC, 2003).

KE drivers are deeply rooted in the cultural characteristics of each nation (Peters and Besley, 2006). The creation and dissemination of knowledge within a society require the cultural exchange of ideas, which in turn depends upon certain cultural conditions (e.g., trust, reciprocal rights, responsibilities between different knowledge partners, institutional routines, regimes, and strategies) (Peters and Besley, 2006). In the absence of cultural attributes such as ambition, high standards, and hard work, societies may be less inclined to accumulate the economic ammunition necessary for growth, or to use that ammunition for economic development even when it is available (Javidan, 2004).

National culture could explain a nation's economic growth, or lack thereof (Barro and McCleary, 2003; Gruenwald, 2008), as nations experiencing economic growth generally exhibit patterns of shared values, beliefs, and social attitudes (Welzel and Inglehart, 2008; Beuningen, 2007). Understanding what and how these cultural patterns of a nation influence its preparedness for developing and sustaining KE is imperative, and incorporating social and cultural dimensions in KE research frameworks is necessary to explain the notable RKE variance across nations (Lee et al., 2002; Grewal and Kumnick, 2006). Although relevant literature offers evidence toward the value of national culture in analyzing and interpreting economic development (e.g., Welzel and Inglehart, 2008; Gruenwald, 2008; Rees and Althakhri, 2008; Beuningen, 2007; Dodor and Rana, 2007; Hofstede, 2007; Barro, 2004; Radcliffe, 2006; Pryor, 2007; Barro and McCleary, 2003; Chaitani,

2010), studies designed to provide a culture-based interpretation of the disparity in RKE across nations are still sporadic.

Khalil and Marouf (2015) investigated the influence of national culture as described by House *et al.* (2004) on RKE across 59 nations. Although it provides an empirically derived cultural interpretation to the cross-national RKE phenomenon, Khalil and Marouf's (2015) analysis has limitations. Most notably, their analysis focused only on cultural practices while discounting cultural values, and overlooked the effect that national wealth could have on the national culture-RKE relationship. National wealth could moderate the relationship between culture and other national features (Hofstede, 2001; Javidan and Hauser, 2004; Khalil, 2011), and perhaps confound the culture-RKE relationship.

This study, then, extends Khalil and Marouf's (2015) research, seeking a cultural values-based understanding of the variation in RKE across nations. More specifically, it aims to identify cultural dimensions that best explain the variance in RKE across nations and explore the influence that national wealth may have on the culture-RKE relationship. The impetus of this interpretive study is to align culture-based implications to the policies and strategies aimed at making nations ready for KE.

Background

Readiness for knowledge economy

Although a number of definitions for KE exist in the relevant literature (e.g., OECD, 1996; Powell and Snellman, 2004; Chen and Dahlman, 2005; Kenawy and Ghany, 2012), no one is universally accepted (e.g., Neef *et al.*, 1998; Bontis, 2002; Peters and Besley, 2006; Al-Rahbi, 2008, p. 39; Khalil and Marouf, 2015). The various definitions, however, all suggest that knowledge has replaced tangible capital to become the main source of economic growth in knowledge-based economies (Kenawy and Ghany, 2012). There are three key economic characteristics of a KE: (1) its greater reliance on the intellectual capabilities of a society than its physical inputs or natural resources; (2) continued and increased application of science and technology across all fields; and (3) the essential role of innovation through knowledge and the capacity to use intellectual capital as the main source of competitiveness in economic growth (Neef *et al.*, 1998).

Since nations have different KE levels (World Bank, 2012b), there has been an increased interest in developing frameworks to assess and benchmark the status of

KE in a nation or a group of nations and to use the outcomes to guide policies aimed at enhancing knowledge-based economic development (Khalil and Marouf, 2015). The most notable existing frameworks include the Organization for Economic Co-operation and Development's (OECD) KE indicators (OECD, 1996,1999), the Asia-Pacific Economic Cooperation (APEC) KE framework (APEC, 2000), the World Bank Knowledge Economy Index (KEI) (World Bank, 2012a, 2012b), the Australian Bureau of Statistics (ABS) framework (ABS, 2002), and the New Economy Index (NEI). These frameworks share two common traits: (1) they identify the basic elements required to create an economic environment conducive to developing and sustaining KE, and (2) they stress that the basis for successful economic growth lies in the creation, acquisition, dissemination, and effective application of knowledge. However, the frameworks were designed mainly to benchmark the KE in certain nations as the organizations addressed the targeted nation's overall socioeconomic development level (Aubert, 2005; Atkinson and Nager, 2014).

Nevertheless, this study asserts that the World Bank's (2012a) Knowledge Assessment Methodology (KAM) is an appropriate framework for measuring and benchmarking nations' RKE (Khalil and Marouf, 2015). KAM is a tool to benchmark a nation's RKE through its aggregate Knowledge Economy Index (KEI) (World Bank, 2012a, 2012b). The KEI is derived from four complementary sub-indexes: (1) economic incentives and institutional regime (EIIR), (2) innovation system (INV), (3) education and human resources (EHR), and (4) information and communications technologies (ICT). These drivers are discussed below.

Knowledge economy drivers

EIIR

Effective and transparent public governance, comprehensive and dynamic regulatory regimes, and an effective structure of economic incentives facilitate the development of local markets and can encourage foreign investment and the creation of joint ventures, which are all essential for the acquisition and dissemination of new knowledge and the adoption of advanced ICT (OCED, 1999; Al-Rahbi, 2008, p. 46). As such, governments should provide economic incentives to encourage domestic businesses to grow naturally and independently (Aubert and Reiffers, 2003; Al-Rahbi, 2008, p. 45); however, rationalizing a nation's regulatory framework in such a way may warrant a fundamental change in the society's value system (Javidan, 2004).

INV

INV, the adoption and application of new knowledge and practices (West and Anderson, 1996), includes a network of institutions, rules, and procedures that influence how a nation creates, acquires, disseminates, and applies knowledge (Al-Rahbi, 2008, p. 58). Innovative economies positively correlate with outcome measures at the company, industry, and national level (OECD, 1996; Bassanini *et al.*, 2000). Research institutions should systematically undertake creative work in order to increase the nation's stock of knowledge that could be applied to improve its products, processes, applications, or technologies (OECD, 1997; Griffith *et al.*, 2001). Government institutions and their respective policies should encourage innovative activities and facilitate the acquisition of new knowledge as well as the transfer and diffusion of technology (Drucker, 1998; Aubert, 2005).

EHR

An effective education and training system that leads to a productive and innovative labor force is vital to the development of KE (Griffith *et al.*, 2001). Human capital development through education and training has been found to positively correlate with gross domestic product (GDP) per capita, public health, political and community participation, and social cohesion (Hanushek and Kimko, 2000; UNESCO, 2005; Al-Rahbi, 2008, p. 51). EHR complement the adoption of new technologies that are essential to the development of KE (Lee *et al.*, 2002). National culture, however, may influence a society's human capital development (Al-Rahbi, 2008, p. 52).

ICT

Although the ICT revolution and advent of KE are strongly related, ICT alone cannot produce knowledge (Lundvall and Foray, 1996), which can be created only by cognitive, mental processes. ICT, however, help to (often) cheaply and quickly encode and transform knowledge into actionable information (Al-Rahbi, 2008, p. 55; Lee *et al.*, 2002; APEC, 2003). ICT enables the rapid exchange of economically valuable information between businesses and industries, creates competitive advantages, and contributes to economic growth (Gurmukh *et al.*, 2000; Hollifield and Donnermeyer, 2003). Therefore, the investment in and acquisition of ICT should not be regarded as a goal in and of itself, but rather a means to achieving higher productivity and economic growth (Whelan, 2000).

While governments play a fundamental role in either facilitating or hampering economic development by influencing or failing to influence KE drivers, they

function within a milieu of national cultural values and practices, and their policies and actions are based on and are reflections of societal values and cultural specifications (House *et al.*, 2004, p. 255; Aubert, 2005). Therefore, the cultural characteristics of a nation are likely to influence the extent of its readiness to embark on knowledge-based economic development (Peters and Besley, 2006).

National culture influence

Culture is viewed as a set of shared beliefs and values that distinguish the members of one group of people from another and shape their values, beliefs, assumptions, expectations, perceptions, and behaviors (Hofstede, 1991, p. 5). House *et al.* (2002), however, differentiate between the cultural values and practices of a society, stating that cultural values denote the people's reported preferred practices whereas the practices of a society represent the people's perceptions of how things are usually done in that society. Consequently, societies differ in cultural values and practices along multiple, complex cultural dimensions (Hofstede, 1983; House *et al.*, 2004).

The national culture taxonomies of Hofstede (1980, 1983) and House *et al.* (2004) are believably the most recognized taxonomies among researchers. Hofstede (1980, 1991) introduced a national culture taxonomy consisting of five bipolar dimensions including power distance, individualism/collectivism, masculinity/femininity, uncertainty avoidance, and long-term/short-term (i.e., Confucian dynamism) orientation. The position of a nation along these dimensional spectrums reveals how its society functions (Hofstede, 1993). Later, House *et al.* (2004) proposed a national culture taxonomy that operationalizes and extends national culture into nine dimensions (some of which are identical to Hofstede's), each with two distinct facets of value and practice. They include power distance, uncertainty avoidance, future orientation, institutional collectivism, in-group collectivism, humane orientation, performance orientation, gender egalitarianism, and assertiveness.

Prior studies have primarily adopted Hofstede *et al.*'s (1990) national culture taxonomy, which has been subjected to criticism (e.g., Yeh and Lawrence, 1995; Wang, 2004, p. 53), and whose reliability and relationship to nations' economic performance have been debatable (Yeh and Lawrence, 1995). House *et al.*'s (2004) national culture taxonomy circumvents most of the criticisms of Hofstede's work (Myers and Tan, 2002), as their data sets yield more reliable and valid estimates of the nine cultural dimensions (Javidan *et al.*, 2004; Heales *et al.*, 2004). This study

adapts House *et al.*'s (2004) national culture taxonomy, and Appendix A depicts the nine cultural dimensions with a brief explanation of each.

In a society, the cultural values signify the people's reported preferred practices, whereas the cultural practices characterize the people's perceptions of how things are usually done in that society (House and Javidan, 2004). However, earlier research found the correlation between cultural values and practices to be positive for gender egalitarianism, positive but insignificant for in-group collectivism, and negative for the other seven dimensions (Javidan *et al.*, 2004, 2006). As such, national culture may affect policy formulation and decision making in both the public and private sectors by influencing organizational culture and leadership (Heales *et al.*, 2004), which may in turn influence the strategies and policies of government and private institutions for the creation, dissemination, and application of knowledge for economic development (Khalil and Marouf, 2015). It may indeed influence the KE drivers, and, consequently RKE. Nonetheless, a nation's national wealth (or, economic development standing) may also influence its readiness for undertaking KE initiatives, therefore influencing the national culture-RKE relationship.

National wealth influence

Although culture's role in national wealth remains controversial (Chaitani, 2010), researchers generally agree on the importance of including culture in analysis of a nation's economic development (Barro and McCleary, 2003; Beuningen, 2007; Inglehart and Welzel, 2009). The influence of culture on economic development, however, could be hindering in some instances (Gruenwald, 2008), play a limited role (Heydemann, 2008), or be influenced by economic development (Rivlin, 2009). In addition, the changeability of culture varies from "not at all" (Hofstede, 2007) to "slow change" (Inglehart and Welzel, 2009; Rivlin, 2009; Roland, 2004) to "accommodating change" (Richards and Waterbury, 2008).

Whether culture is a cause or an effect of national wealth is still debated. On the one hand, culture is assumed to influence economic development, but while the level of practices change daily, the core cultural values remain unaffected (Hofstede, 2007). Economic development requires appropriate policies (e.g., financial), which can be effectively implemented only within an appropriate culture (Minkov and Blagoev, 2009). When economic and financial determinants are held constant, culture can either enable or impede economic development

(Fukuyama and Gellhorn, 2007; Heydemann, 2008; Gruenwald, 2008). Societies that hold shared values, beliefs, and attitudes have been shown to achieve better socioeconomic progress (Beuningen, 2007).

Both culture and institutions help explain the growth and development of a nation (Roland, 2004). The interaction between culture and political and legal institutions has been shown to drive economic growth. Culture in a society creates the environment in which material production can take place within the context of that society's attitudes and beliefs, which influence development in different ways (Radcliffe, 2006; Rivlin, 2009). In addition, ample evidence in the extant literature suggest that cultural differences influence economic development (e.g., Inglehart and Norris, 2003; Javidan and Hauser, 2004; Dodor and Rana, 2007; Hofstede, 2007; Pryor, 2007; Rees and Althakhri, 2008; Inglehart and Welzel, 2009; Heydemann, 2008).

On the other hand, culture is assumed to change (albeit slowly) and economic development, therefore, could influence the cultural development of nations (Rivlin, 2009). Cultures are flexible and can accommodate economic, political, and social change (Richards and Waterbury, 2008). Zakaria (1994) adds that cultures change with economic growth, technological change, and social transformation; therefore, there is a close evolutionary relationship between culture, technology, and scientific knowledge (Roland, 2004). Subsequently, a nation's measures of wealth may be correlated with many aspects of its culture (Javidan and Hauser, 2004).

In this study, national culture is assumed to influence economic development. National wealth is a part of a country's unique culture, as national wealth is considered a reflection of a society's natural resources as well as its effectiveness in managing its external adaptation and internal integration challenges (Javidan and Hauser, 2004). National wealth can therefore confound the relationship between cultural dimensions and socioeconomic phenomena such as RKE (Hofstede, 2001; Javidan and Hauser, 2004). Therefore, the possible effect of national wealth on the culture-RKE relationship will be identified and controlled for.

Research model and hypotheses

Research model

The prevailing cultural values in a society may influence its disposition for knowledge-based economic development because these values may influence the

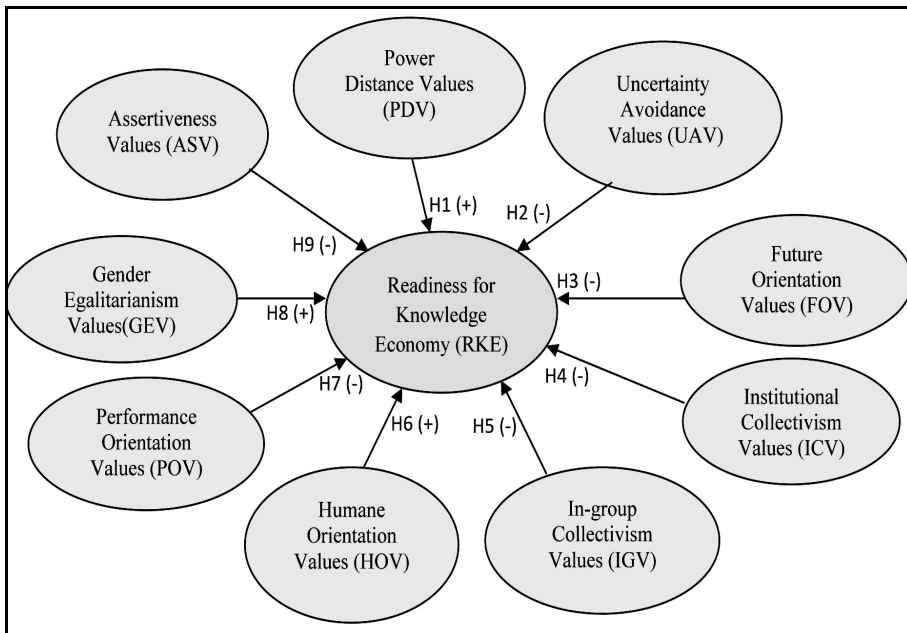


Figure 1: Research model

economic incentive programs and regulations offered in a society, its capacity to conduct R&D and innovation processes, and its ability to develop effective human capital and build an advanced ICT infrastructure (Martinsons and Davison, 2003; Bagchi *et al.*, 2004; Al-Rahbi, 2008, p. 52). To explore the directional relationships between cultural values and RKE, a research model has been adapted (Figure 1).

Research hypotheses

Power distance values (PDV) and RKE

Individuals in high power distance societies are reluctant to accept empowering initiatives, and they are likely to maintain the status quo, restricting government modernization efforts (Zhang *et al.*, 2009), and resist ICT adoption (Islam, 2004). PDV negatively correlates with creativity (Shane, 1992), e-government readiness (Khalil, 2011), and capacity for societal knowledge transfer (Khalil and Seleim, 2010b). It also negatively correlates with societal support for economic competitiveness and the World Competitiveness Index (Carl *et al.*, 2004). Khalil and Marouf's (2015) found power distance practices (PDP) to have a negative influence on two of RKE drivers (EIIR and HER). Given that PDV and PDP correlate

negatively (Javidan *et al.*, 2004, 2006), societies with a high PDV are expected to be more ready to adopt knowledge-based economic initiatives.

H1: Nations with higher PDV have higher RKE.

Uncertainty avoidance values (UAV) and RKE

ICT adoption could flourish in low uncertainty avoidance culture because governments and individuals tend to take more risks and accept innovative ideas (Lim *et al.*, 2004; Hofstede, 1980). However, UAV negatively correlates with economic prosperity, government support for prosperity, the World Competitiveness Index, social health, life expectancy, general satisfaction, human development index (HDI), and civil liberty (de Luque and Javidan, 2004). In addition, poor economic development is explained by the inability of nations to provide rules of law, basic public goods, and a fair distribution of resources (Fukuyama and Gellhorn, 2007). Khalil and Marouf (2015) found uncertainty avoidance practices (UAP) to positively influence KEI and three of its drivers: EIIR, INV, and ICT. Given that UAV and UAP correlate negatively, KE readiness is expected to correlate negatively with UAV.

H2: Nations with lower UAV have higher RKE.

Future orientation values (FOV) and RKE

Highly future-oriented societies are likely to have a high demand for knowledge and information as well as related government services in order to support their social and economic development programs. Their governments are likely to allocate sufficient resources in order to enhance and strengthen their ICT capabilities and modernize their services (Heales *et al.*, 2004; Khalil and Seleim, 2010a, 2010b; Khalil, 2011). However, FOV negatively correlates with economic prosperity, government support for prosperity, the World Competitiveness Index, success in basic science, social health, life expectancy, general satisfaction and HDI (Ashkanasy *et al.*, 2004). Khalil and Marouf (2015) found future orientation practices (FOP) to positively influence RKE and three of its drivers: EIIR, INV, and ICT. Since FOV and FOP correlate negatively, FOV is expected to negatively influence RKE.

H3: Nations with lower FOV have higher RKE.

Institutional collectivism values (ICV) and RKE

Institutionally collective cultures are expected to have governments that encourage knowledge-based economic initiatives, support research and innova-

tion, allocate sufficient resources to ICT infrastructure (to facilitate collaboration and interaction), and develop the requisite human resources for economic development (Khalil and Marouf, 2015). The sharing of knowledge and information in such societies is considered important for teamwork and innovation (Khalil and Seleim, 2010a, 2010b; Khalil, 2011). Nevertheless, ICV were found to correlate negatively with economic prosperity, public sector support for prosperity, the World Competitiveness Index, success in basic science, though they correlate positively with inventiveness (Gelfand *et al.*, 2004). Since Khalil and Marouf (2015) found institutional collectivism practices (ICP), which correlate negatively with ICV, to positively influence RKE and its INV driver, RKE is expected to correlate negatively with ICV.

H4: Nations with lower ICV have higher RKE.

In-group collectivism values (IGV) and RKE

In individualist societies (i.e., low in-group collectivist), governments and businesses play a leading role in economic development, support the adoption of ICT to reinforce performance and productivity, encourage research and group collaboration, and provide resources for human development (Khalil, 2011; Khalil and Marouf, 2015). However, IGV were found to correlate negatively with national wealth (Hofstede, 1980), economic prosperity, success in basic science, social health, and correlate positively with achieving economic goals (Gelfand *et al.*, 2004). However, these correlations become insignificant when controlling for GNP per capita (Gelfand *et al.*, 2004). Khalil and Marouf (2015) found in-group collectivism practices (IGP) to negatively influence a nation's RKE and its four KE drivers: EIIR, INV, EHR, and ICT. Since a non-significant positive relationship exists between IGV and IGP (Javidan *et al.*, 2004; 2006), high individualist societies are expected to experience high readiness for KE.

H5: Nations with lower IGV have higher RKE.

Humane orientation values (HOV) and RKE

Governments in humane-oriented societies support the private sector and sponsor public provisions to provide people with the needed resources and services (Kabasakal and Bodur, 2004; Khalil and Marouf, 2015). HOV have no relationship with economic health indicators (Kabasakal and Bodur, 2004; Javidan *et al.*, 2004); however, humane orientation practices (HOP) correlate negatively with societal GNP per capita, life expectancy and human development, and the adult literacy rate (Javidan, House, and Dorfman, 2004; Kabasakal and Bodur, 2004).

Khalil and Marouf (2015) found HOP to have a negative influence on RKE and its four drivers: EIIR, INV, EHR, and ICT. Since HOV and HOP are negatively correlated, societies with high HOV are expected to be well-prepared for developing KE.

H6: Nations with higher HOV have higher RKE.

Performance orientation values (POV) and RKE

High performance-oriented societies are expected to be rich in human capital, economically prosperous and competitively successful (Javidan, House, and Dorfman, 2004). Governments, businesses, and individuals tend to be “early adopters” of technology and produce and disseminate information and knowledge that supports performance and productivity (Javidan, 2004; Khalil and Marouf, 2015). POV, however, were found to have negative correlations with economic prosperity, the World Competitiveness Index, and life expectancy (Javidan, 2004). Khalil and Marouf (2015) found performance-orientation practices (POP) to influence RKE and its INV driver. Since POV and POP correlate negatively, low performance-oriented nations are expected to be prepared for knowledge-based economic development.

H7: Nations with lower POV have higher RKE.

Gender egalitarianism values (GEV) and RKE

Societies with high gender egalitarianism cultures are presumably rich in human capital (Emrich *et al.*, 2004), and ICT tools are needed to facilitate the exchange of information and knowledge in the workplace (Bagchi *et al.*, 2004). GEV correlate positively with economic prosperity, GNP per capita, life expectancy, general satisfaction, and HDI, and correlate negatively with the role of government (Emrich *et al.*, 2004). Khalil and Marouf (2015) found gender egalitarianism practices (GEP) to have positive but insignificant influence on a nation's RKE and its four KE drivers: EIIR, INV, EHR, and ICT. Given the positive relationship between GEV and GEP, societies with high GEV are expected to be well-prepared for KE.

H8: Nations with higher GEV have higher RKE.

Assertiveness values (ASV) and RKE

Societies having strong assertiveness practices cultures are more likely to value competition, hard work, and performance (den Hartog, 2004). They tend to perform well in global competitiveness indexes and be more economically

prosperous (Jadivan and Hauser, 2004; House *et al.*, 2004, p. xvi). Although ASV correlate negatively with success in science and technology, they correlate with none of the wealth and human condition indicators (den Hartog, 2004). Khalil and Marouf (2015) found assertiveness practices (ASP) to have no influence on a nation's RKE and its four drivers. Given that ASV and ASP are negatively correlated (Javidan *et al.*, 2004, 2006), ASV are expected to negatively influence RKE.

H9: Nations with lower ASV have higher RKE.

Research methodology

Measurement

Independent variables (cultural values)

The independent variables include the nine cultural values stated by House *et al.* (2004): PDV, UAV, FOV, IGV, HOV, POV, GEV, and ASV. Nations' cultural values scores in the research sample were obtained by using a seven-point bipolar scale with the two extremes of each cultural dimension (high/low). The psychometric properties of the measurement scale are documented, with the validity tests exceeding the normal empirical research standards (House and Javidan, 2004; House *et al.*, 2004, p. xv, 725). Societies with high scores tend to value stronger power distance, uncertainty avoidance, future orientation, institutional collectivism, in-group collectivism, human orientation, performance orientation, gender egalitarianism, and assertiveness. Table 1 presents the minimum, maximum, mean, and standard deviation values of the nine cultural

Table 1
Descriptive Statistics for National Culture Values (N = 59)

Cultural dimensions	Minimum	Maximum	Mean	Std. Dev
PDV	2.04	4.35	2.7751	0.41119
UAV	3.16	5.61	4.6036	0.61483
FOV	2.95	6.20	5.4375	0.52389
ICV	3.83	5.65	4.7054	0.49732
IGV	4.06	6.52	5.6353	0.41012
HOV	3.39	6.09	5.3810	0.36582
POV	2.35	6.58	5.8686	0.57539
GEV	3.18	5.17	4.4998	0.48564
ASV	2.66	5.56	3.8212	0.63566

values for the nations in the sample. Among the nine dimensions, POV is the most cherished cultural dimension and PDV is the least desirable cultural dimension in the studied societies (Carl *et al.*, 2004; Javidan, 2004).

Dependent variable (RKE)

Following Khalil and Marouf (2015), this study used the World Bank's (2012a) Knowledge Assessment Methodology (KAM) as a framework for measuring a nation's RKE. KEI represents an aggregate index of a nation's overall development toward KE (World Bank, 2012b). It summarizes the performance of the four KE drivers-EIIR, INV, EHR, and ICT-and is constructed as a simple average of the normalized values of 12 knowledge indicators (three items per driver) of the basic scorecard (Khalil and Marouf, 2015). KEI and its four sub-indexes are normalized on a scale of 0 to 10 relative to other nations in the comparison group. The higher the score, the higher the nation's RKE. For the purpose of this research, we used the 2012 KEI values and their sub-indexes for the nations in the research sample (Chen and Dahlman, 2005; World Bank, 2012b).

Table 2 presents the minimum, maximum, mean, and standard deviation KEI values and their sub-indexes for the nations in the sample. KEI has a mean score of 6.43 and standard deviation of 2.23. As for the sub-indexes, INV has the highest mean and EHR the lowest.

Control variable (national wealth)

National wealth is a multidimensional concept that cannot be captured by GDP per capita alone (Karabell, 2014). GDP per capita and the HDI, however, are the most common indices to benchmark a nation's social wellbeing at a particular time (Dasgupta, 2007). This study adopts the year 2000 GDP per capita (The World Bank, 2000) and year 2000 HDI (UNDP, 2015) as measures of the

Table 2
Descriptive Statistics for Knowledge Economy Indexes (N = 59)*

KE Indexes	Min.	Max.	Mean	Std. Dev.
KEI	2.17	9.43	6.4278	2.23267
EIIR	0.12	9.66	6.3649	2.68430
INV	2.09	9.86	6.7998	2.36187
EHR	1.62	9.81	6.1108	2.34971
ICT	1.90	9.49	6.4344	2.25172

* Adopted from Khalil and Marouf (2015)

economic and human development (i.e., national wealth) status of the countries in the sample during this same year. GDP is calculated as the sum of the gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. HDI, developed by the United Nations Development Program (UNDP), measures a country's achievement in the three areas of human development: longevity, knowledge, and standard of living (Jadivan and Hauser, 2004). Table 3 presents descriptive statistics of the national wealth measures in the sample.

Sampling

This study uses the same sample as Khalil and Marouf (2015). Fifty-nine of the sixty-two countries that participated in the GLOBE project (House *et al.*, 2004) are included in the sample, since they have matching cultural practices and KEI scores. The three nations excluded from the analysis, because of the lack of matched culture and RKE scores, are Germany (East), South Africa (White), and Switzerland (French).

Analysis and results

The culture-RKE relationship

The culture-RKE relationship is explored through testing the nine research hypotheses. The Kolmogorov-Smirnov non-parametric test was first applied on the validity of the normal distribution of the research constructs (or variables). The test is to check whether the national culture and KEI scores in the sample follow normal behavior. Table 4 presents the results.

The Kolmogorov-Smirnov Z statistics for nine of the variables (PDV, UAV, HOV, POV, ASV, KEI, EIIR, INV, and ICT) have associated significance levels of less than 0.05. This result suggests that these variables exhibit abnormal behavior. Subsequently, non-parametric analysis was used to test the effect of national culture values on RKE indices.

Table 3
Descriptive Statistics for National Wealth Measures

Year 2000	Min	Max	Mean	St. Dev
HDI	0.423	0.898	0.73486	0.127916
GDP/capita	\$ 356.463	\$ 37813.23	\$ 12432.45	\$ 12114.17

Table 4
One-Sample Kolmogorov-Smirnov Test of Normality

	PDV	UAV	FOV	ICV	IGV	HOV	POV	GEV	ASV	KEI	EIIR	INV	EHR	ICT
Mean	2.78	4.60	5.44	4.71	5.64	5.38	5.87	4.50	3.82	6.43	6.37	6.80	6.11	6.43
St. D.	0.41	0.62	0.52	0.50	0.41	0.37	0.58	0.49	0.64	2.23	2.68	2.36	2.35	2.25
P values	0.003	0.015	0.200	0.082	0.200	0.006	0.000	0.200	0.012	0.000	0.006	0.005	0.061	0.024

Using the means and standard deviations of the nine cultural dimensions, two groups of nations (high and low) for each dimension were identified. The high group (Group 1) included the nations whose raw scores are (mean + St. Dev.) and the low group (Group 2) included those whose raw scores are (mean - St. Dev.). The nations that did not meet these criteria were excluded from the analysis (Khalil and Marouf, 2015).

To test the research hypotheses, the non-parametric Mann-Whitney U test of two independent samples was applied to the two sub-samples. Table 5 summarizes the results, which include the means and standard deviations of each subgroup within each cultural dimension as well as the significant level (P-value) of each dimension's effect on the KEI and its sub-indexes (four key drivers: EIIR, INV, EHR, and ICT).

UAV, FOV, and ICV have negative correlations with KEI and its four sub-indexes, as all corresponding P-values are 0.001 or less. In addition, IGV have a negative correlation with KEI ($P = 0.051$) and its two sub-indexes of INV ($P = 0.021$) and ICT ($P = 0.026$). However, HOV has a positive correlation with KEI ($P = 0.013$) and its sub-indexes of EIIR ($P = 0.022$), INV ($P = 0.014$), and ICT ($P = 0.012$). GEV have a positive correlation with the three sub-indexes of INV ($P = 0.050$), EHR ($P = 0.022$), and ICT ($P = 0.045$). These results, therefore, support the acceptance of hypotheses H2, H3, H4, H5, and H6, and reject hypotheses H1, H7, H8, and H9.

RKE determinants and the influence of national wealth

To better understand the cultural values-RKE relationships, we further analyzed the data set to explore the cultural values determinants of RKE and its drivers as well as the possible impact that national wealth (GDP per capita and HDI) could have on the culture-RKE relationship. We performed two step-wise regression analyses using the nine cultural values separately and in combination with GDP per capita and HDI (Table 6). The cultural values alone explain

Table 5
The Effect of Cultural Values on KEI and its Sub-indexes

Cultural characteristics	Measurement levels	KEI		EIIR		INV		HER		ICT	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
PDV	High (N = 24)	6.325	1.971	6.603	2.150	6.645	2.256	5.744	2.138	6.308	2.175
	Low (N = 34)	6.428	2.422	6.132	3.033	6.847	2.470	6.264	2.450	6.469	2.344
P-values		0.813		0.676		0.728		0.283		0.776	
UAV	High (N = 36)	5.175	1.857	4.935	2.348	5.562	2.0177	4.968	2.192	5.234	1.950
	Low (N = 23)	8.389	1.034	8.603	1.283	8.737	1.342	7.899	1.195	8.314	1.125
P-values		0.000		0.000		0.000		0.000		0.000	
FOV	High (N = 32)	5.175	1.963	4.979	2.581	5.540	2.0932	4.835	2.213	5.347	2.078
	Low (N = 27)	7.912	1.519	8.008	1.722	8.293	1.718	7.623	1.448	7.724	1.725
P-values		0.000		0.000		0.000		0.000		0.000	
ICV	High (N = 30)	5.376	2.043	5.111	2.539	5.681	2.130	5.120	2.227	5.591	2.047
	Low (N = 28)	7.675	1.722	7.809	2.087	8.080	1.955	7.310	1.844	7.499	1.914
P-values		0.000		0.000		0.000		0.001		0.001	
IGV	High (N = 32)	5.907	2.203	5.775	2.791	6.188	2.311	5.802	2.401	5.862	2.072
	Low (N = 27)	7.046	2.145	7.064	2.418	7.524	2.252	6.477	2.278	7.113	2.304
P-values		0.051		0.063		0.021		0.315		0.026	
HOV	High (N = 33)	7.041	2.157	7.042	2.528	7.399	2.441	6.632	2.312	7.089	2.094
	Low (N = 26)	5.650	2.118	5.506	2.677	6.040	2.059	5.449	2.270	5.603	2.205
P-values		0.013		0.022		0.014		0.061		0.012	
POV	High (N = 35)	6.095	2.348	6.017	2.918	6.394	2.397	5.780	2.436	6.187	2.277
	Low (N = 34)	6.914	2.002	6.873	2.266	7.392	2.227	6.594	2.177	6.795	2.212
P-values		0.235		0.273		0.117		0.217		0.371	
GEV	High (N = 34)	6.965	2.091	6.826	2.788	7.292	2.277	6.767	1.944	6.976	2.026
	Low (N = 24)	5.720	2.297	5.720	2.503	6.144	2.404	5.265	2.635	5.748	2.410
P-values		0.062		0.096		0.050		0.022		0.045	
ASV	High (N = 22)	6.074	2.338	6.431	2.603	6.375	2.479	5.728	2.397	5.761	2.486
	Low (N = 35)	6.643	2.212	6.308	2.832	7.030	2.347	6.345	2.369	6.888	1.998
P-values		0.265		0.902		0.306		0.309		0.069	

Table 6
The Cultural Values and National Wealth Determinants of RKE Indices

Knowledge economy indexes	Regression model (Cultural Values)			Regression model (Culture Values and National Wealth)		
	Predictors	Beta	P-Value	Predictors	Beta	P-Value
KEI	$R^2 = 0.532$			$R^2 = 0.915$		
	UAV	-0.735	.000	HDI	0.797	.000
				UAV	- 0.217	.000
EIIR	$R^2 = 0.465$			$R^2 = 0.704$		
	UAV	-0.688	.000	HDI	0.631	.000
				UAV	- 0.217	.007
INV	$R^2 = 0.495$			$R^2 = 0.817$		
	UAV	-0.710	.000	HDI	0.733	.000
				UAV	- 0.233	.005
HER	$R^2 = 0.499$			$R^2 = 0.870$		
	GEV	0.442	.000	HDI	1.008	.000
	FOV	- 0.360	.002	GEV	0.305	.000
	ICV	- 0.266	.018	GDP	- 0.409	.000
				IGV	- 0.210	.000
ICT	$R^2 = 0.482$			$R^2 = 0.869$		
	UAV (-)	- 0.701	.000	HDI	0.805	.000
				UAV	- 0.178	.000

approximately 53%, 47%, 50%, 50%, and 49% of the variance (R^2) in KEI, EIIR, INV, EHR, and ICT, respectively. Also, the cultural dimension of UAV is the only determinant (or predictor) of KEI, EIIR, INV, and ICT, respectively. And GEV, FOV, and ICV are the cultural values determinants of EHR. However, cultural dimensions and national wealth (GDP per capita, and HDI) collectively explain 92%, 70%, 82%, 87%, and 87%, and 87% of the variance (R^2) in KEI, EIIR, INV, EHR, and ICT, respectively. Also, HDI and UAV are the only determinants of KET, EIIR, INV, and ICT, while HDI, GEV, GDP per capita, and IGV are the only determinants of EHR. These results are discussed next.

Discussion

This research explored the cultural values-RKE relationships and the influence of national wealth on such relationships. The results suggest that nations that cherish lower uncertainty avoidance values, lower future orientation values, lower institutional collectivism values, lower in-group collectivism values, and higher humane orientation values tend to be more ready for pursuing knowledge-based

economic development than do their counterparts. In addition, national wealth influences the cultural values-RKE relationships as well as the cultural values determinants of RKE.

The values of uncertainty avoidance (UAV), future orientation (FOV), and institutional collectivism (ICV) were found to have a strong negative influence on a nation's RKE and its capacity to adopt and sustain knowledge-based economic development initiatives. They also have a negative influence on the four RKE drivers of KEI. As such, governments in nations that value low levels of uncertainty avoidance, future orientation, and institutional collectivism tend to strongly support economic development by providing economic incentives and regulations promoting the adoption of up-to-date ICT infrastructure, nurturing institutional and individual research and innovation, and establishing education and training programs to develop skillful human resources capable of creating, exchanging, and applying knowledge.

In addition, in-group collectivism (IGV) negatively influences RKE and two of its drivers (INV and ICT). Nations with lower in-group orientation experience higher levels of RKE as they tend to have effective economic incentives and regulation regimes, possess high innovation and R&D capacities, and adopt advanced ICT infrastructure which support their KE initiatives. Humane orientation values (HOV), however, positively influence KEI and three of its drivers: EIIR, INV, and ICT. Nations with high humane orientation experience high levels of RKE, as they tend to have strong government systems and regimes that foster the adoption of advanced ICT tools and implementation of rigorous innovation and research programs to produce and utilize knowledge. This helps decrease uncertainty and implement long-term development strategies, and the exploitation of newly created knowledge is likely to propel economic development (Khalil and Marouf, 2015).

Although GEV do not influence RKE, they have a positive influence on three of its drivers: INV, EHR, and ICT. Nations with high GEV tend to have a capacity to innovate, create, and apply new knowledge to develop new products and services, effective development of human resources (both men and women), and advanced ICT infrastructure, which all create an environment favorable to knowledge-based economic development. With the exception of the GEV-related findings, the findings of this study are consistent with those of Khalil and Marouf (2015), who explored the cultural practices-RKE relationships.

The above findings, however, represent the single influence that each cultural dimension has on RKE and its four drivers. Since national culture is multi-dimensional and these cultural dimensions are interrelated, the culture-RKE relationship was further explored in the pursuit to identify determinants of RKE and comprehend the possible effect of national wealth on such a relationship. National culture dimensions collectively explain 53% of the variance in RKE and explain 47%, 50%, 50%, and 48% of the variance in the four drivers (EIIR, INV, EHR, and ICT), respectively. The regression models have a modest predictive power since they explain moderate percentages of the variance in RKE and its drivers. In addition, UAV is the only determinant of RKE and its EIIR, INV, and ICT drivers, while GEV, FOV, and ICV are important determinants of EHR. As such, these results help to answer the question of why different nations experience varying levels of readiness for knowledge-based economic development. A nation needs to cherish low uncertainty avoidance, low future orientation, and low institutional collectivism as well as high gender egalitarianism as part of its cultural profile in order to augment its RKE development.

However, controlling for national wealth, measured by GDP per capita and HDI, has produced varying effects on the relationships between the cultural dimensions and RKE indices. Cultural values, GDP per capita, and HDI collectively explain much more variance in KEI and its sub-indexes than do cultural values alone (Table 6). As such, HDI and UAV are important determinants (predictors) of RKE and three of its drivers: EIIR, INV, and ICT; and HDI, GDP per capita, GEV, and IGV are important determinants of the EHR driver. Among the nine culture dimensions, UAV appear to be a strong determinant of a nation's readiness for developing a knowledge-based economy; therefore, UAV and HDI appear to be orthogonal variables. In the meantime, GDP per capita is not a significant determinant of KEI because it strongly correlates with HDI ($r = 0.823$), which masks its effect on RKE.

The influence that national culture was found to have on RKE and its drivers in this study suggests that a nation's cultural values can reasonably explain and predict its readiness for a knowledge economy as a socioeconomic phenomenon. However, compared to the findings of this study, Khalil and Marouf's (2015) cultural practices-based regression models explain higher percentages of the variance in RKE and its four drivers. Therefore, the cultural practices-based models exhibit more explanatory power than do the cultural values-based models.

This finding supports the assertion that cultural practices are better predictors of socioeconomic indicators than cultural values (Javidan *et al.*, 2006).

Research conclusions, implications, and direction for future research

This study has sought a cultural value understanding of nations' readiness for KE. It provides empirical evidence on the influence of cultural values on nations' RKE as well as on the mediating effect of national wealth on the national culture-RKE relationship. The national culture values of uncertainty avoidance, future orientation, institutional collectivism, in-group collectivism, and humane orientation appear to influence RKE, with uncertainty avoidance serving as the most influential. These cultural characteristics impact RKE directly and indirectly by affecting its four KE drivers. Nations better prepared to undertake effective knowledge-based development programs tend to cherish low uncertainty avoidance, low future orientation, low institutional collectivism, low in-group collectivism, and high humane orientation.

The findings of this study offer insights for both researchers and policy makers. They confirm the existence of an intertwined relationship between national wealth measures and national culture dimensions and the effect of such relationships on RKE. They also contribute to policy makers' quest for a better understanding of the multifaceted challenges of knowledge-based economic development. The transition to a knowledge-based economy requires long-term strategies that focus on developing all four KE drivers. Nations need to first understand their strengths and weaknesses in order to develop appropriate and actionable policies and investments, and to guide the ambitions and mechanisms that enable leaders to monitor progress against a set of goals (Chen and Dahlman, 2005; Khalil and Marouf, 2015).

Since cultures shift rather slowly in the short run (Gelfand *et al.*, 2004; Li and Karakowsky, 2002), the policy makers of a nation should formulate policies and strategies aimed to foster RKE based on the specific cultural profile of that nation (Hofstede, 2007). They should formulate policies that leverage the cultural values favorable to establishing and sustaining economic incentives, engaging in research and innovation, developing skilled human resources, and adopting advanced ICT infrastructure, which are all important RKE drivers.

Over the long term, the manipulation of influential cultural values and practices toward support of developing knowledge economies according to each society's cultural profile is crucial to RKE. Although the prevailing view in the

extant literature is that government policies reflect national cultures, government actions are an important source of cultural change (Li and Karakowsky, 2002). National policies should affect the future cultural values of people and governments and encourage and support KE development. Enhancing KE readiness in a society requires increasing its national materialistic and human wealth, and changing its cultural values to be less uncertainty avoidant, less future oriented, less institutional collectivist, less in-group collectivist, and more humane-oriented.

Nevertheless, the findings and implications of this study should be carefully interpreted and implemented in light of their limitations. First, the World Bank's (2012b) KEI was adopted as a proxy for KE readiness and assumed a causal relationship between national culture and RKE. However, there is no strong existing evidence on the validity of KEI as a measure of a nation's readiness for KE. Future research aimed at investigating the determinants of a nation's RKE should consider validating this assumption and attempting to adopt direct and objective RKE measures in longitudinal research settings that consider the distinct and complex socioeconomic characteristics of different nations (Khalil and Marouf, 2015).

Second, a fundamental assumption for using national culture in this study is that economic development is a product of culture, although economic growth may lead to cultural shifts (Emrich *et al.*, 2004; Zakaria, 1994; Roland, 2004; Richards and Waterbury, 2008), and economic development could influence a culture to change in a particular direction (Rivlin, 2009). Therefore, we treated national wealth, measured by GDP per capita and HDI, as a covariate influencing the national culture-RKE relationship. Partialling out the effect of a nation's wealth, however, also offsets part of a nation's culture effect on RKE (Javidan and Hauser, 2004). The mitigating and intervening effect of national wealth renders a cultural-based explanation of RKE imprecise. Our findings, however, may encourage and inform further experimental studies to explore cause-and-effect relationships between culture and RKE.

Lastly, the national cultural values scores used in this study assume that societal values and behaviors in a nation are homogeneous. Such generalization at the societal or cultural level, however, may obscure important information (Martinsons and Davison, 2003; Myers and Tan, 2002), as cultural values may vary across groups within the same nation. In addition, individual differences in the measurement of a cultural dimension cannot be assumed to reflect the scores of policy makers and government officials (McCoy, 2003). Future research designed

to seek a cultural interpretation to KE development in a particular nation should measure the espoused cultures of leaders and policy makers in governmental institutions and important economic sectors instead of merely using reported culture scores, which may not accurately reflect the present cultural characteristics of that nation (Khalil and Marouf, 2015).

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Omar E. Khalil is currently a Professor of Information Systems at the Quantitative Methods & Information Systems (QMS) Department, College of Business Administration, Kuwait University. Has a Ph. D. in Information Systems from the University of North Texas. Has more than one hundred publications, including journal articles, edited books, chapters in edited books, and conference proceedings. His research interest includes Information Systems Effectiveness, Global Information Systems, Information Quality, Knowledge Management, and Information Ethics. (okhlil@cba.edu.kw)

Laila N. Marouf is the Assistant Vice President for Research at Kuwait University. She is an Associate Professor in Library & information science at College of Social Sciences, Kuwait University. Has a Ph.D. in Library & Information Science from University of Pittsburgh with a focus in Knowledge Management. She earned her B.Sc. in Computer Science and Mathematical Statistics from Kuwait University. She teaches courses in Knowledge Management and Knowledge Sharing & CoPs at the Master's program in the department of Library & Information Science at Kuwait University.

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