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Information Communication Technology Management as a GDP Growth Contributor Within Arab League Nations

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Abstract

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by

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MBA, University of British Columbia, 2004

BS, University of Houston, 2002

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

The general problem addressed in this study was Arab League nations' over-reliance on fossil fuels as a gross domestic product (GDP) growth driver. Arab League nations that depend primarily on fossil fuel production lack alternative resources for growth in times of fossil fuel usage or price decline. Overdependence on fossil fuels has led to minimal development in other economic sectors, primarily in skilled domestic labor, and to a high dependency on foreign skilled labor for skilled domestic jobs. The purpose of this study was to examine to what extent information communication technology (ICT) management can be a viable GDP growth contributor in Arab League nations. The main theoretical foundations consisted of diffusion of innovation theory, rate of adoption theory, and the innovation–decision process. The focus of research questions was on how ICT management and fossil fuel production affect the GDP growth rate of Arab League nations. A cross-sectional design was used. Archival secondary data from unesco.org and data.worldbank.org for the 22 countries that comprise the Arab League nations were analyzed. Results of a Pearson's product-moment correlation analysis indicated that there is a significant relationship between real GDP and ICT management growth rates in Arab League nations. Based on study findings, it was recommended that both oil- and non-oil-producing governments within the Arab League give more attention to the implementation of ICT management policies. The study contributes to positive social change by providing Arab League governments and stakeholders with a comparative assessment of alternative GDP revenue drivers and potential areas to invest capital to increase skilled domestic labor and maximize human resource capital.

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Dedication

I dedicate this dissertation to my two sons, Jayden and Jaylen, and my lovely wife, Juanita; you can achieve anything you put your mind to. I owe it all to Almighty God for the strength and preservation that You have given me to achieve my goals.

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Chapter 1: Introduction to the Study

Background of the Study

Globally, organizations and national governments are using technology in different facets of life to make tasks easier, especially for the labor force (Rienties et al., 2012). Information communication technology (ICT) management, in particular, is one of the major applications of modern technologies. The business management sector is concerned about the transmission of knowledge across generations and the search for new information and ideas. A good business management education system is associated with innovative technology, the development of industries, and support for industrial and economic growth (Rienties et al., 2012). Such a system also has the potential to contribute to a constant supply of highly skilled domestic workers (Jepsen & Montgomery, 2012).

Researchers have explored the use of ICT in management, focusing on multiple dimensions. The existing studies suggest that using ICT in management provides business and educators with more options on which to base their instruction (Andronie & Andronie, 2014; Stahl, 2011). The use of ICT is also associated with an increase in the availability of information and knowledge sources, according to Iglesias-Fernández, Llorente-Heras, and Dueñas-Fernández (2010). As Cavas (2011) noted, ICT management has transformed educational and business approaches through the introduction of e-learning.

The increased availability of Internet technology throughout the world has generally resulted in improved dispersion of information and access to knowledge (Tugui, 2011). Several factors, however, such as the availability of electricity, network

coverage, and access to Internet technology, hinder the development and deployment of ICT management (Wang, 2011). In most developed nations, ICT management resources such as radios, televisions, computer-assisted instruction, local area networks, computer laboratories, fixed broadband Internet access, Web sites, and open education resources are used in ICT management infrastructure (Ion, 2012). ICT management technologies that are taken for granted in the United States sometimes do not exist in some Third-World countries due to daily electricity shutdowns, lack of funding, and political restrictions (Inan & Lowther, 2010).

Previous researchers have studied whether the gross domestic product (GDP) of Arab League nations is correlated with the implementation of ICT management and dependence on fossil fuel production (AlBassam, 2013). In this study, I analyzed the extent of the correlation, if any, between Arab League nations' GDP and ICT management and fossil fuel production dependency. In addition, I analyzed the extent to which ICT management policies have been implemented by Arab League nations and the effect this has had on fossil fuel production dependence in terms of GDP growth. This chapter includes a description of the topic; a statement of the problem, which includes evidence showing that the problem is relevant, current, and significant; the purpose of the study; and research questions and hypotheses. In the chapter, I also provide an overview of the theoretical foundation and the nature of the study, provide definitions of terms used in the study, and discuss the study's assumptions, scope and delimitations, and limitations and its significance.

Problem Statement

The Arab League nations of Algeria, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates have experienced considerable improvements in their economies in recent years, in line with higher production demand for fossil fuels. Most Arab League nations, however, suffer from an overreliance on fossil fuel production (Alyahya, 2011; Campante & Chor, 2012). The general problem that I addressed in this study is oil-dependent Arab League nations' overreliance on fossil fuel production as a GDP growth driver. Fossil fuel production accounts for more than 70% of most Arab League nations' GDP (Fattouh & El-Katiri, 2012). Fossil fuel production has been the leading export and GDP driver for most Arab League nations for more than 30 years (Pamuk, 2006). The overdependence on fossil fuel production has led to minimal development in other economic sectors, primarily in skilled domestic labor. The limited number of skilled domestic workers available to contribute to GDP growth has led to a high dependency on foreign skilled labor for skilled domestic jobs. As researchers have noted, Arab League nations have become highly reliant on expatriates and immigrants from other regions for skilled labor positions (Aswad, Vidican, & Samulewicz, 2011; Zakari & Alkhezzi, 2010).

Due to GDP growth being dependent on pricing stability in fossil fuel production, Arab League nations lack alternative sources of positive growth in times of fossil fuel usage or price decline (Fattouh & El-Katiri, 2012). ICT management is one approach that has been used by organizational leaders to improve information access and efficiency in the business and education systems used to train skilled domestic labor (Hock & Lafi, 2011; Khondker, 2011). Stakeholders of Arab League nations, government and corporate leadership, and external as well as internal investors may benefit from investing in ICT

management as a strategy for increasing skilled domestic labor if it has a positive relationship with real GDP growth.

Purpose of the Study

The purpose of this quantitative study was to examine to what extent ICT management can be a viable real GDP growth contributor in Arab League nations that are primarily dependent on fossil fuel production. Arab League Nations that depend primarily on fossil fuel production lack alternative resources for growth in times of fossil fuel production usage or price decline (Pamuk, 2006). I examined real GDP adjusted for inflation in relation to two independent variables: ICT management and fossil fuel production in Arab League nations, some of which have adopted ICT management policies and some of which have not. The significance of the relationship is that it could inform Arab League nations' leaders with an understanding of how ICT management affects GDP growth. By understanding the effect of ICT management on GDP growth, it could be possible for Arab League nations to identify an alternative GDP growth driver in lieu of fossil fuel production. I used validated secondary data from unesco.org, data.worldbank.org, unstats.un.org, stats.oecd.org, imf.org, itu.int, education-inequalities.org, and nationmaster.com to assess the variables under investigation.

Research Questions and Hypotheses

The general research question was, To what extent does a relationship exist between GDP growth, ICT management, and fossil fuel production? The following are the four sub-research questions that were used to explore the issues in the study:

- RQ1: How do Arab League nations' policies differ in terms of ICT management implementation?

- RQ2: What is the relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate versus those that have not?
- RQ3: What is the effect of fossil fuel production on the ICT management growth rate in Arab League nations?
- RQ4: What is the effect of ICT management on the GDP growth rate of Arab League nations that have and have not implemented full ICT management plans?

I also tested the following four research hypotheses:

- $H_0$1: There is no significant difference in ICT management implementation policies between Arab League nations.

  H_a1: There is a significant difference in ICT management implementation policies between Arab League nations.
- $H_0$2: There is no significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate.

  H_a2: There is a significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate.
- $H_0$3: There is no significant effect of fossil fuel production on ICT management growth rate in Arab League nations.

  H_a3: There is a significant effect of fossil fuel production on ICT management growth rate in Arab League nations.

- $H_0$4: ICT management has no significant effect on Arab League nations' real GDP growth.

  H_a4: ICT management has a significant effect on Arab League nations' real GDP growth.

By answering the research questions and testing the hypotheses, I sought to enhance experts understanding in the field in determining the extent to which ICT management can contribute to GDP growth in lieu of fossil fuel production dependency in the Arab League nations.

Theoretical Foundation

I used diffusion of innovation as the main theory supported by the rate of adoption theory and the innovation–decision process theory. These theories all stem from the work of Rogers (2003). Diffusion of innovation theory provides a way to explain how, over time, an idea gains momentum and spreads (Rogers, 2003). I used the theory of the rate of adoption (Rogers, 2003) to analyze the growth of and fluctuations in Arab League nations' economies that use fossils fuels as their economic base. I used innovation–decision process theory (Rogers, 2003) to evaluate the process of introducing and measuring ICT management growth and implementation in selected countries (Rogers, 2003). The technology used as a business or educational tool or aid requires a long-term commitment from different stakeholders, including teachers, organizational management, government officials, and politicians (Germany, 2013; Kopcha, 2010; Moran, Hawkes, & El Gayar, 2010). I used the theory of the rate of adoption to analyze the extent of growth and the impact of ICT management on Arab League nations that differ in their adoption of an ICT management policy. The management sector may gain from more insight about

ICT management strategies by being better able to expand educational reach and resources to develop a skilled domestic labor workforce. Sustained efforts toward improving the use of ICT management policies are thus important indicators of a nation's ability and potential to gain from the deployment of such policies in the short and long term (Campbell & Abd-Hamid, 2013; Kalota & Hung, 2013; Lin, 2012).

As noted above, the management sector stands to gain from implementing ICT management policies through expanding educational reach and resources needed to train skilled labor. Such gains could lead to the production of a reliable domestic skilled labor force, which is important in enhancing the management decision process in any given organization (Anderson, 2012). However, these gains are unattainable unless stakeholders show a commitment to adopting ICT management technologies that will result in the most gains for the management sector. The commitment may wane with changes in the political landscape, in leadership, or even in priorities at the government and school level (Inan & Lowther, 2010). Both government and business leadership should work together to maximize the implementation of ICT management policies for the best domestic results.

Nature of the Study

I used a quantitative, comparative research design to identify the differences and similarities between Arab League nations that have and have not implemented ICT management policies. Scholars use comparative research terminology differently. Some use the terminology in cross-national research in which they compare different countries (Hossain, 2012) while others widen the scope of the terminology use by comparing various types of cultural and social entities (Hossain, 2012). Other scholars also use the

terminology to encompass comparisons of different social substrates, including subcultures within social and cultural boundaries or across or within states and nations (Fägerlind & Saha, 2014).

In the study, I used quantitative techniques to compare one dependent variable (GDP real growth rate) and two independent variables (ICT management and fossil fuel production) over 6 years. The use of this design allowed me to compare the use of ICT management in Arab League nations across a 6-year span (2010–2015) and determine the extent of tangible gains in ICT management use, as well as economic gains. I used the correlation between ICT management resources in the business sectors to further evaluate tangible gains. By knowing the extent of the effect each selected variable played on GDP growth during the study's timeframe, I could determine whether there is a positive or negative relationship between the variables.

Definitions

Correlation: Correlation is a mutual connection or relationship between two or more variables (Edward, Lestariningati, & Agusdian, 2014). It can be negative or positive, depending on the kind of connection that exists between the variables. A positive correlation between two variables indicates that an increase in one variable by one unit will lead to an increase in the other variable by a given number of units. In contrast, a negative correlation between two variables indicates that an increase in one variable will lead to a decrease in the other variable.

Fossil fuel production: Fossil fuel production refers to hydrocarbon deposits like coal, natural gas, or petroleum that are derived from the remains of ancient animals and

plants that have accumulated over the years and can be used as fuel (Maroto-Valer, Song, & Soong, 2012).

Gross domestic product (GDP): GDP refers to the monetary value of all finished goods and services produced within a country's borders within a specific period of time (Faour, 2013). It encompasses consumption, government and private expenditures, and net exports.

Human-capital theory: Human-capital theory is a theory that states that experience, knowledge, and skills have economic value to an economy or an organization because they enable it to be productive and adaptable (Popovic, 2012).

ICT management: ICT management connotes learning, implementation, and teaching using information and communication technologies that include any application or communication device encompassing radio, cellular phones, television, satellite systems, computer and network software and hardware, and so on, including the various applications and services associated with them, such as distance learning and video conferencing (Allagui & Kuebler, 2011).

ICT uptake: The level of penetration of ICT in a country (International Telecommunication Union, 2011). It is generally measured using ICT Development Index (IDI).

Knowledge-based view: Knowledge-based view is a theory that examines how variations in the key resources of an organization or an economy, or its *know-how*, might lead to differences in performance of the organizations or of the economies in terms of their GDP growth (Young, 2013).

Resource-based theory: Resource-based theory refers to the theory that blends concepts from the fields of strategic management and organizational economics (Barney, 2012).

Resource-dependence theory: Resource-dependence theory is concerned with how organizational behavior is affected by external resources used by organizations (Shafritz, Ott, & Jang, 2015).

Assumptions

In this research study, I used secondary data from online databases. The focus was on the collection of quantitative data from secondary sources of statistical data. The data related to the number of educational institutions with electricity, assisted instruction (e.g., use of radio, television, or computer technology), access to the Internet, and a Web site. I gathered this data for the 6 consecutive years between 2010 and 2015. The database sources I used were unesco.org, data.worldbank.org, unstats.un.org, stats.oecd.org, imf.org, itu.int, education-inequalities.org, and nationmaster.com; they provided secondary data relating to education, technology, and GDP across different nations. The selected nations are part of the 22 Arab League nations member states Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, United Arab Emirates, and Yemen. The United States had the potential to be included in the research to expand the median statistical comparative points for the Arab League nations. I based the selection criteria for the Arab League member nations on the demographics, imports, and exports of those countries, along with their economic reliance on fossil fuel production.

Scope and Delimitations

The study addresses the issue that Algeria, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates had been recording considerable improvements in their economies in past years as a result of overdependence on high production demand for fossil fuels, which has led to minimal developments in other economic sectors, especially skilled domestic labor. During times of low production demand for fossil fuels, the five listed nations have shown both stagnation and decline in GDP growth (Alshehry & Belloumi, 2014). The five listed Arab League nations also do not have set or fully implemented ICT management plans and use a high number of expatriates for skilled labor. Thus, Arab League nations have become highly reliant on expatriates and immigrants from other regions for skilled labor, and these countries have begun to use ICT management to improve information access to make business and education systems more effective (Andronie & Andronie, 2014). At times, the lack of skilled domestic labor has posed challenges to the management of different key organizations in these nations, as corporation leaders must take considerable time to look for relevant expertise. Therefore, in the study, I addressed the problem of Arab League nations' overreliance on fossil fuel production, which accounts for more than 70% of these countries' real GDP growth rate (Fattouh & El-Katiri, 2012). GDP growth is also dependent on market stability of fossil fuel production, which means there is a lack of alternative resources in these nations that can contribute to positive GDP growth when there is a decline in production demand for fossil fuels.

The study is limited to the 22 Arab League nations member states: Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania,

Morocco, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, United Arab Emirates, and Yemen in terms of investigating the correlation between adopting ICT management and GDP growth in relation to fossil fuel production dependency. In the study, I took a quantitative approach to ascertain whether there has been significant GDP growth within Arab League nations that have adopted an ICT management policy over a 6-year span versus Arab League nations that have not, as mentioned earlier. This assisted in determining whether adopting ICT management policies has aided countries in maintaining GDP growth during periods of decreased production demand for fossil fuels compared to countries that have not adopted ICT management policies; it could help determine the influence of ICT management policies within the 13 Arab League nations that have implemented policies in correlation to those that have not.

Limitations

The study was limited to analytical strategies, which include exploratory, descriptive, and inferential analysis. Exploratory analysis, in this case, is a data analysis approach that analyzes data sets in terms of summarizing their main attributes or characteristics using visual methods (in most cases) to see what the data represent beyond hypothesis-testing tasks or formal modeling (Weiss, 2015). The descriptive analysis involves data analysis with the aim of describing and summarizing data to bring out meaning and patterns that come out of the data (Gravetter & Wallnau, 2016). The purpose of inferential analysis, in contrast, is to infer the thoughts of the population from the sample data in terms of making judgments on the chances of occurrence of observed differences between groups (Doane & Seward, 2011).

To address the limitations of analytical strategies associated with exploratory, descriptive, and inferential analysis, I collected data from online databases imported in comma-separated values, text, and Excel formats, which was then loaded into Statistical Package for the Social Sciences (SPSS). In the exploratory analysis, I aimed to determine errors in the data, including outliers and missing values. This process helped in cleaning the collected data. The descriptive analysis helped in summarizing the sample data. The analysis in this step focused on the means and standard deviations of the variables across the 6-year period. The inferential analysis aimed to determine whether there have been significant improvements in each of the variables during the 6-year period.

Significance of the Study

The use of ICT management may signal a significant step toward improving the quality and reach of skilled domestic labor used to increase GDP growth instead of depending on fossil fuel production to drive Arab League nations' economy. By determining whether there are gains from the use of ICT management within Arab League nations, the study may provide an audit and template that governments and other management stakeholders can use as the basis for improving and investing in ICT. The study may aid Arab League nations that have not fully developed or adopted ICT management plans in developing plans or models. The plans or models that are developed may improve the delivery of ICT management, to increase the skilled domestic labor workforce within the Arab League nations that are primarily dependent on fossil fuel production for GDP growth.

Significance to Theory

The study has the potential to contribute to the knowledge base of expanding real GDP growth through domestic human capital. Use of both resource-based and knowledge-based theories to examine the contribution human capital can make in increasing domestic real GDP growth in lieu of fossil fuel production resource dependency may signal an alternative growth resource.

Significance to Practice

The study has the potential to aid Arab League nations in identifying key areas in which to invest, as well as to enhance their domestic skilled labor force to compete with non-domestic skilled labor. National government and foreign companies may be able to identify an alternative source of GDP-building income in the form of domestic human capital. The study could aid corporate management and government leadership in knowing if contributing to ICT management is a favorable option and could provide guidance regarding where to invest capital to lead to a more diverse domestic work pool. In addition, if the option of a highly skilled domestic workforce is available, management could possibly reduce operational costs by not having to import highly skilled workers. At the state level, this could possibly raise GDP due to the Arab League nation having access to skilled domestic labor and not having to expend further capital to outsource labor. In essence, a higher employment rate in the country could lead to economic growth from currency staying domestic. Increased domestic income could have a potential impact on social stability, especially from economic growth among the middle class and not just the wealthiest few. Understanding the GDP in these outlined countries could aid the domestic government, which manages most infrastructures in this region, and then it

could dictate to foreign corporations on the resources that it could invest in, which, if the ICT management relationship is positive, could be skilled domestic labor.

Significance to Social Change

The use of ICT management throughout the Arab League nations may signal a significant step toward improving the quality and reach of skilled domestic labor to increase GDP growth instead of depending on fossil fuel production to drive their economies. By determining if there are GDP gains in correlation with a decline of fossil fuel production within Arab League nations that have adopted ICT management policies, the study may provide an audit and a template that governments and other management stakeholders can use as the basis for improving and investing within ICT management. The study may aid Arab League nations in developing plans or models to improve the delivery of ICT management to increase the skilled domestic labor workforce within their countries, thus promoting positive social change.

Chapter Summary

This chapter covered the background of the study, the statement of the problem, the purpose of the study, research questions and hypotheses, and the theoretical foundation. This chapter also covered the nature of the study, definition of terms, assumptions of the study, scope and delimitations, limitations of the study, and significance of the study with respect to the correlation of Arab League nations' GDP with ICT management and fossil fuel production dependency. The objective of the study was to identify the extent to which ICT management is a viable GDP growth alternative in lieu of fossil fuel production. If we know the degree of correlation, an alternative GDP growth contributor in ICT management may be a viable option for increasing skilled

domestic labor in the Arab League nations. I therefore explored the trend of the GDP growth rate of the Arab League nations that are dependent on fossil fuel production and the trend of GDP growth rate in the Arab League nations that are dependent on ICT.

In general, the study stems from the notion that ICT management is one of the major applications of modern technologies, as almost all the Arab League nations are using technology in different facets of human life to ease work burdens (Rienties et al., 2012). The interest in this topic also stems from the assumption that fossil fuel production has been one of the resources that facilitates economic growth and development in the Arab League nations, as most of these nations have an abundance of fossil fuel resources. The intent in this study was to determine the extent, if any, to which the two variables of ICT management and fossil fuel production correlate with the Arab League nations' GDP growth. Such a determination may aid other Arab League nations in developing set plans or models to improve the delivery of ICT management to increase skilled workforces within those countries and to rely less on outside workforce aid. In addition, the findings of this research may also be useful to academicians and scholars in adding knowledge that relates to the theories and applications regarding GDP, ICT management, and dependency on fossil fuel production. By identifying alternative sources for GDP growth drivers, Arab League nations may be able to invest more in those resources and reduce dependence on fossil fuel production.

Chapter 2: Literature Review

The literature on the correlation between the GDP of Arab League nations with ICT management and fossil fuel production dependency is complete with notions implying that either ICT management, fossil fuel production, or both are a necessity for economic growth (Edquist & Henrekson, 2015). In this chapter, I highlight the empirical and theoretical studies concerning the GDP of the Arab League nations and how GDP relates to ICT management and fossil fuel production dependency. The chapter opens with a brief review of the theoretical foundation and study variables; I sought to address in this study the research knowledge gaps. I critically review the literature on the GDP of the Arab League nations and ICT management to establish whether there is a direct relationship between the Arab League nations' GDP and ICT management. In addition, I review the literature on the GDP of the Arab League nations and fossil fuel production to establish the extent of the relationship between the Arab League nations' GDP and fossil fuel production.

Literature Search Strategy

The search strategy I used for this literature review was to use different databases and search engines to find information that related to the topic, which is the correlation of Arab League nations' GDP with ICT management and fossil fuel production dependency. I searched different databases and search engines using keywords and combinations of various keywords related to the topic. I accessed and used the following library databases and search engines:

- www.jstor.com
- www.waldenu.edu

- www.googlescholar.com
- www.oxford.co.uk
- www.yahoofinance.com
- www.google.com
- www.worldbank.org
- www.unesco.org
- www. omicsgroup.org
- www.ncusar.org

I used the following key search terms and a combination of these search terms:

- GDP
- GDP of Arab League nations
- Arab League nations' economic growth
- ICT education
- ICT education and economic growth in Arab nations
- ICT management
- ICT management and economic growth in Arab League nations
- The impact of ICT management in the growth of GDP in Arab nations
- Correlation between ICT management and the growth of GDP in Arab League nations
- Fossil fuels
- Fossil fuel dependency
- Fossil fuel dependency in Arab League nations

- Fossil fuel dependency and the growth of GDP of Arab League nations
- Fossil fuel dependency and the decline of GDP of Arab League nations
- Correlation between fossil fuel production dependency and the growth of GDP in Arab League nations
- Correlation of Arab League nations' GDP with ICT management and fossil fuel production dependency

The literature review covers scholarly work from different books and journal articles that relate to the topic of the study over 6 years (2010–2015). This included peer-reviewed literature and seminal literature from Jstor, Walden University, Google Scholar, and Oxford, among other databases and search engines. Where there was little current research and few (if any) dissertations and/or conference proceedings, I broke down the topics/subjects into different parts and searched the databases and search engines to find out whether I could obtain relevant information. I also used books and other periodicals that related to the research topic by going through the relevant categories and obtaining information that was related and useful to the research topic.

Theoretical Foundation

The study was anchored by certain theories that provided an explanation of the role of ICT management and fossil fuel production dependency in the growth of GDP among Arab League nations. The study was based upon four main theories: resource-based theory, the knowledge-based view, human-capital theory, and resource-dependence theory. Resource-based theory focuses on the role that internal resources play in the development and maintenance of a firm's or economy's competitive advantage (Barney, Ketchen, & Wright, 2011). The knowledge-based view is a theory that emphasizes the

importance of the resources and organizational capabilities that distinguish an organization from others (Young, 2013). The knowledge-based view was applicable in understanding the importance of the Arab League nations' endowment of fossil fuel production in promoting their economic growth, insofar as GDP correlated with ICT management and dependency on fossil fuel production. Human capital theory suggests that people possess the knowledge, abilities, and skills that provide economic value to firms or economies (Fernando & Fernando, 2014). This theory was important in understanding the role played by ICT management in facilitating growth in the Arab League nations' economies. Finally, resource-dependence theory focuses on the relationship between an organization and its constituents (Choi & Phan, 2012). This theory was important in understanding the relationship that exists between the Arab League nations' GDP and their ICT management and dependency on fossil fuel production.

Literature Review

Resource-Based Theory

Resource-based theory was developed to explain how organizations or economies build sustainable levels of competitive advantage. The proponents of resource-based theory, Barney, Della Corte, Sciarelli, and Arikan (2012), asserted that economies or organizations can be successful if they gain and maintain a competitive advantage. This competitive advantage is gained by creating a strategy that enhances the productivity of the existing labor force in the organization (Hart & Dowell, 2011). Increased productivity, in turn, facilitates economic growth and development (Hart & Dowell, 2011).

Barney et al. stressed that using existing resources in a new way to exploit external opportunities is much more favorable than trying to get new skills for each opportunity available (Hart & Dowell, 2011). This means that, in resource-based theory, resources play the role of helping organizations achieve better performances (Hart & Dowell, 2011). Resources are either *tangible* or *intangible* (Barney, 2012). Tangible resources, in this case, refer to physical things, such as land, machinery, buildings, capital, and equipment, among others. Such resources can be bought, which means that they provide few long-run advantages to the organizations using them because competitors can easily acquire similar resources (Barney, Ketchen, & Wright, 2011). Intangible resources, in contrast, refer to everything else that has no physical presence that can be owned by an organization (Molina-Azorín, 2014). These include brand reputation, intellectual property, trademarks, etc. Unlike tangible resources, intangible resources can take a long time to develop, and other companies cannot acquire similar resources from the market. Intangible resources are therefore the major source of sustainable competitive advantage because they stay within the organization or company.

Resource-based theory incorporates two critical assumptions: Resources must be (a) heterogeneous and (b) immobile (Molina-Azorín, 2014). The assumption that resources must be heterogeneous is based on the idea that capabilities and skills differ from one organization to another. This is because, if organizations had the same mix and amount of resources, there would be no need to employ strategies for competitive advantage, and organizations would simply follow what other organizations were doing, which is the case in perfect competition, which is not followed in real-world markets. Real-world markets expose companies to the same competitive and external forces,

which means that organizations can outperform each other by implementing different strategies. Hence, resource-based theorists assume that competitive advantage is achieved through different mixes of resources.

Regarding the second assumption that resources must be immobile in terms of not moving from one organization to another, at least in the short run, resource-based theorists assume that organizations cannot replicate the resources of rival organizations or implement similar strategies. This is because intangible resources, such as intellectual property, knowledge, processes, and brand equity, among others, are usually immobile.

Thus, it imperative to understand how ICT management can enhance or facilitate the productivity of Arab economies in terms of GDP growth by providing an efficient and skilled labor force. In this case, the labor force is considered an economic resource that helps facilitate GDP growth and can be enhanced through ICT management. Gallego-Álvarez, Manuel Prado-Lorenzo, and García-Sánchez (2011) also supported resource-based theory and argued that a resource can be a source of sustained competitive advantage if it is nonsubstitutable, inimitable, rare, and valuable. Thus, resource-based theory is also applicable in understanding the role that fossil fuel production plays in GDP growth of the Arab League nations. This is because fossil fuel production can be considered a valuable and a nonsubstitutable product among the Arab League nations.

Resource-based theorists also postulate that short-run competitive advantage needs to be transformed into a sustained competitive advantage. To achieve this, the strategic resources need to be heterogeneous and not perfectly mobile. Effectively, this translates into valuable resources that are neither perfectly imitable nor substitutable without great effort (Gallego-Álvarez et al., 2011). Thus, a bundle of resources from a

firm or an economy can assist it in sustaining above-average returns. Resource-based theory is thus applicable in explaining the correlation between the Arab League nations' GDP and their dependence on ICT management and fossil fuel production. This is because the skilled labor force, which can enhance the economic growth of any given nation and can be facilitated by ICT management, is heterogeneous and in most cases not perfectly mobile. In addition, fossil fuel production, which, in most cases, runs the economies of the Arab League nations or determines the level of their GDP growth, can be understood through the concept of resource-based theory, which can enhance its translation into a valuable resource that is neither perfectly imitable nor substitutable without great effort.

Knowledge-Based View

The origin of the knowledge-based view can be attributed to Edith Penrose in 1959 (Young, 2013). Since then, theorists have examined how variations in the key resources of an organization or an economy (i.e., its know-how) might lead to differences in the performance of the organization or the economy in terms of their GDP growth. Dalkir (2013) indicated that recent years have produced a groundswell of interest in organizational and economic differences in "core competence" (p. 192), dynamic capabilities, and knowledge. All these approaches call attention to the competitive advantages that result from idiosyncratic combinations of resources that are not readily assembled in markets or coordinated by the price system but can be mobilized within a specific organization or country (Matsuyama & Hwang, 2013).

While early work focused on more tangible resources such as fossil fuels, financial capital, and location, more recent approaches have underscored the significance

of knowledge. Most analysts employing knowledge-based approaches follow the lead of Holsapple (2013) and stress the importance of *tacit knowledge*. Tacit knowledge is embedded in the skills of workers, work routines, and shared understanding, which, in combination, comprise an organization's distinctive capabilities (Matsuyama & Hwang, 2013). Tacit knowledge does not easily travel between individuals, firms, or economies (Holsapple, 2013). Young (2013) also stated that tacit skills and knowledge that cannot be easily codified tend to persist over time. From this perspective, firm boundaries take on a dual character, being defined by the bundle of resources that a firm owns and by the interaction between resource endowment and available market opportunities (Matsuyama & Hwang, 2013).

Adherents of the knowledge-based view also consider the knowledge of an organization its most significant and strategic resource. Because knowledge-based resources are socially complex and difficult to imitate, heterogeneous capabilities and knowledge bases among organizations are the main determinants of superior corporate performance and sustained competitive advantage (Vermesan & Coenen, 2013). This knowledge is also carried and embedded in multiple entries, such as organizational identity and culture, routines, policies, systems, documents, and employees. This perspective extends and builds upon resource-based theory discussed earlier, in which achieving a competitive advantage is viewed as the most important function of knowledge. However, the proponents of the knowledge-based view differ from proponents of resource-based theory by arguing that resource-based theory treats knowledge as a resource that is generic and has no special characteristics (Katzy, Bondar, & Mason, 2012). This means that it does not differentiate the capabilities that are based

on knowledge. Therefore, ICT management can play a vital role in the knowledge-based view of an organization, because information systems are useful in expediting, enhancing, and synthesizing large-scale inter- and intra-organizational knowledge management.

This perspective of the knowledge-based theory is important in explaining how ICT management relates to GDP growth in the Arab League nations. For instance, as explained at the beginning of this section, an understanding of the concept of tacit knowledge will help explain how ICT management can lead to the generation of tacit knowledge. This will then help in understanding how the tacit knowledge produced by ICT in management improves the productivity of the labor force and its effects on GDP growth in the Arab League nations.

The proponents of the knowledge-based theory see competitive advantage as rooted in resources that are difficult to replicate, are idiosyncratic to the firm or economy, and are deployable across multiple product lines (Matsuyama & Hwang, 2013). This perspective is important in understanding the endowment of fossil fuels upon the Arab League nations, as fossil fuels can be described as a resource that is difficult to replicate, is idiosyncratic to the firm or economy, and is deployable across multiple product lines. Incidentally, Dalkir (2013) asserted that there is no distinction between the resource-based theory and knowledge-based view of a firm or economy. Both approaches focus on the internal resources of an organization or economy and, in particular, the development of core competence and capability as the principal means to generate the scope of a competitive advantage. In this case, fossil fuels can be considered the internal resource of the different Arab League nations.

Human-Capital Theory

Fernando and Fernando (2014) postulated that Adam Smith, "the Father of Economics," formulated the basis of human-capital theory in his 1776 book *The Wealth of Nations*. They further reported that the renowned American economists Becker and Schultz extensively developed the theory. This theory rests on the assumption that formal management is highly instrumental and necessary to improve the productive capacity of a population. The theory underscores how education increases the productivity and efficiency of workers by increasing the level of cognitive stock of economically productive human capability, which is a product of innate abilities and investment in human beings. The provision of formal education is considered an investment in human capital, which proponents of the theory consider equally or more valuable than physical capital (Popovic, 2012).

Another expectation in human-capital theory is that investing highly in human capital creates skills that are useful for economic growth in the labor force. For the human-capital reservoir to survive, rapid reconstruction in the workforce must occur, because human capital can arise out of anything that can raise the productivity of a worker, as in the case of full-time education (Jepsen & Montgomery, 2012). However, investment in human capital comes with costs in the form of forgone earnings and direct costs. This means that those involved in labor-force-making human-capital investment decisions compare the consumption streams and weigh how attractive the alternative future income is; some decisions offer higher future incomes in exchange for higher costs for present training and deferred consumption, and society's returns on investment in human capital can be calculated analogously in principle.

Human-capital theory also has some critics, especially economists, who have argued that it is difficult to measure key concepts using the theory, such as the central idea of human capital and future income (Jepsen & Montgomery, 2012). This is because investing in education does not guarantee advances in productivity as stipulated by the market or employers, which means that it is challenging to measure future income associated with career openings and the productivity of a worker in relation to the differences in actual earnings purported in the theory. Empirical studies also have indicated that there is high variance in earnings as a result of skills learned, which is brought about by imperfect functioning and the labor market structure, not the individuals who constitute that labor supply. Human-capital theory has also attracted criticism from education and training sociologists, especially regarding the 1960s Marxist resistance that was attacked for making bourgeois individualism legitimate in the United States, when the theory originated. The theory was also accused of blaming people for system defects (Popovic, 2012). These factors all indicate that the concept of human capital theory is important in understanding how ICT management helps facilitate the GDP growth of any given Arab nation. Within the confines of this theory, it was easy to understand whether ICT management in Arab League nations increases the productivity and efficiency of workers by increasing the level of cognitive stock of economically productive human capabilities and how this translates into GDP growth.

The conclusion of human-capital theorists is that investment in human capital will lead to greater economic outputs. Notably, the theory's validity is sometimes contradictory and hard to prove. In the past, economic strength was largely dependent on tangible physical assets. Conversely, in the new global economy, hard tangible assets

may not be as important as investing in human capital. Barney (2012) argued that people constitute the organization's or the economy's true assets. Although human capital, like other assets, has value in the marketplace, its potential value can fully be used only with the person's cooperation. Based on this conclusion, it was possible to determine whether the economic strengths of the Arab League nations are largely dependent on the productivity of the labor force, which can be influenced by ICT management.

Resource-Dependence Theory

Resource-dependence theory is concerned with how organizational behavior is affected by the external resources the organization uses. Shafritz et al. (2015) observe that this theory emerged in the 1970s with the publication of *The External Control of Organizations* by Pfeffer and Salancik (Shafritz et al., 2015). These theorists believed that environments are the source of scarce resources, and organizations are dependent on the world's finite resources for survival. Economies are interconnected with the external environment and must respond to the expectations and pressures exerted by various sources. The theory also holds that the pressures exerted upon economies by various constituents may represent conflicting demands. The most powerful and most urgent demands on the economy are determined by which of the constituents has control over resource flows. A lack of control over these resources thus acts to create uncertainty for firms operating in that environment. Therefore, representatives of economies must develop ways to exploit these resources, which are also being sought by other representatives of other economies to ensure their own survival. Based on this perspective of resource-dependence theory, it was possible to understand how the Arab

League nations' fossil fuels are used by these economies and their trading partners for GDP growth and to strengthen their economic bases.

Resource-dependence theory rests upon three assumptions: (a) organizations or economies are assumed to comprise internal and external coalitions, which emerge from social exchanges that are formed to influence and control behavior; (b) the environment is assumed to contain scarce and valued resources essential to organizational or national survival, and thus, the environment poses the problem of organizations or economies that are facing uncertainty in resource acquisition; and (c) organizations are assumed to work toward two related objectives: acquiring control over resources that minimize their dependence on other organizations and control over resources that maximize the dependence of other organizations on themselves. Attaining either objective is thought to affect the exchange between organizations or economies, thereby affecting an organization's or economy's power.

Empirical Literature

This section of the literature review presents other researchers' findings on the differences in the real GDP growth rate of the Arab League nations that are dependent on fossil fuel production and those that are dependent on ICT management. It begins by presenting an overview of the Arab League nations' growth followed by a review of the general relationship between the real GDP growth rates of the Arab League nations and ICT management dependency over the years. This is followed by a review of the correlation that exists between the Arab League nations' real GDP growth rate and their dependency on fossil fuel production.

Overview of Arab League Nations' Growth

Vila-Artadi and Sala-i-Martin's (2013) study indicated that over the 20 years prior to 2003, the economic growth of the Arab League nations was not only not interesting, but rather was disappointing. They indicated that after the GDP per capita of the Arab League nations had rapidly increased between 1963 and 1980, it remained stagnant over the following two decades. Coutts et al. (2013) reported that the GDP per capita of all the Arab League nations remained lower in the year 2000 compared to their levels in 1980. The huge decline in the Arab League nations' economic growth in 1980 was followed by a moderate economic recovery, but this did not improve the incomes of the Arab League nations' economies. Al Rasheed and Hashim (2015) argued, however, that not all the economies of the Arab League nations behaved in a similar way. They gave an example of a situation in which, even though the pattern of the GDP per capita of oil-producing nations was identical to that of the whole region, their GDP levels were slightly higher in the oil-producing nations than the average of the entire region. These scholars also reported that the GDP of the non-oil-producing nations increased at a slower rate but on a continuous basis between 1960 and 2000.

Arab League nations have been experiencing high population growth. Even though a fairly strong population growth should not be a problem per se, Klemencic and Fried (2015) argued that apart from the socioeconomic challenges, which involve the integration of an increasing number of youths into the labor market in the coming decades, the main concern has been the connection that exists between environmental sustainability and continuous population growth. The increased population growth rate in the Arab region has brought up two major challenges: population density and water

scarcity. Klemencic and Fried posited that water scarcity in the Arab region (caused by the increased population growth rate) has halted the economic growth rate of this region, because the production of electricity, which is key in most sectors of the economy, has been affected.

Pamuk's (2006) study, which aimed at estimating economic growth in the Middle East since 1820, showed that the growth performance of the region's non-oil-producing nations, such as Syria, Jordan, Palestine–Israel, Egypt, Turkey, and Lebanon, was more stable. The GDP per capita of these countries experienced an increase of 2.9% per year between 1950 and 1973. From 1973 to 2000, the GDP per capita of these nations grew at 2.4% per year.

The leading strategy that these nations used which led to the increase in their economic growth was *import-substituting industrialization*. This became the leading economic-development strategy for these nations during the 1960s, particularly among larger non-oil-producing nations in this region, such as Egypt, Syria, and Turkey. However, decreases in the economic growth rate of these nations after 1973, particularly after 1980, were caused by the slowdown of the global economy and the decrease in the per capita incomes of the region's oil exporters. This is because there are strong economic linkages between these two groups of nations in terms of capital flows, remittance and labor flows, and trade. In addition, it is also remarkable that non-oil-producing nations experienced higher average rates of economic growth during the centuryafter 1950, which stood at 2.6% per year, compared to average growth rate of the oil-producing nations, which stood at 1.9% per year during the same period. This pattern is also true in the case of North African economies such as Algeria, Morocco, Tunis, and

Libya. Pamuk argued that even if the contribution of oil to the incomes of the non-oil-producing nations is taken into consideration, the aforementioned long-term outcome is a confirmation that oil is, at best, a mixed blessing for the Arab League nations. Thus, one can conclude that Arab League nations' oil production has been at the forefront of the factors that fuel their economic growth.

Regan, Gater, Rahman, and Patel's (2015) study revealed that in considering the pattern of economic growth rates in the non-oil-producing and oil-producing Arab League nations, the GDP per capita of the oil-producing Arab League nations was found to be slightly higher than that of the non-oil-producing Arab League nations. In addition, the GDP per capita of the two groups was found to be volatile (Koren & Tenreyro, 2012). However, the volatility of the GDP per capita was found to be high in the oil-producing countries relative to their non-oil-producing counterparts. This is an indication that the GDP growth of the oil-producing nations is dependent on the price of oil in the short run. Further, the negative trend in the GDP growth rate was evident in all the Arab League nations (both oil-producing and non-oil-producing nations). Ansari (2013) pointed out that the correlation between the annual growth rate of each of the Arab League nations and the aggregate growth rate in the region was very low for some nations. He argued that this is an indication that the different Arab League nations' short-term business cycle is not highly synchronized. Nour (2013b) pointed out that Arab League nations display heterogenic characteristics in their economic growth and performance. However, one common behavior among the Arab League nations that calls for further analysis as far as their economic growth rate is concerned is the large economic growth rates of the Arab League nations in the 1960s and 1970s that disappeared in the 1980s (Eichengreen, Park,

& Shin, 2013). For some nations, the growth rate remained positive, even though it declined, while for some nations, it remained negative.

Having looked at the trend in the growth rate of the Arab League nations, it is imperative that we investigate how such growth patterns affect the income distribution and poverty levels in these nations. It is common knowledge that a nation's economic growth rate will have implications for human welfare. For instance, when an economy experiences positive economic growth, the income of most social groups in such an economy will increase, which will result in a shift in the income distribution to the right, which is an indication that the economy has expanded (Kramin, Safiullin, Kramin, & Timiryasova, 2014). The income for the population of the Arab League nations increased significantly in the 1970s, following an increase in the economic growth of these nations during that period. Incomes increased during the 1970s for both the rich and the poor. Further, as the growth rate slowed down, the income distribution of the Arab League nations also declined. This is an indication that income levels are related proportionally to the economic growth of a nation. During the 1970s, when the economic growth of the Arab League nations increased and led to an improvement in the income distribution of the population in this region, poverty levels fell. However, when economic growth slowed down, and the levels of income declined, the Arab League nations' poverty index increased. This implies that a nation's poverty level is inversely proportional to the level of economic growth in the nation.

Magen (2012) pointed out that the poverty levels in the Arab League nations are substantially lower than the levels of poverty in other nations with similar income levels. One reason Magen provided to support his assertion was the effectiveness of the public

sector in the Arab world, as the governments try to maintain an egalitarian society and social cohesion. Another reason that accounts for the low poverty levels in the Arab League nations compared to other regions is that Arab League nations are marked by a cohesive and critical system of private social responsibility, in which families provide help to their family members during hard times (Al-Kandari & Gaither, 2011). In addition, there is greater redistribution of income through charitable, religious activities within the Arab League nations compared to other nations that are at the same levels of income (Al-Kandari & Gaither, 2011).

ICT Management in Arab League Nations and Economic Growth

Recently, most nations or governments have given priority to the quality of education, ultimate learning, and the provision of equal opportunities for all citizens (Asongu, 2015). This move has been informed by global economic competition and the advent of knowledge. The provision of quality education, equal opportunities for citizens, and ultimate learning has come in the wake of the different organizations' need for skilled labor forces, as skilled labor allows them to create competitive advantage in their industries.

Nefzaoui, Ketata, and El Mourid (2012) attested that increased competition in the global market has allowed education policy makers from different nations to adopt the use of ICT management in their education systems. Improved access to communication, information, and technology, among other aspects, is considered to have impacts on boosting the competitive advantage of individuals in the global market, as it helps facilitate social mobility and create a skilled labor force (Wiseman & Anderson, 2012). The skilled labor force created by the advent of ICT management in education has

significant effects on the performance of different organizational structures that exist within a nation, and this leads to an increase in the economic growth rate of the nation as a whole. In addition, incorporation of ICT management in education is considered to have a multiplier effect on the entire educational system of a given nation (Ortiz, Sosa, & Díaz, 2015) because it enhances learning and provides students with new sets of skills. It also enhances learning by reaching students or pupils who have no or poor access to good facilities, such as those who live in rural areas. Apart from that, the incorporation of ICT management in education is significant in enhancing learning by facilitating and improving the training of teachers and by minimizing the costs that may be associated with the delivery of instruction (Aubert, Karlsson, & Utz, 2013).

Neffati and Besbes (2013), in their research on the correlation between ICT management in education and economic growth using Arab economies as a case study, pointed out that new theories of growth posit that technological innovations and education play an important role in explaining the trends of economic growth in different nations. In addition, they observed that several researchers have emphasized the importance of educational systems and the skills of human resources in the discovery and adoption of new technologies. Further, analysis completed by previous researchers on ICT management and education as growth factors showed that they (i.e., ICT management and education) have become major topics for both decision makers and economists as far as economic policy is concerned. Neffati and Besbes further asserted that education levels are directly proportional to the economic growth of a nation. They argued that the more certificates a person has, the less likely he or she is to be unemployed, implying that the average income of this individual will increase. When the

average income of this person increases, his or her disposable income will also increase, which implies that the consumption component of GDP will increase. An increase in consumption expenditures will eventually increase a nation's GDP, which implies an increase in economic growth.

At the collective level, the studies of the Organisation for Economic Co-operation and Development (OECD) indicated that the effectiveness of the educational system, in terms of the adequacy of training programs that meet economic needs, and the number of years people spend being educated, are positively related to a nation's per capita income. These impacts are borne out at the same time in both developing and developed countries in which the educational outputs are still very important.

Neffati and Besbes (2013) posited that ICT management is a necessary tool that can be used to facilitate information approval and is also a development tool that can be used to meet the essential needs of emerging economies, such as the Arab economies, both at the quantitative and qualitative levels. These scholars added that ICT management is important in creating more intelligent and interactive environments by offering myriad opportunities, including software that expedites communication by transferring video conferencing, learning, or access to networks; technologies that simplify people's social inclusion and functional independence; transferring knowledge between all interested parties; and promote collaborative decision making.

Klemencic and Fried (2015) pointed out that, over the past few decades, the Arab region has made an extraordinary achievement regarding educational development. Klemencic and Fried argued that Arab League nations have experienced the greatest increase in female education attainment compared to any other region in the world.

However, although many Arab League nations have made great progress in educational development, they have not met international standards. In addition, even though no other regions in the world have invested in education more than the Arab League nations, achieving access to education has proven to be challenging for some people in this region who are already suffering marginalization, such as rural citizens and girls.

The World Bank recognized the important role that knowledge plays in long-term economic growth and thus introduced the framework of a *knowledge economy*. The premise of this framework is that sustained investment in innovation, ICT, education, and the creation of economic, institutional environments that are conducive to learning will lead to an increase in the use of knowledge in economic production, which will subsequently result in sustained economic growth (Ahmed & Abdalla Alfaki, 2013).

Ahmed and Abdalla Alfaki (2013) argued that the principal challenges that most Arab League nations (especially the United Arab Emirates [UAE]) face revolve around the inability of these nations to generate innovation and create knowledge capable of supporting the knowledge economy. The building capacity of the Science, Technology, and Innovations (STI) field in the UAE, by strengthening knowledge production, knowledge sharing, technological learning, skill development, and knowledge distribution, is essential to create a knowledge-based economy. Collaboration between the private and public sectors is necessary to generate links among economic sectors. In addition, Ahmed and Abdalla Alfaki posited that Arab League nations need to formulate carefully crafted policies that focus on creating links between the global and local knowledge systems without falling prey to the pitfalls of undue global knowledge dependency. Such dependencies risk sacrificing long-term interests in favor of medium-

and short-term interests, even though global knowledge systems are critical. Global knowledge-based systems entail forfeiting capacity building to generate indigenous knowledge. When there is no indigenous knowledge, Arab League nations' development will be constrained, if not destroyed, by foreign knowledge in the long run. This shows the importance of Arab League nations' nurturing of their own ICT management experts understanding, which can only be done by incorporating ICT management into their curriculum.

Nour's (2013a) study on the incidence of knowledge transfer within the Arab League nations indicated that the components of knowledge have a significantly positive correlation with economic growth. This indicates that education can be used to enhance economic growth and promote human capital development in the Arab League nations. The study's findings also showed that enhancing knowledge transfer can be completed by institutional support in the form of incentives and subsidies to the components of knowledge. Nour asserted that the policy implication of their findings showed a need for Arab League nations to stimulate local incentives and efforts necessary for transferring and building knowledge. They should also pay attention to supporting and enhancing their institutions to create and transfer knowledge and build the knowledge economy in the Arab region.

Nour (2013a) indicated that the new growth of literature has confirmed that knowledge is important in promoting both economic growth and skills. Nour argued that the performance of the Arab League nations has significantly increased in the new knowledge economy, which is marked by the speedy diffusion of ICT, global prosperity, and advanced knowledge systems. However, Schomaker and Zaheer's (2014) study

showed that the Arab League nations have not yet benefitted from the advantages associated with the new economic systems, because they have manifestly lagged behind developing and developed nations in terms of skills, average growth rate, integration in the world economy, competitiveness, diffusion of and spending on ICT, technological capabilities, and knowledge.

Thus, the poor performance of the Arab League nations in these key areas has led to the nations' low overall status in the new economic system despite monetary wealth, due to their poor capacity for creating knowledge and poor technology achievement indexes. Numerous scholars who have discussed the poor performance and status of the Arab League nations have also posited that failure of these nations to adopt knowledge transfer has been the main reason behind such poor performance and status. This indicates the importance of the Arab League nations' ICT management adoption to enhance technology and knowledge transfer.

Yunis, Koong, Liu, Kwan, and Tsang (2012) stated that ICT management plays a critical role in any given economy, as it helps drive the global competitiveness of a country. This indicates that incorporation of ICT management into the Arab League nations' education systems will be important to fuel the Arab countries' economic growth. Yunis et al.'s study, which examined the role of ICT maturity in global competitiveness achievement at the country level and technological and socioeconomic factors that are most likely associated with ICT maturity, found that a stronger relationship exists between research and development spending and the quality of ICT in high-readiness nations compared to low-readiness nations. Their study also found that the relationship between global competitiveness and research and development spending and

ICT management was stronger for low-readiness countries compared to high-readiness countries. Yunis et al. noted their study's findings provided insights for policy makers and managers regarding the impact of technological, economic, and social factors on the maturity of ICT management and on the relationship between global competitiveness and the maturity of ICT. They argued that such insights have significant influence on the programs, strategies, and standards that governments implement to attain and maintain global competitiveness. These factors are also important to the Arab League nations because they can help leadership understand the important role that ICT management plays in the attainment and maintenance of global competitiveness.

Abdalla Alfaki and Ahmed (2013) evaluated the performance of the United Arab Emirates regarding technological readiness and global competitiveness. Their study revealed that empowering a nation with ICT management and education could possibly increase its competitiveness and productivity worldwide. This is an indication that incorporating ICT management into a nation's education system has a significant effect on the economic growth of that nation. Abdalla Alfaki and Ahmed found that the UAE had made significant progress over the previous 6 years on the Global Competitiveness Index (GCI), especially in terms of the quality of infrastructure, particularly ICT, and in the macroeconomic environment. This has been attributed in large part to its readiness to adopt ICT management in its education system. Incorporating ICT management into the education system of Arab League nations thus appears to have a significant effect on the competitiveness of these nations in the global market. Abdalla Alfaki and Ahmed also noted that the UAE is still lagging behind a number of information economies and faces substantial challenges in terms of technological readiness. This hurdle has been argued to

impede the country's ability to adapt, create, and absorb new knowledge and technology. Thus, its economy has experienced a negative trade balance in the transfer of foreign technologies. This finding also stresses the importance of ICT management incorporation in a nation's education system and its impact on improving a country's competitiveness and economic growth.

Toro and Joshi (2012) asserted that ICT is an important vehicle for enhancing the quality of education. Because the world is rapidly shifting toward digital information and media, the role of ICT in the education system of any nation cannot be overemphasized, as it is becoming more important in the 21st century. These scholars argued that ICT people share the best available course materials and practices in terms of educational objectives. Further, ICT-based education leads to changes in the teaching and learning process. It also allows academic institutions to reach new international educational markets and disadvantaged groups. Such changes caused by ICT in the education system help bring competent graduates into the labor force with skills that can help fuel the economic growth rate of a nation.

Almarabeh and AbuAli (2010) observed that Arab League nations have the challenge of integrating the knowledge society into the economy to accelerate their development process. These scholars pointed out that Egypt and the UAE are examples of Arab League nations that need to integrate their knowledge society and economy to accelerate their development processes. They have developed a great interest in the information industry and have come up with a plan to upgrade their countries in terms of training and infrastructure. In addition, Egypt and the UAE have gone further by creating a "Smart Village" in Egypt and an "Internet City" in Dubai. Likewise, some other Arab

League nations, such as Tunisia and Morocco, have also done a great deal to advance their environments by installing relatively modern telecommunications infrastructure, creating technology parks in the framework of technological cooperation with their European partners, and integrating into the global society of knowledge.

Almarabeh and AbuAli (2010) also noted that economic literature reflects the fact that the quality of labor plays an important role in the growth process and that most conventional economies have heightened the quality of their labor force in the long term and in terms of comprehensive economic growth. They quoted Adam Smith, who argued that the wealth of nations and individuals depends on workers' skill levels. Smith claimed that workforce specialization is made up of different types of duties and that each person performs the duty that he or she thinks matters most. In addition, the division-of-labor concept also highlights the prospective increase in production related to improvements to organizations of the production method. Such improvements are only possible when there are competent and dynamic entrepreneurs and workers who are qualified and able to perform specific tasks. Almarabeh and AbuAli further argued that because economic growth cannot be explained solely by capital and labor factors, it is imperative to talk as much as possible about other factors that are within the endogenous growth framework. An example of an endogenous factor is technology. They contended that an economy that progresses technologically affects its long-term growth based on its ability to adapt to technological change.

Abdellatif (2003) also indicated that the importance of quality in terms of education and the workforce for a nation's economic prospects cannot be overemphasized. He professed that a quality education and workforce are important to

economic debates and studies, particularly in the new economy. He posited that since the 1960s, Becker's human capital theory has emphasized that knowledge gained by individuals plays a critical role in the development of a nation or society. Based on this theory, education is viewed as an investment, as it is a factor capable of improving the productivity of an individual, society, or nation. Abdellatif (2003) quoted Denison's growth-accounting study, which determined the main factors of growth in the United States. The study found that a high value for the total economic productivity of technological and social progress factors was attributed to workforce quality improvement, due to improved education levels. Abdellatif asserted that the new economy adopted and enriched human-capital theory. He explained that Mankiw, Weil, and Romer were the first to claim that human capital plays a similar role as physical capital in the production process. In essence, labor-force quality tends to increase production efficiency with constant technological advancements. Such increases in efficiency permit the awarding of falling returns on human capital and thus support growth in the long term.

Edquist and Henrekson (2015) pointed out that growth theories maintained Solow's idea until the 1970s. Solow's idea was that technological progress should be regarded as an exogenous phenomenon. This implies that the origin of technological progress has not been analyzed in exogenous context. However, Romer then developed the endogenous theory, which considers that the endogeneity of technological progress should be offered in explanation as an economic phenomenon. With the advent of theories about endogenous growth, scholars have been encouraged to conduct research to determine the ways through which the dissemination of technology can affect the

economic growth rate of a given nation. Research conducted to determine the effect of technology transfer on the economic growth rate of a nation has revealed that there is a positive correlation between the economic growth rate and technology transfer within a nation. However, such correlation is limited by the country's ability to adapt to the technological changes per se. An increase in the technological factor leads to an increase in infrastructural expenses, education, and social protection, which in turn facilitate a nation's economic growth.

Edquist and Henrekson (2015) reported that there has been a strong debate among international analysts and experts concerning the impact of ICT management on education. Of interest at the heart of the debate has been the promotion of ICT management integration in education, which was part of the broad goal of participation in the new economy. Several studies have supported such integration. There are many advantages to ICT management compared to other educational processes other than simply being accessible, flexible, and having the ability to provide opportunities for increased integration, communication, and various learning and teaching modes. Edquist and Henrekson asserted that the Arab League nations' labor market and economy, following big technological changes and globalization of markets, have gone through considerable evolutions in the recent past. They argued that in speaking more and more about the knowledge economy, it is imperative to consider that the success or growth of any economy is dependent on the quality and competence of the human capital it is endowed with. A number of public decision makers have agreed that a highly qualified labor force is a representation of an essential strategic resource that causes the better performance of an economy. Edquist and Henrekson argued that the notion of a highly

qualified labor force connotes workers who use advanced technologies, which require high levels of competence and specific skills.

In a more precise way, Edquist and Henrekson (2015) maintained that new technology gives school students room to improve their problem-solving capacities and use metacognitive strategies. Thus, ICT can motivate the learner and foster school success. ICT integration is only relevant if and only if the technology either helps the learner establish a better link with skills or helps a teacher improve his or her pedagogy (Edquist & Henrekson, 2015). Further, a UNESCO report revealed that education plays a significant role in both social and economic development, as it helps people fight poverty by equipping them with the confidence, knowledge, and competence they require to forge a better future and exploit their efforts (Edquist & Henrekson, 2015). The report also posited a need to use ICT in education to ensure that there is a more pluralistic and fair development in education, with an aim of improving knowledge, exchanging education as merchandise, and globalizing it in the interests of cultural diversity. The report further indicated that there is a strong correlation between ICT and education and that education has a greater impact on the economic growth of a nation than ICT alone.

Kirişci (2011) highlighted that many Arab League nations have made commendable progress in rolling out access to ICT management and education over the last decade. This has led to a gradual improvement in the institutional environment for both the private and public sectors. Access to ICT in the Arab League nations has made it possible for the private sector to obtain skilled labor at a relatively lower cost, which has since boosted its growth, leading to a general increase in the real GDP growth rate within the nations that have adopted ICT management in education (Asongu, 2015). Access to

skilled labor has also enhanced quick decision making by the management of different organizations within the Arab League nations that have adopted ICT management in education, as the managers get support from the skilled employees (Ashrafi, Sharma, Al-Badi, & Al-Gharbi, 2014). The quick decision-making process has allowed such organizations to expand, allowing them to grow the labor force, which reduces the rate of unemployment.

Tunisia and Morocco, in particular, have been working to support innovation, specifically by creating industrial zones and technology parks, which have attracted foreign direct investment and advanced manufacturing operations (Nefzaoui et al., 2012). Such developments have been supported by ICT management, which has made it possible for innovative activities to be carried out within these nations. The industrial zones and techno parks have also been instrumental in promoting entrepreneurial and innovative activities. Such increases in entrepreneurial and innovative activities lead to the invention of new tools that are significant in facilitating organizational growth. Thus, management within different organizations finds it easy to adopt the right technological tool to manage their organizations.

Jordan has also put much effort into transforming its education sector at the early childhood, basic, and secondary levels, with the aim of producing graduates who have the skills and knowledge needed in the economy (Kirişci, 2011). The major transformation that Jordan is working toward is the adoption of ICT management in its education system (Yusuf, 2014). This is considered instrumental in producing skilled graduates who will provide quality products in the job market, which will eventually lead to an increase in the real GDP growth rate. Saudi Arabia has also launched a multitude of efforts to reform

its education sector, as it has invested in new universities to boost its science and technology outputs (Asongu, 2013). This will lead to an increase in the production of skilled labor, which will be instrumental in boosting Saudi Arabia's economic growth rate.

Kharas and Gertz's (2010) study indicated that there is need for more progress in integrating ICT management into education in the Arab League nations. However, the study posited that in the Arab League nations, improvements in telephone density, upgrades in national networks, the gradual introduction of new Internet provider (IP) delivery technologies, and enhanced national connectivity have created an encouraging environment for the uptake of technology. Further, the study reported that nations with large investments in their national networks and that have small population sizes, such as the Gulf States, have so far matched international standards in terms of ICT infrastructure, while nations that are geographically wide in the region have habitually remained underserved.

Education Standards in the Arab League Nations and Their Contributions to the Workforce

The role that education plays in fostering the economic growth of a nation cannot be overemphasized. Fägerlind and Saha (2014) asserted that education plays a critical role in a nation's economic growth because it ensures a continuous flow of labor. Dave (2014) further noted that education allows people to understand the world and themselves in a more informed way. This allows them to make decisions that are likely to increase their income, which will eventually increase a nation's per capita income. In addition, with a good education system that trains its citizens on how to become innovative and

entrepreneurial, a nation's GDP is likely to increase, as trained individuals will come up with tools and equipment that can enhance the quick production of goods and services in an economy (Ferabolli, 2014). Having briefly described the importance of the education system to an economy, it is imperative to understand the standards or systems of education in the Arab League nations and their contributions to the workforce in these economies.

Kanbar (2012) examined the competencies and attitudes of business students regarding education for sustainable development to investigate whether education for sustainable development can help address the challenges Arab League nations face. Kanbar's study revealed that there is a need to reorient university courses to address issues of sustainability. In her study, the attitude questions showed that somewhat high numbers of students are not cognizant of their responsibilities in terms of environmental problems, implying that curriculum revision is necessary. Courses need to be restructured to inform students about their responsibilities regarding future quality of life. The study also revealed that disciplinary competencies are generally lower than the basic competencies, or "five pillars of learning." This is an indication that the Faculty of Business Administration and Economics (FBAE) should reorient its curriculum to instill education for sustainable development (ESD) into its programs via the development of effective learning materials, pedagogical approaches, and teaching methodologies.

Kanbar (2012) noted that education plays a critical role in social and personal development and in a nation's economic growth, given the significant increase of global threats. Kanbar posited that because education is a motor for change, the major task to which teachers are called is to provide visionary education that urges student

empowerment across all disciplines (i.e., the new generation) to assume their responsibility to create a sustainable future. Kanbar defined this notion as education for sustainable development (ESD). Kanbar also provided the rationale behind the need for ESD in the Arab region. She argued that the efforts to ensure sustainable development have been challenged by an increase in the demand for natural resources that have already been tapped. She argued that even if the Arab League nations maintain a low trajectory toward sustainable development, approximately 124 million people in the region will have no access to basic sanitation. This situation calls for reform within the Arab League nations' education sector so that students are well equipped with relevant knowledge and skills. Thus, incorporating ICT education into Arab curricula is a prudent idea.

Kanbar's (2012) analysis showed that there were only a few learning and teaching methods that universities used, including project-based learning, case-based instruction, and lecturing. However, Kanbar (2012) noted that it is imperative to use a variety of teaching methodologies in classrooms to improve students' ability to learn about issues that revolve around sustainability. She argued that the progression to hybrid forms of teaching methodologies has called for teaching to be compatible with the principles and objectives of ESD. However, she recognized that lecturing is most efficient and appropriate when introducing a concept to a large group of students because it enables them to get information that is not available elsewhere. It is also useful in summarizing, organizing, and synthesizing the content of books and articles, which helps students learn by listening to other people's ideas.

Ahmed and Abdalla Alfaki (2013) contended that the quality and quantity of education, especially basic education, are important prerequisites for increasing work efficiency and productivity. They argued that a workforce that has little formal education is inclined to produce simple products because it lacks the right skills and capabilities to absorb new technologies and generate innovations and ideas to promote creativity and bring about new products. They argued that recent economic growth that the UAE experienced was marked by an increase in pay for its low-skilled labor force.

In their study of how to transform the UAE into a knowledge-based economy, Ahmed and Abdalla Alfaki recommended that the UAE increase its investment in research and development activities and education by increasing its public expenditure to ensure that it at least matches the minimum level of industrialized nations. It could also do this by encouraging more contributions from the private sector. Ahmed and Abdalla Alfaki argued that investment in research and development and education should be accompanied by strategic reforms that ensure that the alignment of the research and learning outcomes meet the knowledge economy's requirements and labor market demands. They contended that particular emphasis should be placed on strengthening vocational and technical training and revamping curricula, especially at higher education levels, at which learning outcomes are supposed to emphasize the promotion of critical-thinking skills in conjunction with problem-solving capacities and creativity. This is useful in training a highly skilled professional labor force to counteract the current mismatch in the demand and supply of human resources in the country. This move should be replicated by all Arab League nations to spur their economic growth. Arab League nations' investment in knowledge outputs will help them benefit from highly skilled

professional labor competitiveness and could lead to an increase in Arab League nations' chances of achieving sustained productivity growth because of the increase in indigenous innovation.

Ahmed and Abdalla Alfaki (2013) argued that establishing an innovative system of rules, institutions, and procedures that can influence the means through which a country creates, uses, acquires, and disseminates technology and knowledge is key for the sustainability of that nation's economic growth. They claimed that innovation is generally realized through efficient research and development activities, with the help that comes from the private and public sectors, the performance of education systems, and the protection of intellectual property. They noted that, regarding global competitiveness's basic requirements (which include the availability of infrastructure and macroeconomic environment) and based on the recent global competitiveness report of 2006–2013, the UAE has been ranked above the rest of the Gulf Cooperation Council (GCC) nations and among the best five countries in the world. They also noted that there is a huge variation in Arab countries' socioeconomic contexts and a related huge variation regarding their current status, as far as ICT management is concerned, in areas such as trained personnel availability, their current levels of information technology use, and their existing equipment base. They posited that based on the recent digital opportunity index (DOI) and reports from the World Economic Forum (WEF) of 2011, the UAE has continued to lead the Arab League nations in ICT management adoption. The index also revealed that a number of Arab League nations across the board moved backward from the world ranking from 2005 to 2011. This is an indication that ICT plays a significant role in a

nation's economic growth and why it is important for Arab League nations to incorporate ICT training into their educational systems.

Gorgis (2013) indicated that there are problems in accessing science education in Arab League nations. The study showed that the problems of access to science education in the Arab League nations are manifested in the high levels of illiteracy, particularly in females. Poor access to science education could have derailed the economic performance of these Arab League nations because it is through science education that people learn how to be more innovative (Gasmelseid, Ahmed, & Al-Eknah, 2014). This, in turn, results in an increase in the production of goods and services in an economy. Hyde (2013) posited that Arab League nations are attempting to increase access to science education through various strategies and programs. Such strategies and programs led to an increase in the enrollment of students at all educational levels in the past decades, which resulted in declining illiteracy levels in Arab League nations (Denys, 2012). However, Sawalha and Atwell (2013) revealed that illiteracy rates are still relatively high and that there is an apparently serious problem in scientific and technological literacy.

Zahlan (2012) noted that, even if education-access problems are properly addressed, the major problem nagging the Arab League nations' educational system is low-quality education. Sabet (2014) claimed that the low-quality education, which is experienced at all levels of education, is caused by neglect in practical activities and an emphasis on theoretical science education. Other factors that have contributed to low-quality education in the Arab League nations include poor curricula and teaching methods, low-quality programs in science and technology education, lack of access to appropriate technologies and the Internet, lack of teacher support, and lack of sufficient

budgets to improve the quality of science education. Such low standards in science education inhibited the economic growth of the Arab League nations (Jemni, 2014).

Zahlan (2014) explained that Arab League nations have made many attempts to reform science curricula. For instance, the Arab League Educational, Cultural and Scientific Organization (ALECSO) has been active in promoting science and technology education. Jemni, Khribi, Othman, Elghoul, and Jaballah (2016) noted that ALECSO published documents regarding science and technology strategies for the Arab League nations. This was followed by the Arab strategy for information in the Internet age, which was formed in 1977 (Thacker & Moreno, 2015). Such advancements in science-and-technology and Internet-oriented strategies are viewed as signs of renewed vigor toward improving the education standards in Arab League nations in order to improve the economic growth of the member states (El Hassan, 2013). Further, the incorporation of the Internet in the education system was aimed at preparing students for future jobs, as the job market is largely IT oriented (Sawalha, Atwell, & Abushariah, 2013). Moon (2013) pointed out that the adoption of the science and technology strategy was to help students become more innovative and entrepreneurial. This was perceived as having a significant effect on the economic growth of the Arab League nations (Suleiman, 2015).

Fossil Fuel Production in Arab League Nations and Economic Growth

British Petroleum (BP) energy studies have shown that Middle Eastern Arab League nations are sitting on top of perhaps half of the entire world's oil and a third of the world's natural gas reserves, even though their economies are considered to be among the most stagnant of the world (Outlook, 2012). Furthermore, hundreds of billions of dollars and other receipts, including wealth in hydrocarbon revenue earned from the Suez

Canal, have been propping up the swollen public sectors and subsidizing the undemocratic governments, as in the case of Egypt (Peters et al., 2012). However, very little has been done to create employment for the escalating number of youths and to create a globally competitive economy. Thus, the availability of massive fossil fuel reserves does not necessarily lead to an increase in the economic growth rate of any nation, regardless of how much it may own.

Ebrahim, Inderwildi, and King (2014), in their study on the macroeconomic impacts of the volatility of oil prices, indicated that ever since the long-term trajectory shifts in global population growth, output, and income, the global economy's livelihood has been largely represented by fossil fuels. Such shifts have also led to the global industrial revolution. They argued that current global energy consumption has continued to be dominated by fossil fuels, which accounts for 90% of the global energy mix. The main fossil fuel that has contributed to this is crude oil. Ebrahim et al. commented that oil has been the main fossil fuel to dominate energy consumption since it displaced coal. They noted, however, that the growing use of oil has also brought with it some significant economic and environmental costs. One economic cost associated with the growing use of oil has in part reflected a significant macroeconomic uncertainty, which is associated with the volatility of oil prices.

Ebrahim et al. (2014) explained that there was a significant price change for oil after the 1973 oil restriction imposed by the Organization of Arab Petroleum Exporting Countries (OAPEC). For instance, before 1973, oil prices in the United States displayed low volatility across a wide range of time periods. The period after 1973 began exhibiting unprecedented and nonlinear volatility levels, a feature that has sharply inclined due to

supply disruptions over the last four decades. This has continued to typify today's oil market. There was a historic increase in oil prices in mid-2008 to $147 per barrel. However, by the end of the same year, the prices had decreased sharply to $40 per barrel. Such sharp fluctuations in oil prices have led to an increase in the vulnerability of the global economy to a financial crisis, as such volatility generates substantial economic uncertainty. Thus, the economic growth of the Arab League nations that are largely dependent on crude oil has been greatly affected.

Handfield, Primo, and de Oliveira (2015) argued that the Arab League nations' economic growth has been affected by the oil prices' volatility because most of these nations depend entirely on oil as their major export product. Thus, the volatility of the oil prices has a direct impact on three primary macroeconomic channels: industrial production, investment, and consumption. The degrees to which such variables are affected depend on two factors: the extent of uncertainty that is generated by the volatility of oil prices and economic agents' attitudes toward the uncertainty. A decline in consumer demand due to price volatility implies that the uncertainties that are advanced by the volatility of oil prices regarding future employment and income prospects lead to a decrease in consumer confidence, which prompts consumers to adopt precautionary saving behaviors, which leads to a decrease in consumption propensity. A decrease in consumption expenditures in an economy will automatically lead to a decrease in the economic growth of a nation. This explains why the volatility of oil prices has resulted in a decrease in the economic growth rate of the Arab League nations that are dependent on oil.

Handfield et al. posited that because investment is one of the most responsive areas in which consumers' portfolios are either expected to grow or be resilient, the effect of oil price volatility on aggregate consumption expenditures has a substantial effect on the decisions that consumers make regarding investment. They asserted that literature on real options has suggested that because of uncertainties that relate to the investment volatility in a volatile energy environment, the benefits of holding investment portfolios that are more risk averse outweigh the future advantages that are gained from current commitments to investment expenditures that are irreversible. They argued that the evidence of the decrease in the aggregate investment caused by the volatility of oil prices is an indication that firms do not actually optimize their investment expenditures in such a fashion. In addition, these scholars asserted that parallel to the consumers' attitudes about the volatility of oil prices, the investors are always risk averse. This commonality is partially driven by the fact that expected trends in consumer demand determine investment. This indicates that a drop in aggregate consumption in the Arab League nations caused by oil-price volatility has a negative effect on current investment decisions, as it leads to a downward revision of demand expectations in the future. In addition, the increased marginal-product costs' unpredictability in light of oil-price volatility has been found to be capable of deterring investment, as it amplifies the uncertainties related to demand in the future.

One of the major contributors to all nations' economic growth is industrial production (Handfield et al., 2015). Industrial production generally decreases in response to the aggregate volatility of oil prices. In addition, the essentiality of oil as an input in industrial production implies that the volatility of oil prices has adverse effects on the

growth of industrial production. Even though different time horizons are considered in production-level planning and investment, the main determinants of investment, such as expected returns and consumption, are also common to industrial production. A decline in industrial production as the volatility of oil prices increases is viewed as a response to the anticipated production declines, increased consumption unpredictability, and the uncertainty of delivery cost. However, as opposed to the predetermined negative relationship between oil price volatility and aggregate investment in the short run, the levels of industrial production may be maintained in the short run regardless of the uncertainty created by the volatility of oil prices. This reflects the differing production-cost risk-management mechanisms commonly used by industrial investors and producers. In addition, contrary to the investor, whose response to an increase in the uncertainty of production costs is to delay expenditures, industrial producers maintain their levels of production by increasing the prices of their products to incorporate an uncertainty premium to compensate for the increased production cost uncertainty.

Uslu (2015) claimed that fossil-fuel-dependent nations, such as Turkey, have a mandate to generate enough electricity and find enough hydrocarbons to meet their economic growth demands. Because most Arab League nations are dependent on oil and fossil fuels, they should focus on how to generate enough electricity and find enough hydrocarbons to meet their economic growth demands. Fossil fuels are generally phenomena that not only impact individuals but also foreign-policy-making processes.

Brown et al. (2011) posited that energy is one of the requisites for economic growth and development. Thus, the extraction of energy and other resources from the environment is necessary to help manufacture goods, provide services, and create capital.

These scholars argued that the central role that energy plays in economic growth and development has been substantiated by both data and theoretical concepts. The key theoretical underpinnings emanate from the laws of thermodynamics (i.e., energy cannot be created or destroyed, but it can be transformed from one form to another, and some capacity of performing useful work is lost as heat when energy is converted). Theoretically, complex and highly organized systems, which include human economies, are always maintained in states that are far from thermodynamic equilibrium due to the continual transformation and intake of energy. Empirically, the major role of energy in modern human economies has been demonstrated by the positive relationship that exists between the use of energy and economic growth. Generally, oil-producing Arab League nations have experienced high economic growth rates compared to their non-oil-producing counterparts. Thus, one can assume that oil is one of the main factors that facilitates the economic growth of such nations and that fossil fuels play a significant role in enhancing the economic growth of Arab League nations.

Several Arab League nations have experienced slow growth in terms of GDP per capita for the last 30 years, based on the data released by the International Monetary Fund (IMF; Kharas & Gertz, 2010). This is because their GDP per capita growth lagged behind Latin America, Africa, and Asia as a whole during this period. The lag in GDP per capita growth did not exclude major oil powers such as Saudi Arabia. This is an indication that the availability of fossil fuels in any given nation does not necessarily guarantee an increase in real GDP growth. The most interesting finding in the IMF's report is that Saudi Arabia dropped from the fifth-ranked economy in terms of GDP per capita growth in 1980 to 40th in 2010. In addition, Saudi Arabia's income in 2010 was slightly below

what it was 30 years ago when the incomes are adjusted for inflation. The World Bank Report of 2008 also indicated that only one of the Arab League nations, Oman, was ranked among the take-off economies (Menegaki & Ozturk, 2013). This low ranking of the Arab League nations is an indication that fossil fuels are not a major driver of the economic growth rate of nations.

Furthermore, despite the fact that the Arab League nations control half of the world's oil and a third of the world's natural gas reserves, the unemployment rates within these nations, especially among youth, has remained high (Outlook, 2012). This has led the sizes of their respective governments to balloon. For instance, an IMF official indicated that state-run enterprises or government agencies account for upwards of 77% of the nonagricultural employment in Egypt, and wages in the public sector encourage workers to seek jobs offered by the government, as their wages are kept artificially high. Such high unemployment rates in the Arab League nations have caused their economic growth rates to constantly slow down. The slow pace at which they grow is actually accounted for by private sector entrepreneurship rather than the public sector's efficiency. The 2009 United Nations Report on Arab Human Development stated that as of 2007, all Arab League nations were less industrialized compared to their level of industrialization in 1970 (Ozturk & Al-Mulali, 2015). This is because the governments were using gas, oil, and other revenues to maintain low prices permanently and a large public labor force. This clearly indicates that the plentiful oil and gas resources among the Arab League nations have done them more harm than good. Thus, one can deduce that fossil fuels are negatively correlated with the real GDP growth rate. This implies that when a country has vast oil and gas reserves, it is likely to experience a decline in its economic growth rate.

Nefzaoui et al. (2012) pointed out that ICT can play a potentially catalytic role in economic growth and development. They argued that ICT enhances economic growth rates because it ensures the smooth passage of information from one organizational structure to another. In essence, firms that adopt ICT to pass information across all of their departments do well in terms of their productivity compared to those that do not employ ICT in their communication process. This is because ICT could lead to a timely delivery of information to the various entities of the organization, which leads to quick decision making, allowing the organization to be more productive. In general, nations in which different organizations have adopted ICT are likely to have higher economic growth rates compared to those that have not adopted ICT (Brown et al., 2011). Kharas and Gertz (2010) stated that the social movements that occurred in the Arab League nations in 2011 have clearly demonstrated that ICT has a potential catalytic role to play. Debatably, the Arab Spring ranks as one of the most significant situations in which ICT played a catalytic role. In 2011, informal ICT allowed young people to use social media, which they accessed through their mobile phones, as a space for self-assertion, self-identification, mobilization, and contestation around civil liberties, democracy, and human rights.

Alshehry and Belloumi (2014), who investigated disaggregate and aggregate levels of economic growth and fossil fuel consumption in Saudi Arabia, posited that although the causal relationship that exists between economic output and energy use is a topic that has been well studied, energy economists are still debating the direction of the causality. The relationship that exists between economic growth and energy use has been among the subjects that have received increasing attention since Kraft and Kraft's 1978

pioneering work that provided evidence supporting unidirectional causality that runs from income to energy consumption for the United States between 1947 and 1974 (Alshehry & Belloumi, 2014). Alshehry and Belloumi (2014) noted that from 1974 on, a number of studies were conducted in many nations that used varied methodologies and time series over a number of time periods and yielded conflicting results. However, even in cases in which different studies were conducted for the same country, divergent findings emerged based on the proxy variables used by different researchers, the data used, and the methodologies employed.

Alshehry and Belloumi (2014) summarized the divergent findings that emerged regarding the causal relationship between economic growth and energy use into four different groups. The first category of the studies includes those that found unidirectional causality that runs from economic growth to the consumption of energy. The second category of studies revealed strong evidence supporting the growth hypothesis, which states that unidirectional causality that runs from the consumption of energy to economic growth exists. The third category of studies includes those that supported the feedback hypothesis, which implies that a bidirectional causality relationship exists between economic growth and the consumption of energy. The last category of studies includes those that supported the absence of the causal relationship between economic growth and the consumption of energy.

Peters et al. (2012) noted that the contribution of fossil fuels to economic growth and development is two-fold. Fossil fuels are the major product of the energy sector, which creates jobs and value through the extraction, transformation, and distribution of energy products and services within the entire economy. The increase in employment

opportunities caused by the energy sector increases the income of citizens in an economy. When the income of people in the economy increases, their disposable income will increase. An increase in disposable income will lead to an increase in consumption expenditures. An increase in consumption expenditures, which is a component of GDP, will increase a nation's GDP. This results in an increase in the economic growth rate of an economy. Thus, fossil fuel availability is directly proportional to the level of GDP and economic growth of a nation in general. For instance, Peters et al. asserted that in 2009, the energy sector was responsible for 4% of U.S. GDP. In addition, in other countries, such as Nigeria, Venezuela, and Kuwait, which are heavily dependent on the energy sector for their exports, the share of the energy industry in their GDPs was even higher. In Nigeria, the energy sector accounted for 30% of the GDP in 2009. In Venezuela, it accounted for 35%, while in Kuwait, it accounted for 57%. Further, the energy sector contributes to the economic growth of an economy by extending its reach into the economies as an employer, purchaser of products and services, and an investor.

Peters et al. (2012) also posited that the energy sector is undoubtedly the engine of economic growth in most Arab League nations because its products serve as inputs of production for almost all goods and services that one can imagine. This is the second way that the energy sector, particularly fossil fuels, contributes to the economic growth and development of a nation. In fact, even though energy is taken for granted by some countries, in a country in which there is a price shock and supply interruptions, the entire economy becomes shaken. Furthermore, even though industries that are energy related do not need large labor forces, their workers are highly skilled and attract high pay. For instance, Peters et al. indicated that the compensation per worker in industries that are

energy related is about twice the average in the United Kingdom, the United States, Norway, and Germany and is four times the average in South Korea and Mexico. This indicates that the energy sector improves the GDP per capita of these economies. Thus, the energy sector in general, and fossil fuels in particular, contribute to the economic growth of these nations because higher wages in the energy sector increase the disposable income of those who work in this sector. This increases their consumption expenditures, which in turn results in an increase in a nation's GDP growth.

Nefzaoui et al. (2012) also pointed out that the variation of significant change in the education sector and society in general within Arab League nations is a result of the variation in the application of ICT in education within these nations. For instance, the Arab League nations in the Gulf region have achieved relatively high rates of ICT access in their schools. However, the low number of computers in the education sector, high levels of technological illiteracy, and high costs of obtaining the services of communication technology in some Arab League nations represent monumental barriers to accessing ICT in education compared to the international rates.

Alternative Source of Arab Nation GDP Growth

The first factor that affects the economic growth of an economy that economists consider when they explore the success or failure of an economy is the investment rate. El-Wassal (2012), who made an inquiry into the determinants of growth benefits in his study *Foreign Direct Investment and Economic Growth in Arab Countries (1970-2008)*, argued that the countries that experienced good economic growth are those that invested a good portion of their GDP, while the countries that failed to invest were bound to fail. In justifying his assertion, El-Wassal argued that economic theory could be partly used to

explain this. He argued that the basic neoclassical growth model of Swan (1956) and Solow (1956) predicted that investment is one of the determinants of economic growth in any given nation. Along these lines, Badran (2012) observed that the investment rates of Arab League nations are not that low. He noted that between 1974 and 2000, the investment rate among nations in the Arab region stood at 24.6%. This rate was higher than that of OECD economies, which stood at 22.9%, and was slightly lower than successful nations in East Asia. A global competitive report of 2011–2012 indicated that there has been a substantial increase in the investment rate in the Arab world. The report indicated that the investment rate of the Arab world increased to a level of 27% in the post-oil-shock period from its level of 17% in the pre-oil-shock period (Schwab & Sala-i-Martin, 2011). However, it is interesting to note that the larger shift in the investment rate applies to both the non-oil-producing and oil-producing Arab League nations.

Alkalbani, Rezgui, Vorakulpipat, and Wilson (2013) stated that one of the major contributors of Arab League nations' GDP growth is the construction industry. However, they argued that the construction industry in Arab League nations suffers many barriers and limitations that prevent it from gripping global construction industry change, which would be helpful for it in becoming more competitive both at the international and national levels. Alkalbani et al. also noted that it is difficult to find detailed surveys, documentation, and studies that detail the current situation of the construction industry in Arab League nations. However, the limited studies that exist have shown that the construction industry in a number of nations has been slow in employing ICT. This situation is changing, as some countries have recently embarked on the ambitious plan of making full use of ICT's capabilities.

The results from a number of surveys have indicated that there has been an increase in the number of Arab nation firms that have been using and investing in ICT in construction (Abdulgahni & Ahmad, 2014). This is because they have realized that using ICT in construction has benefits and allows potential productivity and quality gains. However, compared to many other industrial sectors, the wide adoption of ICT has remained a slow process. In addition, the construction industry in Arab League nations has been slow in taking advantage of the benefits that come with ICT. Alkalbani et al. added that, even though many developing nations are suffering from a lack of ICT infrastructure and resources, some of the developing countries in the Arab world, like Jordan, are different and have high-quality ICT facilities. This has led to the growth of the GDP of such nations. These scholars also posited there is a likelihood that ICT education, industry, and business in Arab League nations will encounter several challenges, such as cultural issues that revolve around the willingness to accept ICT.

Given that Alkalbani et al.'s study on the adoption and diffusion of ICT in the construction industry of a developing nation (taking the Sultanate of Oman as the case study) revealed that ICT use is very low and industry stakeholders perceive definite potential for improvement through the use of such technologies, the authors proposed technology adoption as a way to conceptualize their results and provide a theoretical foundation for their discussion. Thus, they concluded that there is a great perceived requirement for ICT training, as there is low perception of the ease of ICT use in the construction sector.

International public-works agreements have also played a significant role in the Arab League nations' economic growth. Carter (2013) commented that the growth of

industrial and construction projects in international public-works agreements has experienced a significant increase recently, especially in Latin American and Middle Eastern countries. Carter noted that public-works agreements have played a considerable role in the infrastructure sector in the Arab region. These started with the expansion of economic growth in Arab League nations in the Middle East from the second half of the 20th century up to now. The economic and political ideology of the developing Arab League nations has also experienced a significant evolution from socialist inspired to more market-based and -oriented based on broad participation from the private sector in all fields of social and economic life over the previous three decades.

Carter (2013) posited that foreign direct investments (FDIs) have also played a significant role in the economic growth of the Arab League nations. He noted that after the collapse of the Eastern European states and the Soviet Union about two decades ago, there was a complete rejection of the socialist ideology. He asserted that this is clearly seen from the subsequent amendment of the Arab League nations' constitutions (the latest one being Egypt's constitutional amendment in 2007). This change has led to the promulgation of new legislation on investments in most Arab states to help increase the flow of FDIs. Several constitutions of Arab Middle Eastern nations are today designed to promote the effective and positive participation of the private sector.

Agbola (2013) said that although the investment rate in the Arab world was not as high compared to that of nations in East Asia, it was still comparable to those of the industrialized nations of the OECD and larger than those of developing nations. Furthermore, the investment rate of the nations in the Arab region was high in the 1980s and in 1990s, compared to their levels in the 1960s (Shushan & Marcoux, 2011). In the

1980s and 1990s, Arab League nations enjoyed high growth rates. Thus, one can argue that investment is an alternative source of growth of the Arab League nations. However, Glebova, Sadyrtdinov, and Rodnyansky (2013) argued that empirical economists had pointed out that the investment rates of most countries are not correlated with their economic growth rates. Thus, the behavior of the investment rate and growth rate of Arab League nations is not puzzling, even though there was high growth rate in the 1960s when investment rate was low, compared to the high growth rate in the 1980s and 1990s when the investment rate was high (Chauffour, 2012). Understanding the relationship between the investment rate and the growth rate of Arab League nations is important in understanding that the GDP growth of Arab League nations may not only necessarily depend on ICT management and fossil fuel dependence but also on other alternative sources. Thus, in conducting this study, the alternative sources of growth, such as investment rate, should be kept constant when determining the relationship between GDP growth and ICT management and the fossil fuel dependency of the Arab League nations.

Gap in the Literature

The empirical literature has shown that there is a causal relationship between ICT in construction and the potential Arab League nations' GDP growth (Abdulgahni & Ahmad, 2014). Even though ICT construction has a causal relationship effect on the GDP growth of some Arab League nations, the empirical literature does not show the effects of ICT in management on GDP growth. Further, the empirical literature noted that fossil fuel production has a causal relationship with the GDP growth of Arab League nations; oil-producing nations have relatively higher GDP growth rates compared to the non-oil-producing nations in the Arab world. Also, the education system in the Arab League

nations is of relatively low quality, especially science and technology education. ICT in management, in terms of the magnitude by which it affects GDP development, was not established by any researcher.

In addition, the extent to which fossil fuel production affects the GDP growth of the Arab League nations has not been established. In fact, Alshehry and Belloumi (2014) summarized the divergent findings that have emerged regarding the causal relationship between economic growth and energy use into four different groups. The literature does not address the extent ICT in management plays in GDP growth. Thus, in this study, I seek to establish the extent to which ICT management and fossil fuel production dependency affect the GDP growth of the Arab League nations.

Summary and Conclusions

In summary, this chapter presented both the theoretical and empirical literature reviews of the theories upon which the study will be anchored and the research other scholars conducted on the potential correlation that exists between the real GDP growth rate of Arab League nations and ICT management and fossil fuel production dependency. This review has revealed that understanding the relationship between the independent and dependent study variables can be best understood in the context of four theories: resource-based theory, the knowledge-based view, human-capital theory, and resource-dependence theory. Resource-based theory will help in understanding the role the natural resource endowments of a given nation play in propelling its growth. Knowledge-based theory will help in understanding how ICT management creates the skills and knowledge required by a nation to boost its economic growth. Human-capital theory will aid in understanding how ICT management helps build the skilled labor force required by a

nation to propel its economic growth. Resource-dependence theory will help in understanding how overdependence on natural resources—in this case, fossil fuel production—affects the growth rate of a nation. However, there is limited data that has been analyzed in these areas. Thus, in the study, I used International Monetary Fund, Organization for Economic Co-Operation and Development, World Bank, and United Nations data to analyze the extent of the relationships between the real GDP growth rate and the fossil fuel production dependency and ICT management.

Chapter 3: Research Method

Any researcher should seek to bring empirical evidence to bear on the problem under study. As stated in Chapter 1, the goal in this study was to examine real GDP adjusted for inflation in relation to the following independent variables: ICT management and fossil fuel production in Arab League nations that have and have not adopted ICT management policies. This study was, in essence, an attempt to understand the role that ICT management plays in enhancing the economic growth of the Arab League nations. A better understanding of this role may help to inform organizational stakeholders, and government policy makers about the extent to which ICT management can be used to fuel the economies of the Arab League nations. In this chapter, I present the methodology that was used to answer the research questions. I describe the research design and rationale, operationalization of the research variables, target population, data analysis plan, and threats to validity.

Research Design and Rationale

Veitch, Salmon, and Ball (2010) defined research design as the overall strategy that a researcher has chosen to assimilate the study in a legal and coherent manner to ensure that the research problem will be addressed effectively. It encompasses the outline for data collection, measurements, and analysis. In this study, I used a cross-sectional design. Xu et al. (2012) explained that cross-sectional design relies on the differences that already exist between variables, and the groups used in such studies are selected based on previously existing differences instead of random allocation or intervention. By using a cross-sectional design, a researcher can measure the differences between the study variables and be better able to make causal inferences from the study findings.

The purpose of the study—to analyze the extent of the relationship that exists between the Arab League nations' real GDP growth rate, ICT management, and dependency on fossil fuel production—made a cross-sectional design the most applicable design. Use of a cross-sectional design helped me to clarify the relationship between the Arab League nations' real GDP growth rate and ICT management, as well as the relationship between fossil fuel production dependency and the Arab League nations' real GDP growth rate. It also aided in drawing causal inferences about the relationship between the dependent variable (Arab League nations' real GDP growth rate) and the independent variables (fossil fuel production and ICT management). The other rationale for adopting a cross-sectional research design was that it allowed me to gather less biased and more accurate data on a mass of variables at once and from the entire population or the sampled population at a given time). A cross-sectional research design was also used in the study because it involved less time as compared to a longitudinal research design. This is because the data is only gathered once as opposed to the longitudinal research design, in which the researcher must study the cohorts over time (Xu et al., 2012).

Methodology

Population

The target population for the study was the 22 Arab League nations that are found in North Africa and the Middle East. Bhardwaj (2012) described the Arab League nations as those that are united in culture, religion, and language, with 90% of their populations made up of Muslims. The 22 Arab League nations include Egypt, Algeria, Sudan, Iraq, Morocco, Saudi Arabia, Yemen, Syria, Tunisia, Somalia, The United Arabs Emirates,

Jordan, Libya, Palestine, Lebanon, Oman, Kuwait, Mauritania, Qatar, Bahrain, Djibouti, and Comoros. As such, the study targeted a population size (N) of 22.

Sampling and Sampling Procedures

The target population for the study was hypergeometric (small), that is, less than 10,000. As such, the sample size for the study was obtained through a common formula, which was suggested by Doane and Seward (2011). The formula is $n = (N * Z^2 * p * q) / \{E^2 * (N–1) + Z^2 * p * q\}$. In this case, n = the sample size that is desired; Z = the degree of confidence, which in this case was taken as a 95% confidence interval (which is equivalent to 1.96); p = the proportion in the target population estimated to have characteristics being measured, and 0.5 was adopted; q = 1- p stands for the population that does not have the required characteristics, and it was taken as 0.5; E = statistical significance level (the degree of accuracy required in this case is 5%); and N = the target population size, which is the number of Arab League nations, and as such it is 22. Applying the formula gives $n = (22 * 1.96^2 * 0.5 * 0.5) / \{0.05^2 * (22-1) + 1.96^2 * 0.5 * 0.5\} = 21.1288 / .973525 = 21.7033$ countries. Accordingly, I used all 22 Arab League nations in this study.

Procedures for Recruitment, Participation, and Data Collection

In conducting this quantitative study, I used data from secondary sources of research. The database sources I used were unesco.org, data.worldbank.org, unstats.un.org, stats.oecd.org, imf.org, itu.int, education-inequalities.org, and nationmaster.com. Using these sources, I was able to obtain data about education, technology, and real GDP across different nations.

Archival Data

For the study, I used archival data which was obtained primarily from the International Monetary Fund, Organization for Economic Co-Operation and Development, World Bank, International Telecommunication Union, and United Nations databases. The data were collected for three variables including GDP growth rate, ICT management, and fossil fuel production for the period between 2010 and 2015 for all 22 nations included in the sample. The International Monetary Fund, Organization for Economic Co-Operation and Development, World Bank, International Telecommunication Union, and United Nations allow free access to their databases, and therefore, no written permission was required to use these data.

Instrumentation and Operationalization of Constructs

As indicated in Chapter 1, in this study I focused on answering four research questions:

- RQ1: How do Arab League nations' policies differ in ICT management implementation?
- RQ2: What is the relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate versus those that have not?
- RQ3: What is the effect of fossil fuel production on ICT management growth rate in Arab League nations?
- RQ4: What is the effect of ICT management on the GDP growth rate of Arab League nations that have and have not implemented full ICT Management plans?

The analysis I focused toward testing four research hypotheses.

- $H_0$1: There is no significant difference in ICT management implementation policies between Arab League nations.

  H_a1: There is a significant difference in ICT management implementation policies between Arab League nations.

- $H_0$2: There is no significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate.

  H_a2: There is a significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate.

- $H_0$3: There is no significant effect of fossil fuel production on ICT management growth rate in Arab League nations.

  H_a3: There is a significant effect of fossil fuel production on ICT management growth rate in Arab League nations.

- $H_0$4: ICT management has no significant effect on Arab League nations' real GDP growth.

  H_a4: ICT management has a significant effect on Arab League nations' real GDP growth.

The difference between ICT management implementation policies between Arab League nations was investigated by testing hypothesis $H_0$1, which states that there is no significant difference between Arab League nations and ICT management implementation policies. To test the hypothesis, Pearson's product-moment correlation analysis (PPMC) was used. The PPMC shows the strength of the linear relationship between Arab League nations and ICT management implementations policies.

The relationship between the GDP growth rate and Arab League nations that have adopted ICT management policies was investigated by testing hypothesis $H_0$2, which states that there is no significant relationship between real GDP growth rate of Arab League nations that have adopted ICT management policies. To test the hypothesis, Pearson's product-moment correlation analysis (PPMC) was used. The PPMC shows the strength of the linear relationship between GDP growth rate and ICT management policy implementation.

The effect of fossil fuel production on ICT management growth rate of Arab League nations was investigated by testing hypothesis $H_0$3, which states that fossil fuel production has no significant effect on ICT management growth rate of Arab League nations. To test this hypothesis, simple linear regression analysis was used to investigate the extent of the effect that fossil fuel production has on ICT management growth rate of Arab League nations. The regression model for fossil fuel production that was adopted is as follows:

Y= a + B1X + e) (Baird & Bieber, 2016) [Equation 1]

where

Y= Dependent Variable (ICT management growth rate)

X= Independent Variable (fossil fuel production)

a = The constant

B1= The regression coefficient or change induced in Y by X.

e = Error

The effect of ICT management on the real GDP growth rate of the Arab League nations was investigated by testing hypothesis $H_0$4, which states that ICT management

has no significant effect on the real GDP growth of Arab League nations. To test this hypothesis, simple linear regression analysis was used to investigate the extent of the effect of ICT management on the real GDP growth rate. The regression model for ICT that was adopted is as follows:

$Y= a + B1X + e$ (Baird & Bieber, 2016), [Equation 2]

where

Y= Dependent Variable (real GDP growth rate)

X= Independent Variable (ICT management)

a = The constant

B1= The regression coefficient or change induced in Y by X.

e = Error

A multiple linear regression model was used to show how ICT management and fossil fuel production dependency affect the GDP growth rate of the Arab League nations. In addition to the use of the PPMC in the analysis, a multiple linear regression model was also used in determining the magnitude and the direction of the effect of fossil fuel production and ICT management growth rate on the real GDP growth rate in Arab League nations. The model that was used for multiple linear regression is as follows:

$Y=a + B1X1 + B2X2 + e$ (Baird & Bieber, 2016), [Equation 3]

where

Y = Dependent variable (Real GDP growth rate)

X1 = Independent variable (ICT management)

X2 = Independent variable (Fossil fuel production)

a = The constant

B1= The regression coefficients or change induced in Y by X1

B2= The regression coefficients or change induced in Y by X2

e = Error

The rejection or acceptance of the null hypothesis was based upon some level of significance (alpha level) as a criterion. The 5 percent (0.05) alpha level of significance was used as a standard for rejection of the stated null hypotheses in the study. This is because a 0.05 level of significance is the accepted threshold in social sciences and business studies (Amrhein, Korner-Nievergelt, & Roth, 2017). Table 1 shows the objectives, the research hypotheses, and the analytical models.

Intervention Studies or Those Involving Manipulation of an Independent Variable

Presented in this section are the definitions of the key variables that were used in the study and the measurements that were adopted for each of them. The ratings and the measurements that were used for each of the variables presented here were adopted from the level of measurement used by the World Bank because the data was generated from its database (World Bank, 2017). Table 2 gives the definitions and measurements that were adopted for the research variables.

Table 1 *Research Objectives, Hypotheses, and Analytical Models*

Objective	Hypothesis	Model	Type of analysis	Interpretation of results
To determine the relationship between real GDP growth rate of Arab League nations and fossil fuel production.	There is no significant relationship between real GDP growth rate of Arab League nations and fossil fuel production.	Correlation Model $r=\frac{E(x-x)(y-y)}{(n-1)SxSy}$ where: N=The number of pairs of cases SxSy=The standard deviations for x and y	Pearson product-moment correlation (r) PPMC	Range: +1 to -1 If r= +1, then there is a strong positive relationship. If r=-1, then there is a negative relationship.
To determine the relationship between real GDP growth rate of Arab League nations and ICT management.	There is no relationship between real GDP growth rate of Arab League nations and ICT management.	Correlation Model $r=\frac{E(x-x)(y-y)}{(n-1)SxSy}$ where: N=The number of pairs of cases SxSy=The standard deviations for x and y	Pearson product-moment correlation (r) PPMC	Range: +1 to -1 If r= +1, then there is a strong positive relationship, And if r=-1, then there is a negative relationship.
To establish the effect of fossil fuel production on the GDP growth rate of Arab League nations.	Fossil fuel production has no significant effect on the GDP growth of Arab League nations.	Simple Linear Regression Model $Y=a+B1X + e$ [Equation 1] (Baird & Bieber, 2016)	Simple linear regression analysis	R^2 Beta coefficient Positive change in R^2 shows a positive relationship between fossil fuel production and the real GDP growth rate of Arab League nations.
To establish the effect of ICT management on the GDP growth rate of the Arab League nations.	ICT management has no significant effect on the GDP growth of Arab League nations.	Simple Linear Regression Model $Y=a+B1X + e$ [Equation 2] (Baird & Bieber, 2016)	Simple linear regression analysis	R^2 Beta coefficient Positive change in R^2 shows a positive relationship between ICT and the real GDP growth rate of the Arab League nations.
To determine the magnitude and the direction of the effect of fossil fuel production and ICT management growth rate on the real GDP growth rate in Arab League nations.	ICT management and fossil fuel production dependency affect the GDP growth rate of the Arab League nations.	Multiple Linear Regression Model $Y=a + B1X1 + B2X2 + e$ [Equation 3] (Baird & Bieber, 2016)	Multiple linear regression analysis	R^2 Beta coefficient Positive change in R^2 shows that there is a positive relationship between real GDP growth rate in Arab League nations and their fossil fuel production.

Table 2

Research Variables

Variable	Operational indicators	Measures
GDP growth rate	This connotes the rate at which the gross domestic product of a given country grows or changes from one year to another. Its indicators include changes in the consumption expenditure, changes in the government expenditure, changes in the net export, and changes in the private investment expenditure.	It was measured in percentage.
ICT management	This connotes management, implementation, learning, and teaching on information and communication technologies that includes any application or communication device encompassing radio, cellular phones, television, satellite systems, computer and network software and hardware, and so on, including the various applications and services associated with them, like distance learning and video conferencing.	It was measured based on the number of management policies.
Fossil fuel production	This refers to a hydrocarbon deposit like coal, natural gas, or petroleum, which is derived from the remains of ancient animals and plants that has accumulated over the years and is used as fuel.	It was measured based on the number of units of fossil fuel production that a nation produces and/or consumes.
Real GDP	This refers to the value of all goods and services that are produced within the borders of a country within a given time period, and usually one year.	It was measured against the dollar value.

Data Analysis Plan

The data that was used in the study was analyzed using the Statistical Package for Social Sciences (SPSS). The data was also subjected to the data screening. and cleaning producers. Osborne (2010) defined data cleaning as the process that is used in determining the incomplete, unreasonable, or inaccurate data and then improving on data quality by correcting the omissions and the errors that are detected. Because the study used secondary data, the data-cleaning process that was adopted includes reasonableness checks, completeness checks, limit checks, and a review of the entire dataset to check for outliers. In addition, the data was also subjected to a reliability test in which the method of collection and storage was examined to evaluate whether the data was sufficient to answer the research questions appropriately.

Threats to Validity

Becker, Rai, Ringle, and Völckner (2013) have commented that validity connotes the extent to which a measurement, a conclusion or a concept corresponds to the real world and is well founded. There are two types of validity, including external and internal validity. Internal validity concerns the degree of control or the rigor of the study design. It is largely affected by history, maturation, testing, instrumentation, statistical regression, experimental mortality, and selection-maturation interaction. History is a threat to the research design in a situation where other factors that are external to the subjects of the study are occurring because of the passage of time. Researchers deal with this situation by ensuring that all outliers that might be present in the data are removed.

External Validity

External validity is defined as the validity of the generalized causal (inferences) in scientific research, which is usually based on the experiments (Feldt & Magazinius, 2010). It can be affected by such factors as testing reactivity, interaction effects of selection and experimental variables, specificity of variables, reactive effects of experimental arrangements, and multiple-treatment interference. The major threat to external validity in the study is the generalization of the research findings. This is because the study only used data for the period between 2010 and 2015, which is not a large enough time frame to enhance the generalization of the effects of the independent variables on the dependent variables and the relationship that exists between the research variables. However, I addressed this concern by including all Arab League nations, which helped in the generalization of the research findings within the Arab League nations. Lastly, the issues regarding selection of the variables that were used in the study will not affect the study's validity.

Internal Validity

The threat to internal validity is maturation, which can sometimes operate in situations where psychological or biological changes occur in the study subjects. These changes can sometimes result in total or partial effects that are discerned in the study. Because this is a study in social science, the use of cross-sectional research design maturation did not affect its internal validity. Internal validity is also affected by testing. This may occur in a situation where changes in test scores occur because of repeated testing and not because of the intervention. The study's internal validity was not affected by testing, as it was not an intervention study. Finally, internal validity is affected by

instrumentation, in which the results of the study may change because of the calibration of the instrument. Instrumentation did not affect the study. The major threat to internal validity of the study is regression. It is addressed by ensuring that subjects are not selected based on extreme scores.

Because this study used secondary data that was obtained from the International Monetary Fund, Organization for Economic Co-Operation and Development, World Bank, International Telecommunication Union, and United Nations database, the ethical procedures that were taken into consideration related to the extraction of the secondary data from an institution's website. To begin with, it is normally required that the researcher seeks the consent of the organization whose data he or she intends to use in answering the research questions to have access to the institution's database (Weijer et al., 2011). This was not applicable in the study, as the International Monetary Fund, Organization for Economic Co-Operation and Development, World Bank, International Telecommunication Union, and United Nations databases are open, and any researcher has free access to the data stored. Furthermore, these sources' codes allowed for the re-use of their data. However, for this study I took into consideration the presence of an online data cloud that required protection of the machines that were used to retrieve the online data (Harriss & Atkinson, 2015). Another ethical issue that was taken into consideration was the use of the data for its intended purpose. As such, the data that was retrieved from the databases was solely used to answer the research questions.

Summary

In summary, this chapter has covered the research design that was used in the study and the methodological approaches that were followed. It has been categorically

stated that for the study I used a cross-sectional research design in which the data was retrieved only once from online databases including the International Monetary Fund, Organization for Economic Co-Operation and Development, World Bank, International Telecommunication Union, and United Nations database to help answer the research questions. I also adopted a positivistic approach, which supports the exclusion of procedures of the natural sciences from social research. The sampling procedure for the study was simple random sampling, in which none of the 22 Arab League nations was excluded from the study via sampling. This is because the sample size was estimated to include all 22 of the Arab League nations. I conducted inferential statistical analysis using SPSS to analyze the data. I tested the first two hypotheses of the study using Pearson's product-moment correlation (PPMC) analysis to help in establishing the extent of the relationship between the real GDP growth rate of the Arab League nations, ICT management, and dependency on fossil fuel production. I tested the last two hypotheses using simple linear regression analysis to help in establishing the effects of ICT management implementation policies and fossil fuel production rates on the Arab League nations' real GDP growth rate.

Chapter 4: Results

The purpose of this quantitative study was to examine the extent to which ICT management implementation policies can be a viable GDP growth contributor in Arab League nations that are primarily dependent on fossil fuel production. I also examined real GDP adjusted for inflation—in relation to independent variables ICT management and fossil fuel production in Arab League nations that have and have not adopted ICT management implementation policies. The rationale for conducting the study was to enhance experts' understanding of how ICT management affects GDP growth. By understanding the effect of ICT management on GDP growth, it could be possible for Arab League nations to identify an alternative GDP growth driver in lieu of fossil fuel production. Having an alternative GDP growth driver during volatile times will stabilize or continue GDP growth.

In this study, I sought to answer four research questions. The first question centered on how the Arab League nations' policies differ in terms of ICT management implementation. The second question concerned the relationship that exists between the Arab League nations that have adopted ICT management implementation policies and their real GDP growth rate versus the nations that have not adopted such policies. The third question centered on the effect of fossil fuel production on the ICT management growth rate in the Arab League nations. The last question concerned the effect that ICT management has on the GDP growth rate of Arab League nations that have and have not implemented full ICT management plans.

I also sought to test four hypotheses, which were derived from the research questions. The first hypothesis that was tested was that there is no significant difference

in ICT management implementation policies between Arab League nations. The second hypothesis was that there is no significant relationship between Arab League nations that have adopted ICT management implementation policies and their real GDP growth rate. The third hypothesis was that there is no significant effect of fossil fuel production on the ICT management growth rate in Arab League nations. The last hypothesis was that ICT management has no significant effect on Arab League nations' real GDP growth. This chapter covers the data collection process, testing of hypotheses, and the study's results.

Data Collection

As discussed in the third chapter, I used secondary data, which I retrieved from three different sources: unesco.org, data.worldbank.org, and unstats.un.org. These three websites allow free access to their databases, and, therefore, no written permission was required to use their data. The data collected from these three sources were validated through filtering to ensure removal of errors caused by entry of extreme values before data analysis. To guard against personal bias, the data was used as it was collected from the source databases. The data from each of these sources complemented one another because no single source included all the variables I wanted to examine. Study variables included the GDP growth rate, ICT management, and fossil fuel production. Although the original plan was to collect data for the period between 2011 and 2016, the data that I ultimately used in this study analysis were collected for the period between 2010 and 2015 because no archival data was available for the year 2016 at the time of data collection. I collected data for 2010 to maintain the time span which the analysis was intended to cover (a 6-year period). As such, the timeframe for which data were collected

represents one of the discrepancies in data collection from the plan presented in Chapter 3.

In this study, the original plan was that data would be collected from the sample which included the entire population of the Arab League, however not all the countries meet the standard requirement. The sample would compare the Arab League nations that have and have not adopted ICT management implementation policies. However, due to lack of data on the Arab League nations that have not adopted ICT management implementation policies, I instead compared the nations that have low uptake of ICT management policies to those that have high uptake of ICT management policies. This change was useful in answering the research questions, because the Arab League nations with high uptake of ICT were used as the proxy variable to represent Arab League nations that have adopted ICT management implementation policies. The Arab League nations that have low uptake of technology were used as the proxy variable for those which have not adopted ICT management implementation policies.

ICT uptake connotes the level of penetration of ICT in a country (International Telecommunication Union [ITU], 2012). It is generally measured using the ICT Development Index (IDI; ITU, 2012). The decision to use ICT uptake as a proxy variable for ICT management implementation policies was informed by the fact that there exists documentation on the ranking of all the countries in the world, including those in the Arab region, in terms of ICT uptake. For instance, a report by the ITU (2012) revealed that the year 2010 marked increased ICT uptake and improved IDI scores throughout the world, including all countries in the Arab region.

In this study, the findings indicated that within the Arab States region, United Arab Emirates (UAE) was the highest ranked country in terms of ICT uptake, followed by Qatar, Bahrain, Saudi Arabia, and Oman, in that order (ITU, 2012). The same report also showed that the lowest income countries in the region—Comoros, Djibouti, Mauritania and Yemen—had low IDI rankings (ITU, 2012). The countries that were considered to have low uptake of technology are those whose IDI were lower than the regional average, which stood at 3.57 (ITU, 2012). Those that were considered to have high uptake of ICT were those whose IDI average for the year 2010 was equal to or higher than the regional average (ITU, 2012). Based on IDI scores, countries considered to have high uptake of ICT include United Arab Emirates, Qatar, Bahrain, Saudi Arabia, Oman, Jordan, and Lebanon, while countries considered to have low uptake of ICT include Tunisia, Morocco, Egypt, Syria, Algeria, Yemen, Comoros, Djibouti, and Mauritania. Table 3 shows the IDI of the Arab League nations in the year 2010. However, other Arab League nations such as Iraq, Kuwait, Libya, Somalia, Palestine and Sudan were never included in the ranking of countries by IDI and as such, it is difficult to know whether they have high or low uptake of ICT. Therefore, I have not included them in the sample that was used in answering the research questions. Although only 16 of the 22 Arab League nations were included in the sample (see Table 3), this sample is very representative, as it accounts for 72.7% of the targeted population. It is imperative to note that this study targeted all the 22 Arab League nations, which forms the larger population as well as the target population. The data collected from the three sources (unesco.org, data.worldbank.org, and unstats.un.org) were consolidated.

Table 3

IDI 2010

Country	IDI 2010
United Arab Emirates	6.19
Qatar	5.60
Bahrain	5.57
Saudi Arabia	5.42
Oman	4.38
Jordan	3.83
Lebanon	3.57
Tunisia	3.43
Morocco	3.29
Egypt	3.28
Syria	3.05
Algeria	2.82
Yemen	1.72
Comoros	1.67
Djibouti	1.66
Mauritania	1.58
Regional Average	**3.57**

(Source: International Telecommunication Union, 2011)

Another discrepancy from the original intention as indicated in Chapter 3 was the analysis of the fourth hypothesis, which states that ICT management has no significant effect on Arab League nations' real GDP growth. In Chapter 3, it was stated that this hypothesis would be tested through simple linear regression, pitting ICT management as the predictor variable and real GDP growth as the response variable. However, this was modified such that fossil fuel production was introduced into the model as the moderating variable, as it has been used to show a moderating effect of the relationship between ICT management and real GDP growth. This decision was made to increase the effectiveness of the fourth hypothesis, which is similar to the second hypothesis and states that there is no significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate. As it can be seen, both hypotheses generally test the relationship between GDP growth and ICT management. As such, if both are tested using simple linear regression analysis, then the same results will be arrived at and this will amount to repetition. Thus, by introducing fossil fuel production as a moderating variable, the whole dynamics changed, as I was able to underscore the significant effect that fossil fuel production has on the real GDP growth rate and its effect in moderating the relationship between ICT management and real GDP growth rate.

Study Results

Descriptive Statistics

Because it can be very difficult to understand and interpret the raw data, descriptive statistics was employed in this study to get a concise and complete picture of the large data (Weiss, 2015). The secondary data used in this study was collected on three main variables, including the GDP growth rate of the sampled Arab League nations, their

high-technology exports (percentage of manufactured exports; this was used as a proxy variable for ICT management growth rate), and fossil fuel production. Therefore, since the study adopted use of secondary data, there is no response rate to be presented.

However, descriptive statistics analysis has shown that the Arab League nations that have high uptake of technology have higher real GDP growth rates as compared to the Arab League nations that have low uptake of ICT. As shown in Table 4, the average real GDP growth rate of Arab League nations that have high uptake of technology stood at 3.80, with a standard deviation of 1.19 for the period between 2010 and 2015. In contrast, the average of the real GDP growth rate of Arab League nations that have low uptake of technology stood at 3.45 with a standard deviation of 1.94 for the period between 2010 and 2015.

In addition to what is shown in Table 4, the average rate of implementation of ICT management policies for Arab League nations with high uptake of ICT stood at 2.36 with a standard deviation of 1.86 for the period between 2010 and 2015. In contrast, the average rate of implementation of ICT management policies for the Arab League nations with low uptake of technology stood at 2.32 with a standard deviation of 2.3. Comparatively, it is clear that the Arab League nations that have a high rate of implementation of ICT management policies have a high level of GDP growth rate as compared to those that have a low rate of implementation of ICT management policies.

Table 4

Descriptive Statistics

Country	Arab League nations with high uptake of ICT	Arab League nations with low uptake of ICT
Average Real GDP growth rate from 2010-2015	3.80	3.45
Standard deviation	1.19	1.94
Average rate of implementation of the ICT management policies	2.36	2.32
Standard deviation	1.86	2.30

Hypotheses Testing

Within the general problem concerning the extent to which a relationship exists between GDP growth, ICT management, and fossil fuel production in the Arab League nations, four hypotheses were subjected to statistical tests. The variables that together constituted the conceptual framework from which the hypotheses were drawn comprised real GDP growth rate of the sampled Arab League nations, ICT management implementation policies, and fossil fuel production. In this case, real GDP growth rate was generally used as the dependent variable, while ICT management implementation policies growth rate and fossil fuel production were used as the independent variables. However, in some cases, especially for the third hypothesis, "ICT management implementation policies growth rate" was used as the response variable, while fossil fuel production was used as the independent variable. In this study, I used correlation analysis to examine how the various variables are related, whereas multiple regression analysis

was used to determine whether a group of variables predicts a given dependent variable, such as in the fourth hypothesis in which both fossil fuel production and ICT management policies were used as the predictor variables for real GDP growth rate. Pearson's product-moment correlation model was used to test the hypotheses.

In the study, the F-value indicates the overall significance for the regression model (Barr, Levy, Scheepers, & Tily, 2013). The B-value is the measure or test of the amount/degree of change in the criterion variable that is associated with unit change in the dependent variable (Diehl & Williams, 2017). The p-value indicates the degree of confidence, whereas the correlation coefficient (square) indicates the degree to which two or more variables are correlated (Donnarumma, Costantini, Ambrosini, Friston, & Pezzulo, 2017). The R-square value (coefficient of determination) either indicates how well the model fits the data or the percent of variance in the dependent variable explained by the independent variables (Javanmard & Montanari, 2014). The adjusted R-square reflects the model's goodness of fit for the population and controls for overestimates of the population. It may decrease and be negative if variables entered in the model do not add significantly to the model. The significance level was set at 0.05 for all the statistical tests. Therefore, effects with a small p-value less than 0.05 were considered significant.

In the study, four hypotheses were tested. The first hypothesis tested the difference in ICT management implementation policies between Arab League nations. The second hypothesis tested the relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate versus those that have not. The third hypothesis tested the effect of fossil fuel production on ICT management growth rate in Arab League nations. The fourth, and final, hypothesis tested the effect of

ICT management on the GDP growth rate of Arab League nations that have and have not implemented full ICT management plans. The details of these hypotheses tests are given in the next section.

Research Question 1

The first objective of the study was to establish how the Arab League nations' policies differ in ICT management implementation. One hypothesis was drawn from this objective and the conceptual framework. The hypothesis was tested as follows:

$H_0$1: There is no significant difference in ICT management implementation policies between Arab League nations.

H_a1: There is a significant difference in ICT management implementation policies between Arab League nations.

The hypothesis generally predicted that there is a significant difference in ICT management implementation policies between Arab League nations. The data used to test the hypothesis were obtained from unesco.org, data.worldbank.org, and unstats.un.org databases in which high-technology exports (percentage of manufactured exports) was used as a proxy variable for the ICT management implementation policies. The Pearson's product-moment correlation statistical technique was used to test the strength and significance of the relationship between ICT management implementation policies in the Arab League nations that have high uptake of technology, and those that have low uptake of ICT. The results of the correlation analysis for the linear relationship between the implementation of ICT management policies by the Arab League nations that have high and low uptake of ICT are shown in Table 5.

As is evident in Table 5, the Pearson correlation, r, is 0.643 and is statistically significant at the 0.05 level of significance since ($p < 0.05$) (Donnarumma et al., 2017). As such, the linear relationship between the implementation of the ICT management policies by the Arab League nations that have high versus low uptake of ICT is positive and significant (Donnarumma et al., 2017). Therefore, the null hypothesis that there is no significant difference in ICT management implementation policies between Arab League nations was rejected. The alternative hypothesis, which stated that there is a significant difference in ICT management implementation policies between Arab League nations, was accepted.

Table 5

ICT Management Policies Correlation

Variables	Pearson Correlation	
The implementation of ICT management policies by the Arab League nations with a high uptake of ICT	Pearson Correlation	0.643**
The implementation of ICT management policies by the Arab League nations with a low uptake of ICT		

** Correlation is significant at 0.05 significance level

The correlation analysis results, which led to the rejection of the null hypothesis, have been supported by the graphical analysis shown in Figure 1. As evident in Figure 1, Arab League nations with low uptake of ICT have lower rates of implementation of ICT management policies even though they have been showing an improvement in the

implementation rates and ranks, as was asserted by the International Telecommunication Union (2012). In contrast, the Arab League nations with high uptakes of ICT have comparatively higher rates of implementation of ICT management policies, as shown in Figure 1. In general, the figure shows that all the Arab League nations have shown an improvement in the rate of implementation of ICT management policies. However, the Arab League nations that have higher uptake of ICT have higher rates of implementation of ICT management policies, while the Arab League nations that have lower uptake of ICT have lower rates of implementation of ICT management policies. This generally shows that there is a significant difference in ICT management implementation policies between Arab League nations.

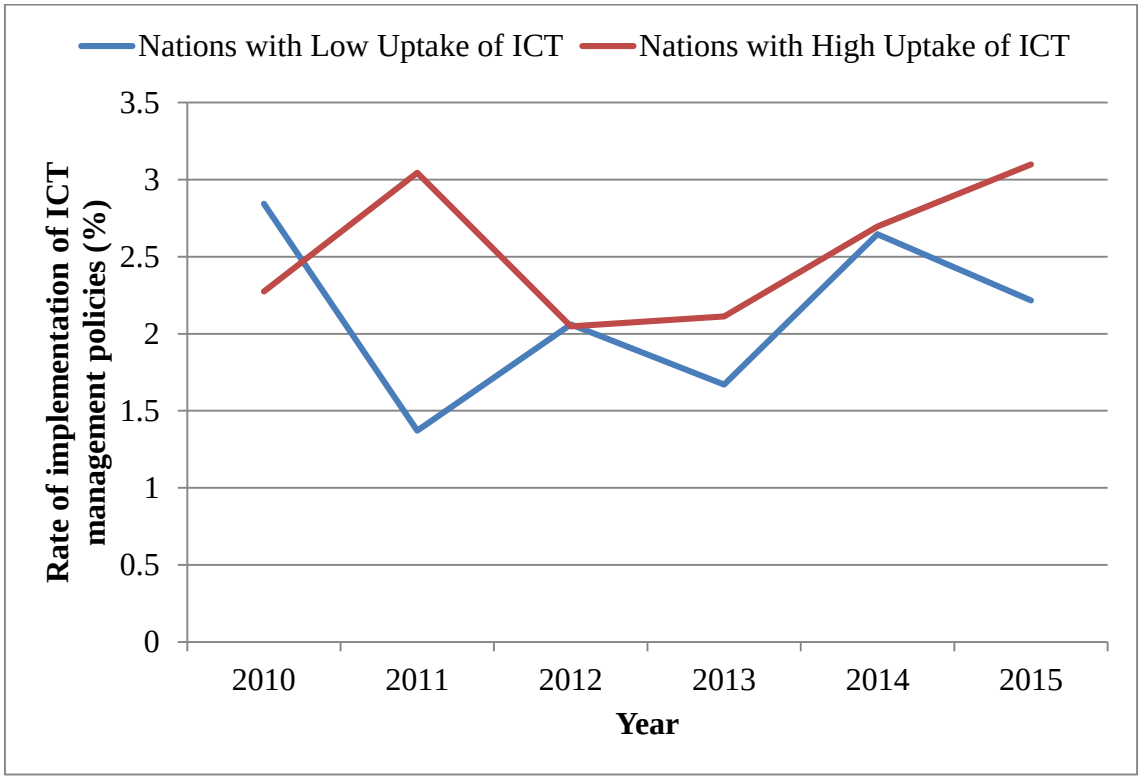

Figure 1. *Comparison of implementation rates of ICT management policies.*

Research Question 2

The second objective of the study was to determine the relationship between Arab League nations that have adopted ICT management policies and their real GDP Growth rate versus those that have not. One hypothesis was drawn from this objective and the conceptual framework. The hypothesis was tested as follows:

$H_0$2: There is no significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate.

H_a2: There is a significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate.

This hypothesis generally predicted that there is a significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate. The data used to test this hypothesis were obtained from unesco.org, data.worldbank.org, unstats.un.org databases in which high-technology exports (percentage of manufactured exports) was used as a proxy variable for the ICT management implementation policies. In this analysis, GDP growth rate was used as the response variable, while rate of implementation of ICT management polices was used as the predictor variable. The Pearson's product-moment correlation statistical technique was used to test the strength and significance of the relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate of technology, and those that have low uptake of ICT. Table 6 presents the regression analysis results for the relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate.

As presented in Table 6, the regression analysis model consisted of rate of implementation of the ICT management policies in Arab League nations as the independent variable and real GDP growth rate of the Arab League nations as the dependent variable in the regression. The results indicate that there is a strong positive relationship between the rate of the implementation of the ICT management policies and the real GDP growth rate of the Arab League nations. This relationship is statistically significant ($r = 0.71$, $p < 0.05$; Halsey, Curran-Everett, Vowler, & Drummond, 2015). Implementation of the ICT management policies in the Arab League nations accounts for 48.8% variance in the real GDP growth rate of these countries ($R^2 = 0.488$; Bramante, Petrella, & Zappa, 2015). Table 7 shows the beta coefficients for the effect of implementation of the ICT management policies on the GDP growth rate of the Arab League nations.

Table 6

Regression Analysis Rate of ICT Implementation

Model	R	R^2	Adjusted R^2	Standard error of the estimate	F
1	0.71[a]	0.488	0.487	0.3796	260.689

Predictors: (Constant), Rate of implementation of the ICT management policies

Dependent Variable: Real GDP growth rate

Table 7

Effect of ICT Management on GDP Growth

Model	Variables	Unstandardized coefficients		Standardized coefficients	P -Value
		B	Std. Error	Beta	
	(Constant)	1.895	0.127		0.000
1	Rate of implementation of the ICT management policies	0.531	0.034	0.711	0.000
	Dependent variable: Real GDP growth rate				

The results shown in Table 7 indicate that the beta coefficient for the rate of implementation of the ICT management polices is 0.711. This implies that changing the rate of implementation of the ICT management policies by one standard deviation leads to a change of 0.711 standard deviation, in the rate of real GDP growth of the Arab League nations when all other factors affecting growth are kept constant (Bernis & Scotti, 2017). In other words, when an Arab League nation improves its rate of implementation of the ICT management policies by 1%, its real GDP growth rate will increase by 0.71%. In addition to that, the beta coefficient for the rate of implementation of the ICT management polices was found to be significant since the p-value was estimated to be less than the level of significance that was used ($p < 0.05$; Halsey et al., 2015). This generally shows that there is a significant relationship between the implantation of the ICT management policies and the real GDP growth rate of the Arab League nations. As

such, based on this finding, the null hypothesis that there is no significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate was rejected. Therefore, the alternative hypothesis, which stated that there is a significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate, was accepted.

Further, the regression analysis results, which led to the acceptance of the hypothesis that there is a significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate, has been supported by the graphical analysis shown in Figure 2. As evident in Figure 2, the Arab League nations that have poor implementation of ICT management policies have lower rates of real GDP growth. In contrast, the Arab League nations have comparatively good implementation of ICT management policies have comparatively higher rates of real GDP growth, as shown in Figure 2. In general, the figure shows that the Arab League nations that have higher uptake of ICT (good implementation of ICT management policies) have higher rates of real GDP growth, while the Arab League nations that have lower uptake of ICT (poor implementation of ICT management policies) have lower rates of real GDP growth. This generally shows that there is a significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate.

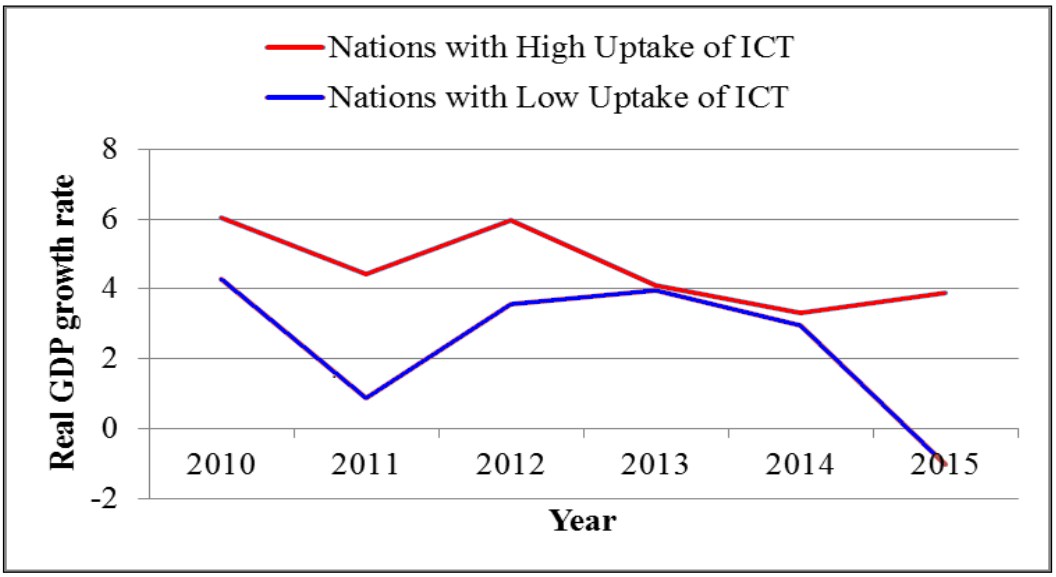

Figure 2. *Comparison of real GDP growth rates for ICTs*.

Research Question 3

The third objective of the study was to determine the effect of fossil fuel production on ICT management growth rate in Arab League nations. One hypothesis was drawn from this objective and the conceptual framework. The hypothesis was tested as follows:

$H_0$3: There is no significant effect of fossil fuel production on ICT management growth rate in Arab League Nations.

H_a3: There is a significant effect of fossil fuel production on ICT management growth rate in Arab League Nations.

This hypothesis generally predicted that there is a significant relationship between fossil fuel production and ICT management growth rate in Arab League nations. The data used to test this hypothesis were obtained from unesco.org, data.worldbank.org, unstats.un.org databases in which high-technology exports (percentage of manufactured

exports) was used as a proxy variable for the ICT management implementation policies. In this analysis, “the ICT management implementation policies” was used as the response variable, while fossil fuel production was used as the predictor variable. The Pearson product-moment correlation statistical technique was used to test the strength and significance of the relationship between fossil fuel production and ICT management growth rate in Arab League nations. Table 8 presents the regression results for the relationship between fossil fuel production and ICT management implementation policies in Arab League nations.

As presented in Table 8, the regression analysis model consisted of the ICT management implementation policies in Arab League nations as the dependent variable and fossil fuel production in the Arab League nations as the independent variable in the regression. The results indicate that there is a strong positive relationship between the ICT management implementation policies and fossil fuel production of the Arab League nations. This relationship is statistically significant ($r = 0.67$, $p < 0.05$; Halsey et al., 2015). This implies that fossil fuel production in the Arab League nations accounts for 42.4% variance in the ICT management implementation policies ($R^2 = 0.424$; Bramante et al., 2015).

Table 8

Regression Analysis of ICT Management and Fossil Fuel Production

Model	R	R^2	Adjusted R^2	Standard error of the estimate	F
1	0.67[a]	0.424	0.422	0.3346	140.132

Predictors: (Constant), Fossil fuel production

Dependent Variable: ICT management implementation policies

Table 9 shows the beta coefficients for the effect of fossil fuel production on ICT management growth rate in Arab League nations. The results shown in Table 9 indicate that the beta coefficient for the fossil fuel production is 0.654. This implies that changing the rate of fossil fuel production by one standard deviation leads to a change of 0.654 standard deviation in the rate of ICT management policies in the Arab League nations when all other factors are kept constant (Bernis & Scotti, 2017). In other words, when an Arab League nation improves its fossil fuel production rate by 1%, its rate of ICT management policies will increase by 0.65%. In addition to that, the beta coefficient for fossil fuel production was found to be significant since the p-value was estimated to be less than the level of significance that was used ($p < 0.05$; Halsey et al., 2015). This generally shows that there is a significant effect of fossil fuel production on ICT management growth rate in Arab League nations. As such, based on the finding, the null hypothesis that there is no significant effect of fossil fuel production on ICT management growth rate in Arab League nations was rejected. Therefore, the alternative hypothesis,

which stated that there is a significant effect of fossil fuel production on ICT management growth rate in Arab League nations, was accepted.

Table 9

Coefficient of Fossil Fuel Production

Model	Variables	Unstandardized coefficients		Standardized coefficients	P -Value
		B	Std. Error	Beta	
	(Constant)	1.782	0.131		0.000
1	Fossil fuel production	0.628	0.014	0.654	0.000
	Dependent Variable: ICT management growth rates				

Research Question 4

The fourth objective of the study was to determine the effect of ICT management on the GDP growth rate of Arab League nations that have implemented full ICT management plans, and those which have not implemented full ICT management plans. One hypothesis was drawn from this objective and the conceptual framework. The hypothesis was tested as follows:

$H_0$4: ICT management has no significant effect on Arab League nations' real GDP growth.

H_a4: ICT management has a significant effect on Arab League nations' real GDP growth.

This hypothesis generally predicted that there is a significant relationship between real GDP growth rate and ICT management growth rate in Arab League nations. The data

used to test this hypothesis was obtained from unesco.org, data.worldbank.org, unstats.un.org databases in which high-technology exports (percentage of manufactured exports) was used as a proxy variable for the ICT management implementation policies. The main difference in the analysis used in testing this hypothesis and hypothesis $H_0$2 is that in this hypothesis, I used fossil fuel production as the variable with moderating effect on the relationship that exists between ICT management and the real GDP growth rate of the Arab League nations. As such, a multiple linear regression model was used to determine the joint effect of the fossil fuel production and ICT management growth rate on the real GDP growth rate of the Arab League nations. Pearson's product-moment correlation statistical technique was used to test the strength and significance of the relationship between fossil fuel production and GDP growth rate in Arab League nations, and the relationship between GDP growth rate and ICT management growth rate. In addition, it was used to show the strength and the significance of the relationship that fossil fuel production and ICT management growth rate jointly have with the real GDP growth rate in the Arab League nations. Table 10 presents the regression analysis results for the relationship that fossil fuel production and ICT management growth rate jointly have with the real GDP growth rate in the Arab League nations.

Table 10

Variables Growth Rates

Model	R	R^2	Adjusted R^2	Standard error of the estimate	F
1	0.71[a]	0.488	0.487	0.3796	260.689
2	0.773[b]	0.597	0.596	0.2986	407.103
3	0.798[c]	0.638	0.635	0.3202	239.067

- Predictors: (Constant), ICT management growth rate
- Predictors: (Constant), Fossil fuel production
- Predictors: (Constant), ICT management growth rate, Fossil fuel production
- Dependent variable: real GDP growth rate

As shown in Table 10, Model 1 consisted of ICT management growth rate as the independent variable and real GDP growth rate as the dependent variable in the regression. The results indicate that there is a strong positive relationship between ICT management growth rate and the real GDP growth rate in the Arab League nations. This relationship is statistically significant ($r = 0.71$, $p < 0.05$; Halsey et al., 2015). ICT management growth rate accounts for 48.8% variance in the real GDP growth rate in the Arab League nations ($R^2 = 0.488$; Bramante et al., 2015).

Model 2 consisted of the real GDP growth rate as the response variable and fossil fuel production as the predictor variable in the regression. The results show that the relationship between real GDP growth rate and fossil fuel production in the Arab League nations is very strong and statistically significant ($r = 0.773$, $p < 0.05$; Halsey et al.,

2015). Fossil fuel production accounts for 59.7% variance in real GDP growth rate in the Arab League nations ($R^2 = 0.597$; Bramante et al., 2015).

Model 3 shows the interactive effect of ICT management growth rate (predictor variable) and fossil fuel production (moderating variable) on the real GDP growth rate in the Arab League nations (response variable). The interaction between fossil fuel production and ICT management growth rate accounts for 63.8% variance in real GDP growth rate in Arab League nations ($R^2 = 0.638$). Fossil fuel production improved the explanatory power of the model by 14.8%, as indicated by adjusted R^2 (Bramante et al., 2015).

Table 11 shows beta coefficients for the moderating effect of fossil fuel production on the relationship between ICT management growth rate and the real GDP growth rate of the Arab League nations. The results indicate that the beta coefficient for ICT management growth rate was 0.711. This implies that changing ICT management growth rate by one standard deviation leads to a change of 0.711, standard deviation in the real GDP growth rate of the Arab League nations holding fossil fuel production constant.

ICT management growth rate had a positive effect on the real GDP growth rate (ß = 0.711, $P < 0.05$; Halsey et al., 2015). Changing fossil fuel production by one standard deviation produces a change of 0.773, standard deviation in real GDP growth rate in Arab league nations. The effect of fossil fuel production on real GDP growth rate is positive and statistically significant (ß = 0.773, $P < 0.05$; Halsey et al., 2015)

Table 11

Beta Coefficients of Growth Rates

Model	Variables	Unstandardized coefficients		Standardized coefficients	P -Value
		B	Std. Error	Beta	
1	(Constant)	1.895	0.128		0.000
	ICT management growth rate	0.531	0.034	0.711	0.000
2	(Constant)	0.721	0.160		0.000
	Fossil Fuel production	0.764	0.038	0.773	0.000
3	(Constant)	0.758	0.152		0.000
	ICT management growth rate	0.218	0.041	0.287	0.000
	Fossil fuel production	0.557	0.055	0.586	0.000
	Dependent Variable: Real GDP growth rate of the Arab League nations				

When both the fossil fuel production and ICT management growth rate were regressed on real GDP growth rate of the Arab League nations using a multiple linear regression model, the beta coefficient of ICT management rate was decreased from 0.711 to 0.287. In contrast, the beta coefficient for fossil fuel production was decreased from 0.773 to 0.586, as shown in Model 3. These changes were statistically significant ($p < 0.05$; Halsey et al., 2015). Therefore, fossil fuel production moderates the relationship between ICT management growth rate and real GDP growth rate of the Arab League nations. Thus, the strength of the relationship between ICT management growth rate and real GDP growth rate in Arab league nations is dependent on fossil production. Based on the finding, the null hypothesis that there is no significant effect of fossil fuel production on ICT management growth rate in Arab League Nations was rejected. Therefore, the alternative hypothesis, which stated that there is a significant effect of fossil fuel production on ICT management growth rate in Arab League nations, was accepted.

Summary

In general, I sought to answer four research questions. The first question was on how the Arab League nations' policies differ in ICT management implementation. The second question was on the relationship that exists between the Arab League nations that have adopted ICT management policies and their real GDP growth rate versus the Arab League nations that have not adopted ICT management policies and their real GDP growth rate. The third question was on the effect of fossil fuel production on ICT management growth rate in the Arab League nations. The last question was on the effect of ICT management on the GDP growth rate of Arab League nations that have and have

not implemented full ICT management plans. The findings of this study have revealed that the linear relationship between the implementation of the ICT management policies by the Arab League nations that have high versus low uptake of ICT and implementation of ICT management policies is positive and significant (Donnarumma et al., 2017). Therefore, the null hypothesis that there is no significant difference in ICT management implementation policies between Arab League nations was rejected.

The findings have also revealed that there is a significant relationship between the implementation of the ICT management policies and the real GDP growth rate of the Arab League nations (Donnarumma et al., 2017). As such, based on this finding, the null hypothesis that there is no significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate was rejected. Further, it has been established that there is a significant effect of fossil fuel production on ICT management growth rate in Arab League nations. Based on this finding, the null hypothesis that there is no significant effect of fossil fuel production on ICT management growth rate in Arab League nations was rejected. Lastly, I have established that fossil fuel production moderates the relationship between ICT management growth rate and real GDP growth rate of the Arab League nations and as such, the strength of the relationship between ICT management growth rate and real GDP growth rate in Arab league nations is dependent on fossil fuel production. These results are interpreted in Chapter 5, which presents an overall summary of the study together with the recommendations and the implications of the study. A summary of key research findings is given in Tables 12 and 13.

Table 12

Summary of Findings: Strengths of the Relationships Between Variables

	Research question	Hypotheses	Test statistics results/Decision
1.	How do Arab League nations' policies differ in ICT management implementation?	$H_0$1. There is no significant difference in ICT management implementation policies between Arab League nations H_a1. There is a significant difference in ICT management implementation policies between Arab League nations	r = 0.643, p < 0.05 There is a significant difference in ICT management implementation policies between Arab League nations.
2.	What is the relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate versus those that have not?	$H_0$2: There is no significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate. H_a2: There is a significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate.	r = 0.71, p < 0.05 There is a significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate.
3.	What is the effect of fossil fuel production on ICT management growth rate in Arab League nations?	$H_0$3: There is no significant effect of fossil fuel production on ICT management growth rate in Arab League Nations. H_a3: There is a significant effect of fossil fuel production on ICT management growth rate in Arab League nations.	r = 0.67, p < 0.05 There is a significant effect of fossil fuel production on ICT management growth rate in Arab League nations.
4.	What is the effect of ICT management on the GDP growth rate of Arab League nations that have and have not implemented full ICT Management plans?	$H_0$4: ICT management has no significant effect on Arab League nations' real GDP growth. H_a4: ICT management has a significant effect on Arab League nations' real GDP growth.	r = 0.71, p < 0.05 ICT management has a significant effect on Arab League nations' real GDP growth.

Table 13

Summary of Findings: Directions and Magnitudes of the Relationships Between Variables

Research Question	Hypotheses	Test Statistics Results/Decision
1. How do Arab League nations' policies differ in ICT management implementation?	$H_0$1. There is no significant difference in ICT management implementation policies between Arab League nations. H_a1. There is a significant difference in ICT management implementation policies between Arab League nations.	r = 0.643 There is a significant variation in ICT management implementation policies between Arab League nations by 64.3%.
2. What is the relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate versus those that have not?	$H_0$2: There is no significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate. H_a2: There is a significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate.	Beta Coefficient = 0.711 Changing the rate of implementation of the ICT management policies by one standard deviation leads to a change of 0.711 standard deviation, in the rate of real GDP growth of the Arab League nations when all other factors affecting growth are kept constant (Donnarumma et al., 2017).
3. What is the effect of fossil fuel production on ICT management growth rate in Arab League nations?	$H_0$3: There is no significant effect of fossil fuel production on ICT management growth rate in Arab League nations. H_a3: There is a significant effect of fossil fuel production on ICT management growth rate in Arab League nations.	Beta Coefficient = 0.654 Changing the rate of fossil fuel production by one standard deviation leads to a change of 0.654 standard deviation, in the rate of ICT management policies in the Arab League nations when all other factors are kept constant (Donnarumma et al., 2017)
4. What is the effect of ICT management on the GDP growth rate of Arab League nations that have and have not implemented full ICT Management plans?	$H_0$4: ICT management has no significant effect on Arab League nations' real GDP growth. H_a4: ICT management has a significant effect on Arab League nations' real GDP growth.	R^2 = 0.638, Adjusted R^2 = 0.148 The interaction between fossil fuel production and ICT management growth rate accounts for 63.8% variance in real GDP growth rate in Arab League nations (R^2 = 0.638). Fossil fuel production improved the effect of the ICT management growth rate by 14.8%, as indicated by adjusted R^2.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of the study was to examine the extent to which ICT management can be a viable GDP growth contributor in Arab League nations that are primarily dependent on fossil fuel production. Further, in this study, I sought to examine real GDP adjusted for inflation—in relation to independent variables such as ICT management and fossil fuel production—in Arab League nations that have and have not adopted ICT management policies. I conducted this study to enhance experts' understanding of how ICT management affects GDP growth. By understanding the effect of ICT management on GDP growth, it might be possible to identify an alternative GDP growth driver in lieu of fossil fuel production. This chapter summarizes the study's findings, interprets the results, and presents the conclusions drawn following the general pattern of the initial questions and hypotheses. Lastly, this chapter also covers the limitations of the study and presents the recommendations and implications of the study.

Interpretation of Findings

In this study, I examined the relationship that exists between ICT management implementation policies and the real GDP growth rate of the Arab League nations. Most of the empirical research in the area shows a positive relationship between ICT and the real GDP growth rate of the Arab League nations (Edquist & Henrekson, 2015). The findings of this study have also generally supported the findings of Yunis et al. (2012) and other related studies that showed there is a positive and significant relationship between ICT-involved management and the real GDP growth rate of the Arab League nations. However, in this study, I went a step further to examine the moderating effect of fossil fuel production on the relationship between ICT management implementation

policies and real GDP growth rate of the Arab League nations. Previous researchers have not considered these effects and relationships (Brown et al., 2011).

I used secondary data for testing the research hypotheses and answering the research questions. The data were collected from four different sources, including the unesco.org, data.worldbank.org, itu.int, unstats.un.org databases. The study variables included real GDP growth rate of the Arab League nations, fossil fuel production, and high-technology exports (percentage of manufactured exports), which was generally used as a proxy variable for the ICT management implementation policies.

I sought to test four hypotheses, which was developed based on the research questions. The first hypothesis tested was that there is no significant difference in ICT management implementation policies between Arab League nations. The second hypothesis was that there is no significant relationship between Arab League nations that have adopted ICT management policies and their real GDP growth rate. The third hypothesis was that there is no significant effect of fossil fuel production on ICT management growth rate in Arab League nations. The last hypothesis was that ICT management has no significant effect on Arab League nations' real GDP growth.

As was indicated in the Chapter 3, each of the hypotheses was tested and interpreted accordingly. To begin with, the type of analysis that was conducted for the first hypothesis was the PPMC. The interpretation of the PPMC results is done based on the range of correlation that lies between + 1 and – 1 (Weiss, 2015). The interpretation of the correlation coefficient is such that if r = + 1, then there is a strong positive relationship, whereas if r = – 1, then there is a negative relationship (Kristoufek, 2014). In other words, if the PPMC was estimated at r = – 1 or any number close to that, then the

interpretation could be there is a strong negative difference in ICT management implementation policies between Arab League nations (Kristoufek, 2014). In contrast, if the PPMC was to be estimated at r = + 1 or any number close to that, then the interpretation could be there is a strong positive difference in ICT management implementation policies between Arab League nations (see Kristoufek, 2014).

For the second hypothesis, in addition to the use of the PPMC in the analysis, I also used a simple linear regression model in determining the magnitude and the direction of the effect of ICT management implementation policies on the real GDP growth rate of the Arab League nations. I interpreted the results of this regression based on the computed R^2 and Beta coefficient, such that a positive change in R^2 would show that there is a positive relationship between ICT management growth rate and the real GDP growth rate of Arab League nations. In contrast, a negative change in R^2 would show that there is a negative relationship between ICT management growth rate and the real GDP growth rate of Arab League nations.

For the third hypothesis, I also used a simple linear regression model to determine the magnitude and the direction of the effect that fossil fuel production has on ICT management growth rate in Arab League nations. I based the interpretations of the results of this regression on the computed R^2 and Beta coefficient, such that a positive change in R^2 would show that there is a positive relationship between fossil fuel production and ICT management growth rate in Arab League nations. In contrast, a negative change in R^2 would show that there is a negative relationship between fossil fuel production and ICT management growth rate of Arab League nations.

For the fourth hypothesis, in addition to the PPMC, I used a multiple linear regression model in determining the magnitude and the direction of the effect of fossil fuel production and ICT management growth rate on the real GDP growth rate in Arab League nations. In this case, three models were generated. For the first model, I tested the relationship between the real GDP growth rate of the Arab League nations and their ICT management growth. For this model, the interpretations of the results of this regression analysis were based on the computed R^2 and Beta coefficient, such that a positive change in R^2 would show a positive relationship between real GDP growth rate in Arab League nations and their ICT management growth rate. In contrast, a negative change in R^2 would show a negative relationship between ICT management growth rates of Arab League nations and their real GDP growth rate. For the second model, I based the interpretations of the results of this regression analysis on the computed R^2 and Beta coefficient, such that a positive change in R^2 showed a positive relationship between real GDP growth rate in Arab League nations and their fossil fuel production. In contrast, a negative change in R^2 indicated a negative relationship between fossil fuel production of Arab League nations and their real GDP growth rate. The last model generally tested the interactive relationship between fossil fuel production, ICT management policies growth rate, and the real GDP growth rate of the Arab League nations. For this model, the interpretations of this regression analysis results were based on the computed R^2 and Beta coefficient. Based on the regression results, a positive change in R^2 showed that fossil fuel production has a positive moderating effect on the relationship between real GDP growth rate in Arab League nations and their ICT management policies growth rate (Sakka, Barki, & Côté, 2016), while a negative change in R^2 showed that fossil fuel

production has a negative moderating effect on the relationship between ICT management growth rates of the Arab League nations and their real GDP growth rates (Sakka et al., 2016). These hypotheses were accepted at the 0.05 level of significance.

Based on the criteria for interpretations and the analyses of each of the hypotheses tested, it is clear there is a significant relationship between the ICT management policies in the Arab League nations and their real GDP growth rates. I base this assertion on the fact that the second hypothesis, which investigated the effect of ICT management growth rates on the real GDP growth rates of the Arab League nations, has been accepted. This is an indication that nations with low uptake of ICT have lower rates of implementation of ICT management policies. This finding conforms to several studies. For instance, Ansari (2013) pointed out that the correlation between the annual growth rate of each of the Arab League nations and the aggregate growth rate in the region was very low for some nations. He argued that this is an indication that the different Arab League nations' short-term business cycle is not highly synchronized. It can therefore be argued that the level of ICT management implementation policies in these countries differed and hence the disparity in growth rate. As such, it can be asserted that ICT management implementation policies have a significant effect on the real GDP growth rates of the Arab League nations.

The results of this study have also revealed that fossil fuel production has a significant positive effect on the real GDP growth rate of the Arab league nations. In addition, the study's findings have shown that fossil fuel production has a significant positive moderating effect on the relationship between the real GDP growth rate of the Arab League nations and their ICT management growth rate. This conforms to the study

by Al Rasheed and Hashim (2015), which showed that not all the economies of the Arab League nations experienced a huge decline in the economic growth in 1980, which was followed by a moderate economic recovery. They gave an example of a situation in which, even though the pattern of the GDP per capita of oil-producing nations was identical to that of the whole region, their GDP levels were slightly higher in the oil-producing nations than the average of the entire region. These scholars also reported that the GDP of the non-oil-producing nations increased at a slower rate but on a continuous basis between 1960 and 2000. Al Rasheed and Hashim (2015) study showed that the growth performance of the region's non-oil-producing nations, such as Syria, Jordan, Palestine–Israel, Egypt, Turkey, and Lebanon, was more stable. The GDP per capita of these countries experienced an increase of 2.9% per year between 1950 and 1973. From 1973 to 2000, the GDP per capita of these nations grew at 2.4% per year. A study by Eichengreen et al. (2013), which aimed at estimating economic growth in the Middle East since 1820, also conforms to the results of this study. Eichengreen et al.'s (2013) study further showed that the growth performance of the region's non-oil-producing nations, such as Syria, Jordan, Palestine–Israel, Egypt, Turkey, and Lebanon, was more stable. It indicated that the GDP per capita of these countries experienced an increase of 2.9% per year between 1950 and 1973. From 1973 to 2000, the GDP per capita of these nations grew at 2.4% per year.

The results of this study also conform to the results of the study conducted by Regan et al. (2015). Regan et al. revealed that in considering the pattern of economic growth rates in the non-oil-producing and oil-producing Arab League nations, the GDP per capita of the oil-producing Arab League nations was found to be slightly higher than

that of the non-oil-producing Arab League nations. In addition, the GDP per capita of the two groups was found to be volatile (Koren & Tenreyro, 2012). As such, it can be asserted that fossil production has a significant effect on the real GDP growth rate of the Arab League nations. This is because both the results of this study and other empirical studies have shown that fossil fuel production has a moderating effect on the relationship between ICT management growth rate of the Arab league nations and their real GDP growth rate, as well as a direct effect on the real GDP growth rate of Arab League nations.

The results of this study also conform to the theories that were described in the second chapter. For instance, these results justify the resource-based theory, which tries to explain how organizations or economies build sustainable levels of competitive advantage (Barney et al., 2012). The proponents of resource-based theory, Barney et al. (2012), assert that economies or organizations can be successful if they gain and maintain a competitive advantage. This competitive advantage is gained by implementing a value that creates a strategy that enhances the productivity of the existing labor force in the economy, and this, in turn, facilitates economic growth and development (Barney et al., 2012). The results of this study best explain these assertions of the proponents of this theory, since it has been established that Arab League nations with high rates of ICT management implementation policies have higher real GDP growth rates as compared to those that have low rates of such policies. It can therefore be argued that Arab League nations that have high rates of ICT management implementation policies have a competitive advantage over those that have low rates of ICT management implementation policies, hence explaining their high real-GDP growth rate.

The results of this study are also in concurrence with the resource-dependence theory. As was indicated in Chapter 2, resource-dependence theory is concerned with how organizational behavior is affected by the external resources the organization uses (Shafritz et al., 2015). Further, resource-dependence theorists generally believe that environments are the source of scarce resources, and organizations are dependent on the world's finite resources for survival (Shafritz et al., 2015). They also postulate that economies are interconnected with the external environment and must respond to the expectations and pressures exerted by various sources. The theory also holds that the pressures exerted upon economies by various constituents may represent conflicting demands. The demands that the economy considers most powerful and most urgent are determined by which of the constituents has control over resource flows. A lack of control over these resources thus acts to create uncertainty for firms operating in that environment. Therefore, economies must develop ways to exploit these resources, which are also being sought by other economies to ensure their own survival. As such, it can be asserted that fossil fuel is one of the external resources that affects the economic growth and performance of the Arab League nations. Based on this concept, it can be argued that some Arab League nations have higher levels of real GDP growth rate because of proper utilization of fossil fuel, which is their common external resource. I based this conclusion on the study's findings that fossil fuel production has both a moderating effect on the relationship between the real GDP growth rate of the Arab league nations and their ICT management implementation policies, as well as a direct effect on the real GDP growth rate of the Arab League nations.

As I have discussed in this section, some of this study's findings are in line with the theoretical underpinnings presented in the literature review and do confirm the findings of the studies discussed in Chapter 2. However, some variables that were not considered in previous studies were introduced in this study, leading to new findings. For example, no known empirical study has been conducted to examine the relationship between ICT management growth rates and the real GDP growth rates of the Arab League nations as moderated by fossil fuel production. Therefore, this study makes a contribution to knowledge arising from these new findings, and by confirming or not confirming the previous studies.

Limitations of the Study

As was indicated in the Chapter 1, this study was limited to analytical strategies, which include exploratory, descriptive, and inferential analysis. Exploratory analysis, in this case, is a data analysis approach that analyzes datasets in terms of summarizing their main attributes or characteristics using visual methods (in most cases) to see what the data represent beyond hypothesis-testing tasks or formal modeling (Weiss, 2015). The descriptive analysis involved data analysis with the aim of describing and summarizing data to bring out meaning and patterns that come out of the data (Gravetter & Wallnau, 2016). The purpose of inferential analysis, in contrast, was to infer the thoughts of the population from the sample data to make judgments on the chances of occurrence of observed differences between groups (Gravetter & Wallnau, 2016).

Another limitation of this study is that it used a variety of sources of data, including unesco.org, data.worldbank.org, itu.int, unstats.un.org databases. This is a limitation because there could have been variations in the way these different data

sources validated their data, as well as the way they measured different variables that were used in this study. Such variations could have caused discrepancies in the data on the same variables as recorded in these different sources. As such, even though this study consolidated the data collected from these sources, it is possible that discrepancies in the variables' measurements could have affected the accuracy of the data I used.

Recommendations

Policy Recommendations

Because ICT management implementation polices were found to be strongly correlated with real GDP growth rate of the Arab league nations, it is recommended that managers and those who oversee implementation of ICT-related polices in these nations develop greater understanding and appreciation of various implementation initiatives. As was noted in the literature review, ICT education is believed to offer many benefits to the economic growth and development of the Arab League nations. As such, proper training on ICT-related matters and implementation of ICT-related policies will enhance the economic growth rates of the nations in this region.

Yunis et al. (2012) stated that training and proper implementation of ICT-related policies encourage proactive problem solving and accepting challenges, innovativeness, continuous improvement, and optimum use of economic resources. Yunis et al.'s findings were supported by this study. Thus, it is recommended that all the governments of the Arab League nations should embrace ICT management implementation policies to have a competitive advantage in the global economy.

Another recommendation regards management and implementation of ICT-related policies. In the literature review, I established that ICT has become an imperative

for economic growth and development of many nations around the world, including those in the Arab League (Wiseman & Anderson, 2012). In fact, Nefzaoui et al. (2012) attested that increased competition in the global market has allowed education policy makers from different nations to adopt ICT management in their education systems. Wiseman and Anderson (2012) also added that improved access to communication, information, and technology, among other aspects, is considered to boost the competitive advantage of individuals in the global market, because it facilitates social mobility and create a skilled labor force. As such, ICT implementation management policies have implications for the economic growth of a nation, making them something that the Arab League nations must adopt.

It is also recommended that the Arab League nations adopt maximum utilization of fossil fuel resources to ensure that they realize the highest production level of fossil fuel, as this will lead to an increase in their economic growth. I base this recommendation on the finding that fossil fuel production has both moderating and direct effects on the real GDP of the Arab League nations. The findings showed that when fossil fuel production was regressed on the real GDP growth rate of the Arab League nations as a moderating variable on the relationship between the real GDP growth and ICT management growth rate, there was a positive change in the level of R^2. This shows that fossil fuel production plays a significant role in fast-tracking economic growth of the Arab League nations, even for those which have adopted ICT management implementation policies.

Recommendations for Further Research

It is recommended that further research studies be conducted that focus on how Arab League nations can incorporate ICT management in their education systems to enhance economic growth. This recommendation has been fixed on the fact that the literature review has shown that incorporation of ICT management in education is considered to have a multiplier effect on the entire educational system of a given nation because enhances it learning and provides students with new sets of skills (Ortiz, Sosa, & Díaz, 2015). ICT education also has a significant effect in promoting the rate of implementation of ICT management policies (Neffati & Besbes, 2013).

The literature also showed that incorporation of ICT management in education enhances learning by reaching students or pupils who have no or poor access to good facilities, such as those who live in rural areas. Apart from that, it is also significant in enhancing learning by facilitating and improving the training of teachers and by minimizing the costs that may be associated with the delivery of instruction.

Further, “educators nowadays face a challenge to re-examine and give careful considerations on changes in pedagogy and accept new methods and techniques under the present conditions” (Toki & Pange, 2013). In addition to that, the finding of this study has also showed that ICT management has a significant positive effect on the economic growth rate of the Arab League nations. At the collective level, the studies of the Organization for Economic Co-operation and Development (OECD) indicated that the effectiveness of the educational system, in terms of the adequacy of training programs that meet economic needs, and the number of years people spend being educated, are positively related to a nation’s per capita income (Sellar & Lingard, 2013). These impacts are borne out at the same time in both developing and developed countries in which the

educational outputs are still very important (Sellar & Lingard, 2013). Therefore, incorporation of ICT management in the education systems of these nations will help in enhancing their economic growth. However, because neither the literature nor this study have suggested ways in which ICT management can be incorporated into the education system of the Arab League nations, future research projects should focus on this area.

Even though the results of this study have shown that there is a significant relationship between ICT management policies and the economic growth rate of the Arab league nations, one of its limitations is that it used a variety of sources of data, including the unesco.org, data.worldbank.org, itu.int, unstats.un.org databases. There could have been a variation in the way these different data sources validated their data, as well as the way they measured different variables that have been used in this study. Such differences could have caused discrepancies in the data on the same variables as recorded in these different sources. Thus, even though I consolidated the data collected from these sources, it is possible that discrepancies in the variables' measurements may have affected the accuracy of the data used. Therefore, it is recommended that further research be conducted to collect actual (primary) data from the relevant authorities of the Arab League nations to ascertain whether implementation of ICT management policies in these nations would lead to an increase in their economic growth rate.

The use of primary data will give such studies, on the effect of ICT management on economic growth, more validity than the secondary data that this study has used. Also, if such data are objectively collected from the relevant authorities, they will be more credible, and they will give a clearer picture of how the ICT policy implementations affect the economic growth rate of the Arab League nations. Because the results of this

study, which used secondary data, have shown that there is a positive significant effect of the implementation of ICT management policies on the economic growth of the Arab league nations, use of primary data would be useful in justifying or refuting this finding so that leaders of the Arab League nations can incorporate ICT into their education systems with the certainty that it will lead to an increase in their economic growth rate.

A study using primary data would also be useful, both at the quantitative and qualitative levels, in upholding or refuting the claims of different researchers who have shown that ICT management is a necessary tool that can facilitate information approval as well as a development tool that can help meet the essential needs of emerging economies, such as those in the Arab region. As such, analysis using primary data collected from the relevant authorities of the Arab League nations would give firsthand information regarding the effect of the implementation of ICT management policies on the economic growth rate of these nations.

The literature and the results of this study have both indicated that the Arab League nations that have higher rates of ICT management implementation policies, as well as higher levels of fossil fuel production, tend to have high real GDP growth, as compared to those that have lower rates of ICT management implementation policies and lower levels of fossil fuel production. In fact, Ion (2012) asserted that ICT management is important in creating more intelligent and interactive environments by offering myriad opportunities, including software that expedites communication by transferring video conferencing, learning, or access to networks; technologies that simplify people's social inclusion and functional independence; transferring knowledge between all interested parties; and promoting collaborative decision making.

However, this study and all the studies reviewed were limited to analytical strategies, which include exploratory, descriptive, and inferential analysis. Exploratory analysis, in this case, is a data analysis approach that analyzes datasets in terms of summarizing their main attributes or characteristics using visual methods (in most cases) to see what the data represent beyond hypothesis-testing tasks or formal modeling (Weiss, 2015). Descriptive analysis involves data analysis with the aim of describing and summarizing data to bring out meaning and patterns that come out of the data (Gravetter & Wallnau, 2016). The purpose of inferential analysis, in contrast, was to infer the thoughts of the population from the sample data in terms of making judgments on the chances of occurrence of observed differences between groups (Gravetter & Wallnau, 2016). As it can be seen, these studies never reviewed the existing ICT management policies in the Arab League nations and their relevance in enhancing economic growth. Therefore, it is recommended that future studies be designed to take a policy review approach, rather than simply using raw data, in justifying whether the existing ICT management policies in the Arab League nations can enhance their economic growth rates.

Implications

The findings of this study have implications for policy makers, managers, administrators, and leaders in other sectors that are people-oriented, results-driven and competence-based. Specifically, the study's findings of a significant positive relationship between ICT management implementation policies and real GDP growth rate of the Arab League nations have implications for the leaders and the policy makers who will be tasked with designing and implementing policies that can facilitate economic growth. By

reading this study, such policy makers will better understand the role of ICT management implementation policies on the real GDP growth of the Arab League nations.

Positive Social Change Implications

A positive social change generally implies a transformation that leads to positive outcomes (Freeman & Webb, 2017). A positive social change may also connote a process that occurs on a large or small scale (e.g., within one person, in small groups, or in an entire society) and at different rates of time (e.g., gradually, over time, or very quickly) and involves the development and execution of ideas and plans that support the value and dignity of others (Stephan, Patterson, Kelly, & Mair, 2016). The findings of this study have positive social change implications in that they can provide the leaders and policy makers of Arab League nations with a comparative assessment of alternative GDP revenue drivers and potential areas in which to invest capital.

At the individual level, this study has a positive social change implication in the sense that may enlighten readers regarding the importance of ICT management in training and development. The study's findings have shown that ICT management policies have a significant effect on the economic growth rate of the Arab League nations. Based on these findings, individuals will anticipate that their chances of getting employed in government agencies will be enhanced if they have ICT management training. At the organizational level, the study has social change implications for leaders in the sense that it gives them room to interpret how the issue of ICT management is consistent with their organizations' mission statements (Sonenshein, 2016). Foreign organizations that are operating in the Arab League nations may be required by their nations' governments to

incorporate ICT management policies in their operations because it is considered a very important driver of domestic economic growth.

At the policy/societal level, the findings of this study will be useful in informing leaders of Arab League nations of the importance of ICT in facilitating economic growth such that they can begin thinking of how to incorporate it into their educational and management systems. In fact, it is important to note that there is a need for technological transformation in the field of education, as e-learning has become a crucial aspect of the educational system (Singh, 2016). Because this study has shown that implementation of ICT management policies has a significant effect on the economic growth rate of the Arab League nations, it suggests that this study has a positive social change implication for these countries because it provides their leaders the opportunity to examine how they can use ICT management to increase their domestic economic performance.

Implications for the Corporate Management Leadership in Addressing ICT

Before recruiting an employee, corporate management leadership generally reviews the criteria of the job market regarding the skills required for a given task. Therefore, since the results of this study have shown that ICT management is useful in enhancing economic growth, the study's implication for corporate management leadership is that it will encourage leaders to revise their recruitment requirements to accommodate ICT management skills.

Based on the literature review, implementing a value-creating strategy can give a country a competitive edge in the global market (Neffati & Besbes, 2013). Neffati & Besbes (2013) also indicated that ICT education has a significant effect in promoting the rate of implementation of ICT management policies. Finally, Kanbar (2012) noted that it

is imperative to use a variety of teaching methodologies in classrooms to improve students' ability to learn about issues that revolve around sustainability. Kanbar argued that the progression to hybrid forms of teaching methodologies has called for teaching to be compatible with the principles and objectives of ESD. However, she recognized that lecturing is most efficient and appropriate when introducing a concept to a large group of students because it enables the students to get information that is not available elsewhere.

As such, this study has implications for the education sector, as it will be imperative for the leaders of Arab League nations to incorporate ICT education in their curriculum to ensure that large numbers of domestic students can get information regarding ICT management policies that will aid in building a skilled labor force through domestic competitiveness. This will ensure that rate of implementation of ICT management policies increases in the Arab League nations because many people will know how to take part in the process. This implication is based on the study's findings that ICT management policies have a significant effect in facilitating the real GDP growth rate of the Arab League nations. As such, if their implementations are fast-tracked, then the growth rates of these economies will significantly increase. This can be done by introducing ICT education in both the education and management curriculum and policies of these nations.

Methodological and Empirical Implications

The main methodological and empirical implication of this study lies in its deviation from what other researchers have generally done by introducing the moderating effect of fossil fuel production on the relationship between ICT management and the economic growth rate of Arab League nations. It is important to note that findings of this

study have generally supported the findings of the other related studies that there is a positive and significant relationship between ICT-involved management and the real GDP growth rate of the Arab League nations.

However, in this study, I departed from this pattern and went a step further to examine the moderating effect of fossil fuel production on the relationship that exists between ICT management implementation policies and real GDP growth rate of the Arab League nations. Previous researchers did not consider the effects of this variable (fossil fuel production) on the relationship between ICT management implementation policies and real GDP growth rate of the Arab League nations (Brown et al., 2011).

Therefore, by introducing a moderating variable, the empirical implication of this study is that it makes room for authors of previous studies to use their already compiled empirical data to test whether fossil fuel production will have a moderating effect on the relationship between ICT management implementation policies and real GDP growth rate of the Arab League nations. As such, it is recommended that designers of future studies take into consideration other moderating variables—other than fossil fuel production—which affect the relationship between ICT management and the economic growth of the Arab League nations. This is because having multiple drivers enriches the outcome of quantitative research (Grant et al., 2016).

The results of this study may also have implications for theory. There were certain theories that provided the foundation for this study such as resource-based theory, knowledge-based view, human-capital theory, and resource-dependence theory. Some of this study's findings were consistent with these theoretical underpinnings. The study's findings have inferences to resource-based theory and knowledge-based theory.

Resource-based theory focuses on the role the internal resources such as employees play in developing and maintaining a firm's competitive advantage. The knowledge-based view of the firm emphasizes the importance of the resources and the organizational capabilities that distinguish an organization from others (Ortiz et al., 2015). In this context, it can be argued that the rate of ICT management growth and the level of fossil fuel production are among the internal factors that give different Arab League nations a competitive advantage over other nations. In particular, the Arab League nations that have higher rates of ICT management implementation policies as well as higher levels of fossil fuel production tend to have higher real GDP growth rates as compared to those that have lower rates of ICT management implementation policies and lower levels of fossil fuel production.

Conclusions

The study was conducted in the general area of ICT management and real GDP growth rate of the Arab League nations. The major focus of this study was on the relationship between ICT management implementation policies and the real GDP growth rate of the Arab League nations and the moderating effect of fossil fuel production on such a relationship. The conceptual framework for the study was derived from the existing literature and empirical evidence. However, in this study, I departed from previous studies by introducing fossil fuel production as the moderating variable. Thus, I addressed the knowledge gaps in the existing body of knowledge and confirmed the contentions of the authors of related studies and the generalizations in the pertinent literature that there is a relationship between ICT and the real GDP growth rate of the Arab League nations.

The results of this study also revealed that fossil fuel production has both moderating and direct effects on the real GDP growth rate of the Arab League nations. In addition, it has been established that there is a significant difference in ICT management implementation policies between Arab League nations, as the countries with higher uptake of ICT tend to have higher implementation rates of ICT policies as compared to those countries with lower ICT uptake. I also showed that the rate of ICT management implementation policies has a significant effect on the real GDP of the Arab League nations.

This study is further grounded in the immediate need of identifying alternative sources of real GDP growth drivers to promote fossil fuel independence and embracing a more sustainable real GDP growth contributor in ICT management (Steven, 2017). Saudi Arabia crown prince Mohammed bin Salman unveiled a plan—*Vision 2030*—to become fossil-fuel independent by 2030. The plan involves the creation of new corporations, better education, fewer subsidies, and increased taxes (Steven, 2017). Based on these findings, I recommend that the Arab League nations develop ways of maximizing both fossil fuel production and ICT management policies, as this will lead to a immediate increment boost in their real GDP growth rates. Also, the non-oil-producing governments of the Arab League nations should give expedited attention to implementation of ICT management policies, as such policies alone have been found to have a significant effect on the real GDP growth rate of the Arab League nations.

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