

**Discovering Institutional Dynamics of
Entrepreneurial Business Environment Development
: Evidence from MENA's Oil-Richest Countries**

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ABSTRACT

Consideration of the MENA region illustrates that during the past years, oil production has resulted a socio-economic transition from old- to modern-style mode. In the meantime, entrepreneurial activity as a feature of economic growth being robust in the MENA region with more than one-half of its population under the age of 25 as a large motivated generation of young working people across the globe. Hence, the main objective of present study is prioritizing the institutional dynamics of entrepreneurial environment development in the most prosperous oil-richest MENA countries.

In order to achieve this objective, first, eleven oil-richest MENA countries: Algeria, Egypt, Iran, Iraq, Kuwait, Libya, Oman, Qatar, Saudi Arabia, Sudan, and the United Arab Emirates are clustered regarding their economic diversification and performance during 2010-2016 using K-means algorithm. In continue, for finding the crucial institutional dynamics of entrepreneurial business environment development, the target is tackled by developing a hierarchy system and analyzing the model using fuzzy extended analytic hierarchy process (FEAHP) in the most successful clustered countries with highest economic diversity and performance. Thus, a group of 108 informants has responded the FEAHP questionnaires for Qatar and the UAE.

Based on the findings, the discovered dynamics are diversity of economic activities, opportunities to start-up, entrepreneurial training programs, market openness, business education, women's support to start-up, technical and vocational education, venture capital, rules and regulations governing entrepreneurial activities, and commercial and services infrastructure.

The current fine-grained argument contributes on the oil-rich countries' entrepreneurship literature, which can be useful for policy and decision makers to strengthen the business environment of Qatar and the UAE, or similar economies, as well as countries that have further remaining development steps ahead to boost competitiveness and attract investment for achieving a robust private sector.

Keywords: Business environment, Economic diversification, Economic performance, K-means clustering algorithm, Entrepreneurial development, Institutional factors, Fuzzy extended analytic hierarchy process

ÖZ

MENA (Orta Doğu ve Kuzey Afrika) Bölgesinde petrol üretimi başladıktan sonra sosyal ve ekonomik değişiklikler ortaya çıktı ve Bölgedeki ülkeler eski yaşam tarzlarını daha modern şekle dönüştürdüler. Bu değişimde ekonomik büyümenin esas unsurlarından birisi olan girişimcilikte de, bölge ülkesinde yaşayanların yarısının 25 yaşın altında olması nedeniyle önemli gelişmeler kaydedildi. Araştırmanın amacı petrol zengini MENA ülkelerinde girişimcilik ikliminin gelişmesinde kurumsal dinamikleri ortaya çıkarmaktır. Bu amaca ulaşmak için, ilk olarak, en baştaki petrol zengini 11 MENA ülkesinde ekonomik çeşitlilik ve ekonomik uygulamalar k-means algoritma kullanılarak kümelendi. Bu ülkeler; Cezayir, Mısır, İran, Irak, Kuveyt, Libya, Oman, Katar, Sudi Arabistan, Sudan ve Birleşik Arap Emirlikleri olarak seçildi ve göstergeler 2010-2016 yıllarını kapsamaktadır.

Girişimcilik ikliminin gelişmesi için gereken kurumsal dinamikleri bulmak için hiyerarşik bir sistem geliştirildi ve model fuzzy extended analytic hierarchy process (FEAHP) kullanılarak analiz edildi. Sorular, ekonomik olarak en başarılı ve ekonomisi en çok çeşitlilik gösteren ülkelere yollandı. Katar ve Birleşik Arap Emirliklerinden 108 yanıt toplandı. Sonuçlara göre, işe başlamak için fırsatlar, girişimcilik geliştirme programları, pazarların dışa açıklığı, işletmecilik eğitimleri, kadınların işe-başlama destekleri, teknik ve hizmet-içi eğitimler, venture kapital, girişimcilikle ilgili kurallar ve ticaret ve hizmetler için altyapılar önemli kurumsal dinamikler olarak ortaya çıkıyor.

Bu sonuçlar Katar ve Birleşik Arap Emirliklerinde girişimcilik ortamını geliştirmek için politikacılara ve politika belirleyicilere ipuçları veriyor. Araştırma sonuçları, benzer ekonomilerde de, öze sektörü güçlendirmek, rekabetçiliği geliştirmek ve yatırımları cezbetmek için ne gibi önlemler alınabileceğini gösteriyor.

Anahtar Kelimeler: İş iklimi, ekonomik çeşitlilik, ekonomik gelişme, K-means kümelendirme logaritmiği, girişimciliği geliştirme, kurumsal faktörler, Fuzzy extended analytic hierarchy process

DEDICATION

I would like to dedicate this success to my soulmate, my wife, Nasim, one who stood beside me in all the difficulties

and said:

Don't be scared to fly high!

And to my beloved family for all the supports they have provided me over the years.

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Chapter 1

INTRODUCTION

1.1 Introduction

OIL producing and exporting have become one of the most important economic activities of many countries, since the invention of the piston engine. Over the past century, oil has been converted into a crucial economic resource around the world causing wars, struggles, fall of empires, change of governments, creating new states and the like. According to the study of Atabaki (2015, p. 91), “the contribution of oil capitalism to shaping the course of the First World War was very significant”.

After decades of oil resources exploitation, particularly following the 1973 oil boom, economic expansion is generally viewed as an opportunity for oil-rich countries to achieve an effective governance-operating model and outstanding changes. The oil revenues yield significant socio-economic underlying forces, which clues particular economic-policy challenges. Despite the vast resource wealth of many developing countries, most of them still struggle to sustain economic development and handle unemployment. Thus, entrepreneurship has emerged as the new growth engine, in light of burgeoning young population that need plenty of employment opportunity (Akitoby and Coorey, 2012; Ennis, 2018; Gadam, Kountchou, and Araar, 2018).

With recent decline in oil price, economic development will arise from miscellaneous sectors and it is essential that “The private sector takes over the momentum from the government. Entrepreneurship can play an important role in this” (Startup, 2016).

Private sector is the beating heart of economic life in a country. Without enterprises and entrepreneurs, there would not be creativity, productivity, and new jobs (The Gedi, 2018).

1.2 Significance of the Research

Forasmuch as, reliance on revenues from sales a narrow range of primary commodities like crude oil or natural gas jeopardizes an economy, so makes it vulnerable to market shocks. That is why the oil and gas-producers concern for what happens when reserves wane, particularly within the improper economic and political circumstances (Morakabati, Beavis, and Fletcher, 2014).

Based on the anterior studies, the long-term remedy of this worry is diverting from a single-sector toward a multi-sector economy to enthuse private sector. By achieving such a situation, if demand for one part’s production fades, upswing in the demand of other segments may compensate. Nowadays, diversification strategy may have been creating a competitive national image and conducive business climate through domestic infrastructure enhancement and legal structure amendment. The idea behind this solution is uncomplicated: To diversify of the non-oil sector, the people should be back into business activities like tourism and hospitality, trade, fashion, high-tech etc. (Van der Ploeg and Poelhekke 2009; Sokhanvar, Aghaei, and Aker, 2018).

Recently, business competitive environment is changed dramatically and possessing a natural advantage, may cause differentials in economic performance among nations.

Porter called “clusters”; pockets of unusual competitive success, which are a feature of nearly every national, regional, and metropolitan economy” (Lee and Carter, 2012, p. 68). Porter (2008) also posits that cluster is a geographically proximate group of entities in a specific field connected by commonalities and complementarities, which have influenced competitiveness inside and outside the clusters’ boundaries. In relation to governments, especially in developing countries, clustering, as an authentic tool for economic development, introduces a new thinking method, which can handle productivity and flexibility of business environment (Galluccio, Michel, Comon, and Hero, 2012; Lee and Carter, 2012). Thus, because today productivity is the main criterion of the economic competitiveness among countries, clusters are essential units for modern competition. “It is a case of ‘how’ you compete not ‘what’ field you compete in. All industries can use the latest technologies, but they cannot operate unless they have an environment which is conducive” (Lee and Carter, 2012, p. 69).

Plenty of the existing economic taxonomies are much simpler than they really are for capturing the specifications and diversity of markets. For instance, the World Bank categorizes economies according to their per capita income into three categories; low, middle, or high-income states. Another economic classification is created by the concept of natural resources assessment, which is called ‘natural evaluation of economies’. Botswana could be an example to this classification, which relies on country’s various natural resources like minerals, cattle, and tourism and the country has been moving forward swiftly. Hence, there is potential for rapid growth for oil-rich countries if the resources are managed properly (Lee and Carter, 2012, p. 54).

Hence, we are interested to investigate these important issues among the oil-richest nations of Middle East and North Africa (MENA) in this study. However, why the MENA region?

MENA is economically a diverse area, which is home to some of the richest and poorest countries in the globe. The size of oil and gas reserves is one of the key factors in determining the national wealth of the countries in this region (Nabli, 2004). According to Cooper and Yue (2008), 60% of the oil and approximately 45% of natural gas reserves of the world are owned by MENA countries. The amount of oil reserves in this region is estimated as 81,098 billion barrels (128,936 km³) and natural gas as 2,868,886 billion cubic feet (81,237.8 km³) (Malone, 2004). Regarding the findings of Andreano, Laureti, and Postiglione (2013), MENA region includes 26 countries, which are generally characterized as slow growth and highly volatile, economically. More than 400 million people living in these lands have similarities in history, ecology, culture and language. Another significant similarity of these countries is having political problems, which are mostly induced by external forces like revolutions, wars, conflicts, embargoes. In spite of these similarities, their economic and business environments exhibit tremendous differences (Mohamed and Sidiropoulos, 2010).

Moreover, consideration of the MENA region illustrates that during the past years, oil and gas production has resulted a socio-economic transition from old- to modern-style mode (Bener et al., 2009). In the meantime, entrepreneurial activity as a feature of economic growth being robust in the MENA region with more than one-half of its population under the age of 25 as a large motivated generation of young working people across the globe. The larger unemployment rate means more job seeker. For

this reason, the issue of self-employment has become a prevalent phenomenon in MENA countries (Hossain and Leo, 2009).

To take full advantage of their ready-made workforce, it requires having many job opportunities. Forming sufficient opportunities is a major challenge because its prerequisite is fostering an entrepreneurial environment. Albeit success rate in MENA varies from country to country, overall, almost 15 percent of the labor forces are tied up to entrepreneurial activities, further than in the US, Germany or Japan. Therefore, a healthy entrepreneurial environment will be crucial, especially for the oil-rich developing countries to use the revenue of their hydrocarbon sector to speed up the development process and improve the quality of employment (World Economic Forum, WEF, 2011).

1.3 Research Questions

The present research is designed to answer the following questions:

- Is it a curse or a blessing having petroleum resource in a country?
- Can oil production boost the country's economic performance?
- Additionally, according to Samuelson and Nordhaus (1998, p. 544), the question is how the nations must conglomerate “labor, resources, capital, and technology” in order to posture a conducive business environment?
- Why do some states do well in running quicker than others?
- How do rich and well-governed countries ever get started up the lane of development?

1.4 Aims and Objectives of the Research

Based on what has been described so far, this research follows two main parts to achieve the answers of the research questions. In the first part, which is called ‘Part

One (Clustering Analysis)' from now on, concerning to find out the most favorable business environments in the MENA region, eleven oil-richest MENA countries in alphabetical order; Algeria, Egypt, Iran, Iraq, Kuwait, Libya, Oman, Qatar, Saudi Arabia, Sudan, and the United Arab Emirates are clustered regarding economic diversification and performance using clustering analysis.

'Clustering Analysis' is utilized as a data mining tool, which is often employed for exploratory purposes and forming a taxonomy among the observations into two or more groups on the basis of objects variate comparison (Hair, Black, Babin, and Anderson, 2010). Thereby, clustering can be appropriated to apply in any research fields to alert new ideas and insights, and develop hypotheses related to make assumptions of some structures among objects (Schindler and Cooper, 2006; Malhotra, 2010). For this study, K-means clustering algorithm is chosen, which is characterized by flexibility and versatility that formal research protocols have not possessed (Wagner and Deller, 1998; Tran, 2011; Galluccio et al., 2012; Shuai, 2013).

In order to explain economic development, in addition to GDP growth, factors such as workforce employment, technological improvements, knowledge creation and life quality level could also be considered (Cypher and Dietz, 2009). As economy grows, demand for goods and services increases, and infrastructure improves. Amplified economic activity means more jobs and more income to spend on goods produced locally (Cateora, Gilly, and Graham, 2009). In addition, the General Secretary for Development Planning in Qatar uses the pursuit of economic diversification and stability, and job creation to upgrade the nation's economy and achieve higher economic development (Morakabati, Beavis, and Fletcher, 2014). Therefore, export

diversification, GDP per capita, and unemployment rate are chosen as variables of clustering analysis.

The creativity of this part of the study is developing a fundamental perspective by grouping oil-rich MENA countries based on the level of their economic developments for designing further conclusive researches. Final clusters reveal similarities and dissimilarities of business environments of these countries. Thus, for the next part of the study, instead of analyzing all of these countries individually, we can regard as members of their clusters and profile as a group with common characteristics. The exclusive procedure of this research can also be used as a framework for partitioning business environments with respect to the level of economic developments throughout of the world. Furthermore, the resulting clusters can display high homogeneity within grouped-countries and high heterogeneity between members of different groups. In this way, the researchers and scientists provide solutions for the development of oil-driven economies and proper management of natural resources using the similarities and dissimilarities of the nations.

In continue, based on what Aghaei, Sokhanvar, and Tümer (2016) gained, ‘innovation’ is a pivotal factor for development of private sector and accordingly the creation of a desirable entrepreneurial business environment, which reduces joblessness. The high unemployment rate, as a social threat, would turn into an opportunity for job seekers under the shadow of proper administration. They also described, government policies can develop economic situation, as much as they can improve soft or hard infrastructures, eliminate trade barriers along with executive inflexibilities and reasons of market failures.

Correspondingly, the findings of Alvarez et al. (2011) about entrepreneurial activities show that recently, the preferences of many people are creating a business rather than salaried outside organizations. For this reason, entrepreneurial activities were promoted by public administration to simplify new venture creation procedure, and by academics that their research support designing public policies.

Based on what has been expressed, in addition to various troubles, which exist in the process of self-employment for people as well as environmental conditions particularly in the oil-rich developing countries in MENA, the lack of entrepreneurship trends drew our attention to determine the most effective institutional dynamins of entrepreneurial development.

According to the research have been conducted until now, there are not adequate knowledge about effective formal and informal factors, which persuade governments for making a vigorous entrepreneurial climate especially in a developing society. At the business level, existing literature has acknowledged the impact of environmental conditions as significant as availability of information, finances, technical service and other types of tangible factors (Spencer and Gómez, 2004).

Interestingly, Shapero and Sokol (1982) stated, the manner of people in a society about making a decision for being an entrepreneur are considerably affected by attitudes, norms, beliefs, and principals of that culture. If majority of society's sights about entrepreneurship to be with distrust, entrepreneurship may not succeed. Motivation of entrepreneurs to creation a new firm is a foundation of communal support and desirable outlook of people to entrepreneurship.

Economic circumstances have also influence on the level of self-employment in a society. Economic growth is the cause of demand surge for goods and services. Therefore, the stability of macroeconomic environment is substantial for national business competitions for entrepreneurs (Global Entrepreneurship Monitor, GEM, 2016; Ennis, 2018).

In general, various approaches have been used to study the entrepreneurial phenomenon: psychological, economic, and sociological or institutional (Alvarez et al., 2011). In this study, we focus on the combination of environmental framework conditions with institutional concerning.

Indeed, for the second part of this study which is called ‘Part Two (FEAHP Analysis)’, based on the results of the clustering analysis, the target is achieved by developing a hierarchy system and analyzing the model using fuzzy extended analytical hierarchy (FEAHP) analysis to prioritize the institutional dynamics for entrepreneurial environment development in as the most favorable economies in MENA.

1.5 Contribution of Study

As previously mentioned, the present study includes two parts to achieve the objectives set. The first part of the study contributes to the literature about oil-rich countries’ business environment development by revealing a comprehensive view of economic diversification and performance across MENA region where the countries are clustered using K-means algorithm in four diverse partitions.

After conducting the clustering analysis in the first part, with identifying the hypercompetitive business environments of oil-rich MENA states, Qatar and the UAE, in the second part of this study, our findings lead to a number of significant

contributions on the literature about oil-rich countries' private sector growth. The outputs can be useful for policy and decision makers to reinforce the business environments of Qatar, the UAE, or countries in the similar situations, as well as less efficient countries that they need to boost competitiveness and attract investment for creating a vigorous and borderless global economy.

1.6 Structure of the Study

The rest of the study is organized as follows: Section 2 gives an overview of definitions and recent works on business environment, economic diversification, economic performance, entrepreneurial development, and the nature of institutions with an emphasis on empirical studies in MENA area. This research continues in this section with developing the evaluation hierarchy systems for assessing the institutional entrepreneurship development factors. Section 3, which is called research methodology, introduces the utilized data and variables, and the analysis procedures in both parts of the study. In Section 4, empirical results are revealed and discussed. We conclude the study by argument in theoretical contributions and draw further implications for research and public policy in Section 5.

Chapter 2

LITERATURE REVIEW

2.1 Previous Studies

2.1.1 Part One (Clustering Analysis)

Many analysts have conducted research on economic growth of oil-driven countries while some have underlined the importance of economic diversification (Gelb, 2011; Callen, Cherif, Hasanov, Hegazy, and Khandelwal, 2014). Callen et al. (2014, p. 5) in their analysis of the Gulf Cooperation Council (GCC) economies, revealed that these countries improved their economies substantially through diversification, and “further diversification is important; however, international experience shows that diversifying away from oil is very difficult”.

Ahmed (2015, p. 47) considered consequences of diversification strategy in UAE where businesses invested into different sectors than oil “to reduce its dependence on oil and encounter the instability in global oil prices”. As a result of implementing this policy, the UAE economy is improved substantially. UAE have diversified its economy mainly through development of the tourism sector, so much so that “in 2012 tourism accounted for 14% of UAE GDP and 31% of Dubai GDP alone” (Ahmed, 2015, p. 48). Shayah (2015) praised UAE in his analysis for its successful diversification policies, economic growth, stable political structure and higher standards of living in the country. At the same time, Shayah (2015, p. 735) explained, “Saudi Arabia is a good example of a poorly diversified economy. A very large part

of their income depends on the production and sale of oil to other countries, which means that their standards of living sometimes fluctuates wildly in correlation with the price of oil.” Based on the statistics, which are reported in Annual Bulletin of Organization of the Petroleum Exporting Countries (OPEC) in 2017, the oil and gas sector accounts for about 50 per cent of the gross domestic product, and about 85 percent of exports earnings in Saudi Arabia. Haouas and Heshmati (2013, p. 3) suggest that although “the UAE’s improved economic performance over the recent years as a result of positive steps taken to diversify its economy”, the economy of UAE is still vulnerable against external shocks and it has to activate and support private sector investments to overcome the potential external threats.

Likewise, Mohamed and Sidiropoulos (2010, p. 82) analyzed Gulf Cooperation Council (GCC) members and found out the most competitive Gulf countries are Qatar and the UAE because of their undertakings known as “business environment reforms, investment in infrastructures, and targeted diversification”. Gelb (2011, p. 5) examined the oil-rich countries and concluded “countries more likely to avoid the ‘resource curse’ are also better placed to diversify economies.”

Barro (1996) on the other hand, emphasized the importance of historical and cultural factors for economic performance and disclosed relation between French colonial heritage and macroeconomic stability. Bleaney (1996, p. 476) adds the idea of “policy-induced macroeconomic instability” as he selects government budget surplus, deviations from the real exchange rates, inflation rate, and the ratio of foreign debt to export revenues as determinants of economic instability. In most studies like Sirimaneetham and Temple (2009), GDP per capita and employment are the major indicators for economic performance.

Moreover, there are lots of research on the nature of the business environment and factors affecting it. According to Awadh and Izgorodin (2014), the business environment is a product of institutions, infrastructures, access to finance, innovation, entrepreneurship, human capital and market sophistication. Masteikiene and Venckuviene (2015) studied ‘the power and scope of globalization’ on the business environment in Baltic countries and explored that it is diminishing. Ward, Duray, Leong, and Sum (1995) have revealed strong relationships between environmental factors such as labour availability, competitive hostility, and competition strategy as determinants of the business environment.

Adeoye and Elegunde (2012, p. 194) analyzed the impact of business environment on the organizational performance in the food and beverage industries in Nigeria and showed that “the external business environment (political, economic, socio-cultural, technological) have impact on organizational performance (effectiveness, efficiency, increase in sales, achievement of corporate goals)” in the sector.

Like Barro (1996), Andreano et al. (2013, p. 681) identified other aspects which were comprised “a set of socio-economic, technological and governance factors” as the main components effecting long-term economic growth in MENA countries. In doing so, the authors have focused on longer-term effects of the variables compared to the time range in this analysis which covers the period of 2010-2016.

2.1.2 Part Two (FEAHP Analysis)

A growing field of study purposes to contextualize entrepreneurial phenomenon by probing how institutional frameworks vitalize or devitalize entrepreneurial environment. In the Ennis's valuable study (2018), Qatar and the UAE are defined as two important actors in the MENA during the recent 20 years. The constitution of Qatari and Emirati power was studied and the results disclosed how understanding the entrepreneurial power of them is essential to descriptions of their development, power, and regional and global ranking. The results also showed that how entrepreneurial strength in Qatar and the UAE has been facilitated by the chase of status, growth narratives, and effective branding tied with flexible autocratic governing. This research discovers “the puzzle of oil wealthy, rentier states exerting entrepreneurial power in regional and global affairs.”

Eijdenberg et al. (2019) have recently conducted an Entrepreneurship research to investigate the ways in culture, politics or economic institutions weakening or strengthening entrepreneurial activities using macro-level surveys and deductive designs in Tanzania. The analysis argues that entrepreneurial activities are not limited only by bureaucracy and arbitrary forces, capital accessibility, competition and customer demand, but also by language obstacles, negative media depictions, and gender inequality.

Cuberes, Priyanka, and Teignier (2019) endeavor to detect the determinants of entrepreneurship gender gaps through distinguishing in employership and in self-employment. Their results expose some remarkable differences within ex-communist and high-income nations.

Based on the paper was published by the staff of InfoDev/World Bank Group, Olafsen and Cook (2016), policies that stimulate growth of entrepreneurship and innovation should acknowledge the distinction between transformational and subsistence entrepreneurship and target their approaches accordingly. Moreover, nascent entrepreneurs that have the chance to observe other prosperous entrepreneurs have an advantage over other businesses.

Zhu, Kara, and Zhu (2019) have conducted a study to compare females' entrepreneurship in China and Vietnam by testing the inspirations, success factors and problems of creating women-owned firms. Female entrepreneurs are eager to make more money, gaining personal satisfaction and freedom in addition to take business ownership as a way to reduce work–family conflict. Businesswomen approve that good management abilities are necessary to reach their objectives. Furthermore, they share same challenges, like the lack of ability to hire and retain workforces, competition, economic development, and access to sources of finance.

Likewise, Hundera et al. (2019) considered that female entrepreneurs often encounter serious conflicts in allotting time and resources to the different roles required of them by their societies. This has been recognized as a potential barrier for women entrepreneurs' performance in sub-Saharan Africa. The outcomes demonstrate that the commonest handling strategies known are negotiation, committing to the entrepreneurial and social roles, looking for domestic and external support.

About considering the impact of social and cultural indicators toward entrepreneurship, Wach (2015) conducted a study, according to the data related to the Global Entrepreneurship Monitor's report on 2013. In the European Union,

entrepreneurial activity was inspected in 23 countries. The outcomes of the study show in innovation-oriented economies of European, the willingness of people to use entrepreneurial opportunities to launch a business, which leads to an increase in entrepreneurial activity, as a hypothesis was supported.

Kim and Li's (2014) research investigated that whether foreign direct investment (FDI) incentives entrepreneurship or not. The authors also consider because of socio-political conditions; the relationship differs across countries. They were analyzed dataset for 104 countries from 2000 to 2009 using a panel negative-binomial model. They declare entrepreneurial activity is an important level of firm establishment. As a conclusion, the positive benefits on firm formation are strongest in districts with weak institutional infrastructures and low educational procurement.

A research is also fulfilled by Hessels, Gelderen, and Thurik (2008) to consider the motivations for starting the own business and the level of social security of the country to explain prevalence of entrepreneurial aspirations. The cross-country analysis was performed on Global Entrepreneurship Monitor data for 29 countries in 2005. The outcomes illuminated the adverse influence of social security level on people's entrepreneurial intentions. Furthermore, the positive correlation was discovered from findings between the rise in motivation to achieve prosperity and entrepreneurial aspirations with regard to employment and export growth.

In the study of McMullen, Bagby, and Palich (2008), by applying institutional theory, they analyzed opportunity-motivated entrepreneurial activity (OME) and necessity-motivated entrepreneurial activity (NME) on 10 indicators of economic liberty and gross domestic product (GDP) per capita for 37 countries. The results depicted OME

and NME are correlated negatively to GDP and with labor freedom positively. Thus, governmental limitations of economic liberty have effect on entrepreneurship and the entrepreneur's intention for taking in entrepreneurial action.

2.2 Concepts and Definitions

2.2.1 Part One (Clustering Analysis)

2.2.1.1 Business Environment

As Cateora et al. (2009, p. 256) pointed out, “the level of business environment development roughly parallels the level of economic growth.” Because investors are very careful about in which market they invest before starting a business and they analyze economic situation of the markets in detail (Lee and Carter, 2012). A holistic business environmental analysis can be conducted in a number of ways, which include economic, political, cultural, social, and technological aspects. In the present study, the main focus is on the economic factor which is one of the most important features in a business decision. The economic development level also shows the market potential of the countries (Tran, 2011; Lee and Carter, 2012; Shuai, 2013; Cateora, Gilly, and Graham, 2013).

2.2.1.2 Economic Diversification

According to Morakabati et al. (2014), there is a strong association between economic diversification and development. Economic diversity is achieved when the country's income is generated from different sources that are not related to each other directly. A by-product of economic diversification is export diversification. To avoid instability, export diversity has been increased in the 60 percent of low- and middle-income countries during the past 30 years (Chandra, Boccardo, and Osorio, 2008). Generally, many developing countries are characterized by the lack of it. They have depended severely on the exports of primary commodities and minerals that are

heavily at risk with environmental changes. Saudi Arabia as the major exporter of oil is a good sample of low economic diversification (Shayah, 2015).

Although it may be assumed that economic growth of oil-rich nations depends on crude oil exports, the cases of Qatar and UAE display that export diversification initiatives can take place by economic and legal reforms (Cateora et al., 2009).

According to Ahmed (2015), investments in non-oil sectors are necessary to reduce the dependency on the oil sector while economic diversification is a fundamental strategy for creating sustainable business environment. In addition to promote the economic development, it is also significant for decreasing the level of risk. As economic diversification improves, countries' production and the quality of these goods and services produced by the country increases to meet foreign expectations and preferences (Izquierdo, Jacques, and Olarreaga, 2003; Lejárraga and Walkenhorst, 2007).

2.2.1.3 Economic Performance

Economic Performance is one of the most important foundations of business environment development. As stated by many studies, economic performance is always affected by the level and direction of macroeconomic variables (Kyereboah-Coleman and Agyire-Tettey, 2008; Sirimaneetham and Temple, 2009). There are various indicators to consider economic performance like GDP per capita, GDP growth, demographics and employment volume of investments, the flow of international trade, government finance, volume, depth and stability of capital markets, and price level (Ghosh and Ostry, 1994; Cypher and Dietz, 2009; Awadh and Izgorodin, 2014). GDP per capita and unemployment rate are selected in this study to measure economic performance of the sample countries.

2.2.2 Part Two (FEAHP Analysis)

2.2.2.1 Entrepreneurial Development and Business Environment

Reviewing what has been discussed attests the importance of entrepreneurship as a bold booster of an economy. As specialists argued, 'Entrepreneurship' is a renowned force to strength the private sector and create value from an opportunity (Spencer and Gómez, 2004). In confrontation with the lack of certainty, entrepreneurs engage opportunities instead resources, and their ability and keeness to use in the market by their entrepreneurial activities. Their efforts as seedbeds for future growth, intensify competition, efficiency and productivity, economic flexibility and adaptation, job creation, and supply chain development, in addition to inspire those who would follow in their footsteps. Indeed, once start-ups mature to small and medium-sized enterprises (SMEs), they turn into important contributors to employment and gross domestic product (GDP) (Thurik and Wennekers, 2004).

Gnyawali and Fogel (1994, p. 50) disclosed, “The greater the percentage of small firms in growing sectors, the greater the share of jobs created by small firms in the industries operating in those sectors.” They also stated, “Firms are more likely to grow if they are in highly innovative industries than if they are in less-innovative industries.”

Entrepreneurship is broadly known as an indispensable driver of private sector expansion, which can have substantial impact on reducing unemployment. On the other hand, a critical foundation of social and economic evolution is a vibrant private sector, which in turn requires a competitive business environment (Alvarez et al., 2011; Jaoui, and Rashid, 2015).

In accordance to what Gnyawali and Fogel (1994) pointed out, scholars agree that competitive business environments increase the likelihood of entrepreneurship growth. The favorable environment is whereas the social milieu values entrepreneurship and many opportunities are provided for entrepreneurs with adequate knowledge and expertise. It will further likely inspire competent people to establish their businesses. Framing a prosperous business environment is far more vital in the case of small-scale enterprises may have little control over the situation, and resources and political clout deficiency that generally are required to effect on enterprise's growth.

2.2.2.2 The Nature of Institutions

A review of literature on institutional theory in economics, sociology, and political science discloses various definitions of institutions. Eventually, North (1990, p. 3) widely developed the concept of 'institution' by 'Institutional Theory' as "institutions are the rules of the game in a society", or further formally, "institutions are the constraints that shape human interaction."

North's theory signalizes the quality of these institutions can shrink transaction costs, and convert economic activities further predictable. North clarifies that the viability and productivity of businesses depend on the prevailing institutional factors. North introduced a typology of institutions by applying this theory in the context of entrepreneurship to clarify how institutions affect economic and social progress, namely formal and informal institutions (Roxas et al., 2007). Informal institutions are produced internally while formal institutions are imposed externally onto the community (Mantzavinos et al., 2004).

Confirming to sociological and institutional theory, environment has undeniable impress to create thriving businesses. It is not only about public policies or legal and

administrative framework for governing the country, but also pertains to the local communities, societies and culture to grow public system to encourage entrepreneurs (Alvarez et al., 2011).

a) Formal Institutions

Formal institutions include written political and economic constitutions, contracts, laws, legal framework, and financial system (North, 2005; Roxas et al., 2007). In this study, formal institutions are categorized in consonance with the framework of Gnyawali and Fogel (1994) and Alvarez et al. (2011) as follows:

- **Government policies and programs**

With the assistance of a highly competent direct programs and policies at all levels of government (national, regional, municipal), market mechanism can get rid of imperfections and administrative inflexibilities. Government policies and programs facilitate taxes and rules, and encourage new businesses.

- **Financial support**

Ease of access to financial resources, equity and debt embracing grants and subsidies are inevitability required for entrepreneurs. Currently, most of developing countries and emerging markets suffer from lack of venture capital firms, commercial banks and other financing sources.

- **Non-financial support**

Along with financial assistance, support services absolutely boost entrepreneurship that is aid in studying market, making business plan, and receiving loan. Ergo, business incubators offer needed facilities to start-up entrepreneurs such as office space, fast communication, and advisory services at low or without a charge. Incubators can be

so worthy wherever deprived of well-enhanced infrastructure or modern physical amenities.

b) Informal Institutions

On the other hand, informal or consensus institutions as mechanisms to ride in tandem with formal institutions helping as tools in order to extend, elaborate, and modify of formal regulations, socially sanctioned norms and values, and standards through organizing frequent humans' interactions based on the society's culture (North, 2005; Hodgson, 2006). Generally, informal institutions can affect the social acceptability of entrepreneurship and specify the people's perceptions of entrepreneurial opportunities (Alvarez et al., 2011). In this study, informal institutions are categorized according to the framework of Gnyawali and Fogel (1994) and Alvarez et al. (2011) as follows:

- **Entrepreneurial and business skills**

Due to the lack of adequate entrepreneurship and business skills in developing countries such as preparing business plan, decision-making, negotiation, pricing, marketing, organization and administration, human resources management, accounting, etc., training and educational services are mainly significant for entrepreneurs. According to the literature, prosperous entrepreneurs were grown under the proper vocational and short-term training systems at all levels (Management Systems International, 1990).

- **Socioeconomic conditions**

Entrepreneurship may not succeed while it does not exist a 'favorable social image' and a 'widespread public support'. Indeed, social conditions might be as important as finance, technical support, physical infrastructure, and communication facilities. On the other side, economic factors also affect the rate of new ventures formation and

progression such as proportion of small businesses out of total number of businesses, in addition to economic growth, performance, and diversity.

Indisputability, efficacious models of entrepreneurship role along with local communities in a society can promote entrepreneurial environment and inspire the potential entrepreneurs. Contrariwise, undesirable public approach towards entrepreneurs tied with the lack of entrepreneurial role models may demoralize entrepreneurs to start their own businesses (Mokry, 1988).

2.2.2.3 Developing the Evaluation Hierarchy Systems

The final purpose of current research is to recognize the most important dynamics of entrepreneurial development in the most favorable business environment of oil-rich MENA countries, using fuzzy AHP method. The first step of the AHP assessment needs creating a hierarchical model for decomposing a complex problem into several elements in some levels (Lee, 2014).

With reference to Saaty (1980), if there are more than seven items in the same group of elements, it is so perplexing for respondents to do pairwise comparisons. Hence, the concept of the rank order scaling technique is applied among 24 professionals to make a consensus of thoughts and extract the most valid elements of entrepreneurship growth model (Lee et al., 2009). Under this process and based on the empirically studied or mentioned in the existing literature, 27 sub-factors with higher scores so-called 'entrepreneurial business environment dynamics' were identified and integrated under a list of 2 dimensions: formal and informal institutions, and 5 factors: government policies and programs, non-financial support, financial support, entrepreneurial and business skills, and socioeconomic conditions. The extracted criteria are organized in a hierarchy system as illustrated in Figure 1 as follows:

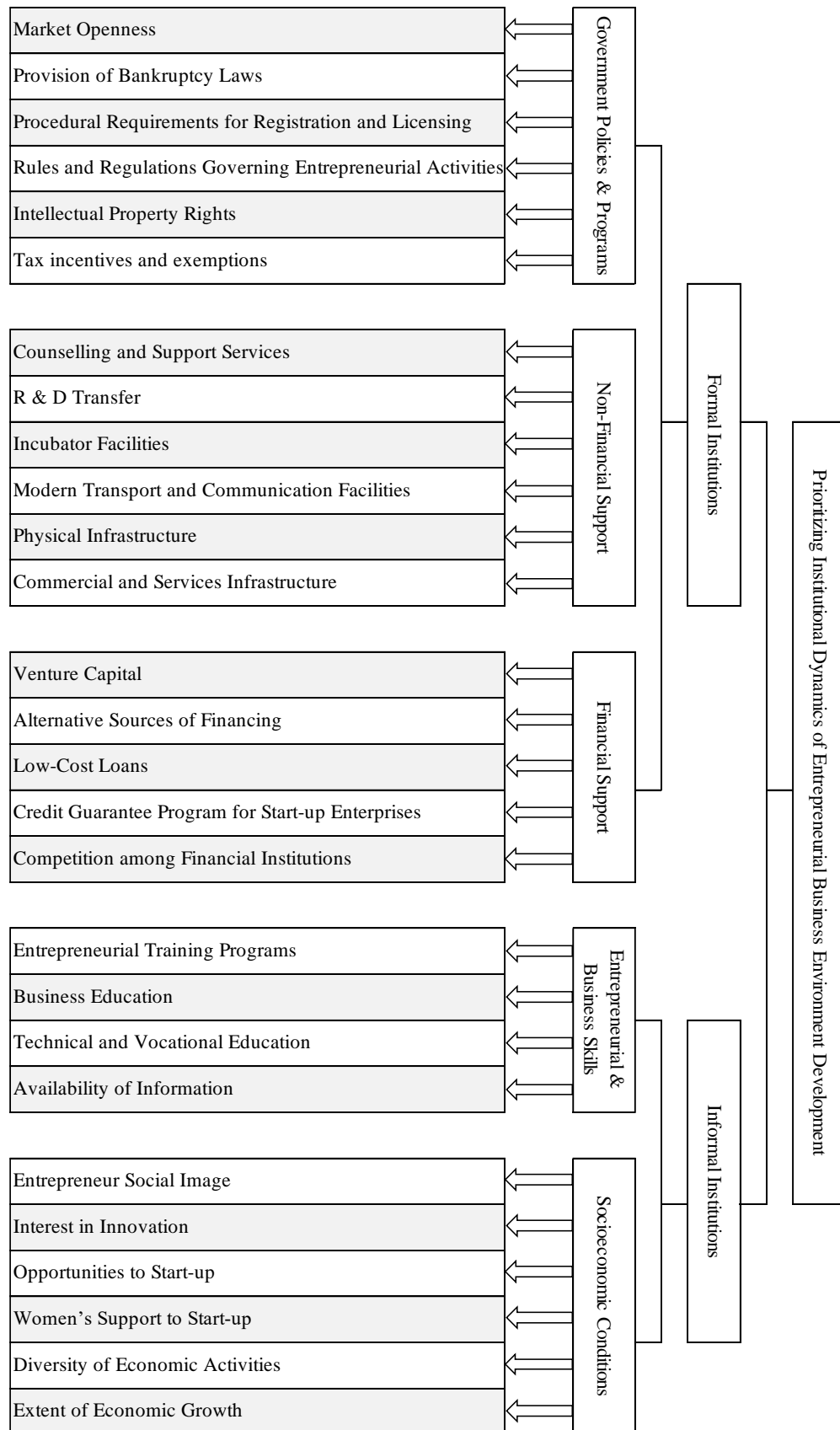


Figure 1: The Hierarchical Model for Prioritizing Institutional Dynamics of Entrepreneurial Business Environment Development (Gnyawali and Fogel, 1994; Alvarez et al., 2011)

Chapter 3

RESEARCH METHODOLOGY

3.1 Data and Variables

3.1.1 Part One (Clustering Analysis)

As described formerly, the MENA has been an attractive region for studying since 1970, because these countries are distinct regarding to economic history, political regimes and evolution configurations, and their demographic, religious and socio-cultural circumstances are almost similar to each other. This part of the globe has been host of several oil producers and exporters (Mohamed and Sidiropoulos, 2010; Awadh and Izgorodin, 2014; Arasli, Teimouri, Kiliç, and Aghaei, 2017). For the current study, the sample was selected according to data availability of oil-richest countries in the MENA region. The database is constructed with the time span ranging from 2010 to 2016 annually and comprises 11 countries in MENA: Algeria, Egypt, Iran, Iraq, Kuwait, Libya, Oman, Qatar, Saudi Arabia, Sudan, and United Arab Emirates (UAE).

To measure export diversification and crude oil exports dependency (COED), the ratio of crude oil exports to total exports are calculated. It is assumed that a higher ratio implies lower export diversification. Unemployment rate (UNEMP) and GDP per capita (GDPPC) are selected as economic performance indicators during desired time horizon.

The data for GDP per capita (constant 2010 US\$), unemployment rate (% of total labor force), and exports of goods and services (% of GDP) are obtained from the data repository of World Bank for each of the sample countries. The data for Crude oil exports (% of GDP) are drawn from the Annual Statistical Bulletin of OPEC published in 2017. Likewise, some missing values are acquired from International Monetary Fund (IMF) and Federal Reserve Economic Data (FRED) data banks.

Regarding to the defined objective and chosen variables, some important issues must be considered before operating the partitioning procedures like, adequacy of sample size, outliers' detection, and considering whether the data should be standardized or not (Hair et al., 2010). The sample size sufficiency should be controlled by researcher with respect to the group sizes, which is essential for the research target being inquired. They should endeavor to form greater samples because small groups will be represented by enough cases more easily. The size of existing dataset is making use of 231 records seem appropriately large for a valid K-means clustering analysis. Although oil-rich nations in MENA are limited in number with available dataset, a versatile and flexible clustering method like K-means is able to create accurate groups (Hair et al., 2010).

In data preparation step, because of the sensitivity of clustering algorithm to enter extreme values of objects, a few outliers were found. Therefore, instead of withdrawing the country entirely, a representative of central propensity for each partition is applied. For this reason, because the mean value is affected by outliers, the median value of each dependent variable is substituted which splits the distribution in half numerically and is not affected by extreme values.

Finally, the last concern of sample selection is the necessity of standardization. Because there are various units for variables, through the most common form of standardization known as Z-score, all records are converted through the value of sampling error dividing by the value of standard error, with a mean and standard deviation equal 0 and 1 respectively, to eliminate bias and create a normal distribution approximately (Groebner, Shannon, Fry, and Smith, 2011).

3.1.2 Part Two (FEAHP Analysis)

In order to conduct the second part of the analysis, we are going to engage the major findings of the first part of the study, which was published as an article by Aker and Aghaei's (2019). Because their final results unveiled high similarities of clustered-countries based on their business environments and economic capabilities, in purpose of conducting a research, instead of considering all of those countries individually, we can investigate as members of a unit group with the most similar features. Thus, in this part of the study, the population of interest is cluster DP11, which is composed of two countries with the highest economic diversification (least crude oil exports dependency) and economic performance, Qatar and the UAE.

For this purpose, data was being collected by utilizing a fuzzy AHP questionnaire during the last quarter of 2018. Steps were taken to ensure that the selected informants. This has given us confidence about the validity of the proposed research framework.

The respondents were personally contacted and invited to participate in this study by completing the questionnaires. Quota sampling method was employed which is a non-probabilistic version of stratified sampling in terms of gender and age, level of familiarity with the subject in Qatar and the UAE, to reduce bias, and pick a wide range of potential respondents (Roy, Pattnaik, and Mall, 2017; Tofan and Breesam, 2018).

All participants were guaranteed about confidentiality and anonymity before they decided to contribute (Lee et al., 2009; Arasli et al., 2017). This study removed some missing data to decrease common method biases (Teimouri et al., 2018). The questionnaire was translated from English into Arabic for use in this study. The elements of the model were later back translated and tested to perceive if the original and the back translated versions were alike in respect of meaning (Brislin, 1986).

As published by Cheng and Li (2001), small sample size is not awkward in the AHP methodology. The AHP is a 'subjective method' that does not necessitate a large quantity of participants. The opinions of a small set of professionals composed of managers and business owners, in addition to eminent students, educators, and scholars had adequate experience and knowledge in the research subject, are generally satisfactory to generate reliable and useful outcomes (Lee, 2014). Therefore, out of 120 questionnaires, which were distributed to collect pairwise comparisons data, 108 received responses yielding a return rate about 90%.

3.2 Data Analysis Procedure

3.2.1 Part One (Clustering Analysis)

Considering the fast growing repository of data in various fields, appropriate knowledge-discovery methodologies could be utilized to extract advantageous hidden information and facilitate decision making significantly (Ahmad and Dey, 2007). In this context, clustering is one of the most capable data mining methods in a variety of scientific grounds such as marketing, economics, and so forth, which is implemented in splitting a dataset to homogenous categories; called clusters (Cheung, 2003; Ahmad and Dey, 2007; Yedla, Pathakota, and Srinivasa, 2010). A cluster contains similar

objects' assortment, which are dissimilar to members of other clusters (Yedla et al., 2010).

Unsupervised clustering methods include hierarchical and partition procedures. Partitioning method categorizes a set of data in a solo phase, which places objects into desired number of categories (Dunham, 2006). The K-means (KM) method or Generalized Lloyd's Algorithm (GLA), which was expanded by Mc Queen in 1967, is the prevalent method of partitioning because of its ability to group giant dataset swiftly and efficiently (Žalik, 2008; Lai and Huang, 2010; Yedla et al., 2010; Galluccio et al., 2012; Jiang, Lin, and Davis, 2012).

In the K-means algorithm, number of clusters, K , should be predefined (Joseph, Jeberson, and Jeberson, 2010; Galluccio et al., 2012). Afterward, clusters can be created by devoting N objects O_1, O_2, \dots, O_N to K partitions such that a membership O_i belongs to the j^{th} group without overlapping (Cheung, 2003; Žalik, 2008; Zhang and Xia, 2009).

The KM determines the squared distances for measuring dissimilarity between the input data points and cluster centers or centroids, which are user-specified parameters (Xiong, Wu, and Chen, 2009; Yedla et al., 2010).

Euclidean distance is often applied for calculating distances between couples of data points $X = (x_1, x_2, x_3 \dots x_m)$ and $Y = (y_1, y_2, y_3 \dots y_m)$ by following Equation 3.1 (Yedla et al., 2010):

$$d(X, Y) = \sqrt{(x_1 - y_1)^2 + (x_2 - y_2)^2 + \dots + (x_m - y_m)^2} \quad (3.1)$$

Subsequently, each element is assigned into a cluster with the closest center (Yuan, Meng, Zhang, and Dong, 2004; Žalik, 2008; Nazeer and Sebastian, 2009; Galluccio et al., 2012). The indicator function, $I(j | \mathbf{O}_t) = 1$ holds with:

$$I(j|\mathbf{O}_t) \begin{cases} 1 & \text{if } j = \operatorname{argmin}_{1 \leq r \leq k} \|\mathbf{O}_t - \mathbf{m}_r\|^2; \\ 0 & \text{otherwise.} \end{cases} \quad (3.2)$$

where $\mathbf{m}_1, \mathbf{m}_2, \dots, \mathbf{m}_k$, are an initial centroids values called seed-points.

After nomination of initial centroids wherein they are selected randomly, a cluster will be formed over a set of points, which belonged to the nearest centroid. Later, the centroids should be updated by taking the average of the data in each cluster. Some objects may transfer from a cluster to another one (Xiong et al., 2009; Joseph et al., 2010). The adaptive centroids of every single cluster can be learned through the following:

Stage 1. Pre-identifying number of clusters (K) and initializing the seed points

$$\{\mathbf{m}_j\}_{j=1}^k \text{ randomly.}$$

Stage 2. Computing assigning indicator, I , for each object (\mathbf{O}_t) thru equation (3.2).

Stage 3. Only update the successful seed points (\mathbf{m}_w), $I(w | \mathbf{O}_t) = 1$, as below:

$$\mathbf{m}_w^{\text{new}} = \mathbf{m}_w^{\text{old}} + \eta(\mathbf{O}_t - \mathbf{m}_w^{\text{old}}), \quad (3.3)$$

where η is a small positive learning rate.

Eventually, the step 2 and 3 are implemented for partitioning phase iteratively and new clusters centroids are updated until either objects don't change clusters or centroids remain steady (Cheung, 2003; Žalik, 2008; Xiong et al., 2009; Joseph et al., 2010; Lai and Huang, 2010). Therefore, the complexity of K-means technique in addition to the size of dataset depends on the number of clusters and iterations (Yedla et al., 2010).

3.2.1.1 Number of Clusters, K

As mentioned before, to perform K-means algorithm, the number of clusters, K , should be chosen in advance arbitrarily. It is important to remember that the KM has intense sensitivity to initialization, which causes the outcomes' quality (Yedla et al., 2010; Galluccio et al., 2012). The final destination of clustering is breakdown the dataset into the groups based on the highly significant differences between them. One of the appropriate statistical technique to assess whether objects are clustered to three or more distinct groups properly, is the single factor analysis of variance (One-way ANOVA). Here, the cluster's membership is the factor for detecting dissimilarity between objects. Further detected significant differences between pairs of partitions is considered as the herald of suitability of the number of clusters, K (Bradley, 2007; Morakabati et al., 2014).

3.2.1.2 Clustering Results Validation

K-means algorithm forms almost 'spherical clusters' inherently. Indeed, applying KM method will create an important question about the reflection of partitioning quality, which is whether clusters reflect an actual structure or objects only partitioned into artificial clusters (Rousseeuw, 1987).

Knowledge in the field of clustering has hitherto offered a variety of very functional quantitative validating measures to assess the quality of explored patterns. The specific aptitudes of each criterion in particular problems make them outperform others (Vendramin, Campello, and Hruschka, 2010). In quest of attaining highly dense and separated partitions using KM clustering method, the Silhouette Width Criterion (SWC) is appropriate whilst proximities are measured by Euclidian distance (Rousseeuw, 1987).

3.2.1.3 Silhouette Width Criterion (SWC)

For evaluating the quality of formed-clusters, SWC is employed which was proposed by Rousseeuw (1987) as a well-known indicator, based on geometrical comparison of cohesion and separation to measure how close an object in a cluster is to another object in neighboring groups (Vendramin et al., 2010). In doing so, by a so-called Silhouette for each group, it can be displayed “which objects lie well within their cluster, and which ones are merely somewhere in between clusters” (Rousseeuw, 1987, p. 57). Based on the study of Rousseeuw (1987) validation criteria for partitioning can be determined by the average of silhouettes, which confirms propriety of the number of clusters, K .

Concerning to define SWC criterion for created clusters to confirm that a member of the dataset (O_t) belongs to the partition $j \in \{1, \dots, k\}$, a certain amount of $S(t)$ should be determined (Vendramin et al., 2010).

Based on the Rousseeuw’s findings, in the case of dissimilarities between more than one clusters, the silhouette weight of the individual object (O_t) can be computed by the formula as shown below:

$$S_{O_t} = \frac{b_{j,t} - a_{j,t}}{\max\{a_{j,t}, b_{j,t}\}} \quad (3.4)$$

where,

$a_{j,t}$ = average distance of O_t to all other members within cluster j ;

$d_{l,t}$ = average distance of O_t to all members within another cluster l , $l \neq j$;

$b_{j,t}$ = minimum $d_{l,t}$ computed by $l = 2, \dots, k$, $l \neq j$, which denotes the average dissimilarity of O_t to the nearest adjacent cluster;

Moreover, the denominator of formula 3.4 represents a normalization term. The higher number of S_{o_t} implies the finer allotment O_t into cluster j . Finally, based on what was expressed, SWC can determine as the mean of S_{o_t} over $t = 1, 2, \dots, N$ (see Equation 3.5).

$$SWC = \frac{1}{N} \sum_{j=1}^N S_{o_t} \quad (3.5)$$

The obtained value of SWC are between -1 (poor quality) and +1 (good quality), hence, the more proper SWC can be obtained when between-group distance ($b_{j,t}$) and within-group distance ($a_{j,t}$) is maximized and minimized respectively (Rousseeuw and Kaufman, 1990; Vendramin et al., 2010).

3.2.2 Part Two (FEAHP Analysis)

The fuzzy extension of Saaty's priority theory has been employed by many researchers to solve different kinds of problems. The main theme of these methods is to use fuzzy theory and hierarchical structure analysis to offer a systematic process of choosing and justifying criteria (Chang, 1996; Bozbura, Beskese, and Kahraman, 2007).

Chang (1992) first introduced FEAHP. In this algorithm, for determining the priorities of decision factors, triangular fuzzy numbers are utilized along the extent analysis method for computing the synthetic extent value of the pairwise comparison. Using FEAHP, the fuzziness of the data related to deciding the preferences of various decision factors can be handled (Lee et al., 2009).

3.2.2.1 Analytic Hierarchy Process (AHP)

Saaty (1980) developed a systematic problem-solving procedure for transfiguring a complicated multi criteria decision-making (MCDM) to an understandable and resolvable hierarchy system consists of elements in different levels. Because of its

well-known advantages, this technique has been extensively employed to solve intricate real-world and management decision-making problems (Saaty, 2000; Lee, 2010; Zheng et al., 2010; Lee, 2014; Tümer, Aghaei, and Lasisi, 2019).

For prioritizing elements in a hierarchy, pairwise judgments of elements are made by relative importance in each level and the values are assigned to represent the judgments. Due to the crisp judgments, the conventional AHP has some bugs, which leads to the experiences and judgments of humans are not well-defined (Lee, 2014). Because the assessment factors are based on personal attitudes intrinsically, it is difficult for respondents and decision makers to indicate preferences via exact numerical values and provide precise judgments (Chan and Kumar, 2007; Zheng et al., 2010). This traditional AHP approach gives reasonably good approximation only when the decision-maker's preferences are consistent. AHP is futile when engaged to vague problem. To prevail over this imperfection and resolving uncertainty, fuzzy logic could be integrated with the usual pair-wise comparison, as an AHP extension (Lee et al., 2009).

Reasons hitherto explained, fuzzy extended analytic hierarchy process (FEAHP) is utilized to prioritize criteria of each level of the model. In addition to the steps of FEAHP method are relatively more reliable, less time taking, and less computational expense than many other fuzzy AHP approaches, it can better cover the weaknesses of the conventional AHP method (Chang, 1996). This approach not only can effectively lever the innate ambiguity and imprecision of the human decision making process, but also can provide the robustness and flexibility desired for the decision makers to realize the decision problems (Chan and Kumar, 2007). Universally, the fuzzy AHP

methodology in comparison with conventional AHP, gives a more precise portrait of the decision-making procedure (Lee, 2010).

3.2.2.2 Fuzzy Logic Set Theory

Lotfi Zadeh (1965) had introduced the ‘Fuzzy Set Theory’ as an extension and gross oversimplification of the classical concept of set. Since its introduction, Fuzzy Set Theory has been engaged in the miscellaneous grounds (Lee, 2010; Zheng et al., 2010).

In the classical approach, membership of components in a set is considered in binary terms qua a component either belongs or does not belong to the set, however, fuzzy logic is an approach of considering based on ‘degrees of truth’ rather than the usual ‘true (1)’ or ‘false (0)’. In other words, fuzzy set is a set whose components have degrees of membership (Sun, 2010).

Fuzzy Set Theory was developed to deal with the uncertainty (fuzziness) of human decision-making, which consequently causes to generate misleading results (Lee et al., 2009). “It has proven advantages within uncertainty, vagueness, provides formalized tools for dealing with the imprecision intrinsic to many problems, and it can effectively handle both qualitative and quantitative data in the multi-attribute problems” (Zheng et al., 2010, p. 79).

The fuzzy set theory resembles human reasoning in approximation within uncertainty circumstances to make decisions. It utilizes grouping of data with boundaries that are not sharply identified (Chan and Kumar, 2007).

3.2.2.3 Triangular Fuzzy Number

A fuzzy number $\tilde{M} = \{(x, \mu_{\tilde{M}}(x)) | x \in X\}$ is a fuzzy subset of real numbers with ordered pairs, in the universe of information X whose membership function is

$\mu_{\tilde{M}}(x): R \rightarrow (0,1)$. In sum, fuzzy numbers are divided into two main groups: trapezoidal and triangular fuzzy numbers. Triangular fuzzy number with intuitive application is broadly exploited membership function in various fields because of its computational efficacy. It is a normal and convex fuzzy subset of X and symbolized by $\tilde{M} = (l, m, u)$, which is the sort of elements $\{x \in R | l < x < u\}$ has the following membership function, which is also represented in Figure 2 and Equation 3.6 (Chang, 1996; Lee et al., 2009; Lee, 2010):

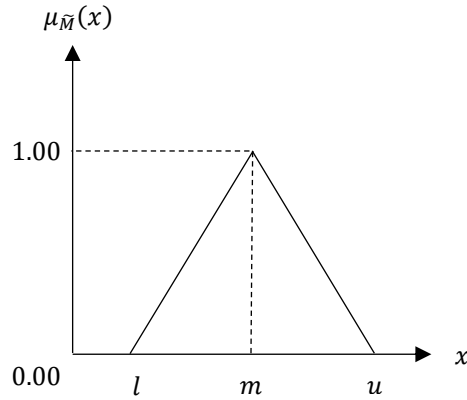


Figure 2: A Triangular Fuzzy Number, $\tilde{M} = (l, m, u)$

$$\mu_{\tilde{M}}(x) = \begin{cases} (x - l)/(m - l), & x \in [l, m], \\ (x - u)/(m - u), & x \in [m, u], \\ 0, & \text{otherwise.} \end{cases} \quad (3.6)$$

At when $l = m = u$, it is conventionally become a non-fuzzy set. When $l \leq m \leq u$, the l and u represent respectively the lower and upper bound of the triangular fuzzy number of M , and parameter m as the strongest grade of membership, provides the maximal grade of $\mu_{\tilde{M}}(x)$ (Chang, 1996; Lee, 2010).

3.2.2.4 Standard Fuzzy Operator

Considering two triangular fuzzy numbers $M_1 = (l_1, m_1, u_1)$ and $M_2 = (l_2, m_2, u_2)$, their operational laws are as following Equations 3.7, 3.8, 3.9, and 3.10 (Chang, 1996):

- $(l_1, m_1, u_1) \oplus (l_2, m_2, u_2) = (l_1 + l_2, m_1 + m_2, u_1 + u_2).$ (3.7)

- $(l_1, m_1, u_1) \otimes (l_2, m_2, u_2) \approx (l_1 l_2, m_1 m_2, u_1 u_2).$ (3.8)

- $(\lambda, \lambda, \lambda) \otimes (l_1, m_1, u_1) = (\lambda l_1, \lambda m_1, \lambda u_1), \lambda > 0, \lambda \in R.$ (3.9)

- $(l_1, m_1, u_1)^{-1} \approx (1/u_1, 1/m_1, 1/l_1).$ (3.10)

3.2.2.5 Linguistic Variables and Questionnaire Development

This study develops a fuzzy AHP questionnaire consisting of two parts. The first part collects demographic information. The second part contains items to assess the relative importance of 2 dimensions, 5 factors, and 27 sub-factors of the model influencing entrepreneurial business environment development. Like conventional AHP, the pair comparisons are made by the most widely used nine-point scale in order to generate relative importance weights (Saaty, 1990; Erdem, 2016).

As formerly mentioned, in many circumstances, because of either decision-factors are numerically immeasurable or uncertainties connected, scholars find it inflexible to assign numerical value, thus, a linguistic variable can be utilized. Based on Zadeh's (1975) study, linguistic variable as "a variable whose values are words or sentences in a natural or artificial language" plays a significant role in the modelling of approximate reasoning by fuzzy sets. Non-numeric linguistic terms are subjective classes for the linguistic variables (Zheng et al., 2010, p. 80).

In this research, triangular fuzzy numbers are used to represent subjective pairwise experts' judgments among the linguistic options associated with the degrees of membership in the set. The triangular fuzzy conversion scale used to convert such linguistic terms to triangular fuzzy scales in the pairwise comparisons in FEAHP method, which are presented in Table 1 as follows (Lee, 2010):

Table 1: Triangular Fuzzy Conversion Scale

Linguistic Scale	Fuzzy number	Triangular fuzzy scale	Triangular fuzzy reciprocal scale
Just equal		(1,1,1)	(1,1,1)
Equally important	$\tilde{1}$	(1/2,1,3/2)	(2/3,1,2)
Weakly more important	$\tilde{3}$	(1,3/2,2)	(1/2,2/3,1)
Moderately more important	$\tilde{5}$	(3/2,2,5/2)	(2/5,1/2,2/3)
Strongly more important	$\tilde{7}$	(2,5/2,3)	(1/3,2/5,1/2)
Extremely more important	$\tilde{9}$	(5/2,3,7/2)	(2/7,1/3,2/5)

Decision groups' members are asked to compare the pair of criteria at a given level to define their relative importance in relation to the criterion at the immediately prior level (Zheng et al., 2010). A pilot test was conducted within a group of 32 experts. A few items had to be rephrased to make them more representative for the research model.

3.2.2.6 Extent Analysis Algorithm on Fuzzy AHP

FAHP is employed to deciding on the local comparative importance between each pair of criteria in the same bunch of attributes. The fuzzy assessment by triangular fuzzy numbers ensues the following matrix \tilde{A} (Wang, Luo, and Hua, 2008):

$$\tilde{A} = (\tilde{a}_{ij})_{n \times n} = \begin{bmatrix} (1, 1, 1) & (l_{12}, m_{12}, u_{12}) & \dots & (l_{1n}, m_{1n}, u_{1n}) \\ (l_{21}, m_{21}, u_{21}) & (1, 1, 1) & \dots & (l_{2n}, m_{2n}, u_{2n}) \\ \vdots & \vdots & \ddots & \vdots \\ \vdots & \vdots & \vdots & \vdots \\ (l_{n1}, m_{n1}, u_{n1}) & (l_{n2}, m_{n2}, u_{n2}) & \dots & (1, 1, 1) \end{bmatrix}$$

where $\tilde{a}_{ij} = (l_{ij}, m_{ij}, u_{ij})$, $\tilde{a}_{ij}^{-1} = (1/u_{ji}, 1/m_{ji}, 1/l_{ji})$ for $i, j = 1, \dots, n$ and $i \neq$

j .

Concerning aggregation of the participants' attitudes (a_{ij}^{ag}), geometric mean approach was preferred using Equation 3.11 as follows:

$$a_{ij}^{ag} = \sqrt[Q]{\prod_{q=1}^Q a_{ij}^q} \quad (3.11)$$

where a_{ij}^q is an element of matrix \tilde{A} of an individual $q = 1, 2, \dots, Q$ (Saaty, 2008; Ahmad, and Hussain, 2017; Tümer et al., 2019).

Afterwards, in order to evaluate a priority vector of the matrix \tilde{A} , an extent analysis with the subsequent phases was suggested by Chang (Sun, 2010):

Phase 1. Firstly, the value of fuzzy synthetic extent is specified. Let $X = \{x_1, x_2, \dots, x_n\}$ be an object set, and $U = \{u_1, u_2, \dots, u_m\}$ be a goal set. According to the method of extent analysis, for each object, an extent analysis must be carried out regarding to each goal, respectively. Thus, we can obtain m extent analysis values as M_i^j , $\{(i = 1, 2, \dots, n), (j = 1, 2, \dots, m)\}$, where M_i^j as a triangular fuzzy number, signifying the extent analysis value of i^{th} decision element with respect to the j^{th} goal. The value of fuzzy synthetic extent should be stemmed through the following Equation 3.12 (Chang, 1996; Bozbura et al., 2007; Lee, 2010; Zheng et al., 2010; Erdem, 2016):

$$S_i = \sum_{j=1}^m M_i^j \otimes \left[\sum_{i=1}^n \sum_{j=1}^m M_i^j \right]^{-1} \quad (3.12)$$

To find $\sum_{j=1}^m M_i^j$, execute the operation of fuzzy number addition for all values of M_i^j as shown in Equation 3.13 below:

$$\sum_{j=1}^m M_i^j = \left(\sum_{j=1}^m a_j, \sum_{j=1}^m b_j, \sum_{j=1}^m c_j \right), \quad i = 1, 2, \dots, n \quad (3.13)$$

And to attain $[\sum_{i=1}^n \sum_{j=1}^m M_i^j]^{-1}$, operate the fuzzy addition for M_i^j values, which is shown in Equation 3.14 as follows:

$$\sum_{i=1}^n \sum_{j=1}^m M_i^j = \left(\sum_{i=1}^n a_i, \sum_{i=1}^n b_i, \sum_{i=1}^n c_i \right), \quad (3.14)$$

Lastly, figure the inverse of the vector in Equation 3.15 such that:

$$\left[\sum_{i=1}^n \sum_{j=1}^m M_i^j \right]^{-1} = \left(\frac{1}{\sum_{i=1}^n c_i}, \frac{1}{\sum_{i=1}^n b_i}, \frac{1}{\sum_{i=1}^n a_i} \right) \quad (3.15)$$

Phase 2. The degree of possibility of $\tilde{S}_j \geq \tilde{S}_i$ is computed using following Equation 3.16 (Chang, 1996; Bozbura et al., 2007; Wang et al., 2008; Lee, 2010; Zheng et al., 2010; Erdem, 2016):

$$V(\tilde{S}_j \geq \tilde{S}_i) = \sup_{x_j \geq x_i} [\min(\mu_{\tilde{S}_j}(x_i), \mu_{\tilde{S}_i}(x_j))] \quad (3.16)$$

And equally articulated by Equation 3.17:

$$\begin{aligned} V(\tilde{S}_j \geq \tilde{S}_i) &= hgt(\tilde{S}_j \cap \tilde{S}_i) = \mu_{\tilde{S}_j}(d) \\ &= \begin{cases} 1, & \text{if } m_j \geq m_i, \\ 0, & \text{if } l_i \geq u_j, \\ l_i - u_j / (m_j - u_j) - (m_i - l_i), & \text{if } m_j < m_i, l_i < u_j \end{cases} \quad i, j = 1, \dots, n; j \neq i \quad (3.17) \end{aligned}$$

where $\tilde{S}_i = (l_i, m_i, u_i)$ and $\tilde{S}_j = (l_j, m_j, u_j)$ are two triangular fuzzy numbers and d is the ordinate of the highest intersection (point D) between μ_{S_i} and μ_{S_j} . Calculation of both values $V(\tilde{S}_i \geq \tilde{S}_j)$ and $V(\tilde{S}_j \geq \tilde{S}_i)$ are obligatory to compare \tilde{S}_i and \tilde{S}_j (see Figure 3):

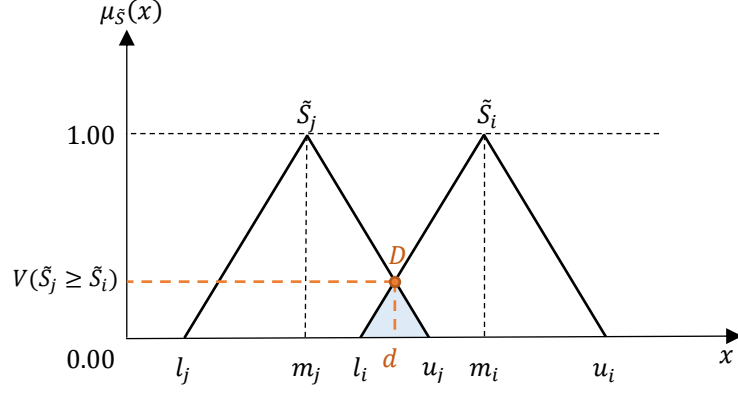


Figure 3: Degree of Possibility of $V(\tilde{S}_j \geq \tilde{S}_i)$

Phase 3. The degree of possibility identification process for a convex fuzzy set to be greater than k convex fuzzy number $\tilde{M}_i, (i = 1, 2, \dots, k)$ as depicted in Equation 3.18 (Bozbura et al., 2007; Lee et al., 2009; Zheng et al., 2010; Erdem, 2016):

$$V(\tilde{M} \geq \tilde{M}_i) = \min V[(\tilde{M} \geq \tilde{M}_1) \wedge (\tilde{M} \geq \tilde{M}_2) \wedge \dots \wedge (\tilde{M} \geq \tilde{M}_k)] \quad (3.18)$$

Assume that:

$$p(A_i) = \min V(\tilde{S}_i \geq \tilde{S}_k), \quad i, k = 1, 2, \dots, n; k \neq i.$$

Now, Equation 3.19 itemizes the weight vector as below:

$$W' = (p(A_1), p(A_2), \dots, p(A_n))^T \quad (3.19)$$

where $A_i (i = 1, 2, \dots, n)$ are n decision elements.

Phase 4. Equations 3.20 and 3.21 can obtain (Zheng et al., 2010) the normalized weight vectors as follows:

$$P(A_i) = \frac{p(A_i)}{\sum_{i=1}^n p(A_i)} \quad (3.20)$$

$$W = (P(A_1), P(A_2), \dots, P(A_n))^T \quad (3.21)$$

where W is a non-fuzzy set and it provides the weights of the model's elements.

Chapter 4

EMPIRICAL RESULTS AND DISCUSSION: CLUSTERING ANALYSIS

After analyzing the dataset using K-means clustering method through IBM SPSS Modeler 18.0, One-way ANOVA was conducted by SPSS 23.0 to ascertain the optimum quantity of clusters in the range of 3 to 10; which were tested one-by-one. Given clustering results of various number of K are compared using One-way ANOVA. The median of each dependent variable is taken as the representative of each cluster to test dissimilarity between groups. In conclusion, comparing the results of ANOVA with different K , shows enough evidence in 95% of confidence interval for the best number of clusters, $K=4$, across 11 MENA countries, because of the maximum differences between groups which are reported in Table 2:

Table 2: Analysis of Variance for the Differences among the Clusters

Factor	Cluster No.	Min.	Max.	Mean	±	S.D.	F-value	P-value	Pair difference
COED	1	-1.01	.08	-.2861	±	.4314	17.989	.001	1 vs. 2, 3, 4 2 vs. 3, 4 3 vs. 4
	2	-1.20	-.99	-1.0926	±	.1451			
	3	1.10	1.70	1.3984	±	.4197			
	4	.53	.81	.6685	±	.2028			
GDPPC	1	-.78	-.08	-.5505	±	.2737	11.284	.005	1 vs. 2, 4 2 vs. 3 3 vs. 4
	2	.88	2.35	1.6168	±	1.0375			
	3	-.82	-.66	-.7385	±	.1132			
	4	.07	.88	.4740	±	.5693			
UNEMP	1	.07	1.42	.6413	±	.6192	10.202	.006	1 vs. 2, 4 2 vs. 3, 4 3 vs. 4
	2	-1.60	-1.02	-1.3122	±	.4117			
	3	.46	.84	.6505	±	.2632			
	4	-1.12	-.74	-.9274	±	.2697			

In continue, Figure 4 displays absolute four clusters' center when crude-oil export dependency, unemployment rate and GDP per capita were analyzed in 2010-2016.

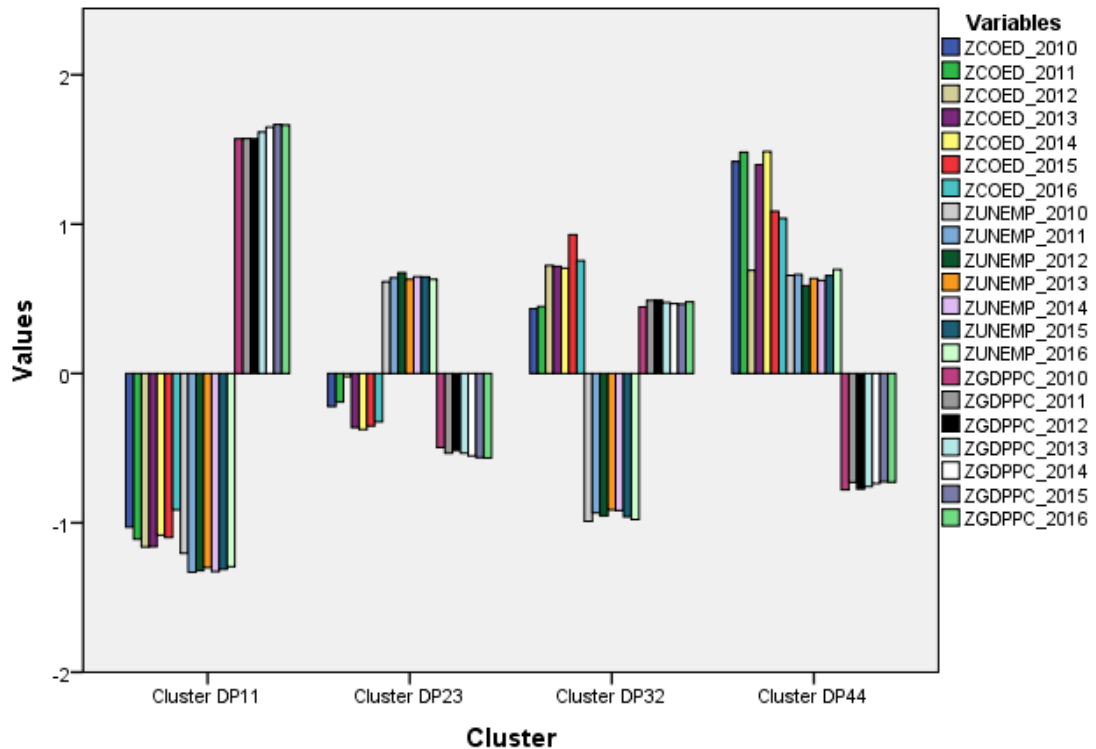


Figure 4: Final Cluster Centers

According to the given explanations regarding the partitioning results validation and quality, Figure 5 exhibits graphical Silhouette Coefficient as follows:

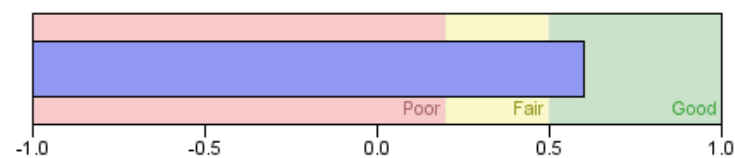


Figure 5: Silhouette Measure of Cohesion and Separation

Surely, Silhouette measure near +1 reveals that each cluster is distant from the neighbors, however, the values near zero show that the cluster is very close to the decision border between two adjacent partitions. Furthermore, negative coefficients

show objects might have been grouped poorly. Therefore, Figure 5 implies a good quality of partitioning with four clusters ($.5 \leq S \leq 1.0$) in comparison with the tested clusters' numbers: 3, 5, 6, 7, 8, 9, and 10.

In this research, a coding system for labelling clusters is designed. **D**iversification and **P**erformance of the economy are represented by letters, **DP**, and two digits define the rank of groups in economic diversification and performance respectively which are between 1 as the best and 4 for the worst order. In following, Table 3 shows the 11 MENA countries that are clustered based on research variables:

Table 3: K-Means Clustering Results for 11 Oil-Rich MENA Countries

Cluster No.	Case country	Cluster code	Distance from cluster center
1	Qatar	DP11	2.1181
	United Arab Emirates		2.0756
2	Egypt	DP23	2.3429
	Algeria		1.9435
	Oman		2.1852
	Iran		1.8513
	Libya		2.3127
3	Kuwait	DP32	1.2760
	Saudi Arabia		1.1244
4	Sudan	DP44	2.1564
	Iraq		2.1796

Additionally, the median of variables for each cluster for judging the business environment condition of the countries are plotted at separate line charts in Figure 6 as below:

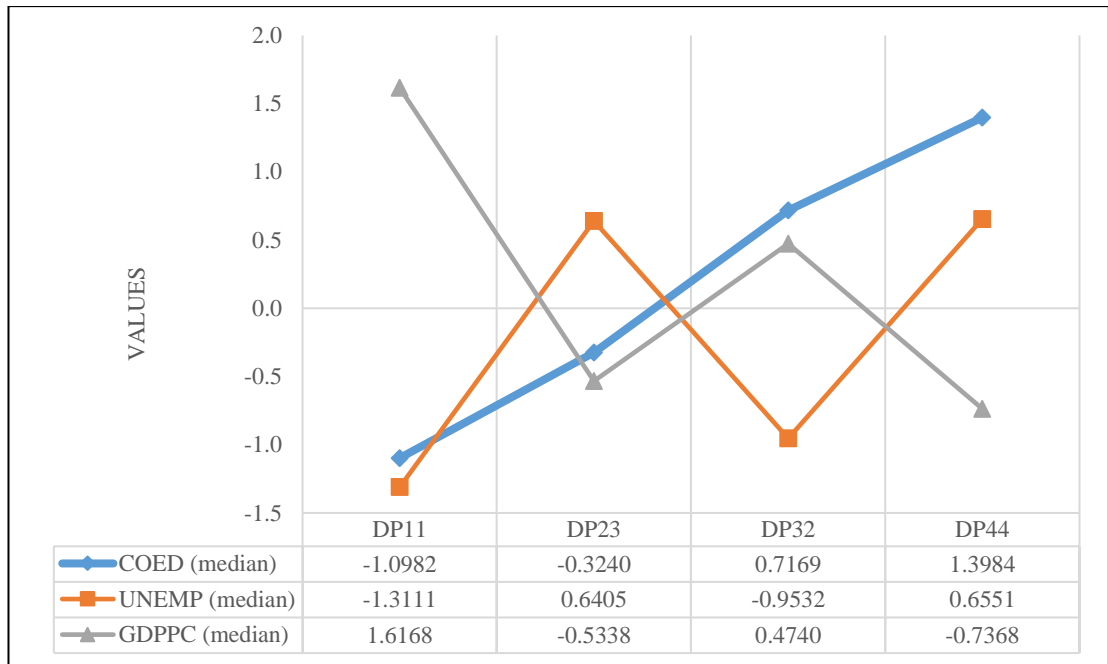


Figure 6: COED, UNEMP, and GDPPC; Clusters: DP11, DP23, DP32, and DP44, 2010–2016

As Figure 6 demonstrates, in the clusters DP11 and DP44 crude-oil export dependency (COED) and unemployment (UNEMP) move in a similar way, while GDP per capita (GDPPC) to opposite direction. In clusters DP23 and DP32, COED and GDPPC have similar directions, but UNEMP moves in the opposite direction.

As shown in the Figure 7, the highest level of economic diversification (least dependency to the crude oil exports) belongs to the Cluster DP11, and least diversification is observed in Cluster DP44.

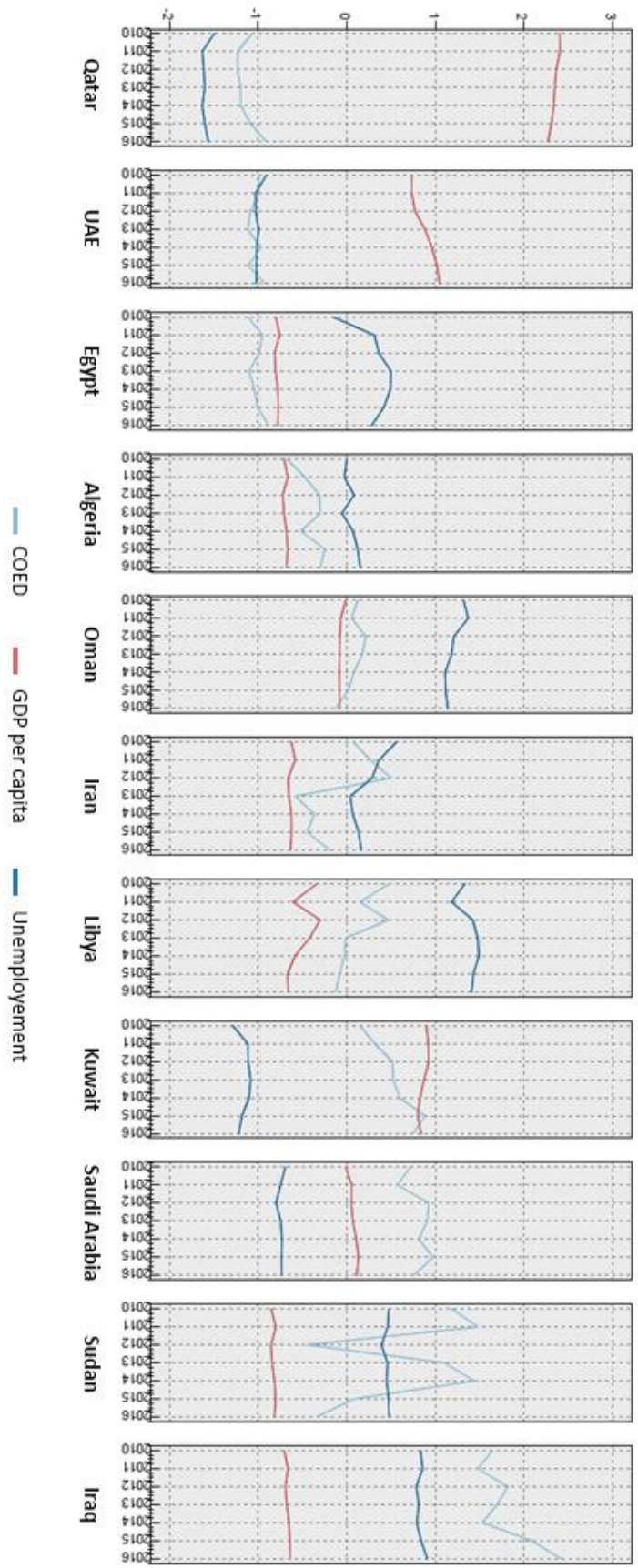


Figure 7: Multiplot of COED, GDPPC, and UNEMP vs. Year, 11 Oil-Rich MENA Countries, 2010-2016

Hence, Qatar and the UAE have the most competitive business environments in comparison to other countries. Egypt, Algeria, Oman, Iran, and Libya are in the second cluster where their exports are almost diversified, but their economic performance is not good. Kuwait and Saudi Arabia are in the third group where their economies are less diversified, but their economic performances are better than second group. Sudan and Iraq are in the weakest cluster regarding to the economic diversity and performance.

Chapter 5

EMPIRICAL RESULTS AND DISCUSSION:

FEAHP ANALYSIS

A descriptive analysis was executed in the beginning of this part to identify the sociodemographic characteristics (gender, age, marital status, income) of the respondents of the second part of the study. The sample consisted of 58.33% males versus 41.67% females. 19% of the participants were less than 30 years old, 35% were in 30-40 age range, 23% were between 40-50, and 23% were over 50 years old. The average the respondents' age was 34. In terms of educational background, all respondents had a university degree. Their level of study were 34% bachelor, 44% master, and 22% PhD. 46% are still students. 28% of participants had a monthly income less than \$1,000, 35% between \$1,000 and \$ 2,000, 19% between \$2000 and \$3000, and 18% had a monthly income more than \$3,000.

5.2.1 FEAHP Assessment

In the second part of the research, to illustrate the exact manual calculation process, the main dimensions at the second level of the proposed hierarchical model are prioritized using FEAHP method. The figured results define the local weights of each dimension. This process should be iterated for all groups of elements in the model.

The preliminary matrix of aggregated pairwise comparisons for informal and formal institutions is displayed in Table 4:

Table 4: A Triangular Fuzzy Pairwise Comparison Matrix

Dimension	D ₁	D ₂
D ₁	(1.0000, 1.0000, 1.0000)	(0.9716, 1.0088, 1.0683)
D ₂	(0.9361, 0.9912, 1.0292)	(1.0000, 1.0000, 1.0000)

Notes: D₁: Formal institutions; D₂: Informal institutions

Regarding the explained phases, the values of fuzzy synthetic extent using the standard fuzzy arithmetic are defined, in Table 5:

Table 5: Value of Fuzzy Synthetic Extent

\tilde{S}_1	(0.4812, 0.5022, 0.5293)
\tilde{S}_2	(0.4725, 0.4978, 0.5193)

The computed reciprocal degree of possibilities of fuzzy synthetic vectors are depicted in Table 6:

Table 6: Degree of Possibility of Fuzzy Synthetic Extents

$\tilde{S}_1 \geq \tilde{S}_2$	$\tilde{S}_2 \geq \tilde{S}_1$
1.0000	0.8965

Based on the algorithm of FEAHP, in this step minimum number of degree of possibilities for each fuzzy synthetic vector in comparison with other vectors must be nominated. Because there is no more than one synthetic vector comparison for each of them, thus, the results are attained as follows:

$$p(A_1) = \min V(\tilde{S}_1 \geq \tilde{S}_2) = 1.0000$$

$$p(A_2) = \min V(\tilde{S}_2 \geq \tilde{S}_1) = 0.8965$$

Consequently, the weight vector is concluded below:

$$W' = (p(A_1), p(A_2))^T = (1.0000, 0.8965)^T$$

At the end, the normalized weight vector is calculated as below:

$$\sum_{i=1}^2 p(A_i) = 1.8965$$

$$P(A_1) = \frac{p(A_1)}{\sum_{i=1}^2 p(A_i)} = \frac{1.0000}{1.8965} = 0.5273$$

$$P(A_2) = \frac{p(A_2)}{\sum_{i=1}^2 p(A_i)} = \frac{0.8965}{1.8965} = 0.4727$$

$$W_{D_1 \& D_2} = (P(A_1), P(A_2))^T = (0.5273, 0.4727)^T$$

Seeing FEAHP method requires long time and high precision to calculate the local weights for each group of model's elements, and, in addition, no specific statistical package for this method has not yet been offered, in this study, using the programming language R, statistical FEAHP computing code¹ is developed for the first time. Therefore, based on the local weights, which are computed using R, and the global weights through combining of associated elements, the final rank orders of the entrepreneurial business environment dynamics are reported in Table 7 as follows:

¹ The FEAHP computing R code available from the author on reasonable request.

Table 7: Elements' Weight to Prioritize the Dynamics of Entrepreneurial Business Environments of Qatar and the UAE

Model's element	Dimension	Factor			Sub-factor		
	Global weights	Local weights	Global weights	Rank	Local weights	Global weights	Rank
Formal institutions	0.5273						
<i>Government Policies & Programs</i>		0.3912	0.2063	2			
Market openness					0.2590	0.0534	4
Rules and regulations governing entrepreneurial activities					0.2064	0.0426	9
Tax incentives and exemptions					0.1605	0.0331	16
Procedural requirements for registration and licensing					0.1506	0.0311	17
Intellectual property rights					0.1248	0.0257	21
Provision of bankruptcy laws					0.0987	0.0204	25
<i>Non-financial support</i>		0.3351	0.1767	4			
Commercial and services infrastructure					0.2399	0.0424	10
Modern transport and communication facilities					0.2117	0.0374	13
R & D transfer					0.1992	0.0352	15
Counselling and support services					0.1303	0.0230	22
Physical infrastructure					0.1134	0.0200	26
Incubator facilities					0.1055	0.0186	27
<i>Financial support</i>		0.2736	0.1443	5			
Venture capital					0.3092	0.0446	8
Alternative sources of financing					0.2045	0.0295	18
Low-cost loans					0.1808	0.0261	20
Credit guarantee program for start-up enterprises					0.1551	0.0224	23
Competition among financial institutions					0.1505	0.0217	24
Informal institutions	0.4727						
<i>Entrepreneurial & Business Skills</i>		0.4023	0.1902	3			
Entrepreneurial training programs					0.3052	0.0580	3
Business education					0.2595	0.0493	5
Technical and vocational education					0.2429	0.0462	7
Availability of information					0.1924	0.0366	14
<i>Socioeconomic Conditions</i>		0.5977	0.2825	1			
Diversity of economic activities					0.2324	0.0657	1

Model's element	Dimension	Factor			Sub-factor		
	Global weights	Local weights	Global weights	Rank	Local weights	Global weights	Rank
Opportunities to start-up					0.2172	0.0614	2
Women's support to start-up					0.1656	0.0468	6
Extent of economic growth					0.1427	0.0403	11
Entrepreneur social image					0.1419	0.0401	12
Interest in innovation					0.1001	0.0283	19

An examination of the global weightings rated in Table 7 unveiled that socioeconomic conditions (0.2825) is the most important institutional factor influencing entrepreneurial environment development of Qatar and the UAE, followed by government policies & programs (0.2063), entrepreneurial & business skills (0.1902), non-financial support (0.1767), and financial support (0.1443).

Among sub-factors' global weights, the top ten belongs to the diversity of economic activities (0.0657), opportunities to start-up (0.0614), entrepreneurial training programs (0.0580), market openness (0.0534), business education (0.0493), women's support to start-up (0.0468), technical and vocational education (0.0462), venture capital (0.0446), rules and regulations governing entrepreneurial activities (0.0426), and commercial and services infrastructure (0.0346). Hence, the main findings of the FEAHP analysis are summarized in the ten following paragraphs.

First, *diversity of economic activities* is the vitally important booster of the entrepreneurial environment in the oil-dependent countries, which is in line with the findings of the first part of this study by Aker and Aghaei (2019) who found that "The success stories of Qatar and UAE show that higher economic diversification can promote the business environment definitely".

Second, *opportunities to start-up* is the next effective dynamic points that a thriving partnership between the public and private sectors, maximizing opportunities and impelling economic situation (UAE Vision 2021, 2014).

Third, *entrepreneurial training programs* has the next high importance for enhancing entrepreneurial situation of the case countries to provide an alternate route to productive employment.

Forth, *market openness* is the following critical dynamic for growing the entrepreneurial environment of Qatar and the UAE. This result affirms the Aker and Aghaei's (2019) finding that "If a lesson should be learned from the experiences of Qatar and UAE, it is that "globalization" can accelerate economic and business environment development".

Fifth, *business education* is a significant dynamic to mature entrepreneurial environments in Qatar and the UAE. Alvarez et al. (2011) describes education for establishing and managing small, new or growing businesses can be an important informal determinant.

Sixth, *women's support to start-up* is a considerable dynamic, which can play either a regulatory or a supporting role to improve the image of their countries and provide gender equality, personal security, and civil liberties. Females' entrepreneurship is a vital unemployed basis of economic development globally. Unfortunately, women in MENA have the lowest rates of Total Entrepreneurial Activity (TEA) at only 4% of the population in comparison with Sub-Saharan Africa (27%), Latin American and Caribbean economies (15%) or in economies of Panama, Thailand, Ghana, Ecuador,

Nigeria, Mexico, and Uganda that females have the same or a little more than males (EcoMENA, 2016). The pivotal role of women entrepreneurship for economic growth is widely being recognized and encouraged by the governments of Qatar and the UAE (Women of The Channel, CRN, 2016).

Seventh, *technical and vocational education* can be a functioning dynamic for prosperity of an innovative society. This is why governments can help entrepreneurs by setting up extension services for vocational educating and training the workforce (Gulf News Opinion, 2012).

Eighth, *venture capital* as an influencing formal institution in the class of financial support to enhancing the entrepreneurial environment in Qatar and the UAE. What is certain is that entrepreneur wants capital to create a business. In this line, the findings of studies reveal that policies that provide access to bank credit, credit with low interest rates, and credit guarantee schemes contribute considerably to the advancement of new businesses (Alvarez et al., 2011). Looking to the future, executives also believe that more private investor funding (e.g., angel investment) would be effective measure in supporting new businesses (Startup, 2016).

Ninth dynamics is *rules and regulations governing entrepreneurial activities* in the studied countries. To originate a business, market mechanisms efficiency can be improved by government policies if they lead to eliminating conditions that cause executive inflexibilities and market failures (Aghaei et al., 2016).

Tenth is *commercial and services infrastructure* as an influencing formal institutional dynamic. This institution is incorporated the “presence of commercial, accounting and

other legal services and institutions that allow or promote the emergence of new, small or growing businesses” (Alvarez et al., 2011, p. 125).

Chapter 6

CONCLUSION AND POLICY IMPLICATIONS

6.1 Conclusion

As previously mentioned, the present study includes two parts to achieve the objectives set. The first part of the study contributes to the literature about oil-rich countries' business environment development by revealing a comprehensive view of economic diversification and performance across MENA region where the countries are clustered using K-means algorithm in four diverse partitions. Based on the results of this part, higher exports diversity (lower oil-exports dependency) in addition to better economic performance (higher per capita income and lower unemployment rate) can influence the competitiveness of business environment of the countries positively and vice versa. The findings of this investigation agree with the "Business Environment Ratings" of the Economist as Qatar has the 21st and UAE has the 29th most favorable business environment among 82 countries.

The success stories of Qatar and the UAE (DP11) show that higher economic diversification can promote the business environment definitely. As the countries' reliance on primary commodities exports (crude oil) diminishes, they can achieve a more secure business environment for investments. They are proper models of handling the oil-sector revenues in order to galvanize the non-oil sector.

In Thomson Reuters Zawya’s (2018) article, based on the new Global Entrepreneurship Index (GEI) in 2018 with the following components: “Startups’ skills, risk acceptance, cultural support, technology use, human capital and innovation”, Qatar was positioned as the best entrepreneurial Arab country with the healthiest entrepreneurship ecosystem followed by the UAE” which are displayed in Figure 8 as follows:

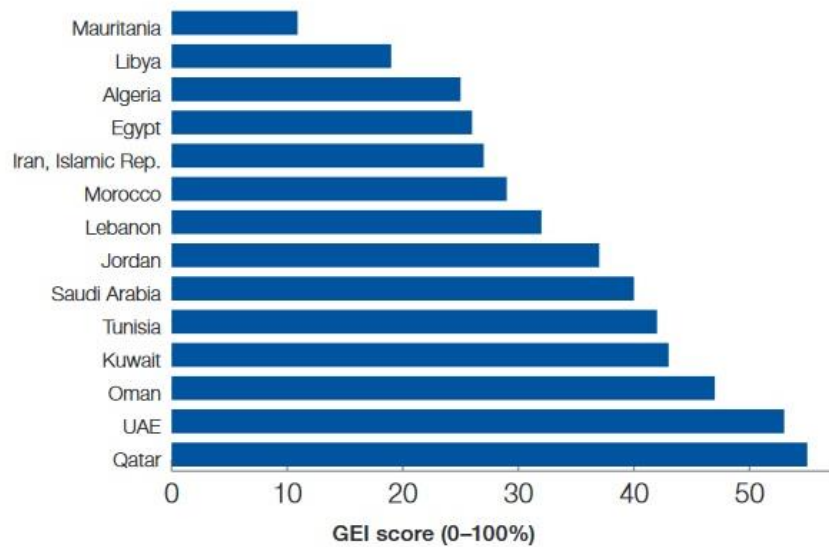


Figure 8: MENA Region GEI Scores (2018)

(Source: <https://thegedi.org/global-entrepreneurship-and-development-index/>)

In the Global Competitiveness Report (GCR) for 2016/2017, which is released by the world economic forum (WEF), Qatar ranks 18th out of 138 nations, two places behind the UAE (GEM, 2016). Additionally, The UAE placed first amid the Arab nations based on the Global Competitive Index (GCI) (2018), however, holding 17th position among 137 countries ranked. Qatar came second in the Arab world holding 25th order overall.

The second group of clustered countries (DP23), Egypt, Algeria, Oman, Iran, and Libya have diversified their economies, but their economic performance is not

satisfactory. These countries can recover their business environments by improving their macroeconomic indicators such as GDP per capita and employment rate to shift toward the first cluster's development level.

Saudi Arabia and Kuwait are in the third cluster (DP32). They have more-stable but less-diversified economies compared to the second cluster (DP23). Thus, they may adopt policies in order to reduce dependence on oil sales to move toward the most competitive cluster, DP11.

Iraq and Sudan are in the fourth rank (DP44), constituting poorest economic performance and diversity in comparison to the other clusters with the most unfavourable business environment for investors and entrepreneurs.

Looking at the results of this study, economic diversity is an indispensable factor for developing a country's business climate. This necessity is even more paramount for countries with vast oil reserves in the MENA, which is considered as an unstable region, economically and politically (Morakabati et al., 2014). In order to achieve a desirable business environment, the countries in the clusters DP23, DP32, and DP44, certainly need to drive economic recovery and growth plans. This long path requires a serious willpower to change, applying knowledge for the proper use of resources, constant controlling of changes, and preventing corruption in the economic system of the countries. This ambitious goal will be paved by strong, committed and regulated governments, which can play either a regulatory or a supporting role to improve the image of their countries and provide personal security, civil liberties, and political stability in their system, like the governments of Qatar and the UAE. Sustainability of the economic and business environment may be weakened or strengthened by changes

in government policies especially when the performance of the private sector is feeble (Henderson, 2006).

Of course, highly effective role of political and cultural conditions for developing and globalizing these countries cannot be ignored. As argued previously, in market evolutionary stages, economic collaboration, technological transformation, political, social, and cultural aspects should be taken into account for alterations. To increase economic diversification, governments, industries and foreign investors should cooperate to introduce changes in producing and exporting different products (Cateora et al., 2009).

Obviously, dependence on a narrow range of exports of primary products such as crude oil makes countries vulnerable to market shocks and destabilizes economies. Fall in products' prices results in economic slowdowns dramatically and lower investments by the private sector particularly (Ghosh and Ostry, 1994; Wagner and Deller, 1998; Bond and Malik, 2009; Shuai, 2013). A multi-sector approach would lead to a better economic performance, because if demand for one segment's production falters, the rise in the demand for the goods of other sectors may compensate. Today, diversification strategy may include developing the service sector such as financial services, tourism and transport in addition to the manufacturing sector. Furthermore, diversity can speed up overall economic development by organizing a conducive business environment through developing local infrastructure, building a competitive country image and improving the legal framework (Imbs and Wacziarg, 2003; Blattman, Hwang, and Williamson, 2007; Koren and Tenreyro, 2007; Van der Ploeg and Poelhekke, 2009). Recently, the attention is focused on the tourism sector as the

main source to increase the national income in lots of countries (Sokhanvar, Aghaei, and Aker, 2018).

Lee and Carter (2012) examined the impact of political instability on country image and investors' perceptions. The stable investment destinations like Qatar and the UAE are more preferred by investors than politically uncertain countries like Libya, Iraq and Sudan. The risk level and government interference in the economy are important negative factors for political and economic stability.

Hence, the answer to the main research question of this study 'is it a curse or a blessing having petroleum resources in a country?' is that 'resource curse' which is the extreme dependency on a resource, can cause damages in the economy (Gelb, 2011). However, the 'resource curse' can be turned into blessing for oil-rich countries if the resources are managed properly and economic dependence on the oil resources is reduced. Certainly, huge oil resources are blessing for first cluster members of this study Qatar and UAE, but for the members in the fourth cluster (Iraq and Sudan) it is a curse. In the second (Egypt, Algeria, Oman, Iran, and Libya) and third (Saudi Arabia and Kuwait) clustered countries, although oil has often played a constructive role in their economic prosperity, but in absence of proper economic and political management, this blessing can be converted to a curse, which is a serious warning for the members of these clusters. Thus, to achieve a more favorable business environment, Kuwait and Saudi Arabia need to increase export diversification rate, while Egypt, Algeria, Iran, Oman, and Libya should improve relations with the rest of the world benefiting from the system of 'globalization'.

As before enlightened, entrepreneurship is a catalyst of private sector developing and subsequently creating a more favorable business environment. Therefore, after conducting the clustering analysis in the first part, with identifying the hypercompetitive business environments of oil-rich MENA states, Qatar and the UAE, in the second part of this study, an institutional fuzzy extended AHP model is developed to prioritize the dynamics of entrepreneurial development in these countries. The model consists of a main goal, 2 dimensions, 5 factors, and 27 sub-factors, in four levels of the hierarchy. Based on the results of FEAHP analysis, the local and global weightings for all model's elements were revealed. Out of the 27 sub-factors, top 10 ranked items are recognized as substantial dynamics for entrepreneurial business environment leap.

Our findings lead to a number of significant contributions on the literature about oil-rich countries' private sector growth. The outputs can be useful for policy and decision makers to reinforce the business environments of Qatar, the UAE, or countries in the similar situations, as well as less efficient countries that they need to boost competitiveness and attract investment for creating a vigorous and borderless global economy. For Qatar and the UAE, and countries are almost alike, it is recommended in addition to the top 10 dynamics, attention more be paid to the other 17 lower-rated sub-factors in the model. Above all, the findings are more beneficial for the rest of countries clustered in the first part of the study includes Algeria, Egypt, Iran, Iraq, Kuwait, Libya, Oman, Saudi Arabia, Sudan, which possess less favorable business environments. It is strongly suggested they pay particular attention to the 10 higher-ranked dynamics before 17 lower-ranked.

6.2 Policy Implications

Abundant hydrocarbon resources can be advantageous to build sustainable growth for their entire people. They convert these natural assets into financial wealth and provide world-class infrastructure; create efficient systems for public services; train a highly skilled labor force, and backing the development of entrepreneurship and innovation. In fact, hydrocarbon earnings (80.3% and 63.5% of fiscal income in Qatar and the UAE) “has structured development paths and modern state-building in particular ways” (Ennis, 2018, p. 574).

The Qatar National Vision 2030 targets to “Transform Qatar into an advanced society capable of achieving sustainable development. The planned development goals are divided into four central pillars: Most national efforts to boost and foster entrepreneurial activity fall within the economic and human development” (GEM, 2016, p. 24).

The UAE Vision 2021 (2014, p. 22) states: “We want the UAE to transform its economy into a model where growth is driven by knowledge and innovation”.

If a lesson should be learned from the experiences of prosper members of cluster DP11, Qatar and UAE, compared to the negative experiences for clusters DP23, DP32, and DP44, it is that ‘globalization’ can accelerate economic and business environment development. Also, ‘globalization’ will not be reached unless political leaders, policy makers, and governors accept that it is a prerequisite, where trade openness is accepted without intervention. The reforms are essential to promote business environment by liberalization of trade and financial sectors (Kyereboah-Coleman and Agyire-Tettey, 2008; Lee and Carter, 2012).

In addition, ‘innovation’ is crucial for private sector and entrepreneurial environment development, which increase the rate of self-employment in a society as a way of reducing unemployment. Higher unemployment rate in a country motivates people to find the self-employment opportunities. In addition, market mechanisms efficiency can be affected by government policies if they lead to eliminating conditions that cause executive inflexibilities and market failures (Aghaei, Sokhanvar, and Tümer, 2016).

Despite Qatar and the UAE sit in the core of the world’s largest oil-producing region are among the top nine producers by proven reserves within the Organization of Petroleum Exporting Countries (OPEC), which continues to be influential in global oil markets, their sources of power initially start with their economic capabilities and, importantly, how these are used. *Resource wealth alone is insufficient*. They have not ignored important institutions to promote their entrepreneurship level. Economic capabilities allow them to construct their image and legitimacy at home and abroad. What brings them together analytically is their interest in building their status regionally and internationally (Roxas, 2007; Ennis, 2018).

Although adaption of foreign technology seems as a basic principle of development and we might assert that “Just go abroad; copy more efficient methods; put them into effect at home; then sit back and wait for the extra output to roll in”, one of the key elements of economic development is the fostering the entrepreneurial spirit (Samuelson, 1998, p. 544).

Towards strengthening the growing business sector like Qatar and the UAE, the strategy is advised to other oil-rich countries is defining the existing opportunities in the various economic sectors in their domestic markets. By this strategy, they can

identify ways to transform gaps into opportunities through innovative projects, which works on implementing innovative ideas that benefit all sectors in the countries (Gulf Times, 2018).

Furthermore, government has an important direct and indirect effect in establishing and maintaining a healthy economic environment and entrepreneurial growth in a society “while making sure that government itself maintains a healthy respect for profits and the role of private initiative” (Samuelson, 1998, p. 544). Governmental and non-governmental business development organizations can provide programs in order to expand societal cognizance towards entrepreneurship and encourage people for being entrepreneurs. In opposite, those fascinated in creating new businesses, may perceive ineffective government regulations in the economy destructively (Gnyawali and Fogel, 1994).

Certainly, given the rapid economic expansion of Qatar and the UAE, the constructive role of their governments is undeniable. Qatar and the UAE’s strategic plan were designed to eliminate reliance on oil to ensure long-term prosperity. They intend to sustain their drive toward economic diversity by stimulating strategic sectors to channel their energies into industries and services such as finance, knowledge-based industries and tourism, which are invigorated by skilled Qataris and Emiratis, expatriates and world-class elites (Morakabati et al., 2014, UAE vision 2021, 2014). For this reason, the attractive UAE's new long-term visa system has been formed for investors, entrepreneurs and specialized talents (Arabian Business, 2019).

Over the recent years, the people who have access to global media would have faced to commercials advertising diverse aspects of Qatar and the UAE. The well-planned

efficient evolution of Qatar and the UAE for inclusion to the global economy and vibrant entrepreneurial sector, relying on the proper use of oil and natural gas revenues, has fortified their global national image “from near obscurity to fame in the global public eye” (Ennis, 2018, p. 586).

Based on the Qatar National Vision 2030, they have seriously focused on the following objectives, as these are the nation’s surest path towards sustainable development in future (GEM, 2016):

- Sound Economic Management
- Responsible Exploitation of Oil and Gas
- Suitable Economic Diversification

The Qatari and Emirati governments adopt a policy aiming at diversifying income resources and developing economic infrastructure. Thus, they created a fertile ecosystem to promote innovative ventures through exploring the potential of entrepreneurs alongside reforms in education and training system, workforce nationalization, developing start-up incubators and business accelerators bankruptcy laws, credit scoring, financing structures and investment tools such as angel investing, growth equity capital models, government-backed lending. Additionally, they have rectified the political and organizational atmosphere, which expected to eliminate financial and legislative obstacles for new businesses (Jaoui and Rashid, 2015; GEM, 2016).

In order to develop and commercialize innovative ideas, they are also provided efficient legal frameworks and government services to flourish their business

environments. “Regulations can promote efficient markets and protect intellectual property” (UAE vision 2021, 2014; Gulf Times, 2018).

Moreover, in Qatar and the UAE, a remarkable information and communication infrastructure improvement has created businesses network and facilitated transactions and interactions globally (UAE vision 2021, 2014). Through high penetration rates of smartphone, social media, and websites, enormous opportunities for entrepreneurs have been opened up (The National, 2015).

They intensely concentrated to small and medium-sized enterprises (SMEs) and start-ups, as that is the cause of economic diversity strengthening and non-oil sector evolution. For this reason, special economic zones (SEZs) were established and offer benefits, infrastructure, services and policies, and exemptions particularly for home-grown private sector mainly comprised of SMEs. The Ministry of Energy and Industry of Qatar (MEI) also offered projects targeting SMEs. Minister of energy and industry (2014) announced that the MEI had arranged “a list of 30 SME projects in under-served areas, including pharmaceuticals, chemicals, environmental-friendly projects and high-tech industries.” The MEI exempted taxes on inputs and equipment utilized to these projects, and supported in financing (Oxford Business Group, 2018).

Interestingly, statistics show female entrepreneurs in the MENA area enlarged from 4 percent to 10 percent during 2011-14, which meaningfully contracts the gap between male and female in entrepreneurial life, and can trigger a momentum of evolution and job creation, which can support much higher levels of GDP and ensure economic prosperity (CRN, 2016; EcoMENA, 2016), however, they said high unemployment levels, narrow access to finance, regulatory and social restrictions, work-life balance,

insufficient training and information, and lack of women-friendly entrepreneurship policies are still main challenges confronted by women entrepreneurs in MENA (CRN, 2016).

In order to mend women entrepreneurial intentions, regional governments effort in Qatar and the UAE in cooperation with non-governmental bodies, develop policies and programs, which leads to secure women's parity under the umbrella of law, fill the residual gender gaps in health, education, access to finance, and promote females' civic and political contribution. On the other side, availability of different opportunities, technologies, and information are heartening women to build their own businesses. The UAE Gender Balance Council announced, "The UAE has emerged as a model for women's empowerment due to the steadfast support provided by the country's leadership in fostering an environment that provides women opportunities to actively contribute to national progress" (CRN, 2016; EcoMENA, 2016; Smallbone and Welter, 2017).

Despite financial support is a major factor of new business start-ups creation, many commercial lenders such as investment companies and commercial banks may hesitate to invest in high-risk small start-ups or tend to refuse financing until the business has been as long as the business reaches the prosperity. On the other hand, most bankers lack the required experience and knowledge for realizing and responding to the particular needs of entrepreneurs. Therefore, creation of venture capital firms, availability low-interest loans and credit guarantee schemes to finance small businesses have all supported launching a new business (Gnyawali and Fogel, 1994).

Generally, although drastic economic developments that have recently taken place in the MENA region have been considerable, not acceptable for progression of the private sector and trade-friendly rules toward forming a more advanced business destination (Thomson Reuters Zawya, 2018). For the countries that they desire take advantages of the development pattern of Qatar and the UAE's shift to a knowledge economy, they should “cultivate a healthy risk-taking culture where hard work, boldness and innovation are rightfully rewarded” (UAE vision 2021, 2014). This leap can only be achieved within a conducive entrepreneurial environment that employs the aptitude and creativity of entrepreneurs.

To recap, the national strategy for evolving business incubators and accelerators could be a road map of entrepreneurial business environment triumph in an appropriate and encouraging investment climate, contributing excellently to the economic diversification (Gulf Times, 2018). *Entrepreneurial leap does not happen in a vacuum.* Entrepreneurs are living in the environment of their specific geography, which is their local, national, or even supranational economy (The Gedi, 2018). While abundant requirements to be ready to create a more favorable business environment for national entrepreneurs, it is indispensable that the government, academia and industry support the nascent ecosystem. Likewise, policymakers should strive for navigating investments in areas like technology and automation, which would assist entrepreneurs in high value-added.

What can be learned from the extraordinary success story of the two countries of Qatar and the UAE is that the hard work of entrepreneurs is not enough solely. They want to be an ecosystem's part in which they obtain personal, cultural, and financial support.

They need their achievements to be known and their route to success to be validated by the country's leaders (WEF, 2011).

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