

THE INFLUENCE OF GOVERNMENT-PRIVATE SECTOR COLLABORATION
ON INNOVATION IN A DEVELOPING KNOWLEDGE ECONOMY: THE CASE
OF BAHRAIN



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ON INNOVATION IN A DEVELOPING KNOWLEDGE ECONOMY: THE CASE
OF BAHRAIN

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Marjan Modara

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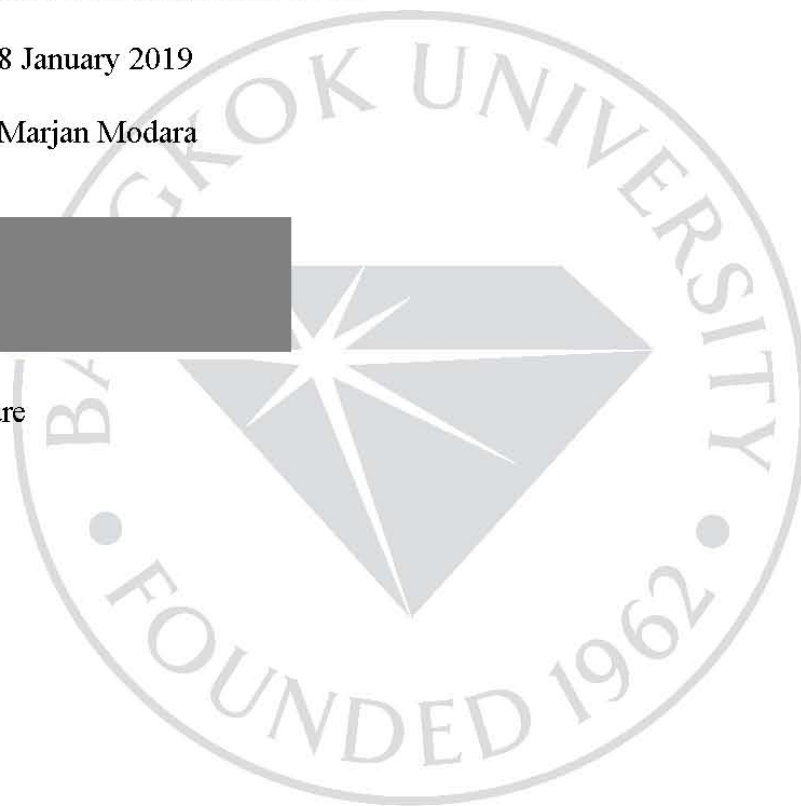
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Signature



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ABSTRACT

Knowledge and innovation have become the foremost driving strength of economic and social development worldwide. Globalization and the accelerated dissemination and transfer of new knowledge and innovations have affected all nations and regions, public and private institutions, and the lives and prospects of citizens in those nations. The Kingdom of Bahrain is one of those countries that has lagged behind the pace of the current innovations, and its leaders have realized that in order for Bahrain to remain in the forefront of the global economy, its government has to focus on building strategies and policies that will contribute in developing an innovation ecosystem in the country. Based on the perspectives of 22 participants and three Focus Groups, one each from private, semi-government, and government sectors that influence the economy of Bahrain and the reports and articles published regarding those sectors; (a) government, (b) education, (c) ICT, (d), finance, and (d)

industry, the findings showed that the government and the private sector were taking progressive steps in collaboration to influence the innovation processes in the kingdom. While the results demonstrate that most of the participants are of the belief that the private sector should lead the collaboration efforts, the government institutions are the ones who have initiated the lead and are promoting the process. The findings also show that finance is the leading sector in innovation activities, while education and the big industries are still lagging far behind. As government and private institutions need to build their collaborative roles towards building an innovation ecosystem, internal frameworks are required to be devised as innovation strategies in the core of each organization's business. The researcher has confidence that all stakeholders will recognize the efforts established to date in the works undertaken by the government and the private institutions to build a strong government-private collaborative initiative, and use the findings and recommendations of this study to modernize their activities to support the efforts undertaken to date. It is of vital importance for the private sector to take the role of producer of innovation in the potential forthcoming innovative accomplishments and to take the lead role in collaborative efforts, giving way to the government institutions to focus on drawing effective policies and regulations for these activities.

Keywords: Innovation, knowledge economy, collaboration, Bahrain

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CHAPTER 1

INTRODUCTION

This research study is about the role of government and private sector collaboration to facilitate and support innovation in a knowledge economy (KE). It examines the elements that contribute to the development of a KE, explores the share of innovation among these elements, and identifies the role that government and private sector collaboration plays in this relationship.

The developing KE of the Kingdom of Bahrain serves as the focus for this research. *The Economic Vision 2030* for Bahrain states:

We aspire to shift from an economy built on oil wealth to a productive, globally competitive economy, shaped by the government and driven by a pioneering private sector – an economy that raises a broad middle class of Bahrainis who enjoy good living standards through increased productivity and high-wage jobs (p.3).

With the government and private sector collaboration as the case study, this research examines the role of innovation in KE to elaborate the criticality of this element to the goal of aiding the kingdom to claim an attractive spot in the international value chain.

1.1 Background

Knowledge has developed into and will continue to be an instrumental element in the welfare of humankind and organizations alike. Knowledge importance can be found in the steady progression of civilizations as a direct result of creating, accumulating, disseminating, and using knowledge that enhances the efficiency of

economic movements and establishes firsthand and diverse scopes of events that aid economic divisions and expand their financial input.

Drucker (1994) stated that capitalism and technology shaped global progression during the period between mid-eighteenth century to the start of the twentieth century, with a profound change that was propelled by transferring the association of knowledge from a product that belonged to an individual to one belonging to the public through accomplishing and not retaining. Instead of having knowledge retained in instruments, procedures, and commodities, knowledge became part of the workforce.

Adam Smith, in his book “The Wealth of Nations” which was published in 1776, set the base for the contemporary development of knowledge. The emphasis was given to producing a new kind of economic system that was based on a knowledgeable workforce (Smith & Cannan, 2003). Smith described how this new addition made a society richer as the workforce focused on a clear and specific job and drove technological innovation and created immense oversupplies. Those supplies’ returned values were then reinvested and used in making new knowledge, thus new technologies. In this structure, the workforce absorbed knowledge in executing and building on top of old knowledge, therefore creating new ones within the aggressive marketplace progression (Smith & Cannan, 2003).

Nowadays, the importance of knowledge is judged by the effectiveness of its applications and what those applications are capable of doing. Very few individuals comprehend that developed economies come to be by the application of knowledge to

labor, which set off the productivity eruption of the last hundred years (Drucker, 1994).

Hoppe (as cited in Al-Rahbi, 2008) claimed that an understanding of the historical progress of knowledge is necessary to explain how and why knowledge has turned into a key element in commercial and social activities. He also believed that knowledge buildup is not an old and infinitely developing learning process that humankind has continuously been contributing to as individuals and societies.

According to Mokyr (2002), economic historians came to recognize that technology was not as important as institutional change in economic progress before 1750. The industrial revolution marked not only when growth began, but also the time during which technology took on a leading role and an ever-increasing weight in the production of financial development. It was only after 1750 that technology and science started to influence one another in different ways and began to coevolve. It was during the second stage of the industrial revolution, after 1820, that many new components were added to the ever-expanding possibilities of production in the West. These included less costly steel, electricity, manmade chemicals, pharmaceutical products, food processing, and substitutable-parts manufacturing to name but a few Mokyr (2002).

What is vivid in the developments of the twentieth century, and particularly after the two world wars, is the importance of the growth of these developments rather than the inventions alone that led to the third stage of the industrial revolution. It was the extensive logical foundation of the knowledge underlying the theories and the reduced cost of accessing that knowledge increased the feasibility of diverse

innovation. One example would be the invention of the laser in the field of quantum physics. This invention was followed by an array of applications such as laser-based musical instruments, barcodes, eye surgery, and smart bombs (Mokyr, 2002).

Today, knowledge is considered to be the driver of economy and, in the new economy of this era, knowledge has emerged as a capital that is to be evaluated, established, and dealt with properly (Bogdanowicz & Bailey, 2002). Similarly, the World Bank (2007) considered knowledge application in all types of innovation in technology a major resource for creating capital and jobs and hence generating value and competitiveness for the development of the countries.

In 2017, Schwab concluded that we were at the verge of a fourth industrial revolution. The first industrial revolution mechanized manufacturing products by using water and steam power. In the second revolution mass production was made possible through the use of electricity. The third revolution used microchip and information technology (IT) as a means to product automation. Today, the fourth revolution has been forming on the previous digital revolution, which started in the middle of the 20th century. It is described as a blend of knowledge that blurs the boundaries between the physical, digital, and biological domains.

According to Schwab (2017) the pace of current innovations has no historical model, and when compared to its former industrial revolutions, the fourth revolution is progressing at an exponential rather than linear rate. Additionally, not only is it disrupting global industry, the extent and penetration of its commotion represents the conversion of entire systems of fabrication, management, and governance.

In our present era, countries have to aim at drawing plans and guidelines that will alter their innovation ecosystem if they want to continue a foreground position in the international economy (Schwab, 2017). That is the reason why Bahrain's leaders in year 2007 found their economy standing at a cross road where the future economic growth depended on whether they were able to do major modifications on several levels to keep stride with the competition regionally and worldwide. The researcher strives to shed light on where Bahrain stands after a decade of this revelation in relation to global competition.

1.2 Problem Statement

In 2007, The Kingdom of Bahrain submitted a “National Strategy Development” under the title of *Bahrain 2030 National Planning Development Strategies*, which was published in 2008 as *The Economic Vision 2030 For Bahrain*. In it, Bahrain conveys that by year 2030 its economy would be converted to a knowledge-based system.

As proclaimed in their Bahrain Vision 2030, the leaders of Bahrain realized the need to smoothly transform Bahrain's economy, acquire knowledge and a skilled workforce, and enhance productivity and innovation.

The Organization for Economic Co-operation and Development (OECD, 1996) defines a KE as “an economy, which is directly based on the production, distribution and use of knowledge and information” (p.7). Even though the pace is different for each, all OECD economies are going for a KE.

Bahrain's leaders have recognized that the sustainability of Bahrain's future lies in the KE and to successfully promote, embrace, and exploit innovation through science and technology.

Yet, the Bahraini leaders also convey that for Bahrain's economy to become a knowledge-based economy and attract foreign investors, it has to be able to offer a high-quality public service, a cutting-edge infrastructure, and an appealing living environment.

The formation of the correct conditions to change this economy does not come automatically or unintentionally. For this conversion to happen, a collaborative and systematized plan is required. This plan has to draw skilled social capital, nurture local ability and create successful networks amongst all bodies of the society.

Knowledge's part alongside the economy is imperative in all types of social relations. The progress of the KE, globalization, and global competitive force has amplified the significance of inventiveness and innovation in native markets (OECD, 2007; Porter, 2001).

Winden and Berg (2008, cited in Yigitcanlar, Velibeyoglu, & Martinez-Fernandez, p. 2) state that for cities to compete nationwide and globally, they need knowledge organizations such as universities and research centers, a group of knowledgeable individuals, high technology substructure, and links to the worldwide economy. Moreover, "knowledge cities must not only possess the people and things necessary for the production of knowledge but, as importantly, function as breeding grounds for talent and innovation".

Today, after ten years of drawing that vision, and having withstood two crises, the world financial crisis in 2008 and Bahrain's internal crisis in 2011, it is critical to assess where Bahrain's economy is standing in relation to the world's advanced KEs and to evaluate Bahrain's potential in the new economy and its readiness to establish knowledge activities. With a specific focus on the relationship of government and private sector collaboration, this study aims to reveal the city's strengths and what it has achieved so far in knowledge foundations. To build its KE, Bahrain's government has to plan a system that stands and relies on many aspects while undergoes a long progression. This long process needs the participation, commitment and backing of many segments and representatives of the society.

1.3 Purpose of the Study

The purpose of this study is to investigate what a KE is according to international organizations, scholars, and practitioners. The most globally used KE assessment models and frameworks such as the knowledge assessment methodology (KAM), global innovation index (GII), and the most admired knowledge city index (MAKCi) are studied to explore the elements that have been recognized as the pillars of KE; education, innovation, information and communication technology (ICT), and a conducive economic and institutional environment. The baseline of this study is the importance of innovation and the central role it plays in the economic development process. This research is designed to explore how the collaboration of government and private sectors influence the innovation processes in the developing KE of the Kingdom of Bahrain.

1.4 Research Questions

This research focuses on the Kingdom of Bahrain and its journey to build a KE. Recognizing the importance of the government collaborating with the private sector in this venture, the main question of this research is as follows:

RQ. What is the role of the government and the private sector in collaboration to drive innovation forward in Bahrain?

A country needs to go through a long process to develop a KE which in itself is inclusive of the existence of many crucial elements of which a major one is innovation. This takes us to the first sub-leading question:

RQs1. How is innovation defined and measured in a KE?

Once the first question is answered and the indicators of innovation assessment are recognized, the investigation of where the government and the private sector stand in regards to their participating roles in a developing economy leads to the second sub-leading question:

RQs2. What is the nature and current state of the government and private sector collaboration in support of innovation in Bahrain?

1.5 Significance of the Study

Nowadays, the markets of the top advanced nations are established on knowledge. A Knowledge-based Economy, further known as Knowledge Economy (KE), stands at the new vanguard of economic model and practical analysis. In this economy knowledge has a central part in having decisions made and is foreseen as primary asset for individuals and establishments (OECD, 1996). Moving forward from now on in this study, the researcher will be using the abbreviation (KE) to mean

both knowledge economy and knowledge-based economy. In the experiential study done by Iacovoiiu's (2016), innovation and knowledge were shown as crucial features in advanced countries that maintained an excessive stand of economic growth.

Currently, most of the research on KE is mainly focused on developed countries or the developing KEs of the East Asia countries. Accordingly, the studies done for the Arab region are very limited or scarce. Also, no studies could be located in the preceding scholarly articles or reports on the effect of the roles of the government and the private sector on innovation in the Kingdom of Bahrain.

This exploration targets to study the part that the government and the private sector play in collaborating for the purpose of increasing the innovation processes in a developing KE. The researcher would search to identify this role utilizing the Kingdom of Bahrain as the focus area of this study to discover a localized process on the means of how the collaboration of its government and private sector could be in order to influence the development of innovation in Bahrain's pursuit for a KE.

This research would therefore highlight where innovation development stands in Bahrain and what role the collaboration amongst the government and the private sector plays in advancing this development in order to assist Bahrain's economic leaders' pursuit for building a KE. While this study focuses on Bahrain, its findings could have potential relevance for other countries in the region that are in the process of building a KE.

1.6 Research Methodology and Framework

As this research is based on knowledge being a social phenomenon, the researcher is basing her opinion on the ontological reality of relativism in which

scientific laws are created through individuals' interpretation (Easterby-Smith, Thorpe, & Jackson, 2012). The researcher's belief is in that the truth of a KE in a society is linked to the protagonists behind it, and that it can be interpreted by exploring and understanding the perception of the participants' realities in regards to the roles of the government and the private sector in collaboration to influence innovation processes in the developing KE of Bahrain (McGregor & Murnane, 2010).

This study was based on constructionism epistemology, which views that all knowledge is contingent upon human practices constructed on the interaction between them and their world which is further advanced and conveyed inside a basically social environment (Crotty, 1998). This research followed the case study approach by referring to in-depth qualitative insights from a predetermined single context (collaboration). This was consistent with the definition of case studies provided by Yin (2014).

The truth of this research model, or theory, or framework was reached through discussion and agreement between researchers, city planners, policy producers and decision makers in the Kingdom of Bahrain as knowledge by nature is context sensitive and is related based on situation according to Bennet, Bennet, and Avedisian (2015).

Data was collected by conducting face-to-face individual semi structured interviews which were after backed up by secondary evidence collected from various sources such as empirical articles, government reports, and official documents. Secondary data was used to provide additional clarifications, consequently allowing for limited data triangulation.

Last, Focus Group interviews were conducted as an added source of data triangulation to allow for more clarification of the findings of the individual interviews and the support documents. In these Focus Groups the researcher presented the findings of the individual interviews and allowed the participants in the Focus Groups to discuss and express their perspectives on the roles of the government and the private sector in collaboration for the purpose of pushing innovation forward.

An illustrated framework (see Figure 1.1) was constructed by the researcher as a guideline which would be followed during this study.

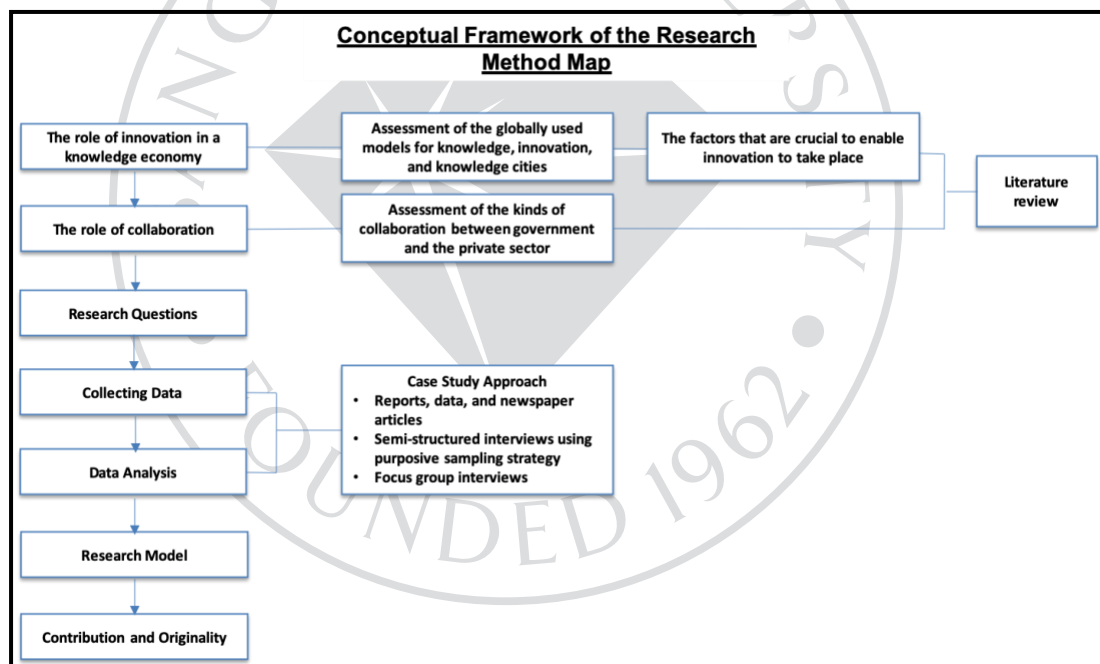


Figure 1.1: Conceptual framework of the research method map

Source: Researcher's own elaboration

1.7 Scope of the Study

This research study is based on the collaboration role of the government and private sector in the Kingdom of Bahrain as a case study. Interviewees were selected

according to their relevance role in innovation and their participation in building a KE. Accordingly, individuals in the government and private sectors who do not have a crucial role in the aforementioned areas were not be included.

1.8 Personal Motivation

The researcher found her niche for pursuing a doctoral degree during her participation in a course about knowledge management while undergoing an engineering management post graduate degree in 2013. The field of knowledge management was still new in Bahrain, and whenever knowledge management was discussed amongst her social network, individuals would confess that they had not heard of the term, nor had they come across it in their businesses.

In the pursuit of a research project for her doctoral degree, the researcher aimed at not just filling a gap in the field of knowledge, but also creating a new understanding that would be of importance and interest to the decision makers in her country by assisting them to draw new policies and processes for the development of the economy through the findings at the end of this study. She also undertook to produce a solid reference for further research work and studies within the government and private sector locally and regionally.

The thought of becoming an expert in the field of knowledge and innovation and being a contributor to her country's global development in this new era by engraving a trail paved with her impact via this study, is the researcher's main quest in undertaking this journey.

1.9 Organization of the Dissertation

This research study is organized as follows: Chapter One contains an introduction to the background of the problem, a statement of what the problem is, its purpose, and significance, and clarifies what the questions of the problem are, its framework, and limitations. Chapter Two provides a review of past studies, common evaluation models used to assess knowledge economies, the research gap, and the proposed research model. Chapter Three describes the research design methodology, human and data sources, the tools and methods used for data compilation, and the evaluation approach. Chapter Four contains the empirical findings: description, analysis, and synthesis. Chapter Five answers the main question of the study along with the two sub questions, while Chapter Six brings this study to a closure with the summary of findings and resulting conclusions, recommendations, limitations and an outlook for future research to pave the way forward.

CHAPTER 2

LITERATURE REVIEW

The purpose of this chapter is to investigate the existing scholarly research relevant to innovation in relation to its importance in a KE. Further, it will examine the contribution of government and private sector collaboration in an innovation ecosystem of a KE.

The chapter is organized by first looking into the definition of knowledge and the part that it plays in a KE. Then the notion of KE is discussed and its pillars will be identified. The section that follows will highlight the function of innovation as a key pillar in a KE. The enablers of innovation are investigated next. Collaboration of the public and the private sector are explored and the impact of their collaboration in the innovation ecosystem is recognized.

2.1 The Role of Knowledge

Knowledge has surfaced as an intangible asset for organizations and has become the main source of value in the GDP of developed countries. In order to comprehend and appreciate its value, one has to first look into the concept of what it is and come to understand it.

2.1.1 The nature of knowledge. Debates on what knowledge is have been going on for thousands of years. Today, there are many definitions and meanings for knowledge. For example, Nonaka and Takeuchi (1995) consider knowledge as “a dynamic human process of justifying personal belief toward the truth” (p. 58). According to Hoppe (cited in Al-Rahbi, 2008), knowledge is formed, cultivated, and continually reformed by the actions that individuals participate in during their

existence, enhanced by their inquisitiveness and skepticism that foster ongoing knowledge making progression through daily practice and contact alongside other individuals. Hence, Hoppe views (cited in Al-Rahbi, 2008) that the build-up of knowledge begins with people who constitute the infrastructure of societies. Only people are able to understand and what they comprehend varies depending on their perspectives, experience, recollection, and interpretation.

Drucker (1998) viewed our contemporary conception of knowledge as information that “proves itself in action” and considers outcomes as its main focus. Bennet and Bennet (2004) take it further and defined knowledge from a practical point of view as “knowledge is considered the capacity (potential or actual) to take effective action in varied and uncertain situations” (p. 10). They describe knowledge as a human capability that can consist of understanding, perceptions, implications, intuition, ingenuity, ruling, and the skill to foresee the consequence of our activities.

Knowledge is an essential and strategic intangible resource to innovation and competitiveness in business (Nonaka & Toyama, 2005). It is argued by Nonaka and Toyama (2005) that knowledge is produced by merging and assimilating internal knowledge of an organization with the external knowledge that is rooted in various shareholders who construct all components of a society. More imperative than to identify the sources of knowledge, it is important to understand its worth and how it contributes to the development of these societies.

According to Hicks, Dattero and Galup (2007), cumulateness is an important characteristic of knowledge. The extent to which a society is knowledgeable depends heavily on knowledge access and preservation (Aubert & Reiffers, 2004). It should

be noted that for the purpose of this dissertation, countries are considered as a network of non-profit and profit-oriented companies, governmental institutions and other organizations (Nazari, Herremans, Isaac, Manassian, & Kline, 2009). Thus, the knowledge concept is discussed at both micro and macro levels. In highly developed countries, knowledge is considered as a common good, meaning society members have easy access to information and data (Osborne & Brown, 2011). On the contrary, in developing countries, citizens' access to knowledge is limited (Peng, Moffett, & McAdam, 2010). In turn, barriers to knowledge do not allow society members to develop their skills and competencies, limiting these countries' ability to use knowledge as a source of competitive advantage (Soliman, 2015; Pawlowski & Pirkkalainen, 2012).

On the other hand, (Mohamed, O'Sullivan & Ribière, 2008) state that according to Shaikh Mohammed bin Rashid Al Maktoum, the ruler of Dubai, it is not the limitation of access to knowledge in the Arab world, but the lack of knowledge, the absence of the right environment for building it, and training the appropriate personal with the suitable instruments to contain it that are the barriers amongst the citizens in the Arab world.

The different understandings on knowledge is foreseen to become bigger and more reflective as observed studies, predominantly in advanced countries, start to illustrate the productive association between economic development and the amount of knowledge that countries can generate, disseminate and use effectively (Al-Rahbi, 2008).

Nevertheless, for one to understand how knowledge is formed, it is necessary to know and understand if there is only one knowledge or different kinds; and, if there are different kinds, to learn what they are.

2.1.2 Types of knowledge. Nonaka (1991) and subsequently Alwis and Hartmann (2008) classify knowledge into two types: tacit and explicit. Tacit knowledge is identified as “know-how” which is rooted in the minds of individuals (Newell, Robertson, Scarbrough & Swan, 2002). The power of organizations comes from the know-how of their employees and to know their tacit knowledge accumulated is what gives an establishment its competitive advantage. Tacit knowledge is originated from individuals’ personal experiences and has become a part of their nature which is hard to copy, convey, or express. It comprises reasoning skills, philosophies, images, perspectives, and mental models (Smith, 2001) and is associated with a range of technical skills such as know-how and craft. This type of knowledge does not require much time or thought, making it helpful in determining how a company or any other business or social entity makes decisions and impacts the collective behavior of its members (Bhardwaj & Monin, 2006). This type of knowledge is subjective and experiential in nature. It is impossible to express tacit knowledge in words, numbers, or sentences (Madichie, 2013).

In their investigation, Bhardwaj and Monin (2006) attempted to identify the part tacit knowledge had in shaping the knowledge base of knowledge-intensive companies. The analysis of the gathered primary data demonstrated that tacit knowledge significantly contributed to the knowledge base of the studied organizations by interacting with their systems and subsystems (Bhardwaj & Monin,

2006). Similar results were demonstrated by Alwis and Hartmann (2008) according to whom tacit knowledge interacted with enterprises' psychological, functional, social, intellectual, and cultural organizational subsystems, shaping their knowledge base. However, Bhardwaj and Monin's (2006) findings are limited to New Zealand, making them inapplicable to other cultural contexts. The point is that the tacit to explicit knowledge interplay may differ across countries since a nation has a strong impact on the values, opinions and attitudes possessed by its members (Pawlowski & Pirkkalainen, 2012).

Alternatively, knowledge that is easy to communicate, codify, and articulate is known as explicit or "know-what" (Matusik & Hill, 1998). Explicit knowledge is usually communicated in the form of documentation, articles, books, journals, video presentations or seminars (Jasimuddin, Klein & Connell, 2005) and contributes to the establishment's productivity and effectiveness (Pawlowski & Pirkkalainen, 2012).

There is an unawareness of who knows what in organizations due to absence of trust, absence of incentives to share knowledge, and mostly, absence of the value of the knowledge that each individual carry (Szulanski, 1996). Both tacit and explicit knowledge are valuable in an establishment and are leveraged in creating and sustaining value as they jointly supplement each other (Edvinsson & Sullivan, 1996). However, tacit knowledge holds a higher competitive advantage than explicit knowledge by contributing more to competency growth of the organization (Smith, 2001).

To make knowledge operative, Mokyr (as cited in Al-Rahbi, 2008) differentiates knowledge based on its usefulness and separates it into two categories:

(a) “propositional knowledge” that is represented in technical know-how and is focused on the way nature operates; and (b) “perspective knowledge” that is represented in technical knowledge and is focused on the way techniques are used to construct new or better products. Mokyr (2002) suggested that the easy-going intellectual communities that emerged in the seventeenth century and included engineers, scientists, mechanics, and philosophers who had informal social connections were behind the creation of the scientific culture of knowing “how” as much as about knowing “why”.

Useful knowledge is achieved when Individuals face a problem or a gap in their outside world and try to sort it out by starting to distinguish facts, recognize group related phenomena, make connections and determine cause and effect, hence building a private useful knowledge when the individual adds his/her knowledge to others knowledge Metcalfe and Ramlogan (as cited in Al-Rahbi, 2008).

Hislop (2013) discusses two perspectives of knowledge: The Objectivist view in which the focus is on collecting and codifying knowledge, and the Practice-based view in which knowledge is perceived as socially created and somewhat subjective. He goes on to outline these two extremely different perspectives. From the Objectivist perspective, he focuses on collecting and codifying knowledge on the basis that knowledge is a discrete entity separate from individuals who may understand or use it. The emphasis in this point of view is on explicit knowledge and the assumption that explicit is much easier to manage and share.

From the Practice-based perspective, the emphasis is on tacit knowledge and based on interactive sharing of knowledge and the procedures of observation making

and captivating through varied forms of collaboration plus communication (Hislop, 2013). As defined by Hislop (2013) “Practice refers to purposeful human activity. It assumes that activity includes both physical and cognitive elements, and that these elements are inseparable. Knowledge use and development is therefore regarded as a fundamental aspect of activity” (p. 31).

On the other hand, Bennet, Bennet, and Avedisian (2015) explain explicit and tacit knowledge by putting the two in three different levels; surface, shallow, and deep knowledge. According to them, surface knowledge is explicit and can be found in books, computers, and the mind/brain in forms of information that can easily be codified. However, shallow knowledge is created when some understanding, significance, or logic is added to information (shallow knowledge) that requires context. This is the realm of social knowledge. They go on to describe deep knowledge, developed over time, as primary tacit, residing within the unconscious of an individual developed over time, and emerging when wanted for making decisions and acting on those decisions, often delivering the best resolution to a complex problem. This is the realm of the expert who has developed higher-order conceptual thinking, that is, the ability to perceive patterns, in a domain of knowledge.

In this study, the researcher contemplates the rules, by-laws, and the regulatory policies that govern the affiliation amid the government and the private sector and also regulates how each of these entities runs their institution internally, as explicit knowledge.

Alternatively, the know-hows embedded in procedures and processes of organizations as well as the minds of individuals active in the government and private sector are considered as tacit knowledge.

The researcher speculates that the government and private sector entities can promote the sharing of their organizations useful knowledges by collaborating and sharing both their tacit and explicit knowledge and putting them into use to reach a common strategy to move their economy forward. Operating in the realm of social knowledge, this would, then, require some level of context in terms of a common language and understanding.

2.1.3 National knowledge. Knowledge is commonly considered as one of the most important assets for a company to create sustainable competitive advantage (Jasimuddin, Klein & Connell, 2005; Alwis & Hartmann, 2008). This statement also applies to countries since knowledge plays the predominant role in the creation of wealth in the majority of developed countries (Stover, 2004).

The absence of entree to info and knowledge and administrative governmental levels and organizations are among the main hurdles to the national competitiveness of both advanced and evolving countries (Alwis & Hartmann, 2008). Although competitiveness has many classifications, it is usually described as the ability of organizations or countries to make a comparatively high factor of income and employment on a steady basis (Nazari et al., 2009). In agreement with Ruscoe (2008), a state should acquire specialization initially to get a world-class typical living. However, this action necessitates noteworthy financial investments in the formation of new knowledge as well as its dispersal (Schulze & Hoegl, 2008). In

addition, the influence of the outside environment has to be contemplated by a country to attain a higher level of competitiveness and output (Jasimuddin, Klein & Connell, 2005).

Al-Roubaie (2010) explored the role of local knowledge, “Indigenous Knowledge”, capability in emerging countries. He highlighted that in order for undeveloped countries to promote their progress, they had to focus on endorsing the development of knowledge locally to shrink the gap between their economies and the advanced countries’ economies. Knowledge has become the main source of progression in today’s economies and its sustainability (OECD, 1996). Yet, for the countries that are in the process of developing to advance, it is essential for the public and the private sectors to join their forces and increase awareness of all entities in their society to promote research for development, provide information, offer funding support, and build competences to produce and distribute knowledge by allowing external knowledge integrate and adapt to the local knowledge ecosystem (Al-Roubaie, 2010).

Katić, Ćosić, Anđelić and Raletić (2012) also studied the relationship between knowledge and the advancement of local competitiveness in a state which was pursuing to change its economy, which is in line with the goals of this study as well. De Waal and Sultan (2012) were of the opinion that a state’s effectiveness relies on how innovative, knowledgeable and adaptive it is to new technologies besides its economic considerations.

Katic et al. (2012) highly underlined the inappropriateness of the current knowledge prototypes for developing countries. They are of the opinion that it is high

time that a new model should be designed of which the main factors comprised of innovation, ICT, knowledge and education. The findings produced by Katic et al. (2012) were restricted to the particular emerging country of Serbia which limited the generalizability of their study to other countries with different cultures.

The study conducted by Nour (2014) is also relevant to this doctoral project since the researcher overviewed the challenges and prospects for the transition to knowledge economies (KEs) in the Arab region. Nour (2014) used both relative and narrative methods and used the OECD (1996) framework and definition of KE (KE) and the World Bank frame and description of the Knowledge Index (KI) and KE Index (KEI) indicators to compare the challenges that the Arab region confronted. The researcher concluded that for the Arab countries to transit to a KE they had to shift from an oil-based resources to a knowledge based resource by emphasis on knowledge diffusion, elevating human capital, fostering institutional change, and providing enablers for innovation (Nour, 2014).

Ahmed & Al-Roubaie (2012) stated that the knowledge they alleged for a KE was more than only knowledge of a high-tech nature and comprised of the cultural knowledge of a society. This was the tacit knowledge that was not the explicit info which was documented and concealed in the databases of the establishments in a society (Al-Ali, 2008; Al-Roubaie, 2010; Al-Roubaie & Alvis, 2014). In their opinion, a culture's knowledge was the means on how its citizens cooperated with one another, and reacted to the data they obtained external to their society and adapted it to their local needs (Al-Ali, 2008; Al-Roubaie, 2010).

2.2 KE Definition and Development

In today's economy, knowledge has become a new source of capital. As a capital, it has to be evaluated, advanced, and managed as a business investment. Nowadays, the implication of knowledge is considered by what it can produce, has converted to being the main factor of manufacturing, and after it has been consumed it will be used to create new knowledge (Drucker, 1994).

The OECD (1996) coined the term KBE and pondered knowledge as the key component for economic growth. All OECD countries today depend on creating, dispersing, and exploiting knowledge.

World Bank (1998) stated that:

Knowledge is critical for development, because everything we do depends on knowledge. Simply to live, we must transform the resources we have into the things we need, and that takes knowledge. We must use those resources in ways that generate ever-higher returns to our efforts and investments. That, too, takes knowledge and ever-greater proportion to our resources. (p.16)

Houghton & Sheehan (2000) reveal that in the agricultural and subsequently the industrial economy, knowledge was used for knowing in what way to farm, build, and pit. Now, knowledge is a mean for gaining competitive lead applying it to make and produce more smart goods in order to gain competitive advantage. They are of the opinion that the two strengths which effect today's KE are: the practice of knowledge-intensified economic activities, and the ever-increasing globalization of economic affairs.

Aubert and Reiffers (2004) indicate that in a KE learning is the base of growth and enables the endogenous improvement of resources, and imply that the supply of knowledge is of less importance than its renewal. They go on to state that knowledge is a limitless and continually renewed resource but very hard to evaluate since it is tacit.

In their report (2014), United Nations Development Programme (UNDP) and Mohammed bin Rashid Al Maktoum Foundation (MBRF) forward that one of the simpler definitions of a KE is the one from World Bank as “an economy that makes effective use of knowledge for its economic and social development. This includes tapping foreign knowledge as well as adapting and creating knowledge for its specific needs” (p. 17). In other words, KE relies mainly on the use of intangibles instead of the physical abilities and the utilization of technology as a resource rather than the conversion of raw materials or the exploitation of low-cost workers. In KE, knowledge is produced, collected, transferred, and used more efficiently by individuals, enterprises, establishments, and communities to promote economic and social development.

Knowledge has continuously been the foremost factor in the growth of economies (Aubert & Reiffers, 2004; Godin, 2008; Houghton & Sheehan, 2000; World Bank, 2007). What marks the present knowledge as special today is its characteristics, strength, and the degree on how fast it is intensifying due to the progression of the ICT and globalization (Godin, 2008; Houghton & Sheehan, 2000). Another very important factor is the rise of the countries who are integrating policies

linked to knowledge and innovation to develop and compete globally (World Bank, 2007).

Godin (2008) indicated that in 1962, Fritz Machlup, the Austrian born American economist, measured all types of knowledge formation and distribution in the United States, and was one of the pioneers in economy who presented the notion of KE. He further stated that Machlup's computations gave rise to two waves of writing in the new KE. The first one was started by Porat in the 1970s by computing the information economy and its proportion in the Gross National Production in the United States in 1967. It was then trailed by a series of comparable analyses formed in diverse countries and global organizations. The second wave began in the 1990s and still continues today by institutes such as OECD, World Bank, and the International Monetary Fund (IMF) who measure and assist KE by using different kinds of models. In today's world, developing countries are moving towards having a KE in order to position themselves among the KE leaders on a global scale.

Information and communication technologies have intensified the codification of knowledge and have made it pervasive and accessible to a large number of individuals (OECD, 1996). What is novel about the evolving era of KE is the abundance of readily obtainable, continually revised data, which everyone can access, share, cooperate on, make use of, and promptly interconnect through a global grid (Godin, 2008; Houghton & Sheehan, 2000). Although, the appearance of IT has considerably added to the actual use and utilization of knowledge, yet a gap remains among advanced and evolving countries in the degree of how much their economy is knowledge driven (Smedlund, 2008; Madichie, 2013).

In the latest KE, production and trading high-tech commodities and services for the international marketplaces are the pillar of a stable and sustainable economic development. To empower and improve their KE settings, countries have to construct milieus capable of being competitive, of high interacting competences, inspire technology transmission, encourage innovation, distribute and captivate knowledge, and obtain skills (Ahmed & Al-Roubaie, 2012).

Parcero and Ryan (2016) evaluate the performance of Qatar and the United Arab Emirates (UAE) in regards to their accomplishments to transform their economies to a KE by comparing them to 17 countries by means of the four pillars framework used by the World Bank comprised of: (a) ICT, (b) education, (c) innovation, and (d) economy and regime. Their findings indicate that Qatar and UAE lag far behind the leaders in KE, specifically in the innovation pillar. Similarly, in his study about transforming an oil-based economy to one that is knowledge based, Nurunnabi (2017) found that innovation is amongst the six key factors that Saudi Arabia needs to consider developing highly in order to transit its economy to one that is based on knowledge.

2.2.1 measuring and assessing KE. In order to foster an appropriate framework to assist policy makers in the government and private sectors in advancing to a KE, it is first logical to review existing frameworks that have worked and are being used in the developed countries as a benchmark to look into the elements and factors which can be adjusted to the local requirements and abilities of a progressing country in its pursuit towards a KE.

Although many KE frameworks exist (Australian Bureau of Statistics [ABS], 2002), there is no globally-agreed framework for evaluating the level to which an economy is knowledge based (ABS, 2002). In this study, three frameworks, developed by OECD (1996), Asia-Pacific Economic Cooperation (APEC, 2000), and the World Bank Institute (2008) will be considered due to the involvement of many countries in developing them, their relevancy to a developing country's competencies and features, and their international use as benchmarks.

A KE competitive assessment is done by combining indicators that have been drawn by reputable organizations such as the World Bank, the World Economic Forum (WEF), the United Nations (UN), the International Institute for Management Development (IMD), and the International Telecommunication Union (ITU). As stated by Al Shami, Lotfi, Coleman, and Dostál (2015) establishments, government bodies, and aid and research institutions have been using these indicators to assist the competitiveness of a country or countries' KE status.

Further, OECD, APEC, and World Bank frameworks provide parameters for measuring a KE that is beneficial in recognizing appropriate elements and indicators that might be considered in a comparable frame for a developing country.

2.2.1.1 OECD framework. The OECD was established in 1961. Today, the OECD is a forum of 34 industrialized states that cultivates and supports economic and social policies. OECD's mission is to “build strong economies in its member countries, improve efficiency, home market systems, expand free trade, and contribute to development in industrialized as well as developing countries” (OECD Watch, 2017).

The OECD has made a substantial input to research on the KE and its framework is considered among the pioneers in mapping the development of a KE. Its publication “The Knowledge-based Economy” (OECD, 1996) was a first attempt to integrate statistical indicators for a KE. It was followed by two more compilations in 1999 and 2000 based on a two-year research project to identify the reasons causing the contrasting degrees of financial development of the affiliate countries during the 1990s. The 34 OECD member countries are: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States (OECD Watch, 2017). The result of these publications contributed significantly to research on a KE.

The concluding report of the economic progress assignment, “The New Economy: Beyond the Hype” was released in mid 2001 (OECD, 2001) and highlighted the role of the main features in the growing economies of OECD member nations as follows:

- A steady and accessible macro-economic setting with efficiently operative markets that encourage business generally and the making of new corporations specifically.
- Dissemination of ICT as an efficient tool to hoard, disperse, and connect knowledge originators and operators.
- Financing and investing in R&D as means for innovation growth, synchronizing R&D and innovative accomplishments, and safeguarding scholarly property privileges of new inventors; and
- Human capital investment in schooling and coaching at all stages and ages as a strength of the KE

2.2.1.2 the APEC framework. The APEC agenda was formed as part of a project assigned by the APEC Economic Committee in the middle of 1999. The project was under the heading of “Towards Knowledge-based Economies in APEC” and was established by team special KE Task Force and included Australia, Canada, and Korea (APEC Economic Committee, 2000). The goal of the project was to “provide the analytical basis useful for promoting the effective use of knowledge, and the creation and dissemination of knowledge among APEC economies” (APEC Economic Committee, 2000, p. iv)

The assignment required the investigation of observed evidence and established that financial development is most durable for those countries, which are solid in all of the four scopes. This was also the finding of the OECD Growth Project which were analyzed and cited in the APEC Economic Committee report.

The list of the elements that the member countries should endeavor for are as follows:

- An effective national innovation system that supports innovation and technological change and focuses on productivity and competitiveness.
- Prevalent human resources development which includes a high standard education and training all the way through an individual's career.
- An effective ICT infrastructure that permits citizens and businesses access relevant information globally at all times and by affordable means; and
- A business ecosystem that is appealing and supports enterprises and commands innovation development

2.2.1.3 the World Bank framework. The World Bank launched their scheme “Knowledge for Development” (K4D) in 1999 with the aim to promote awareness amid national policymakers with regards to the influential growing effects of knowledge, and to urge economists to pool international and indigenous information so as to highlight relative benefits. K4D tends to use a KE framework which merges the principles of the OECD and APEC structures.

The Knowledge Assessment Methodology (KAM) Basic Scorecard (Figure 2. 1) is the flagship and foundation architecture of the World Bank's K4D program which is the approach created and applied by the World Bank for assessing a state's capability to produce, embrace, and disperse knowledge (Chen & Dahlman, 2006; Robertson, 2009).

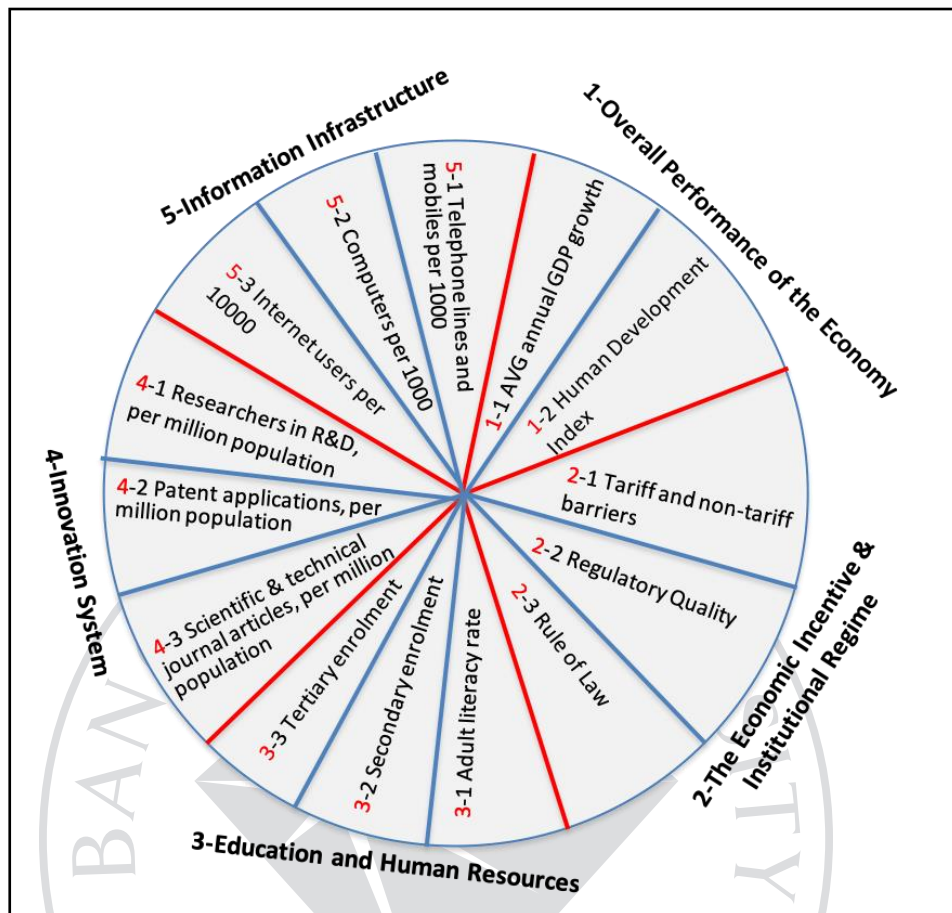


Figure 2.1: KAM basic scorecard

Source: Researcher's own elaboration extracted from Chen & Dahlman (2006)

The uniqueness of KAM is in its all-inclusive view of the large range of related factors to the KE and is based on data issued by trustworthy institutions that are at the forefront of collecting and producing a nation's statistics which are dependable, internationally consistent, and are up to date (Chen & Dahlman, 2006).

The KAM is an enabler benchmark tool that helps identify the level of the KE of a country in order to compare itself with neighboring countries, the ones they are competing against, or countries which they would like to use as role models for benchmarking. This tool is used for emulation by learning through similarities with others instead of imposing policies and programs (Robertson, 2009). KAM

recognizes that the settings leading to KE development should include an official administration offering the right incentives, an educated and trained work force, an up-to-date prevalent information infrastructure, and an active innovation system which are all connected under four pillars (Table 2.1).

Table 2.1: The four pillars of KE

PILLAR 1 Economic and Institutional regime	PILLAR 2 Education and skills	PILLAR 3 Information and communication infrastructure	PILLAR Innovation system
The country's economic and institutional regime must provide incentives for the efficient use of existing and new knowledge and the flourishing of entrepreneurship	The country's people need education and skills that enable them to create and share, and to use it well.	A dynamic information infrastructure is needed to facilitate the effective communication, dissemination, and processing of information.	The country's innovation system firms, research centers, universities, and other organizations must be capable of tapping the growing stock of global knowledge, assimilating and adapting it to local needs, and creating new technology.

Source: World Bank Institute (2008)

The KEI is the basic scorecard derived from KAM, which is used recurrently for environmental preparedness of a country to utilize knowledge in economic development. It includes three variables for each of the four pillars and are grouped under two indexes: the KI and the KEI (Figure 2.2).

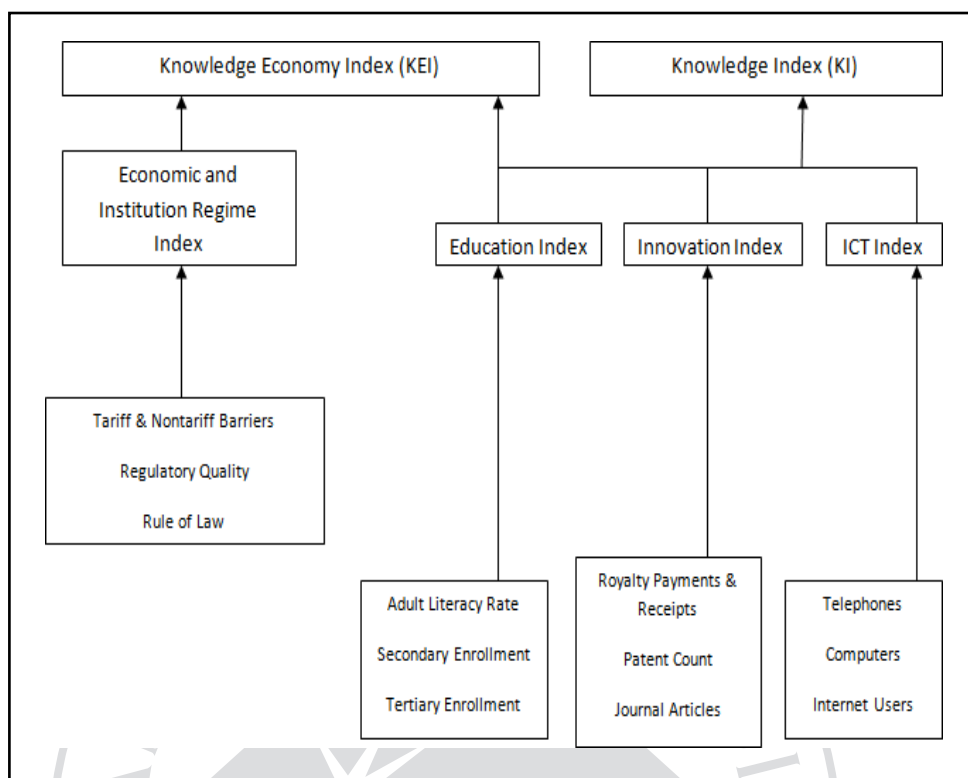


Figure 2.2: The four pillars of KEI and the KI

Source: World Bank Institute (2008)

The KI measures a country's ability to generate, adopt, and diffuse knowledge (Chen, 2008). This is a sign of the general potential of knowledge growth in all countries. It is the simple medium of the standardized performance marks of a country or region on the important variables in three KE pillars – education and human resources, the innovation system and ICT.

The KEI measures whether the setting is favorable for knowledge to be used efficiently for economic progress. It is a collective index that denotes the overall level of progress of a state or region regarding their KE. It is the simple medium of the standardized performance marks of a state or region on all four pillars.

In 2005, the model included 128 countries in its database and used 80 structural and qualitative variables for measuring a KE (Chen & Dahlman, 2006)

(Table 2.2). World Bank's 2012 KEI included 148 structural and qualitative variables distinguished for 146 countries across the world, to measure their performance according to the four KE pillars (Hadad, 2017).

Table 2.2: The variables in KAM

Performance Indicators Average Annual GDP growth (%) GDP per capita (International Current PPP) Human Development Index Poverty index Composite ICRG risk rating Average unemployment rate, % of total labor force Employment in industry (% of total employment) Employment in services (% of total employment) GDP (current US\$ bill)	Innovation System FDI as percentage of GDP Royalty and license fees payments (\$ millions) Royalty and license fees payments in US\$ millions / million population Royalty and license fees receipts in US\$ millions Royalty and license fees receipts in US\$ millions / million population Science & engineering enrolment ratio (% of tertiary level students) Researchers in R&D Researchers in R&D / million Total expenditure for R&D as percentage of GDP Manufacturing, Trade as % of GDP Research collaboration between companies and universities Cost to register a business (% of GNI per capita) Cost to enforce a contract (% of GNI per capita) Scientific and technical journal articles Scientific and technical journal articles per million people Administrative burden for start-ups Availability of venture capital Patent Applications granted by the USPTO Patent Applications granted by the USPTO (per million pop.) State of cluster development High-technology exports as percentage of manufactured exports Private sector spending on R&D
Economic Regime Average Gross capital formation as % of GDP General government budget balance as % of GDP Trade as % of GDP Tariff & nontariff barriers Intellectual Property is well protected Soundness of banks Exports of goods and services as % of GDP Interest rate spread (lending minus deposit rate) Intensity of local competition Domestic credit to the private sector (% of GDP)	Information Infrastructure Telephones per 1,000 people (telephone mainlines + mobile phones) Main Telephone lines per 1,000 people 65. Mobile phones per 1,000 people Computers per 1,000 persons TV Sets per 1,000 people Radios per 1,000 people Daily newspapers per 1,000 people Internet hosts per 10,000 people Internet users per 10,000 people International telecommunications: cost of call to US in \$ per 3 minutes E-government ICT Expenditures as a % of GDP
Institutions Regulatory quality Rule of law Government Effectiveness Voice and accountability Political stability Control of corruption Press freedom	Gender Equality Gender development Index Females in labor force (% of total labor force) Seats in Parliament held by women (as % of total) Females Literacy Rate (% of females ages 15 and above) School enrolment, secondary, female (% gross) School enrolment, tertiary, female (% gross)
Education and Human Resources Adult literacy rate (% age 15 and above) Average years of schooling Secondary enrolment Tertiary enrolment Life expectancy at birth, years Internet access in schools Public spending on education as % of GDP Professional and technical workers as % of the labor force 8th grade achievement in mathematics 8th grade achievement in science Quality of science and math education Extent of staff training Management education is locally available in first class business schools Well educated people do not emigrate abroad	

Source: Chen and Dahlman (2006)

The KE framework affirms that providing funds in the above four pillars is a necessity for continuous creation, implementation, adaptation, and use of knowledge in the local production of an economy that results in higher value added commodities and services (Chen & Dahlman, 2006). The researchers continue to state that these investments would promote the probability of the success in an economy, and

consequently economic development in today's highly competitive and global economy.

2.3 Knowledge Cities and Smart Cities

A city which is guided by the principle of becoming more sustainable and resilient in its operations is considered as smart (Spielman, Hartwich, & Grebmer, 2010; Lombardi, Giordano, Farouh, & Yousef, 2012). The smart city concept is generated by a range of social and economic trends, including sustainable development and advances in communication and information technologies (Bakıcı, Almirall, & Wareham, 2012).

Although there is still no consensus concerning the phenomenon of the smart city, many researchers agree that improving quality of life is the primary objective associated with the smart city concept (Dupont, Morel, & Guidat, 2015; Florida, 2008). Nevertheless, the extent to which stakeholders such as citizens impact the creation of a smart city varies in the literature. For example, Kumaraswamy and Anvuur (2008) were convinced that stakeholder engagement in this process was crucial. On the contrary, Hill (2011) arrived at the conclusion that it was impossible to engage all citizens because of significant differences between stakeholder groups.

Brewer et al. (2013) also emphasized the importance of citizens' involvement. Indeed, citizens can be viewed as both producers and consumers of digital information. The researchers also indicated that the model of the smart city was highly dependent on the cultural, political, and economic context of a country (Brewer et al., 2013). This statement has an important implication for this doctoral project since Arab countries such as Bahrain or Saudi Arabia have a unique cultural

context, in which all aspects of social and business life are controlled and regulated by Islamic law (Ahmed & Al-Roubaie, 2012). These characteristics may have an impact on the way in which information is produced and consumed by citizens as well as the extent to which they are involved in the creation of smart cities (Morse, 2010)

Mohamed, O'Sullivan, and Ribière (2008) believe that although there is a knowledge gap between the West and the Arab world, the gap can be narrowed by nurturing the R&D strategy and the ICT infrastructure.

Dubai and Qatar were the pioneers in taking initiative to transform their societies into a *knowledge society* by pursuing ground-breaking models in 2007. The first model was introduced by Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, when he introduced a grant of ten billion US dollars for an Avant-garde foundation, the MBRF, to foster knowledge in the region. The second model was the establishment of a center by the Qatari government for knowledge creation called *Education City*. The center's core objective is to establish the most dominant educational and research hub in the Middle East (Mohamed, O'Sullivan, & Ribière, 2008).

2.3.1 knowledge city indices. The role of innovation in a country's development is hard to estimate since it allows for improving the quality of its citizens' life, developing more advanced infrastructure and making governmental processes and policies more effective and adequate (Garcia, 2010; Garcia, 2008). However, the extent to which a particular city, region or community is innovative was hard to assess until recently.

In 2007, the MAKCi Awards were introduced. The award's process is “an international consulting process established to identify and recognize those communities around the world who are successfully engaging in formal and systematic knowledge-based development processes” (World Capital Institute [WCI], 2008b, p.1).

The MAKCi framework allows for identifying the extent to which communities and cities are actively increasing their societal capital through the transformation of knowledge-based wealth into innovative solutions (Bergek, Jacobsson, Carlsson, Lindmark, & Rickne, 2008; WCI, 2008a). In addition, this process allows for examining whether a particular city can be considered as a social capital engine for its regions (Garcia, 2007; WCI, 2008b).

The MAKCi framework offers the generic cataloguing of city classifications as a value system, which consists of eight categories (Figure 2-3) namely identity capital, intelligence capital, financial capital, relational capital, human individual capital, human collective capital, instrumental-material capital, and instrumental-knowledge capital (WCI, 2008a).

Although all categories are equally important in the creation of a value-production system, only the instrumental-intangible capital category is viewed as knowledge-based methods of fabrication that helps other capital types control their capacity to generate value (Martín-de-Castro, López-Sáez & Navas-López, 2008). This category considers productive, educational, scientific, technological, and governmental innovation (Eijkman, 2008).

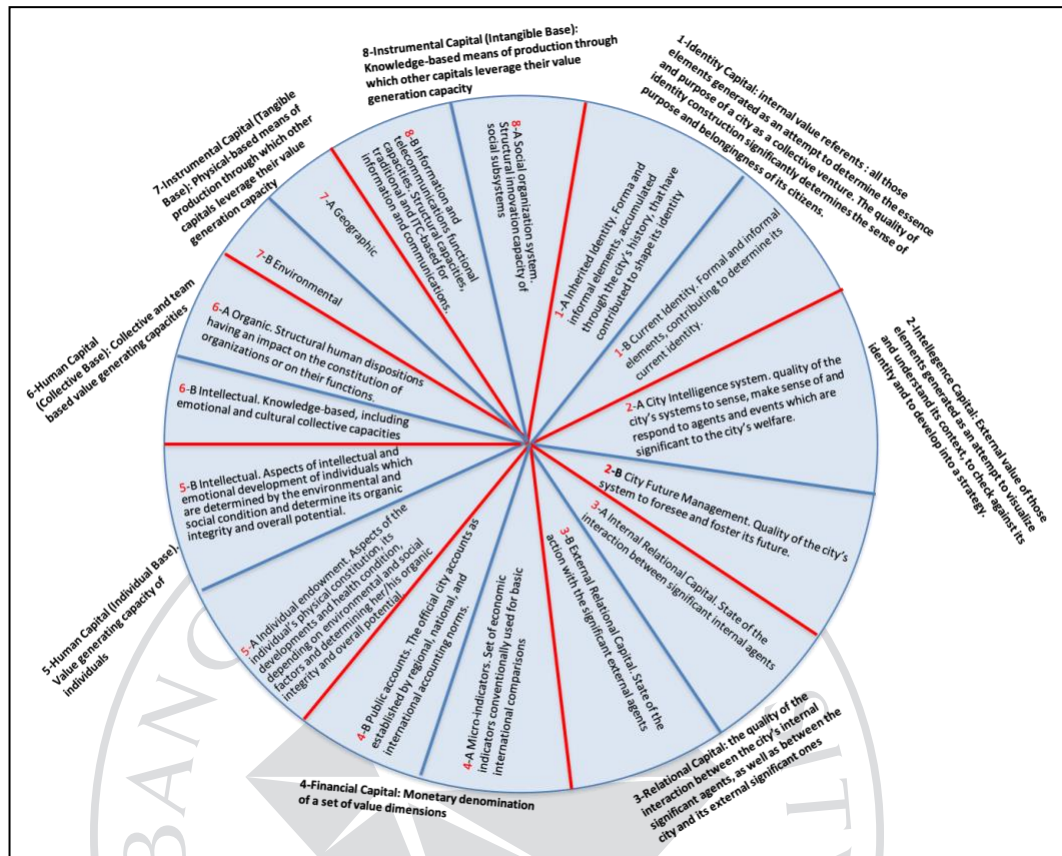


Figure 2.3: MAKCi's eight city category value system

Source: Researcher's own elaboration extracted from WCI (2008a)

The significance of the MAKCi framework is that it allows for measuring the innovation capacity of both private and public sectors. For example, it is possible to measure the extent to which a country's private sector is innovative on the basis of new business incubation, initial public offerings, survival rate after one and five years and percentage of high significance new commerce creation (Popidiuk & Choo, 2006). In turn, the innovation ability of the community segment is assessed on the basis of indicators such as legal reforms, political organization and a country's ranking in international government efficiency benchmarks (Bergek et al., 2008).

2.4 The Role of Innovation

Modara and Bennet (2017) stated that “Innovation is a process full of diversity and risk for creating something new. To understand the important role of innovation in an economy, one has to first understand the concept of innovation along with identifying innovation types” (p. 515).

Damanpour and Evan (1984) state that innovation is an extensively used model and the expression is variously defined to propose the particular requirements and characteristics of a certain study. Innovations do differ, and each kind has its own characteristics that affect its rate of implementation.

Therefore, we need to differentiate between the diverse types and come up with one that suits the aim of the current study.

2.4.1 the definition and types of innovation. In the early versions of innovation models, Knight (as cited in Modara & Bennet, 2017) implied that

There are four kinds of innovation: (a) product or service innovation which was concerned with the establishment's new product or service contributions (b) production-process innovation, related to alterations of the establishment's operations or inventions; (c) organizational structure innovation relating to the relationships, communication, or formal reward systems in the establishment; and (d) people innovation in regards to the change in levels, personnel, job allocations, culture, and conduct of employees of the organization. (p. 515)

However, innovation is a complex term to define. It comes in many forms and from anywhere internal or external to organizations. It can be a product or a service, which is either new or improved. Innovation can be a process or a business practice

in an organization. But whatever is the outcome of innovation, it is a major economic driver in all segments of the economy, a new way for doing things better. New markets are created when companies innovate, and those companies can gain relative advantage and increase their productivity by using their resources of labor, land and capital more efficiently (OECD, 2007).

Schumpeter is a main figure for evolving the indication of innovation as a basis for economic transformation (Godin, 2008). Conventionally, innovation was understood as an invention, creation, idea or procedure, which provided innovative ways for working to solve critical problems or realizing goals (Nazari et al., 2009). It was generally accepted in the prevailing literature that innovation was fundamental for ethnic, societal, environmental, and financial development (Galindo & Mendez-Picazo, 2013; Aubert & Reiffers, 2004). However, the latest transferal from industrial economies to economies which are centered on knowledge has also altered the innovation system model (Schulze & Hoegl, 2008). Nour (2014) observed that in this transformed paradigm the continued social and economic consequences depended heavily on innovation in science and high-tech machinery as well as shared and collective innovation, which typically emerged from an exclusive mixture of knowledge, skills and practices (Nour, 2014).

The ability to recognize and spot prospects is what drives innovation (Tidd, Bessant, & Pavitt, 2005) which according to Schumpeter can be found in any of these occurrences: a new product, a new means of production, start of a new marketplace, discovery of a new material, and implementation of a new form of business (Godin, 2008).

In their theoretical paper Rowley, Baregheh, and Sambrook (2011) conducted a thorough assessment of the models and frameworks of the different forms of innovation and sought to categorize and refine the relationships amongst them. In other earlier studies, the focus was on binary models that came in the form of pairs, administrative/technical, product/process, and radical/incremental (Godin, 2008). Administrative and technical innovation is a dual model in which technical innovation is related to new goods, procedures, or services, while administrative innovation is the one that occurs in the social system of an organization (Damanpour & Evan, 1984). The social system includes the relations between individuals who interrelate to achieve a specific goal or mission. Technical here is not to be confused with technological innovation which has to do with technology advancement.

Product and method innovation is one more dual classification of forms of innovation. Knight (1967) recognized product innovation as a new or enhanced formation or facility for the clients who see the effect in the new product or service delivered to them, while method innovations alter or develop how organizations handle their day-to-day performance in their establishments.

The third binary category is radical and incremental innovation. While small change innovation is an addition to a preceding innovation such as a change in the material or an updated design, radical innovation is fundamental change in which a whole new product or design is produced. Rowley et al. (2011) consider radical and incremental innovations as attributes to the other types of innovations and not a separate category of their own.

Figure 2.4 illustrates the simple diagram that Rowley et al. (2011) constructed from the innovation types they discussed in their paper in order to simplify the ordeal of understanding the types of innovation and the connections between them.

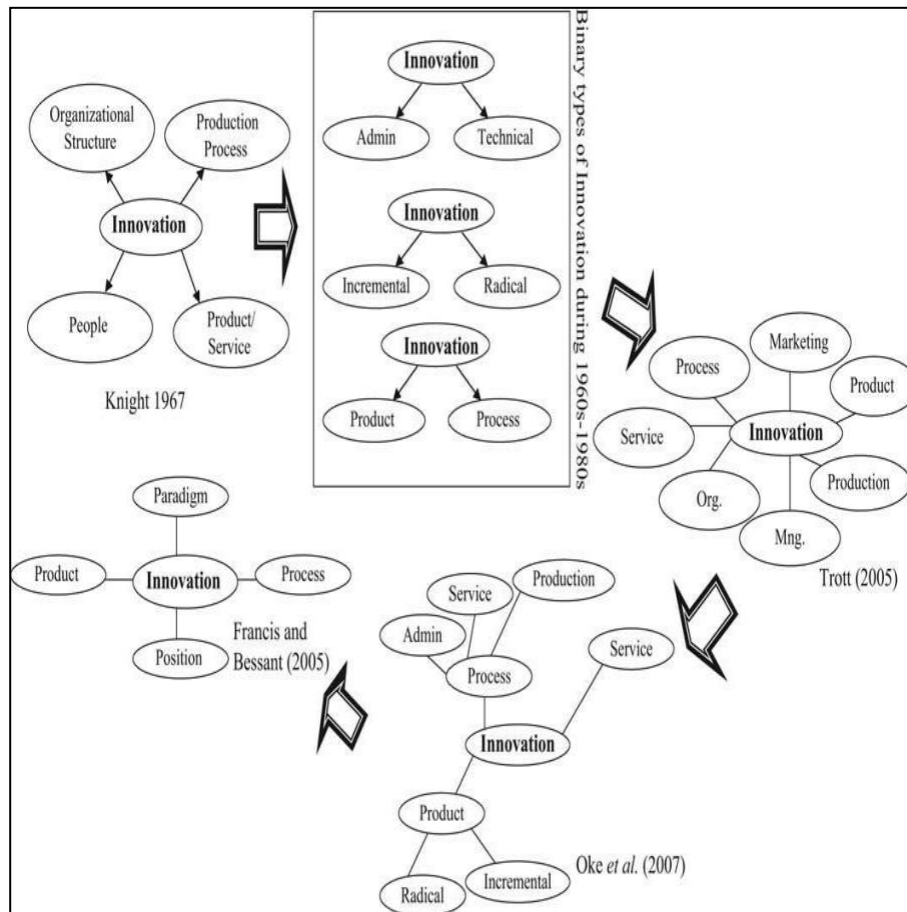


Figure 2.4: Typologies of innovation

Source: Rowley et al. (2011)

Johannessen, Olsen, and Lumpkin (2001) introduced yet another model of innovation types which digs deeper into the details of six kinds of innovative events: novel products, novel services, novel methods of fabrication, introducing different markets, novel origins of resource, and new modes of systematizing. Bessant and Tidd (2007) introduce two new types along with product and process which are position and paradigm innovation. Position innovation deals with changing the

perspective of the customer in regards to how they view or understand the product, while paradigm innovation is related to a substantial shift in opinions and markets.

Figure 2.5 shows the proposal framework for types of innovation as developed by Rowley et al. (2011) after making the definitions offered by previous authors match in conjunction with the framework constructed by Francis and Bessant (2005). Their contribution is to make it simpler for future researches on types of innovation by their creation of the clear relationship between several kinds of innovation and provision of the innovation-type mapping tool that can be utilized by future researchers as a guide and source of innovation types.

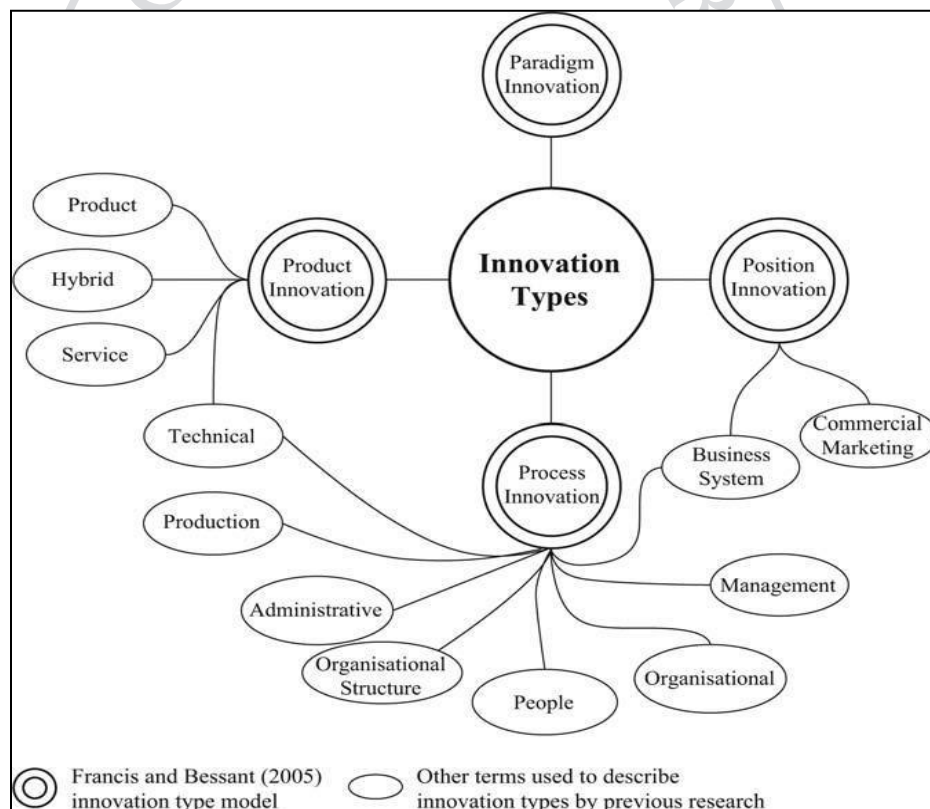


Figure 2.5: Innovation-type mapping tool

Source: Rowley et al. (2011)

2.4.2 Innovation and knowledge. According to the ABS (2002) report, observed studies show that the undertaking of knowledge happens amongst all entities that have interest in innovation, and for exclusive goods, procedures, and technologies to be produced via a non-linear flow of knowledge, it is crucial amongst all those entities in the grid to have a scheme called the innovation system.

Existing knowledge is considered as an important condition for the innovation process to occur (Bergek et al., 2008). For example, Al-Roubaie (2010) arrived at the conclusion that there was a link between a company's innovative capability and its prior knowledge. The researcher found that organizations with a very low level of knowledge did not have any innovative capability. These outcomes can be explained by the fact that the low level of knowledge can become unfeasible to accumulate the necessary amount of knowledge (Popidiuk & Choo, 2006) to support innovation.

Even though knowledge is commonly cited as an important prerequisite for innovation, it does not initiate the innovation process (Dodgson, Gann, & Salter, 2008; Galindo & Mendez-Picazo, 2013). According to Sorensen and Torfing (2011), this process begins with the creating and defining a problem by an organization. Similarly, Schulze and Hoegl (2008) demonstrate results where the innovation process is pushed by a mixture of a firm's current knowledge and technical intuitions. It should be noted that these problems are also the result of initial research, which is confirmation of the fact that the innovation process begins with a firm's creating and defining problems (Galindo & Mendez-Picazo, 2013). This approach to innovation is in keeping with the improvement of tacit knowledge since when innovation starts

with a difficulty, tacit knowledge directs the further development of new knowledge (Nazari et al., 2009).

Mechanisms connecting social knowledge and innovation have also been given close consideration in the assessment of the literature. Numerous knowledge academics and researches concur that innovation is a product of knowledge interchange and recombining (Bergek et al., 2008; Popidiuk & Choo, 2006). This viewpoint concurs with Narvekar and Jain (2006) who claimed that an innovation originates from a process of current knowledge and competences reprocess in a new application setting. The validity of this framework as well as the link between knowledge and innovation has been explored by many researchers in the field ((Martín-de-Castro, López-Sáez, & Navas-López, 2008); Popidiuk & Choo, 2006).

Aubert and Reiffers (2004) reported that a company's combined competence pushes innovation. The researchers were convinced that an enterprise's energetic competency to use knowledge in amalgamation with technology allowed for generating new applications for existing knowledge (Aubert & Reiffers, 2004). This statement is also consistent with the knowledge-based view of the organization, according to which the integration of knowledge plays an important role in a company's ability to create and maintain competitive advantage (Galindo & Mendez-Picazo, 2013; Ruscoe, 2008). This integration was argued by Martín-de-Castro et al. (2008) to occur through routines, direction, and a hierarchy of capabilities. The scope of Aubert and Reiffers' (2004) study is limited to developed countries in the Middle East, making it highly relevant to this doctoral project.

Knowledge and innovation are usually viewed as moderating variables for more generic performance frameworks (Bergek et al., 2008). For instance, Pawlowski and Pirkkalainen (2012) state that knowledge acquisition plays a mediating role between new product development and social capital. However, other approaches—including dynamic capabilities, core competencies, and core capabilities—are aimed predominantly at strategic issues (Dodgson et al., 2008). Therefore, they fail to build a direct link between knowledge and innovation. Nevertheless, these approaches imply that a firm's knowledge is the main source of its capability and strategic advantage (Popidiuk & Choo, 2006) and this advantage usually comes in the form of innovative processes, products, or services.

Gopalakrishnan, Bierly, and Kessler (1999) endeavored to connect the features of knowledge to innovation kinds and examined the affiliation between the two and concluded that process innovations incorporated more complicated and systematic knowledge in contrast with product innovations. These results specified that innovation at the total level was more complicated and perplexing than at the micro level. As such, reforms, which signify the enhancement of governmental processes and guidelines, could be recognized as process innovations (Galindo & Mendez-Picazo, 2013). These innovations necessitate substantial means of finance and time to transpire, whereas product innovations that regularly occur at the micro level, are simpler and less costly to introduce (Bergek et al., 2008).

This dissertation addresses macro level innovations by examining the roles of the government and the private sector and how those roles influence innovation activities in the developing KE of Bahrain.

2.4.3 innovation and economy. In his paper, Godin (2008) is of the opinion that J. Schumpeter is a main figure on technological innovation. He states that the majority of economists studying technological innovation consider Schumpeter as the pioneer in presenting innovation into economic studies.

According to the previous sections of this literature review, innovation in the modern world is usually associated with technology (Aubert & Reiffers, 2003; Pawlowski & Pirkkalainen, 2012). The emergence and growing popularity of the Internet has contributed to the embracing of Web 2.0 technology. In turn, a heavier emphasis has been placed on knowledge sharing rather than information consumption (de Waal & Sultan, 2012). In addition, knowledge-generating activities, which foster communities and social networks, have replaced centralized content and control (Madichie, 2013). Nevertheless, these notions are applicable only to highly developed countries such as the UK or the US. In some developing countries, citizens have very limited access to information and Web 2.0 technology. For instance, in China, internet users have no access to Facebook, one of the largest social networking services worldwide (Martín-de-Castro et al., 2008; Peng et al., 2010). As can be seen, the overall context in which innovation takes place differs across developed and developing countries (Sorensen & Torfing, 2011).

Innovation is considered to be the primary source of significant capital production within an economy (Jackson, 2011) and the primary driver of contemporary economic development (Ezell, 2014; IacovoIU, 2016).

According to Khorsheed (2015) innovation and knowledge-driven technology changes are the reason for the biggest share of the economic growth and—regardless of

the end result of whether innovation outcome is a product or a process, whether it is a major kind or a small change, or whether it is technological or business oriented—it is of value increase for the end user, the manufacturer or the whole society.

Modern-day services such as telecommunications, IT, and financial service make a significant impact on innovation (Gryczka, 2016) and hence hold a strong role in the new economy. As a result of these drivers, developing countries such as Bahrain are considering the shift from a natural resource-based (oil) economy to a KBE.

This research focuses on the innovation pillar in a KE and aims to investigate the elements that induce its maturity in a developing KE.

2.4.4 The Global Innovation Index (GII). The GII is another ranking that demonstrates countries' capacity for and success in innovation (Chen, 2008). GII is a report, which is published yearly by Cornell University, INSEAD, a business school, and the World Intellectual Property Organization (WIPO) which ranks 127 countries' economies around the world based on 81 indicators to find the most innovative one (GII, 2017). It differentiates between innovation occurrence and innovative construction by evaluating innovation inputs and innovation outputs as independent variables of determinants for an innovation ecosystem (Merican & Göktaş, 2011).

One significant distinction between the GII and KAM frameworks is that the GII recognizes innovation as the main driver of economic development and welfare and understands that the human factor behind innovation is crucial for the proposal of policies that assist in promoting economic growth and wealthier innovation-prone environments locally. GII's goal is to capture the multi-dimensional features of

innovation and provide the instruments that can help in shaping policies to support sustainable output progress, enhanced productivity, and employment growth (GII, 2017).

Another significant distinction between GII and KAM frameworks is that the GII approaches innovation in a much more detailed and precise way. According to the GII, there are seven support elements of innovation, namely institutes, social capital and research, substructure, market complexity, business complexity, knowledge and technology products, and creative productivities (Narvekar and Jain, 2006). These elements describe specific features of the milieu, which facilitate creation of new knowledge in an economy (Popidiuk & Choo, 2006). Figure 2-6 shows the pillars of GII and the primary elements of each pillar as per the researchers own structure.

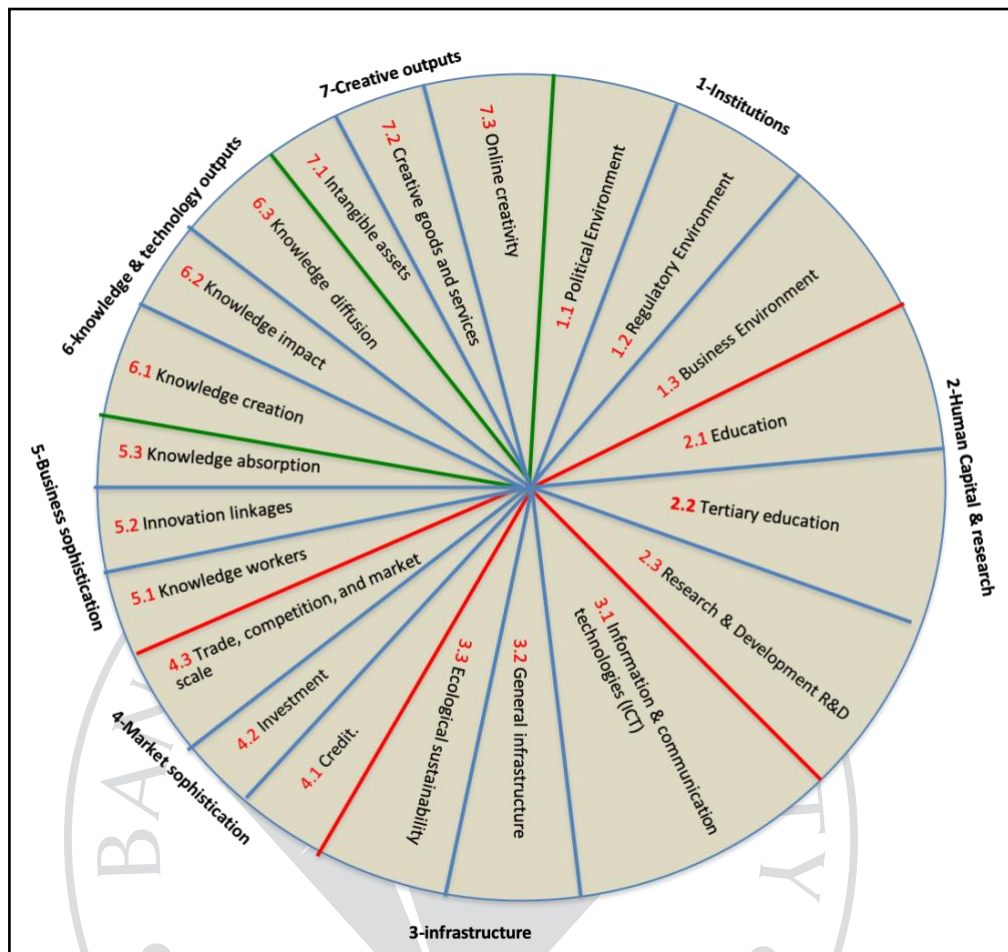


Figure 2.6: GII pillars

Source: Researcher's own elaboration extracted from GII (2017)

2.4.5 innovation ecosystem. The notion of innovation ecosystem appeared in early 2000s to address the demands of the emerging KEs in which the creation of innovations and the related development processes for these innovations were gradually becoming non-linear and more network-based (World Economic Forum, 2015). Up to that time, innovation systems, which were coined in the industrial age, were argued by Huggins and Izushi (2008) to be crucial to a country's ability to generate and adopt knowledge. Therefore, the extent to which the innovation system of organizations, research centers, institutions, universities, think tanks, or other

establishments applied and adapted global knowledge to the needs of local communities to create new technology determined whether or not a country could develop a KE and sustain long-term economic growth (Al-Ali, 2008).

Innovation ecosystems developed from state innovation systems models with a difference in that policies could govern innovation systems and affect the organizations, while innovation ecosystems were dynamic structures that developed in accordance to changes in the market conditions that couldn't automatically be administered by public policies (Mercan & Göktaş, 2011). Innovation ecosystems are distinct organizational spaces that are custom-made to co-create values through collaboration (Smorodinskaya, Russel, Katukov & Still, 2017). They are high-level environment of actors, assets, and connections that were created by collaborative activities of networks.

Largely, innovation ecosystems deal with the social, organizational, and cultural changes that facilitate the creation of the knowledge-based economy. According to Crowley (2011), innovation had its own ecosystem that contained numerous actors – people, businesses and organizations – and was a complicated and recursive procedure that involved several interactions, which consequently resulted into a product, a process or service for the market.

Jackson (2011) stated that an innovation ecosystem was an economic model that aimed at enabling technology progress and innovation. It comprised two distinctive economies, the first one, KE, which had research as its driver, and the second one being a commercial economy, which was charted by the marketplace. These two economies were linked since the outcome of research, translated into

innovation, converted into value in the commercial economy after which a part of that value would then inject back into the KE as an investment for R&D to produce new knowledge.

The World Economic Forum argued that innovation meant not only technological innovation, but rather in a more holistic sense, took the shape of an ecosystem that was conducive to the creation of ideas and the execution of those ideas in the shape of new products, services, and processes (World Economic Forum, 2015). With regards to the scope of innovation, it was also found that not only formal scientific R&D generated new ideas, but non-R&D activities that did not require research funds, could also generate new ideas that increased the effectiveness of the goods or services being created (Smorodinskaya et al., 2017). Innovations such as in administrative and governmental methods, personnel, accounting, and work procedures were considered as non-R&D oriented and the result of their applications could be direct money generating ones or not a direct source of money generating ones.

Although, Smorodinskaya et al. (2017) argued that natural ecosystems could not be the same as social and economic ecosystems, but both kinds contained inhabitants that were capable in self-organizing and self-developing in a comparable and agile mode of complex adaptive systems. The two kinds of ecosystems also associated with inter-relationship of components and the ability to adjust in and evolve with a changing environment in a mutual matter. In contrast to a typical traditional system, ecosystems can get new sources of development and attain dynamic sustainability within internal, self-correcting organizational changes or from

an outside intervention rather than through top-down interference of any centralized entities (Smorodinskaya et al., 2017).

Jackson (2011) associated the relationships of the components of the two ecosystems and described a biological ecosystem as a complicated set of relations among the organic resources, habitats, and occupants of an area, whose primary goal is to preserve an equilibrium sustaining form by means of energy transformation between all those organic and non-organic entities. The innovation ecosystem's actors on the other hand, comprised of material resources (capitals, equipment, accommodations, etc.) and the human capital organizations who ran the establishments in a society such as universities, business firms, government bodies, and financial institutions and interacted with each other to create new knowledge that injected value in the economy.

Fukuda and Watanabi (2012) also compared the commonality of an innovation ecosystem to a natural ecosystem in that they both consisted of many contributors that interacted with each other by co-existing, co-evolving, and co-adapting. It was only through the collaboration of these complex inter-related networks that the performance of the innovation ecosystem was improved. The government sector would initiate policies and inject funds for R&D, while the private-sector comprising of universities, research centers, and enterprises, would create new knowledge that would get diffused into the market and generate value.

Bramwell, Hepburn, and Wolfe (2012) discussed the availability of an innovation ecosystem globally by nations adopting and building strong and sustainable ones that support and leverage the unrestricted flow of knowledge

throughout their economies. They went on to say that policy decision-makers should look at innovation systems holistically and focus mainly on the collaborative, inter-reliant nature of the innovation methods and come to know how to best encourage constructive systems and affiliations within and across the sectors of comparative advantage in the society.

We use the term ‘innovation ecosystem’ to refer to the inter-organizational, political, economic, environmental, and technological systems of innovation through which a milieu conducive to business growth is catalyzed, sustained and supported. An innovation ecosystem is a network of relationships through which information and talent flow through systems of sustained value co-creation. (Sinkovec, 2014, p. 3)

The researcher went on to emphasize that innovations made to the innovation ecosystem itself represented the most valued methods of innovation.

Sinkovec (2014) stated that there were no perfect models available for an ideal innovation ecosystem, and it was all dependent on progress and the kind of wider governmental, financial, and societal systems. Khorsheed (2015) believed that the innovation competence in a society and its ability to sustain growth was dependent to largely on the strengths of and collaborations between many organizations and the effectiveness of distinct policies. When putting together the actors who would contribute to the innovation ecosystem, among the factors that helped in it being a healthy one was the provision of a mechanism that regulated the construction of the affiliations and other non-tangibles and developed trust between the bodies within the ecosystem (Jackson, 2011).

It appeared that successful innovation needed a face-to-face collaboration to succeed. Factors for its success included availability of accessible funds, capacity to fail, a mix of pride and competition, cultural backup, capability to grab the opportunity when being in the right place at the right time, governing environment that did not impose too many barriers, and most important having individuals with vision on the funding side (Lawlor, 2014).

The researcher did not find in the literature one single formula for constructing a successful innovation ecosystem because these ecosystems depended on the local culture and environment, the nature of the innovation and its processes, the impact of those innovations on the local economy, and the period those ecosystems needed in order to mature. Other difficulties involved the nature of each actor or stakeholder taking part in those ecosystems and their goals. The researcher reached a conclusion that an effective innovation ecosystem would be drawn from lengthy development of collaboration between those actors in order to reach a common goal. Generally, those ecosystems were related to a specific goal, which when attained, the purpose for the ecosystem's existence would no longer be necessary, and therefore the ecosystem would be a project related one.

2.5 Collaboration

2.5.1 collaboration definition. Guzman & Sierra defined collaboration as a cooperative arrangement, in which two or more parties work jointly towards a common aim. Chun, Luna-Reyes, and Sandoval-Almazan lightly defined collaboration as “a process or a set of activities in which two or more agents work together to achieve shared goals” (as cited in Modara & Bennet, 2017).

Bennet, Bennet, and Lewis (2015) perceived collaboration as a procedure in which two or more units joined to make new knowledge by tactics in bringing their mindsets and existing assets and knowledge jointly to share, relate, and influence those mindsets to produce value to both of their units. Considering the setting of this dissertation, it is appropriate to define collaboration as stated by Modara and Bennet (2017) as “A cooperative arrangement, in which the private and the public sectors work jointly towards a common goal” (p. 517).

Collaboration was reported by Sorensen and Torfing (2012) as an effectual instrument that permitted for transferring knowledge amid individuals and created competitive gain. Hence, efficient collaboration amongst the private sector and government can ease the growth of innovation as well as fuel economic growth (Bommert, 2010).

At the same time, interaction between private and public organizations can lead to a conflict of interest between the parties, which, in turn, may damage their effectiveness and profitability (Spielman et al., 2010). That is why negotiations are considered as an important aspect of collaboration that helps to find solutions advantageous to both parties (Nardelli, Jensen, & Nielsen, 2015).

Business managers are making the concept of collaboration a part of their daily mundane as the world is spearheading faster into the internet epoch and globalization (Bennet, Bennet, & Lewis, 2015).

2.5.2 relation to innovation. The effect of innovation on companies' accomplishments and economic sustainability in the private business domain has been widely reviewed in the current body of literature (Yigitcanlar, Velibeyoglu, &

Martinez-Fernandez, 2008; Sorensen & Torfing, 2011). Sorensen and Torfing (2011) found that innovation aided private businesses reduce their costs and expenses, increase the quality of their merchandises, services and procedures and open new marketplaces. In return, corporations that fail to transform and start innovating slowly lose their modest advantage and observe decreasing revenues and market shares (Crosby & Bryson, 2010).

Crowdsourcing was mentioned by Madichie (2013) as another way of generating knowledge in the business environment. However, small and medium enterprises (SMEs) are limited in their resources, meaning they are unable to invest heavily in R&D (Yigitcanlar, Velibeyoglu, & Martinez-Fernandez, 2008). Nevertheless, SMEs tend to form strategic alliances with each other as well as public knowledge producers in order to successfully compete with larger market players (Spielman et al., 2010).

In comparison to the private sector, there is a lot of skepticism about public organizations' needs and capability to innovate (Nardelli et al., 2015). Undoubtedly, the public sector is reflected as a slow-moving establishment unable of taking quick decisions and reacting to transformations in the environment outside of their organizations in a quick manner (Guzman & Sierra, 2012). This declaration was consistent with Weber (1978) who claimed that stability was the main purpose of public bureaucracy.

Public innovation is hampered by bureaucracy characteristics such as multi-layered hierarchies, the lack of economic incentives, and a wide range of formal rules.

The lack of resources was reported by Lember, Petersen, Scherrer, and Agren (2014) as another barrier to public innovation. The growth of public bureaucracies is associated with increased spending on the provision of internal coordination (Sorensen & Torfing, 2011).

2.5.3 collaboration between government and private sector. The need for government and private sector collaboration (GPC) initiates from several encounters in the arena of technology and science (Crosby & Bryson, 2010). For example, improving the official frameworks to partnership between private and public establishments, improving the attraction of a country as a site for R&D and cultivating interdepartmental synchronization were recognized by Yigitcanlar et. Al (2008) as solid challenges that eased collaboration amid the private sector and the public sector. By founding a trust with private companies, the government could successfully face these challenges, warrant sustained progress in productivity, and develop the quality of its citizens' lives (Sorensen & Torfing, 2011).

Nonetheless, empirical evidence on the association of public-private collaboration and innovation is infrequent, making this connection inadequately understood and studied (Nardelli et al., 2015).

There are two perspectives on the issue of GPC, namely innovation as a market occurrence and innovation as a nonmarket occurrence (Lember et al., 2014). The market-oriented approach to the contextualization of innovation and collaboration is appropriate since both private- and public-sector organizations are involved in the process of innovation creation (Guzman & Sierra, 2012).

According to the market-oriented approach, GPC can be viewed as a powerful tool for fostering innovation in both developed and developing countries (Morth, 2007). From the market perspective, collaboration between private and public organizations is focused on the provision of an organizational frame for knowledge generation and innovation activities (Osborne & Brown, 2011). Furthermore, planned partnerships between the government and private companies were reported by Kristensen, McQuaid, and Scherrer (2015) to deliver innovation-relevant substructures and provide innovation policy.

Sorensen and Torfing (2011) concurred that GPC allowed for nurturing the production of knowledge and innovation by delivering the setting for producing innovative goods, services, and procedures to the marketplace. The role of the government in this process is to select the most suitable partners (Sorensen & Torfing, 2011). However, this intervention is considered by some scholars as inappropriate since the market is a self-regulated entity (Morse, 2010; Erakovich & Anderson, 2013). Nevertheless, the large difference between social and private returns caused by market failure was reported by Crosby and Bryson (2010) to justify government intervention in innovation and technology.

Delivering infrastructure is an additional main field of applying GPC models in sectors such as well-being, transportation and education (Brewer et al., 2013). This statement is also pertinent to innovation-related infrastructure as private and public establishments have long been cooperating in constructing and running infrastructure for the dispersal of knowledge and technology (Guzman & Sierra, 2012). According to Kumaraswamy and Anvuur (2008), public-private collaboration is a method of

innovation delivery, which is actively used as a tool for innovation program development and innovation project delivery. However, these processes require integrating partners from public research institutions and private businesses to ensure their success. In this context, GPC is supportive to organize the innovation process by combining innovation policy modes and linking them with specific innovation projects (Nardelli et al., 2015).

Alternatively to the market-centered approach, there is still no consensus among scholars and researchers on how the concept of innovation should be perceived and understood in the public sector (Kristensen et al., 2015; Crosby & Bryson, 2010). Nevertheless, it is commonly accepted that there are three public sector dimensions of innovation, namely, collaboration (a) as an incentive of modification in public organizations' practices; (b) as a method of dealing with social problems; and (c) as a tactical instrument for introducing governance modifications (Lember et al., 2014).

For instance, Gunday, Ulusoy, Kilic, and Alpan (2011) found that GPC could significantly change public organizations' routines. The researchers mentioned that the development of new capabilities and learning patterns focused on the launch of a new project resulted in direct innovation effects (Gunday et al., 2011). In turn, non-direct innovation effects may develop as a lateral effect of collaborative plans. Sorensen and Torfing (2011) reported that redesigned business processes as a result of public-private collaboration produced a strong positive impact on organizational productivity.

GPCs can be viewed as a form of relationship established when a private organization provides its economic funds and administration capabilities to the public sector in order to apply public policies (Guzman & Sierra, 2012). In return, this enterprise is provided with certain benefits such as the association of its brand with public goods or services (Crosby & Bryson, 2010). However, this definition is more applicable to the domain of marketing rather than management, which limits its use for the purpose of this project. In terms of innovation, public-private collaboration is a form of partnership that implies active cooperation between governmental organizations and private businesses on innovation activities (Kamal, 2012).

Crosby and Bryson (2010) recognized that cross-sector partnerships were shaped more often in unsettled environments. This concurred with Yigitcanlar, O'Connor, and Westerman (2008) who also contended that the incapability of each sector to resolve an important shared issue on its own meaningfully nurtured cross-sector collaborations. Existing cross-boundary units as well as over-all agreements on the subject to be dealt with were conveyed by Erakovich and Anderson (2013) as another aspect that enhanced the creation of collaboration concerning the public sector and the private sector.

The significance of Crosby and Bryson's (2010) study is that the researchers investigated the issue of GPC to implement an innovative IT solution in a firm's management and leadership system. Nevertheless, their project is still limited since it is based on theoretical assumptions derived from the existing literature. No empirical tests were conducted by Crosby and Bryson (2010) to validate their statements.

GPCs are considered to change the method in which public services are formed and supplied to customers (Nardelli et al., 2015). Successful collaborations are contingent deeply on trust, respect and agility (Guzman & Sierra, 2012). Joint benefits were also recognized by Lember et al. (2014) as a significant factor that influenced the degree of success for public-private collaboration.

The issue of public-private collaborations was further investigated by Guzman and Sierra (2012). By analyzing primary quantitative data, the researchers attempted to understand how to optimize partnerships between public-sector organizations and private-sector companies. Guzman and Sierra (2012) arrived at the conclusion that collaboration between these entities was successful only when it brought benefits to both parties.

Similar outcomes were produced by Brewer et al. (2013) according to whom a partnership is established only when it is mutually beneficial to both private and public-sector organizations. It should be noted that Guzman and Sierra (2012) were focused only on two non-Arab countries. Hence, the applicability of their empirical findings to the Arab world is limited.

As previously mentioned, the bureaucratic nature of public organizations limits their ability to innovate (Kristensen et al., 2015). Gunday et al. (2011) were also convinced that the quality and quantity of public innovation required to deal with policy challenges was highly limited by the bureaucratic way in which the innovation process occurs within public organizations.

According to Kumaraswamy and Anvuur (2008), GPC, which results in the development of innovative products, services, or processes, allows the government to

shift the place of implementation as well as diffusion to the most capable companies. This collaboration brings together all public innovation assets such as knowledge, creativity, and imagination and political authority which market competition fails to do (Morse, 2010).

also, while public establishments could interchange knowledge and resources, their innovation competence was highly limited by diverse hierarchical levels as observed by Yigitcanlar et al. (2008). Because of the stated hurdles, private firms had begun to practice innovation by starting calculated partnerships with other market performers (Erakovich & Anderson, 2013), and in return, public organizations had inclined to smoothen out their hierarchical structures.

In Capdevila and Zarlenga's (2015) broad view on the smart city concept, collaboration between private and public-sector organizations increased the quality of life. The researchers also emphasized the role of citizens and their ability to produce technologic solutions rather than being mere knowledge consumers (Capdevila & Zarlenga, 2015).

In turn, Almirall and Wareham (2008) put an emphasis on infrastructure and its role in the implementation of a smart city. The point is that different types of infrastructure (e.g., transport infrastructure, energy infrastructure, and urban infrastructure) represent the ground to the development of a city's assets (Nardelli et al., 2015). However, in most cases, private businesses are not capable of making capital-intensive investments, which are often required during the development of a smart city. That is why the establishment of a public-private partnership is beneficial for these companies (Erakovich & Anderson, 2013). The involvement of a

government is also beneficial since it adds to the funding and clears the administrative work required to modify and improve a city's hard infrastructure (Crosby & Bryson, 2010; Hollands, 2008).

The researcher (Nour, 2014) reached the conclusion that in order for the Arab countries to transfer their economies to a KE, they had to recognize the vital role of the private sector and the important role that collaboration held concerning public and private sectors to generate clear tactics for this transfer. This doctoral project attempts to bridge this gap by identifying how GPC contributes to innovation activities in a developing KE.

2.6 The Kingdom of Bahrain

The Kingdom of Bahrain will be discussed in terms of a brief history followed, more specifically, by a look at the Economy of Bahrain.

2.6.1 history of Bahrain. The Kingdom of Bahrain is an archipelago consisting of 33 islands situated in the Arabian Gulf between the Kingdom of Saudi Arabia and Qatar. Its total area is approximately 780 km² with an estimated population of 1.4 million, according to 2016 statistics, of which Bahrainis constitute 48 percent while the remaining 52 percent are non-nationals (Kingdom of Bahrain - eGovernment Portal, 2017).

Due to its unique location in the middle of the Arabian Gulf, Bahrain has been one of the Gulf's most central commercial crossroads and trading centers connecting the East and the West for over 4000 years. Having established a rich pearl diving industry, the country was the Gulf's celebrated trade hub by the middle of the 19th

century and had begun to emerge as a modern state (Kingdom of Bahrain – eGovernment Portal, 2017).

Bahrain was the first Gulf state to discover oil in 1932, but due to the limited oil reserves in comparison to its neighbors, the government started pursuing a diverse strategy for its economy from the early 1970s. Since then; business, logistics, communication, professional services, and real estate have also become vital sectors with an emphasis on building the capabilities and talents of the Bahraini nationals (Kingdom of Bahrain - eGovernment Portal, 2017).

The diversification encompassed industrial developments, refinery plants, a dockyard for repairing ships ASRY, a steel company, the aluminum smelter company ALBA, and a number of factories for handling raw aluminum (Hvidt, 2013).

From 1975 onwards and after the civil war started in Lebanon, Bahrain became the leading financial hub in the region. By the 1980s Bahrain had already become the highest developed state in the Arabian Gulf with services and manufacturing accounting for almost half the share of its economy and was the only Gulf state which implemented a free trade agreement (FTA) in 2006 with the USA as part of its economic plan to diversify (Hvidt, 2013).

In 1981, Bahrain along with Kuwait, Oman, Qatar, the Kingdom of Saudi Arabia, and UAE, established the Gulf Cooperation Council (GCC). The main purpose of this union was to tie a closer and stronger relationship amongst them in order to achieve unity, strengthen areas of cooperation, and formulate similar regulations in various fields. These fields included economy, commerce, education, and legislative and administrative affairs to name but a few. Of the most important

factors was to encourage scientific and technological development in the arenas of industry, drilling, farming, water and animal resources, to start scientific research, establish joint projects, and support co-operation by private sector for the well of their people (Financial Action Task Force [FATF], 2017).

The Kingdom of Bahrain provides easy access to every market in the Middle East by road, sea and air, making it highly attractive to international companies willing to establish business relations with the GCC state members. Furthermore, the country provides local and foreign organizations with one of the most liberal business environments in the GCC with zero taxation for private enterprises (Economic Development Board, 2018c)

2.6.2 The Economy of Bahrain. Planning for economy development has become a recent experience in Bahrain and began from its realization that it would lag behind and its economy would suffer if it didn't start making significant changes at several levels to keep up with the fast globalization and increasing competition. In 2000, the Economic Development Board (EDB) was established with an inclusive duty to formulate and oversee the economic progress strategy for the Kingdom of Bahrain through building the right climate to entice direct investment into the Kingdom (Investing in Bahrain 2015, n.d.). As a dynamic Government agency, EDB's main target is to build a business environment that looks appealing to investors from abroad, while encouraging a strong development of its local companies. EDB's foremost objective is to support and monitor initiatives that improve economic and business environment in Bahrain.

In 2007, His Royal Highness the Crown Prince of Bahrain had a vision drawn for the economy of Bahrain to be shifted from one that depended on oil revenue to one that would be productive and globally competitive by 2030. This economy would be built with the collaboration of the government and the private sector and aimed at raising a broad middle class Bahraini sector through improved productivity and high-wage jobs.

The program was launched in October 2008 by His Majesty King Hamad bin Isa bin Salman Al Khalifa under the title of The Economic Vision 2030 and based on three major principles, namely fairness, sustainability, and competitiveness (From Bahrain Vision 2030, n.d.).

In close collaboration with the civil society, legislative body, and private sector, the government is planning to translate its operational and strategic plans into a tangible national strategy (From Bahrain Vision 2030, n.d.).

The Economic Vision 2030 can be viewed as the government's attempt to further diversify the country's economy and make it less dependent on oil and gas exports. The Vision 2030 is a comprehensive economic strategy for the Kingdom of Bahrain, which provides a clear direction for its continued development (From Bahrain Vision 2030, n.d.) and states that:

We aspire to shift from an economy built on oil wealth to a productive, globally competitive economy, shaped by the government and driven by a pioneering private sector – an economy that raises a broad middle class of Bahrainis who enjoy good living standards through increased productivity and high-wage jobs. (p.3)

According to the Vision 2030, in order to enable the Kingdom to attain an attractive spot in the global value chain, it has to increase the levels of sophistication and innovation by creating a milieu that is favorable to entrepreneurs and innovation, and creates knowledge-based and highly value-added organizations and economic accomplishments.

Although, the plan is not specific on how to go by achieving these goals, emphasis is on investment in human resources with particular importance in both health and education arenas. The plan is based on the view that education is a precondition to achieving a knowledge-based society and states “Bahraini society in 2030 will be a meritocracy where hard work and talent are rewarded with success” (From Bahrain Vision 2030, n.d., p.20).

The limited reserve of oil and gas, however, is not the only reason for Bahrain’s willingness to transform its economy. In accordance with Ahmed and Al-Roubaie (2012) and IMF (2016), Bahrain is facing shortages of quality employment as well as appropriate skills. Furthermore, without proper reforms and economy transformation, the quality and number of jobs available are not going to satisfy the demand in the nearest future (WEF, 2016). This action has resulted in a stagnation of average wages in the private sector (From Bahrain Vision 2030, n.d.).

The expatriate workforce is another challenge that hampers Bahrain’s economic development. The country’s private sector creates only around 1,100 jobs on a yearly basis for Bahrainis and more than 2,500 jobs for expatriates (From Bahrain Vision 2030, n.d.). Expatriate workers get paid much less comparing to local workers. This fact creates the previously mentioned challenges such as the lack of

skills and shortages of quality employment in Bahrain (“Bahrain’s labor market: Bridging the Gulf”, 2010; WEF, 2016).

In a highly globalized and competitive world of today, Bahrain’s reliance on cheap expatriate labor weakens its competitive position and threatens its economic sustainability in the long-term (“Bahrain’s labor market: Bridging the Gulf”, 2010). That is why the government gives close attention to the role of knowledge and innovation in the process of economy transformation. In addition, the country’s innovation output is negligible on a global scale, meaning that Bahrain can hardly be attributed to knowledge economies (Ahmed & Al-Roubaie, 2012).

The recent oil price crisis has resulted in the unprecedented drop in oil prices, which, in turn, have produced a strong negative impact on the economic sustainability of Bahrain. Under these circumstances, the role of the Vision 2030 in preserving Bahrain’s economic sustainability and resilience is crucial.

In accordance with Al-Roubaie (2010), fostering economic growth is impossible without knowledge creation as well as technological diffusion. Countries do not operate in isolation, meaning they must build an enabling environment, which is capable of encouraging technology and knowledge transfer as well as enhancing competitiveness, in order to remain competitive at a global scale (Soliman, 2015).

The importance of technological learning and innovation in building a KBE was emphasized by Ahmed and Al-Roubaie (2012). Similarly, to this doctoral project, the researchers were focused on the Muslim world in general and Bahrain in particular. Ahmed & Al-Roubaie (2012) used the World Bank’s KAM, which is loosely based on the KE Index and the GII. The researchers arrived at the conclusion

that Bahrain was one of the most high-performance Muslim countries in relation to innovation outputs (Ahmed & Al-Roubaie, 2012) but ranked only 59th among the most innovative countries worldwide (GII, 2016).

An inability to generate knowledge and innovation in order to support the KE was argued by Ahmed and Al-Roubaie (2012) as the key challenge facing the Muslim countries in general and Bahrain in particular. The Vision 2030 attempts to overcome this challenge by building capacity for technology and science, strengthening knowledge production, knowledge sharing and knowledge transfer and developing skills and competencies (From Bahrain Vision 2030, n.d.). As stated by Ahmed and Al-Roubaie (2012) the linking of various sectors of economy requires close collaboration between the public sector and the private sector. However, it should be noted that the outcomes produced by Ahmed and Al-Roubaie (2012) are based only on secondary data. This approach to research is considered by some scholars as limited since it is impossible to test the validity and reliability of secondary data (Bhattacharjee, 2012).

The role of innovation, technology, and science in transforming an Arab country into a KE was also investigated by Ahmed and Alfaki (2013). In accordance with Ahmed and Al-Roubaie (2012) there are four pillars of the KE, namely information and communication technologies, education, innovation and economic incentive and institutional regime. Ahmed and Alfaki (2013) also used these pillars as a basis for exploring the role of science, technology, and innovation. The researchers arrived at the conclusion that the UAE have made important progress in the implementation of the mentioned KE pillars (Ahmed & Alfaki, 2013).

Ahmed and Alfaki's (2013) findings correlate closely with those produced by Zahlan (2012) according to whom many Arab countries have managed to achieve good results in improving their macro-economic environment and contributing to the quality of their infrastructure levels. Nevertheless, the lack of investment in R&D, poor access to new knowledge and information and governmental regulations and laws hurdle the GCC states' ability to create, absorb, adapt and transfer knowledge, which is the key characteristic of a KE (Ahmed & Alfaki's, 2013; Nour, 2013; Zahlan, 2012). Although Bahrain is considered to provide its citizens with freedoms such as access to information and knowledge, the identified challenges are also relevant to this Arab state.

The importance of GPC and its potential contribution to economic growth is recognized by the country's rulers. According to His Royal Highness Prince Salman bin Hamad bin Isa Al Khalifa, active collaboration between private- and public-sector organizations would help accelerate economic growth (BNA, 2016).

As reported in DT News, 2016 His Royal Highness Prince Salman bin Hamad bin Isa Al Khalifa enacted 31 new laws, which are expected to further diversify Bahrain's economy, enhance regulatory frameworks and public services, and support human development. These laws are a result of the extensive collaboration between executive and legislative authorities.

In turn, the development and adoption of these laws have resulted in significant improvements across several areas such as procedures and processes related to urban development. It is planned to strengthen the role of private-sector organizations in driving Bahrain's economic growth. The role of the public sector is

planning to be transformed into a dynamic regulator as stated lately by HRH Prince Khalifa bin Salman Al Khalifa, the prime minister of Bahrain,

These include reforming the role of the public sector from the central driver of growth to one that serves as a regulator and active partner with the private sector, supporting innovation to stimulate competitiveness, and investing in citizens' futures to further improve their living standards (Worldfolio, 2017).

These actions can be viewed as the government's attempt to facilitate collaboration between the public and private sectors, which is focused on the promotion of innovation as well as the creation of high-quality opportunities for the country's citizens.

2.7 Building a Research Model

In order to build a research model that connects the vocabulary of the related terminologies appearing in the title of this study and to help the researcher explore and relate ideas in the qualitative research phase of this analysis, the researcher began with some general past studies review of the main terminologies stated in the title of this project which are: KE, innovation, and collaboration.

For the KE, the frameworks used by OECD, APEC, and World Bank were analyzed since they provide parameters for measuring a KE that is beneficial in recognizing appropriate elements and markers that might be considered in a related frame for a developing country. As stated by Al Shami et al. (2015), OECD, APEC, and World Bank indicators have been used to assist competitiveness of a country or countries' KE status. The three frameworks combined are in agreement that for an economy to develop, its environment has to be conducive for an efficient use of

knowledge, and that environment should consist of: an economic and official regime that provides incentives for an effective use of existing and new knowledge; an educated and skilled human resources who are able to create, share, and use knowledge well; an efficient ICT infrastructure that facilitates the successful communication, diffusion, and dispensation of knowledge; and an innovation system that is capable of getting access into the growing worldwide knowledge and adapting it to indigenous requirements in order to create new knowledge needed locally. That manifested in the KEI pillars as shown in Figure 2.7.

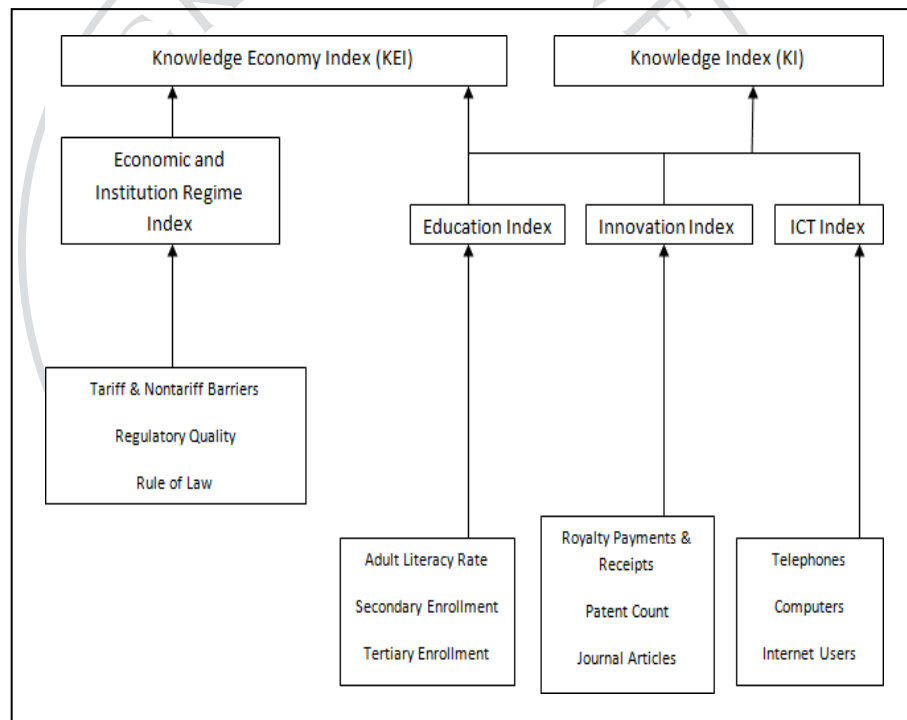


Figure 2.7: The four pillars of KEI and KI

Source: World Bank Institute (2008)

Next the researcher explored innovation and its relation to a country's economy growth and development. The MAKCi framework was discovered while conducting the literature review for the existing studies. The framework is used as an

award process for identifying and recognizing societies globally that are effectively engaging in official and organized knowledge-based growth process (WCI, 2008b).

Out of the eight equally important capital categories used in the award process as value-production system, the instrumental-intangible capital category eight is viewed as a knowledge-based means of production that helps other capital types leverage capacity to generate value (Martín-de-Castro et al., 2008). This category considers productive, educational, scientific, technological and governmental innovation (Eijkman, 2008), which relate to the variables in the KEI framework.

Categories two, five, and six also include elements that generate value. Category two's value is in the quality of the city's system foreseeing and fostering its future, category five generates value from the capacity of individuals, while category six's value is in the capabilities generated collectively by team-based measures. The significance of the MAKCi framework is that it allows for measuring the innovation capacity of both private and public sectors (Bergek et al., 2008; Popidiuk & Choo, 2006).

The third framework that is used in this research to arrive at the research model frame is the GII framework (Figure 2.8). The researcher used it since it is another ranking that demonstrates a country's capacity for and success in innovation (Chen, 2008).

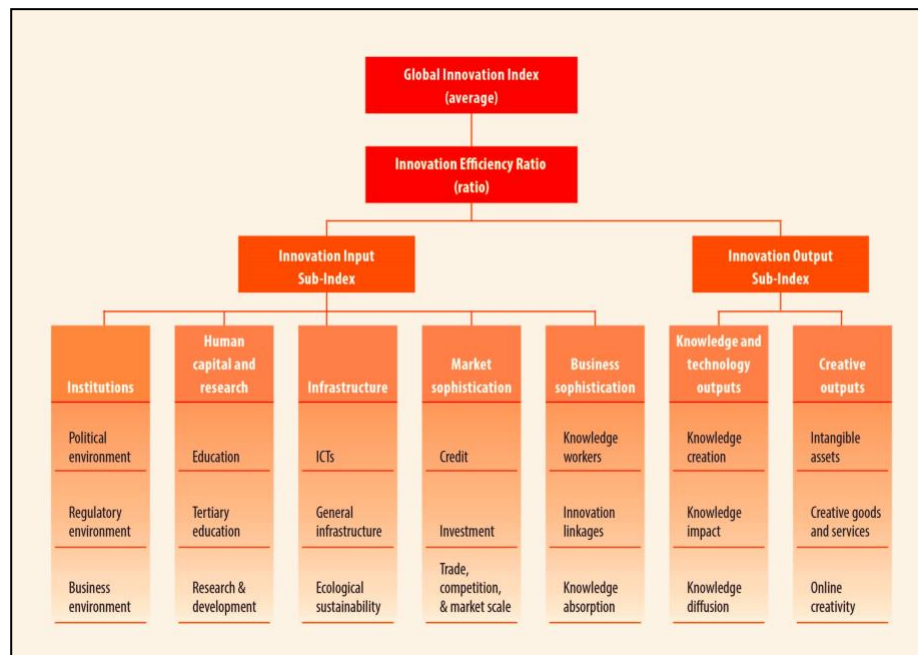


Figure 2.8: The GII

Source: Extracted from (GII, 2017a)

GII is a report, which is published yearly by Cornell University, INSEAD, a business school, and the World Intellectual Property Organization, which ranks 140 countries' economies around the world based on 79 indicators to find the most innovative one. According to GII the main role of innovation is driving economic development and welfare (GII,2014). GII is inclusive of eight pillars that denote the elements that enhance innovative capability and display results from successful innovation. Five pillars are features that develop the capacity of a country to produce ideas that can be used to innovate commodities and services and hence, are named inputs. The other three features define the consequences of the benefits gained from the successful innovation which are outputs produced by the five input features and the benefits to the residents and institutions of the country.

The input pillars in GII relate to the variables in the KEI and elements of the categories two, five, six, and eight in the MAKCi framework that were considered by the researcher and included in the development of the research model.

The three frameworks' variables were explored and correlated by the researcher to investigate the commonality of innovation inducing factors amongst these models that lead to knowledge creation, innovation, and subsequently development of a KE as seen in Figure 2.9.

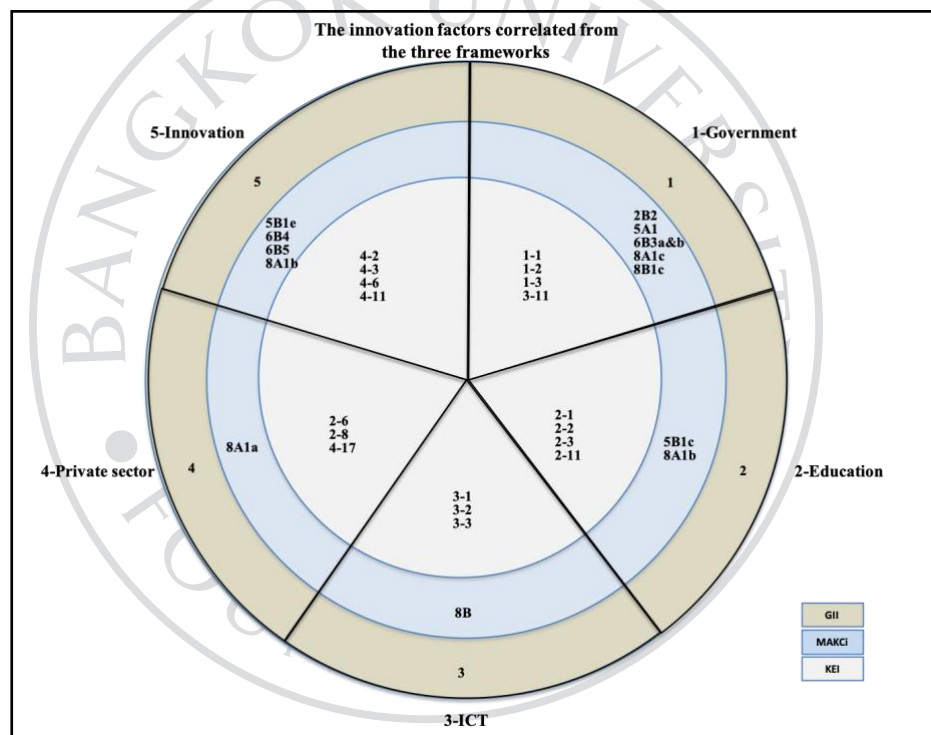


Figure 2.9: The merging of the three frameworks' variables

Source: Researcher's own elaboration extracted from GII (2017); WCI (2008a);

Chen & Dahlman (2006)

In the act of correlating the frameworks, the researcher detected that innovation creating factors categorized under five environments in the society that

had to be conducive to innovation activities in order for innovation to be generated in a country.

The last terminology to be investigated by the researcher was ‘collaboration’ and the mechanism on which the government (public sector) and the private sector could collaborate in order to assist in driving the process of innovation forward. Going forward, this occurrence will be referred to as ‘government and private sector collaboration’ (GPC). Two perspectives, namely, collaboration as a marketplace phenomenon and collaboration as a non-marketplace phenomenon were discovered (Lember et al., 2014) as illustrated in Table 2.3.

Table 2.3: The two perspectives on government and private sector collaboration

Government Private Collaboration for Innovation	
Innovation as Market Phenomenon	Innovation as Non-market Phenomenon
a- Providing organizational framework for knowledge generation and innovation activities	e- serving as a catalyst for change in public organizations
b- providing innovation related infrastructure	f- serving as a strategic instrument for governance changes
c- delivering innovation policy and linking to specific projects	g- serving as a mode of dealing with social problems
d- selecting suitable partners to produce innovative products, services, and processes	

Source: Researcher’s own elaboration extracted from Lember et al. (2014)

Note that collaboration for the sake of innovation as a market phenomenon correlates with the elements of the three frameworks, and since market is related to economy and this research is about KE, the elements of the GPC for innovation as market phenomenon were added to the comparison framework of GII, MAKCi, and KEI (Figure 2.9).

Recall that Khorsheed (2015) stated that the innovation competency in a society and its ability to maintain development was dependent largely on the strengths of, and collaborations between numerous institutions, and the effectiveness of diverse policies.

The researcher had already established earlier that innovation is complicated and multidimensional and that its active forces that impact one another were best seen as an ecosystem in which numerous shareholders interacted and networked with each other (Fukuda & Watanabi, 2012).

Putting together the innovation elements extracted from the four frameworks analyzed resulted into 5 distinct milieus: (a) government; (b) education; (c) ICT; (d) private sector; and (e) Innovation that steered the researcher in constructing her research model as shown in Figure 2.10. This research model facilitated her in confining the areas that she should probe in relation to innovation progress in a developing KE and subsequently pave the road on which she would investigate to reach for an innovation ecosystem model as an end result needed to complete this project.

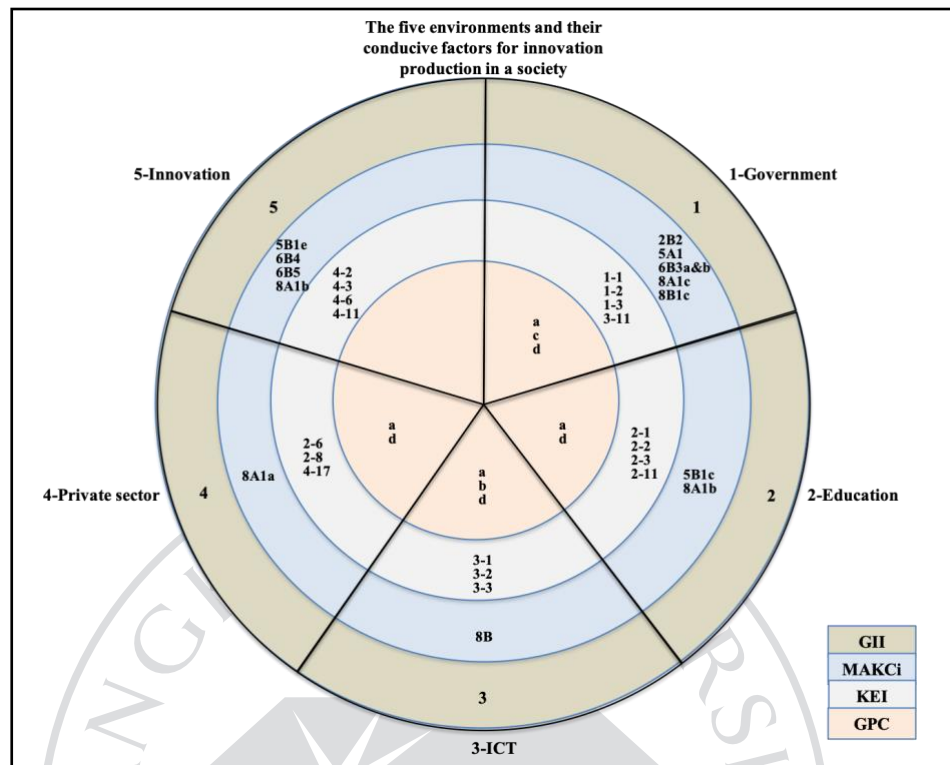


Figure 2.10: The research model

Source: Researcher's own elaboration extracted from GII (2017); WCI (2008a); Chen & Dahlman (2006); Lember et al. (2014)

The codes designating each element in the frameworks of the five environments in Figure 2.10 were clarified in Table 2.4.

Table 2.4: The elements needed to induce innovation in the five conducive environments of a society

The five innovation conducive environments			
1- Government Environment			
GII	MAKCI	KEI	GPC Market orientation
1-Nurturing an institutional framework that attracts business and fosters growth by providing good governance (1-1), correct levels of protection (1-2), and incentives (1-3).	2B2-City's Future Management. Existence of the City's Future Centre or formal enablement of its functions through another kind of innovation initiative. (1-4) 5A1-Ethnic diversity. (1-5) 6B3a&b-City's cultural diversity (1-6) and tolerance capacity (1-7) to relate empathically and assertively with people of a different race, social, cultural or economic background. 8A1c-Innovation capacity of the public sector. (1-8) Structural capacities of government bodies (1-9) 8B1c-E-government: coverage, transparency, accessibility, and usability, content, services, participation (1-10)	1-1Regulatory quality (1-11) 1-2Rule of Law (1-12) 1-3Government effectiveness (1-13) 3-11E-government (1-14)	a-Providing organizational framework for knowledge generation (1-15) and innovation activities (1-16) c-Delivering innovation policy (1-17) and linking to specific projects (1-18) d-Selecting suitable partners to produce innovative products, services, and processes (1-19)
2- Education Environment			
GII	MAKCI	KEI	GPC Market orientation
2-The level and standard of education (2-1) and research activity (2-2)	5B1c-Number of individuals (2-3) and quality of their performance (2-4) in formal education system. 8A1b-Innovation capacity of the education (2-5), university curricula life cycle (2-6)	2-1 Adult literacy rate (2-7) 2-2 Secondary Enrollment (2-8) 2-3 Tertiary Enrollment (2-9) 2-11QualityICT of science and math education (2-10)	a-Providing organizational framework for knowledge generation (2-11) and innovation activities (2-12) d-Selecting suitable partners to produce innovative products, services, and processes (2-13)
3- ICT Environment			
GII	MAKCI	KEI	GPC Market orientation
3- ICT access, use, e-government, online participation of citizens (3-1).	8B-Infomaiton and telecommunications functional capacities. (3-2)	3-1 Telephones (3-3) 3-2 Computers (3-4) 3-3 Internet Users (3-5)	a-Providing organizational framework for knowledge generation and innovation activities. b-Providing innovation related - infrastructure (3-6) d-Selecting suitable partners to produce innovative products, services, and processes (3-7)
4- Private sector Environment			
GII	MAKCI	KEI	GPC Market orientation
4-The availability of credit (4-1) and an environment that supports investment (4-2), access to the international market, competition, and market scale (4-3)	8A1a-Innovtion capacity of the private sector 4-4), new business incubation and creation (4-5), preparation of high-value new business creation (4-6), and survival of new businesses (4-7).	2-6Soundness of banks (4-7) 2-8Professional and technical workers in labor force (4-8) 4-17Availability of VC (4-9)	a-Providing organizational framework for knowledge generation (4-10) and innovation activities (4-11) d-Selecting suitable partners to produce innovative products, services, and processes (4-12)
5- Innovation Environment			
GII	MAKCI	KEI	GPC Market orientation
5-Conduciveness of firms to innovation activities (5-1), employing knowledge workers (5-2), and R&D (5-3).	5B1e-Knowledge intensive competencies (5-4). Individual capacity. Number of individuals and quality of their performance in formal production activities (5-5). 6B4-Entrepreneurship. Collective capacity to create new high-value businesses. (5-6) 6B5-Innovation. Collective capacity to conceive (5-7) and effectively develop new ways to add value in any relevant human activity (5-8). 8A1b-Innovation capacity of the scientific and technological establishment (5-9), scientific citations and networking, patents and licenses. (5-10)	4-2 Patent Count (5-11) 4-3 Scientific and technical journal articles (5-12) 4-6Science & engineering enrollment (5-13) 4-11Research collaboration between companies and universities (5-14)	

Source: Researcher's own elaboration extracted from the four frameworks'

variables GII (2017); WCI (2008a); Chen & Dahlman (2006); Lember et al. (2014)

2.8 Summary

We understand that knowledge plays an important role in a country's ability to innovate and become more sustainable (Aubert & Reiffers, 2004; Ahmed and Al-Roubaie 2012). However, there are numerous challenges that hamper the transformation from industrial or natural resources economies to knowledge-based economies (Ahmed & Alfaki, 2013; Al-Ali, 2008; Al-Rahbi, 2008; Parceró & Ryan, 2016). These challenges include the lack of investment in R&D, poor access to new knowledge and information and governmental regulations and laws (Parceró & Ryan, 2016). Collaboration between private-sector businesses and public-sector organizations is widely reported to have a strong positive impact on the extent to which a country is deemed innovative (Sorensen & Torfing, 2011; Cankar & Petkovsek, 2013). The contribution of innovation, technology, and science to the transformation of the GCC states into knowledge economies is also extensively covered in the existing body of management literature (Ahmed & Alfaki, 2013; Parceró & Ryan, 2016). Nevertheless, the factors that influence building innovation capacity and the means of collaboration of government and private sector in doing so in the Kingdom of Bahrain remains under researched.

CHAPTER 3

RESEARCH METHODS

3.1 Introduction

This research study is about the collaboration of government and private sectors to facilitate and support innovation in a KE. It intends to examine the elements that contribute to the development of a KE, to explore the share of innovation among these elements, and to specifically identify the role of collaboration amongst government and private sector (G-PS) in order to enhance innovation processes in Bahrain.

3.2 Research Strategy

3.2.1 the research paradigm. In order to explore and understand the social phenomena that this research is studying, the researcher is basing her point of view on the ontological reality of relativism in which scientific laws are created through an individuals' interpretation (Easterby-Smith et al., 2012). The researcher's belief is that the truth of a KE in a society is linked to the protagonists behind it, and that it can be interpreted by investigating the various dimensions of collaboration between the private sector and the government entities in Bahrain. Through this investigation the researcher develops an empathic understanding of the process of analysis by the main characters involved after which a theory is accepted and a scientific debate comes to closure influenced by the politics of business and commercial resources.

In order for the researcher to figure out what creates and authenticates knowledge, and what the connection is or should be between knowing and being, that

is, between epistemology and ontology, she has to theorize her understanding and explain how she knows what she knows by defining her epistemological path.

“The theory of knowledge embedded in the theoretical perspective and thereby in the methodology ... An epistemology ... is a way of understanding and explaining how we know what we know” (Crotty, 1998, p. 3).

This study is based on constructionism epistemology which views that all knowledge is subject to human practices constructed on the interaction between them and their world, which is further developed and conveyed within an essentially social environment (Crotty, 1998).

The truth of this research model, or theory or framework, is reached through discussion and agreement between researchers, city planners, policy makers and leaders of the Kingdom of Bahrain as knowledge by nature is context sensitive and situation dependent (Bennet, Bennet, & Avedisian, 2015).

3.2.2 methodology. The researcher aims to solve the research in a systematic method by grouping research techniques in order to make a consistent and logical progression to get to the knowledge aimed at in this research. This is linking the ontology and epistemology of the researcher to come up with a plan of how to develop a procedure for the problem at hand.

The qualitative research methodology is the most suitable choice for this study when compared to such strategies as the quantitative paradigm or the mixed methods approach (Creswell, 2014). One of the key points justifying this statement is that the gathering and interpretation of qualitative evidence is compatible with the overall direction of the research established in Chapters One and Two.

The qualitative research methodology is a generic expression that denotes a collection of methods and means of data collection and analysis. The focus is on connotation of these data that are naturally interpretive or descriptive (Noble & Smith, 2013). Reality is constructed by the study of participants and the researcher, with the importance given to the intensity of data collected rather than the number of recruiting samples.

Specifically, the literature review focused on linking the concepts of public-private collaboration and the KE (Abduljawad, 2013; EDB, 2008). According to Bhattacharjee (2012) the qualitative strategy is highly beneficial when addressing the relationships established between two or more dimensions as this strategy allows for obtaining in-depth insight pertaining to these aspects.

This perspective should contribute significantly to the existing research gap regarding collaboration and innovation in a KE (Schulze & Hoegl, 2008).

The applicability of the qualitative methodology to the field of KE and innovation is high. For example, Droste et al. (2016) followed this tactic when analyzing the impact made by the European governments with regards to green knowledge creation and were of the opinion that the analysis of qualitative evidence was highly relevant. Nonetheless, it was implied that the adopted methodological approach did not allow for making accurate predictions relating to the long-term perspective (Droste et al., 2016).

A similar principle of research was followed by Brenes, Camacho, Ciravegna, and Picardo (2016) when discussing innovation within the context of economically struggling countries (e.g., locales in Latin America). Interestingly, Brenes et al.

(2016) claimed that firm resources could be vital in fostering innovation, which was not mentioned by such authors as Lember et al. (2014). This example showcases how the qualitative strategy can address the gaps identified in Chapter Two. That said, the usability of the qualitative data that could be obtained on collaboration and innovation from the Bahrain context is unknown.

The main advantage of interviews stems from their capability to offer a comprehensive explanation and analysis of a research topic, without confining the extent of the research and the nature of contributor's responses (Collis & Hussey, 2003). They are mainly useful in cases where there is a need to attain highly personalized data, as well as in cases where there are opportunities for probing to get underlying factors. Interviews are thus useful for gaining insight and context into a topic. They can provide information to which the interviewee was previously privy to, unlike other data collection methods such as questionnaires may act as blinkers to the responses required. They therefore become critical for discovery-oriented researches where the researcher is, in advance, only roughly aware of what they are looking for.

In an interview, there is leeway for a respondent to describe what is important to them, and from their responses useful quotes and stories can also be collected. In response to the need to seek complete description and analysis of subject matter, interviews from the onset, facilitate for the accurate screening for the right interviewee.

In line with the above, face to face interviews will go further in making screening more accurate, as an individual being interviewed is unable to provide false

information during screening questions (Akbarak, 2000). This one stems from their ability to capture verbal and nonverbal cues in the data collection process. One is able to pay attention to body language and expressions which may indicate levels of excitement or discomfort brought about by certain questions. Such question can highlight where there is a chance of information being falsified, where there is difference between what is actually said, and what one strongly feels about the matter, or even to validate a point being emphasized.

Interviews also provide for additional intervention when needed. This may consist of more explanations being provided to clarify the question, as well as requesting the respondent to explain further if the answer provided remains vague (Abawi, 2013). Probing always ensures that there is clarity by the end of the interview.

The interviewee still remains with the opportunity to introduce critical changes in the interview schedule based on initial results, a phenomenon which is not possible when one makes use of other methods such as questionnaires.

3.2.3 the method. Referring to in-depth qualitative insights from a predetermined single context, such as Bahrain, is consistent with the definition of case studies provided by Cohen, Manion, and Morrison (2005) and Yin (2014). Cohen et al. (2005) describe a case study as:

... the case study researcher typically observes the characteristics of an individual unit – a child, a class, a school or a community. The purpose of such observation is to probe deeply and to analyze intensively the multifarious phenomenon that constitute the life cycle of the unit. (p.185)

Yin (2014) defines case study research as “an empirical inquiry that investigates a contemporary phenomenon (the ‘case’) in depth within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident” (p. 16), which is the situation with the government and private sector’s collaboration.

Concurring to this definition, a case study is hence concerned with close observation of how a certain population group perform in a particular context. The criteria for selecting a case is to acquire an adequate diversity of data and to qualify the collected data for generalization of research findings based on certain attributes which are vital for assessment (Oliver & Kandadi, 2006). Recall that Khorsheed (2015) stated that innovation in a society and its ability to uphold growth was conditional largely on the strengths of, and partnerships between, many establishments and the effectiveness of clear and explicit policies. Collaboration amongst the stakeholders of innovation in the government and the private sector in Bahrain is chosen as the phenomena to be under investigation in this thesis.

According to the literature review in Chapter Two, the four major bodies in Bahrain that have an impact on its economic development are: the financial sector, education, information and communication technology (ICT), and the industry. These four bodies influencing the economy of Bahrain are selected as the units of analysis for the fieldwork. It is presumed that the variations among these four bodies will reveal the elements of the low-level potency of innovation in Bahrain. Therefore, both simple or conditional definitions of Cohen et al. (2005) and Yin’s (2013) of a case

study meet this research's goal of delving deep into a contemporary phenomenon, collaboration to innovate, within the context of a country's economy.

Given the nature of this research being an in-depth study of a contemporary phenomenon (i.e., collaboration of government and private sector), in a complex environment (i.e., Bahrain's economy), where a variety of stakeholder perspectives with specific focus on the four fields inclusive of the financial, education, ICT, and the industrial sectors are sought, and where the underlying research philosophy is based on an interpretive understanding of the world, the case study strategy is chosen to meet the needs of this research.

According to Yin (2013), "A major strength of case study data collection is the opportunity to use many different sources of evidence" (p.119). He continues to elaborate that analysis of case study methods done on cases that used several sources of data are regarded more highly with regards to their overall value. In addition, the furthest vital advantage offered by using numerous sources of data is the development of joining lines of inquiry (Yin, 2013). Figure 3.1 illustrates the four major sources of data for this case study.

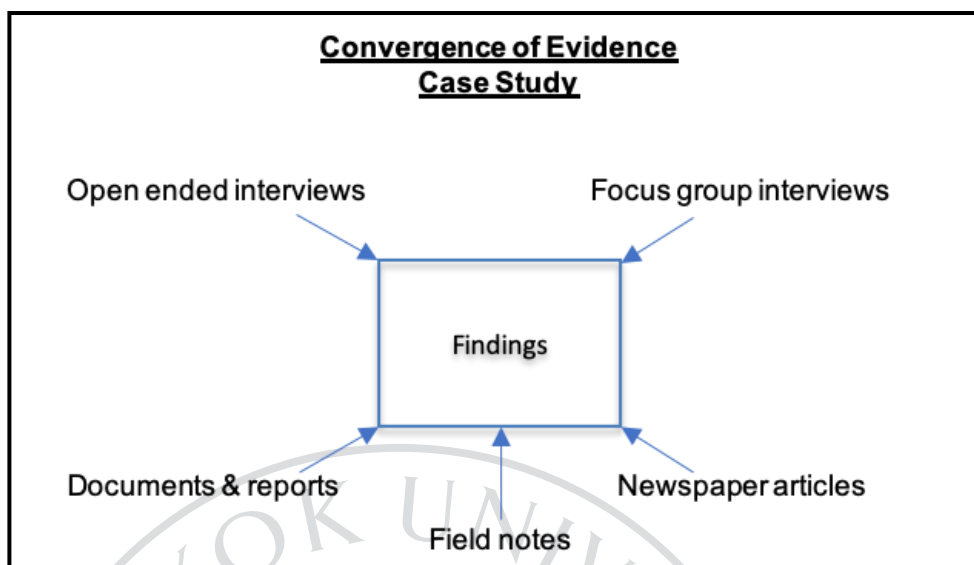


Figure 3.1: The major data sources for this study

Source: Researcher's own elaboration

A case study strategy has its critics and there are limits in embracing this approach that need to be addressed. Initially, the researcher was mindful of the difficulty of generalizing as an outcome of one case study (Borg 1981; Gustafsson, 2017), which was selecting Bahrain to study aspects of its government and private sector collaboration to influence innovation processes.

This researcher is attempting to enlighten scholars interested in countries attempting to develop a KE what is happening in a specific location (Saunders, Lewis, & Thornhill, 2015), thereby adding knowledge to the research of the role of the government and the private sector on innovation development in a KE. The case study approach enables this aim. Aspirations to develop a KE are not confined to a particular type of country: two similar case studies in the GCC countries that addressed KE developments were identified. The first one was conducted by Al-Rahbi (2008) whose interest was to investigate the prospects for the development of a

KE in the Sultanate of Oman. By using a mixed qualitative and quantitative methodology, he interviewed key government officials and conducted a survey amongst service companies in Oman and concluded that in order for Oman to develop and sustain a KE, it has to adopt five major pillars (Al-Rahbi, 2018).

In the second study, Abduljawad (2013) explored the university-industry-government partnership in the state of Qatar and its impact on innovation as a tool fueling its developing KE. By using an explorative, single multisite case study, he concluded that by establishing and managing a university-industry-government partnership, the state of Qatar can initiate a strategy that will feed its innovation development to assess its drive in pursuing a KE (Abduljawad, 2013).

This aim is also relevant for this project, meaning that the research results would be difficult to replicate in a different setting. While the findings could potentially be generalizable to other Gulf countries due to the similarities in religion, language, and culture, this may not be true considering that Bahrain's setting is unique compared to its neighbors in terms of its tolerance and friendliness towards non-nationals, safe environment, and affordable living.

The use of a case study in this research thus deploys the view of *relatability*, where other institutes relative to situational features of the case study and recognizing similar issues and problems described in this research work can learn from the findings. According to Bassey (1981), a strong advocate of the concept of *relatability*, trusts that "relatability of a case study is more important than its generalizability" (p. 85).

The contribution of this study to the KE research will be established from a combination of the case study analysis and the results of the literature review.

However, the researcher is not anticipating that the results of this research to be demonstrative of all countries pursuing to develop a KE, but she is foreseeing that in time and as more case studies are executed by other scholars then the contribution to the KE society will be increasingly modified and developed accordingly.

This understanding of case studies to the research community was one that was also alleged by Nunes and McPherson (2002) in their informative case study of a Master of Arts program in IT Management. They concurred that it was challenging to generalize from one case study but trusted that such a view did not make their findings or their contribution to knowledge any less valuable. They stated that as additional studies were executed, the body of knowledge in their ground of interest would progressively increase and they, in turn, will have contributed to a larger body of work such as a review of related literature, then the input to knowledge could prove significant and valuable to the broader research community.

In order for the researcher to build a solid case study and a well-defined approach in planning and employing case study approach for this research, the researcher has constructed the following steps: a well-defined justification for choosing a case study strategy in relation to the nature of this work has been presented and elaborated openly; case selection and its units of analysis for the fieldwork will be defined; in order to meet and prevent the criticism of bias in the case study, a case study protocol will be constructed for the interview etiquettes and questions; well-

organized data methods collection will be followed; and data analysis techniques will be elaborated in detail for the sake of transparency and enquiry (Figure 3.2).

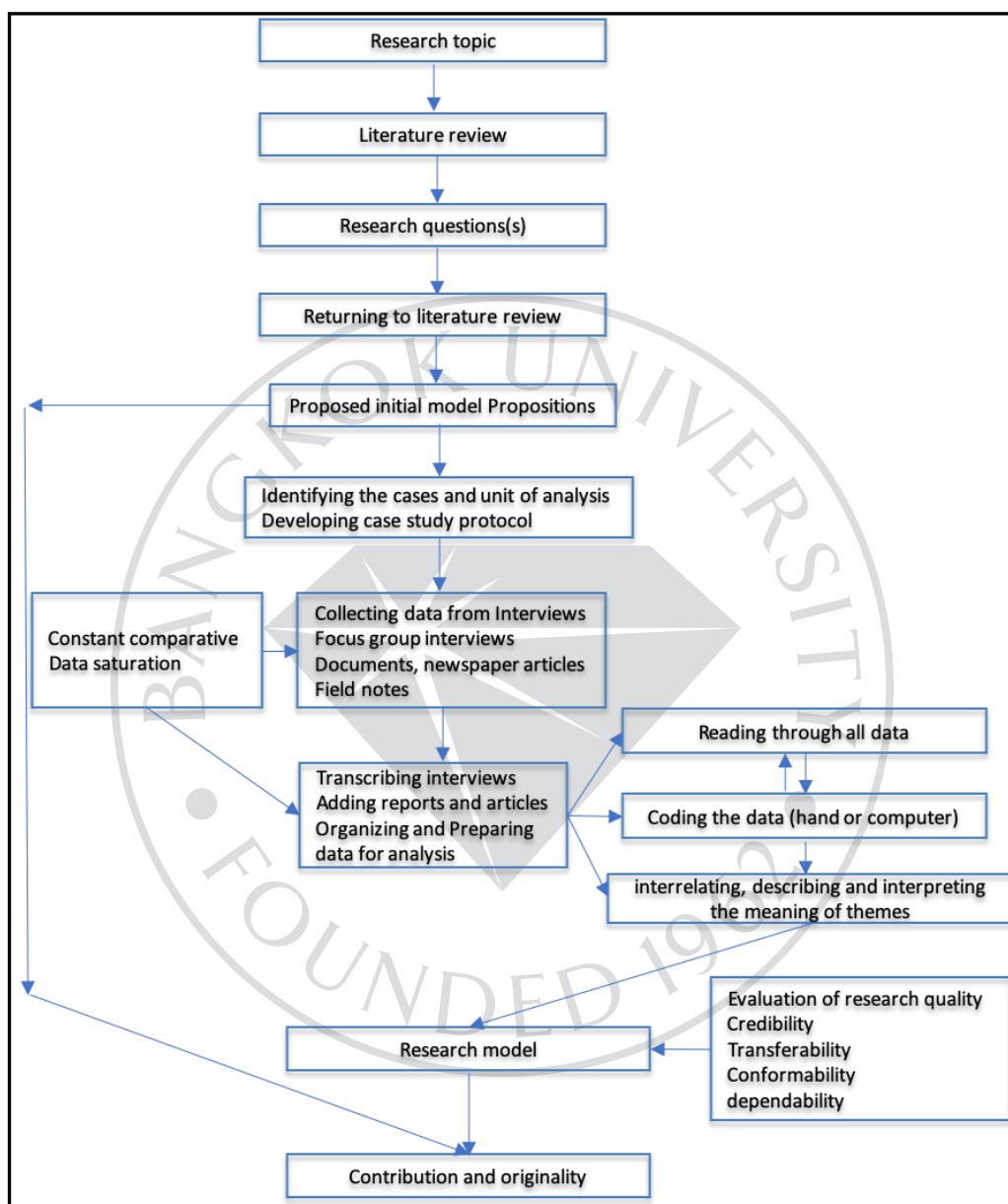


Figure 3.2: The research methodology

Source: Researcher's own elaboration

3.3 Selecting the Case

The criteria for selecting a case is to acquire an adequate diversity of data and to qualify the collected data for generalization of research findings based on certain

attributes which are vital for assessment (Oliver & Kandadi, 2006). Collaboration amongst the stakeholders of innovation in the government and the private sector in Bahrain is chosen as the phenomena to be under investigation in this thesis.

According to the literature review in Chapter Two, the four major bodies in Bahrain that have an impact on its economic development are: the financial sector, tertiary education, ICT, and the industry. These four bodies influencing the economy of Bahrain are selected as the units of analysis for the fieldwork. It is presumed that the variations among these four bodies will reveal the elements of the low-level potency of innovation in Bahrain.

3.3.1 the units of analysis. According to the literature review in Chapter Two and in building the Case in Chapter Three, the researcher established that the four major bodies in Bahrain that have an impact on its economic development are: the financial sector, the industry, tertiary education, and ICT. Accordingly, the researcher then selected these four bodies influencing the economy of Bahrain as the units of analysis for the fieldwork. The researcher presumes that the variations among the perceptions and the viewpoints of the key government and private sector authorities in these four bodies, as the subunits for this study, will reveal the elements of the low-level potency of innovation in Bahrain. It is propositioned that the multiplicity among the institutes will reveal different perspectives on the current innovation status in Bahrain and ways for collaboration.

3.3.1.1 Finance. The financial sector is the leading single employer in Bahrain, with Bahrainis occupying over 80 percent of the jobs. Largely, the sector

provides 27 percent of Bahrain's Gross Domestic Product (GDP), making it one of the main drivers of development in the kingdom (Central Bank of Bahrain, 2012).

Data was collected from one of the private banks and three different government bodies dealing with finance and investment. The chief executive of the bank is a personal contact of the researcher and gave his willingness to participate in the study as soon as the researcher approached him. The researcher met two of the government directors in two separate conventions related to innovation and robotics and approached them for interviews. They were later emailed for an official request and an appointment was arranged through their offices. The third government official was introduced through a third party and showed interest in being part of the study. The researcher began all the interviews with a brief personal and professional introduction. The confidentiality of the characters and the data which was to be collected from the participants was reviewed and explained by the researcher. Additionally, they were informed that a copy of their interview transcript and a summary report of the results would be available to them at their request.

3.3.1.2 Industry. A total of four officials; one high official in the hydrocarbon industry; two CEOs in transport organizations; and one board member in an organization which deals with both hydrocarbon and transport sectors were included in this field. One is a close contact of the researcher and assisted in her getting into contact with other two whereas the fourth one she managed to get connected to via a colleague from high school. The researcher first met the official contact who she knows personally and after conducting the interview with him he suggested that she interviews two other highly positioned people who he had close contact with and

would pass a word to them to meet her. Indeed, the researcher was able to contact them and get appointments through their offices. Although the researcher had her appointment rescheduled twice, she finally managed to meet both parties and complete the interviews satisfactorily. The fourth official in transportation sector was a surprise and although the researcher had a doubt that he would give her enough time for completing the interview due to his busy schedule, he turned out to be the most interested in the research subject and told the researcher, “I am grateful for this opportunity to have been a part of your research because you have triggered a few things in my mind that I hope to take forward beyond this interview.”

3.3.1.3 Tertiary Education. To address the requirements of a developing society resolute to transform its economy based mainly on oil and gas to a KBE that engages a highly proficient workforce of both genders, the development and readiness of its higher education sector as mentioned in Chapter Two is a necessity.

A total of eight individuals with high ranking positions in five different higher education institutions were interviewed. One private university professor was selected by the researcher after she started reading his articles in the newspaper that addressed innovation, entrepreneurship, and leadership. She contacted him and informed the professor of her study and asked his permission for an interview after explaining how their fields were related. He was very open and welcoming. An appointment was arranged through his office for a few days later.

The researcher personally knows the other private university professor who is part of the master’s degree program which the researcher had undertaken a few years

back. He did not hesitate in agreeing to be part of this study and immediately set up an appointment for two days later for the interview.

The director in the government institute is also a personal contact who had no objection in sitting for an interview.

The remaining five entities were identified in forums and conferences related to education and innovation or entrepreneurship. As mentioned before, the individuals generally are very open and helpful in Bahrain. When the researcher approached those professionals, and elaborated about her research area and how they could be of assistance and value to her study, just as in other organizations, participants were supportive of the research study and related to its importance to the point where they were eager to openly share their perspectives with the researcher.

3.3.1.4 Information Communication Technology (ICT). Bahrain has identified ICT as one of its key strategic sectors, and the government's policies have made Bahrain a leader in the region for growth of communications and the Internet (EDB, 2015). The Information Technology and Telecommunication Development Index for 2017, released by the International Telecommunications Union (ITU) – a UN specialized agency for ICT released in Geneva, ranks Bahrain 31st globally and 1st in the region out of 22 countries. The index is a benchmark of the level of ICT development in nations across the planet. The index is extremely trusted upon by governments, international establishments, development banks and private sector evaluation and international financiers. According to the index, in Bahrain, 98 percent of households have access to Internet, 94.75 of households have computers, and 20.8 inhabitants per 100 have fixed-telephone subscriptions. There are 216.93

mobile-cellular telephone subscriptions per 100 inhabitants and 98 percent of the inhabitants uses the internet in Bahrain (Figure 3.3).

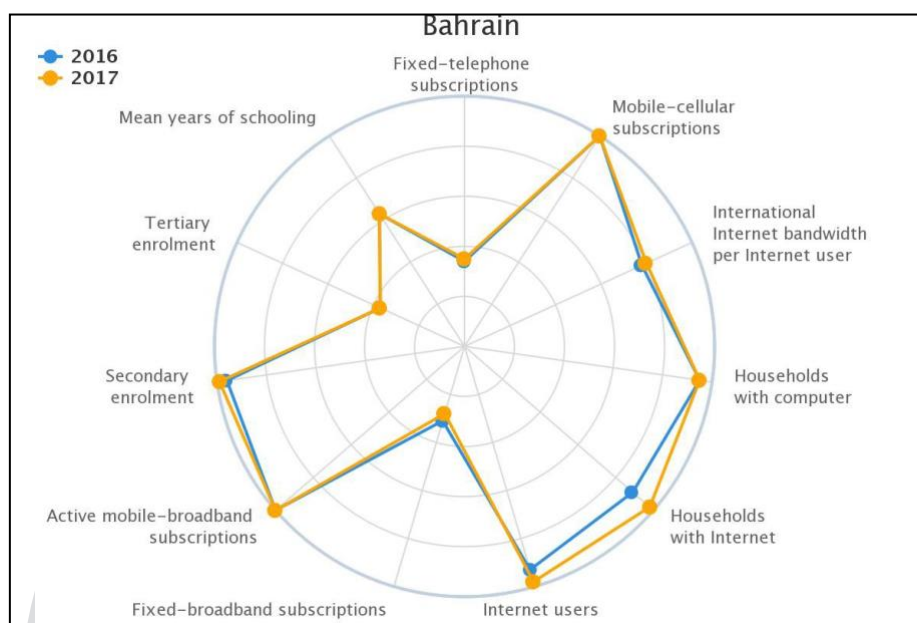


Figure 3.3: Bahrain economy card

Source: ICT Development Index 2017

A mixed sample of six interviews were conducted in this field covering six entities from six different organizations dealing with ICT in the private and the government sector. The organizations selected were a cross over between ICT, finance, government services, entrepreneurs, and a mobile and internet network provider. The researcher's objective was to get the views and perspectives of professionals in regards to the kind of the existing of ICT in Bahrain and its role and influence on the development of innovation locally.

Similar to the interviews done in the other three fields, the researcher would identify the participants on the basis of their background, experience, and involvement in this sector and their willingness to take part in this study. One of the three chief executives is a personal acquaintance and was very welcoming when

contacted by the researcher and setup a date immediately for an appointment in his office. The second executive as well as the supervisor of a department in one of the private companies were referred by a family member who knew them well and suggested them as good candidates for the research. The third executive was identified by the researcher through his activities and participation in ICT events as head of an ICT nonprofit organization and owner of ICT consultancy.

One entrepreneur was also identified while waiting in the office of another executive for his interview. The entrepreneur is a professional in gaming and has a vast knowledge of the ICT infrastructure and the gaming industry in Bahrain and added value to the data collected for analysis in this field. The chief operating officer working in one of the government bodies was also referred by another acquaintance who works in the same organization and assisted in the researcher establishing contact with the executive's office and setting up an appointment for an interview.

Table 3.1 shows the mixed sample of the four subunits selected due to their authority level in the four fields established by the researcher in Chapter Three as the units of analysis that have an impact on the economy of Bahrain; Tertiary Education, Finance/Investment, ICT, and Industry. The participants' selection was based on the involvement of their institutions in the innovation process in Bahrain and the authority level of the participant to be interviewed in his/her institute. Out of the 22 participants, 9 (41%) represent the private sector while 13 (59%) are government officials.

Table 3.1: The units of analysis

The Units of Analysis						
Unit	Field	Designation	Nos.		Gov.	Private
Finance/ Investment	Private	CEO	2			40%
	Government	Directors	3		60%	
	Sub-Total		5	23%	3	2
Industry	Government	CEO	3		100%	
	Government	Director	1			
	Sub-Total		4	18%	4	0%
Tertiary Education/ Vocational Training	Private	Professors	2		71%	29%
	Government	CEO	2			
	Government	Advisor	1			
	Government	Director	1			
	Government	Manager	1			
	Sub-Total		7	32%	5	2
ICT	Private	CEO	3			83%
	Private	Supervisor	1			
	Private	Entrepreneur	1			
	Government	COO	1		17%	
	Sub-Total		6	27%	1	5
			22		13	9
				100%	59%	41%

Source: Researcher's own elaboration extracted from the data collection

The units of analysis are the participants' perceptions and viewpoints on the current innovation status in Bahrain, the influence of the information and communication in relation to innovation, the degree of involvement of government in the innovation process, and the connection concerning the government and the private sector in collaborating for the sake of developing innovation processes in Bahrain.

These individuals were chosen based on their expertise in their fields and their relevance to innovation and IT. Most of the interviews were conducted in the interviewees' offices located in their organizations with a couple being conducted in different sites. The participant's consent was taken prior to the start of the questions for recording the interview and they were assured that their identity is kept anonymous. They were also requested to perform the interview in English language to which no one objected.

During the interviews, the native Arabic speaking individuals would occasionally use Arabic terms in between the discussion. The researcher had no difficulty in translating those terms later when transcribing the interviews since her first language is Arabic and her second language is English.

Due to the status of most of the interviewees and the positions they hold in their organizations, setting up an appointment with them to which they would adhere to and not change was a tricky endeavor. Therefore, it took a period of four months for the researcher to conduct the interviews. She continued the process of gathering data until the data that was being gathered began to become repetitive, with no new thoughts evolving and no new understandings gained, which occurred when she reached 22 interviews.

3.3.2 case study protocol. Creswell (2014) indicates that in a qualitative study, data collection is a process of several steps that begin with the identifying of the sites where data is to be collected from, followed by the selection of participants, and completed with the gathering and management of the data. Flexibility of the researcher is a must in real world studies as new paths may surface along the

investigation process. The researcher's focus is on the subunits of the units of analysis who are professionals that are experienced and therefore can provide the needed knowledge and perceptiveness to lessen the researcher's control of events. During the research inquiry, data is collected in an attempt to address the research questions.

The researcher's work and education background, flexibility and compliance to change are vital. Further, communal capital skills of the researcher and her good professional and social relations are crucial in the data collection progression as social and professional networks are vital to efficient data collection. In order to meet and prevent the criticism of bias in the case study, the researcher followed Yin's (2013) proposal in establishing a case study protocol to be followed and developed as the study progressed by the researcher all through the data collection.

Yin (2014) suggests using a case study protocol to raise the research reliability. A case study protocol is a record encompassing more than the interviews. It designates the processes and general rules that should be monitored by the scholar. The protocol is organized previous to the data collection stage (Yin, 2014) and is comprised of an outline of the case study assignment (purposes, concerns, and themes being investigated) in order for the reader to know the general topic and aim of the study. Case study protocol includes interview etiquettes which identify the matters to be discussed with the interviewees and questions to be considered during the meeting (Table 3.2).

Table 3.2: The case study protocol

Case Study Protocol
<p>The Case</p> <p>Innovation in the Kingdom of Bahrain has been getting official and public attention in the past few years. This increased notice was largely due to the commitment of the government to diversify its oil and gas dependent economy and to meet its Vision 2030 goal of becoming a knowledge based economy. However, not enough information has been acknowledged or spoken about as to how innovation processes is manifested and regulated by all concerned stakeholders in Bahrain. The case of collaboration between government and private sector for the sake of innovation was researched in this study.</p>
<p>Objective of the Research</p> <p>The research explored the role of each of the government and the private sector in collaborating to advocate innovation in Bahrain and the role the information and communication technology (ICT) played in this collaboration. The perspectives of key stakeholders in the government and the private sector on factors that induce innovation in Bahrain were investigated.</p>
<p>The Main questions for the case study were:</p> <ul style="list-style-type: none"> • Why was the innovation index low for Bahrain? • How was information & communication technology (ICT) influencing innovation in Bahrain? • What was the role of the government in the innovation processes in Bahrain? • How could the government and the private sector collaborate to develop innovation in Bahrain? <p>Data aiming to answer these questions were collected from the literature review, the interviews, the newspaper articles, and organizations' reports and web sites.</p>
<p>The Site</p> <p>The fieldwork of this study was the government, the universities, and the business sectors in the Kingdom of Bahrain.</p>
<p>Context and unit of analysis</p> <p>The context was the innovation processes via the collaboration amongst the government and private sector organizations involved in the areas of finance, industry, ICT, and tertiary education as the four units investigated in this research.</p> <p>Accordingly, the sub-units for this study were the perceptions and viewpoints of the key government and private sector entities involved in innovation and technology in those units of analysis. It was propositioned that the multiplicity among the institutes will reveal different perspectives on the current innovation status in Bahrain and ways for collaboration.</p>
<p>Interview guidelines</p> <ul style="list-style-type: none"> □ The researcher sent email requests for appointments for the interviews. In the email, the researcher gave a brief introduction of herself, the PhD program, and attached the Participation Statement and the Interview Template for the general questions that were asked in the interviews. □ In the interview meeting the following standard steps were adhered to by the researcher: <ul style="list-style-type: none"> ○ The researcher gave a brief bio of herself ○ The researcher explained to the interviewees the purpose of the study for which the data was being collected for. ○ The researcher used an audio-recorder to record the interviews and took written notes during the interview whenever needed. ○ The permission of the interviewee to conduct the session in English language was obtained at the start of the interview. ○ The permission of the interviewee to record the session was also taken beforehand. ○ The researcher thanked the participants for their participation and asked if they could refer the researcher to any person who would be of an added value to the study. ○ The researcher made the result of the research available to the participants for their consent.

Source: Researcher's own elaboration

3.4 Data Collection

This section overviews the applicable methods of data collection by appraising their usefulness for the study. Easterby-Smith et al. (2012) stated that qualitative data could be obtained through three distinct approaches, namely natural language, observations, and visual metaphors.

Notably, the existing empirical articles demonstrated that the applicability of these sources to the field of public-private partnership differed. No significant works of other authors which employed either observations or visual metaphors were found on this subject. While this does not necessarily mean that these tools are unsuitable for the aims and objectives established in Chapter One, this project has to maintain high levels of reliability and validity. This argument implies that interviews are considered as the best sensible technique of evidence gathering as the first primary source of data collection for this case.

The above discussion is supported by the fact that other scholars have successfully applied interviews to the chosen research focus. For example, Keranen (2017) relied on face-to-face interviews with the representatives of public and private sectors to obtain understanding of the functions played by these actors during public-private collaborations. The interviews allowed the author to understand the complex behaviors of the study participants (Keranen, 2017), which should also be highly advantageous for the current project.

As a second example, Woodson (2016) conducted interviews with employees in the medical industry. The analysis of the qualitative data gave the author an opportunity to claim that public-private joint efforts could boost innovation, but their

impact on this dimension is limited due to funding problems and legal challenges (Woodson, 2016).

The above articles justify the choice of interviews as the primary method of data collection. That said, given the scarcity of the studies using observations or visual metaphors, it is difficult to accurately evaluate the suitability of this technique in comparison with the other platforms of gathering primary evidence (Easterby-Smith et al., 2012).

In addition, it can be argued that qualitative interviews are advantageous in closing the gaps identified in Chapter Two. Specifically, it was noted that while the body of knowledge on knowledge and innovation in Bahrain is extensive, little is discussed by other authors regarding the importance of the role of government and the private sector in innovation and how they can collaborate to enhance the innovation processes in Bahrain in order to influence the developing KE (Ahmed & Al-Roubaie, 2012; Pawlowski & Pirkkalainen, 2012).

3.4.1 the interviews. In order to get to the crucial information needed to address the purpose of this study and pave the road for the end results, key entities in Bahrain's public and private institutions have to be interviewed; hence, the researcher has opted for a purposive sampling approach (Tongco, 2007; Etikan, Musa, & Alkassim, 2015).

Etikan et al. (2015) define purposive sampling as, "The purposive sampling technique, also called judgment sampling, is the deliberate choice of a participant due to the qualities the participant possesses" (p. 2). They go on to state that purposive sampling is a nonrandom technique with no underlying theories or a fixed number of

participants. Basically put, individuals who hold and are able and willing to offer the knowledge and/or experience they possess that is relevant to the study at hand are chosen by the researcher based on her decision of what needs to be known.

According to Easterby-Smith et al. (2012), human participants can provide valuable qualitative knowledge. Although Easterby-Smith et al. (2012) also asserted that this evidence can be gathered from a wide variety of individuals, this study focuses on the people involved in the public and private sectors in Bahrain who deal with innovation processes and technology. This is done to close the gap identified by Nardelli et al. (2015), who demonstrated that there was little empirical evidence regarding the connection between private-public collaboration and innovation.

Another criticism of what was stated above was admitted by Easterby-Smith et al. (2012) who noted that the issue of access was critical for the collection of qualitative data. Bahrain is a small country and is very well known for its friendliness and the willingness of its citizens to help and assist whenever possible (EDB, 2014).

In a previous research, the researcher was able to reach managers and head of institutions for interviews and had no difficulty getting support from higher authorities (Modara, 2014). Similarly, the researcher hoped that getting interviews setup with the decision makers and managers of the organizations and institutions involved in public-private innovation and technology would not be a difficult task.

Indeed, the researcher being a Bahraini citizen who has an experience of over 25 years in the government and the private sector managed to secure interviews with seven professionals from the network of her connections in both sectors. All of these

individuals hold high positions in esteemed organizations and were ready to assist the researcher and be part of her study when they were requested to by her.

Since the area of investigation is a fairly new topic in the region, and in order to find other candidates relevant to the area of her study, the researcher began to attend or participate in conferences and workshops focused on innovation and technology in Bahrain. It was in those events that she identified and meet additional key personnel involved in the areas of innovation and digital technology development.

After succeeding to arrange a couple of interviews, the researcher also decided to ask the interviewees at the end of each interview for advice and reference to other key personnel who could be of value to the research. They were all helpful and guided her by providing names and references.

Out of a total of 29 requests for interviews, there were four occasions where the researcher did not obtain any response back. One worked in the e-government, the second one was from Tamkeen, and the last two worked in the private banking sector. Except for these, she received an email reply or a telephone call from the office of the other 25 participants with confirmation for an interview, including the time and location of the meeting. This represented an 83 percent response rate.

By suggesting questions related to the established dimensions to the representatives of the final sample, this study aims to create viable academic and practical insight. The semi-structured interview type is selected to potentially ask additional questions in an attempt to clarify the responses provided by the interviewees (Bryman, 2012). This is done to produce more outcomes related to the

outlined research gap. At the same time, the works of such authors as Pawlowski and Pirkkalainen (2012) also indicate that the phenomenon of private-public partnerships encompasses a wide variety of factors (e.g., social development). The main implication of this is that a single semi-structured interview may be insufficient to analyze all factors affecting these ventures. While an unstructured interview may have been beneficial in addressing this issue, this method was not represented in the modern empirical articles relating to the study context.

The composed semi-structured questions were emailed to the participants as part of the email requesting permission for an interview in order to allow the participant to reflect upon his/her experiences and prepare for the interview. The recordings of the interviews showed 19 minutes for the shortest duration and 74 minutes for the longest duration, which was mainly due to the answers of the participants and how much detail they were willing to put into their responses. All of the participants were very open to the questions and gave as much time as needed for the interview except for one who had a secretary come in and remind her of her next appointment twice during the interview, which put the interviewer under pressure to run through the questions quicker. The participant was courteous enough though to answer the questions sufficiently.

At the start of each interview, the researcher would ask for permission to record the interview and that the language to be in English. In all cases the participants had no objection, and most of the participants in the private sector and a few of the public officials were indifferent whether their identities were kept anonymous or exposed. The researcher has opted to keep participants' identities

anonymous due to the small size of the country and how outsiders not involved in the research could interpret information incorrectly by not having an in-depth knowledge of its objectives.

The researcher started the interviews for the data collection with semi-structured, open-ended questions related to the topics—according to the title of the research—in the areas of innovation, collaboration, and ICT as shown in Appendix B. The researcher remained flexible and, depending on the way the interview was going, the researcher would occasionally ask a question which was not on the list based on the knowledge and experience of the interviewee. This method gave the researcher the freedom to explore matters which the participants gave rise to, and permitted her to ask queries not part of the pre-written questions and discuss subject areas considered to be of importance in the field of the participant and related to the topics covered.

For enhancing the accuracy, credibility and validity of the collected information (Creswell, 2014; Lincoln & Guba, 1985), the researcher used participant-checking as a quality control. The researcher sent an interview transcript to each participant for verification and did not receive any feedback either because of the nature of the participants' position being too busy to have time to review the transcript or they did not have any adjustments to be made.

The researcher adhered to research protocols and submitted a participation statement, as shown in Appendix A, in the email requesting the participants' agreement to be part of the study and the option to withdraw if they felt that they needed to withdraw at any point.

The full list of the interview questions suggested to the employees of private and public organizations in Bahrain is given in Appendix B. It is observed that the representatives of the sample are faced with 23 questions in total, excluding any emerging additional questions that the researcher could ask due to the semi-structured nature of the interviews. Questions 1-7 relate to the general innovation potential of Bahrain. This information is gathered to obtain preliminary knowledge about the opinions and perceptions of the interviewees. Furthermore, the literature review identified stressed that Bahrain's share of innovation is not enough to compare this setting to the Western countries (GII, 2016). Questions 1-7 should reveal whether the attitudes within the sample correlate with this opinion. A potential discrepancy could identify a general lack of awareness of the problems faced by Bahrain, thus suggesting a possible direction of improvement for the stakeholders involved in government and public sectors. At the same time, it was noted in the literature review that innovation could be difficult to measure, potentially meaning that the answers of the interviewees may be highly subjective (Nour, 2013).

Questions 8 pertains to the discussion of the second pillar of the KE by examining the innovation infrastructure of Bahrain. World Bank (2007) noted that this aspect primarily consisted of ICT as mentioned in Question 8. It is recognized that the model of the KE proposed by Chen & Dahlman (2006) can be used to quantify the ICT performance of different countries, which was done by the World Bank (2008). Nonetheless, due to the qualitative nature of the study, all numerical evidence related to this is effectively ignored. While this is a noticeable shortcoming

of this project, the qualitative data may reveal useful insights going beyond numerical statistics in regards to the role that the ICT plays in the innovation process in Bahrain.

Questions 9-15 are related to the collaboration factor amongst the public and private sectors. Questions 9-13 aim to evaluate the current extent of the collaboration, trust, and successful partnerships if any between ICT sector and the different business and government entities in Bahrain. While questions 14 and 15 deal with the barriers and challenges associated with this collaboration and the role that the government should play in strategizing the collaboration between the ICT sector and the business entities.

According to Chen & Dahlman (2006), governments worldwide should strive to implement sensible economic aid actors in generating and using knowledge. This assertion was conceptualized as economic incentives (Question 16-18). The answers given by the interviewees should be positive given such initiatives as zero taxation for private enterprises in Bahrain (Economic Development Board of Bahrain, 2018c). On the other hand, the actual effects of these strategies were not evaluated in Chapter Two, potentially meaning that the interviews may uncover significant problems related to this dimension.

Question 20 dealt with further collaboration measures which should be considered between business organizations and the government in order to support innovation processes.

Turning now to Questions 19 and 21, these items appraise the innovation initiatives in Bahrain. Chen & Dahlman (2006) and World Bank (2007) highlight that this factor was defined as the access to the latest research as well as the existing

network of academic institutions, research laboratories etc. The two components of the above argument are addressed by Question 19 and 21, respectively. At the same time, Chen & Dahlman (2006) claim that this component of the KE framework was vital regardless of the institutional background.

Questions 22-23 conclude the interview by going back to innovation and what aspect of it should be focused on in Bahrain from their perspective, and also asking the participants to add insights that might have been forgotten to be included in the interview questions but would add value to this study.

3.4.1.1 the pilot interview. In order for the researcher to have an indication in regards to the effectiveness of the interview questions, and to provide her with a sense of comfort on how to perform during the session as well as the duration of it, the researcher set up a pilot interview with the head of a private university. As a professor in management and technology and having supervised over 50 PhD students, this participant has vast knowledge in research, innovation, and technology. He proved a valuable resource in refining the interview questions and aiding the researcher in interview techniques. The pilot session also provided practical information on the length of time to complete the interviews and the difficulties associated with recording and taking notes.

3.4.2 Focus Group interviews. The one-on-one interviews were transcribed and analyzed by the researcher from which a model for the roles of the government and the private sector emerged according to the data collected. As the second source of gathering data for this case, the researcher then conducted three Focus Groups in order to triangulate their responses to the findings of the individual interviews and

explore the findings in greater depth, both to validate the previous findings and allow for unforeseen ones to emerge.

As stated by Dilshad and Latif (2013) the Focus Group is a qualitative technique for collecting data. Anderson defines the Focus Group as “a group comprised of individuals with certain characteristics who focus discussion on a given issue or topic” (as cited in Dilshad & Latif, 2013), while Marczak and Sewell (n.d.) define a Focus Group as “a group of interacting individuals having some common interest or characteristics, brought together by a moderator, who uses the group and its interaction as a way to gain information about a specific or focused issue”.

According to Easterby-Smith et al. (2012), in the Focus Group the role of the interviewer is a moderator who has to be skillful on both initiating and facilitating the line of discussions and allowing the participants to feel comfortable to express their views and respond to the ideas of the other participants.

Denscombe (2010) identified prompt/stimulus, moderator-not a neutral person, and interaction within the group as three unique characteristics of Focus Groups. He went on to explain these characteristics further by stating that the Focus Group usually is about a topic which is introduced by the moderator as a main focus of the discussions. While the moderator herself adopts a more neutral role in the process of the Focus Group contrary to the direct individual interviews, the interaction between the members of the Focus Group is of the utmost importance and weighs more than just collecting the perspectives of the individuals.

It was challenging for the researcher to get a group of people in one organization to meet with her at the same time due to their work schedules and

availability. However, the researcher managed to arrange three interviews with three organizations which dealt with investment, academia, and regulations respectively.

Referring to Easterby-Smith et al. (2012), “The format of the interview should be organized by using what is called a ‘topic guide’. This is a resume of the main areas of interest that are to be explored” (p. 133). The researcher was the moderator in those Focus Group interviews and presented a summary of the research topic and what had emerged from the individual interviews and then opened up the ground for the participants to express their views and provide any examples that they had regarding the roles of the government and the private sector in collaboration to push innovation forward in Bahrain.

Focus Groups were held at the venues of the participant groups where they were in familiar grounds and at ease to share their views and converse with each other about their different perspectives, if any. Each group consisted of four participants and their organizations varied from investment to higher education academics, and lastly with project-oriented researchers who dealt with regulatory bodies. Two of the groups were comprised of Bahrainis and expatriates, while the last group involved Bahraini nationals only.

3.4.3 The documents. Referring to Yin (2014), documents are vital for validating facts and information collected from other data sources. In addition to the interviews the researcher has kept a daily track of the two local newspapers published in the English language from the Fall of 2016 to the end of 2018 in order to stay updated on the events, developments and decisions made in the public and private sector in Bahrain in regards to innovation, technology, and the economy

developments. Organizations tend to publish and announce their actions and achievements through local newspapers as one source of competition in Bahrain. The researcher would print those articles and keep a record of them which later proved to be very substantial and provided additional clarifications regarding what was stated by the interviewees as a valid point of comparison, thus allowing for limited data triangulation.

In addition to the interviews, secondary evidence is collected from such sources as published articles, governmental reports, and official documents. It is acknowledged that the applicability of this evidence is limited in comparison to the primary data. Nevertheless, the gathered secondary data could provide additional clarifications regarding what was stated by the interviewees or provide a valid point of comparison, thus allowing for limited data triangulation. This is especially useful given the lack of primary quantitative data.

Bahrain is a small country and one of the attributes of living in a small place is that once one follows the news in the local newspaper, one starts getting a feel of what is going on in the country and begins to recognize individuals and their area of work and expertise. The researcher was able to see a pattern merging in the topics being discussed by the government and private sector authorities as well as coming to know the events being organized and held in the country that were related to innovation, technology, and KE.

The researcher has kept a scanned copy of the related newspaper articles and reports for years 2016 to 2018 as secondary data. This secondary data, together with

the interview records, will aid in delivering a rich base of the role and influence of collaboration for the sake of developing the innovation process in Bahrain.

Printing those articles and keeping a record of them provided both additional clarifications regarding what was stated by the interviewees and a valid point of comparison, thus allowing for limited data triangulation. This is especially useful given the lack of primary quantitative data.

3.4.4 field notes. The practice of keeping notes during the interview proceedings, which was very beneficial for the researcher after when she started transcribing the interviews and analyzing the data. As the researcher was coding, the perceptive notes supported how the codes developed throughout the coding process. The researcher used her field notes to convert nonverbal communication and cultural characteristics of participant performance during the coding process. The notes were also beneficial in formulating follow-up questions as an outcome each time new data was collected.

The researcher took field notes, once after the interviews, at the time which she would write down her personal thoughts about the mindsets of the interviewee and how the interview process proceeded in general, and second one in the form of notes consisted of unbiased comments and thoughts that were generated after in regards to the subjects discussed during the interview.

The gathered data was stored on the researcher's computer with a password that only the researcher was aware of and also kept a copy safe in another location. The researcher used ExpressScribe software and a foot pedal to play back the interview recordings while listening with a headphone and transcribed them in

Microsoft Word. In order to aid the analysis process, Computer Assisted Qualitative Data Analysis Software (CAQDAS) application NVivo 12 is used to manage efficiently and effectively the transcribed interviews and the scanned newspaper articles. NVivo is one of the most widely used software due to its coding and retrieval sophistication functions and modelling means, which speed up the procedure of managing large data collections and their retrieval (Easterby-Smith et al., 2012; Noble & Smith, 2013). NVivo 12 offered the researcher a structured management system for creating logical relationships among the different documents and was a support analysis system for the researcher.

The researcher would later correlate the notes taken in the workplaces or the environments where the interviews took place and the codes emerging in the analysis phase as a way of triangulation for the data collected.

3.5 Framework for Data Analysis

Turning now to the framework of data analysis for the case study, it is necessary to define which case study type is adopted by this investigation. According to Yin (2014), the current project constitutes an exploratory case study considering that the role of GPC on country-wide innovation in Bahrain is ultimately unknown. This can be complemented by referring to the framework of data interpretation given by Yin (2014).

Propositions are helpful in any case study and increases the prospect of the researcher being able to place boundaries on the scope of the study and intensifies the viability of completing the project. It is one of the most beneficial techniques of data

analysis for exploratory case studies as well and the more a study comprises explicit propositions, the more it confines its feasibility limits (Yin, 2014).

The author thus established propositions according to what she observed through the review of the literature in connection to the four components of the KE of Chen and Dahlman (2006). Thus, by linking together the concepts of KE, innovation and government-private sector initiatives, this model of data analysis as illustrated in Figure 3.3 closes the gap identified in Chapter Two with regards to the lack of research regarding these factors in Bahrain.

The researcher proposes the following:

In order for government-private sector collaboration to contribute to country-wide innovation, the government has to support these relations through economic and institutional regulations.

In order for government-private sector collaboration to contribute to country-wide innovation, the workforce involved in these partnerships has to be educated and skillful.

In order for government-private sector collaboration to contribute to country-wide innovation, the companies involved in these contracts have to be conducive to innovation.

In order for government-private sector collaboration to contribute to country-wide innovation, all sectors involved in this partnership have to be supplied with appropriate hardware and software technology.

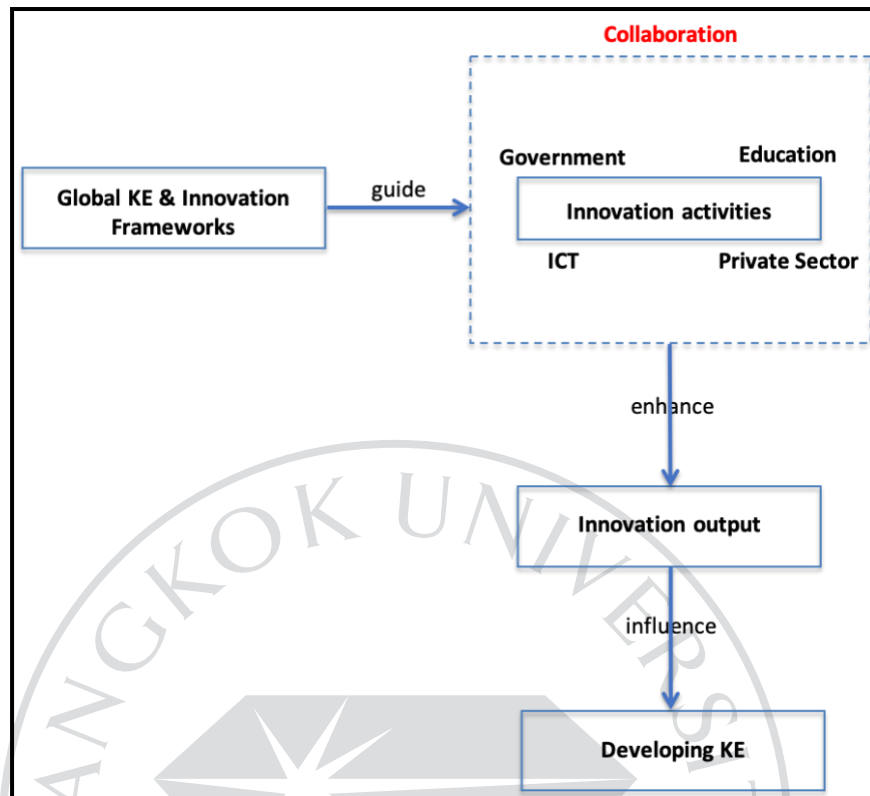


Figure 3.3: The Research Propositions

Source: Researcher's own elaboration

3.5.1 Methods of Data Analysis. In terms of the methods of data analysis, axial coding is employed to examine the interview transcripts. Specifically, the constituents of the approach of Chen and Dahlman (2006); economic & institutional regulations, education, ICT, and R&D are considered as categories that are elicited from the primary data. The influence of government-private sector relations constitutes the fifth and final category for axial coding. Given the structure of the interview, this is justified since the majority of the questions have already been linked to what was stated by Chen and Dahlman (2006). The pieces of data pertaining to each category are then discussed in detail and compared against each other to produce the research outcomes (Close, 2012).

Axial coding supports the above system of data analysis since the discussion of each particular category should relate directly to the corresponding propositions, thus fully addressing the designated research gap. In order to aid the analysis process, computer software was used as an additional tool to examine the primary evidence. The researcher opted to use NVivo software due to its coding and retrieval sophistication functions and modelling means, which assisted in speeding up the procedure of managing the data collections and their retrieval (Easterby-Smith et al., 2012; Noble & Smith, 2013).

3.6 Validity & Reliability

According to Yin (2014) “The value of a research is commonly assessed by means of testing the construct validity, internal validity, external validity, and reliability” (p. 45). Golareshani (2003) argued that:

The association of quantitative paradigm with qualitative research through validity and reliability have changed our understanding of the traditional meaning of reliability and validity from the qualitative researchers’ perspectives. Reliability and validity are conceptualized as trustworthiness, rigor and quality in qualitative paradigm. (p. 604)

The validity and reliability of this study was conceptualized by adopting Lincoln and Guba’s (1985) measures. Those measures are generally designed for qualitative research and assess the whole research process in case study methodologies.

Credibility: validates that the research was steered in such way that the identification of its subject was done correctly. Credibility is improved by using

several bases as proof for data, various respondents are assigned the perceptions and connotations that have been collected in order to find equivalents, by allowing contributors to check their interview transcriptions and provide remarks on them, by using data triangulation, and through continued engagement in information gathering. One way of achieving credibility was by collecting and verifying data from different resources. Another way was the researcher validating data collected and understandings of participants of one institute with those of another one. The researcher used this method with interviewees from different ICT bodies as well as with interviewees from different educational, financial, and industrial institutions. Furthermore, data collected from participants were compared against explicit documents such as newspaper articles and institutions' reports.

Transferability: shows whether the findings could be generalized or conveyed to other milieus or locations. The generality in explanatory qualitative research is not interpretation from small examples to large populations, rather it is to show how evident findings could obtain similar outcomes if they were shifted to other countries with alike properties. The outcomes of this study are relevant to other neighboring countries in the Arabian Gulf such as The Kingdom of Saudi Arabia, Qatar, and Oman. Those countries have many things in common with Bahrain, such as comparable governments, language, culture, and natural resources and economies. They have also drawn similar visions as Bahrain's 2030 Vision for shifting their oil-based economies to a knowledge-based economy. The researcher undertook to enhance transferability of the results by conducting a thorough job of describing the study setting and the assumptions that were vital to the research.

Dependability: shows that the research procedure is systematic and well documented and can be tracked. It also gives a detailed write-up of the methods and approaches used in the research. The researcher has done her best to explain the research methodology and methods in Chapter 3 which she drew a map to follow in this study, the data collection procedure in this chapter, and data analysis in Chapter Five.

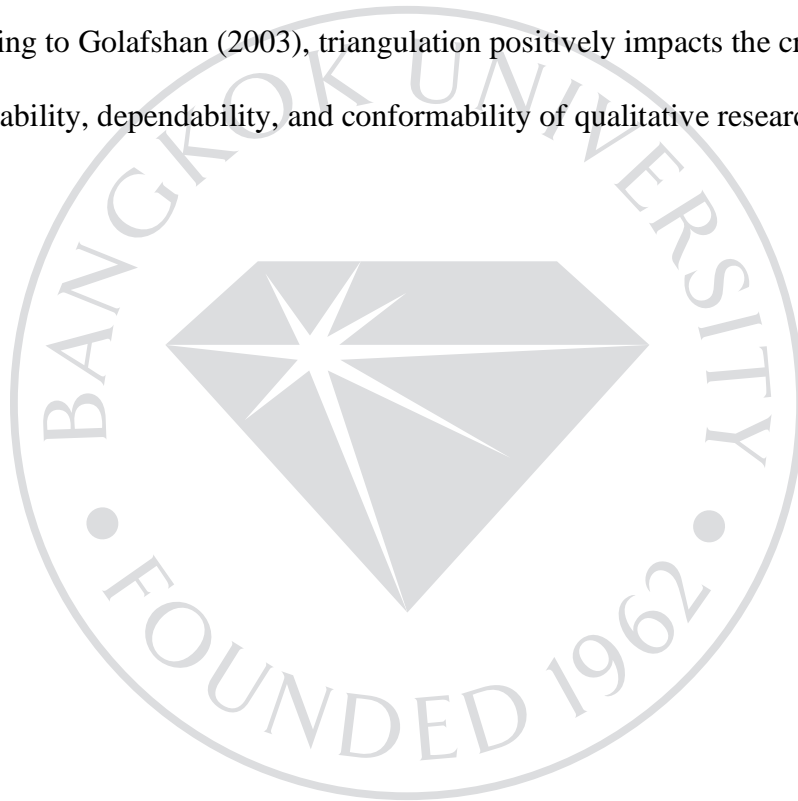
Conformability: assesses whether the outcomes emerge from the data collected from the case and not from presumptions by showing raw data and representing the steps of the analysis that lead to progression of the results and outcomes. In order to meet and prevent the criticism of bias in case study, the researcher followed Yin's (2014) proposal in establishing a case study protocol to be followed and developed as the study progressed by the researcher all through the data collection as per table 3.2. The researcher used numerous approaches to accomplish each phase of trustworthiness in this research.

The researcher to provide information, ensuring that the research findings are consistent with the data collected and allowing for effective transferability, used rich descriptions of data collected. The researcher used a (CAQDAS) NVivo 12 application to manage and organize research documents.

Purposive selection approach was used to select appropriate sites, participants, and documents in order to reflect an accurate representation of the findings. Although the purpose of this research is not to generalize the findings across different contexts, purposive sampling was used to establish the applicability (transferability) of the

findings in different contexts such as partnership in different sectors and/or in different regions.

Triangulation strategy was utilized by the use of multiple sources of data, primary and secondary, to include different perspectives from different participants from within and across organizational units and by using supporting documents. The researcher used this strategy to ensure that data remain the same in different contexts. According to Golafshan (2003), triangulation positively impacts the credibility, transferability, dependability, and conformability of qualitative research project.



CHAPTER 4

CASE STUDY: DESCRIPTION, ANALYSIS, FINDINGS

This chapter describes the findings from the case study. In the first order, the outcomes of the interviews performed by the researcher with the participants chosen from the four units of analysis as established in Chapter three based on those units' impact on the economy of Bahrain; Tertiary Education, Finance/Investment, ICT, and Industry, are discussed. Then a correlation of the findings, with a focus on innovation, is assessed and synthesized in terms of not only matching and contrasting the observed findings from the participants alongside each other, but also where the observed findings are associated and contrasted touching the research model created in the literature review of Chapter two. Thus, this chapter explains, deliberates, investigates, and combines the empirical findings with the findings from the literature review.

4.1 Introduction

One of the principles of using the case study approach is to use multiple sources of evidence (Yin, 2014). The primary source of data in this study is the in-depth interviews of key individuals with decision making power in their organizations. In order to get to the crucial information needed to address the purpose of this study and pave the road for the end results, leaders of key entities in Bahrain's public and private institutions were interviewed; hence, the researcher, as shown in Chapter 3, opted for a purposive sampling approach to target key entities in Bahrain's public and private institutions for her interviews. Etikan, Musa, and Alkassim (2015) define purposive sampling as "The purposive sampling technique, also called

judgment sampling is the deliberate choice of a participant due to the qualities the participant possesses” (p. 2).

They go on to state that purposive sampling is a non-random technique with no underlying theories or a fixed number of participants. In terms of this research, individuals who hold and are able and willing to offer the knowledge and or experience they possess that is relevant to the study at hand were chosen by the researcher based on the research model (Figure 2.12) which she developed in Chapter 2, and in the sectors of the society that contribute to the economy as indicated in the model and specified as follows: ICT, education, finance, and industry.

At the start of each interview, the researcher would explain to the participant the concept of the innovation and collaboration being addressed in this research as per the findings in Chapter 2 in order for all participants to have the same notion of innovation and collaboration. That would assess them in answering the interview questions and discussing further their perspectives on these two terms and focusing on the innovation processes and the role of each of the government and the private sector in collaboration to develop these processes.

In addition to the interviews, secondary evidence was also collected from such sources as government reports, official documents, and newspaper articles related to the four areas of interest in this study. The researcher kept a daily track of the two local newspapers, Gulf Daily News (GDN) and Daily Tribune (DT), published in the English language from the Fall of 2016 through the Summer of 2018 in order to stay updated on the events, developments, and decisions made in the public and private

sector in Bahrain. Organizations tend to publish and announce their actions and achievements through local newspapers as one source of competition in Bahrain.

Printing those articles and keeping a record of them provided both additional clarifications regarding what was stated by the interviewees and a valid point of comparison, thus allowing for limited data triangulation. This is especially useful given the lack of primary quantitative data.

Minutes were also taken by the researcher in the field to convey and seize additional information observed before, during, and after the interviews as an additional method for capturing data that was perceived but not communicated orally.

4.2 The Participants' Responses

The preliminary findings of the transcribed interviews will be looked at next. They are drawn together to create a knowledge sharing theme for further analysis and discussion. The interview question will be written down first followed by a summary of overarching response, which will then be followed by each of the four units of analysis; (a) education, (b) finance, (c) ICT, and (c) industry noted separately.

4.2.1 question 1. To what extent do you believe in the existence of an innovation culture in Bahrain? Since Questions 1 and 3 are interrelated, the answers are integrated below. The rating scale was from 5 to 1, reflecting a strong belief (5) to no belief (1) in an innovation culture in Bahrain. Out of the 22 participants, sixteen rated innovation culture at 2, four ranked it at 4, one gave it a 3, and one did not rate.

All 22 participants forwarded that Bahrain lacks a system that nourishes the belief that an individual can innovate, and that there is something within the culture that brings innovation to a halt. This is clearly shown in Figure 4.1. The low and

medium responses to question 1 (73% and 4.5%, respectively). Even the four interviewees who rated their belief in the existence of an innovation culture in Bahrain as high (18%), still recognized this lack and that there are barriers in the system. One responder became so caught up in elaborating on this topic that he moved on without rating (4.5%).

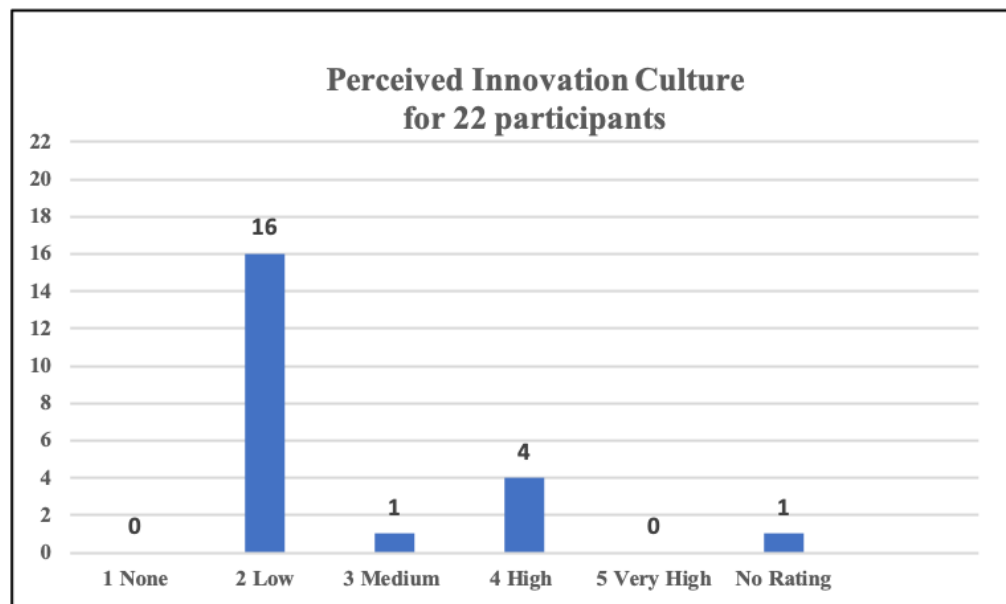


Figure 4.1: Rating innovation culture in Bahrain

Source: Researcher's own elaboration extracted from the research interviews

The overall innovation arena was characterized as implementing technology that has been built outside the country, and that generally individuals are followers, not leaders, when it comes to innovation. It was pointed out by those who believe there is some level of innovation culture that it is rather a copying culture where decision rights reside in the older generation, who are an enormous barrier in this region to the dynamic in-learning (coaching) and information management kind of innovation to which the younger people are exposed. Two responders indicated that,

while encouraging young people to try and fail is lacking, the youngsters themselves prefer 7:00 a.m. to 2:00 p.m. guaranteed government jobs.

Most of the participants recognized that Bahrainis are risk averse, which means most of the investments come from Kuwait and Saudi Arabia. This risk aversiveness was also denoted by Ravi (2017), who indicated that the reason Bahrain lacks global ranking by the Global Entrepreneurship Development Institute is because Bahraini entrepreneurs are risk averse and lack the flexibility and vision to adopt new methods and technologies. Bahrain ranks 35 out of 137 countries in the Global Entrepreneurship Index 2018 (GEDI, 2017), and Bahrain's second lowest component in the index is *risk acceptance*, which is the willingness of individuals to take the risk of starting a business.

Only one interviewee, P21, is of the belief that islanders are generally innovative, that Bahrainis are unique in the Gulf region as islanders, and that they have an open and innovative mindset, which comes from the blending of the ethnicity of the different cultures transiting or residing on the island.

4.2.1.1 education unit. P3 expressed that as an academic individual, for him to rate the innovation culture it must be measured against a matrix or a measurement such as the numbers of research articles, or a survey. But, since the research interview sought his personal views on the subject of innovation culture in Bahrain, he said that as a Bahraini having exchanged ideas with individuals who are involved in innovation, he believes that the innovation culture is limited in Bahrain. He said that innovation has become a buzzword in Bahrain, and defined innovation as “doing things better” (P3).

As per OECD (2007), innovation is a complex term to define and comes in many forms and from anywhere internal or external to organizations, and as stated by Damanpour and Evan (1984), innovation is an extensively used model and the expression is variously defined to propose the particular requirements and characteristics of a certain study. Innovations do differ, and each kind has its own characteristics that affect its rate of implementation.

As per P3's opinion, there is a lot of waste in his field of education, and no one is innovating on how to use this waste as an input resource to produce something better. Interviewee P7, a director in a governmental education authority, sees this as systematic. She stated that Bahrain lacks a system that nourishes the belief that an individual can innovate and that this innovation will lead to something better.

Similarly, the professional in the governmental vocational development entity, P13, is of the opinion that there is something within the culture that brings innovation to a halt and that there are more individuals with a mindset that they will not be supported for new ideas than the individuals who believe that they will be supported.

The head of one of the universities, P15, points out that there was negligible incentive for people to fail by taking a risk and learning from that failure. As per his comment,

My day to day is in the public realm and the public realm I find there is a very little incentive to innovate. There is very little incentive to tell people to take a risk and give anything a try. It is very much procedural and rules-based. And if that is how you function and operate in your day to day, it is tough to translate that into an innovation culture then.

4.2.1.2 finance unit. Investment professional P11 commented that Bahrainis are not risk takers and that is why most of the investments are coming from Kuwait and Saudi Arabia. The private financier P6 is of the opinion that encouraging young people to try and fail does not exist, which is in line with what the academia professional P15, mentioned above. P6 continued, noting that licensing and permits processes for startups are more difficult than they appear, which leads to one of the reasons that make individuals prefer 7:00 a.m. to 2:00 p.m. guaranteed government jobs. The government investor professional P11 commented that although this risk averseness had started changing slowly, the overall innovation scene in Bahrain was still implementing technology that had been built outside of Bahrain with no attempt to develop new technology locally.

On the other hand, the head of a private investment development body, P21, is the individual mentioned above who holds the belief that islanders are generally innovative in their lifestyles and, as islanders, Bahrainis are unique in the Gulf region and possess an open and innovative mindset. P21 specifically forwarded that this mindset comes from the blending of the ethnicity of the different cultures transiting or residing on the island and the limited resources in a confined geographical space made them independent in their food, water supply, and economic setups. Further, he explains that, for example, even though there was a lot of risk and challenges in pearl diving, it was a necessity out of the need to make a living before oil was discovered in Bahrain in 1932. Then, there is the mixture of ethnicity itself and the diversity in the culture that was transferred to the local people of Bahrain from the ship merchants stopping over and bringing with them ideas, food, and salt. The risky pearl industry

and the networking with the incoming merchants are the evidences that support his belief that a Bahraini innovation culture has developed from a background of economic diversity and knowledge transfer for more than a century.

4.2.1.3 information communication technology (ICT) unit. From an ICT perspective, P14 explained that individuals in Bahrain are followers, not leaders, when it comes to innovation, as was noted by P11 of the financial sector. P18 said that in the private and public workplace no one is encouraged to innovate, and that they are just expected to report to work and leave on time and do their work as asked. This interviewee did note that students are innovative when attending university, but that when they graduate and join the workforce, they are not expected by their managers to innovate because the culture of innovation at the workplace is weak. Without the support of their managers at work, the eagerness to innovate subsides in the newly employed young graduates.

Statements are frequently published in the media from the leaders of the country promoting innovation such as the article by Saxena (2018), which provides details on the major investor forum of industry leaders and top businessmen held in Bahrain on May 9, 2018, during which the Crown Prince (CP), stressed the importance of promoting innovation and competitiveness across all sectors. Despite this top-level activity, P18 felt that there is no national drive for innovation, and, perhaps a primary source of this perception is that no one existing body is responsible for innovation. He emphasized this point by saying that the number of initiatives and projects moving towards innovation is low.

4.2.1.4 industry unit. P5 viewed the culture of innovation as fundamentally nonexistent in Bahrain, and that it is rather a copying culture. He believes that this copying culture is rooted in the educational system, which does not allow students to open up and look at problems differently since they are still taught from a prescribed text.

P9 viewed the older generation as an enormous barrier in this region to the kind of innovation that the younger people are exposed to, that is, a more dynamic in-learning and information management that is vastly superior to what their parents were open to. Further, P9 believes that institutionally and hierarchically some of the attributes that bring down the Bahrain index of innovation globally relates to the business culture, particularly in state-owned enterprises that are bureaucratic and centralized. Similarly, this opinion emerged in the literature review in Chapter 2, where Yigitcanlar, O'Connor, and Westerman (2008) said that, while public organizations can exchange knowledge and resources, their innovation capability is highly limited by different hierarchical levels.

As for P19, although he thinks there is a beginning of a recognition for innovation, he is of the understanding that innovation needs time and development to become part of an institution's DNA. He believes that the culture has to start in institutions, and only then will it become part of the culture in the society.

4.2.1.5 summarizing the answers for question 1. Bahrainis are unique in the Arabian Gulf region and have an open innovative mindset, which they inherited by the blend of ethnicity through the years from the diverse cultures that transited or took residency in Bahrain. But, their risk aversiveness and the lack of flexibility and vision

to adopt new methods and technologies made them copy and implement technologies that were created and built outside of Bahrain. Hence, innovation culture is limited in Bahrain and a system that nourishes the trust in individuals to innovate and incentives for people to fail by taking risks and learning from failure is lacking generally. The overall environment in both the private and public sector is geared more towards doing business. Even when innovative students graduate and join the workforce, they are not expected by their managers to innovate due to the weak innovation culture at work, which leads to those young employees' eagerness to innovate subsiding. Also, this question helped in clarifying the absence of a national drive for innovation and the absence of an existing body responsible for innovation.

4.2.2 question 2. How would you evaluate the overall innovation capability in Bahrain? Similar to Question 1, Questions 2 and 3 are interrelated, and thus the answers are integrated below. These questions asked how the research participants would evaluate the overall innovation capability in Bahrain, with the highest capability 5 and the lowest 1. They were then asked to elaborate on that rating. Overall, 11 (50%) of the participants rated the capability of individuals to innovate in Bahrain as 3.

All 22 participants concurred that most of the individuals in Bahrain are *capable of innovating*, but that the environment and culture to support that innovation is lacking. Only 5 (23%) rated the level of innovation capability as low and only 5 (23%) rated it as high. See Figure 4.2. Again, one individual did not give a rating.

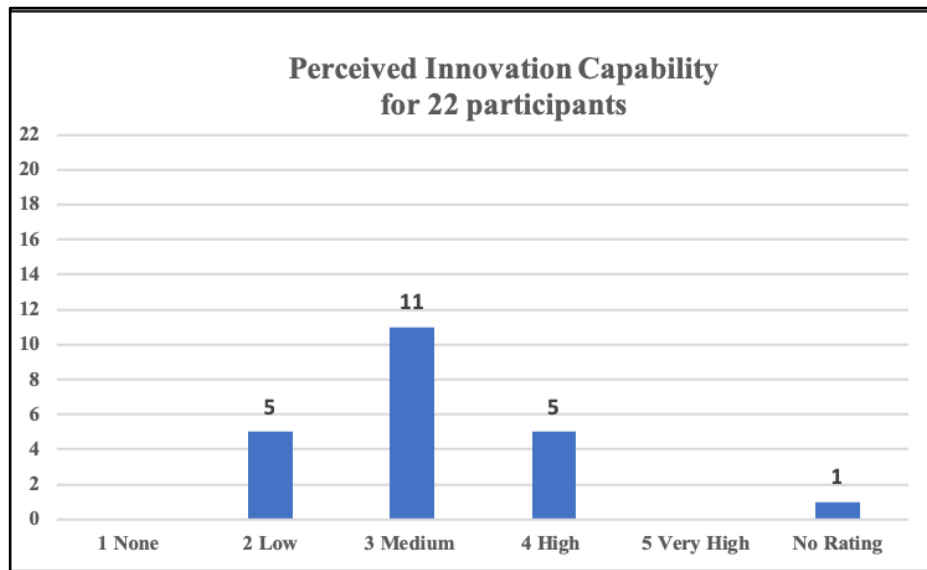


Figure 4.2: Rating innovation capability in Bahrain

Source: Researcher's own elaboration extracted from the research interviews

Participants see the digital capability as very basic and one that needs a lot of work to improve it, starting with the teachers. Generally, the partakers from the ICT sector are of the opinion that currently the individual's capability in the field of technology is deficient except for the younger generation, who are on a more advanced level due to their exposure to the internet, information and data, and ease of exposure with what is happening in the West. This correlated with the opinion of the interviewee P9 in 4.2.1.4 above.

Participants were of the opinion that Bahrainis were capable of innovating if given the chance, but generally fear, absence of the environment, methodology, the know-how, lack of direction, mentorship, and the absence of institutes that maintain and encourage innovation would get in their creativity. P6 elaborated "Barriers to entries are high. Getting licensing is not as easy as it should be. Encouraging young people to try and fail is not there and we need to change it". Another factor is the

absence of a perception that innovation is necessary since most of the people in Bahrain have a fairly stable life. Fear of losing that stability stops them from innovating. As P6 said “We are living in dignity and comfort, so no need for materialistic things, but if I need to be innovative I have to be given incentive, recognition and acknowledgement for my contribution”. This is reflective of the risk aversiveness that surfaced in response to 4.2.1 above.

Participants also pointed out that organizations are also very risk averse, and do not allow failure, which keeps employees from trying new things and innovating. This is in line with the participants’ answers to question 1, where it was recognized that Bahrainis are risk averse, which also affected Bahrain’s Global Entrepreneurship Index ranking.

As for the industry sector, all the participants concurred that innovation capability is there and that change management could create more initiatives to support that capability and a managed approach to change the current mindset. Several participants further noted that younger people are more capable of innovation, and that today they see more events that are centered on innovation than a few years ago.

4.2.2.1 education unit. P3 agrees that capabilities are there, but the environment for them to innovate is lacking, and P7 concurs that there are personal capabilities but a system or culture of innovation is what is missing. P10 stated that regarding capability the Bahrainis can be capable, but whether they are able or not was the question.

P7 was sad to say that the education system in Bahrain hinders building the capability of the students to innovate. Both P7 and P12 were of the opinion that students are taught to do things on a procedure basis and their personalities are built on what is wrong or right rather than developing their capabilities to analyze. Therefore, students end up as characters that play by the book, making decisions within the rules, and not encouraged to think out of the box.

P12 specifically looked at the level of digital capability, which to his belief is still very basic in Bahrain and needs a lot of improvement, starting with the teachers. However, according to P15, the infrastructure was emerging, the leadership encouragement for digital capability was gaining momentum and the number of feedstock or the pipeline of innovative young people had started to grow:

I have a huge and very strong anticipation that we are at a tipping point. I really believe it because of the SMEs that I have talked with here really want to do new things and be leaders in new areas. The prospect of more students who can be fostered into the incubation center that we are going to develop here could see them as a pipeline into the accelerator space. The kinds of projects that I have seen come out of our students. The desire on part of the senior leadership of the Kingdom to make knowledge and the knowledge economy the future. I think it is completely sincere. It is not about, ok we will do this now because the price of oil is down. No, I think this is something that they are in for the long term. So, I have great hopes and aspirations and I believe that that future direction is sincere. I am very optimistic that we will see a major transformation as an innovation economy over the next 5-10 years.

Still, similar to the opinions of P7 and P12 above, P15 commented that the weakness is that those innovative students graduate into systems and a culture that dictate to them what to do and follow. The mindsets in Bahrain have to change to foster capabilities and not to beat them down “Unfortunately, the power is skewed to those that are still in the bureaucratic and regulatory machinery” (P9).

4.2.2.2 finance unit. While agreeing that the potentials are there, P1 went further in saying that Bahrain is blessed with an indigenous population that values education and is economically active. P4 concurred, saying that Bahrain has very competent people but fear, and the absence of the environment, hinders them to be innovative, specifically saying, “So, regarding capability out there, there is a lack of direction, mentorship, as well as the absence of institutes that maintain and encourage these innovations.” As introduced in earlier findings, also missing is the necessity for Bahrainis to innovate in order to make their lives better, since most of the people in Bahrain have a fairly stable life and the fear of losing it stops them from innovating and changing the status quo.

P6 believes that it is the methodology and the knowledge which is missing, and P11 is of the opinion that the problem is the corporates, which are very risk-averse. He believes that the culture within the corporates does not allow for failure. This emerged in the other sectors as previously mentioned. P21 also indicated that for Bahrainis to be capable of innovating they have to have all the indications that point to innovation such as education and infrastructure, which is not entirely developed. If these indicators were developed, Bahrainis would not only be capable of bringing

innovation to their small community, but also of exporting it and becoming leaders within the region.

4.2.2.3 ICT unit. The participants from the ICT field varied in their opinions about innovation capability from 2 to 4 because they based their rating of innovation capability more on the technical competency of the individuals. They were all of the opinion that, currently, individuals lack capability in the field of ICT, although they categorized the younger generation on a more advanced level due to their exposure to the internet, information and data, and ease of contact with what is happening in the West.

According to P17, “There is a trend and encouragement from the leaders of Bahrain to look at this very seriously to take and make Bahrain a FinTech hub in the region”, and that universities have already started introducing programs towards technology sciences. P22 also indicated that it has been three to four years that innovation has emerged in Bahrain and people have started talking about it, but still Bahrain is at the beginning stage. He believes that schools and universities are the ones responsible to build the capacities that will build up to capability.

4.2.2.4 industry unit. As for industry, the participant P8 indicated that capabilities are there, but need more initiatives and more change management. He backed this view by saying that when he took over the lead in his organization, even though it had been a long time since there was any change, as he initiated a few modifications, everyone agreed and took his leads for the changes to happen.

In another industry organization, P9 indicated that “Although the younger generation are more capable of innovation, unfortunately, the power of change is

skewed more towards those who are still in the bureaucratic and regulatory mindset”. Participant P19 was of the opinion that now there are more of those individuals who are really talking the language of innovation in Bahrain, and one can see more events that are centered on innovation than a few years ago.

There is a noted similarity in the responses from the ICT group and the industry group, both of whom appear to acknowledge that an innovation culture is developing, although still at a beginning stage. This is in contrast to the responses from the education and vocational and finance and investment units, 4.2.2.1 and 4.2.2.2, respectively.

4.2.2.5 summarizing the answers for question 2. Bahrainis are capable to innovate but lack the environment inclusive of a system or culture within which to innovate. The education system was found to be an obstacle for students to be innovative, and merely built the characteristics of the students on ethics and not analytical thinking. Digital capabilities were basic with a lot of room for development starting with the teachers themselves. The universities have started developing programs for digital capabilities and technology science, which contribute to the growth of the number of innovative young people in the pipeline. But, the mindset of the Bahraini market has to change in order to foster those capabilities when they graduate and not beat them down. One of the strong points was that Bahrain is blessed with an indigenous population that values education and is economically active, but since they have a fairly stable life the fear of losing it stops them from changing the status quo and taking risk-involved innovation. It was believed that schools and

universities are the ones responsible to build capacities that lead to capabilities. An innovation culture was noticed to be emerging, although still at a beginning stage.

4.2.3 question 3. Elaborating on innovation capability in Bahrain. Thoughts from this question are discussed in the above sections on rating innovation culture (4.2.1) and on rating innovation capability (4.2.2). The researcher first sought the rating of innovation culture and innovation capability in the form of numbers so as to get an overall sense of where each participant thought these two factors stand for ease of comparison between the answers. After rating, the researcher followed the questions 1 and 2 by asking the participants to elaborate on their ratings and explain why they thought innovation culture and innovation capability stood at that rating for each respondent's point of view by putting those numbers into words.

4.2.4 question 4. How would you rate the innovativeness of these sectors in Bahrain? Order them by most innovative as 5 down to the least as 1. This question dealt with innovation and the rate of innovativeness of the five major sectors ICT, education, finance, industry, government, affecting the economy of Bahrain as discussed in the Research Model Figure 2.12 drawn by the researcher in Chapter 2.

In looking at the overall rating of these sectors as per the research interviewees, the highest average is in finance while education was rated the lowest even by the education participants. See Figure 4.3. They were of the opinion that finance is the most innovative sector since the financial institutions have already started converging technology into financial services in what is called financial technology or as commonly known 'FinTech'.

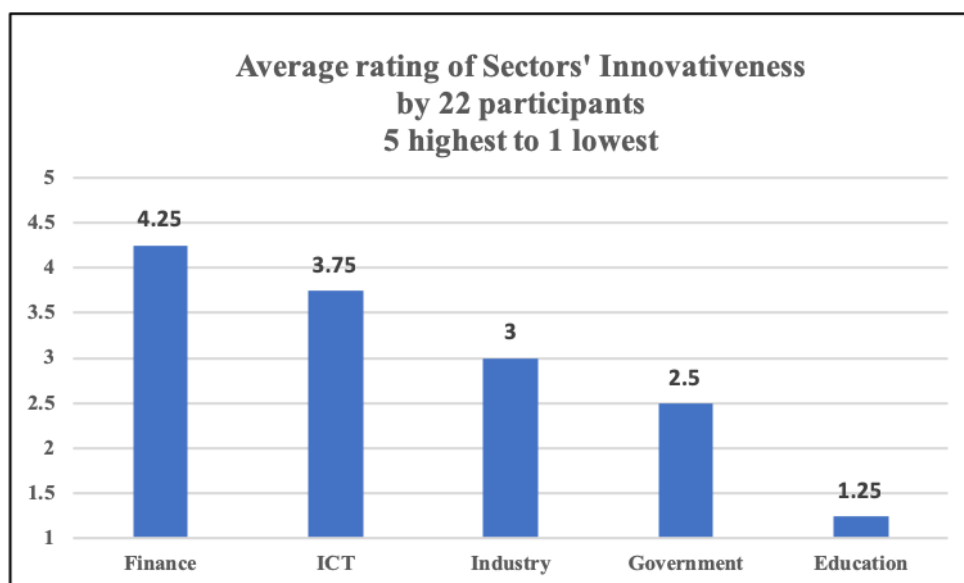


Figure 4.3: Rating innovativeness of Bahrain's five main economy influencers

Source: Researcher's own elaboration extracted from the research interviews

Although, it was publicized that a total of 48 Bahrain schools ranked above the global average set in the Progress in International Literacy Study (PIRLS) in 2016 ("Bahraini students excel", 2018), yet, when observing the news closely, it is perceived that the students had taken part in an international study that assesses the reading achievement of fourth graders.

In this study, education participants were of the opinion that education has calcified in Bahrain. They revealed that at the time of entering college, high school graduates are weak in English language and Math, and not prepared well for university-level study. Consistent with this opinion, Ravi (2018) wrote that the education system in Bahrain stood stagnant and still followed the systems of instruction and examination of 30 years ago. She forwarded that the Ministry of Education should have officers who have brave new ideas that go beyond

bureaucratic rule books and prepare the children to own their future. Clearly, participants in this study perceived a lack of innovation in the education sector.

The view of the participants on the innovativeness of the finance sector is rated 4.25, which is the highest amongst all five sectors. One reason for these ratings could be due to the existence of a conducive regulatory environment that assists the financial sector to foster and grow. The Central Bank of Bahrain, created in 2006, is the responsible body that allows a reliable policy method to be commenced through Bahrain's financial sector. It provides a direct and proficient regulatory framework for financial facilities working in Bahrain (Central Bank of Bahrain, 2012). That would support high ratings of innovativeness in the finance sector.

The ICT sector participants rated the ICT sector as the most innovative of all sectors due, in their words, to Bahrain having one of the best ICT infrastructures in the region. The ICT sector received a 4 from education participants, which may reflect the presence in Bahrain of many international schools and learning institutions that require ICT support. Both government and industry participants rated ICT at the 3 level.

Response rating the innovativeness of the government sector shows a wide difference of opinion. While industry participants rated the government sector the lowest segment (1) because of its bureaucratic and regulated institutions, ICT participants rated it high (4), though clearly stating that they meant eGovernment in this regard and not the government as a whole. As stated in "iGA migrates 40pc systems to cloud",

Bahrain is the first Arab country to adopt to cloud computing which is one validation that the government's eTransformation is on the right track as endorsed by Bahrain's high ranking in several international reports (International Telecommunication Union, 2017).

The following are verbalized explanations of the ratings by the four participant groups.

4.2.4.1 education unit. Even though all the participants are from the education sector, in average their rating for innovation in the education sector (pre-tertiary) is the lowest, with their highest in the finance and investment sector. P3 attributed this to what he introduced in an earlier response, that education "has calcified in Bahrain, that the people in charge are not innovative and that, in general, the graduates from public schools are not critical thinkers and lack the ability for analytical intelligence". In an interview, Dr. Akbar Jaffari insisted on reforms in the educational and training sectors and said that one cannot stop growth, but the education system in Bahrain has not lived up to expectations of reforming to meet requirements (Alkair, 2018).

As also previously introduced, P15 was of the belief that the schools are not graduating students with the capacity to move on to the next tertiary level, with the majority of the high school graduates having to go through a foundation year, which meant that they have not been prepared properly for higher education. According to Ravi (2018) Bahrain schools have not opened up as rapidly as the world outside Bahrain has changed. She believes that as the Ministry of Education is cautious to meet the external standards, there is just not enough dialogue about the future of education amongst the stakeholders in Bahrain. On the other hand, P15 believed that

there are some progressive measures that are taking place at the university level in terms of research and partnerships with the private sector.

4.2.4.2 finance unit. Here again we see the average rating highest in finance and investment while education scores the lowest. As noted above, P1 believes that the financial sector has been successful because the government decided from the start to put in place a conducive regulatory environment which created the right milieu for it to foster. Further, P1 continued on to say that the sector has had instances of innovation in the role they played in developing the Islamic finance. This was noted in the statement by CBB's executive director of Banking supervision Khalid Hamad

"The CBB has released a new Sharia governance module, which is significantly impacting compliance and governance standards among Islamic banks locally. This module is being used to set a benchmark for the global Islamic banking market" ("Bahrain regional leader in Islamic finance development", 2018).

As for industry, P1 believes that although the industry is very successful in what they do, they never became innovators since they did not succeed in creating downstream clusters around them. Consistent with this view point is Professor Waleed Zubari elaborating on the fact that even though fifty percent of the world's desalination plants were located in the GCC, yet the technology for these plants were imported ("Bahrain 'can be hub for desalination engineers'", 2017) Regarding the ICT sector, P4 and P11 believe that Bahrainis are consumers or appliers and very quick implementers, not innovators.

4.2.4.3 ICT unit. The participants in the ICT unit of analysis who took part in this research rated education lowest (1) for innovativeness while rating their sector (ICT) as the highest. P18 believes that Bahrain has one of the best ICT infrastructures and, according to him, since innovation comes from technology, ICT is the sector that is most innovative in Bahrain.

In line with that view point, TRA had discussed the government's efforts in setting the proper plan and conducting the necessary preparations to secure the implementation of the 5G network in Bahrain to enable it become the leader in the region to launch the 5G network ("TRA panel reviews efforts to launch 5G in Bahrain", 2018).

4.2.4.2 industry unit. In this field, the ratings were industry and finance as the highest at 4, then came ICT at 3, education at 2, with government being rated the lowest at 1. P5 had no hesitation in putting the government in the lowest segment in innovativeness, and by far the least innovative of all five sectors. Both he and P9 indicated that the government is a bureaucratic and regulated institution, which hampers it from being innovative.

4.2.5 question 5. To what extent do you foresee an increase in innovation in Bahrain in the next 5-10 years? After looking at the views of the participants on the innovation culture and capability in Bahrain, the possibilities of innovation development occurring in the next 5-10 years that will bring Bahrain closer to the 2030 Vision, and in which sectors, was discussed.

The majority, 16 interviewees of the 22 participants (72%), see the possibility of a big jump in innovation in Bahrain in the next 5-10 years (see Figure 4.4).

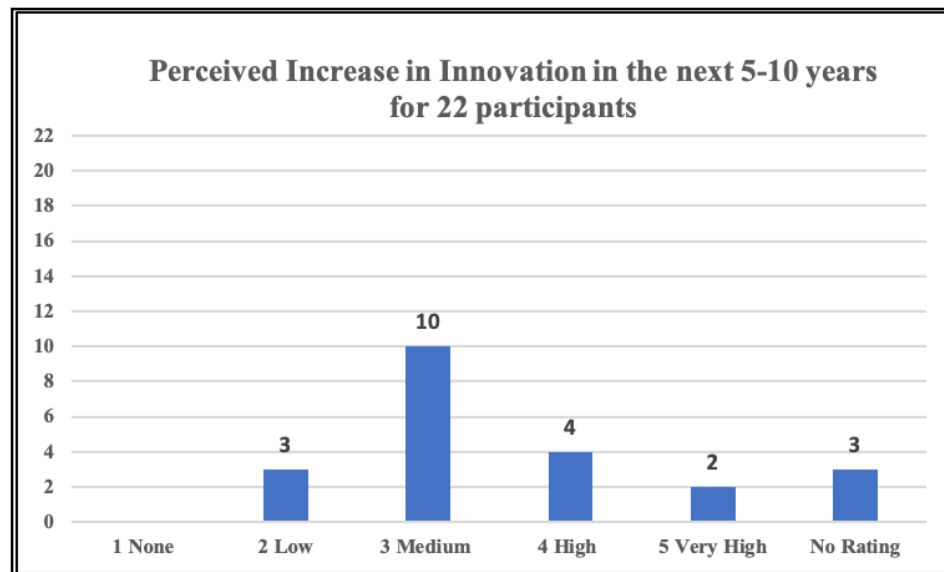


Figure 4.4: Rating increase in innovation in the next 5-10 years

Source: Researcher's own elaboration from research interviews

The finance professional in the government, P4, based his view for innovation increase in Bahrain on the condition that the government should put in place a strategy improvement for innovation activities by setting techniques, opening up to and reaching the citizens more, and by easing the processes.

With the rising of the entrepreneurs, FinTech and Blockchain, in the financial sector, interviewees see ICT development as the backbone for innovation in all sectors. The interviewees also persisted on the main prerequisite base of an education system capable of building the skills of the workforce for all these sectors to succeed.

The belief that it is crucial for the government to partner with the private sector and let the private sector lead innovation was clearly stated by the ICT professional in the government sector, P22, who expressed clearly that,

Economic growth is very important. It is very important now in Bahrain especially with the next trend. Government shouldn't come in. Private sector has to

lead this. So, economic role is very important and to diversify is very important and this will emphasize diversification for the country. I think it is very important to build that relationship or partnership between the government and the private sector in Bahrain

This role was also strengthened by the CP (“Driving The Economy”, 2018) where he stated that “The private sector’s role as main driver of Bahrain’s development must be strengthened” (p.1).

4.2.5.1 education unit. Two of the participants in this sector were doubtful in seeing any innovation increase in Bahrain in the near future, where one indicated that, sadly, she does not see this happening. Another participant believed that not only will there not be progress within the next 5-10 years, but it will take a long time to recap because of the time that was lost by not keeping up with the rest of the world in innovation. Recall that in the previous question, the education participants rated education as having the lowest level of innovation.

In contrast, five participants in this sector see it happening in the rising of the entrepreneurs, the need for the country to be competitive economically, and, as P15 specifically stated, “The desire on part of the senior leadership of the Kingdom to make knowledge and the knowledge economy the future.” CP was clear on his views towards the key objectives of the kingdom’s development program by investing in Bahrain’s citizens and encouraging innovation across all sectors (“Investing in citizens ‘key to development’”, 2018).

4.2.5.2 finance and unit. All participants in this group believed that there is going to be an increase in innovation in the next 5-10 years. P4 stated that

government is leading a drive for it but needs strategy improvement, the technique, and opening up to people. And P6 participant sees it in the financial regulator Central Bank of Bahrain (CBB), which pushes by the launch of Bahrain FinTech Bay for the financial sector to become innovative. This point was reiterated by EDB's Dr. Kotilaine announcement that during the first half of 2017 Bahrain's business environment witnessed a dramatic improvement with initiatives such as pioneering crowd funding regulations, a regulatory sandbox for FinTech companies and a cloud first policy (designed to help organizations take advantage of cloud technology) (Saxena, 2017).

The government investment professional, P11, sees the necessity of keeping it consistent and sustainable by not just a drive now to be forgotten soon, but through consistent pressure, while P21 sees it in the development of the ICT, which is the backbone for the financial sector innovation.

4.2.5.3 ICT unit. Participants in the ICT field see a big jump in innovation in the next 5-10 years. They were in synch with the financial unit participants in that the development will be mostly in ICT, which is needed as a backbone to push the financial sector to innovate when it comes to FinTech, blockchain, and startups related to the banking sector.

The government professional P22 believes that the government should partner with the private sector and allow the private sector to lead the innovation for the sake of economic growth.

4.2.5.4 industry unit. As for the industry, the participants believe that the increase in innovation is inevitable and that finance through FinTech, industry by

introducing high-technology into their production and procedures, and ICT with the means of providing up-to-date infrastructure are the sectors that will spearhead innovation growth. The banking industry in the Gulf region is keeping pace with the historic changes in the FinTech industry as stated by Dr. Kawan, CEO of Bank ABC. He went on to elaborate that Bahrain should steer ahead with its world leading mobile penetration, high internet and social media usage and ICT infrastructure (Saxena, 2018).

P5 added, that the increase in innovation would be in finance and industry since these two are fundamentally the sectors that keep the economy of a country going. He added that the main prerequisite base of a strong education system is needed for all these sectors to succeed in innovating.

4.2.6 question 6. Elaborating on innovation increase in which sector?

Thoughts from this question are discussed in section on foreseeing an increase in innovation in Bahrain (4.2.5) above. The researcher first sought the view of the participants, and after hearing their perspectives on the current innovation status in Bahrain, whether they anticipated an increase in the innovation activities in Bahrain in the coming 5 to 10 years. If the answer was in the direction that showed the participant's agreement in increase of innovation, it would then be followed by acquiring the participant's point of view of which sector or sectors they would see this increase to be.

4.2.7 question 7. What would cause this increase to occur? What would be the first priority to address? After discussing the innovation possibilities in Bahrain, the question raised next dealt with the probable areas that would witness the

innovation increase within it, and the priorities to address to increase this innovation were probed by the researcher and the participants' points of view were noted.

The education scholars viewed that what was needed for such a thing to occur was more important and that was changing the mindset of the people, changing how to tackle education, and changing the way the government thought and operated. P7's perspective on the government was that the initiatives were there, but those initiatives were in segmented events rather than a holistic one. To her understanding, not looking at the innovation as a system is the main problem. To all education participants, education is the first priority to address as education is the base for everything.

In his speech at the opening of the joint workshop on Bahrain's growth options, Dr. Amin El Sharkawi stressed that in order for Bahrain to maintain high wage jobs for the coming years, its curriculum needs to change with the fast stride of technological advancements (UNDP, 2017). He stated that only by financing in individual capital will Bahrain ensure an innovative, adaptive, and advancing capable workforce.

The financial and ICT professionals agreed that education should be addressed first and took it further to changing the culture and the mindset towards innovation and actually giving things a try. According to the technology experts steering the eCommerce and Internet Security Forum for Teachers, in order for education to be more collaborative, increased numbers of classrooms in Bahrain need to embrace new technology.

P6 said that there is a need to address the freedom of thought because people are afraid of taking risk and failing. Change the mindset and the culture from one that is afraid to take risks to one that takes risks and accepts failure.

The industry unit interviewees saw the first priority to address is getting the regulatory framework and the strategic directions for innovation in place. P9 explicitly said that the regulatory body should create a fairly simple expression of commitment of regulatory and legal framework that protects the owners of the intellectual property and gives them ample freedom to operate confidently within that protective framework. He continued to say that the regulatory body should set up the framework and then simply stay out of the way of individuals putting it into action.

4.2.7.1 education unit. Education participants believe that education is the first priority to address. P3 stated that critical thinking is needed to be introduced into schools and teachers have to become innovative themselves “If most of our teachers don’t want our students to think out of the box, how can they become innovative?”. P7 believes that besides changing how education is tackled, people’s mindset and the way the government thinks and works has to change too. She went on to say that one of the problems was that innovation was not looked at holistically as a system.

P12 commented that industries had to evolve fast so as not to die and that we are passed a knowledge economy and are actually in an innovation economy, “We are now looking at the innovation economy and the imagination economy. We have gone past the knowledge economy. Who cares about what you know, it is actually now what you do with what you know. That is the key thing”.

4.2.7.2 finance unit. P6 believes in changing the mindset and the culture from one that is afraid to take risk to one that takes risks and accepts failure. He went on to state that the mindset of failure had to change and “old bureaucratic people had to stay out of the lime line”. This is in line with the statement of Gunday et al. (2011) who were also convinced that the quality and quantity of public innovation required to deal with policy challenges that are highly limited by the bureaucratic way in which the innovation process occurs within public organizations. P11 was in the same line of thought of P6 and believed in changing the mindset of the people, while P21 is of the belief that education had to be prioritized.

4.2.7.3 ICT unit. Similar to the participants' views from the previous two units of the research, P14 prioritized education, and commented that education has to be looked at and specially the graduating students. Although, he was on the opinion that the private schools were doing better, the focus should be on the public education.

P16 believed in changing the mindset of the people that do not act unless it's from top to down, for example the guidelines seen in the CP's ideas and directions which people don't have any difficulty in following. P18 was in the same line of thought as P7, from the education unit, and would like to see a national plan for innovation in place.

4.2.7.4 industry unit. As for the industry, P5 continued on the same belief as the previous respondents in wanting to see a total education system shakeup, while P8 believes that whatever initiative is taken regarding innovation cannot happen unless ICT development is taken seriously.

P9 and P19 see the first priority to address the same as the ICT participants did and that would be to get the regulatory framework and the strategic directions for innovation in place.

4.2.8 question 8. What role do you believe that the information communication technology (ICT) sector plays in the innovation process in Bahrain? The role of dissemination of ICT as an efficient tool to store, disperse, and connect knowledge originators and operators has been established as one of the four main features in the growing economies of OECD member nations. This question is related to ICT and the views of the interviewees' in regards to the role it plays in innovation in Bahrain currently.

All 22 participants agreed that ICT plays the role of an enabler that empowers the users to deliver their projects or innovative ideas and is a backbone in any institute especially in education and universities. The views differed from it being an infrastructure to one of whether the sector ICT itself was innovative.

The views on ICT as infrastructure are positive and they believe that Bahrain has one of the best infrastructures in the region. The fact that Amazon Web Services decided to setup their main hub in the region here in Bahrain is one proof of that. P20 also elaborated that the infrastructure is fit for the gaming industry to come and setup shop to develop their games is yet another testimony. But, ICT as being an innovative sector itself, the views were that they are considered more as vendors who sell products of global companies, than companies innovating products or services for the market.

4.2.8.1 education unit. All the participants in the education and vocational unit believe that ICT is an enabler and a backbone in any institution, and as noted by P3 that ICT was a backbone for institutions such as education and universities where it would be used as a means to get to know what kind of knowledge was out there, which could be collected and build upon in order to create new knowledge.

As expressed by P7, ICT pushes you to think outside the box and is a mindset opener that connects individuals to the global knowledge and research. She continued to say that ICT is a big and important player in innovation and without ICT innovation is hindered. P15 expressed that no innovation could happen if there was not an effective ICT infrastructure in place.

4.2.8.2 finance unit. P4 believes that ICT is being promoted so as to develop Bahrain as a technology hub alongside the country being a financial hub as well. P6 reflected that the role of ICT in innovation in Bahrain is very low. He said that they are vendors who just sell products of global companies.

While P11 and P2 believe that ICT is an enabler of innovation because whatever is innovated it is undoubtedly going to have an element of technology into it, and P21 viewed ICT in Bahrain as,

Of course, it plays an important role in the process because we are talking about the 4th industrial revolution. The more people are knowledgeable and informative on the ICT, the more it will ease their access to the digital revolution. But, of course this is not the only element. It just plays an important role in the process of innovation which is an important factor in the knowledge economy

4.2.8.3 ICT unit. The participants from ICT field all agreed that ICT in Bahrain is an enabler that empowers the end users to deliver their projects or innovative ideas. P17 believes that having the latest ideas and technology in ICT from outside is actually good to encourage the youngsters in Bahrain to become innovative. P18 viewed ICT as the primary tool in today's world for innovation and competitiveness "I think ICT is the strongest tool that needs to transform innovation. If the transformation mandate is to become innovative and competitive, I think ICT would be the number 1 tool in today's world". P22 stated, "It is the arm of innovation. If you want to make innovation a reality, IT should be part of it."

The ICT in Bahrain is an infrastructure that according to P20 is one of the best in the region as he claimed:

The ICT infrastructure in Bahrain is one of those infrastructures that is fitting for game developers to come and set up shop here. At the same time, that can be a hub for networking because when you look into Bahrain's competitive advantage within the GCC, the telecom setup especially the ICT sector is really advanced.

4.2.8.4 industry unit. P5 does not believe that ICT in Bahrain has much role in the innovation process because according to him even though the global indices for Bahrain are very good, he wants "The active role...applying it and getting the value out of it is what I do not see". The other three participants though see a lot of installation and activity around communication technology being applied.

P9 sees how Batelco, one of the main ICT providers on the island, is progressive in providing business solutions quickly. In particular, he commented on

how Batelco had a big role in Amazon Web Services (AWS) pursuing their business aspirations in this region to set up their hub here in Bahrain based on the status of the ICT infrastructure. Batelco was selected by the iGA to help implement the migration of a number of ministry platforms to AWS. The agreement is in line with the iGA and Batelco's commitment to support the government in its digital transformation strategy for Bahrain ("Batelco chosen for key digital project", 2018).

P19 sees the role of ICT in how global economy and global manufacturing and industries foundation is based on IT:

You go to factories production robotics and there is a software that makes parts that are put together to make a car or airplane. So, the basic element is programing and it is very interesting perspective to look at things from the way the global economy and the global manufacturing and industries foundation is based on. Mostly it is IT driven. Very interesting.

4.2.9 question 9. To what extent do you believe that the ICT sector collaborates with your organization to enable the innovation process in Bahrain? Questions 9 and 10 deal with collaboration of the ICT sector with the other sectors with an elaboration on how and why based on the answers of the participants.

Therefore the answers of the participants for the questions 9 and 10 are integrated below since they were sometimes interrelated and gave importance as a whole. The extent of the collaboration and the how, and why between ICT and the other sectors to enable innovation are the query concerns of these questions. All participants concurred that there is a lot of collaboration and partnerships between all sectors and the ICT.

The collaboration ranged from providing programs and software for daily management of business, accessing the most recent R&D available globally, hiring graduates of IT, and ensuring the sustainability and growth of the SMEs in the ICT sector. The following sections reflect a snap shot of what participants of each unit of analysis had to say in regards to ICT sector collaboration with the other sectors in Bahrain.

4.2.9.1 education unit. The overall assessment of the participants for collaboration with the ICT sector was high which means they are collaborating well. P2 explained that ICT provides data base management for them, while what they actually want is to use it to transform the education to be more virtual and interactive. P3 believes that although the collaboration is there, the ambitions of the collaboration are not being met. He hopes for his sector to innovate by using ICT and not just to use it as a means to communicate better.

Two perspectives were outlined for how ICT is used by the participants in their organizations. One perspective was that ICT was used as an administrative tool, while the other perspective was that it was being used as a teaching tool. P3 commented that at his organization it was being used as an administrative tool for running the daily business of the institutions and keeping track of all students and staff records and activities, on which the overall view was that ICT was doing what it should be doing.

The other perspective was expressed by P2, who viewed the ICT Unit technology as a teaching tool, and expressed that they still have not used the technology for teaching purposes,

Microsoft has a lot of tools in terms of learning and data management for lectures and for teaching in smart environments. The challenge is for the institution to use the appropriate tools for their needs: in terms of having the appropriate technology, and the technological skills to use it.

According to P7 it is just a very simple utilization of ICT in making sure that their data reaches everyone and to get feedback from them in return. On the other hand, she said they try to utilize it to their best through their in-house IT department by accessing the most recent R&D available globally or communicate through LinkedIn for discussions and debates with international colleagues in order to open up their horizon.

P12 stated that his organization collaborates closely with the industry which resulted in P12's organization to produce new programs and reshape its curriculum. One example of this was when Batelco and BIBF collaborated to develop a program focusing on digital learning content and development solutions for Batelco employees. Batelco CEO said that the partnership came at a time when digitalization across all industries was growing and organizations recognized its importance for delivery of better results ("Batelco signs deal with BIBF for digital learning", 2018).

P13 believed that it is the generation gap and the lack of knowledge of the older managers who do not realize the capacity of technology and what it can do for them beyond logging in and collecting information. They don't know that this big data collected can give them many solutions if they were capable of knowing what to ask and look for. While the younger generation does know what the technology can do for them, they are not motivated to do anything towards it because as he said "they

were brought up being spoon fed and lazy”. P15 on the other hand said that the ICT market hires the graduates from his organization hence, making his organization and the ICT’s a very positive collaboration.

4.2.9.2 finance unit. As an IT professional in the financial sector of a government body, P4 believes that he had managed to collaborate well with the rest of IT representatives of different bodies in the government sector when his organization succeeded to iterate, change, and improve an IT operation that was not straightforward for other directorates. By improving the IT operation, those directorates that could not use it before due to its complication, started using the modified operation done by P4’s organization and did not need to refer back to them due to its new ease of application.

P11 states that as a government investment arm, they collaborate with the local ICT companies and entities such as Bahrain Technology Companies Society (BTECH). P21 considers their organization as the major partner for the young who work in ICT and also a partner of BTECH. This partnership was stressed upon by BTECH chairman Ubaydli Al Ubaydli who sees a need for an integrated plan to develop companies operating in the sector and supplement the efforts of BTECH to act as a bridge between the companies and government decision makers. He believes that the availability of qualified human resources capable of leading Bahrain in localization of innovation in ICT as a major national advantage (“Plan to develop ICT in Bahrain discussed”, 2018).

P21 explained that his organization’s role “is how to bring the startups into the business of ICT and how to ensure sustainability and growth of these micro and small

businesses in the ICT sector”. P21 continued to explain on how his organization had a successful collaboration with the Ministry of Commerce & Industry in drawing up new commercial registration licenses based on the needs of those newly developed businesses.

4.2.9.3 ICT unit. P16 indicated that as an incumbent telecom and ICT provider, his organization has to collaborate with customers and users to provide them with the infrastructure they need to use and deliver their projects and or innovative ideas.

P17 said that there was a lot of collaboration between his organization and both the private sector and the regulator CBB to promote ICT services. He continued that there is a lot of coordination going on these days in general to promote FinTech solutions and services as he commented “We are under the umbrella of the regulator CBB, and a lot of collaboration between us and them are in place in order to encourage the financial sectors to become advanced in the ICT”. He went on to say that the collaboration was to assist CBB in their FinTech regulation process while collaborating with banks to get more at ease with these technologies.

This collaboration was emphasized on by the CEO of EDB, who stated that with the help of the private and public sector, EDB was able to launch a number of initiatives such as the Regulatory Sandbox, crowd funding regulations, commercial registration of incubators, accelerators and start-ups, and the establishment of the SME board (“New push for investments”, 2018). While Benefit CEO said that Benefit, BAB, and CBB are in constant meeting to enhance cooperation to implement projects that put Bahrain at the top of International Arab Banks that use modern

technologies in banking operations (“Benefit to launch new banking products: CEO”, 2018).

4.2.9.4 industry unit. P5 is of the understanding that the local ICT is just a base that provides the fundamentals of internet and day to day data base management. So, as far as collaboration goes, the industries that he is in, deal with highly sophisticated technologies which are developed outside of Bahrain. He continued to elaborate that his organizations collaborate with those external ICT providers only

These are specialized companies. There are three companies in the world who can do it. We are not even on the playing field, and don’t even think about it. It is just so specialized.

P8 and P9 are also of the understanding that their organizations’ collaboration with the local ICT is mainly for the infrastructure use of the ICT for admin reasons and internet use to connect them with the external application providers.

4.2.10 question 10. If yes, how? And if no, why? Thoughts from this question are discussed in the section regarding the extent of the ICT collaboration with organizations to enable in house innovation processes (see section 4.2.9). The researcher first explained the participants’ views on the extent of the ICT sector collaboration with other sectors for the purpose of ICT role in enabling the innovation processes in those sectors, then the researcher followed the question 4.2.9 by this question on how the participants viewed this collaboration to be if the answer was yes, or why there were no collaboration if the participant’s answer was no.

4.2.11 question 11. Is there a trust between sectors? This question dealt with the trust amongst the four sectors and to what extent their trust was between their entities in doing business with each other

The extent of trust was based on the how well the sectors understood the needs of each other and provided solutions and services for these needs. Most of the sectors in not trusting ICT entities had to do with ICT not providing them with the innovative software that would help those sectors develop their organizations.

Reasons could be from both sides; the sectors' management not knowing what exactly they need for their development or ICT providers not having the knowledge and capacity to provide added value software to the other sectors in the society. Although a few indicated successful partnerships and trust, the overall gap is bigger and needs to be addressed.

4.2.11.1 education unit. P7 believes that there is no trust with the ICT in the sense that the ICT sector does not provide them with the innovative software that will help them to advance and develop in their work. P12, on the ther hand, stated that their two sectors work hand in hand to cocreate curriculums, train, and assist the students.

P13 indicated that there is a gap in between their sectors. Sometimes the gap is from the education sector management in not knowing exactly the value added of the product being sold to them. Other times it would be from the ICT provider's sales people not knowing the product they are selling well or not knowing what the exact benefit will be to the organizations they are selling to as he explained

They don't know how to tell the organization what exactly the product they are selling them can do for their organization and how it can raise their bar to the next level. Because, they basically only sell the product and that is what they are good at and know how to do. They know the product well, but what can the product in its context can specifically do for a certain organization? they don't know

P15 said that the ICT sector's trust in them and their relationship is very high and can be seen in the high rate of employment of their IT graduates and their satisfaction of the level of these graduates once they join their companies.

4.2.11.2 finance unit. P6 believes that the trust level between them and the ICT providers are not very high. If there was then it wouldn't take them so long to approve each other's contracts. He went on to state that trust exists with other industry entities and is on a good level.

P11 thinks that they are building a trust and their organization's relationship with the ICT providers looks much better than what it looked like two years ago in 2016 although there is still a lot of work to be done:

If I was to say is the environment better than two years ago from an ICT and from a startup perspective? Anybody being fair would say yes, it is. Is it the finished article? Absolutely not. Absolutely not. There is so much work to be done. P21 believes that there is a trust between them and the ICT providers and they work together as a team.

4.2.11.3 ICT unit. P14 does not see it as an issue of trust as much as the customer not feeling the need for improvement or innovation. Organizations leave

the expenditure on innovation as the last thing needed in the organization as he elaborated:

The problem is when we go to them and advise them that we can improve their products and that we can offer them much better, they don't believe they need it and say that they are happy with what they have. So, this is the problem, it is not that they don't trust us, they just think they don't need the improvement.

P16 believes that there is no trust between the competing bodies of the ICT sector themselves, while P17, P18, and P22 believe that there is trust. P17 stated that the trust between them and the regulatory body is very high "There is a trust between us and the regulatory body and that is why whenever there are new services and new ideas, they consider our organization because of the trust that they have in us". He continued to explain that so is the trust between his organization and the customers.

4.2.11.4 industry unit. P5 and P8 state that it is not a matter of trust, rather their business relationships had to be regulated by contracts with the ICT sector, since P5 and P8's businesses are highly specialized. P5 stated that "It is not a matter of trust. It is a matter of the industry we are in doesn't lend itself to their involvement in all honesty". P5 and P8 both believed that their businesses being hydrocarbon and transportation, respectively, are too restrictive and highly specialized and that their organizations, being too small compared to the global conglomerates, turned to those bigger firms for their ICT needs. According to them, it was not practical to spend large amounts of money on technology that was already developed and available.

P9 and P19 believe there is trust and both are looking into Cloud base solutions in terms of where to store their information. P19 continued:

We are implementing a very huge IT package which is very sophisticated because it has multiple sub-systems that have to be integrated together and they have to talk to each other in a different way. We are very much engaged with the contractors.

4.2.12 Question 12. How can the trust be built or strengthened? The views of the four fields on how to build and strengthen trust between sectors varied from trust needing time to be built, to changing the mindset of the old generation, to making sure on knowing what is the right product and price to offer the customer, all the way to decentralization and shifting the dependency more towards the private sector being key factor for trust.

4.2.12.1 Education unit. P7 says that trust comes with delivering the right product “But from the sense that we have ICT providers that will provide innovative software that will help us to advance our work further, I don’t think that trust is there”. While, P10 indicated that trust comes over time.

P15 stated that it is not a matter of building trust as much as it has to do with meeting their needs for skilled workforce down the line:

They need to think of what they need down the road. I know it is hard for them. Those things are changing so quickly, but I think the IT sector in particular could do a better job of telling us the competencies that the students are going to need now, because the jobs are changing so quickly. And it can be

built on in the future as well. That is an area where we could build a strong relationship on.

4.2.12.2 Finance unit. P1 believes that “in order to have a culture of collaboration, entities have to have trust in between themselves first that there is value in that collaboration”. P6 believes that trust is not built overnight. In fact, he explained that “it is built on small deeds over a long period of time”.

P11 was on the belief that sectors have started building trust in between them and have realized that goals cannot be achieved by one entity taking the whole responsibility “Everybody thinks that we are massive team and have the ability to wave a wand and get everything done. That is not going to happen”.

The trust building efforts was also evident when BTECH and Tamkeen met to discuss the preparation of a national plan for developing the ICT sector in Bahrain as part of Vision 2030 which aims to build a KE (“Plan to develop ICT in Bahrain discussed”, 2018). Representatives of all government and private sectors involved in ICT, EDB, iGA, Bahrain University, Bahrain Polytechnic, and Batelco were among the attendees.

4.2.12.3 ICT unit. P14 believes that it is changing the mindset, and since majority of the leaders in the market have an old mindset culture we just have to wait for the new generation to take over he

because if they have been doing business like this for years, how can I approach him and her and change his and her mind? The only option I think is to wait for the new generation to take over slowly and with their new culture and mindset to change and improve things.

P16 says trust building depends on how one puts the solution to the customer, and if it is mostly the right product and price, trust is built between them over time. P18 believes that decentralization of the government and shifting dependency more to the private sector is the key. He continued that government should become more lenient and dependent on the private sector to help gets things built and developed.

4.2.12.4 Industry unit. Both P5 and P8 believe that trust is built when the right product or service is delivered between the entities. P8 continued that it was not always the other person's fault in not delivering the right product. His organization would be at fault too in some incidents in which they, internally, were not able to identify what it was exactly they wanted from the other party to deliver and hence, got the wrong product.

According to P19 relationships between entities has to be structured in order to build trust "My belief is to ensure sustainability, you need to structure these relationships". This was in line with the declaration of Huawei CEO of Bahrain, Yuedong, who said that his company is aiming at preparing for the inevitable digital world with innovative ICT (Reginal, 2018). He continued that Huawei collaborates with Alba, VIVA, Batelco, Bahrain International Airport, University of Bahrain, and Polytechnic. The new Huawei ICT center in Bahrain Polytechnic shows their collaboration with education. He further said that the intelligent world is around the corner and that everyone needs to work together to build a better and smarter kingdom.

4.2.13 Question 13. How can the Government influence or contribute further to support your organization and the ICT sector's collaboration? This question was

asked in order to address the government's role in the collaboration phenomena between the sectors and the ICT from the viewpoints of the participants on how they see it and expect it to be. The question was expanded by the interviewer during the answers of the participants to include collaboration between all sectors in general.

Views ranged from the government being an entity that builds the culture for innovation, to one that directs, forces, and pushes collaboration through policies and legislations. A few thoughts that the government should not influence the collaboration and that it was the last thing that they wanted to see. One saw the government bureaucracy delaying and sidelining procedures while another one believed that as long as the private sector is working within a framework set by the government there should not be any interference from the government bodies.

Putting in place rules and regulations on how to deal with the new technology, giving incentives for innovation initiatives, and decentralizing and relying more on the private sector were additional views.

While one participant indicated that the government is already doing a lot of collaboration through entities such as the supreme council for ICT which drives and pushes the development of this sector, the information government authority (iGA) that puts together the policies and strategies for services offered to the citizens, and the information and telecommunication regulatory authority (TRA) which regulates all the communication entities services and infrastructure. Setting the proper plan and conducting the necessary preparations to secure the required spectrum for implementing the 5G networks in Bahrain was discussed by TRA. TRA hoped that the outcome from the working group would enable the kingdom become the leader in

the region to launch the 5G network, and fulfil its commitment towards enabling the latest telecom technologies (“TRA panel reviews efforts to launch 5G in Bahrain”, 2018).

Others indicated that the government is to facilitate and create the environment for the companies to collaborate and then step aside and let these entities do their day-to-day work. While another was on the belief that the government should not only influence but should also contribute to this collaboration.

4.2.13.1 Education unit. P2 sees it in that the government can set a policy framework for an enabling environment. He believes that already the government is listening and open to change. One good example is Tamkeen which supports the youngsters in building their capacities. As part of Tamkeen’s efforts is to enhance the entrepreneurial ecosystem in Bahrain, Tamkeen and Flat6Labs partnered to support startups with a focus in sectors including financial services and payments, education, ICT, and games to name a few. Alshehabi (2018) wrote that Flat6Labs’ chief executive declared,

Their interest to setup shop in Bahrain came from the unique feature of the government’s support of the startups represented by Tamkeen and EDB which Flat6Lab did not find anywhere else in the region. Another factor was the availability of a huge well educated Bahraini talent who knows what startups can really do. The businesses in Bahrain will be enhanced by Flat6Labs bringing global successful models of business accelerators to Bahrain. Another one is for the government to assist in building a knowledge sharing

connectivity in which the universities can connect their libraries and on-line open sources to enhance knowledge management processes.

P3 believes that innovation can be directed, forced, and pushed through legislations and policies. Innovation has to be managed. He also believes that the government is responsible for creating the culture of innovation by connecting the private sector to the universities and research centers and building the mindset for research and development. According to him, giving incentives to people has a big role in building this culture “Capability and culture to cater for that capability are two of the musts for innovation to happen”.

P7 being in a government agency sees the necessity of the government providing funds to them a priority for them to do any initiatives. She continues that in order for them to be creative and work on innovative ideas her organization needs to have a budget allocated for those creative projects, and that if the government did not allocate that budget, her organization would just go on doing their routine work. while P10 sees the role of the government as a facilitator more than an influencer. Setting up a committee involving concerned parties to facilitate things

It is the same when the government opens the field for all concerned in the government in certain domains to develop a program to be submitted to the parliament, the participants input will be more valuable since he and she participated actively in drawing these policies and had an active role in it

P13 believes the government has to be more involved and push the support for the ICT sector by setting regulations for using big data and giving incentives to those who use the big data and innovate. The regulations are not to be obstructing the

progress though. By looking at EDB's Dr. Kotilaine declaration in that during the first half of 2017 Bahrain's business environment already started witnessing a dramatic improvement with initiatives such as pioneering crowd funding regulations, a regulatory sandbox for FinTech companies and a cloud first policy (designed to help organizations take advantage of cloud technology) (Saxena, 2017).

P15 believes that the government is actually a barrier at the present time for their working with the industry. He continued that the government has to give them the freedom to act in order to push their innovation initiatives forward faster.

4.2.13.2 Finance unit. According to the finance expert P4, Bahrain government is doing very well in ICT regulations compared to the rest of the Gulf countries. There is a supreme council for ICT which drives and pushes the development of this sector. There is information government authority (iGA) that puts together the policies and strategies for the government bodies, and the information and telecommunication regulatory authority (TRA) which regulates all the communication entities' services and infrastructure. According to him:

So, collaborating with ICT, I think the government of Bahrain are doing the best and are benchmarked the highest amongst Asia and one of the top 7 around the world. So, besides this, the freedom of the internet, the regulation of TRA, and the telecom services and their infrastructure, that we have are all supported.

P6 on the other hand believes that government should not be in the way in the sense that after putting a legal system for enforcing the rights of the parties in the relationship "should get out of the way of their collaboration". The government

should facilitate as they do in the successful case of Tamkeen by supporting the capacity building of the small and medium enterprises indirectly.

P11 stated that

The government should create an environment that includes all types of companies with the ability to develop new products and business models and implement them. The government is a facilitator that should create the environment for these companies and then gets out of the way of their day-to-day work.

P21 on the other hand believes that the government should not only influence but should also contribute to this collaboration. That can be witnessed in the CEO of EDB's comment on how with the aid of the private and public sector, EDB was able to launch a number of initiatives ("New push for investments", 2018). Regulatory Sandbox, crowd funding regulations, commercial registration of incubators, accelerators and start-ups, and the establishment of the SME board were a few of these initiatives.

4.2.13.3 ICT unit. P14 suggests that the government can introduce an award system for innovation. P16 believes that the government is just another customer and end user of their products with no influence in collaboration but at the same time he thinks that they have a big role in putting in place rules and regulations for how to deal with new technologies coming in such as Bitcoin and FinTech "Yes, in that, they have a big role. Especially with the changes happening like the Bitcoin or FinTech. We have to have some regulations and rules on how to deal with these new concepts". P17 believes that the support of the government is already in place and working very

well in his finance sector represented through the regulatory framework of CBB. P18 states that the support comes by the way of the government removing centralization and depending more on the private sector.

P22 believes that the government has to support the education system more. According to him “Without a bright brain, we have no innovation”. Tamkeen is an example of building good capabilities and the government should continue to create investments in the human resources. He continued that the government financing of universities, colleges, and research centers is very important.

4.2.13.4 industry unit. Although P5 is a government personnel, he says that to be frank he does not want the government to influence this collaboration and it is the last thing that he wants. He stated that “I don’t want the government to influence. It is the last thing I want. I want the private sector to work and flourish. Because the minute the government bureaucracy sets in, frankly everything gets delayed and gets sidelined and gets lost in the process”. In his view, the private sector should collaborate with no interference from the government as long as those private entities are working within a framework set by the government.

P9 was in the same line of thought as P5 and said that the government should step aside after enabling a legislation in a simple way that “--- advances the interest of the people who are trying to do the business not the people who are trying to regulate it or govern it”. P19 believes that how and where to innovate must be left to people to work it out and states that the role of the government should be “No more than a catalyst to encourage and incentivize organizations to engage into innovation”.

4.2.14 Question 14. What are the barriers and challenges associated with this collaboration? The participants' view points on barriers for collaboration ranged from culture, existing rules, lack of trust among entities, and expectation of quick return on investment. Legal barriers, marketing capabilities, and slow speed of implementation were other factors, while additional opinions ranged from not having a national plan for innovation, no research center, and the lack of awareness with regards to intellectual property and product registration.

4.2.14.1 Education unit. P2 says there are barriers of connectivity in terms of knowledge sharing among the universities. He would like to see an ICT grid for knowledge similar to energy grids "We need to have ICT grid for knowledge, for our libraries and our journals. So, as students from Kuwait, or Oman, or Saudi Arabia, or Bahrain, can basically have the same access for knowledge. This is a backbone for research".

P7 identify the barriers to be financial since the first projects to get halted are the innovation and innovation incentives "There are a few things that get stopped at the beginning and they all feed in to innovation. Special projects, professional development, and incentives".

P10 also concurred that availability of budget was a barrier and believe that planning projects that complement each other in order not to repeat or redo an existing system is another way for removing the barriers. P12 sees delay in time due to the bureaucratic nature of decisions is a barrier to innovation "The only thing that I would say is time. We would like things to be moving a lot quicker. But, currently things take a lot longer than it should. I think time. We would like to be a lot faster".

P13 pointed to culture as one big barrier, while P15 states that existing rules stand as barriers for our collaboration with the private sector

So, the barriers are just rules that say I cannot do training for the industry. I cannot have a faculty who is a great guy, and who has come out of the industry and who teaches in the day time here, go and give training on Saturdays or evenings in the industry. Because the rules of the government say that I cannot pay him above his salary for doing those extra trainings. The government says that we can train the industry, but all the rules around it make it impossible to do.

4.2.14.2 Finance unit. P4 stated that although he thought that he will be facing financial barriers he never actually faced any in his organization, although it is a public institution. P6 thinks that lack of collaboration has do a lot with the lack of trust in our culture

We assume the other side is guilty before being innocent. Rather than think oh, you know what I am going to start with the fact that they are honest unless they prove me otherwise. We always start with the thought process that someone is there to get us. I think we need a bit of trust from both sides.

P11 sees the barriers in lack of communication “Communication is one of the biggest things. How do you keep a lot of different people on the same page?”, and the deficiency of the government in capacities and resources to solve everyone’s problems.

4.2.14.3 ICT unit. P14 finds the barriers in the culture of expecting quick returns on investment which does not happen in innovation. In innovation, the return

in investment takes time and does not have a fixed time frame. While P16 sees the challenges in legal barriers, marketing and capabilities

How to make the relationship attractive for the partners to come. What is your value as government plus ICT providers? How can you bring them to the country? Or how can you make those ideas successful? Because they have options. They can go somewhere else. So, why here? Why Bahrain?

P17 sees the barriers in speed and the speed of implementation which is a big factor these days in keeping up with innovation:

We always say that the big fish will eat the smaller one. Today, the size doesn't matter. Now we say the fast will eat the slow. So, regardless of the size, it is the speed and the speed of implementation that is important now. Sometimes this kind of slowness and other sectors' priority interests might make things move slower for us, and hence, a barrier for us to progress.

Because if you want to be among the leaders in ICT and FinTech, then you have to act fast.

Not having a national plan for innovation, lack of innovation culture, a weak education system, absence of a research center, and lack of awareness about intellectual property and registering products are the main barriers for innovation collaboration according to P18.

4.2.14.4 Industry unit. P5 believes that it is not a barrier as much as it is the complexity of the industries he is in. They are very highly technical businesses with high end technologies that are made outside of Bahrain "It is the complexity of these industries that hinders our collaboration with the local entities".

While P19 states it is lack of diversity and lack of multiple cultures and backgrounds of people in the organization. He believes that “If you have diverse minds and diverse experiences from multiple backgrounds, the chances I think are higher that spark will take place”.

4.2.15 Question 15. What are your wishes related to comprising and strategizing this Collaboration? One collaboration means was for universities collaborating with the industry for their researches to be based on the market needs. A series of these collaborations have started of which Bahrain Airport Company (BAC) signing a Memorandum of Agreement (MoA) with Bahrain Polytechnic to establish the first in a long-term research initiative to engage students in research related to the aviation industry is one example (“BAC and Bahrain Polytechnic launch joint research programme”, 2018). Another one was University of Bahrain launching the ‘Forsati for her’ project in partnership with United Development Program (UNDP), Microsoft, Think Smart, and Tamkeen. The aim of this project is to educate 3000 female programmers with an aim to setup tech businesses (“UoB to empower 3,000 women students to launch 30 startups”, 2018).

Another participant sees it in ICT to employ individuals from academia in order to attend to the academic field needs from someone who comes from the same field and knows what is needed from their perspective. Another sees it by decentralization of the government bodies, while her colleague believes in having more updates on the new trends in the market through workshops run by capable individuals who are well informed in the area of their expertise.

One educational professional believes that teachers should first become tech savvy themselves in order to be role models for their students, and another participant likes to see a body council to facilitate collaboration activities and ongoing communication and discussions. A government representative wishes to see more collaboration between the government bodies themselves and less isolation between them, while a private professional expressed his wishes to see more transparency from the government bodies.

Sharing their innovation experience is what one ICT expert would like to see more and another one believes that everyone should collaborate and look at the interest of the country to serve its Vision 2030.

4.2.15.1 Education unit. P2 hopes to see a shared ICT grid for the libraries in the region to share their researches and have an online platform for sharing ideas. He also believes that the industry can help by having their team who takes master's degree program with his organization do their researches based on the market needs. P3 hopes to see someone in the ICT with education background in order to attend to their educational needs "It will be great to have someone who has been a teacher once and he and she is in ICT now and can understand the issues from a teaching point of view". Decentralizing is what P7 wishes to see in the government in order for her organization to outsource their need directly to the local firms,

Outsourcing to local firms or local ICT providers. It can go through the eGovernment, but then you have to encourage new developers to have access to different needs of companies and government entities in order to be able to provide new solutions.

P10 wishes to see more collaboration in the sense of having her organization updated periodically on the new trends in the market through workshops run by capable individuals who are able to communicate well and are well informed in the area of their expertise. P12 would like to see the public-private partnership model strengthened,

Any successful tech economy is driven by the private sector in partnership with the government. So, I think the model is to become far more kind of public-private partnership (PPP). And that is missing right now. That is the bit that needs to be strengthened.

While P13 would like to see the ICT agenda pushed more into education, manufacturing, and all other sectors of the society. He also believes that in education, the teachers have to become technology users first,

You go into Education and not that you need students to learn something, you need the teachers to be users of technology. To be users of data. To show that they are a role model for the students. That they are actually coming up with new ways in teaching, or actually searched and found something being applied somewhere and they experiment it in the classroom and if it works here then they write a paper about it and that kind of propagates into other schools.

P15 wishes to see fewer regulatory barriers in his area. He also wants to see a body counsel that takes care of touching on these issues “There needs to be something and government can facilitate this through a sector council that is funded and can facilitate collaboration activities and ongoing communication and discussions. We need a venue for dialogue between the two sectors”.

4.2.15.2 Finance unit. P4 wishes to see more collaboration between the government sectors themselves since they work in isolation from each other “We are one entity, why are we asking for the same information. That is very disappointing”. P6 thinks that someone has to take the initiative and push collaboration and it has to be done from the top management or leadership “So, I think somebody has to reach out and it has to come from the highest level in the organization”. P21 wishes to see more transparency from the government. He specifically would like to see EDB to be more transparent and work with everyone to enhance and develop the ecosystem. He believes that,

They assist in bringing investments to Bahrain, but each investment has to go the concerned ministry according to the nature of the investment. So, they should be working to enhance the ecosystem in general in Bahrain and work with everyone each in their own expertise.

4.2.15.3 ICT unit. P14 would like to see more individuals share their innovation experience and not just publicize an initiative that they have started and then leave it halfway incomplete. The organizations are so focused on the PR of their initiatives that they rush to do the PR and forget to complete the system itself “But, the problem with the initiatives that we have in Bahrain in general, is that they are too PR focused. So, they want to do it to be the first and the biggest. If you have the wrong objective, the result will not be great”.

P16 would love to see more transparency and collaboration between organizations than competition, and P17 believes that because of the small scale of this country, collaboration should be more effective and everyone should be looking

at the interest of the country to serve its vision “I think if we can manage to all work together effectively and efficiently, believe me I think we can lift up the country”.

P18 wishes to see a stronger private sector ICT. He believes that change in government is slow, therefore, the private sector has to take the initiative and build its capabilities in the ICT sector. Individual capabilities exist, the organizations have to use these capabilities, independently without relying on the government, and build their core capabilities. That will free the government to take care of its own institutions to change and develop them without having to worry about solving issues for the private sector too “Sometimes it is very difficult to change the government. They are big and slow, but at least being able to get the private sector to depend on its own resources will free the government to move faster”.

4.2.15.4 Industry unit. P5 believes that the private sector needs to communicate more with the government sector to see how each organization can help the other by knowing their internal capabilities “They have to come forward. We need to know what they have to offer us”. While, P9 said that “The government should set the framework for collaboration and then step aside for the organizations to collaborate within that framework. Government should just supervise without interfering in the day-to-day collaboration of the entities”.

P19 was of the opinion that the organization has to set an internal strategy for innovation first “I think one of the issues in your topic of research is for an organization to have an innovation strategy. I never thought of that to be frank. But, I think it is a starting point. To start with is to ask ourselves what it is that we want from innovation?”.

4.2.16 Questions 16. Does the government of Bahrain provide incentive to your organization to support its innovation activities? The view points of the 22 participants ranged from no incentives from the government to their institutions for innovation (46%) to a few believing in that the Tamkeen model is the best funding support put in place by the government (36%). One finds the Tamkeen model to be more of a support to startups and entrepreneurs building their projects than it being innovation capability builder. While 18% found it not relevant. See Figure 4.5.

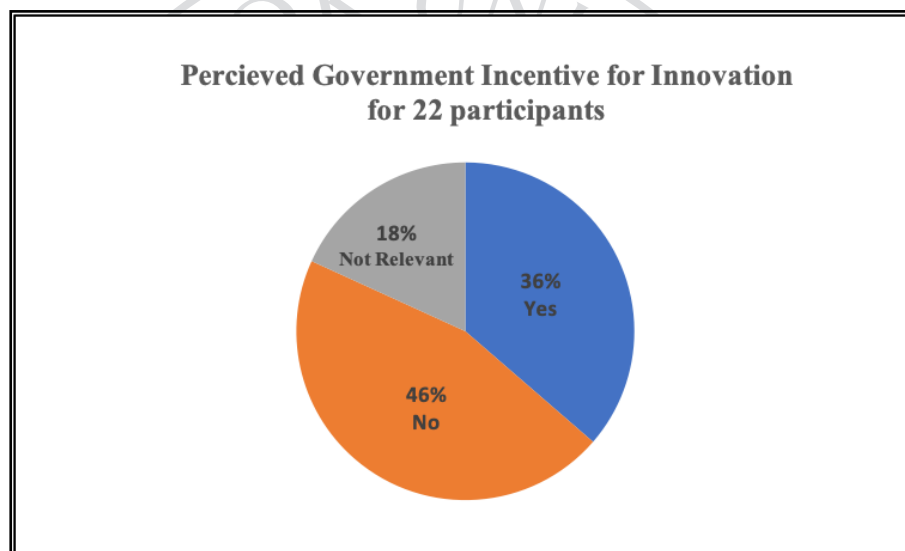


Figure 4.5: Government incentive for innovation in Bahrain

Source: Researcher's own elaboration extracted from the research interviews

One participant stated that her organization gets a reward from the government as incentives for their internal innovation initiatives and all ICT participants agreed that their organizations do not get any incentives from the government except for Tamkeen building the capabilities of the Bahraini employees. And one industry professional indicated that the support they receive from Tamkeen is for ideas and initiatives that have been developed in-house for empowering their young Bahrainis.

4.2.16.1 Education unit. P2 believes that Tamkeen is a funding model incentive set in place by the government to support and build the capacities of the startups. Contrary to that, P3 and P13 do not believe that the government gives any incentives for innovation.

P7 says they do it more internally and, although Tamkeen does support the young, it is more entrepreneurial support than innovation.

She continued to say that there are talks of incentives from the government, although not very clear. “The incentive is not clear, but you do hear it every once in a while, in meetings in the high professional governmental official level meetings trying to reorganize and restructure the way the government operates. Probably you have heard the term ‘handara’, it is mainly lead by the Crown Prince”.

P10 says that her organization gets incentives for their internal innovation initiatives in the form of a prize from the eGovernment, while P12 said “Yes, we do already a lot of support through EDB and Tamkeen”.

4.2.16.2 Finance unit. P4 does not believe government gives anymore incentives due to the financial situation “Before they were doing it. Let us say two or three years ago. They would give incentives for best ideas and encourage people to implement them. But, lately they are not doing it. It might be due to the financial situation”. P6 and P11 believe that there is incentive through Tamkeen, and as P11 put it “I think Tamkeen is a phenomenal example of that. The answer is Yes”.

P21 says that they are funded by the government for implementation of their strategies “In the sense that whatever we provide to the government in terms of

strategy, they provide us the support for implementing it. Mainly financing our activities”.

4.2.16.3 ICT unit. The four ICT private sector participants agreed that they don't get any incentives from the government for innovation, but they agreed on that Tamkeen does support the development and building the capabilities of the Bahraini employees which as indicated by P14 “The support we get as business is Tamkeen support, in general. It is not related to ICT or innovation”.

P18 was of the opinion Tamkeen is the only body that is supporting the private sector and now it is mandate. But, it is not enough. Because if you tell me today, that as a company, I will give you training and will give you money and push innovation, but when I hit obstacles with the ministries not accepting the new ideas, it is a problem. So, yes, it is there. But, the circle is not complete.

Ravi (2017) agreed in that the government does have a few excellent support systems in place, but the problem is that the SMEs lose momentum quickly. The loss in momentum could be in the SME's not receiving enough advice about product improvement, or in process innovation, or getting in-depth market information.

4.2.16.4 Industry unit. P5, P8, and P9 agreed that their organizations don't receive any incentives from the government for their innovations. Although, P8 did indicate that his team does get education support from Tamkeen for specific profession in his institution. He continued that the support was for developing their skills and not for innovation purposes. P9 clearly was of the opinion that “We don't want their incentives. We want them out of the way of our business”.

P19 also indicated that they do get support through Tamkeen, but it was for ideas and initiatives that have been developed in-house and Tamkeen's support was for empowering the young Bahrainis working in his institution to develop those ideas.

4.2.17 Question 17. What kind of incentive? Are they effective? Thoughts from this question are discussed in 4.2.16 (government incentives in supporting innovation) above. The researcher first sought whether the government of Bahrain provided any incentives for the participants' organization. If the answer was yes, the researcher followed the question by asking the participants what kinds those incentives were and whether they were effective.

4.2.18 Question 18. How might the government Incentives be improved? One participant believes in recognition instead of financial incentive. Another considers a need for a better tracking to measure innovation, while an investor sees it in Tamkeen simplifying the incentives and selecting better who they give support to which is concurred by another participant who stated that Tamkeen's support should be reviewed as to not treat all business needs the same.

A line should be drawn from education research to industry to funding in order to tailor make what industries are looking for, while the government should engage more with the industry's needs, but the industry has to go to the government for their sectors needs and not expect the government to always come up with solutions.

4.2.18.1 Education unit. P15 indicated strategizing government incentives as another way of improving those incentives. He said that if government helped in subsidizing the cost of innovation if companies collaborated with the university and its students on innovating the companies' products and services would be one idea of

improving incentives. According to him that “would create an ecosystem of inspiring the company that wants to innovate and also providing opportunities for students to express their creativity alongside the faculty members by sharing a part of the cost of that R&D”.

Universities and the industries have started establishing long initiatives to engage students in research activities. One such initiative was the MoA signed by BAC and Bahrain Polytechnic (“BAC and Bahrain Polytechnic launch joint research program”, 2018). This joint program is beneficial to both parties in that it will setup an ecosystem in which the research skills and knowledge of the young students would be mobilized for the challenges faced by airport operations, while the students will be provided by the necessary support and training from the staff of Bahrain International Airport. The ultimate goal is to launch a research and innovation program arranged on the diverse functions and disciplines at the Bahrain International Airport.

4.2.18.2 Finance unit. P4 believes it does not have to be financial “If they encourage people who innovate and give them recognition or certificate can be enough satisfaction as incentives for Bahrainis”. P6 considers a need for a better tracking to measure innovation and “Again, the other thing is to remove cultural and social barriers to allow more of the younger innovative people to do their thing. This is all about that.”

And P11 is of the opinion that Tamkeen needs to simplify the incentives and select better who they give the incentives to. Tamkeen has many schemes and program guides but no R&D offering. The government should also think of R&D “And it should be driven by our industrial sectors. So, there should be a line from

education research to industry and the funding should really be tailored by what industries are looking for”. He went on to emphasize that

There should be an alignment between the researchers and industry where the patents or whatever knowledge comes out of the research can influence and help industry become better and more efficient and develop more product or whatever that looks like

4.2.18.3 ICT unit. P14 states that Tamkeen’s support should be reviewed as to not treat all business needs the same. “Tamkeen has rules such as help you in advertisement which is a good thing, but they do not support you to buy lap tops or computers. Now as an ICT company, I need support in technology and not marketing”.

P16 believes that the incentives should be in financial support, since the rate of return in innovation takes a long time and the entity which is innovating needs financial resources to survive that period. On the other hand P17 believes that Tamkeen is doing a good job in not only in terms of financial support but also in development support.

P18 suggests a competition for innovation “A competition for innovation. Looking at any company that can show innovative ideas nationwide should be rewarded and recognized”.

4.2.18.4 Industry unit. P5 and P19 believe that these incentives can be improved by the government being engaged with the industry. P19 was of the opinion that:

Each industry understands its challenges, and nobody else will better understand their business as each industry does itself. So, then the industrial sectors have to come up with ideas and go to the government with the project, or product, or concept. They shouldn't expect the government to always have the magic wand and come up with solutions. From my personal experience, I have seen all the support I need from the government

4.2.19 Question 19. How tolerant is your organization towards employees' new ideas? Taking risk? Not penalizing failure? All 22 participants except for two indicated that their organizations are very tolerant towards employees initiating new ideas with no penalties for failure of initiatives. As a matter of fact, they said they use failures as lessons learned.

One of the two not in agreement stated that his organization is not tolerant to new ideas nor innovation while the second one indicated that his organization is not an innovation encouraging one. He continued to say that even though failure was not penalized, but the process of coming up with an idea till implementing it was so long and full of hurdles of finance and gates to go through that employees were not encouraged on why they should even bother to come up with new ideas and innovate.

4.2.19.1 Education unit. Of all the participants, P13 is the only one that indicates his organization is not tolerant to new ideas and innovation. He believes that in general in the public sector "There are people who think if you come up with something new, you will basically kick them out".

P7, P10, and P12 participants agreed that their organizations are tolerant to the employees' new ideas and initiatives, not penalizing failure, and actually having lessons learned policy. P12 went on to say that

How can we want to correct the environment with people who are afraid of making mistakes? Part of innovation is making mistakes, right? You have to encourage people to take risk. 9 times out of 10 it is not going to work

P15 indicated that in his organization there were two kinds of mindset. The students' mindset primed to challenge and trying new things and the employees' being part of the government mindsets which are averse to change. He said that "It is something that is here in Bahrain people are a little too averse to failure and we need to allow people to take risk".

4.2.19.2 Finance unit. P6 said that not only are they tolerant in his organization, but they actually rewarded people for coming up with new ideas. He continued to say

We have an award system with a small budget set aside. When someone comes up with an idea to improve efficiency, say of cost, increase in revenue or improve customer service, we not only recognize that person, we publicly announce and award them. We put cash in their account.

P21 stated that their organization is very tolerant and encourage failure and lessons learned "We bring in that culture of 'if you fail you would do better'".

4.2.19.3 ICT unit. P16 is the only participant in this sector that said unfortunately his organization is not an innovation encouraging one "Honestly, it is not something I am proud of, but I don't see much of innovation". He went on to say

that although failure is not penalized, but the process of coming up with an idea till implementing it is so long and full of hurdles of finance and gates to go through that employees are not encouraged on why they should even bother to go through it “Because even if they do and fail at the end they get questioned on why it failed”.

P14 and P17 both agreed that their organizations encourage new ideas and do not penalize failure. P17 continued “And to encourage our employees more, we established a division called Marketing and Innovation and one lab for banking services innovation”.

P18 said that his organization “has an openness for ideas”. He said that they encourage the employees to use smart tools through ICT, rather than using traditional tools. He believes that as an IT company provider they have to be a role model for their customers “So, because we are as a company, very much well connected to Microsoft, we have to show our customers that we are using it”.

P22 is very proud of his organization’s open floor for new initiatives and innovative ideas. He stated that most of the services offered in his institution were all initiatives of different thoughts of employees and external entities.

4.2.19.4 Industry unit. As for the industry, all four participants agreed that their organizations welcome new ideas, are tolerant to employees’ initiatives and do not penalize failure for trying new things for improvement.

P5 stated that “Yes, we are not going to penalize people. Because then you will discourage any future ideas. No, we don’t do that. Absolutely not”. P8 believes that people are managed to stimulate in his organization and that is the reason why

they had recently implemented two successful initiatives that were initiated by the management and their staff.

P19 said that his institution was based on an innovative idea from the start and that “innovation has to be engrained within the values and culture of the organization, because if we stop innovating in our business, it is very difficult to ensure survival and continuity”.

4.2.20 Question 20. Are there any other entities that contribute to your in house Innovation? UNIDO, British Embassy according to one university professional are their supporters while another one believed that Quality Assurance body is another one. Tamkeen and Bipa are two more supportive entities and the industry in general assists one of the educational institutions in their educational programs.

In the financial sector, eGovernment, Ministry of Commerce and Industry, Tamkeen, and EDB are supporters to other sectors innovation and the ICT sector is of the view that BTECH society contributes to them collaborating. The industry sector finds finance and all the technology providers as their supporters in innovation.

4.2.20.1 Education unit. According to P2, UNIDO and British embassy are two of the entities that collaborate with them in their innovation activities. P3 believes that the Quality Assurance body is the entity that stimulates the generation of new ideas for his organization. He believes that the Quality Assurance team gives him ideas by the enquiries they make and the questions they ask in regards to the actions that P3’s organization takes in-house. He said “Therefore, one of their queries regarding whether we give contracts to our students lead me to think of an innovative way of bringing in money for my department”. Taking up research contracts with the

industry and involving the students in the research not only engaged them but also helped bring in money which he then used for upgrading his department's books and software.

P7 sees the dialogue they hold with their stakeholders, the universities, and their feedback as a source for them to innovate. So is building on top of their international stakeholders' knowledge and coming up with new solutions. P10 indicated Tamkeen and Bipa as the two organizations enhancing the development of her organization's staff by offering training and courses.

P12 said collaborating with external organizations was a way for providing scholars to teach, arrange conferences, and conduct joint researches that assisted in P12's organization to generate and create a local innovation culture. While P13 believes no external agency contributes to their internal innovation process, the industry in general helped to ensure P13's institute kept innovating in their programs.

4.2.20.2 Finance unit. P6 said that his organization collaborates with eGovernment, Visa and MasterCard, PayPal, and EDB. P1 collaborates with Ministry of Industry and Commerce, Tamkeen, the SME development committee, and many more.

P21 collaborates with the entrepreneurs and believes that "The entrepreneurs themselves are always our main drive for innovation. We learn from them as they learn from us".

4.2.20.3 ICT unit. The participants from ICT indicated that they all contribute to each other and mostly BTECH, the major contributor in ICT representing the Bahrain ICT private sector companies. As P18 stated "So, I think today, BTECH is

the most important body that links the government, EDB, Tamkeen, and the universities together”.

4.2.20.4 Industry unit. P5 said that they collaborated highly with the finance and legal sectors “We cannot work without finance and we cannot work without legal systems. So, based on this, we have close collaborations”.

P9 said that most of the entities they collaborated with were external technology providers on a continuous basis, since according to him technology is changing so fast and gets out of date so quickly that they had to be kept updated all the time.

P19 though said that most of their collaboration was being done inside the organization by focusing on business excellence “So, we are looking into setting up within each function teams that continuously evaluate the way the business services are delivered with a view of always improving”.

4.2.21 Question 21. Is there research and development (R&D) entity in your organization? All agreed that their organizations did not have R&D in-house and that Bahrain overall lacks R&D. The industry is in general too small to have R&D, and one participant indicated that his organization is more an operator than a producer, hence no need for an R&D department in-house.

4.2.21.1 Education unit. P3 is very disappointed for not having R&D in Bahrain. He said that the culture for R&D is missing and no one spends money or research. He said that “If you go to all these institutions you find most of the budget is for salaries and is not for R&D. This is very bad”.

P10 indicated that “We do have a section for research. But, till now it has not been activated to be honest”. She continued that their staff contributed papers in conferences but due to limitation in the human resources that they have, they really haven’t gone into R&D.

P12 said that they have just started having the industry pay them to do research projects through a program which they had already started in the past year. He went on to say that “And also, we are doing long term research projects with some of the best universities in the world around water security and renewable energy”.

P15 commented that “We have just established a dean of applied research. So, his job is going to be to reach out to industry, specially SMEs and bring them into our organization”. He said that they will invite the SMEs for them to join their various lab environments and that their students and staff would assist them evolve or innovate their processes and product lines by working alongside each other in those labs.

4.2.21.2 Finance unit. P11 stated that Bahrain does not have an R&D strategy and for the government to identify what the themes for the R&D are, it has to first identify what it wants to build the research around “But, no point in trying to put your head up and say we want to do”.

P21 on the other hand said that their institution supports R&D and they are working on systems to build the R&D culture in schools and the universities “But we don’t have a complete line for innovation entrepreneurship from school to university. This is what we are trying to establish”. He continued that they have started yearly conferences on how to boost innovation entrepreneurship through educational system for schools and universities.

4.2.21.3 ICT unit. All the participants from ICT field indicated that they don't have R&D in their organizations and P17 stated that:

Overall in our country, we don't give R&D importance as the West and European countries do and spend billions on R&D. For us to become innovative, we have to have a big R&D on the level of the nation such as incubators to let them do the brainstorming.

P18 said that they collaborated with entities who have R&D outside of Bahrain, and P22 indicated that his organization relies on university of Bahrain to do their researches "We are working very closely with them. Any new ideas, we take them to University of Bahrain and they do the research and look at the best practice according to the experience and case studies around the world".

4.2.21.4 Industry unit. P8 said that "So, it goes without saying. We are too small to have research teams. There are already established organizations to do research and development on our highly expensive machines. At this point we are not considering an R&D in house". P9 stated that "Not really. Nothing formal. We are an operating company".

4.2.22 Question 22. Which aspect of Innovation do you believe that Bahrain should be focusing on? Hotel management and health technology were the views of one participant. An investor specialist participant believes that it should start from schools and even pre-school since creative thinking is the key. Services to investors investing in Bahrain should be the focus in the point of view of another participant while tourism is what Bahrain should be focusing on according to one industry professional.

4.2.22.1 Education unit. P13 believes that Bahrain has a void in the area of hotel management programs, culinary arts programs, and tourism management. He said that “I am told that the reason we don’t have it is because many of the young people don’t want to go into those fields. It is perceived as lower work. But, you know, hospitality at the high end, great chefs, great five star hotels have great jobs in there”.

According to him, another area would be health technology. There are no programs that have lab technicians, X-ray technicians, CT scan technicians, respiratory therapists, and para medics. He continued that there were good opportunities in those careers and should be looked at in the future.

4.2.22.2 Finance unit. P4 believes that innovation processes and practices are what is missing in organizations in Bahrain. Tools such as the ones used by Google and similar innovative companies in the West, to help generate ideas, are needed to be introduced into the culture of the institutions “Ideas are very important. We don’t understand the importance of these ideas”.

P6 believes that it should start by removing the thinking of “we have always done it this way, why are you changing it now?”. He continued to say “This research cannot be separate from discussing the culture of change. You can have all the strategies you want but as Peter Drucker says ‘culture eats strategy for breakfast’”.

P11 insisted on:

If we are going to get a true innovative environment, it has to be driven by Bahrainis and has to be driven by locals. But, locals have to be doing the work. They can’t be doing management. They have to be willing to actually

get down and get their hands dirty. If we are taking technology, they have to be coding it. So, that is a challenge. It is a big challenge.

P21 trusts that we should start from schools and even pre-school since creative thinking starts from an early age.

4.2.22.3 ICT unit. P14 is on the belief that “the education system is so far behind and I definitely think that there needs to be a lot of collaboration there”. Ministry of Education should be collaborating more with the ICT sector on the innovation process.

P17 believes that R&D should be a priority, while P22 trusts that the focus should be services. He stated that “We have to develop our services, to be independent, to be transparent, and to be accountable”. He continued “I need for the investor when he comes to Bahrain to be experiencing a friendly and flexible and comfortable environment for the business”.

4.2.22.4 Industry unit. P5 is of the belief that “The education system needs a total revamp”. While, P8 believes that tourism is what Bahrain should be focusing on “Tourism. This is still an area to touch. It can bring benefit to the country almost throughout the year. You have very nice weather more than half of the year”.

P19 believes that Bahrain should take advantage of its small size and develop R&D. Any idea or concept to test will not cost much and could be tested with minimum investment with a quick turnaround if it does not work. Another area according to P19 is leveraging data. He stated that “The data is there, but there is no central body that tries to learn the trends of these big data and where we can excel, where can we go beyond the current status”.

4.2.23 Question 23. What ideas do you have that would benefit this research?

One participant was on the opinion that “I think what you want to ask in the Bahrain level is ‘why do we lack R&D?’” she went on to say that it does not have to be scientific research and can be scholarly or organizational research.

Another believes that we need a sustainable innovation by investing in education and research. Another participant believes that we have to change the culture of “we have always done it this way, why change it now?” He states, “Believe me, I am not asking us to change as Arabs or Muslims or the identity. But, what I am saying is culture is the way we do things as people”.

The other aspect is that what is quite challenging in Bahrain is creating a straight line between developing skills and those skills getting into the work place “We do have a problem here in Bahrain. We put time in developing skills, but those Bahraini skills are not flowing in to the industry”. Another believes that health and wellness is an area to focus on while an ICT participant believes that Bahrain should focus on how to have a center of excellence for innovation. A proper innovation center such as incubators, which will purely work on R&D “We lack a center of excellence in innovation. I believe this will be wow if we establish one”.

While another participant states that innovation initiatives are scattered in Bahrain. He believes there should be an institutional model that can be represented as a high-level committee of high level council committee that will collaborate the whole innovation projects in Bahrain. It should have a road map for every year “We need to have an institutional model that could be a high council or supreme council

that will coordinate and organize the scattered efforts which exist currently in Bahrain”.

And last but not least the industry professional believes that the openness of Bahrain and the Bahraini people’s nature for outward looking is a big advantage to do more in encouraging investors to open shop here in the areas of medicine, education and banking.

4.2.23.1 Education unit. P2 believes that it is needed to look closely at the IP policy to make sure that there is a property rights protection and a legal framework to support IP. P7 stated that we should seriously look into “I think what you want to ask in the Bahrain level is ‘why do we lack R&D?’”. She goes on to say that there is no culture of the importance of R&D and according to her, it does not need to be a scientific research. It can be a scholarly research or an organizational research. There should be a nationwide strategy for R&D, which has to be put in place by the government because no one will stick to it unless it is advocated by the government “I am saying that this is the culture that you are propelled with. The government wants rather than one wanting to improve for the sake of improvement”.

P13 also concurred that there should be a nationwide strategy for R&D which has to be put in place by the government. “We are driven here by the government. If the government wants something then everyone becomes an advocate for it and wants to show the government that they are doing something towards it”. He indicated “I am saying that this is the culture that you are propelled with the government wants rather than one wanting to improve for the sake of improvement”.

4.2.23.2 Finance unit. P1 believes that in terms of the institutional framework around innovation, the economy has to be a marketplace economy. He continues that we need to have a sustainable innovation by investing in education and research. Bahrain has to be open to talent and attract more quality talent to accelerate the process or transition towards a knowledge based economy.

P6 believes that we have to change the culture of “we have always done it this way, why change it now?”. He states “Believe me, I am not asking us to change as Arabs or Muslims or the identity. But, what I am saying is culture is the way we do things as people”.

P11 believes that we should be looking at two aspects. The first is that “We have to change from making a huge effort at the later stage of education while it starts at the school kids and that is where the shift should start”. The other aspect is that it is quite challenging in Bahrain to create a straight line between developing skills and those skills getting into the work place:

We do have a problem here in Bahrain. We put time in developing skills, but those Bahraini skills are not flowing in to the industry. That is a particular issue here where they are competing against expats who are doing it on the same money and more experience

P21 believes that health and wellness is an area to focus on because “the region spends every year between 5-6 billion dollars by going to Thailand, Germany, and East Europe. So, we want to work with these sectors to make it more attractive for people to come here than go abroad to get these services”.

4.2.23.3 ICT unit. P17 believes that Bahrain should focus on how to have a center of excellence for innovation. A proper innovation center such as incubators which will purely work on R&D “We lack a center of excellence in innovation. I believe this will be wow if we establish one”.

P18 indicated that “You see, my ultimate idea is building an ecosystem for innovation for Bahrain, and I think you mentioned it somewhere in your research. and having a national plan to make this ecosystem thrive”.

P22 states that innovation initiatives are scattered in Bahrain. He believes there should be an institutional model that can be represented as a high-level committee of high level council committee the will collaborate the whole innovation projects in Bahrain. It should have a road map for every year “We need to have an institutional model that could be a high council or supreme council that will coordinate and organize the scattered efforts which exist currently in Bahrain”.

4.2.23.4 Industry unit. P5 indicates that “the education system needs a total revamp”. He says that it is not equipped for the real future world. The public schooling should be worked on here in Bahrain because the private sector is much stronger but, according to him, not everyone can afford to enroll their children in private schools.

P9 believes that the openness of Bahrain and the Bahraini people’s nature for outward looking is a big advantage to do more in encouraging investors to open shop here in the areas of medicine, education and banking.

4.3 Focus Group

In order to investigate further into the findings observed and collected by the researcher through the personal interviews and the collected various organizational reports and newspaper articles, the researcher conducted three Focus Group interviews. It was challenging for the researcher to get a group of people in one organization to meet with her at the same time due to their work schedules and availability. The researcher however managed to arrange three meetings with three organizations which dealt with investment, academia, and regulations respectively.

The researcher was the moderator in those Focus Group interviews and presented a summary of the research topic and what had emerged from the individual interviews and then opened up the ground for the participants to express their views and provide any examples that they had regarding the roles of the government and the private sector in collaboration to push innovation forward in Bahrain. These discussions assisted the researcher in gaining additional insight on perspectives of professional practitioners in the field and aided her in relating with the findings of the individual interviews either in reiteration or new findings emerging as a result of applied practices in the field of those Focus Group teams.

4.3.1 The Investment Focus Group F1

According to the investment Focus Group (F1), based on their experience, collaborating with other government entities has been much easier and smoother than collaborating with the private sector. Although, the F1 team's perspective on the role of the government in pushing innovation in the private sector was to regulate and

remove obstacles for the private sector to innovate and not collaborate, they were of the opinion that, as one Focus Group participant expressed, “Even when the government regulates and removes the barriers, the private sector has been hesitant to innovate due to the risk aversiveness mindset and culture in the private sector”.

One example was that even though the government had setup regulation for the banks to give loans to GCC citizens to buy property in Bahrain, the banks still came back to the government asking the public authorities to draw their loan policies for them. The banks still felt uncomfortable and wanted the government to write the framework for them and do the whole process of loans procedures and not the regulatory framework only. Not only were they reluctant to setup up the policies the financial sector was hesitant to collaborate amongst themselves also as one of the participants in F1 went on to state that,

This is an example of reluctance from the private sector to commit and to operate in collaboration with each other at an industry level. They don't want to talk to their competitors and trust is still missing between them. They don't realize that by collaborating and making it easy for GCC nationals to get loans locally, the banking industry is helping the real estate industry sell properties which will help bring in more individuals to Bahrain who in return will boost the country's economy.

Another example was that when CBB regulated crowdfunding no entity in the private sector took initiative to establish a fund and the government had to look for organizations outside of Bahrain to establish one. “Why does the government have to

talk to entities from outside to invent a crowdfunding entity? Why don't the private sector try to invent it themselves here in Bahrain?"

F1 participants agreed that the enablers and the innovation foundation for the model drawn in this research are correct and what EDB is trying to do is to tackle the elements in the ecosystem that need to be enhanced. The Cloud First policy, the Crowdsourcing, and the Tamkeen programs for cloud certifications developed because EDB had a big hand in bringing AWS to Bahrain. "If bringing AWS changed the financial ecosystem, it can be done with other sectors as well. For example, the books and music side of Amazon can revolutionize the logistics industry since they have to change in order to be up to the standard of these industries".

The participants of the Focus Group F1 explained that in general the ideas come from CP's office to EDB's teams which in return design the innovation frameworks and assign the initiatives and the relevant entities based on the nature of the projects involved. The development of the ventures is then supervised and checked periodically by the CP's office to make sure they are on track since they have the authority to do so,

Today, the culture is still top down and initiatives still comes from the top to push things forward. No one will do anything unless they are told to do so. We agree with you that initiatives have to be bottom up and it will be interesting to see the flow of information being from the entities to the public sector instead of the public sector pushing them, but time factor pushes the public sector to

work top to bottom. Is it perfect? No, but the government can't wait and have to move fast to catch up with the global pace.

As for innovation, FI participants viewed that IP protection was the first thing to tackle with a priority on working with the legal sector and trying to get the judges understand what a patent is, what is the underlined technology behind it, and how it is different from what already exists. It is only when the legal system gets knowledgeable about patents they can get to know how to enforce it and get it across the individuals the illegality of using others technology and calling it their own. "It is very difficult to explain in our culture where everyone uses others ideas that it is not legal to do that without the owner of the ideas permission".

As for innovation, F1 participants stated that in order for the private sector to innovate the role of the government has to be the provider of the ICT infrastructure which is why the government is rolling out the 5G network in the second half of 2019 to enable all entities develop their databases digitally and connect them. "While we lack R&D in Bahrain, we can still focus on certain areas such as oil & gas or renewable and sustainable energy which are the two main natural resources in Bahrain, but the industry is not trying to innovate in it". By providing funds and establishing a center dedicated for R&D in those areas and by collaborating with King Fahad University for Petroleum and Minerals and other engineering schools locally and in Dubai, Bahrain can become a center for R&D in the region.

F1's perspective on Bahrain is that "the culture of risk-taking factor mindset has to change". Even though bankruptcy laws have been introduced in the sense that

failing in business is ok, but mentally still businesses have to get prepared to taking risks and failing. “There are many challenges, but things are changing and getting better”. In their views, F1 group sees Bahrain as “much more advanced than it gives itself credit for and this research is proof to that by having put down what is going on in Bahrain and documenting it”.

4.3.2 The Academia Focus Group F2

Focus Group F2 consisted of academics from a private university. In this group the scholar, who has published many articles in innovation and knowledge economy in the Arab world, was of the opinion that the topic of this research is a very important focus given the fact that Bahrain is trying to promote a knowledge-based economy. According to him, “The government is about institution, and in a knowledge economy it is the institutional structure of the state that basically provides the facilities for innovation”. There is something called the institution and national innovation system which is driven by incentives, support, and education that are the duties of the public sector and their role in the innovation. “The government does not innovate, it doesn’t have the creativity to do so. It is the private sector that thinks. You have to clarify this division between the public and private sector. Even in the United State, it’s not the government that basically innovates or creates”.

Another very important role of the government as conveyed by F2 is that the government has to convey the culture of innovation within the society which has to be built starting from the early stages in the education sector and as early as KG level,

Traditional economy is driven by labor and capital while knowledge economy is driven by ideas and creativity. The first pillar in knowledge economy is the human capital and the individuals are the ones who come up with ideas and are creative. Human capital is linked to education and the government is responsible for education and building the human capital skills which channels into innovation.

According to their perspective, Focus Group F2 believes that as the government is responsible for the constitutional structure of the state, their role is to facilitate and not to collaborate. Universities collaborate with other universities in the level of their labs and researches and the universities collaborate with the industry because they have common interest amongst themselves, but the private sector does not collaborate with the public sector,

There is no such thing called collaboration between private sector and the public sector. The government does not collaborate with the private sector, but rather facilitates the procedures for the private sector to innovate. Therefore, the collaboration falls in the arena of the private sector amongst themselves and not with the government.

The role of the government is in promoting innovation, but the regulators are not cooperating with us in the sense of regulating what is needed for us in education. F2 participants believe that their sector's regulator is not cooperating with them but regulating and insuring that the education system are following the regulations and the rules which makes these regulations become an obstacle for the universities to

innovate in their institutions. The regulators need to revise their roles and the universities need to cooperate more with them.

But you have to separate between the finance and the other sectors as far as their regulators are concerned. The financial sector is money driven while the education sector is service driven. Look at it this way, for a knowledge economy you need skills, human capital, you need infrastructure, ICT and all these are basically part of the government support programs in order to build capacity for KE. The issue here is very important in that the role of government is building capacities for the KE then you can say what the government in Bahrain has done so far in building these capacities.

4.3.3 The Government Projects Group F3

Focus Group F3 consisted of individuals involved in government projects and according to the F3 group this research is,

Very insightful research that has touched on many factors which are indeed in the line of what the government is thinking in the sense of the role of the government as the regulator and the private sector as the operator of things. Not just in innovation, but in general operations within the economy which lead to innovation in all sectors.

The researcher explained to the group that she felt that although the government had started to do their role as far as regulations were concerned, t in the private sector there was still that hesitation to take risks. She was of the belief that someone had to look into this and see what it is that is keeping the private sector from

not taking the risk. As was noted by Focus Group F1, “Even when the government provides all the necessary tools for the private sector to innovate, the private sector is still hesitant and turns to the government entities to actually do the operations for them as well which is not in the scope of operations of the public sector”, which was noted by Focus Group F2 as well. Also, the researcher had observed in her findings of the individual interviews a lack of communication between what the government actually did and what the citizens witnessed or heard about. The researcher commented that during her individual interviews a gap in communication emerged between the government and the private sector which needed to be tackled and bridged for transferring information to the citizens.

The team in group F3 was of the opinion that “As far as collaboration is concerned, the important thing to highlight is the fact which stems from the notion that the government wants to move away from being an operator and into being a regulator” which was in the same line of understanding as stated by the F2 group. One example of the government moving operations into the private sector has been in the electricity arena where a few of the grids were being operated by private companies and sold back to the government who then provided it to the citizens. Another example was in providing affordable housing via projects that were purely run-operated-built by the private sector and semi-funded by the government. Unfortunately, though, as one member of the Focus Group F3 stated and was agreed upon by the group,

The citizens mindset is still used to the government being the provider and everyone, including the private sector, still relying on the government to fully provide all services and infrastructure and accommodations etc. instead of the private sector having to bear a part of the cost.

The F3 group was of the opinion that they understood that the aforementioned was not collaboration, but privatization, yet they were also of the opinion that to get to those privatization projects the government entities had to collaborate amongst themselves first in order to shift those services to the private sector. Therefore, collaboration had already started in the government sector and needed time for it to be built between the government and the private sector. One way the government had started bridging the gap of collaboration between the government and the private sector was through involving the private sector in exclusively government projects of which one example was the revival of the pearling industry.

According to the F3 participants when the government officials were drawing the policies for reviving the pearling industry they followed the strategy of involving private sector representatives to get their expertise and ideas on how those policies would affect the private sector each depending on those organizations' roles at the time of implementation of those policies. The feedback of the diving centers was sought in regards to diving, while the pearl merchants got involved for setting up the lab for testing of pearls and gem stones.

One government official stated that,

The government has a way of failing itself when it comes to telling people even locally of what the government is doing and they are learning that slowly. The government is not trying hard enough to tell stories of their projects and immediately lose credibility once they do because it seems like the way people read government's stories is 'there they go again patting themselves on the back.

Focus Group F3 believes that a wide spread collaboration for policies that have a national impact has already started within the public sector apparatus and examples such as the Sandbox, FinTech Bay, and Cloud First policies are proof of that in which EDB, CBB, the eGovernment, and MOICT collaborated, each in the area of its expertise, to make these policies become a reality. They went on to state that the model which emerged in this research is a proof of that collaboration.

F3 group participants continued to state that there was a collaboration in the government within its own organizations, but not so much with the private sector "The fact that some of these findings are in line with what the government wants to do does not mean they are redundant. On the contrary, they mean that the government is thinking correctly and that most of what it is doing is on the right track and path and heading in the right direction".

4.4 Correlation of the findings with a focus on collaboration for innovation

In Chapter 2 the GII, KEI, and the MAKCi frameworks were explored, analyzed and correlated by the researcher. The identification of innovation factors across these models led the researcher to recognize a number of consistent and related

factors, which were then combined with the elements of the GPC as a market phenomenon, resulting in the formation of the innovation ecosystem research model as shown in Figure 2.12.

Recall that Khorsheed (2015) stated that the innovation capability in a society and its ability to sustain growth was dependent to a large degree on the strengths of, and partnership between, many organizations, and the effectiveness of specific and distinct policies. During the process of developing the research model, the researcher assembled five milieus, namely: (a) government; (b) ICT; (c) education; (d) private sector; and (e) innovation, which are part of the research model and constitute economy generators and/or supporters in a developing KE. All of these milieus incorporated the factors shown in Table 4.1, which were extracted from the GII, KEI, MAKCi, and GPC, that led to knowledge creation and innovation, which is one of the pillars of KE and crucial for its development.

These factors were grouped together in terms of their commonalities; from which the environments for innovation in a developing KE emerged. These environments were then used to guide the interview questions with regards to what the interviewees had to say and what the literature review had identified in relation to Bahrain's share of public and private sectors' collaboration in relation to innovation activities, and why innovation measured low for Bahrain in the global assessments compared to the advanced economies.

Table 4.1: Factors leading to innovation in a KE

<u>The five innovation conducive environments</u>			
1- Government Environment			
GII	MAKCi	KEI	GPC Market orientation
1-Nurturing an institutional framework that attracts business and fosters growth by providing good governance (1-1), correct levels of protection (1-2), and incentives (1-3).	2B2-City's Future Management. Existence of the City's Future Centre or formal enablement of its functions through another kind of innovation initiative. (1-4) 5A1-Ethnic diversity. (1-5) 6B3a&b-City's cultural diversity (1-6) and tolerance capacity (1-7) to relate empathically and assertively with people of a different race, social, cultural or economic background. 8A1c-Innovation capacity of the public sector. (1-8) Structural capacities of government bodies (1-9) 8B1c-E-government: coverage, transparency, accessibility, and usability, content, services, participation (1-10)	1-1Regulatory quality (1-11) 1-2Rule of Law (1-12) 1-3Government effectiveness (1-13) 3-11E-government (1-14)	a-Providing organizational framework for knowledge generation (1-15) and innovation activities (1-16) c-Delivering innovation policy (1-17) and linking to specific projects (1-18) d-Selecting suitable partners to produce innovative products, services, and processes (1-19)
2- Education Environment			
GII	MAKCi	KEI	GPC Market orientation
2-The level and standard of education (2-1) and research activity (2-2)	5B1c-Number of individuals (2-3) and quality of their performance (2-4) in formal education system. 8A1b-Innovation capacity of the education (2-5), university curricula life cycle (2-6)	2-1 Adult literacy rate (2-7) 2-2 Secondary Enrollment (2-8) 2-3 Tertiary Enrollment (2-9) 2-11QualityICT of science and math education (2-10)	a-Providing organizational framework for knowledge generation (2-11) and innovation activities (2-12) d-Selecting suitable partners to produce innovative products, services, and processes (2-13)
3- ICTEnvironment			
GII	MAKCi	KEI	GPC Market orientation
3- ICT access, use, e-government, online participation of citizens (3-1).	8B-Infomaiton and telecommunications functional capacities. (3-2)	3-1 Telephones (3-3) 3-2 Computers (3-4) 3-3 Internet Users (3-5)	a-Providing organizational framework for knowledge generation and innovation activities. b-Providing innovation related - infrastructure (3-6) d-Selecting suitable partners to produce innovative products, services, and processes (3-7)
4- Private sector Environment			
GII	MAKCi	KEI	GPC Market orientation
4-The availability of credit (4-1) and an environment that supports investment (4-2), access to the international market, competition, and market scale (4-3)	8A1a-Innovation capacity of the private sector 4-4), new business incubation and creation (4-5), preparation of high-value new business creation (4-6), and survival of new businesses (4-7).	2-6Soundness of banks (4-7) 2-8Professional and technical workers in labor force (4-8) 4-17Availability of VC (4-9)	a-Providing organizational framework for knowledge generation (4-10) and innovation activities (4-11) d-Selecting suitable partners to produce innovative products, services, and processes (4-12)
5- Innovation Environment			
GII	MAKCi	KEI	GPC Market orientation
5-Conduciveness of firms to innovation activities (5-1), employing knowledge workers (5-2), and R&D (5-3).	5B1e-Knowledge intensive competencies (5-4). Individual capacity. Number of individuals and quality of their performance in formal production activities (5-5). 6B4-Entrepreneurship. Collective capacity to create new high-value businesses. (5-6) 6B5-Innovation. Collective capacity to conceive (5-7) and effectively develop new ways to add value in any relevant human activity (5-8). 8A1b-Innovation capacity of the scientific and technological establishment (5-9), scientific citations and networking, patents and licenses. (5-10)	4-2 Patent Count (5-11) 4-3 Scientific and technical journal articles (5-12) 4-6Science & engineering enrollment (5-13) 4-11 Research collaboration between companies and universities (5-14)	

Source: Researcher's own elaboration extracted from KEI, GII, MAKCi, and GPC frameworks

In the sections below, the researcher builds her observations and areas of concern and interest based on how the questions of the interviews were constructed in Chapter 3 (Methodology), and the relation of the answers of the participants to the terms shown in Table 4.1 above. A list of initial concepts/codes based on the dissemination of the terms from Table 4.1 and the terms used by the interviewees was used to guide the coding in the software NVivo 12 as a mean for facilitating the initial coding.

The data collected from the secondary sources from newspaper articles and organizational reports, as an additional clarification regarding what was stated by the interviewees and the perspectives of the Focus Groups, was also articulated within the researcher's observations and areas of concern and interest, thus allowing for a level of data triangulation. The findings from the literature review in Chapter 2 were also related by the researcher wherever suitable with a view to synthesizing theory with practice as an added layer of understanding and depth.

After numerous iterations of preliminary coding, the codes recognized in the first phase were then grouped into applicable categories guided by the five environments of an innovation ecosystem as defined by the researcher in the research model demonstrated in Figure 2.12 and Table 4.1. Analysis bias was managed by continuously associating and merging evidence from interviews, Focus Group observations, and secondary data. Finally, the relations among these notional concepts were recognized to establish the themes that emerged and eventually led to the researcher's findings.

In the sections below, the five environments of the research model and their elements would be correlated with the activities practiced by the different sectors in Bahrain as per the data collected for the purpose of this study, followed by the positive and negative aspects detected by the researcher.

The final emerging theme would be discussed last in conclusion of this chapter when no new themes or relations materialized.

4.4.1 Government Environment. In the Government Environment of the research model, one of the factors that were related to the government's role in support of innovation in a country was the city's ethnic (1-5) and cultural diversity, and tolerance capacity to relate to empathically and assertively with the people of a different race, social, cultural, or economic background (1-6 & 1-7). The size of the country was a theme that emerged during the discussions and was elaborated on in the collected data.

4.4.1.1 Cultural diversity and size. Tolerance and diversity were the first encountered factors in relation to its local citizens and their relationship with the expatriates, and the fact that Bahrain celebrates diversity and acceptance of other cultures is yet another feature adding value for Bahrain and observed by the researcher in the responses of the participants in this study.

The small size of the country was observed by the researcher to be a source of advantage for the country, and the fact that it is an island with cultural diversity was recognized by one interviewee to be a factor behind Bahrainis' open mindset, tolerance and friendliness towards newcomers. The country's uniqueness among the

region was noted by another participant, who is a non-national professional living in Bahrain for the past few years,

I think Bahrain has something to offer to people, and discretion is part of that. My sense is Bahraini people are global in their outlook, but also pretty discreet. The Bahrainis don't judge excessively so, and almost kind of live and let live. I think that is a quality not to be underestimated. Bahraini people tend to be more outward looking in a way that is disarming and unafraid. Maybe because it is an island and hundreds of years people have passed through it for trading and interact with the local Bahrainis. (P9)

This was also established by another participant who noted the fact that Bahrain had undergone three civilizations with a mixture of ethnicity and cultural diversity that helped in shaping and developing the mindset of its people to look for innovative ways in order to survive living in a small bounded geographical boundary (P21).

Shaikh Ahmed bin Mohammed Al Khalifa, minister of finance, reiterated in a published statement that the reason for Bahrain's easy communication with the world market was in having people from different cultures work and live in Bahrain, and it was that diversity that allowed Bahrain to be flexible and able to learn from the West as well as the emerging economies of the East ("The Challenge is to stay relevant: FM", 2018).

Sanjeev Paul, the CEO of the Bahrain Development Bank Group, was of the same opinion and said that Bahrain was blessed with a few natural resources, connectivity, and direct entree to the largest markets in the region inclusive of

Kingdom of Saudi Arabia and Africa (Abraham, 2018). He continued that Bahrain was fortunate with its citizens who were driven to succeed, were hardworking, well-educated with a manifestation of a young generation who were eager to achieve.

Similarly, the researcher came across the factor of Bahrain's small size in a newspaper publication, where the author had advocated that the small size of Bahrain helped in taking full advantage of the country being totally connected to the Internet, which enhanced its fortune on many fronts (Boyle, 2018). Further, the belief of Abdulrahman Almoayed, a homegrown family business entrepreneur, that Bahrain's small size had made its local citizens stronger and tough to the volatile circumstances of the region, and its small market environment acted as an eccentric testing ground that attracted businesses wanting to come to the region (Saxena, 2017). As a successful businessman, Almoayed believed that Bahrain had always been a good market for innovative products and services. Of the same opinion was Cloudflare tech strategy advisor Dr. Michael Nelson who stated that "Bahrain is in a great position to prototype policies, given its size and agility in adapting to change." (Saxena, 2018).

4.4.1.2 Future outlook. City's future management (1-4), another factor in the Government Environment, could be seen in Bahrain's futuristic planning from the time oil was discovered in 1932. Bahrain was the first among the GCC countries to discover oil, and the first to know that it had to diversify its economy due to its shortage in oil. Therefore, the kingdom spearheaded into banking, telecommunications, aluminum, and the technology industries. The economy diversification has been the focus of the leaders in Bahrain since the 1970s, and in 2008 was perceived it in the Economic Vision 2030 in which the new economy was to

be built with the collaboration of the government and the private sector and shifted from one that depended on oil revenue to one that would be productive and globally competitive by 2030.

Today, and after ten years of drawing the Vision 2030, the government is under pressure to increase revenue and income as well as provide job opportunities for its young graduates. It is a much bigger challenge that needs collaboration of all the stakeholders involved in creation of economic value and employment inclusive of the universities as well as the private sector industry.

According to the investment Focus Group F1, and based on their personal experience, collaboration has taken off in the government and was seen to be much easier and smoother within the government entities than collaboration within the private sector. They were also of the opinion that “The role of the government in pushing innovation in the private sector was to regulate and remove the obstacles and then step aside for the private sector to innovate”. Unfortunately, though they stated that “Even when the government regulates and removes the barriers, the private sector has been hesitant to innovate due to the risk aversiveness mindset and culture in the private sector”.

Although the interviewees agreed that there should be a body responsible for the directives of the innovation projects, no entity was identified to be managing the future innovation initiatives or directives of the country. as the investment professional P11 stated,

The government should create an environment that includes all types of companies with the ability to develop new products and business models and

implement them. The government is a facilitator that should create the environment for these companies and then get out of the way of their day-to-day business.

4.4.1.3 Bureaucracy, centralization and eGovernment. Government's bureaucratic and traditional ways of conducting business and its centralization authority, and most of the governments' employees, who are still very naïve digitally, are found to be obstacles for the government's entities' capacity to innovate in their processes. That related to the innovation capacity of the public sector in the Government Environment (1-8 & 1-9). The outlook of most of the participants in innovation in the public sector was that overall work was procedural and rules based which left little incentive for the employees to innovate.

Another interviewee, P7, said "We have a culture of being driven by the government. If the government initiates a cause, we all want to shine for the government's sake and not for our organizations." This could not have been further from the truth when CP announced the launch of Bahrain's first government innovation competition (Fikra). The competition will give the employees of the public sector a chance to deliver their suggestions on innovation and improvement of government services through a digital platform ("Innovation competition launched", 2018).

This was reiterated by the participants in Focus Group F1 where they were of the opinion that

Today, the culture is still top down and initiatives still comes from the top to push things forward. No one will do anything unless they are told to do so. We

agree with you that initiatives have to be bottom up and it will be interesting to see the flow of information being from the entities to the public sector instead of the public sector pushing them, but time factor pushes the public sector to work top to bottom. Is it perfect? No, but the government can't wait and have to move fast to catch up with the global pace.

The only government body that was consistently found to be inventive and providing innovative services to individuals and businesses was the Information & eGovernment Authority and was in correlation with e-government: coverage, transparency, accessibility, usability, content, services, and participation of the Government Environment factor (1-10).

eGovernment Authority was established in 2007 to offer government services electronically (eGovernment, 2018). Later in 2015 the eGovernment Authority merged with the Central Informatics Organization and formed the Information & eGovernment Authority (iGA) to handle responsibilities such as planning public policies, appropriate legislations and decisions for the application of the eGovernment and information technology data programs. The creation of online channels for eGovernment service deliveries, technical and scientific support, service provision, and communication easing are just a few of the iGA services for ministries and other government entities.

4.4.1.4 Investment climate. In the Government Environment of the research model, there is a factor for the government to nurture an institutional framework that attracts business and fosters growth by providing good governance (1-1) and correct level of protection (1-2). The Economic Development Board (EDB) is a public

agency responsible for drawing inward investment into Bahrain (Economic Development Board, 2018a). Established in 2000, EDB's major role is to work with the government on both existing and potential investors to enhance Bahrain's investment climate. In order to bring potential investors, EDB communicates Bahrain's key strengths and identifies opportunities to foster economic development.

Amazon Web Services (AWS) was the latest in a number of global companies that have setup shop in the kingdom through the due diligence done by EDB. Government's forward position on data byelaw, and cloud friendly policies was the main driver for AWS decision to come to Bahrain. The advanced ICT infrastructure was another deciding factor for Bahrain being AWS's choice in the region. This decision wouldn't have been made possible if it was not for EDB, the ICT infrastructure, and the open mindset of doing business in Bahrain. "The decision to open one of the first AWS offices in the Middle East, in Bahrain, speaks of the creativity, innovation, and forward thinking we see across all of the Bahrain economy from start-ups through government institutions." (Carlson, 2016).

The industry professional P9 expressed the opinion in his interview that "Batelco had a big role in AWS pursuing business aspirations in this region to set up their hub here in Bahrain based on the status of the ICT infrastructure they provide". The collaboration between iGA and Batelco to help implement the migration of a number of ministry platforms to AWS cloud.

As good governance and role model for the private sector, the iGA CEO stated that "Our organization had succeeded in fully migrating more than 40 government systems and services to the Cloud using AWS servers. This action would contribute in

governmental and semi-governmental services becoming better in quality and efficiency” (“iGA migrates 40pc systems to Cloud”, 2018).

Focus Group F1 participants commented that the Cloud First policy, the Crowdsourcing, and the Tamkeen programs for cloud certifications were the result of the collaboration work between EDB, CBB, and Tamkeen when AWS decided to bring its offices to Bahrain.

4.4.1.5 Government incentives. The provision of incentives (1-3) is another element in the Government Environment which was enquired about in the interviews, and resulted in a new entity named ‘Tamkeen’ emerging that the government of Bahrain had initiated to build the capabilities of the Bahrainis in the private sector.

Tamkeen is a public authority in Bahrain which was established in 2006 to support Bahrain’s private sector and position the private sector as the major driver of economic growth and progress. Tamkeen is one of the foundations of Bahrain’s national reform initiatives and Bahrain’s Economic Vision 2030 (Tamkeen, 2018). Training, funding, grants, advice-giving, and entrepreneurship are just a few of the programs that Tamkeen provides to support and develop Bahraini individuals and businesses.

The legal mandate of Tamkeen is to enhance the economy at large and to make the private sector the engine of growth in order for the private sector not to be independent on the government. Basically, to expand the private sector’s contribution to the economy, but at the same time it’s a dual mandate that aims at making the Bahrainis the perfect choice for employees in the private sector in lieu of the expatriate workforce.

The participants of this study were all in agreement that Tamkeen was considered as a successful incentive initiative developed by the government and was fully cooperative with all the entities in Bahrain. One of the finance sector participants clearly stated that “Tamkeen is the best financial support program for small and medium size enterprises that I have ever seen in my 30+ years of banking all over the world” (P6), and another participant was of the opinion that the ICT sector has a very successful partnership with Tamkeen. According to Tamkeen, No.1 training certification was in ICT and many Bahrainis were being certified in the ICT sector “We are building the right skills for the future with Tamkeen”. Tamkeen offers 36 basic skills certifications scheme and 112 professional certifications scheme in computer use, database and network design and administration, and software and applications development and analysis (Tamkeen, 2018). According to the participants of Focus Group F1, “It was the collaboration efforts of EDB bringing AWS to Bahrain and CBB in drawing the Cloud First and the Crowdsourcing regulations that lead Tamkeen develop programs for Cloud Certifications”.

Institute of Public Administration (BIPA) was also recognized as another incentive initiated by the Government. BIPA was established in 2006 with a major goal of improving government employees functioning in the scopes of policies and strategies, resource, and change management (BIPA, 2018). Developing the government services is another area of concentration for BIPA by developing of skills, behavior and knowledge of the public workforce, centered on learning and training. Participating as consultants to the government bodies for decision-making,

scientific research for problem solving, and building and developing capabilities by the means of coaching and assessment are other responsibility areas of BIPA.

It was observed though, that even the government officials participating in the study mentioned Tamkeen as the best incentive and support for human capital development. As stated by the government industry professional P19, “We do get support through Tamkeen for empowering the skills of the young Bahrainis working in our institution”, while the role of BIPA was not mentioned in the development of the Bahraini human capital.

4.4.1.6 Regulatory, rule of law, and government effectiveness. As for correlating the interviewees responses with the factors of regulatory quality (1-11), rule of law (1-12), and government effectiveness (1-13) in the Government Environment of the research model, it was perceived that Bahrain had recognized early on that in order to advance and be globally competitive, and at the same time provide quality service, support and regulate the key entities in its society, it had to establish efficient regulatory authorities for these entities. Four regulatory bodies associated to the four units of analysis chosen in Chapter 3: the financial sector, education, ICT, and the industry as part of the fieldwork, will be elaborated on further next.

The financial institution regulator body Central Bank of Bahrain (CBB) was established in 2006 as a successor to Bahrain Monetary Agency which had previously carried out central banking and regulatory functions for 33 years since its establishment in 1973 (Central Bank of Bahrain, 2012). As a public corporate entity, CBB is the sole regulator of Bahrain’s financial sector and covers the sectors’

activities inclusive of banking, insurance, investment business, and capital markets activities in order to maintain the monetary and financial stability in the kingdom.

Realizing the importance of the global Financial Technology (FinTech) which attracted over US\$ 22 billion investment in 2015, and as a regulatory body watchful about the dependability of the numerous technologies as well as the financial trustworthiness of the FinTech companies, CBB developed a framework process to facilitate the development of the FinTech industry in a calculated way under the Regulatory Sandbox (Sandbox). This development would not have been possible without the government entities first collaborating amongst themselves, as clearly mentioned by the participants of the Focus Group F3.

We believe that a wide spread collaboration for policies that have a national impact has already started within the public sector apparatus and examples such as the Sandbox, FinTech Bay, and Cloud First policies are proof of that in which EDB, CBB, the eGovernment, and MOICT collaborated, each in the area of its expertise, to make these policies become a reality.

Subsequently, it was reported by Saxena (2017) that Bahrain FinTech Bay operated by Singapore-based FinTech incubator FinTech Consortium was to open in Bahrain in February 2018. It was to assist in creating an ecosystem where innovators, and entrepreneurs could connect and collaborate with corporates, financiers, regulators and other stakeholders to develop, test, scale, and grow new financial technologies and companies. The FinTech Bay would also collaborate with CBB and EDB and other government entities to cultivate the regulatory framework vital to foster a thriving FinTech sector.

On February 21, 2018 Bahrain FinTech Bay (BFB) launched its offices in Bahrain (Economic Development Board, 2018a). BFB is the region's biggest FinTech hub and will be working with recognized industry frontrunners and new entrants from Bahrain, the region, and across the globe to push innovation and generate opportunities for growth. Khalid Al Rumaihi, Chief Executive of EDB commented at the opening,

Bahrain FinTech Bay will play a central role in growing the supportive ecosystem that is necessary for innovation to thrive. The facilitation of co-working and incubation, combined with Bahrain's regulatory sandbox and focus on opening up access to funding, is creating an ideal environment for startups and corporates to test and then scale across the region.

The education sector is regulated and overseen by three bodies consisting of:

- (a) the Ministry of Education (MOE), (b), the Higher Education Council (HEC), and
- (c) Education & Training Quality Authority (BQA).

The Ministry of Education offers educational prospects for all the citizens of Bahrain (Ministry of Education, 2018). These prospects are offered in order to develop the mental, physical and emotional abilities and skills of individuals. By drawing development plans, implementing and evaluating those plans, MOE strives to attain the requirements of quality to improve the excellence and effectiveness of education according to the international standards as stated in the Education Laws in the kingdom.

The Council of Higher education (HEC) was established in 2005 to improve the performance of universities, screen and assess delivery, and regulate new study

programs of universities (Higher Education Council, 2018). The aim of HEC is to provide prospects for students to focus on areas of knowledge that will meet the future needs and necessities in order to sustain and develop the economy of Bahrain.

BQA was established in 2008 and is responsible for putting the standards and rules for measuring the quality of the way the education and training institutions are performing in Bahrain, and drawing the National qualifications. Their mandate is to improve the services provided in education and vocational training in Bahrain with the aim of ensuring the professional advancement of Bahrain's human capital. Since their establishment in 2008, BQA has initiated a number of quality assurance undertakings inclusive of placing performance standards and taking on impartial reviews of all education and training establishments registered and operational in the kingdom (Education & Training Quality Authority, 2018a).

As for the ICT, the Telecommunication Regulatory Authority of Bahrain (TRA), another regulatory body, is the governmental body that safeguards the interests of subscribers and customers, and encourages efficient and impartial competition among operators of the ICT sector which was established in 2002.

As per TRA's chairman's statement, TRA is in pursuit to inspire wider economic growth on the same track of the kingdom's Economic Vision 2030 with the goal of developing Bahrain into a 'Smart City' (Telecommunication Regulatory Authority, 2018). TRA's statement was reiterated by the participants of Focus Group F1, "In order for the private sector to innovate, the role of the government has to be the provider of a state of the art ICT infrastructure".

The achievements of TRA can be observed and noted by the rankings that Bahrain has attained in the ICT Development Index (IDI) – a composite index that monitors and compares ICT developments across countries and over time; Bahrain ranked 1 in the Arab world and ranked 31 globally in the “Measuring the Information Society Report 2017” (International Telecommunication Union, 2017) as shown in Figure 4.6. Bahrain also ranked 1 in Mobile broadband penetration and ranked 2 in the percentage of Individuals using Internet (World Economic Forum, 2018).



Figure 4.6: Bahrain IDI 2017 rank

Source: ITU 2017

As for the industry sector, the Ministry of Industry, Commerce and Tourism (MOICT) is the body that is dedicated to adopt and apply international systems as a

foundation for improving professionalism and providing high quality services in the private sector businesses and industries in Bahrain (Ministry of Industry, Commerce and Tourism, 2018). The focus of MOICT is to lead the economic sectors in industry, trade, tourism, and services by continuing to lead projects in infrastructure expansion, while embracing advanced techniques in easing procedures and transactions. They aim to provide a suitable environment in order to make Bahrain more attractive as an investment destination in the region as well as advance the government performance in general.

4.4.1.7 Summary of Government Environment. The fact that Bahrain is a small island country located strategically in the center of the East and West was found to be an advantage for the country in building tolerant and culturally diversified citizens who have an open mindset that accepts a foreign workforce into its local market. This aids in bringing in new knowledge and ways of doing business, which would then disseminate into the local workforce and businesses. Another positive point that emerged in the government environment was the fact that since the 1970s the leadership of Bahrain had always been looking ahead and planning for the future.

iGA, EDB, Tamkeen, and Bipa were government agencies that were found most innovative and active in pushing services, investments, and capabilities and developing them relentlessly. Effective regulatory bodies that have been set up by the government also emerged as solid and effective institutions that were steering their services efficiently, each in its own area of expertise.

However, the bureaucratic and traditional way of conducting work, its centralization authority, and technically naïve workforce in most of the government

agencies were found to be obstacles for the government entities capacity to innovate and further develop their institutions. The absence of plans and innovative ideas being initiated by the public sector without waiting for the leadership directives was another hurdle in the progress of government bodies. No entity was located either for steering or overlooking innovation activities.

4.4.2 Education Environment. This is the second environment as demonstrated in the research model (Figure 2.12) and corresponding to GII's report, in that the level and standard of education and research activity in a country are primary determinants of that state's innovation capacity (GII, 2017a). Education is emphasized in the literature on knowledge regions and cities as a fundamental factor for innovation (Barroso, 2010; Wiig, 2007).

Wiig (2007) looked at it from the perspective of the need of the society to develop the adaptive capacity of its people through education where he stated, "People are society's basic knowledge agents and their knowledge growth through formal and informal education are required for competence to tackle challenges in the private and public sectors and are central to function and progress". (p. 147)

Barroso (2010), on the other hand, emphasized that education is a stimulus for developing knowledge for public good "Smart growth means strengthening knowledge and innovation as drivers of our future growth. This requires improving the quality of our education, strengthening our research performance, promoting innovation and knowledge transfer." (p. 9)

4.4.2.1 Education system and the standard of education. In the Education Environment, the level and standard of education (2-1) was a factor noted to influence

the innovation in a country. The development of the education system in Bahrain was among the first priorities that emerged in the interviews, and was one of the determinant factors if Bahrain aspired to push innovation development forward. The first responsibility was laid on the schools and universities to build the innovation capabilities of the people in Bahrain. As clearly stated by one participant:

It has been 3-4 years that innovation has emerged in Bahrain. People have started talking about innovation, but still I believe that schools and universities, those are responsible to build the capacity. Capacity will take up to capability. Universities have just started tackling this issue and it has become a part of the university culture. (P4)

The responsibility of building a culture of innovation within a society was the role of the government as conveyed by Focus Group F2. They were of the opinion that the building of this culture had to start from the early stages in the education sector and as early as KG level,

Traditional economy is driven by labor and capital while knowledge economy is driven by ideas and creativity. The first pillar in a knowledge economy is the human capital and the individuals are the ones who come up with ideas and are creative. Human capital is linked to education and the government is responsible for education and building the human capital skills which channels into innovation.

However, the difficulty with the education sector in Bahrain was that it took longer for them to embrace new approaches (Alshehabi, 2017), and, according to Dr. Shaikh Abdulla Al Khalifa chairman of Derasat board of trustees Bahrain had a good

technology foundation and infrastructure, but he believed that education system, had to be revised and improved to generate a labor force that would be tech savvy (Alshehabi, 2018).

The government of Bahrain had already recognized this challenge and established the Education Reform Board in February 2006, which was later renamed the Supreme Council for Education and Training Development (SCETD) in 2016, to address all levels of education and training in Bahrain for the purpose of equipping the country to face the needs of the new millennium (Al-Mudhahki, 2017). Yet, the teachers in pre-tertiary level in the public schools were still bound to the curriculum that had not been revised to cope with the new global technology, and as one participant acknowledged “Education has calcified in Bahrain” (P3).

The fact that education had to be divided into two sectors; pre-tertiary and tertiary levels was highlighted from the beginning of the data collection for this research. Pre-tertiary included elementary and secondary level, while the tertiary dealt with university level. All the participants agreed that the pre-tertiary education system was seen as stagnant, while a few developments were noticeable at the university level. This was also evident when Bahrain’s Global Competitiveness Index (GCI) key indicators of 2010 and 2016 were compared for the quality of primary education standing at 35 and 34, while the quality of higher education had improved from 31 to 24, and the quality of math and science from 40 to 31, respectively.

This demonstrates that after ten years of the initiation of the education reform and notwithstanding the challenges, an unmistakable improvement was

apparent and a drive was being built. Yet, this development still looked slow and showed stagnation or falling back in a few areas.

4.4.2.2 Schools (*pre-tertiary*). Bahrain has a solid base in education since 1893 when formal education commenced by the American Mission Hospital establishing a school to teach English and Arabic (BNA, 2011). The first public boy's school was opened in 1919 followed by the first public school for girls in 1928 (Ministry of Education, 2018). Education is provided free by the government to all Bahraini and non-Bahraini students in public schools and compulsory from age 6 to age 14 and non-compulsory for three years of upper-secondary schooling. All public and private schools are under the supervision of the Ministry of Education (Ministry of Education, 2018).

Therefore, if one wanted to employ the indices as adopted by KEI (World Bank Institute, 2008) for the adult literacy rate, and secondary and tertiary enrollment, which correlated with elements (2-7), (2-8), and (2-9) in the Education Environment in order to assess the education indices in Bahrain, one would find that today Bahrain's literacy rate stands at over 95 percent of the adult population. Further, and although the kingdom has achieved an almost 100 percent enrollment rate in primary schooling, the factor correlated to the number of individuals (2-3) in the formal education system of the Education Environment, yet the quality of education (2-1) received by the students remained a challenge.

In an interview in a local newspaper, Dr. Akbar Jaffari, a consultant for productivity improvement, insisted on reforms in the education and training sectors as he believed that growth could not be stopped. He noted that the education system in

Bahrain had not lived up to expectations of reforming to meet requirements of growth (Alkair, 2018).

Most of the public school students graduate without the ability to think critically, out of the box, or the capacity for being ready for the tertiary level. In general, the students who graduate from public high schools are not proficient enough in English and Math, which makes them unable to cope with the university level. This corresponded to the element of quality of performance of students in formal education (2-4) in the Education Environment and was also reflected in the annual report published by Education & Training Quality Authority (2018b). In the report, Education & Training Quality Authority (BQA) authorities were alarmed at the 28 percent increase in 'inadequate' results in primary schools and revealed an overall poor performance in the intermediate phase of education.

Overall, the education system was found to obstruct building the capability of the students to be creative and innovative since their decision making was based on what they learned from books and not by analytical thinking and solving problems, which related to the innovation capacity of the education factor (2-5) in the Education Environment. Hence, the culture of importing technology that gets produced outside of Bahrain, and adapting it to the local use was an extended aftermath of the education system.

According to the Grade 12 national examination results as reported in the BQA (2017) annual report, 87 percent of the government school students and 55 percent of the private school students did not pass problem-solving examinations, while 75 percent of the government school students and 26 percent of the private

school students did not pass the English exams. The national examinations are designed by the BQA based on international standards and comparable to international qualifications.

According to Ravi (2018) Bahrain schools had not opened up as rapidly as the world outside Bahrain had, and that most schools still practiced the systems of instruction and examination that were followed 30 years ago. She was of the belief that although the Ministry of Education was careful to meet the external standards, there was just not enough dialogue about the future of education amongst the stakeholders in Bahrain, which related to the element of selecting suitable partners to produce innovative products, services, and processes (2-13) of the Education Environment.

This lack of dialogue was also emphasized by one of the participants in the investment arena who stressed the fact that:

What is needed to be done to create the skills of the future has to be transferred across to the education sector. Working on projects in order to be able to think critically and solving problems have to be included in the education system. It is not just about knowledge anymore. It is about how one builds the mindset in how to use that knowledge learned to put it together and build new knowledge. With the world of big data today, the problem is not just learning about this data, but knowing what to do with this data. (P11)

The fact that the curricula of basic and upper-secondary education needed to be revised had already been established by the Bahraini government in their review of the education system in 2003 (Al-Mudhahki, 2017). The curriculum was mostly based

on building existing knowledge and did not sufficiently emphasize building skills, critical thinking, and how to become innovative.

According to the technology experts steering the eCommerce and Internet Security Forum for Teachers, in order for education to be more collaborative, increased numbers of classrooms in Bahrain needed to embrace new technology. In his speech at the opening of the joint workshop on Bahrain's growth options, Dr. Amin El Sharkawi stressed that in order for Bahrain to maintain high wage jobs for the coming years, its curriculum needed to change with the fast stride of technological advancements (UNDP, 2017). Dr. Amin indicated that only by financing in individual capital would Bahrain ensure an innovative, adaptive, and an advancing capable workforce.

Although the universities had started adopting the culture of innovation by producing technology-related programs in their curriculum and partnering with the ICT sector for various innovation activities, correlating factors with (2-6) and (2-13) of the Education Environment, the pre-tertiary schooling was still lagging far behind.

4.4.2.3 Universities (tertiary). National Endowment for Science Technology and the Arts (NESTA, 2007) underlines the main role of universities in providing a skilled workforce, while OECD (2003) puts forward universities' responsibilities as generating, disseminating, and storing knowledge for the development of societal competitive advantage.

The University of Bahrain (UOB) and Bahrain Polytechnic (BP) are two higher education institutions that are run by the government of Bahrain since the 1980s, and offer higher academic programs. In 2001 the National Action Charter led

the road for private universities to open up in Bahrain, which has resulted in over 13 universities operating in Bahrain today.

On BP's Web page, it is stated that the aim of the institution was to address the economic growth and diversification in Bahrain by providing applied, professional, and technical qualifications skilled Bahraini labor (Bahrain Polytechnic, 2016), while UOB's president stressed the fact that the new challenges for academics now were to meet the needs of the new generation of learners in this increasingly interconnected world of today. He continued, "This provides new challenges for academics who must constantly evolve and innovate to meet the changing needs of academia and millennial learners" (UOB, 2016. p.5).

In correlation with elements (2-5) and (2-6) of the Education Environment in the research model, these challenges were also noted by an interviewee of this study who believed that, from the tertiary level point of view, one of the hurdles in Bahrain was the generation digital gap, which he put as, "The struggle between the digital natives 'students', and the digital refugees 'teachers' is about reconciling the gap between the two generations. It is not easy, because in many cases the digital natives are far ahead" (P2).

In their annual report, BQA (2017) reviewed and published the reports of 102 academic programs offered by 13 higher education institutions in the fields of medicine and health, computer science, IT, business and administration, law, engineering, design, science and education. The report indicated that most programs in the field of engineering were offered by two government institutions and had been reviewed, and although the programs received 'confidence' judgement, a number of

these programs faced rising challenges. One of these challenges was the inability of these institutions to keep up with updating their infrastructure to keep pace with new trends and the increasing numbers of students admitted. The second challenge was due to the shortage in human resources.

Yet, BP and the UOB had developed new programs based on the global trend and the local industries' needs and had started teaching by following a problem-based learning approach. They pushed their students to collaborate in solving problems, hence producing a generation of critical thinkers and problem solvers. This coincided with the elements (2-4) and (2-5) in the Education Environment dealing with the quality of performance of the individuals in formal education systems and the innovation capacity of the education.

There was no seamless collaboration between the industry and academia in the sense of professors working as consultants in the industry on a projects basis or conducting courses or workshops at the companies' premises because of regulatory policies that did not allow professors to take additional engagements. Therefore, the observation was that there needed to be a cross-over in the sense of internships and vocational training. In the area of filling the skill gap one participant pointed out that "Since it took a long time for schools and universities to move quickly in changing their curriculums and programs, rather, vocational training could fill that gap" (P7).

With the launch of FinTech Bay and Startup Bahrain initiatives, the universities have started building the capabilities of their students to meet the digital economy requirements for the professionals needed in the digital know-how and the skills for the infrastructure this technology was based on by collaborating with

relevant organizations. This correlated with the perspective of Focus Group F2, who believed that the government was responsible to facilitate and the universities to collaborate with industry to provide the right skills needed for the knowledge economy.

This collaboration corresponds to the GPC market orientation of the Education Environment and its element of selecting suitable partners to produce innovative products, services, and processes (2-13). One example was the launch of the ‘Forsati for her’ program by UOB (“UOB to empower 3,000 women students to launch 30 startups”, 2018). In this project, UOB partnered with the United Nations Development Program (UNDP), Microsoft, Think Smart, and Tamkeen to educate 3,000 female programmers to enable the female students to setup tech businesses after graduating from this program. According to UOB president, Professor Riyadh Hamzah, UOB had the talented individuals, and by cooperating with the other sector that had the infrastructure, the university would be able to provide the backbone for Bahrain’s emerging digital economy and growing entrepreneurship ecosystem.

Another successful example was the new academic programs offered by BP which had already shifted from an objective and input-based method to an outcome-based method with importance on critical thinking and transferable proficiencies. These programs were offered in lieu of the labor market needs for graduates who needed to be skilled to adapt to the ever changing reality of today’s market (Al-Mudhahki, 2017).

From the tertiary level, the industry was not willing to train people anymore. The industry wanted work-ready students at the time of graduation from university, which, as observed by one participant, was not fair to the universities.

Along the same line of thoughts and to address this gap, the Royal College of Surgeons in Ireland in Bahrain (RCSI Bahrain) teamed up with BP in a conference focused specifically on the interrelationship between higher education institutions and employers in producing employable graduates for the Bahraini job market. The conference aimed at how to better address the skills and employability challenges faced by sectors with a view on future collaboration on vocational training (“RCSIB, Polytechnic to conduct summit on employability”, 2018).

4.4.2.4 Lifelong learning. According to the World Economic Forum (2018), quality higher education and training is vital for economies that need to climb up the value chain and move past modest production procedures and commodities. In today’s globalized economy, countries were required to foster pools of knowledgeable workers who were capable of performing complicated assignments and were adaptable to their rapidly changing environment and the progressing requirements of the production system.

As indicated by one of the professionals in the finance and investment sector, the industry was not willing to train people anymore. The industry wanted the students to be work ready at the time of graduation from university. According to him and as noted above, that was not fair to the universities. Therefore, there needed to be a cross-over in the sense of internships and vocational training. In order to fill the skill

gap, Bahrain could not wait for schools and universities to move quickly, rather vocational training should be considered fully as the solution to fill in that gap.

The need to allow people with non-tech degrees to actually find their way into the technology arena had emerged also, since technology was the subject that mattered today, and those non-tech workers needed to become tech savvy. A lifelong learning culture did not exist in Bahrain and one participant saw the need to build that culture:

You also need to allow people who did a non-tech degree to actually find their way into tech because that is where the subject matters. So, it is more courses, night courses, its weekend courses and that kind of stuff. We don't have that culture in Bahrain. So, we need to build that culture. Lifelong learning. How do you do lifelong learning if there are no courses available to you? (P11)

This was also highlighted by the resident representative of UNDP in Bahrain, Mr. Amin El Sharkawi, who stated that by investing in human capital, Bahrain would create a skilled workforce who would be innovative, adaptive, and forward thinking ("Derasat and UNDP", 2017).

4.4.2.5 The strengths and weaknesses of the Education Environment in Bahrain. The fact that Bahrain owned a solid base in education since the late 19th century, and free public schools, compulsory first nine years of education, an almost 100 percent enrollment rate in primary schooling, and a literacy rate of over 95 percent, was a strength in the education system for the kingdom. Those facts correlated with the elements of the Education Environment in the research model in the level and standard of education (2-1), the number of individuals in the formal

education system (2-4), adult literacy rate (2-7), secondary enrollment (2-8), and tertiary enrollment (2-9), were an affirmation to this solid base and a reflection of strength in the Education Environment.

However, that level turned out not to be sufficient for the high school graduates entering universities and the quality of their performance (2-4) and the quality of their science and math education (2-10) were not up to the standard for university level, and generally most of the students had to go through a foundation year to make them ready for higher education. The curriculum of the education system was observed to need a review and was mostly based on knowledge and did not sufficiently emphasize skills, critical thinking, and innovation correlating to the innovation capacity of the education (2-5) in the Education Environment.

It was also perceived in the pre-tertiary level that the elements of research activity (2-2), providing organizational framework for knowledge generation (2-11) and innovation activities (2-12), and selecting suitable partners to produce innovative products, services, and processes (2-13) were missing.

However, the universities were observed to be adopting the culture of innovation by producing technology-related programs in their curriculum and partnering with the ICT sector for various innovation activities. Those activities correlated with the elements in the Education Environment by providing organizational framework for knowledge generation (2-11) and innovation activities (2-12) and selecting suitable partners to produce innovative products, services, and processes (2-13). That collaboration was witnessed also in the FinTech and Startup

Bahrain initiatives, where programs were being developed for building the capabilities needed for the digital technology.

Having said that, research activity (2-2) was still absent in the environment of the universities, as was the seamless collaboration with the private sector in the sense of professors working as consultants in the private sector on a projects basis or conducting courses or workshops at the companies' premises because of regulatory policies that did not allow professors to take additional engagements beyond their faculty work at their academic institutions.

The regulatory deficiency was noted by Focus Group F2 as,

The regulators are not cooperating with us in the sense of regulating what is needed for us in education. The regulators are not cooperating with us but regulating and insuring that the education systems are following the regulations which are themselves obstacles for the universities to innovate in their institutions. The regulators need to revise their roles as purely regulators and the universities need to cooperate more with them in drawing these regulations.

An absence of lifelong learning also emerged, with the need to allow people who had graduated in a non-tech field and could not get a job to find their way into the technology arena. The need to build the culture for lifelong learning was highlighted by the academic professional P3, as well as developing programs and classes to accommodate the working class who needed to develop themselves at the same time while working.

4.4.3 ICT Environment. Bahrain has identified ICT as one of its key strategic sectors, and the government's policies have made Bahrain a leader in the region for growth of communications and the Internet (EDB, 2015).

In the ICT Environment of the research model, the elements that were needed to be in place from the ICT standpoint in order to have an innovation ready milieu were; ICT access, ICT use, eGovernment, online participation of citizens (3-1), information and telecommunication functional capacities (3-2), the existence of telephones (3-3), computers (3-4), and internet users (3-5).

ICT's role and the fact that it is a backbone for research and innovation was recognized by all participants of this research. Its function as an enabler of innovation was acknowledged and the fact that the infrastructure of ICT in Bahrain is one of the highest in the region was evident to all. One participant in this research viewed ICT in Bahrain as:

It just plays an important role in the process of innovation which is an important factor in the knowledge economy. The ICT infrastructure in Bahrain is one of those infrastructures that is fitting for game developers to come and setup shop here. At the same time that can be a hub for networking, because when you look into Bahrain's competitive advantage within the GCC, the telecom setup especially the ICT sector is really advanced. (P21)

The gaming community had already discovered that the infrastructure of ICT in Bahrain as one of the best in the region and was voiced out by one game developer professional. A reiteration of the above statement came from the IT professional in the public sector:

For 22 years, Bahrain has had a government internet which is a global network interconnecting the whole government entities and ministries. We have more than 120 government entities, ministries, post offices, all interconnected with the network. The global network. We can communicate with each other. So, the infrastructure is there. (P22)

There is a Supreme Council for ICT that pushes and drives the development in this sector. There is the Information & eGovernment Authority (iGA) that puts together the strategy and policies for ICT in Bahrain, while Telecommunication Regulatory Authority (TRA), established in 2002, is the body that supports the telecom services and its infrastructure in Bahrain and oversees the sector and protects consumer rights.

The Information Technology and Telecommunication Development Index for 2017, released by the International Telecommunications Union (ITU) – a UN specialized agency for ICT released in Geneva, ranks Bahrain 31st globally and 1st in the region out of 22 countries. The index is a benchmark of the level of ICT development in countries across the world. The index is highly relied upon by governments, international organizations, development banks and private sector analysis and investors worldwide. According to the index, in Bahrain, 98 percent of households have access to the Internet, 94.75 of households have computers, and 20.8 inhabitants per 100 have fixed-telephone subscriptions. There are 216.93 mobile-cellular telephone subscriptions per 100 inhabitants and 98 percent of the inhabitants use the Internet in Bahrain (ICT Development Index, 2017).

Bahrain's telecom infrastructure is one of the best in the region and was ranked 25 among 126 countries (GII, 2018). The infrastructure and the facilities are there, and this structure is one of the best developed in the region and one of the reasons that AWS decided to base their center in for the region in Bahrain. In September 2017, AWS declared plans to establish its initial cloud data facility in the Middle East in Bahrain to aid the progress of local companies in the ICT sector (Oxford Business Group, 2018).

Bahrain's government has adopted a smart government strategy and has recognized that, in order to fulfil that strategy, it has to improve its data gathering and dissemination methods as part of that plan. In a further step to get closer to implementing the smart government strategy, the government has started working on e-governance by requesting all public entities to submit their requirements and work towards migrating all their operations to the cloud to reduce cost and speed up the provision of their services and increase tractability (Oxford Business Group, 2018).

The importance of the impact of ICT's role on the economy of Bahrain was the reason behind the establishment of the Bahrain Information Technology Society (BTECH) in 2012. BTECH is a major contributor today in the ICT segment representing the Bahrain ICT private sector companies with the aim of supporting them to excel and compete with other regional and international competitors (BTECH, 2018). Its major role is to link government, EDB, Tamkeen, and the universities together.

Bahrain is a very quick implementer and adopter of the telecom technology, but they are not developing and building the technology, only following what others

are doing. Bahrain was the first in the region to have 4G and is working on having 5G soon. The outcome of the working group in TRA for setting the proper plan and conducting the necessary preparations to secure the required spectrum for implementing the 5G networks in Bahrain was discussed by the TRA (“TRA panel reviews efforts to launch 5G in Bahrain”, 2018). The result of the working group plan would make the kingdom one of the leaders in the region to launch the 5G network, thus fulfilling TRA’s commitment towards facilitating the latest telecom technologies in Bahrain.

EDB continues to promote Bahrain as an ideal place for global ICT companies to invest their products and services in the Gulf and the wider Middle East and North Africa region. Already established as a FinTech hub, and the holder of one of the best ICT infrastructures in the region, Bahrain stands a good site to set its role as a leading center of ICT in the region.

4.4.3.1 The strengths and weaknesses of the ICT Environment in Bahrain.

The role of ICT as an enabler and a backbone for institutions that empowered the employees of these institutions to deliver their projects or innovative ideas was recognized by participants. The fact that Bahrain’s ICT infrastructure was top on the list in the region was also established through the global indices related to ICT rankings. Yet, the reality that the ICT sector itself was not innovating but merely being a vendor and provider for products of global companies was also noted. Bahrainis were observed to be good importers and adopters of technologies that have been produced externally, but not generators of knowledge and new technology.

4.4.4 Private sector Environment. In the Private sector Environment of the research model, the elements that were needed to be in place from the financial point of view in order to influence innovation dealt with the availability of credit (4-1) and an environment that supports investment (4-2), access to the international market, competition, and market scale (4-3). Soundness of banks (4-7), professional and technical workers in labor force (4-8), and availability of venture capital (VC) (4-9) were also additional elements that were needed for Private sector Environment to be impacting innovation activities. Probing into the financial sector, all participants were under the understanding that this sector had been leading the market in Bahrain from the 1970s, but somehow had become stagnant in the past twenty years until recently. In 2017 the financial sector picked up momentum again in the areas of FinTech, Blockchain, and Startups.

There is a trend and encouragement from the leaders of Bahrain and the financial regulator Central Bank of Bahrain (CBB) that has taken impulse since the second half of 2017, which looked into innovation capabilities very seriously and aimed at making Bahrain a FinTech hub in the region. EDB's Dr. Kotilaine announced that during the first half of 2017, Bahrain's business environment had seen dramatic improvement with initiatives such as pioneering crowd funding regulations, a regulatory sandbox for FinTech companies and a cloud-first policy designed to help organizations take advantage of cloud technology (Saxena, 2017).

As further highlighted by Missan Al Maskati, chairman of the Bahrain FinTech Consortium, FinTech was expected to drive innovation in digital banking

platforms, and the current and future developments were aimed at making Bahrain the leading FinTech ecosystem in the region (Saxena, 2017).

The initiatives were followed up by AFS chairman and Bank ABC deputy group chief executive Sael Al Waary, who announced that the second Middle East and Africa FinTech Forum would be held in Bahrain in March 2018. According to him, the directives for hosting these forums were vital for Bahrain to enable leading influencers, innovators, and investors to engage in discussions and collaborate on applying pioneering solutions for the progress of FinTech companies and policies in Bahrain (“Bahrain to host”, 2018).

Innovation capacity of the private sector (4-4), new business incubation and creation (4-5), preparation of high-value new business creation (4-6), and survival of new businesses (4-7) were also factors in the Private sector Environment that needed to be in the innovation ecosystem for innovation to happen.

As decision makers in their organizations, all the participants expressed a positive tolerance attitude towards employees’ new ideas, acceptance of these new ideas’ failures, if that occurred, and having a culture of lessons learned. Yet, interviewee P1 conveyed that

Although many leaders and authority figures believed that their organizations were open to new ideas and employees were welcomed to innovate and not be penalized if they failed after pursuing an idea, the real test was in seeing this belief in the institutions’ core strategy and day-to-day way of doing business.

A few examples were seen where the heads of companies had exercised the fact that they were implementing what they said in believing they push the ideas of

their employees to become realities. As an example, the participant P17 stated that in order for his organization to put the ideas of the employees in action and encourage them to innovate and introduce these innovations to the banks, his organization established a division dedicated to marketing and innovation at Bahrain FinTech Bay.

Startup Genome (2018) reported that more than 50 percent of the young Bahraini generation were eager to start their own businesses, and factors such as the opportunity of 100 percent foreign ownership in numerous sectors, limitless return of capital, no tax on profits or bonuses, and ease of business were only a few of the many advantages that were available in Bahrain to help them achieve their dreams. In order to aid the entrepreneur's dreams of a business to become a reality, EDB developed a startup ecosystem for innovative digital startups that brought together entrepreneurs, companies, financiers, incubators, academic establishments, and the Bahrain government to encourage and support the startup culture in Bahrain.

4.4.4.1 The strengths and weaknesses of the Private sector Environment in Bahrain. It was concurred by all participants that the financial sector had been leading the market in Bahrain for over 40 years, but somehow had become stagnant in the past twenty years. Realizing that it was treading far behind the global financial technology innovation, the government had to push the financial sector to innovate and hence, began working on its regulations in the area of financial technology (FinTech). With the support of the leadership and the regulatory body, CBB, and the promoters of investment in Bahrain, EDB, the financial environment began to see a dramatic improvement in its innovation activities with initiatives such as

crowdfunding regulations, FinTech sandbox regulatory framework, and a cloud-first policy designed to aid organizations take advantage of cloud technology.

As per Focus Group F1, the culture of pushing development forward was still top down,

Today, the culture is still top down and initiatives still comes from the top to push things forward. No one will do anything unless they are told to do so. We agree with you that initiatives have to be bottom up and it will be interesting to see the flow of information being from the entities to the public sector instead of the public sector pushing them, but time factor pushes the public sector to work top to bottom. Is it perfect? No, but the government can't wait and have to move fast to catch up with the global pace.

Forums and conferences started picking up in order to enable leading influencers, innovators, and investors to engage in collaborating and networking to find and apply pioneering solutions for the progress of FinTech companies and policies in Bahrain. These activities directed the way to changing the mindsets and culture of the financial organizations to welcome new ideas of their employees and their implementation with taking into consideration of failure and lessons learned.

Those changes in the mindsets and the culture for innovation were also the reason for a new environment shaping up by the young Bahraini tech savvy generation who were eager to start their own businesses. In order to assist those young entrepreneurs with dreams of setting up and owning their own businesses, EDB developed a startup ecosystem for innovative digital projects that brought together

entrepreneurs, financiers, incubators, academic establishments, and the Bahrain government to encourage and support the startup culture in Bahrain.

4.4.5 Innovation Environment. In the Innovation Environment of the research model, the key elements required to have an effective innovation in the area of company and individual capacities were; conduciveness of firms to innovation activities (5-1) and R&D (5-3), knowledge intensive competencies (5-4), entrepreneurship and collective capacity to create new high-value businesses(5-6), research collaboration between companies and universities (5-14), and selecting suitable partners to produce innovative products, services, and processes (5-15). Patent counts (5-11), scientific and technical journal articles (5-12), science and engineering enrollment (5-13) were the ways innovation was measured in numbers.

From this frame of reference, innovation is not a choice, and comes with regulatory pressure, technological change, and global competitive pressure, which Bahrain is facing these days. The drop in oil prices and the fact that oil resources were finite has led the government of Bahrain look at other alternatives for economic diversification.

4.4.5.1 Bahrain's innovation today. In their paper, Griffiths, Maraghi, and Hughes (2011) discussed Bahrain's stage of innovation advancement as being at a primary stage, but asserted that the government had already acknowledged that, and had begun drawing new policies intended for, more transparent practices and forceful quality assurance and control programs. They were of the opinion that the government should look into the lessons learned from the OECD (2003) report in regards to

educational research and the necessity to tackle the relationship between the threesome of universities, practitioners, and the policy-makers in Bahrain.

Yet, it was observed that today, and after 7 years of the Griffiths et al. (2011) recommendation, Bahrain still lagged behind in quality of scientific research institutions, capacity for innovation, company spending on R&D, and university-industry collaboration on R&D being ranked 73, 67, 56, and 45, respectively out of a total of 137 countries in the 2017 Global Competitiveness Index (World Economic Forum, 2018).

4.4.5.2 Culture of innovation. Alternatively, according to the financial professionals amongst the participants, GCC countries' economies being oil producing ones for over 90 years, distorted their need for innovation. The participants found individuals and organizations as risk averse who feared change in an environment which was fairly comfortable with stable work and living conditions. That comfort zone left no room for motivation to innovate.

According to the investment Focus Group F1, "Even when the government regulates and removes the barriers, the private sector has been hesitant to innovate due to the risk aversiveness mindset and culture in the private sector".

It was observed from the responses that ICT students who innovated while at university graduated into a work environment that was mundane and not at the high-tech level as per their capabilities, which were developed while in college. It was also noted that some individual's mindsets at the time of getting college degrees were for the sake of work development and getting promotions at work. The degree was not for

becoming more knowledgeable in order to be creative and create new knowledge for innovation.

Bahrainis in general were perceived as good at adopting innovation and technology that was imported from outside in an environment where no culture or mindset for innovation or R&D expenditure existed since the rewards were intangible and took a long time to materialize and show a return on investment.

Another hurdle that repeatedly surfaced from the participants' views and again stood in the way of the progress of innovation in Bahrain was the fact that although all participants agreed that Bahrainis were capable to innovate, the element of an innovation environment to harness those capabilities was absent. As explained by several participants, barriers to entries were high. Getting permits and licenses for new businesses and startups were not as easy as was announced by the authorities, which was noted in Bahrain's second lowest component in the Global Entrepreneurship Index 2018 index as *risk acceptance*, which denotes the willingness of individuals to take the risk of starting a business

Although one participant was of the understanding that innovation needed time and development to become part of an institution's DNA, there was the beginning of a recognition for innovation in institutions in Bahrain, which was concurred by another participant who believed that the culture had to start in institutions, and only then would it become part of the culture in the society as a whole. Yet, it was observed that the mindset of the society had already started shifting towards innovation activities by the emergence of the startup ecosystem scene which was initiated by EDB.

4.4.5.3 Uniqueness of Bahrain. The uniqueness of Bahrainis in the Arabian Gulf region was recognized by the foreign authorities who participated in this study. They were of the opinion that Bahrainis, as islanders, owned an open mindset that developed from a blending of the ethnicity of the different cultures transiting or residing on the island. This open mindset made them flexible and agile in adapting quickly to change.

Investment professional P1 stated clearly that, Bahrain's economy is the smallest among the GCC countries. Bahrain's small size could be considered an advantage in decision making, drawing policies and regulations, and controlling the market since results of projects undertaken could be identified quickly for evaluation by decision makers in deciding whether to continue or stop a project, hence minimizing the risk of big budgetary losses and time lost.

4.4.5.6 Generational gap and individual capacity. The digital generation gap emerged as another obstruction to innovate for the younger generation, while the older generation still looked fairly comfortable doing business as it had always been done. "The only option is to wait for the new generation to take over slowly and with their new culture and mindset change and improve things" was the view one of the younger professionals (P14). Although big data is the new global trend for problem solving and certainly part of the younger generation's culture, the older culture still relied generally on feelings and asking peers for solutions; hence, a communication gap and behavioral gap between the two generations.

Although the general perspective of the participants in this study was of a culture in Bahrain which was not conducive for innovation, yet, the researcher observed other perceptions emerging within the answers of the interviewees which shed light on a changing scene that had started evolving since the second half of 2017.

One of those new class of innovators that had emerged in Bahrain was in digital gaming and game development. This scene was explained by P20, a successful game developer himself, who confided that the small geographical area, the cultural diversity, the open mindset of the citizens, and the talented younger generation make Bahrain a unique place for gaming community members to meet and develop their sector. The ICT infrastructure, being one of the best in the region, as was indicated earlier in the ICT Environment 4.3.3, was also a main factor for the gaming community to choose Bahrain as their base in the region.

According to Startup Genome (2018), Bahrain's regional route network and central location in the region permitted it to be easily accessible for the billion dollar gaming market in the area. Bahrain has a robust gaming scene, especially in the Virtual Reality (VR) arena, and has already attracted more than 15,000 attendees for various gaming events held locally. Animania Bahrain, IGN convention, Comicon, and Bahrain Gaming experience are just a few examples of those occasions.

A new startup scene has taken shape in Bahrain with the Startup Bahrain ecosystem for innovative digital startups. It is a communal enterprise that brings together entrepreneurs, companies, financiers, incubators, academic establishments, and the Bahrain government to encourage and support the startup culture in Bahrain.

More than 50 percent of the young Bahraini generation are eager to start their own businesses, and factors such as the opportunity of 100 percent foreign ownership in numerous sectors, limitless return of capital, no tax on profits or bonuses, and ease of business help them achieve that (Startup Genome, 2018). Bahrain's predominantly bilingual local startups also have the advantage of living in a strategic location in the center of the Arabian Gulf and are able to tap into the localized marketplace and reach 400 million Arabic speaking individuals in the Middle East and North Africa (Startup Genome, 2018).

4.4.5.7 Collective capacity & leadership in the big industries. As for the specialized industry professionals who participated in this study, the reason behind why their industries were not innovating in Bahrain and were not contemplating to innovate anytime in the future was that their industries were highly specialized and technical, and their technologies came from organizations abroad which have already been in these fields for decades. The participants of these industries were of the understanding that their organizations in Bahrain were too small to take up any initiatives to innovate, and that it was much more economically healthy from both budgetary and time aspects to use technologies from abroad rather than to attempt to innovate locally.

The highlight of leadership advocating innovation came when HRH the CP personally emailed all the public sector employees and asked them to take part in the newly-introduced government innovation competition (Fikra). The competition represented a new milestone in fostering excellence throughout all sectors of the public bodies, and is a testimony of Bahrain's leaders pledge in placing citizens at the

center of all development efforts by integrating the public sector's ideas and innovations ("Innovation competition launched", 2018).

4.4.5.8 No national drive. Many private and Public sector entities indicated that there was a mandate at place to digitally transform their data. The Ministry of Education, NHRA for healthcare, and the financial sector for FinTech are just a few noted for this initiative. But, as pointed out by one participant, when the sectors act on mandates, they don't have a common framework, and everyone has an internal drive based on a boss's decision or a particular ministry's vision. In other words, there was still no collaborative culture in place and individuals or organizations were still doing their businesses in silos. As it was put by one investor participant: "For a country that produces no wheat, Bahrain has an awful lot of silos".

As voiced by many participants, there was a concern that there was no national drive for innovation and there was no one body or organization today which is responsible for innovation initiatives.

Innovation has to be a sustainable act with a national strategy in place and not an individual initiative that is talked about in conferences and workshops at which everyone gets excited while attending, but then forget when they are back to their normal day at work and business goes back to normal and innovation is put back on the shelf until the next event. (P19)

The professional participant P19 was clear on that and went on to say that in order for his organization to 'walk the talk', they had already put in place a committee that evaluated the projects and engagements of his organization and then this same committee reported the results to the upper management in a sustainable way.

4.4.5.9 R&D in Bahrain. According to Chen and Dahlman (2005), an efficient innovation system is one that offers an environment that fosters research and development (R&D), that results in producing new goods, new procedures, and new knowledge, and hence is a key base for technical development. A new department that promotes creativity and innovation among students opened at UOB. It includes cutting edge technology to hone skills of students and provide an environment that fosters creativity (“New university department”, 2018).

In Bahrain, individuals and organizations were found to be generally capable of adapting to innovation and technology that had been imported from outside. There was no culture or mindset for innovating or spending on R&D since the rewards were intangible and took a long time for to materialize and show a return.

No R&D in Bahrain was present as acknowledged by all participants and specifically the education sector participants. No money was spent on R&D, and the culture of research was missing in Bahrain. Although three entities stated that they had research departments in house, those departments were not active. “I think what you want to ask in the Bahrain level is ‘Why do we lack R&D?’ I don’t know any institution, be it governmental including us or private or semi-private, that really has a dedicated R&D department” (P7).

Investment and financial sector participants were of the opinion that looking at the formal indicators of research and innovation in Bahrain by international standards, the current situation is abysmal. P11 expressed his disappointment at R&D status in Bahrain and stated that although people say that there was R&D in Bahrain, in reality there was none. His understanding of research was to have a research institute where

people were in labs researching in an area and not a faculty member who was interested in an area and was researching about it. He stated that the government did not have an R&D strategy, nor had it identified what the themes were. “There is no point in trying to put one’s head up and just say that we want to do it” (P11). R&D needed funding and skilled people to administer it and an entity that would be ready to take the output of it.

Yet, the government had no R&D strategy and there was an absence of availability of research services. The only center that was responsible for economic and science research in the kingdom and was funded by the government, Bahrain Center for Scientific Research (BCSR), was closed down in 2010.

In 2014, the Higher Education Council launched a national strategy for R&D in Bahrain. The strategy included the current state of research in the kingdom, its concept and objectives, and the key points and proposals (Higher Education Council, 2014). The scheme recognized three highest priority areas that were needed to be under focus of research in Bahrain and relevant to the country’s economic and social needs: (a) financial services inclusive of Islamic Banking and Insurance; (b) Health Services and Translational Medicine; and (c) ICT. The strategy determined that research had to be undergone in close collaboration of universities with industry or government.

It was concluded in the plan that the return on investment in research would not occur instantly but would increase and grow over time, and by investing in research an increase in attracting and developing human capital would be evident, so would investment in technology, the kingdom’s capacity improvement in using the

existing global knowledge as well as solving the kingdom's social and economic needs.

In the same line, participant P19 stated that his organization had signed an MOU with Bahrain Polytechnic to setup an innovation lab,

Our organization has a very unique environment with many stakeholders and they will collaborate through this lab with the Polytechnic to conduct applied research on how to manage the diverse range of operations that is carried out by these different stake holders and have them all delivering their services in a synchronized manner.

He went on to state that his organization would also want the students of Polytechnic to conduct various research that the members of his organization found challenging and in need of solutions.

4.4.5.10 The strengths and weaknesses of the Innovation Environment in Bahrain. Although the government of Bahrain had realized ten years ago that its innovation progress stood at a primary stage and started drawing policies to push its development, yet, today and after ten years of that realization, the country stood at rank 72 out of 126 countries in the innovation index published by GII in the institution's 2018 report. Looking into the elements of those rankings, one finds out that the elements are based on numbers and statistics that do not always reflect the reality of what is actually going on in a society.

Probing into the minds of the actors involved in different aspects of the economy of Bahrain in order to shed some light on a few of these reality viewpoints behind the innovation scene, the following strengths and weaknesses were realized.

The positives observed include the culture and mindset of innovation in the industry changing from a risk averse mindset that feared change towards one that looked to collaborate with other entities for innovation purposes. Another change in the innovation arena was the appearance of the entrepreneurial mindset in the young generation and the government's support by developing the startup ecosystem in order to bring together all elements needed to promote a startup culture in one environment.

The researcher observed that, even though many events and conferences were being conducted for innovation purposes, there were no systems or mechanisms in place to put it into the heart of organizations. The willingness of the top was apparent, the infrastructure was in place, but no focus was found on the systemic tactical issues to deal with the innovation processes and activities in a holistic way.

4.5 Government Private sector Collaboration

The interview phase and the documents collected throughout the data collection stage of this research revealed a theme of a collaboration scene that had already started emerging amongst the five major entities: (a) government; (b) education; (c) ICT; (d) finance; and (e) the industry, that have an impact on Bahrain's economy. With a focus on government private collaboration, the following section will report on the empirical finding that emerged from the coding of the interview findings and the information extracted from external documents collected by the researcher.

4.5.1 Leadership advocating collaboration. The need for GPC was initiated in lieu of several challenges which the government faced. One of these challenges had always been to diversify its economy away from oil and gas since the 1970s, and the

second one surfaced when Bahrain's leaders realized at the beginning of the 21st century that, in order for Bahrain to attain an attractive position in the global value chain, it had to increase the levels of sophistication and innovation by creating a milieu that would be favorable to entrepreneurs and innovation, and create knowledge-based and highly valued organizations with economic accomplishments. Yet, the authorities also understood that in only focusing on how to expand the economy, the government's main role as service provider to its citizens, by making the environment safe and comfortable, and further improving their living standards, would be jeopardized.

From that moment on, the importance of GPC and its potential contribution to economic growth was recognized by the country's rulers and had always been the focus of their agenda ever since in order to achieve their Vision 2030. HRH Prince Khalifa bin Salman Al Khalifa, the prime minister of Bahrain was clear in that the role of the public sector in this collaboration would be transformed into a dynamic regulator (Worldfolio, 2017):

This includes reforming the role of the public sector from the central driver of growth to one that serves as a regulator and active partner with the private sector, supporting innovation to stimulate competitiveness, and investing in citizens' futures to further improve their living standards.

This importance of GPC and its potential contribution to economic growth was also recognized and was continuously stressed upon by HRH the Crown Prince of Bahrain (CP) at every official meeting and in the media, where HRH kept on highlighting the private sector's role as the primary engine of growth ("Growth hop",

2016; “Innovation legal framework”, 2017; Saxena, 2018; “Gateway Gulf forum”, 2018; “New push for investments”, 2018).

According to their perspective, Focus Group F2 believes that “As the government is responsible for the constitutional structure of the state, their role is to facilitate and not to collaborate”. They were of the understanding that universities had to collaborate with other universities in the level of their labs and researches and the universities on the other hand collaborated with the industry in lieu of their common interests,

There is no such thing called collaboration between private sector and the public sector. The government does not collaborate with the private sector, but rather facilitates the procedures for the private sector to innovate. Therefore, the collaboration falls in the arena of the private sector amongst themselves and not with the government.

This strategy of collaboration to increase the role of the private sector in driving economic development could not have been stressed enough by the CP when he addressed industry heads and top businessmen joining a major investor forum in Bahrain on May 9th 2018. Addressing the forum, he stated that of the utmost importance was the private sectors’ role in promoting innovation and competitiveness across all segments by establishing new ways of connecting as teams and not individuals to drive regional and global growth (Saxena, 2018).

The belief that it is crucial for the government to partner with the private sector and let the private sector lead innovation was also noted by government

authorities of whom one ICT professional in the government (P22) clearly expressed that “In the diversification of the economy in Bahrain, the role of the private sector should be to lead this diversification by building a partnership with the government”, which was strengthened by CP’s saying “The private sector’s role as main driver of Bahrain’s development must be strengthened” (“Driving the economy”, 2018. p.1).

4.5.2 Tamkeen’s collaboration. Ravi (2017) was of the belief that building a strong SME community and a collaboration culture was far more important in fostering SME innovation and success than enforcing policy and regulation. That could not have been transitioned better than when EDB’s CEO stated that the success of launching a number of initiatives such as the regulatory sandbox, crowd funding regulations, commercial registration of incubators, accelerators and startups, and the establishment of the SME board would not have been possible without the collaboration of the joint assistance of the private and public sectors (“New push for investments”, 2018).

A part of Tamkeen’s efforts is to enhance the entrepreneurial ecosystem in Bahrain, hence, Tamkeen and Flat6Labs partnered to support startups with a focus on sectors including financial services and payments, education, ICT, and game development to name a few. Flat6Labs’ chief executive declared that their interest to setup shop in Bahrain came from the unique feature of the government’s support of the startups represented by Tamkeen and EDB, which Flat6Lab did not find anywhere else in the region. Another factor for choosing Bahrain was the availability of large numbers of well-educated Bahraini talent who knew the potentials of startups.

Businesses would be enhanced by Flat6Labs bringing global successful models of business accelerators to Bahrain (Alshehabi, 2018).

Kotilaine (2017) reiterated that the Tamkeen and Flat6Lab partnership looked like an excellent example of what was stated by Bahrain's government pursuit to achieve economic diversification by GPC. He was of the belief that it was the funding and the know-how of Foreign Direct Investment (FDI) that brought ideas and expertise to Bahrain and was the driving force behind prosperity and job creation. Bahrain would serve as a platform for product and services production for the broader region. The attractive regulations and access to human capital would help those investments in achieving the desired scale of production to supply other markets.

Another successful collaboration which involved Tamkeen was when the University of Bahrain (UOB) launched 'Forsati for her' project in partnership with United Nations Development Program (UNDP), Microsoft, and Think Smart. The initiative was a coding program aimed at helping female Bahraini students learn and apply new skills to compete in the global economy. The program was aimed to also equip Bahraini females with the necessary tools to become leaders in the IT industry (Alshehabi, 2018).

4.5.3 ICT sector's collaboration. The private sector is also under the same understanding when Bahrain Technology Association (BTECH) chairman, Ubaydli Ubaydli said that Bahraini institutions should work with numerous public sector entities through a public private partnership model. He continued that the role of this collaboration model was to take advantage of the digital transformation of the GCC countries and grow their capacity and competency ("Bigger role in 5G", 2018).

From the ICT sector, Huawei's CEO stated that his organization leveraged its ICT knowledge, inclusive technical know-how and ongoing innovation to partner with the public and private sectors in Bahrain. This partnership aimed to build open, robust and secure platforms for Bahrain's market (Saxena, 2018). The MoU signed between Batelco, the national digital solution provider in Bahrain, and Huawei was a prime example of Huawei's CEO statement for cooperation and collaborative business initiatives aimed for the development of Safe Cities and the National Broadband Network in Bahrain ("Batelco, Huawei in deal", 2018).

In order to bridge the gap between software, hardware, and services to assist entrepreneurs in their journey from accelerators to distributors, an IoT hub was launched by Batelco and Brinc. The two organizations would offer programs and services specially packaged for IoT hardware startups who would be seeking for speed, access, and the know-how to construct prosperous enterprises ("Batelco-Brinc launch IoT hub", 2018).

In the finance arena, Benefit, BAB, and CBB continually meet to improve cooperation to implement projects that would put Bahrain at the top of International Arab Banks by the use of prevailing technologies in banking processes ("Benefit to launch", 2018). The financial sector is the leading single employer in Bahrain, with Bahrainis occupying over 80 percent of the jobs in this sector. Largely, the sector provides 27 percent of Bahrain's GDP, making it one of the main drivers of development in the kingdom (Central Bank of Bahrain, 2012).

Participant P17 in the ICT sector was clear in that "Today more than any time in the past the ICT sector is working hand-in-hand with the financial sector in terms

of promoting FinTech solutions and services”. According to him, the telecom sectors were big contributors to the ICT companies and their infrastructure was vital and very important to the ICT businesses, whose services and products in return were vital to the other sectors in need of them.

Yet, in another service-oriented collaboration between the public and private sector, iGA and Benefit signed an MoU to develop ePayment services and banking processes to improve performance and decrease cost (“iGA & Benefit”, 2018).

4.5.4 Academia collaboration. There is no seamless collaboration between the industry and academia in the sense of professors working as consultants in the industry on a projects basis or conducting courses or workshops at the companies’ premises, as was noted by a few of the participants of this study. No policies are set in the regulatory guidelines allowing for professors to take additional engagements, thus academics cannot engage with the industry for consultancy purposes in order to mix practice with theory for the sake of research or employee development.

As a way to bypass the aforementioned hurdle of academia and industry collaboration, the universities and the industry started a series of collaborations in order for the universities to build the capabilities of their students and for the industry to get access to research and knowledge resources available at the universities. By collaborating, the universities will get a chance to tap in the industries needs and build the capabilities of their students to become work ready, while the industries would gain access to the latest knowledge.

For example, Bahrain Airport Company (BAC) signed a Memorandum of Agreement with Bahrain Polytechnic to lead the first of a long-term research initiative

to involve students in research associated to the flying industry. The final purpose was to launch a research and innovation program targeted on the varied setups and masteries at Bahrain International Airport via the interchange of creative ideas and concepts to oblige the aviation sector at large (“BAC and Polytechnic”, 2018).

As another example, the Royal College of Surgeons in Ireland – Medical University of Bahrain (RCSI Bahrain) and Bahrain Polytechnic teamed up to host a conference focused specifically on the interrelationship between higher education institutions and employers in producing highly employable graduates for the Bahraini job market. The conference included working sessions to better address the skills and employability challenges faced by the business sectors with a view to future collaboration on vocational training (“RCSIB, Polytechnic”, 2018).

As with collaboration, a high level of collaboration has been established between tertiary education and the ICT sectors in terms of setting up innovation centers or innovation labs. A successful story is Huawei setting up a technological lab at the Polytechnic and Batelco providing the network. “Huawei has got the plumbing, Batelco plugs it all together, and then our students come up with really clever things that can ride on that network environment” (P15). Polytechnic has also collaborated with AWS by uploading Polytechnic’s system on the Cloud and now working with AWS to design a curriculum for developing their students’ capability to understand the new world of the Cloud.

4.5.5 Collaboration in innovation activities status in Bahrain. The interviews and the data collected in the course of this study highlighted the areas of collaboration in the Bahrain economy environment with relation to innovation

activities by the government and the private sector. The observed findings led the researcher to a few constructive steps that would aid her in her recommendations and the way forward to this study.

In the findings, it was observed that the leadership of Bahrain is the highest advocate for GPC in Bahrain. Many forms of collaboration have started in the right direction for pushing innovation agenda forward. Of these collaborations the ones that involve the universities, Tamkeen, EDB, the finance sector, iGA, with the ICT are the most critical ones and should be looked at in more details.

It was also noted that although the top leaders were advocating and supporting the GPC agenda and putting the importance of the leading role of the private sector in this collaboration, there was no clear path or strategy laid out on the nature of this collaboration or leadership for the private sector.

CHAPTER 5

FINDINGS AND RECOMMENDATIONS

The purpose of this chapter is to answer the main question of this research:

RQ. What is the role of the government and the private sector in collaboration to drive innovation forward in Bahrain?

The chapter is organized by a brief recap in section 5.1 of the main terms of this study; knowledge, innovation, KE, collaboration, and innovation ecosystem. Section 5.2 addresses the two sub questions of the study leading the way to finding the answer for the main question that this study aimed to investigate.

5.1 Introduction

Knowledge has developed into and will continue to be an instrumental element in the welfare of humankind and organizations alike. Today, the significance of knowledge was considered by what it could do by the way it was applied effectively, and was considered to be the driver of the new economy in which knowledge was an assessed, developed, and managed capital (Bogdanowicz & Bailey, 2002).

The leaders of Bahrain had already recognized in Bahrain's Vision 2030 the need to smoothly transform Bahrain's economy to the new KE that productively promoted and embraced knowledge through a skillful workforce, high quality public service, a cutting-edge infrastructure, and an appealing living environment that attracted local and foreign investment.

Innovation was recognized to be a key driver and one of the four pillars of a KE in Chapter 2. The ability to recognize and spot prospects was established as what

drove innovation which could be found in a new product, a new method of production, start of a new market, discovery of a new material, or implementation of a new form of business. The capability to identify and promote those prospects for innovation needs a collaborative and organized plan to be put in place, and the creation of an effective network established between all entities of the society.

An innovation ecosystem is where multiple environments are involved in co-creating knowledge and innovation. Especially important among those environments are the government, education, ICT, private sector and an innovation conducive environment, and of the utmost importance, is the government support to facilitate efficient and effective collaboration amongst those distinct entities.

It is that environments' linkages that shape partnerships amongst those entities on which this study has focused. Specifically, the research addressed the importance of these linkages, the way they networked, and the influence they had on innovation activities. The analysis mainly focused on collaboration amongst the five most important environments influencing the economy of Bahrain, namely; (a) government, (a) education, (b) ICT, (c) finance, and (d) industry. Modern day services such as ICT, finance and semi-Government services, and tertiary education hold a strong role in the new economy in Bahrain.

The aim of this research was to investigate and develop a model for the government and the private sector roles in this collaborative environment and their influence on the innovation processes and activities for the sake of shedding light on Bahrain's pursuit of a developing KE and drawing a way forward. The study addressed the following research questions:

RQ. What is the role of the government and the private sector in collaboration to drive innovation forward in Bahrain?

RQs1. How is innovation defined and measured in a KE?

RQs2. What is the nature and current state of the government and private sector collaboration in support of innovation in Bahrain?

In order to answer the main question, the researcher had to examine and answer the two sub-questions, which are answered first to lead the way into resolving the main question that this study investigated.

5.2 RQs1. How is innovation defined and measured in a KE?

The researcher investigated this query on how innovation was measured through an intensive literature review, which included a thorough review of past studies and the literature available on innovation evaluation practiced by globally recognized organizations. In doing so, the researcher identified the factors that she should be seeking in relation to innovation activities in a KE and the relevant innovation elements used by countries to benchmark with each other.

Knowledge translated into innovation was recognized to be the primary source of significant capital production within an economy of this era, and the primary driver of contemporary economic development. Whether the innovation result was disruptive or minor, or whether it was of a technological nature or business oriented, it had an intellectual or economic value impact on the end user, the producer, and the whole society.

In order to foster an appropriate framework to assess innovation and explore the elements that needed to be in place for assessing a country's innovativeness, the

researcher reviewed the existing frameworks that were established and being used by global organizations to evaluate innovation in countries seeking to be recognized as KEs. A brief summary is provided below.

The frameworks used by OECD, APEC, and World Bank were analyzed for the parameters they provided to measure a KE. These three frameworks combined agree that for an economy to develop, its environment had to be conducive to the efficient use of knowledge. One of the four essential factors that this environment had to contain was an innovation system that was capable of getting access into the growing worldwide knowledge network and adapting that knowledge to its confined indigenous requirements in order to create new knowledge needed locally. This innovation system consisted of elements such as royalty payments & receipts, patent count, researchers in R&D, private sector spending on R&D, high tech experts, and scientific and technical journal articles.

The second framework used was MAKCi, which is an award process for identifying and recognizing societies globally that are effectively engaging in official and organized knowledge-based growth processes. The factors in this framework that were of importance to this study were found in four of MAKCi's eight capital categories, which were related elements in innovation creation as a value-production system in a city. The significance of using the MAKCi framework was that it allowed for measuring the innovation capacity of both private and public sectors.

GII was the third framework used for innovation evaluation in a country, and its importance was that it demonstrated the ranking of a country's capacity for and success in innovation. According to GII, there were seven support elements for

innovation, namely institutions, human capital and research, infrastructure, market sophistication, business sophistication, knowledge and technology outputs, and creative outputs. These elements describe specific features of the milieu, which facilitate creation of new knowledge in an economy.

The last framework incorporated by the researcher involved the approaches used for collaboration amid the government and the private sector for the purpose of innovation. The elements of this collaboration as a market phenomenon was recognized by Lember et al. (2014). Since this research deals with the economic factor of knowledge, these approaches were acknowledged and added to the previous three frameworks in order to identify the elements that were used in measuring innovation in countries.

Synthesizing and integrating the innovation elements extracted from the four frameworks analyzed resulted in five distinct milieus: (a) government; (b) education; (c) ICT; (d) private sector; and (e) innovation that steered the researcher in constructing her research model. All items supported across the three primary instruments are included in the five areas of the model. Refer to Figure 2.12 and table 4.1.

This research model assisted the researcher in answering the next question based on the belief that the truth of innovation in a developing KE is linked to the protagonists behind it, and how this truth could be interpreted by exploring and understanding the perception of those protagonists and their experiences. In this research the focus is on the nature and the status of collaboration between the government agencies and the private sector for sake of innovation purposes in

Bahrain and what these sectors are doing in relation to developing innovation in order to push the economy of Bahrain towards a knowledge-based economy.

5.3 RQs2. What is the nature and current state of the government and private sector collaboration in support of innovation in Bahrain?

After conducting the qualitative search and analysis of the data associated to the elements in correlation with the innovation conducive factors of the research model (Figure 2.10), the researcher witnessed firsthand the reality of the progress of innovation activities in Bahrain and the collaboration roles of the entities involved in those activities. The extent of the involvement of those entities and the nature of their collaboration was also manifested, leading the way for the researcher and enabling her to answer the main question of this study, thereby fulfilling the purpose of this study.

A brief finding of what has been done and what has not been done in the five innovation conducive environments in Bahrain with regards to their innovation activities are correlated with the factors extracted from Table 2.4, and as demonstrated separately in a figure for each environment. These factors were correlated by the researcher using the qualitative data collected during and for the purpose of this study.

5.3.1 Government Environment. The Government Environment was the first in the research model (Figure 2.10) and the innovation inducing factors for this environment are extracted and illustrated in Table 5.1 for ease of reference.

Table 5.1: Government environment

1- Government Environment			
GII	MAKCI	KEI	GPC Market orientation
1-Nurturing an institutional framework that attracts business and fosters growth by providing good governance (1-1), correct levels of protection (1-2), and incentives (1-3).	2B2-City's Future Management. Existence of the City's Future Centre or formal enablement of its functions through another kind of innovation initiative. (1-4) 5A1-Ethnic diversity. (1-5) 6B3a&b-City's cultural diversity (1-6) and tolerance capacity (1-7) to relate empathically and assertively with people of a different race, social, cultural or economic background. 8A1c-Innovation capacity of the public sector. (1-8) Structural capacities of government bodies (1-9) 8B1c-E-government: coverage, transparency, accessibility, and usability, content, services, participation (1-10)	1-1Regulatory quality (1-11) 1-2Rule of Law (1-12) 1-3Government effectiveness (1-13) 3-11E-government (1-14)	a-Providing organizational framework for knowledge generation (1-15) and innovation activities (1-16) c-Delivering innovation policy (1-17) and linking to specific projects (1-18) d-Selecting suitable partners to produce innovative products, services, and processes (1-19)

Source: Researcher's own elaboration

EDB was recognized as the public agency responsible for drawing inward investment into Bahrain. Its major role is to work with entities from the public and private sectors on both existing and potential investors to enhance Bahrain's investment climate. The highlight of their achievements was the AWS decision to open their offices in Bahrain. MOICT was another public sector entity recognized for its continuous endeavor to remove barriers and make procedures less bureaucratic for businesses and industries to legalize their entities in Bahrain.

Tamkeen was perceived as the government's arm for building the capabilities of the Bahraini private workforce and supporting the development of the private sector organizations, while Bipa was recognized as the government support for public employees' skills development. These two entities are considered as incentive bodies founded by the government to build capacities in the private and the public sectors of the country. It was observed that even the government officials participating in the study mentioned Tamkeen as the best incentive and support for human capital

development, while the role of Bipa was not mentioned in the development of the Bahraini human capital.

As for the regulatory quality, the regulatory bodies in Bahrain in association to the four units of analysis in this research; (a) finance, (b) education, (c) ICT, and (d) the industry, were identified and discovered to be already established and in place by the government to support and regulate these key sectors vital to the development of the economy in Bahrain. It was further observed that the two regulatory bodies for finance and ICT, CBB and TRA respectively, were more involved in developing their sectors by updating their regulations or issuing new regulations and policies to keep up with the fast pace of their sectors' global development. Education and industry regulators were in terms of supervising and reviewing their sectors for performance purposes in general or for legalizing their sectors' institutions. The regulatory bodies in education consisted of MOE, HEC, and BQA, while MOICT is the regulatory body for commerce, industry and tourism.

For the future outlook of the country, economy diversification has been the focus of the leaders in Bahrain since the 1970s, and in 2008 was perceived in the Economic Vision 2030 in which the new economy was to be built with the collaboration of the government and the private sector and shifted from one that depended on oil revenue to one that would be productive and globally competitive by 2030. Yet, no entity was identified to be responsible for the management of this future outlook and its sustainability measures for the sake of the stakeholder's knowledge of where Bahrain stands, nor the direction it is heading. Although a national development strategy was indicated to have been drawn by EDB on their website

documenting the last decades achievements in Bahrain and the kingdom's strategic direction for 2015-2018, the report was not accessible.

The fact that Bahrain celebrates diversity and acceptance of other cultures is yet another feature adding value for Bahrain which surfaced in the responses of the participants in this study. According to an international report, Bahrain was ranked number 5 most friendly country for expatriates from 188 countries. "Bahrain is a beautiful melting pot of many different cultures" states an expat from the USA (InterNations, 2018).

In the government sector, the body found to be consistently innovating and providing innovative services is eGovernment. Government bodies are still seen as generally bureaucratic and traditional way of conducting work was still the norm in most of the government bodies. Centralization of authority and the non-skilled public workforce were found to be obstacles for the government entities capacity to innovate.

CBB and MOICT were observed to have started collaboration and producing policies for specific innovative projects such as the new FinTech regulations and their commercial registration counterparts. These policies were the result of collaboration between EDB, CBB, and MOICT as suitable partners to produce these services and processes.

From a total of 19 factors in this environment, nine factors (47.4%)—1-1, 1-2, 1-3, 1-5, 1-6, 1-7, 1-10, 1-11, and 1-14—were established and functioning well. Two factors (10.5%)—1-12, and 1-13—were established but needed to be developed more. Five factors (26.3%)—1-8, 1-9, 1-17, 1-18 and 1-19—had just started taking

momentum; while three factors (15.8%)—1-4 and 1-15, 1-16—needed to be established. Figure 5.1 represents the current status percentages and scope for innovation conducive factors in the government environment of Bahrain.

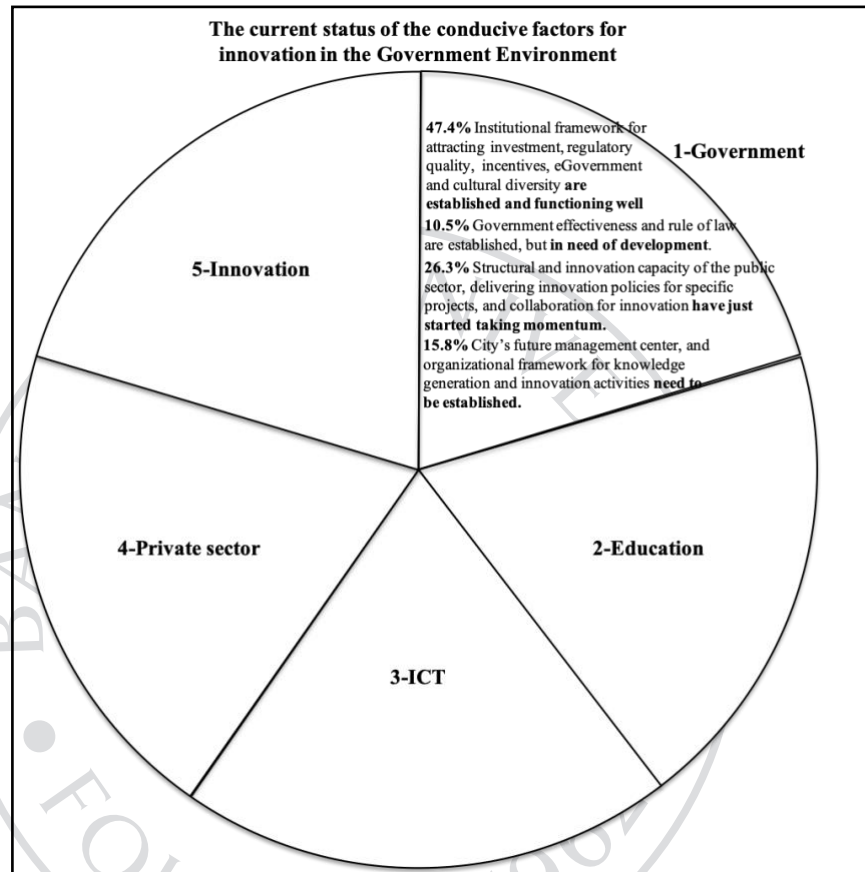


Figure 5.1: Government environment conducive elements

Source: Researcher's own elaboration

5.3.2 Education Environment. The Education Environment was the second in the research model (Figure 2.10). The innovation inducing factors for this environment are extracted and illustrated in Table 5.2 for ease of reference.

Table 5.2: Education environment

2- Education Environment			
GII	MAKCI	KEI	GPC Market orientation
2-The level and standard of education (2-1) and research activity (2-2)	5B1c-Number of individuals (2-3) and quality of their performance (2-4) in formal education system. 8A1b-Innovation capacity of the education (2-5), university curricula life cycle (2-6)	2-1 Adult literacy rate (2-7) 2-2 Secondary Enrollment (2-8) 2-3 Tertiary Enrollment (2-9) 2-11Quality of science and math education (2-10)	a-Providing organizational framework for knowledge generation (2-11) and innovation activities (2-12) d-Selecting suitable partners to produce innovative products, services, and processes (2-13)

Source: Researcher's own elaboration

Bahrain owns a solid base in education with free public schools, compulsory first nine years of education, an almost 100 percent enrollment rate in primary schooling, and a literacy rate of over 95 percent, is a strength in the education system for the kingdom. Yet, the quality of science and math education are not up to the international standard for high school graduates entering universities, and generally most of the students have to attend foundation year to make them ready for higher education. The curriculum of the education system needs to be reviewed since it was based on building existing knowledge and not on educating students how to conduct research activities or how to become analytical and skillful in building new knowledge to innovate.

However, it was observed that the universities have started adopting the culture of innovation by introducing technology-related programs in their curriculum and collaborating with the ICT sector for steering and holding numerous innovation activities. They have also started developing programs to build capabilities needed for the new FinTech and startup scene emerging in the financial sector as the finance entities pursuit to innovate and progress in the global competition.

Research activities are negligible in the tertiary level and policies stand in the way of the academics collaborating with the industry and business sectors as

consultants or coaches for running workshops at the companies' premises. While the demand for technology-based workers is increasing, an absence of lifelong learning surfaced for those individuals who need to learn new skills in lieu of the areas they graduated in, in order to allow them to change their current professions. The difficulty arose from not having night programs for those professionals who had to work and study at the same time.

No organizational framework was found for knowledge generation and no research activities were noticed in the universities. A collaboration culture was perceived to pick up momentum though, between the universities and the ICT and private sector for developing new programs according to the needs of the industries, initiatives to start research work conducted by universities faculty and students to solve industry related problems, and ICT labs being setup in universities as experimental technology hubs.

In this environment, and from a total of 13 factors needed to be available in the education environment to make it conducive for innovation activities, three factors (23.1%)—2-7, 2-8, and 2-9—are in place and established. Five elements (38.4%)—2-1, 2-2, 2-3, 2-4, and 2-10—exist but traditional and need to be developed, and factor (7.7%)—2-13—had just started taking momentum. Four elements (30.8%)—2-5, 2-6 and 2-11, 2-12 —need to be established. Figure 5.2 represents the current status percentages and scope for innovation conducive factors in the education environment of Bahrain.

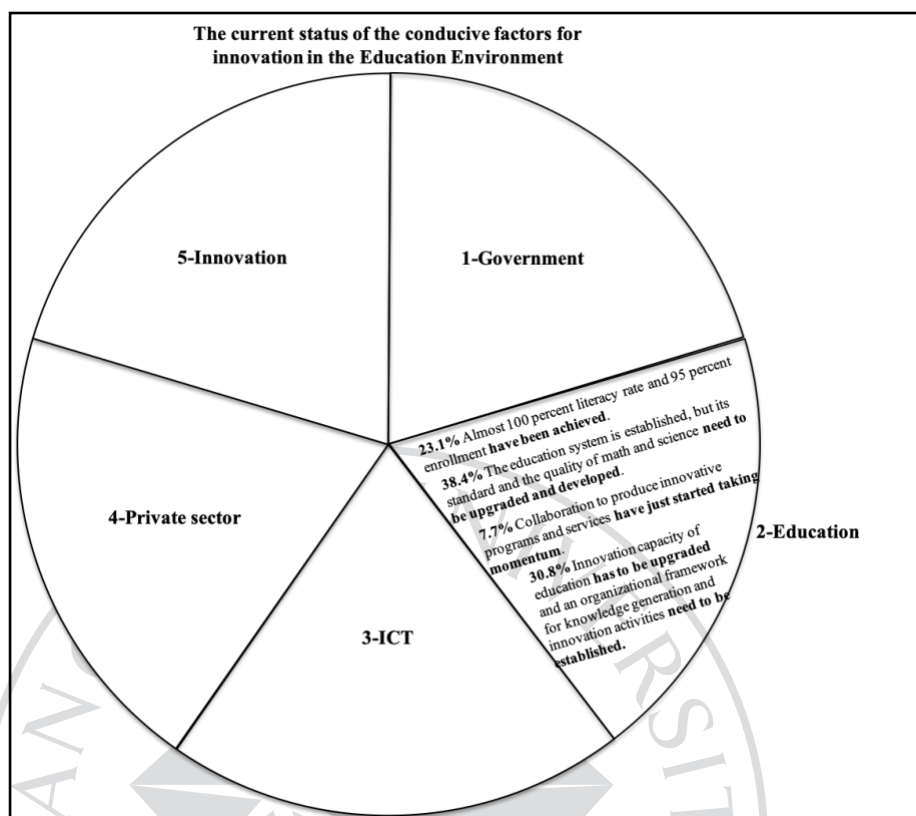


Figure 5.2: Education environment conducive elements

Source: Researcher's own elaboration

5.3.3 ICT Environment. The ICT Environment was the third in the research model (Figure 2.10). The innovation inducing factors for this environment are extracted and illustrated in Table 5.3 for ease of reference.

Table 5.3: ICT environment

3- ICT Environment			
GII	MAKCI	KEI	GPC Market orientation
3- ICT access, use, e-government, online participation of citizens (3-1).	8B-Infomaiton and telecommunications functional capacities. (3-2)	3-1 Telephones (3-3) 3-2 Computers (3-4) 3-3 Internet Users (3-5)	a-Providing organizational framework for knowledge generation (3-6) and innovation activities. (3-7) b-Providing innovation related - infrastructure (3-8) d-Selecting suitable partners to produce innovative products, services, and processes (3-9)

Source: Researcher's own elaboration

This study concurred with the fact that ICT in Bahrain is an enabler and the backbone for all sectors' innovation activities, and its quality ranked high according

to international indices. The roles of the Supreme Council for ICT, the regulatory body TRA, and iGA, were also recognized as very supportive and progressive in unwavering and forward-looking development of the ICT sector in Bahrain.

According to the index, 98% of households in Bahrain have access to the Internet, 94.75% of households have computers, and 20.8 inhabitants per 100 have fixed-telephone subscriptions. There are 216.93 mobile-cellular telephone subscriptions per 100 inhabitants and 98% of the inhabitants use the Internet in Bahrain (ICT Development Index, 2017).

Already established as a FinTech hub, and the holder of one of the best ICT infrastructures in the region, Bahrain attempts to build its role as a leading center of ICT and hence become the site for an ICT hub as well. It was also noted that although the ICT infrastructure was established and holds a high standard in the region, the ICT sector is not innovative but collaborates with other sectors in Bahrain to provide innovation related infrastructure. This concurs with the innovation inducing factor of the ICT Environment of providing innovative products, but does not provide innovative services or processes.

In this environment and from a total of nine factors needed for the ICT environment to make it conducive for innovation activities, six elements (66.7%)—3-1, 3-2, 3-3, 3-4, 3-5, and 3-7—were in place and functioning really well. Element — 3-9— (11.1%) had recently started picking up momentum since the ICT sector and other sectors began partnering and collaborating not for business reasons only, but also to produce innovative products, services, and processes. Element— 3-6 and 3-7— (22.2%)—needed to be established. Figure 5.3 represents the current status

percentages and scope for innovation conducive factors in the ICT environment of Bahrain.

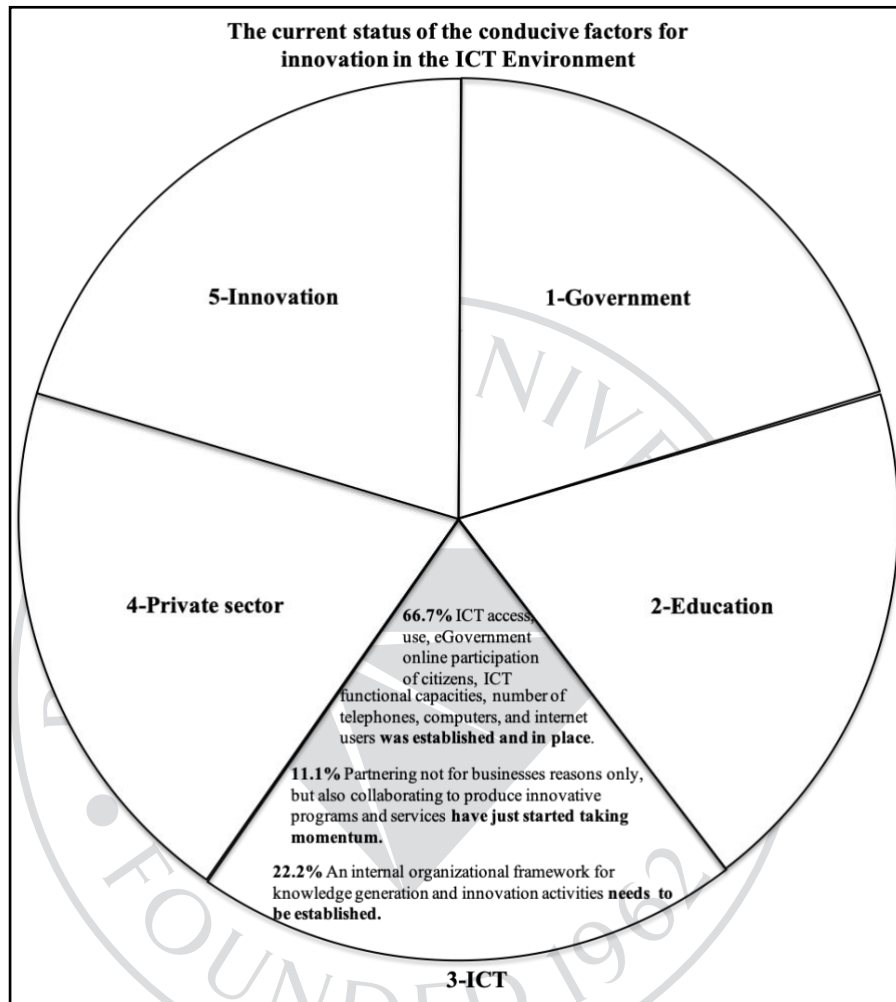


Figure 5.3: ICT Environment conducive elements

Source: Researcher's own elaboration

5.3.4 The private sector. The Private sector Environment was the fourth of the innovation conducive environments in the research model (Figure 2.10). The innovation inducing factors for this environment are extracted and illustrated in Table 5.4 for ease of reference.

Table 5.4: Private sector environment

4- Private sector Environment			
GII	MAKCI	KEI	GPC Market orientation
4-The availability of credit (4-1) and an environment that supports investment (4-2), access to the international market, competition, and market scale (4-3)	8A1a-Innovation capacity of the private sector (4-4), new business incubation and creation (4-5), preparation of high-value new business creation (4-6), and survival of new businesses (4-7).	2-6Soundness of banks (4-8) 2-8Professional and technical workers in labor force (4-9) 4-17Availability of VC (4-10)	a-Providing organizational framework for knowledge generation (4-11) and innovation activities (4-12) d-Selecting suitable partners to produce innovative products, services, and processes (4-13)

Source: Researcher's own elaboration

It was observed from the interviews that most of the participants agreed that the financial sector is the most innovative in Bahrain, although it had been stagnant in offering innovative and new services in the past two decades. The availability of credit and an environment that supports investment has started picking up pace in Bahrain in the past couple of years with the collaboration of the government and the financial sector.

With the support of the leadership and the regulatory body, CBB, and the promoters of investment in Bahrain, EDB, the financial environment has started a trend of innovation activities by producing and offering services that are technology driven. By setting regulations such as crowdfunding, CBB opened up a door to aid SMEs and startups in getting entree to unconventional forms of capital to start their businesses if they were not able to get access to traditional funding option.

Sandbox regulatory framework was another guiding policy drawn by CBB with the collaboration of EDB and the financial sector in order to build the innovation capacities of the private sector without them having to incur all the normal burdens of the regulatory and financial costs of engaging in the activities in question. New bankruptcy laws were released also by CBB to back those businesses that failed and could not survive.

The new Bahraini tech-savvy generation were also ready to jump on board with the new Sandbox framework and crowdfunding regulations in place, and in order to promote the local business environment shaping up and introduce it to the international market, EDB developed a startup ecosystem for innovative digital projects and collected all the stakeholders in one digital environment to encourage and support the startup culture in Bahrain.

Although the collaboration and partnership of the participants for the sake of producing innovative products, services, and processes in the financial and digital technology has started with a success in the banking and startup environment, yet no organizational framework for knowledge generation or innovation activities was detected. Also noted was the fact that even though the industry sector was very strong in Bahrain, which was represented by the oil and gas company Bapco, the worldly renowned aluminum company Alba, and the petrochemical company GPIC, yet their industries outputs had remained the same with no new innovative products. The overall view was that since those industries were global, and their technologies were very high tech and produced outside of Bahrain, there was no reason for them to spend big amount of capital on R&D to innovate locally.

In this environment and from a total of thirteen factors needed to make it conducive for innovation activities, three factors (38.5%)—4-1, 4-2, 4-3, 4-8, and 4-10—are in place and established. Two elements (38.5%)—4-4, 4-5, 4-6, 4-7 and 4-13—had just been established and were picking up pace very quickly, while factor (7.7%)—4-9— could be identified in the financial and technology sectors, but the extent of it in the industry was not apparent. Factor (15.3%)—4-11, 4-12—

representing an internal organizational framework for knowledge generation and innovation activities, needed to be established. Figure 5.4 represents the current status percentages and scope for innovation conducive factors in the private sector environment of Bahrain.

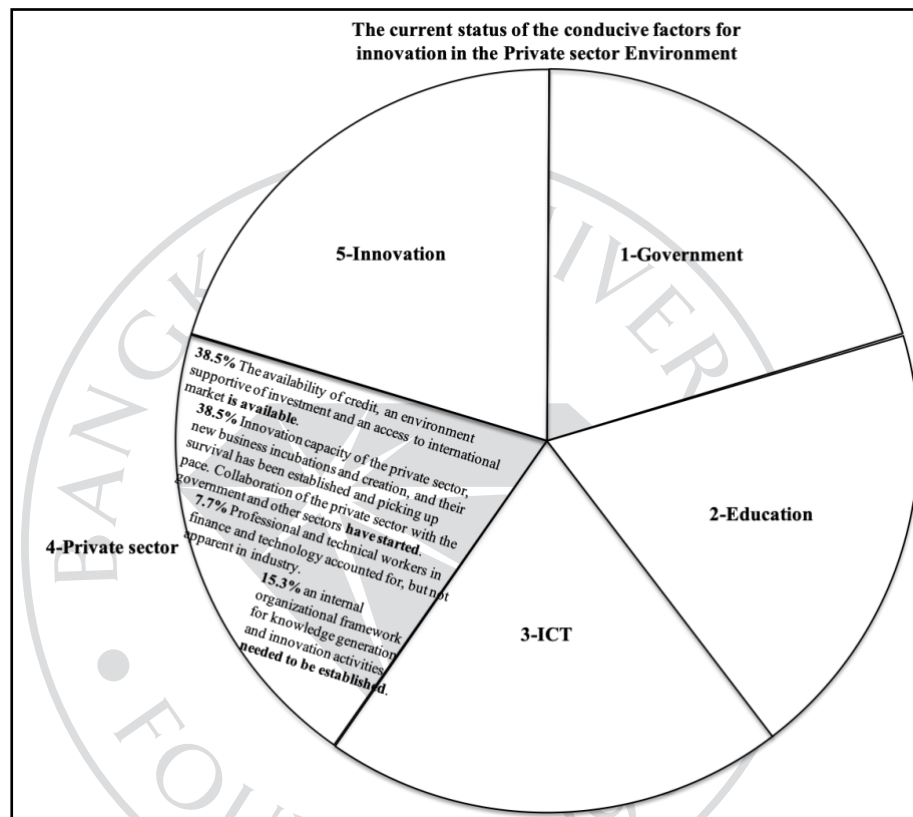


Figure 5.4: Innovation environment conducive elements

Source: Researcher's own elaboration

5.3.5 Innovation in Bahrain. The Innovation Environment was the fifth and the last of the innovation conducive environments in the research model (Figure 2.10). The innovation inducing factors for this environment are extracted and illustrated in Table 5.5 for ease of reference.

Table 5.5: Innovation environment

5- Innovation Environment			
GII	MAKCi	KEI	GPC Market orientation
5-Conduciveness of firms to innovation activities (5-1), employing knowledge workers (5-2), and R&D (5-3).	5B1e-Knowledge intensive competencies (5-4). Individual capacity. Number of individuals and quality of their performance in formal production activities (5-5). 6B4-Entrepreneurship. Collective capacity to create new high-value businesses. (5-6) 6B5-Innovation. Collective capacity to conceive (5-7) and effectively develop new ways to add value in any relevant human activity (5-8). 8A1b-Innovation capacity of the scientific and technological establishment (5-9), scientific citations and networking, patents and licenses. (5-10)	4-2 Patent Count (5-11) 4-3 Scientific and technical journal articles (5-12) 4-6Science & engineering enrollment (5-13) 4-11Research collaboration between companies and universities (5-14)	

Source: Researcher's own elaboration

The reality of innovation in Bahrain was observed in this study from three angles; (a) where Bahrain stood in the global rankings with regards to innovation, (b) how the advocators of innovation in the society in Bahrain participating in this study perceived current innovation status in Bahrain, and (c) the researcher's collection of the facts, reports, and events of innovation activities in the kingdom during the recent two years.

In the latest KEI conducted in 2012, Bahrain ranked 75 in the innovation index out of 145 countries; in the latest GII ranking, Bahrain was 72 out of 126 countries in 2018; and in the 2017 Global Competitiveness Index, Bahrain stood at 73, 67, 56, and 45 in quality of scientific research institutions, capacity for innovation, company spending on R&D, and university-industry collaboration on R&D, respectively, out of a total of 137 countries.

Therefore, according to the global indices, Bahrain is lagging far behind developed countries in the capacity for innovation, spending on R&D, and a lack of scientific research institutions. No statistics were found for individual capacities or

the number of individuals and quality of their performance in formal activities in these indices.

After examining the viewpoints of the stakeholders of the Bahrain economy, pessimistic and optimistic outlooks were observed. Those with negative views saw that the government was too bureaucratic and centralized which halted the fast paced innovation activities to keep stride with the global competition. Another barrier from their perspective was the stagnant education system that was not able to build capabilities for the future workforce that needed to enter the fast-track technology development.

On the positive side, it was noted that the culture and mindset of the industry was changing from a risk averse mindset that feared failure and change towards one that collaborated with other sectors for the common goal of finding solutions for innovation purposes. The most interesting find was the appearance of the startup and entrepreneurial sector and the government's support by developing an ecosystem for this new environment.

In order to assist those young entrepreneurs with dreams of setting up and owning their own businesses, EDB developed a startup ecosystem for innovative digital projects that brought together entrepreneurs, financiers, incubators, academic establishments, and the Bahrain government to encourage and support the startup culture in Bahrain.

In this environment and from a total of fourteen factors needed to be available in order to show the degree of innovativeness of the innovation environment in a society, seven factors (50%)—5-1, 5-2, 5-3, 5-6, 5-7, 5-8, and 5-14—have just been

established and are picking up pace very quickly. Seven elements (50%)—5-4, 5-5, 5-9, 5-10, 5-11, 5-12, and 5-13—are negligible and their scope is not apparent in the interest of making the innovation environment conducive in Bahrain. Figure 5.5 represents the current status percentages and scope for innovation conducive factors in the innovation environment of Bahrain.

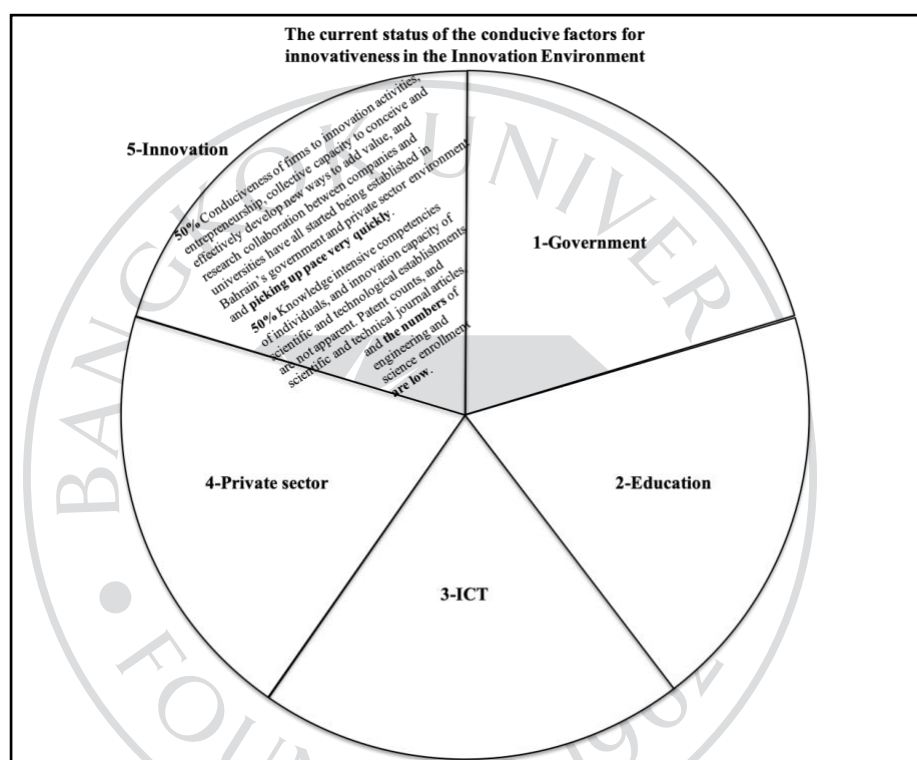


Figure 5.5: Innovation environment conducive elements

Source: Researcher's own elaboration

5.3.6 Emerging theme of collaboration for innovation activities in

Bahrain. In the findings, it was observed that the leadership of Bahrain was the highest advocate for GPC in Bahrain. Many forms of collaboration had already started in the right direction for pushing innovation agenda forward. Of these collaborations the ones that involved EDB, CBB, Tamkeen, iGA, and the ICT for the sake of

supporting the finance sector to become innovative were the most critical ones and set the stage to answer the last of the three questions in this study.

5.4 RQ. What is the role of the government and the private sector in collaboration to drive innovation forward in Bahrain?

As forwarded in Chapter 2, Chun, Luna-Reyes, and Sandoval-Almazan lightly defined collaboration as “a process or a set of activities in which two or more agents work together to achieve shared goals” (as cited in Modara & Bennet, 2017). While Modara and Bennet (2017) observed collaboration as a set of actions that two or more agents undergo together to achieve shared goals. Bennet, Bennet, and Lewis (2015) perceived collaboration as a procedure in which two or more units joined to make new knowledge by tactics in bringing their mindsets and existing assets and knowledge jointly to share, relate, and influence those mindsets to produce value to both of their units.

In the context of this research, the definition of collaboration is “a collaborative arrangement, in which two entities work jointly, each in their area of influence, by new tactics in bringing their approaches and existing assets and knowledge mutually to share, convey, and effect those approaches in order to create new knowledge for the ultimate goal of achieving a mutual goal.” This leads us to the last question that this research aimed to answer with regards to the ‘how’ of collaboration between the public and the private sectors for the sake of influencing the innovation activities to generate value for the growth of the local economy in Bahrain.

By answering the second question of this research, which dealt with the current state of collaboration and innovation in Bahrain, a few empirical evidences

were realized. Although the overall perspective of the participants was that the government is not innovative except for in the eGovernment projects, this was contrary to what emerged amongst a few of the new government entities that had been established in the past ten years, inclusive of eGovernment. A success story for this collaboration, which aimed at pushing innovation forward, emerged with the efficacious collaboration of EDB's team with vital entities in CBB, TRA, MOICT, Tamkeen, and eGovernment in advancing technological innovation in the financial sector.

In its journey to achieve Vision 2030, Bahrain's government had taken many steps towards this accomplishment since the launch of this vision in 2008. One of these strides started in year 2000, way before its Vision's inception, by establishing the semi-government entity of the economic board EDB with an inclusive duty to formulate and oversee the economic progress strategy for the kingdom through building the right climate to entice direct investment into the country. As a dynamic government agency, EDB's main target was to build a business environment that looked appealing to investors from abroad, while encouraging strong development of its local companies. EDB's foremost objective was to support and monitor initiatives that improve the economic and business environment in Bahrain, and for over 15 years EDB has been fostering potential investments across all sectors and attracting enterprises to grow and flourish the business environment of Bahrain.

In another arena, Bahrain had been the base for a healthy and advanced financial services sector for over 40 years, which is the largest non-oil provider to Bahrain's GDP and the second largest employer. In those 40 years, the financial

sector was steered by CBB, which fostered a rock-solid and nourishing regulatory environment for the financial sector to continue its services even during global economic turmoil. But, somehow the finance sector became stagnant in the past two decades until recently in 2017, during which the leaders of the sector and CBB comprehended that in order for the financial sector to stay competitive globally and gain leadership in the region once again, it had to become innovative in its services and products.

For innovation to flourish in the financial sector, CBB and EDB had to collaborate and review the proper legislation and regulatory administration in support of the financial sector. The latest of these regulations was the FinTech Regulatory Sandbox Framework, which is a virtual space for current CBB licensed financial institutions and newcomers or international investors. This space enables these investors to test their technology-based innovations without having to go under the heavy load of regulations and permits (Central Bank of Bahrain, 2012b).

To incite and foster innovation activities for technology investors in finance (FinTech), SMEs, and startups, a new crowdfunding regulation was also issued by CBB to create a legal framework for the startup investors loans accessed via a larger pool of financiers in return for equity participation of these financiers in those innovative startup projects.

Bahrain might be a small country, but its liberal regulatory environment, exceptional connectivity infrastructure, and its central location in the region give it the leisure of being an ideal test bed and an innovation hub for startups to launch their concepts, products and services for fine tuning and scaling up those projects across

the region. In line with the crowdfunding regulation, EDB launched in September 2017 a distinct digital platform for entrepreneurs that gives those individuals a single network place with entry tools and resources to nurture their concepts and connect them to the business community.

In the area of security procedures and protection of data, the CBB has also implemented regulatory modifications allowing the use of cloud technology to enable local and international banks to upload their data safely and securely to the cloud. These regulations were amongst those reasons that had a major role in AWS's decision to open offices in Bahrain.

The launch of EDB's entrepreneur's digital platform ecosystem and CBB's regulatory modifications for the cloud technology would not have been possible if Bahrain's ICT infrastructure was not ready. One of the best in the region, and ranked 25 among 126 countries (GII, 2018), the infrastructure and the facilities for ICT in Bahrain are in place, and are considered one of the best developed in the region international standards. This comes under the regulations put in place by TRA with the pursuit to inspire wider economic growth on the same track of the kingdom's Vision 2030 with the goal of developing Bahrain into a smart city. This achievement was noted also when Bahrain attained its number 1 rank in the Arab world and rank 31 globally in the ITU global ranking in 2017.

In its role to support and encourage startups, SMEs, and entrepreneurs, as well as give them the legal status to perform their activities and to simplify the procedures for the establishment of those businesses which do not need a physical location to operate, the MOICT established a commercial registration that did not need a physical

address for the applicant to operate. In other words, to make it easier and to lessen the cost of putting up a business for certain businesses that did not require an office, but needed a legal status to operate and draw contracts, these startups could have the option of registering their business under a virtual commercial registration.

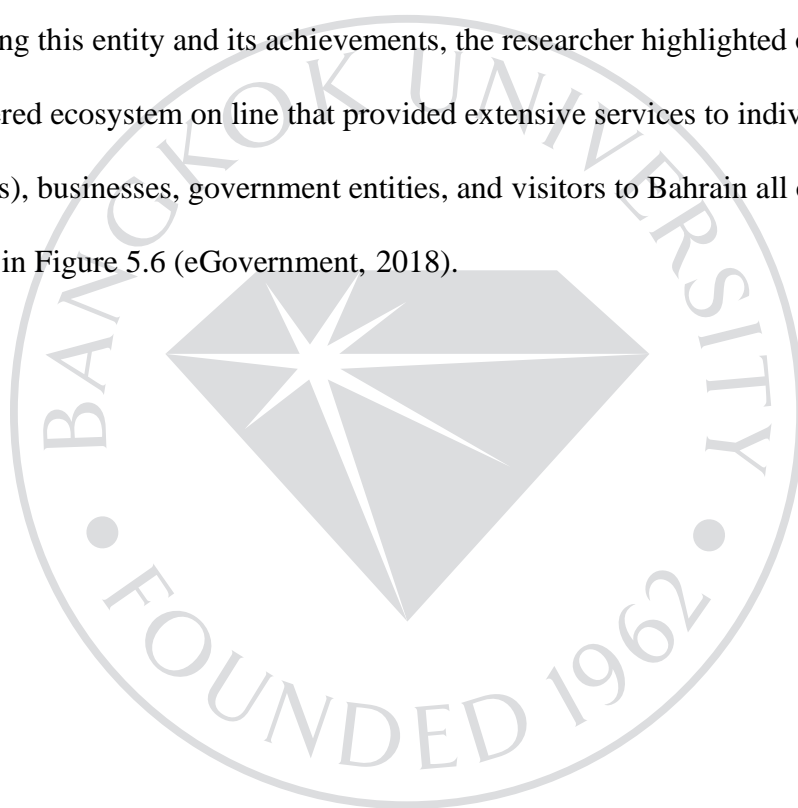
Last, but not least, Tamkeen's role in this collaboration is twofold: (a) investment and (b) innovation. As for investment, Tamkeen is planning to invest in the creation and development of an entrepreneur hub and empowerment of niche incubators. Tamkeen is also looking into spreading its financial support mechanism by constructing and empowering of angel investment linkages and crowdfunding, and backing of IPOs. In innovation, Tamkeen is looking into supporting new products and services created by these startup enterprises by funding their ideation and prototyping, and supporting their intellectual property.

This illustration also highlighted another very important aspect in the government sector which is positioned as a foundation beneath all the processes that occurred in the previous collaboration, and yet was not visible to the natural eye of a normal spectator. This government entity is the eGovernment whose clear and main objective is to have all government ministries and their different entities coordinate and integrate by linking them digitally via one network by providing them with the best services and programs of high level in quality, efficiency, and security.

These services are provided under an established eGovernance approved by the Supreme Committee for Information and Communication Technology (SCICT) and designed through a council inclusive of relevant ministries, stakeholders, and executive structure. By creating a customized infrastructure, databanks, policies,

principles and information systems across all ministries and government bodies and placing them under one standard network, procedures and services are streamlined and become easily accessible by all parties in the government. Effort duplication is avoided, and global costs of ICT project implementation are reduced, while quality assurance and electronic systems become core focus of these projects.

eGovernment was recognized as the innovative arm of the government, and by reviewing this entity and its achievements, the researcher highlighted on the skillfully engineered ecosystem on line that provided extensive services to individuals (citizens), businesses, government entities, and visitors to Bahrain all on one platform as seen in Figure 5.6 (eGovernment, 2018).



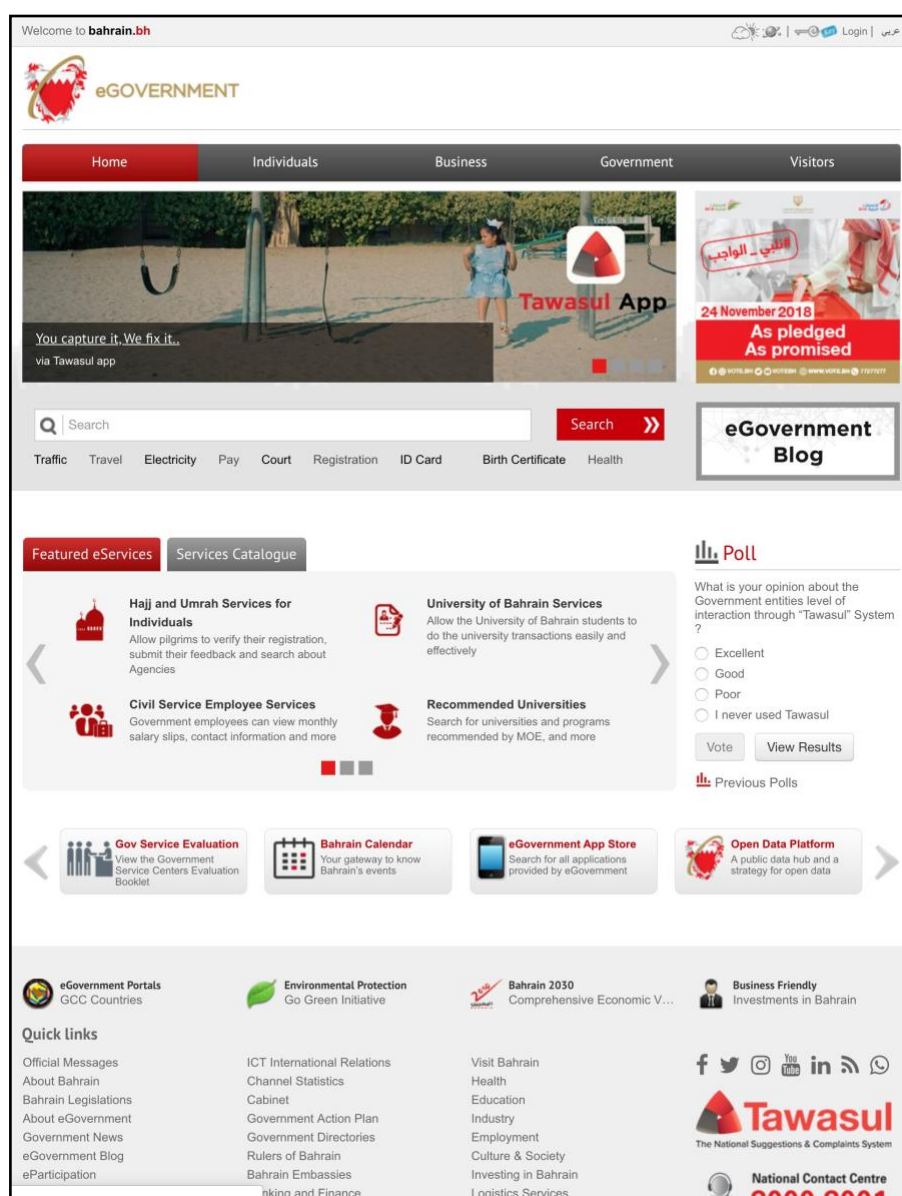


Figure 5.6: eGovernment portal

Source: eGovernment (2018)

The entities involved were brought together and their roles were identified in the model that was constructed by the researcher to illustrate the collaboration between them and the role that each stakeholder played with the common goal of enabling the financial sector to innovate. EDB was classified as the advocate and the promoter for the financial sector's innovation. CBB is the regulatory body in charge

of supervising and regulating all the activities of the financial sector in Bahrain, therefore had to be brought in to put the regulations needed for the finance to innovate. MOICT was the next step in order to legalize and authorize the new businesses forming as a byproduct of these new innovative activities. Tamkeen's role kicked in after those digital oriented individuals and organizations started shaping up and needed capability and capacity building support. The innovation producers were the financial sector and the digital oriented individuals and organizations, and the whole project would not have materialized without the existence of the ICT infrastructure and the eGovernment platform as illustrated in Figure 5.7.

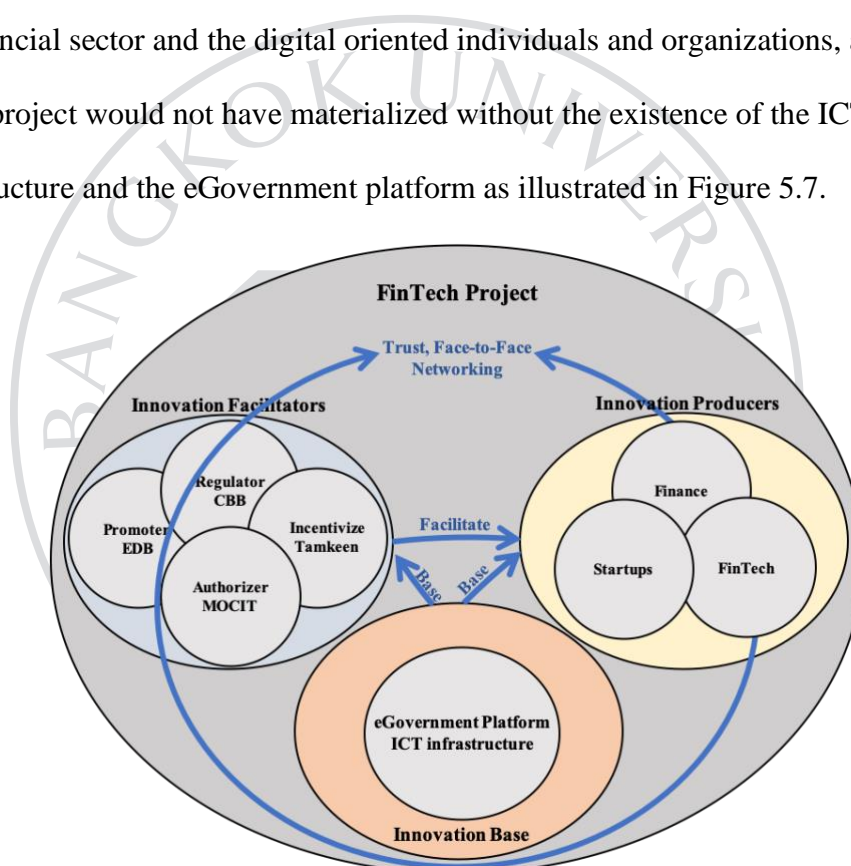


Figure 5.7: Finance sector innovation project model

Source: Researcher's own elaboration

It is noted that the existence of this innovation ecosystem for the financial sector was a project that came to an end after the collaboration of the stakeholders was manifested in the regulations, authorizations, and the incentives development and

established the grounds for the financial related technology (FinTech) to materialize. It is noteworthy to highlight that another ecosystem emerged as a result of the financial innovation ecosystem project collaboration. That collaboration paved the way for creating an ecosystem to enable the networking of the tech savvy individuals and organizations with other stakeholders. This ecosystem was the Startup Bahrain digital ecosystem developed by EDB that caters for startups and entrepreneurs in the technology sector (Figure 5.8) and acted as an information guide for all the entities involved in FinTech or technology innovation. The Startup Bahrain comprise of the startups, the corporates, the participating investors, the accelerators, incubators, educational institutions, and the Bahrain government.



Figure 5.8: Startup Bahrain digital ecosystem

Source: Startup (2018)

5.4.1 Constructing a GPC Model for Bahrain. The realization that the finance sector was lagging behind in innovative services and the steps taken by the

government to push innovation forward in this vital and crucial sector to nurture the economy in Bahrain, emerged as **an excellent prototype of the private sector and the government's roles in collaboration to influence the innovation activities in Bahrain.**

It was this project and the innovation ecosystem model, comprised of KE and commercial economy as founded by Jackson (2011) and recognized in Chapter 2, that directed the way for the researcher in developing the GPC model prototype for innovation activities in Bahrain.

As established by Jackson (2011), the innovation ecosystem model is an economic model that comprises of two distinctive economies; the first one, KE, which has knowledge as its driver, and the second one being a commercial economy, which is charted by the marketplace. These two economies are linked since the outcome of new knowledge, which is innovation, converts into value generating products, services, or processes in the commercial economy. After the generation of these new knowledge and their worth in values get disseminated in the commercial economy, a part of that knowledge and value would then be injected back into the innovation ecosystem as resources to be used in producing new ideas and inventions in this cooperative ecosystem, hence generating new knowledge converted into new innovation which will get injected into the commercial economy and so on.

By developing the financial sector innovation project model earlier (Figure 5.7), the researcher recognized four entities that would be permanent entities as innovation enablers of the government environment. The first body and the initiator of this process is EDB, who as promoters originate the process by identifying the sector

that needs to transform and change in order to influence the economy's diversification and development. The second entity, the regulatory body, although a fixed entity also as part of the enablers, would be identifiable only amongst the different regulatory bodies existing when EDB identifies which sector to focus on to push innovation activities forward. This regulatory body is responsible for drawing new frameworks and policies for these new activities. MOICT steps in next as the sole entity responsible for authorizing the commercial registrations of all businesses in Bahrain to permit the new activity's operations. Tamkeen as the support for the development of the enterprises and the enhancement of the productivity and training of the Bahraini workforce, comes forward and begins putting training programs and support systems for the new entity's further development. eGovernment and the ICT infrastructure were acknowledged as the two permanent bodies in the KE environment and featuring the foundation for all the aforementioned activities which no collaboration actions could be pursued without their presence.

By combining the financial sector's successful innovation project model (Figure 5.7), as detailed earlier in this chapter, and the innovation ecosystem model established by Jackson (2011), the researcher devised the collaborative role model as illustrated in Figure 5.9 to outline the different roles each actor plays to contribute effectively to collaborate and influence the innovation activities in the developing KE of Bahrain.

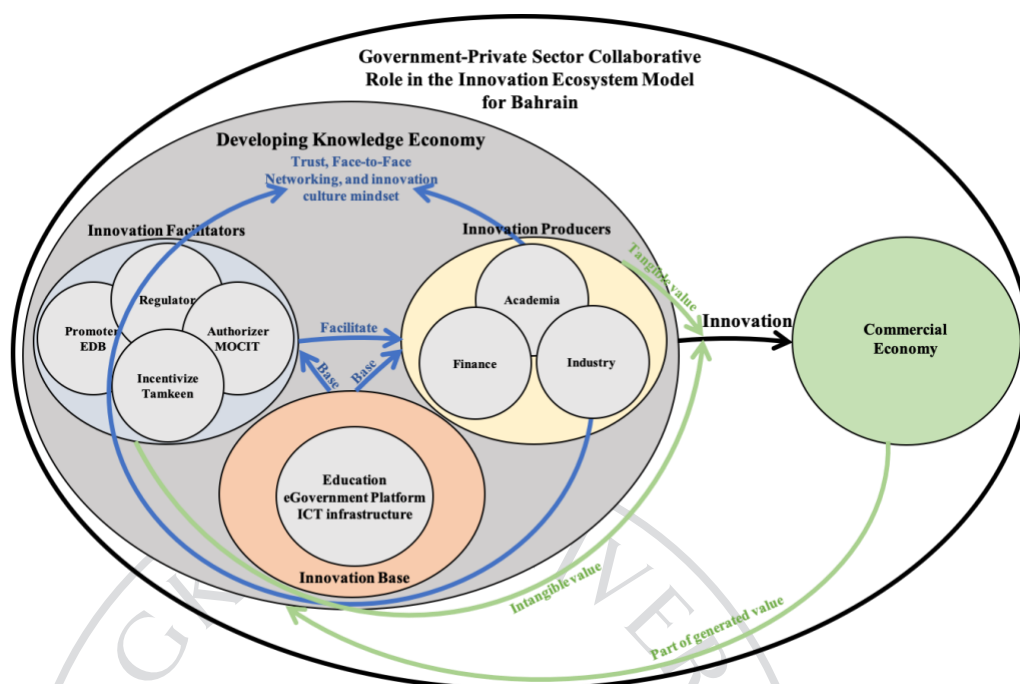


Figure 5.9: Government-private sector collaborative role model for Bahrain

Source: Researcher's own elaboration

By first collaborating amongst its own related entities, the government collaborates amongst the entities involved in the project at hand and produces new regulations, policies, and incentives as a strategy to facilitate the innovative capacity of the private sector under focus of the project. These new outputs are by themselves innovation products that add intangible values into the KE by producing new processes for other governmental entities to use. In return, the private sector's role inclusive of the academia, finance and industry is to collaborate amongst themselves and utilize these new regulation frameworks, policies, and procedures to produce innovative products, services, and processes that generate tangible and direct values that get infused into the KE. The byproducts of these intangible and tangible values are innovations that are injected into the commercial economy. The factors of trust, face-to-face networking, and an innovation culture mindset are all crucial elements

for these collaborative efforts to take place. After the diffusion of these innovations in the economy a fraction of their generated value would be disseminated back into the developing KE to make new knowledge, hence new innovation.

By devising the government-private sector collaborative role model for Bahrain's innovation ecosystem, the researcher was able to bridge the gap on the nature of the roles the government and the private sector play in collaboration to influence the innovation activities and the significance of the roles each of these two sectors hold in producing clear strategies for the transition of Bahrain's oil & gas dependent economy to a knowledge based economy.

By observing the Finance Innovation Project Model (Figure 5.7), it was clear that of all the four pillars of KE; economic and institution regime, education, innovation, and ICT, the only pillar missing in the model was education. In order to support innovation activities in Bahrain to develop further, the education sector's role should be a priority to kick in as builder of individuals' creative capacities and skills as early as pre-primary school stages. Therefore, education has been added as one of the crucial factors in the base of the innovation ecosystem projects in Bahrain. Also, the financial sector in Bahrain emerged as one of the main sectors influencing the economy of Bahrain and thus have been included in the innovation producers and their collaboration with the academia sector very crucial to push innovation activities forward in the developing KE of Bahrain.

5.4.2 Summary of findings. In order to expand and diversify its oil & gas based economy and shift it to one that is knowledge-based by year 2030, Bahrain is increasing its efforts to position itself as the region's technology hub as it had already

established the country's position as a financial hub. Bahrain's investment in its ICT infrastructure, coupled with top technology based international organizations investing in Bahrain, such as AWS, is creating ideal conditions to build innovative capacities in the kingdom. One of the key drivers for nurturing innovation activities and building innovative capacities is the collaboration initiative of the government and the private sector. The base of this partnership stands on actors such as investment promoters, regulatory and authorized bodies, and entities that incentivize and contribute to the development of innovation inducive environments that lead to innovation producers.

The findings of this research in the context of Bahrain suggest that in the government milieu, the institutional framework for attracting investments locally and internationally has already been established and is functioning well. This institution not only identifies the private sector, which needs to be promoted to become innovative in order to compete regionally and globally, but also identifies the related regulatory body that is needed to devise the governing frameworks and policies needed for this private sector to innovate. The government incentives for building the innovation capabilities of individuals and the capacities of organizations were perceived in the collaboration role the different public entities played amongst themselves in order to facilitate policies and regulations to enable the private sector to innovate. This collaboration role in the government arena was observed to have been established and functioning well. Also, on the positive side, collaboration for specific innovation projects had already started during the past two years, and was observed to be picking up momentum. An innovation culture mindset, trust between entities, and a

face-to-face networking were also observed to have been recognized, proven in use, and effective among the collaborating entities. Yet, it was discovered that government effectiveness and rule of law, although established, needed more development. Still nonexistent and in need of one to be established was a center for the city's future management.

From the positive perspective in the education arena, was the achievement of 100% literacy rate and 95% school enrollments, while in the tertiary level, the universities had started collaborating with the industry and the private sector to produce innovative programs for graduates and developing technology labs for research purposes. Yet, the pre-tertiary education system standard and the quality of math and science remains in need of upgrading and developing to become in a level where students would be analytic thinkers with problem solving abilities and innovative mindsets. The collaboration of the education sector with the other sectors for building the creative capacities of the teachers first in order to have them capable of building the future generation of creative minds and culture was also found in need of development.

The ICT infrastructure was found to be highly developed in Bahrain and ranked top in the region by global ICT indices, and the reason why technology investors came and established their offices here in the kingdom. Collaboration of the ICT sector with other entities for innovation purposes had already started and was picking up pace.

In the private sector, the environment was found to be open with an access to the international market, and the innovation capacity of the sector had just started

growing with new business incubators setting up offices in Bahrain and the collaborative role of these private businesses with the government entities for innovation activities purposes had begun in the sense that the government bodies facilitated the regulations needed to enable the private sector to innovate. Skilled and professional individuals in the sector were also growing in numbers due to the support and incentives given to the startups and the entrepreneurs via programs developed by Tamkeen.

It was observed that an internal organizational framework for knowledge generation and innovation activities did not exist in the public or private sector organizations, and no strategy was drawn on the nature of how a collaboration could take shape between the public and the private sector to strategize innovation activities.

An excellent example of the nature of the collaborative roles of the government and the private sector in order to influence the innovation activities in Bahrain emerged in this study and a prototype model for this collaboration was devised by the researcher.

5.4.3 Conclusion. Building a KE is a long process that involves wide-ranging and far-reaching changes that a country needs to make and is unique to the nature and culture of that country. These changes depend mainly on the actors involved in the country's economic development, inclusive of government entities and the private sector organizations, and no progress can be achieved without all of these entities collaborating to reach the ultimate goal of progress in the country. The objective of this study was to explore the extent of the government and private sector collaboration and how it influenced the innovation activities in Bahrain in its pursuit of a

developing KE. The study was based on explorative single multi-unit case study methodology with the essential view concerning global KE and innovation indices.

Establishing and maintaining a GPC strategy for the roles that each of these sectors plays in this strategy is a vital initiative that will nurture the innovation activities and processes in the Kingdom of Bahrain. By establishing this strategy, this research aspires to contribute to the determinations of the government leaders and the decision makers to diversify and shift the gas & oil dependent economy of Bahrain to one that is knowledge-based.

Bahrain's government is strong-minded to create a new economy that increases the levels of sophistication and innovation by creating a milieu that is favorable to entrepreneurs and innovation and creates knowledge-based highly valued-added organizations and economic accomplishments.

Innovation in Bahrain needs an environment inclusive of material resources, human capital organizations, and financial means. This environment is developed through the collaboration of all its actors while enthused by policies and support issued and provided by the government of Bahrain. This necessitates strategic and active participation in the creation and management of this environment. It was accordingly established in the findings of this research that the government, more than the private sector, has entities that are equipped and loyal to Bahrain Vision 2030, and are responsible for the development and promotion of this vision becoming a reality. Hence, it is very important for the government to adopt a strategy that aligns the roles of the government as facilitators with that of the private sector as the producers of innovation in the innovation activities for a strategic objective of becoming a

knowledge-based economy in 2030. This approach ensures the commitment of each sector to the success of these collaborative roles since each segment will base their partnership on the success of their own organizations' objectives to reach one common vision, that of Vision 2030.

The policy makers of Bahrain are faced with the challenge of not having a direct R&D expenditure or the existence of R&D institutions, which are a major part of building a KE. There is simply not enough R&D expenditure or R&D activities going on in Bahrain for it to fulfil the innovation creating criteria according to the global innovation related indices. This elevates the necessity on how the government of Bahrain would advocate collaborative innovation activities amongst its public and private sector to develop its KE.

5.5 Recommendations

In this study the role of the government in the GPC arena emerged as the main advocator of innovation activities by being the facilitator and enabling the path for the private sector to build its organizations' innovation capacity along with the support of the government incentivizing and building the capabilities of the workforce. The role of the government surfaced, as well, as a supporter of the new tech savvy generation in Bahrain and the provider of incentives for this new sector to develop their entrepreneurial ambitions by nurturing their innovative ideas and ventures.

Although many initiatives and steps have been taken by the government to foster the production of the innovation activities and processes in Bahrain, it was perceived that those initiatives were produced as a byproduct of single projects with no systematic procedures or a holistic strategy in place to embody the collaborative

progression. The following recommendations, based on the findings of this case study, are proposed as additional insights for those initiatives:

5.5.1 Government. In order to lessen the bureaucracy measurements still followed in many public institutions, it is recommended that the rule of law and government effectiveness become more progressive by decentralizing and flattening organizational hierarchies.

A framework for collaboration procedures amongst public institutions specific to developing regulations for innovation processes in the area of their expertise is recommended to be drawn with a dedicated group or center appointed to overlook its operations in a healthy and sustainable manner.

Another framework recommended for collaboration procedures for the government entities regulatory activities' partnership with the private sector, is an assigned advisory and supervisory body. The framework drawn for the public institutions collaboration could be combined with the one drawn for private-public collaboration and brought under one umbrella designated as "The Center for Future Advancement of the Country".

5.5.2 Education. As one of the four pillars of KE, education is not only about literacy, for which Bahrain has already reached a rate over 95 percent, it is also about the quality of education received by the students, which still remains a challenge in Bahrain. Overall, the education system was found to obstruct building the capability of the students to be creative and innovative since their decision making was based on what they learned from books and not by analyzing and solving problems related to the innovative capacity of the education sector.

The education needed for a KE is one that enriches people's understanding of their society's needs to raise productivity and creativity in order to promote entrepreneurship and technological advances. For this to happen, it is recommended the education system to be based on building skills and competencies for technology and science, and strengthening knowledge production, knowledge sharing and knowledge transfer.

It is recommended for the government to draw regulations to enable academia professors to take up consultancy contracts in private sector organizations. Such consultancy projects will increase the interaction between the academic world and industry, giving way to universities exposure to technological advancements and hence providing a heads up for planning new programs and certificates for graduates who will infiltrate the job markets continuously being created as a result of these fast-developing technologies. On the other hand, industry would have greater exposure to the science and research arena, which will in turn advocate for the development of a missing culture for an R&D mindset.

One last recommendation is for the private sector to collaborate in developing the knowledge and skills of its workforce by advocating vocational training and continuous studies in this era where existing jobs quickly become obsolete and new ones get rapidly created due to the ever-increasing rate of technological advancements.

5.5.3 ICT. ICT infrastructure in Bahrain has been established to be one of the best in the region according to global indices. Bahrain graduates hundreds of technology and computer science students yearly who have undertaken projects that

are considered some of the best globally. It is recommended that Bahrain establish itself as the ICT hub for the region by setting up an R&D center and incorporating the technology and computer science graduates into this center while also attracting ICT researchers from abroad to join in this center in order to enhance such technologies and benefit the GCC countries and the region.

5.5.4 Innovation. A strategy that aligns the roles of the government as facilitator with that of the private sector as the producer of innovation is recommended to be drawn with the collaborative efforts of the government and the private sector authorities involved in innovation activities. It is recommended that the Government-Private Sector Collaborative Role Model for Bahrain as developed in this research and elaborated in Figure 5.9 be used as a guideline to draw this strategy.

5.6 Limitations of this study

One of the key shortcomings of the current study is that its design is cross-sectional (Saunders et al., 2015) in that the findings of the project do not go beyond the current time period. Yet, this study was vital to inform the decision makers the current status of the roles of the government and the private sector in influencing the innovation activities in Bahrain.

This study was conducted in one country and the results reached in this study for Bahrain might not be generalizable to other countries. However, this research could still serve as the groundwork for further studies on the development of knowledge economies in this region, especially for the GCC countries based on their similar culture, language, religion, and economies which are hydrocarbon dependent.

The units of analysis chosen by the researcher were also related to areas crucial for Bahrain's economy, which could be different for other countries. Further, the choice of the interviewees who took part in this study were based on the nature of their work and their connections to the activities that generated value for the economy in Bahrain. Other individuals not chosen could have possibly provided added value information in regards to the innovation development in Bahrain and the collaboration of the sectors in this regard.

Notwithstanding the above limitations, the interviewees were very helpful and supportive to the researcher, and interested in the area of the research. They gave their full attention at the time of their interviews, despite busy schedules. One CEO participant spared time from his busy agenda to study the interview questions beforehand, and informed the researcher later that he conducted a small search of his own to get more familiar with innovation and its activities in his organization. He thanked the researcher at the end of his interview and said, "I am grateful for this opportunity to have been a participant in your research because you have triggered a few things in my mind that I hope to take forward beyond this interview".

The second key limitation was the researcher's lack of experience in drawing open ended research questions and further conducting interviews for qualitative studies. The fact that the questions were closed ended and left little room for the interviewees to elaborate on their answers was a limitation in having them express their views on the subject of collaboration and provide examples of real projects.

The researcher's effort to overcome this limitation was through conducting Focus Groups and opening up the floor for the Focus Group participants to share their

views and give examples of projects undertaken by them or other organizations with regards to collaboration.

5.7 Future Research

Innovation is a new and developing occurrence in Bahrain, which became apparent after the interviews were analyzed and correlated with the reports and articles. After the correlation, it was perceived that there was a knowledge gap between what the interviewees thought about collaboration roles of the government and the private sector for innovation activities and what was practically happening in Bahrain.

Future research should repeat this study in other units of analysis in Bahrain such as primary education, health, and transportation, as this could further evaluate the current status of collaboration amongst these entities as compared to the units which were addressed in this research. Impending research should be undertaken in the industrial sector to promote innovation of scale possibilities in this sector.

BIBLIOGRAPHY

- Abawi, K. (2013). *Data Collection Instruments (Questionnaire & Interview)*. Geneva: Geneva Foundation for Medical Education and Research.
- Abduljawad, H. (2013). *University-industry-government partnership: A state of Qatar transformation to a knowledge-based economy case study* (Doctoral dissertation). Retrieved from ProQuest Dissertations Publishing. (UMI No. 3577942)
- Abraham, R. (2018, July/August). Developing Ecosystems that support Economic growth. *bizbahrain*, 5, 12-15.
- Ahmed, A., & Abdalla Alfaki, I. M. (2013). Transforming the United Arab Emirates into a knowledge-based economy: The role of science, technology and innovation. *World Journal of Science, Technology and Sustainable Development*, 10(2), 84–102. doi.org/10.1108/20425941311323109
- Ahmed, A., & Al-Roubaie, A. (2012). Building a knowledge-based economy in the Muslim world: The critical role of innovation and technological learning. *World Journal of Science, Technology and Sustainable Development*, 9(2), 76–98. doi.org/10.1108/20425941211244243
- Akbayrak, B. (2000). A comparison of two data collection methods: Interviews and questionnaires. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 18, 1-10. Retrieved from <http://www.efdergi.hacettepe.edu.tr/200018BURCU%20AKBAYRAK.pdf>

- Al Shami, A., Lotfi, A., Coleman, S., & Dostál, P. (2015). Unified knowledge based economy hybrid forecasting. *Technological Forecasting and Social Change*, 91, 107–123. doi.org/10.1016/j.techfore.2014.01.014
- Al-Ali, J. (2008). Emiratisation: drawing UAE nationals into their surging economy. *International Journal of Sociology and Social Policy*, 28(9/10), 365–379. doi.org/10.1108/01443330810900202
- Bramwell, A., Hepburn, N., & Wolfe, D. A. (2012). Growing innovation ecosystems: University-industry knowledge transfer and regional economic development in Canada. *Knowledge Synthesis Paper on Leveraging Investments in HERD. Final Report to the Social Sciences and Humanities Research Council of Canada.*
- Almirall, E., & Wareham, J. (2008). Living Labs and open innovation: Roles and applicability - ESADE Knowledge. Retrieved June 25, 2018, from <http://www.esadeknowledge.com/view/living-labs-and-open-innovation-roles-and-applicability-151918>
- Al-Mudhahki, J.S. (2017). Bahrain: Moving towards a Knowledge-Based Economy. In S. Kirdar (Editor), *Education in the Arab World* (pp. 117-135). UK: Bloomsbury.
- Al-Rahbi, I. A. (2008). *An empirical study of the key knowledge economy factors for sustainable economic development in Oman* (Unpublished doctoral dissertation). Victoria University, Melbourne, Australia. Retrieved from http://vuir.vu.edu.au/2033/1/Al-Rahbi_Ibrahim_PDD_thesis_April_2009.pdf

Al-Roubaie, A. (2010). Building indigenous knowledge capacity for development.

World Journal of Science, Technology and Sustainable Development, 7(2),

113–129. doi.org/10.1108/20425945201000008

Al-Roubaie, A., & Alvi, S. (2014). Knowledge transfer for sustainable development:

east-west collaboration? *World Journal of Science, Technology and*

Sustainable Development, 11(4), 242–255. doi.org/10.1108/WJSTSD-06-

2014-0007

Seidler-de Alwis, R., & Hartmann, E. (2008). The use of tacit knowledge within

innovative companies: knowledge management in innovative enterprises.

Journal of Knowledge Management, 12(1), 133–147.

doi.org/10.1108/13673270810852449

Asia Pacific Economic Cooperation, Economic Committee. (2000). *Towards*

knowledge-based economies in APEC: Report. Singapore: APEC Secretariat.

Aubert, J., & Reiffers, J. (2004). *Knowledge Economies in the Middle East and North*

Africa. Washington: World Bank Publications.

Avedisian, J., & Bennet, A. (2010). Values as knowledge: A new frame of reference

for a new generation of knowledge workers. *On the Horizon*, 18(3), 255–265.

doi.org/10.1108/10748121011072708

Bagherinejad, J. (2006). Cultivating technological innovations in Middle Eastern

countries: Factors affecting firms' technological innovation behavior in Iran.

Cross Cultural Management: An International Journal, 13(4), 361–380.

doi.org/10.1108/13527600610713440

Bahrain Vision 2030. (n.d.) Bahrain Economic Development Board. Retrieved from

https://issuu.com/economicdevelopmentboard/docs/bahrain_vision_2030

Bahrain's labor market: Bridging the Gulf. (2010, 14 January). *The Economist*.

Retrieved from <https://www.economist.com/finance-and-economics/2010/01/14/bridging-the-gulf>

Bahrain Polytechnic. (2016). About Bahrain Polytechnic. Retrieved from

<http://www.polytechnic.bh/about-us/our-story/>

Baker, S. E., Edwards, R., & Doidge, M. (2012). *How many qualitative interviews is enough?: Expert voices and early career reflections on sampling and cases in qualitative research* (Working Paper). National Centre for Research Methods, Southampton, UK: National Centre for Research Methods, Southampton.

Retrieved from <http://eprints.brighton.ac.uk/11632/>

Bakıcı, T., Almirall, E., & Wareham, J. (2013). A smart city initiative: The case of Barcelona. *Journal of the Knowledge Economy*, 4(2), 135–148.

doi.org/10.1007/s13132-012-0084-9

Barlow, J., & Köberle-Gaiser, M. (2009). Delivering innovation in hospital construction: Contracts and collaboration in the UK's private finance initiative hospitals program. *California Management Review*, 51(2), 126–143.

doi.org/10.2307/41166483

Barroso, J. M. (2010). *Europe 2020: A strategy for smart, sustainable and inclusive growth*. Brussels: European Commission.

- Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, 13(4), 544–559. Retrieved from <https://nsuworks.nova.edu/tqr/vol13/iss4/2>
- Bell, E., & Bryman, A. (2006). The ethics of management research: An exploratory content analysis. *British Journal of Management*, 18(1), 63–77.
doi.org/10.1111/j.1467-8551.2006.00487.x
- Bennet, A., & Bennet, D. (2004). *Organizational survival in the new world*. Amsterdam: Butterworth-Heinemann.
- Bennet, A., Bennet, D., & Avedisian, J. (2015). *The course of knowledge: A 21st century theory*. Marlinton, West Virginia: MQI Press.
- Bennet, A., Bennet, D., & Lewis, J. (2015). *Leading with the future in mind: Knowledge and emergent leadership*. Frost, West Virginia: MQIPress.
- Bergek, A., Jacobsson, S., Carlsson, B., Lindmark, S., & Rickne, A. (2008). Analyzing the functional dynamics of technological innovation systems: A scheme of analysis. *Research Policy*, 37(3), 407–429.
doi.org/10.1016/j.respol.2007.12.003
- Bessant, J., & Tidd, J. (2007). *Innovation and entrepreneurship*. Chichester, England: John Wiley & Sons.
- Bhardwaj, M., & Monin, J. (2006). Tacit to explicit: An interplay shaping organization knowledge. *Journal of Knowledge Management*, 10(3), 72–85.
doi.org/10.1108/13673270610670867
- Bhattacharjee, A. (2012). *Social science research: Principles methods, and practices*. Tampa, FL: University of South Florida.

- Bin Byat, A., & Sultan, O. (2014). The United Arab Emirates: Fostering a unique innovation ecosystem for a knowledge-based economy. In S. Dutta, B. Lanvin, & S. Wunsch-Vincent (Eds.), *The global innovation index 2014* (pp. 101–111). Geneva, Switzerland: Cornell University, INSEAD, and WIPO.
- Bogdanowicz, M. S., & Bailey, E. K. (2002). The value of knowledge and the values of the new knowledge worker: Generation X in the new economy. *Journal of European Industrial Training*, 26(2/3/4), 125–129.
doi.org/10.1108/03090590210422003
- Bommert, B. (2010). Collaborative innovation in the public sector. *International Public Management Review*, 11(1), 15–33. Retrieved from <http://journals.sfu.ca/ipmr/index.php/ipmr/article/view/73>
- Boyle, G. (2018, 28 February). What does the future hold for Bahrain? *Gulf Daily News*. p. 7.
- Brenes, E. R., Camacho, A. R., Ciravegna, L., & Pichardo, C. A. (2016). Strategy and innovation in emerging economies after the end of the commodity boom—Insights from Latin America. *Journal of Business Research*, 69(10), 4363–4367. doi.org/10.1016/j.jbusres.2016.03.059
- Brewer, G., Gajendran, T., Jefferies, M., McGeorge, D., Rowlinson, S., & Dainty, A. (2013). Value through innovation in long-term service delivery: Facility management in an Australian PPP. *Built Environment Project and Asset Management*, 3(1), 74–88. doi.org/10.1108/BEPAM-03-2012-0008
- Bryman, A. (2012). *Social research methods* (4th ed.). Oxford: Oxford University Press.

BTECH. (2018). Leading Bahrain's ICT companies. Retrieved from <http://btech.bh/>

Callen, M. T., Cherif, R., Hasanov, F., Hegazy, M. A., & Khandelwal, P. (2014).

Economic diversification in the GCC: Past, present, and future. Washington D. C.: International Monetary Fund.

Cankar, S., & Petkovsek, V. (2013). Private and public sector innovation and the importance of cross-sector collaboration. *Journal of Applied Business Research*, 29(6), p 1597.

Capdevila, I., & Zarlenga, M. I. (2015). Smart city or smart citizens? The Barcelona case. *Journal of Strategy and Management*, 8(3), 266–282.
doi.org/10.1108/JSMA-03-2015-0030

Carlson, T. (2016, December). New office in Bahrain opening to build an ecosystem to jumpstart Cloud capabilities [Web log post]. Retrieved from <https://aws.amazon.com/blogs/publicsector/new-office-in-bahrain-opening-to-build-an-ecosystem-to-jumpstart-cloud-capabilities/>

Carrillo, F. J. (2004). Capital cities: A taxonomy of capital accounts for knowledge cities. *Journal of Knowledge Management*, 8(5), 28–46.
doi.org/10.1108/1367327041058738

Carrillo, F. J., Yigitcanlar, T., García, B., & Lönnqvist, A. (2014). *Knowledge and the city: Concepts, applications and trends of knowledge-based urban development*. New York: Routledge.

Central Bank of Bahrain. (2012a). Profile. Retrieved from <https://www.cbb.gov.bh/page-p-profile.htm>

- Central Bank of Bahrain. (2012b). Regulatory Sandbox. Retrieved from:
https://www.cbb.gov.bh/page-p-regulatory_sandbox_en.htm
- Chen, C.K. (2008). Construct model of the knowledge-based economy indicators.
Transformations in Business & Economics, 7(2), 21–31. Retrieved from
<http://www.transformations.knf.vu.lt/14/ge14.pdf>
- Chen, D. H. C., & Dahlman, C. J. (2005). *The knowledge economy, the KAM methodology and World Bank operations*. Retrieved from SSRN database.
 (World Bank Institute Working Paper No. 37256)
- Chun, S., Luna-Reyes, L. F., & Sandoval-Almazán, R. (2012). Collaborative e-government. *Transforming Government: People, Process and Policy*, 6(1), 5–12. doi.org/10.1108/17506161211214868
- Close, A. (2012). *Online Consumer Behaviour*. New York: Routledge.
- Cohen, L., Manion, L. & Morrison, K. (2005). *Research Methods in Education*. Taylor & Francis e-Library (4th edition).
- Collis, J. & Hussey, R. (2003). *Business Research: A Practical Guide for Undergraduate and Postgraduate Students*. Houndmills, Basingstoke, Hampshire: Palgrave Macmillan.
- Cox, A. M. (2007). Beyond information – factors in participation in networks of practice: A case study of web management in UK higher education. *Journal of Documentation*, 63(5), 765–787. doi.org/10.1108/00220410710827790
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative and mixed methods approaches* (4th edition). Thousand Oaks, CA: SAGE Publications, Inc.

- Crosby, B. C., & Bryson, J. M. (2010). Integrative leadership and the creation and maintenance of cross-sector collaborations. *The Leadership Quarterly*, 21(2), 211–230. doi.org/10.1016/j.leaqua.2010.01.003
- Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. Australia: Allen & Unwin.
- Crowley, L. (2011). Streets ahead: What makes a city innovative? Retrieved from http://reglab.dk/wordpress/wp-content/uploads/2016/05/306_streets_ahead3.pdf
- Damanpour, F., & Evan, W. M. (1984). Organizational innovation and performance: The problem of “organizational lag.” *Administrative Science Quarterly*, 29(3), 392–409. doi.org/10.2307/2393031
- De Waal, A., & Sultan, S. (2012). Applicability of the high performance organization framework in the Middle East: The case of Palestine Polytechnic University. *Education, Business and Society: Contemporary Middle Eastern Issues*, 5(3), 213–223. doi.org/10.1108/17537981211265598
- Denscombe, M. (2010). *The good research guide for small-scale social research projects*. (4th ed.). New York: McGraw-Hill.
- Dilshad, R.M., & Latif, M.I. (2013). Focus Group interview as a tool for qualitative research: An analysis. *Pakistan Journal of Social Sciences*, 33(1), 191-198.
- Dodgson, M., Gann, D., & Salter, A. (2008). *The management of technological innovation*. Oxford: Oxford University Press.

Droste, N., Hansjürgens, B., Kuikman, P., Otter, N., Antikainen, R., Leskinen, P., ...

Thomsen, M. (2016). Steering innovations towards a green economy:

Understanding government intervention. *Journal of Cleaner Production*, 135, 426–434. doi.org/10.1016/j.jclepro.2016.06.123

Drucker, P. F. (1994). *Post-capitalist society* (Reprint edition). New York: Harper Business.

Drucker, P. F. (1997). From capitalism to knowledge society. In D. Neef (Ed.), *The Knowledge Economy* (pp. 15–34). Boston: Butterworth-Heinemann.

Dupont, L., Morel, L., & Guidat, C. (2015). Innovative public-private partnership to support Smart City: The case of “Chaire REVES.” *Journal of Strategy and Management*, 8(3), 245–265. doi.org/10.1108/JSMA-03-2015-0027

Dutta, S., INSEAD, & Caulkin, S. (2007). *The power of innovation* (Global Innovation Index 2007) (pp. 26–37). Retrieved from <http://english.gov.cn/r/Pub/GOV/ReceivedContent/Other/2016-08-12/GII-2007-Report.pdf>

Easterby-Smith, M., Thorpe, R., & Jackson, P. R. (2012). *Management research*. London, UK: SAGE Publications.

Economic Development Board. (2018a). About EDB Bahrain. Retrieved from <http://bahrainedb.com/about-us/>

Economic Development Board. (2018b). Bahrain FinTech Bay highlights launch with announcement of startups and founding partners. Retrieved from <http://bahrainedb.com/latest-news/bahrain-FinTech-bay-highlights-launch-announcement-startups-founding-partners/>

Economic Development Board. (2018c). Seize the potential. Invest in Bahrain for ICT. Retrieved from <http://bahrainedb.com/app/uploads/2017/06/ICT-A4-Brochure-Jun2017.pdf>

Economic & Social Research Council. (2015). *Framework for research ethics*. Retrieved from <https://esrc.ukri.org/files/funding/guidance-for-applicants/esrc-framework-for-research-ethics-2015/>

Education & Training Quality Authority. (2018a). About BQA. Kingdom of Bahrain. <http://www.bqa.gov.bh/En/AboutQaaet/Pages/default.aspx>

Education & Training Quality Authority. (2018b). *Education and training ... Endeavors and outcomes*. Kingdom of Bahrain. <http://www.bqa.gov.bh/En/Publications/AnnualReports/ENG%20AR%20FINAL.pdf>

Edvinsson, L., & Sullivan, P. (1996). Developing a model for managing intellectual capital. *European Management Journal*, 14(4), 356–364. doi.org/10.1016/0263-2373(96)00022-9

Eftimoski, D., & Milenkovski, B. (2012). The knowledge competitiveness of Macedonian economy - comparative analysis. *Journal of Competitiveness*, 4(3), 122–135. Retrieved from <https://search.proquest.com/openview/dc099dafb79e1b2247523a797e06b633/1?pq-origsite=gscholar&cbl=1576352>

eGovernment. (2018). About eGovernment. Retrieved from <https://www.bahrain.bh/>

- Eijkman, H. (2008). Web 2.0 as a non-foundational network-centric learning space. *Campus-Wide Information Systems*, 25(2), 93–104.
doi.org/10.1108/10650740810866567
- Erakovich, R., & Anderson, T. (2013). Cross-sector collaboration: management decision and change model. *International Journal of Public Sector Management*, 26(2), 163–173. doi.org/10.1108/09513551311318031
- Ergazakis, K., Metaxiotis, K., Psarras, J., & Askounis, D. (2006). A unified methodological approach for the development of knowledge cities. *Journal of Knowledge Management*, 10(5), 65–78. doi.org/10.1108/13673270610691189
- Etikan, I., Musa, S., & Alkassim, R. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1–4. doi.org/10.11648/j.ajtas.20160501.11
- Evan, W. (1966). Organizational lag. *Human Organization*, 25(1), 51-53. Retrieved from <http://www.jstor.org/stable/44125021>
- Ezell, S. (2014, November 30). *How the Silicon Valley innovation ecosystem creates success* [Slide presentation]. Retrieved from <https://itif.org/publications/2014/11/30/how-silicon-valley-innovation-ecosystem-creates-success>
- Florida, R. (2009). *Who's your city? How the creative economy is making where to live the most important decision of your life* (Reprint edition). New York: Basic Books.

- Francis, D., & Bessant, J. (2005). Targeting innovation and implications for capability development. *Technovation*, 25(3), 171–183.
doi.org/10.1016/j.technovation.2004.03.004
- Fukuda, K., & Watanabe, C. (2012). Innovation ecosystem for sustainable development. In *Sustainable development: Policy and urban development-Tourism, life science, management and environment* (pp. 389–404). IntechOpen. doi.org/10.5772/26626
- Galindo, M., & Méndez-Picazo, M. (2013). Innovation, entrepreneurship and economic growth. *Management Decision*, 51(3), 501–514.
doi.org/10.1108/00251741311309625
- Garcia, B. C. (2007). Working and learning in a knowledge city: a multilevel development framework for knowledge workers. *Journal of Knowledge Management*, 11(5), 18–30. doi.org/10.1108/13673270710819771
- Garcia, B. C. (2008). Global KBD community developments: the MAKCi experience. *Journal of Knowledge Management*, 12(5), 91–106.
doi.org/10.1108/13673270810902966
- Garcia, B. C. (2010). Making MAKCi: An emerging knowledge-generative network of practice in the Web 2.0. *VINE*, 40(1), 39–61.
doi.org/10.1108/03055721011024919
- Global Innovation Index. (n.d.) About the Global Innovation Index [Organizational framework]. Retrieved from <https://www.globalinnovationindex.org/about-gii>
- GII. (2017b). *The Global Innovation Index*. Cornell University, INSEAD, and WIPO.

- Godin, B. (2008). In the shadow of Schumpeter: W. Rupert Maclaurin and the study of technological innovation. *Minerva*, 46(3), 343–360.
doi.org/10.1007/s11024-008-9100-4
- Golafshani, N. (2003). Understanding Reliability and Validity in Qualitative Research. *The Qualitative Report*, 8(4), 597–606. Retrieved from <http://nsuworks.nova.edu/tqr/vol8/iss4/6>
- Gopalakrishnan, S., Bierly, P., & Kessler, E. H. (1999). A reexamination of product and process innovations using a knowledge-based view. *Journal of High Technology Management Research*, 1(10), 147–166.
- Griffiths, D., Maraghi, F., & Hughes, A. (2011). *Taking the Lead: Innovation and Higher Education Institutions in Bahrain*. Paper presented at 10th International Entrepreneurship Forum, Bahrain. Retrieved from https://www.researchgate.net/publication/305996165_Taking_the_Lead_Innovation_and_Higher_Education_Institutions_in_Bahrain
- Gryczka, M. (2017). The changing role of the service sector in an innovation-oriented economy. *Folia Oeconomica Stetinensia*, 16(2), 175–190.
doi.org/10.1515/fofi-2016-0033
- Gunday, G., Ulusoy, G., Kilic, K., & Alpkan, L. (2011). Effects of innovation types on firm performance. *International Journal of Production Economics*, 133(2), 662–676. doi.org/10.1016/j.ijpe.2011.05.014
- Gustafsson, J. (2017). Single case studies vs. multiple case studies: A comparative study. Academy of Business, Engineering and Science. Halmstad University. Halmstad, Sweden.

- Guzmán, F., & Sierra, V. (2012). Public-private collaborations: branded public services? *European Journal of Marketing*, 46(7/8), 994–1012.
doi.org/10.1108/03090561211230160
- Hadad, S. (2017). Knowledge economy: Characteristics and dimensions. *Management Dynamics in the Knowledge Economy*, 5(2), 203–225.
- Hicks, R. C., Dattero, R., & Galup, S. D. (2007). A metaphor for knowledge management: explicit islands in a tacit sea. *Journal of Knowledge Management*, 11(1), 5–16. doi.org/10.1108/13673270710728204
- Higher Education Council. (2014). *National Research Strategy 2014-2024*. Manama: Higher Education Council.
- Higher Education Council. (2018). Secretariat General of the Higher Education Council. Ministry of Education. Retrieved from <http://moedu.gov.bh/hec/Default.aspx>
- Hill, A. (2011). Foreign infrastructure investment in Chile: The success of public-private partnerships through concessions contracts. *Northwestern Journal of International Law & Business*, 32(1), 165–190.
- Hislop, D. (2013). *Knowledge management in organizations*. Oxford: Oxford University Press.
- Hollands, R. G. (2008). Will the real smart city please stand up? *City*, 12(3), 303–320.
doi.org/10.1080/13604810802479126
- Hoppe, H.-H. (1997). On certainty and uncertainty, or: How rational can our expectations be? *The Review of Austrian Economics*, 10(1), 49–78.
doi.org/10.1007/BF02538143

- Houghton, J., & Sheehan, P. (2000, February). A primer on the knowledge economy. Presented at the *National Innovation Summit*, Melbourne, Australia. Retrieved from <http://www.vu.edu.au/research>
- Huggins, R., & Izushi, H. (2008). Benchmarking the knowledge competitiveness of the globe's high-performing regions: A review of the World Knowledge Competitiveness Index. *Competitiveness Review*, 18(1/2), 70–86. doi.org/10.1108/10595420810874619
- Hvidt, M. (2013). *Economic diversification in GCC countries: Past record and future trends*. The London School of Economics and Political Science. Retrieved from <http://www.lse.ac.uk/IDEAS/programmes/kuwait/home.aspx>
- Iacovoiu, V. B. (2016). Is innovation a main driver of the economic development? *Economic Insights - Trends and Challenges*, 68(1), 73–80.
- iGA migrates 40pc systems to Cloud. (2018, May 12). *Gulf Daily News*. p. 15.
- Innovation competition launched. (2018, September 26). *Gulf Daily News*. p. 2.
- International Monetary Fund. (2016). *Economic diversification in oil-exporting Arab countries*. Manama, Bahrain. Retrieved from http://www.imf.org/~media/Websites/IMF/imported-legacy-sidebar/external/np/pp/eng/2016/_042916.ashx
- International Telecommunication Union. (2017). *Measuring the information society report 2017- Volume 1*. Geneva, Switzerland. Retrieved from https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2017/MISR2017_Volume1.pdf

InterNations. (2018). The friendliest countries in the world. *Globetrender*. Retrieved from: <http://globetrendermagazine.com/2018/03/21/friendliest-countries-world-expats-2018/>

Investing in Bahrain 2015. (n.d.). Bahrain Economic Development Board. Retrieved from https://issuu.com/economicdevelopmentboard/docs/investing_in_bahrain_2015

ITU. (2017). ICT Development Index 2017. Retrieved from <https://www.itu.int/net4/ITU-D/idi/2017/index.html#idi2017economycard-tab&BHR>

Jackson, D. J. (2011). *What is an innovation ecosystem?* Arlington, VA: National Science Foundation. Retrieved from https://www.researchgate.net/profile/Deborah_Jackson2/publication/266414637_What_is_an_Innovation_Ecosystem/links/551438490cf2eda0df30714f.pdf

Jasimuddin, S. M., Klein, J. H., & Connell, C. (2005). The paradox of using tacit and explicit knowledge: Strategies to face dilemmas. *Management Decision*, 43(1), 102–112. doi.org/10.1108/00251740510572515

Jiao, H., Zhou, J., Gao, T., & Liu, X. (2016). The more interactions the better? The moderating effect of the interaction between local producers and users of knowledge on the relationship between R&D investment and regional innovation systems. *Technological Forecasting and Social Change*, 110, 13–20. doi.org/10.1016/j.techfore.2016.03.025

- Johannessen, J., Olsen, B., & Lumpkin, G. T. (2001). Innovation as newness: What is new, how new, and new to whom? *European Journal of Innovation Management*, 4(1), 20–31. doi.org/10.1108/14601060110365547
- Katić, A., Ćosić, I., Anđelić, G., & Raletić, S. (2012). Review of Competitiveness Indices that Use Knowledge as a Criterion. *Acta Polytechnica Hungaria*, 9(5), 25-44. Retrieved from
- Keranen, O. (2017). Roles for developing public–private partnerships in centralized public procurement. *Industrial Marketing Management*, 62, 199-210. doi.org/10.1016/j.indmarman.2016.09.003
- Khorsheed, M. (2015). Saudi Arabia: From Oil Kingdom to Knowledge-Based Economy - Khorsheed - 2015 - Middle East Policy - Wiley Online Library. *Middle East Policy*, 22(3), 147–157. doi.org/10.1111/mepo.12149
- Kingdom of Bahrain - eGovernment Portal. (2017). *Bahrain.bh*. Retrieved 5 August 2017, from <http://www.bahrain.bh/wps/portal>
- Knight, K. (1967). A Descriptive Model of the Intra-Firm Innovation Process. *The Journal of Business*, 40(4), 478. Retrieved from <http://www.jstor.org/stable/2351630>
- Kristensen, I., McQuaid, W., & Scherrer, W. (2015). Public private partnership as an instrument of innovation policy. In U. Hilpert (Ed.), *Routledge handbook of politics and technology* (pp. 249–261). Oxford: Routledge.
- Kumaraswamy, M. M., & Anvuur, A. M. (2008). Selecting sustainable teams for PPP projects. *Building and Environment*, 43(6), 999–1009. doi.org/10.1016/j.buildenv.2007.02.001

- Kurtić, A., & Donlagić, S. (2012, June). *Determining key factors for knowledge economy development in Bosnia and Hercegovina*. Presented at the Management, knowledge and learning conference, Celje, Slovenia.
- Labra, R., Rock, J. A., & Álvarez, I. (2016). Identifying the key factors of growth in natural resource-driven countries. A look from the knowledge-based economy. *Ensayos Sobre Política Económica*, 34(79), 78–89.
doi.org/10.1016/j.espe.2015.12.001
- Lawlor, A. (2014). Innovation ecosystems. Empowering entrepreneurs and powering economies. *The Economist Intelligence Unit*.
- Lember, V., Petersen, O., Scherrer, W., & Agren, R. (2014). Innovation in public services: Private, public, and public-private partnership. In *9th Regional Innovation Policies Conference*.
- Lincoln, Y. & Guba, E. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage.
- Lombardi, P., Giordano, S., Farouh, H., & Yousef, W. (2012). Modelling the smart city performance. *Innovation: The European Journal of Social Science Research*, 25(2), 137–149. doi.org/10.1080/13511610.2012.660325
- MacDonald, M. (2016). *Bahrain - Buildings*. *Mottmac.com*. Retrieved 9 April 2017, from <https://www.mottmac.com/bahrain>
- Madichie, N. O. (2013). Is the Middle East the land of the future? It is not a given! *Foresight*, 15(4), 321–333. doi.org/10.1108/FS-04-2013-0015
- Marczak, M., & Sewell, M. (n.d.) “Using Focus Groups for Evaluation.” Tucson, AZ: The University of Arizona. Retrieved from <https://cals.arizona.edu/sfcs/cyfernet/cyfar/focus.htm>

- Martín-de-Castro, G., López-Sáez, P., & Navas-López, J. E. (2008). Processes of knowledge creation in knowledge-intensive firms: Empirical evidence from Boston's Route 128 and Spain. *Technovation*, 28(4), 222–230.
doi.org/10.1016/j.technovation.2007.10.002
- Mason, M. (2010). Sample size and saturation in PhD studies using qualitative interviews. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 11(3). doi.org/10.17169/fqs-11.3.1428
- Matusik, S. F., & Hill, C. W. L. (1998). The utilization of contingent work, knowledge creation, and competitive advantage. *Academy of Management Review*, 23(4), 680–697. doi.org/10.5465/amr.1998.1255633
- McGregor, S. L. T., & Murnane, J. A. (2010). Paradigm, methodology and method: Intellectual integrity in consumer scholarship. *International Journal of Consumer Studies*, 34(4), 419–427. doi.org/10.1111/j.1470-6431.2010.00883.x
- Mercan, B., & Göktas, D. (2011). Components of innovation ecosystems: A cross-country study. *International Research Journal of Finance and Economics*, (76), 11.
- Metcalfe, S., & Ramlogan, R. (2008). Innovation systems and the competitive process in developing economies. *The Quarterly Review of Economics and Finance*, 48(2), 433–446. doi.org/10.1016/j.qref.2006.12.021
- Miller, T., Birch, M., Mauthner, M., & Jessop, J. (2012). *Ethics in qualitative research* (2nd ed.). London: Sage.

- Ministry of Education. (2018). About Ministry. Retrieved from <http://www.moe.gov.bh/Home.aspx>
- Ministry of Industry Commerce and Tourism. (2018). Ministry quality policy. Retrieved from <http://www.moic.gov.bh/en/Ministry/Pages/Ministry-Quality-Policy.aspx>
- Mohamed, M. S., O'Sullivan, K. J., & Ribière, V. (2008). A paradigm shift in the Arab region knowledge evolution. *Journal of Knowledge Management*, 12(5), 107–120. doi.org/10.1108/13673270810902975
- Mohamed, M., Stankosky, M., & Mohamed, M. (2009). An empirical assessment of knowledge management criticality for sustainable development. *Journal of Knowledge Management*, 13(5), 271–286. doi.org/10.1108/13673270910988105
- Modara, M. (2014). The role of knowledge management in enhancing the organizational productivity. The George Washington University, Washington D.C., USA.
- Modara, M., & Bennet, A. (2017). The impact of government-private sector collaboration on innovation in a developing knowledge economy. In (Ed.). *Proceedings of the International Conference on Sustainable Futures – ICSF*. (pp. 513-521) Kingdom of Bahrain.
- Mokyr, J. (2002). *The gifts of Athena: Historical origins of the knowledge economy*. Princeton, NJ: Princeton University Press.

- Morse, R. S. (2010). Integrative public leadership: Catalyzing collaboration to create public value. *The Leadership Quarterly*, 21(2), 231–245.
doi.org/10.1016/j.leaqua.2010.01.004
- Mörth, U. (2007). Public and private partnerships as dilemmas between efficiency and democratic accountability: The case of Galileo. *Journal of European Integration*, 29(5), 601–617. doi.org/10.1080/07036330701694907
- Mustafa Kamal, M. (2012). Shared services: Lessons from private sector for public sector domain. *Journal of Enterprise Information Management*, 25(5), 431–440. doi.org/10.1108/17410391211265124
- Nardelli, G., Jensen, J. O., & Nielsen, S. B. (2015). Facilities management innovation in public-private collaborations. *Journal of Facilities Management*, 13(2), 185–203. doi.org/10.1108/JFM-04-2014-0012
- Narvekar, R. S., & Jain, K. (2006). A new framework to understand the technological innovation process. *Journal of Intellectual Capital*, 7(2), 174–186.
doi.org/10.1108/14691930610661845
- Nazari, J. A., Herremans, I. M., Isaac, R. G., Manassian, A., & Kline, T. J. (2009). Organizational characteristics fostering intellectual capital in Canada and the Middle East. *Journal of Intellectual Capital*, 10(1), 135–148.
doi.org/10.1108/14691930910922950
- Neale, P., Thapa, S., & Boyce, C. (2006). *Preparing a case study: A guide for designing and conducting a case study for evaluation input*. Massachusetts: Pathfinder international.

- Neef, D. (1998). Rethinking economics in the knowledge-based economy. In *The economic impact of knowledge*. Woburn, MA: Butterworth-Heinemann.
- NESTA. (2007). *Innovation in UK Cities*. Retrieved from https://media.nesta.org.uk/documents/innovation_in_uk_cities.pdf:
- Newell, S., Robertson, M., Scarbrough, H., & Swan, J. (2009). *Managing knowledge work and innovation* (2nd ed.). Basingstoke, UK: Palgrave Macmillan.
- Noble, H., & Smith, J. (2014). Qualitative data analysis: A practical example. *Evidence-Based Nursing*, 17(1), 2–3. doi.org/10.1136/eb-2013-101603
- Nonaka, I. (1991). The knowledge-creating company. *Harvard Business Review*, (69), 96–104.
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. New York: Oxford University Press.
- Nonaka, I., & Toyama, R. (2005). The theory of the knowledge-creating firm: Subjectivity, objectivity and synthesis. *Industrial and Corporate Change*, 14(3), 419–436. doi.org/10.1093/icc/dth058
- Nour, S. (2014). Prospects for transition to a knowledge-based economy in the Arab region. *World Journal of Science, Technology and Sustainable Development*, 11(4), 256–270. doi.org/10.1108/WJSTSD-07-2014-0017
- Nour, S. (2015). Overview of knowledge economy in the Arab region. *Journal of the Knowledge Economy*, 6(4), 870–904. doi.org/10.1007/s13132-013-0153-8
- Nurunnabi, M. (2017). Transformation from an oil-based economy to a knowledge-based economy in Saudi Arabia: The direction of Saudi Vision 2030. *Journal*

of the Knowledge Economy, 8(2), 536–564. doi.org/10.1007/s13132-017-0479-8

OECD. (1996). *The Knowledge-Based Economy*. Paris: Organisation for Economic Co-operation and Development (OECD).

OECD. (2003). *New Challenges for Educational Research*. Paris: OECD.

Oliver, S., & Kandadi, K.R. (2006). How to develop knowledge culture in organizations? A multiple case study of large distributed organizations. *J. Knowledge Management*, 10, 6-24. Organization for Economic Cooperation and Development (2001). *The new economy: Beyond the hype*. Retrieved from <http://www.oecd.org/economy/growth/2380634.pdf>

Organization for Economic Cooperation and Development (2007). Innovation and growth: Rationale for an innovation strategy. Retrieved from <https://www.oecd.org/sti/inno/39374789.pdf>

OECD Watch. (2017). *Oecdwatch.org*. Retrieved 8 May 2017, from <https://www.oecdwatch.org/oecd-guidelines/oecd>

Ordóñez de Pablos, P. (2002). Evidence of intellectual capital measurement from Asia, Europe and the Middle East. *Journal of Intellectual Capital*, 3(3), 287–302. doi.org/10.1108/14691930210435624

Osborne, S., & Brown, L. (2011). Innovation, public policy and public services delivery in the UK. The word that would be king? *Public Administration*, 89(4), 1335–1350. doi.org/10.1111/j.1467-9299.2011.01932.x

- Oxford Business Group. (2016). *The report: Bahrain 2016: Construction & Real Estate*. Retrieved from <https://oxfordbusinessgroup.com/bahrain-2016/construction-real-estate>
- Oxford Business Group. (2018). *The report: Bahrain 2018: ICT*. Retrieved from <https://oxfordbusinessgroup.com/bahrain-2018/ict>
- Parcerro, O. J., & Ryan, J. C. (2017). Becoming a knowledge economy: The case of Qatar, UAE, and 17 benchmark countries. *Journal of the Knowledge Economy*, 8(4), 1146–1173. doi.org/10.1007/s13132-016-0355-y
- Pawlowski, J. M., & Pirkkalainen, H. (2012). *Global social knowledge management: The future of knowledge management across borders*. Paper presented at the European Conference on Knowledge Management, Spain.
- Peng, J., Moffett, S., & McAdam, R. (2010). Knowledge management in China: A review | journal of technology management in china | vol 5, no 2. *Journal of Technology Management in China*, 5(2), 158–175. doi.org/10.1108/17468771011053171
- Peterson, J. E. (2009). Life after oil: Economic alternatives for the Arab Gulf states. *Mediterranean Quarterly*, 20(3), 1–18. doi.org/10.1215/10474552-2009-011
- Popadiuk, S., & Choo, C. W. (2006). Innovation and knowledge creation: How are these concepts related? *International Journal of Information Management*, 26(4), 302–312. doi.org/10.1016/j.ijinfomgt.2006.03.011
- Porter, M. E. (2001). Strategy and the internet. *Harvard Business Review*, 79(3), 62–78.

RCSIB, Polytechnic to conduct summit on employability. (2018, March 10). The Daily Tribune, p. 11.

Robertson, S. (2009). 'Producing' Knowledge Economies: The World Bank, the KAM, Education and Development. In M. Simons, M. Olssen & M. Peters, *Re-reading Education Policies: Studying the Policy Agenda of the 21st Century*. Rotterdam: Sense Publishers.

Rowley, J., Baregheh, A., & Sambrook, S. (2011). Towards an innovation-type mapping tool. *Management Decision*, 49(1), 73–86.
doi.org/10.1108/00251741111094446

Ruscoe, J. (2008). A new role for research in achieving prosperity in the Middle East. *Education, Business and Society: Contemporary Middle Eastern Issues*, 1(1), 6–11. doi.org/10.1108/17537980810861466

Saunders, M., Lewis, P., & Thornhill, A. (2015). *Research methods for business students* (5th ed.). New York: Pearson Education Limited.

Saxena, A. (2017, September 24). Bahrain ideal place to set up business. *Gulf Daily News*. p. 15.

Saxena, A. (2017, December 28). Largest FinTech hub to open in Bahrain. *Gulf Daily News*. p. 17.

Saxena, A. (2018, March 9). Bank ABC planning to launch fully digital unit. *Gulf Daily News*. p. 15.

Saxena, A. (2018, October 2). Bahrain ideal testing ground for innovation. *Gulf Daily News*. p. 14.

- Schulze, A., & Hoegl, M. (2008). Organizational knowledge creation and the generation of new product ideas: A behavioral approach. *Research Policy*, 37(10), 1742-1750. doi.org/10.1016/j.respol.2008.07.002
- Schwab, K. (2017). *The fourth industrial revolution* (1st ed.). London: Portfolio Penguin.
- Secretariat General of the Gulf Cooperation Council. (2017). *Gcc-sg.org*. Retrieved 4 August 2017, from <http://www.gcc-sg.org/en-us/Pages/default.aspx>
- Seidler-de Alwis, R., & Hartmann, E. (2008). The use of tacit knowledge within innovative companies: Knowledge management in innovative enterprises. *Journal of Knowledge Management*, 12(1), 133–147. doi.org/10.1108/13673270810852449
- Sinkovec, B. (2014). *Building knowledge economy through innovation ecosystem: The role of innovation hubs*. Brussels: Knowledge Economy Network. Retrieved from <https://www.knowledgeeconomy.net/uploads/documents/2014/KEN-2014%20Analytical%20Compendium.pdf>
- Smedlund, A. (2008). The knowledge system of a firm: social capital for explicit, tacit and potential knowledge. *Journal of Knowledge Management*, 12(1), 63–77. doi.org/10.1108/13673270810852395
- Smith, A., & Cannan, E. (2003). *The wealth of nations* (1st ed.). New York: Bantam Books.

Smith, E. A. (2001). The role of tacit and explicit knowledge in the workplace.

Journal of Knowledge Management, 5(4), 311–321.

doi.org/10.1108/13673270110411733

Smorodinskaya, N., Russel, M.G., Katukov, D., & Still, K. (2017). *Innovation*

ecosystems vs. Innovation systems in terms of collaboration and co-creation of

Value. Proceedings of the 50th Hawaii International Conference on System

Sciences. Retrieved from:

https://inecon.org/docs/2018/Smorodinskaya_Katukov_paper_HICCS_2017.pdf

Soliman, F. (2015). *From knowledge management to learning organization to*

innovation: The way ahead! (Reprint). Cambridge Scholars Publishing.

Sørensen, E., & Torfing, J. (2011). Enhancing collaborative innovation in the public

sector. *Administration & Society*, 43(8), 842–868.

doi.org/10.1177/0095399711418768

Spielman, D. J., Hartwich, F., & Grebmer, K. (2010). Public–private partnerships and

developing-country agriculture: Evidence from the international agricultural

research system. *Public Administration and Development*, 30(4), 261–276.

doi.org/10.1002/pad.574

Stan, O. & Kondal, R.K. (2006). How to develop knowledge culture in organizations?

A multiple case study of large distributed organizations. *Journal of Knowledge*

Management, 10 (5), 6-24.

Startup Bahrain. (2018). Welcome to Startup Bahrain. Retrieved from:

<http://startupbahrain.com/>

- Startup Genome. (2018). *Global startup ecosystem report 2018*. Retrieved from <https://startupgenome.com/all-report-thank-you/?file=2018>
- Stover, M. (2004). Making tacit knowledge explicit: The ready reference database as codified knowledge. *Reference Services Review*, 32(2), 164–173.
doi.org/10.1108/00907320410537685
- Szulanski, G. (1996). Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic Management Journal*, 17(S2), 27–43.
doi.org/10.1002/smj.4250171105
- Tadros, M. (2015). *The Arab Gulf states and the knowledge economy: Challenges and opportunities*. Retrieved from Arab Gulf States Institute in Washington website: Arab Gulf States Institute in Washington
- The challenge is to stay relevant: FM. (2018, February 22). *The Daily Tribune*. p. 7.
- The Portal of The Cooperation Council for the Arab States of the Gulf.
(2017). Gccgov.org. Retrieved 2017, August 5, from
- Tamkeen. (2018). Individuals support. Retrieved from <https://portal.tamkeen.bh/ind/Public/CertificatesList?pro=BS>
- Telecommunication Regulatory Authority – Kingdom of Bahrain. (2018). Annual report 2017. Retrieved from <http://www.tra.org.bh/tra2017/en/>
- Tidd, J., & Bessant, J., Pavitt, K. (2005). *Managing innovation: Integrating technological, market and organizational change* (3rd Edition edition). Newark: Wiley.
- Tongco, M. (2007). Purposive sampling as a tool for informant selection. *Ethnobotany Research and Applications*, 5, 147–158.

- Trewin, D. (2002). *Measuring a knowledge-based economy and society: An Australian framework, 2002*. Australian Bureau of Statistics.
- Trott, P. (2011). *Innovation management and new product development* (5th ed.). Harlow: Prentice Hall.
- TRA panel reviews efforts to launch 5G in Bahrain. (2018, April 12). *Gulf Daily News*. p. 13.
- United Nations Development Programme & Mohammed bin Rashid Al Maktoum Foundation. (2014). *Arab knowledge report 2014: Youth and localisation of knowledge*. Retrieved from <http://www.undp.org/content/dam/rbas/report/UNDP-GENERAL-REPORT-ENG.pdf>
- UOB. (2016). *Strategic Plan*. Retrieved from http://www.uob.edu.bh/en/images/About_UOB/Strategy_EN16Sep2018.pdf
- UOB to empower 3,000 women students to launch 30 startups. (2018, March 13). *The Daily Tribune*, p. 5.
- Weber, M. (1978). *Economy and Society: An Outline of Interpretive Sociology* (1st ed.). Univ of California Press.
- Wiig, K. M. (2007). Effective societal knowledge management. *Journal of Knowledge Management*, 11(5), 141-156.
- Wiles, R. (2013). *What are qualitative research ethics?* London: Bloomsbury Academic.
- Willems, T., & Dooren, W. V. (2016). (De)politicization dynamics in public–private partnerships (PPPs): Lessons from a comparison between UK and Flemish

PPP policy. *Public Management Review*, 18(2), 199–220.

doi.org/10.1080/14719037.2014.969759

Williams, R. (2006). Narratives of knowledge and intelligence ... beyond the tacit and explicit. *Journal of Knowledge Management*, 10(4), 81–99.

doi.org/10.1108/13673270610679381

Woodson, T. (2016). Public private partnerships and emerging technologies: A look at nanomedicine for diseases of poverty. *Research Policy*, 45(7), 1410-1418.

World Bank. (1998). *Knowledge for Development*. Washington, D.C.: World Bank.

World Bank. (2007). Washington, D.C.

World Bank. (2007). Building knowledge economies.

World Bank Institute. (2008). *K4D Knowledge for development*. Washington, D.C.

World Capital Institute. (2008). *The Most Admired Knowledge City: Executive Summary*. The World Capital Institute & Teleos.

World Economic Forum. (2015). *The Global Competitiveness Report 2015–2016*.

Geneva. Retrieved from: http://www3.weforum.org/docs/gcr/2015-2016/Global_Competitiveness_Report_2015-2016.pdf

World Economic Forum. (2016). *The future of jobs: Employment, skills and workforce strategy for the fourth industrial revolution*. Retrieved from http://www3.weforum.org/docs/WEF_Future_of_Jobs.pdf

World Economic Forum. (2018). *The Arab World Competitiveness Report*. Geneva.

Retrieved from: http://www3.weforum.org/docs/Arab-World-Competitiveness-Report-2018/AWCRpercent202018.0724_1342.pdf

- Worldfolio, T. (2017). Reforms to shift role of public sector from driver of growth to regulator [Global news provider]. Retrieved 2018, June 28, , from <http://www.theworldfolio.com/news/reforms-to-shift-role-of-public-sector-from-driver-of-growth-to-regulator/4275/>
- Yigitcanlar, T., O'Connor, K., & Westerman, C. (2008). The making of knowledge cities: Melbourne's knowledge-based urban development experience. *Cities*, 25(2), 63–72. doi.org/10.1016/j.cities.2008.01.001
- Yigitcanlar, T., Velibeyoglu, K., & Martinez-Fernandez, C. (2008). Rising knowledge cities: The role of urban knowledge precincts. *Journal of Knowledge Management*, 12(5), 8–20. doi.org/10.1108/13673270810902902
- Yin, R. K. (2014). *Case study research: Design and methods* (5th ed.). Los Angeles: SAGE Publications, Inc.

APPENDICES



APPENDIX A

Pre-Interview Sheet



Participant Statement for Partaking in the Research Titled

THE ROLE OF GOVERNMENT-PRIVATE SECTOR COLLABORATION ON
INNOVATION IN THE DEVELOPING KNOWLEDGE ECONOMY OF THE
KINGDOM OF BAHRAIN

This is a research study. You have been chosen due to your background, experience and position in an organization that is relevant and will add value to this research. Your participation is very much appreciated. Please feel free to ask any questions at any time to clarify the research topic and your role.

Interviewer/Researcher

Marjan Modara, PhD candidate
Citizen: Bahrain

Institution

Program: PhD – Knowledge and Innovation Management
Bangkok University, Thailand

Introduction

In October 2008, The Kingdom of Bahrain launched its comprehensive economic vision under the title of “The Economic Vision 2030 for Bahrain”. In it, Bahrain conveys that by the year 2030 its economy would be converted to a Knowledge-based Economy. In this study, it is argued that innovation, as one of the major pillars of Knowledge Economy, plays a central role in the economic development. The global indices show that Bahrain lags behind the advanced economies in innovation. Accordingly, the fundamental objective of this research focus is on how to enable the private sector's innovation process forward in the Kingdom's developing knowledge economy pursuit by assessing the government and Information & Communication Technology (ICT) collaboration.

Description of Procedures

Your participation in this research study is highly valued, it will consist of 1 to 1.5 hours interview. After a couple of months, the transcript of the interview will be sent to you for your review of the accuracy of the content as per your interview. The interview session will be scheduled with your office to take place at and during a suitable time of your choice. During the interview, the interviewer will ask a series of questions that will be sent to your office ahead of time for your convenience. Since it is a semi-structured and open-ended interview, a few more questions will be asked according to the progress of the interview. If it is acceptable by you, the session will



be audio recorded to make sure that an accurate representation of your perspective is captured.

The audio file will be transcribed by the interviewer. The original audio and or transcript files will be securely maintained by the interviewer. Upon completion of the research study, the audio and transcript files will be safely discarded after the successful dissertation defense.

Language of the Interview

The language of the study and the interviews will be in English.

Benefits

The information gained from this study will help us to better understand yours and your organization's experiences in the government-private sector collaboration in the area of innovation progress in the Kingdom of Bahrain.

Participant Rights

Your participation in this research study is completely voluntary. You may decide at any time to withdraw from the research study without any conditions.

Confidentiality

Your name will not appear in any supporting documents of this research unless you have approved and your prior consent attained by the interviewer.

Further clarification

In the event that you may require further clarifications, please feel free to contact me or my dissertation advisors at any time at:

Marjan Modara, PhD candidate at +973 33980900 or at my email:
marjanmodara@gmail.com

Dr. Alex Bennet, Advisor, email: alex@mountainquestinstitute.com

Dr. Vincent Ribière, email: vincent.r@bu.ac.th

APPENDIX B

Interview Questions for Key Public and Private Personnel



PhD-KIM
Knowledge and Innovation Management

Interview Questions for

CEO

09/04/18

1. To what extent do you believe in the existence of an innovation culture in Bahrain? 5 being a very high extent to 1 none at all.

5. 4. 3. 2. 1.

☐ ☐ ☐ ☐ ☐

2. How would you evaluate the overall innovation capability in Bahrain? 5 being extremely capable and 1 not capable at all.

5. 4. 3. 2. 1.

☐ ☐ ☐ ☐ ☐

3. Can you please elaborate?

4. How would you rate the innovativeness of these sectors in Bahrain? Order them by the most innovative (5-1) to least.

ICT Education Finance Industry Government

☐ ☐ ☐ ☐ ☐

5. To what extent do you foresee an increase in innovation in Bahrain in the next 5-10 years?

5. 4. 3. 2. 1.

☐ ☐ ☐ ☐ ☐

6. In which sector/s?

7. What will cause this to occur? What would be the first priority to address?



PhD-KIM

Knowledge and Innovation Management

8. What role do you believe that the Information Communication Technology (ICT) sector plays in the innovation process in Bahrain?

9. To what extent do you believe that the ICT sector collaborates with your organization to enable the innovation process in house?

5. 4. 3. 2. 1.

☐ ☐ ☐ ☐ ☐

10. If yes, how? And if no, why?

11. Is there a trust between your two sectors? Overall trust between different sectors in Bahrain?

12. How can it be built or strengthened?

13. How can the government influence or further contribute to support your organization and the ICT sector's collaboration?

14. What are the barriers/ challenges associated with this collaboration?

15. What are your wishes related to comprising/ strategizing this collaboration?

16. Does the government of Bahrain provide incentives to your organization to support its innovation activities?

Yes No

☐ ☐

17. What kind of incentives are these? Are they effective?

Yes No

☐ ☐

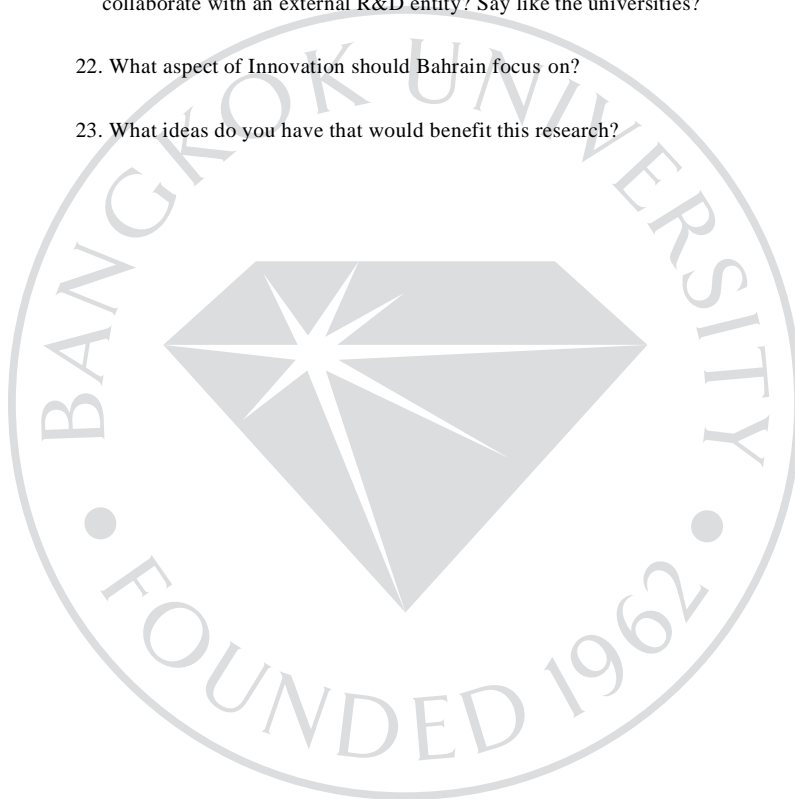
18. How might the incentives be improved?



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19. How tolerant is your organization towards employees initiating new ideas? Risk taking to diversify your business? Not penalizing failures?
20. Are there any other entities that significantly contribute to your innovation process?
21. Is there Research & Development (R&D) entity in your organization? If not, do you collaborate with an external R&D entity? Say like the universities?
22. What aspect of Innovation should Bahrain focus on?
23. What ideas do you have that would benefit this research?



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