

Socio-Cultural Dimension of Innovation in Islamic Economics: A Comparative Analysis of Top Innovative Countries and Muslim Countries

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ABSTRACT. In this study, we employ sub-Hofstede indexes and Global Innovation Index (GII) to demonstrate the socio-cultural dimension of innovation in Muslim countries by comparing it with top GII countries. Even though our comparative analysis points out that culture more or less matters in terms of innovation performance of countries, it seems that sub-Hofstede indexes are not sufficient alone to reveal the innovation performance of economies. On the other hand, even though Islam encourages innovative activities for Muslims, most of the Muslim countries have relatively lower R&D expenditures per capita compared to the top GII countries. Muslim countries with several exceptions such as Türkiye and Malaysia cluster around a certain index level in terms of sub-Hofstede indexes, which is not good for innovation capacity as well. Therefore, it may be possible to conclude that the institutional structures that will increase or reveal the innovation capacity of the society can be successful if they are compatible with the cultural roots, historical backgrounds, and geographic position of the societies since culture matters to promote innovation in countries. Therefore, Muslim countries should establish institutional structures compatible with their cultures to increase their innovation activities.

KEYWORDS: Islamic Economics, Culture, Innovation, Muslim Countries

JEL Classification: A13, O1, O31, Z12, Z13

KAUJIE Classification: H4, H44, S4

1. Introduction

Developments in production methods after the industrial revolution increased the importance of innovation, which is one of the main drivers of development even more. Moreover, with the emergence of the phenomenon of globalization as a reality towards the end of the 20th century, increasing the innovation capacity or using the existing innovation capacity has become indispensable for economies to compete at the global level.

This positive relationship between innovation and the level of development of economies has led economists to examine the factors underlying innovation capacity. While many factors determine the innovation capacity of a country, the culture of the economies is one of the most important of these factors.

On the other hand, when the income distribution in the world is examined in the light of the recent available data, it is seen that the countries with high income per capita are generally innovative. At this point, when the Muslim countries are examined, it is seen that Muslim countries have a much lower share in world income compared to their share in the total world population. This brings up the need to examine the innovation culture in Muslim countries and the dynamics underlying this culture. Although there are numerous studies addressing the correlation between the development levels of countries and their innovation capacities, as far as known, it is considered that this study is unique in that it addresses to only Muslim countries by revealing the paradox between the theoretical perspective of the Islam on innovation, and lack of innovation capacities of Muslim countries in practice. For this very reason, it is thought that this study will make an important contribution to the relevant literature.

Accordingly, in this study, we determined the research question of the study as follows: is there a relationship between innovation capacity and socio-cultural structure of Muslim countries? While seeking an answer to this research question, we, in the meantime, intend to set light to the approach of Islamic teachings to innovation to clarify it, since there exist a number of arguments in the literature pointing to Islamic teachings as one of the reasons for the low level of development of Muslim countries.

In this study, we will try to explore socio-cultural dimension of innovation for Muslim countries. For this aim, after revealing related literature and the relationship between concepts of culture and innovation in the second and third chapters, we are going to touch upon the normative approach of Islam to innovation by shedding light on Islamic teachings about innovation in the fourth chapter. After that, we will employ sub-Hofstede indexes as a proxy to refer the socio-cultural gap of Muslim countries in comparison with top GII countries to make a comparative analysis between them.

2. Literature Review

The direct and indirect interrelationship between the concepts of culture, social values, innovation, and economy requires reviewing various studies from different disciplines. To focus on the topic, we classified the literature review in four headlines: studies on the relationship between culture and innovation, studies on the relationship between culture and economy, studies on the relationship between innovation and economy, studies on the perspective of Islamic economics towards innovation.

Many studies attempted to show the strong linkage between culture and innovation,

including some empirical research based on different cultural dimensions introduced by Hofstede Index. Kaasa & Vadi (2008) tried to explore the relationships between these cultural dimensions and the capability of initiating innovation measured by the number of patent applications using the sample of European countries and found that innovation requires lower than average power distance, uncertainty avoidance, family-related collectivism, and masculinity. Rinne et al. (2012) assessed the link between Hofstede's cultural dimensions and innovation as measured by the Global Innovation Index (GII) via multivariate multiple linear regression and found a strong negative relationship between power distance and innovation scores and a strong positive relationship between individualism and innovation scores. Strychalska-Rudzewicz (2016) searched for the impact of national on the level of innovation by analyzing the relationship between Hofstede's cultural dimensions of power distance, individualism, uncertainty avoidance, and innovation index scores in European countries and confirmed that these cultural dimensions play a major role on innovation. On the other hand, Nyssen Guillen & Deckert (2021) tried to find how the seven cultural dimensions (communicating, evaluating, leading, deciding, trusting, disagreeing, scheduling influence national innovativeness and showed that Top-Down Deciding, Relationship-based Trusting and Flexible-Time Scheduling have a significant negative influence on national innovativeness.

The connection between culture and economy has been tried to be disclosed by many studies. By conducting a comparative historical analysis of the relations between culture and institutional structure of the Muslim world and the Latin world, Greif (1994) demonstrated

how the process of organizational innovation affects the development of the economic, political, legal, and social setup of the society. Guiso et al. (2006) showed the direct impact of culture on expectations and preferences and the impact of beliefs and preferences on economic outcomes, by isolating the cultural component of beliefs and preferences to assure that the causality between culture and economics works one-way. By constructing an endogenous growth model that includes the cultural dimension of individualism-collectivism, Gorodnichenko & Roland (2010) found that has a strong causal effect on economic development and argued that individualism can offset the negative effects of bad institutions on growth. Gorodnichenko & Roland (2011) showed that the cultural dimension of individualism-collectivism is the most important effect of culture on long-run growth. Alesina & Giuliano (2015), assessed the two-way causal effect between culture and institutions and argued that the studies which try to isolate one direction of causality between these could not show how culture and institutions jointly affect development.

As a determinant of long-term economic growth, several studies tried to explore the impact of innovation on development. Grossman & Helpman (1994) argued that purposive, profit-seeking investments in knowledge which implies innovation play a critical role in the long-run growth process and technological improvements are the most significant tools to overcome the limits for growth. Andergassen et al. (2009) analyzed the impact of innovation investment, which is based on the R&D activities of heterogeneous and rationally bounded firms, on the structure and long-term growth of an economic system, and found that the innovation generation has a

positive impact on long-term growth. By constructing a dynamic general equilibrium model in which economic growth is driven mainly by domestic innovation and adoption of foreign innovations through trade, Santacreu (2014) found that innovation and adoption affect a country's productivity growth differently where the adoption channel has been especially important in developing countries. Maradana et al. (2017) examined the long-run relationship between innovation and per capita economic growth and revealed the presence of both one-way and two-way causality between innovation and per capita economic growth.

Many studies discussed innovation from an Islamic perspective but the approach to the matter has not been economics-oriented. Abd-Allah (2006) discussed innovation and creativity in the context of bid'a and ijihad and argued that these concepts together enabled Islam to preserve continuity with the past while renewing its vitality as a dynamic faith. Adham et al. (2012) tried to conceptualize innovation and entrepreneurship from an Islamic perspective and concluded that Islam enables

the achievement of a balanced economic, social, and moral development through the conduct of values-based innovation and entrepreneurship. Yazdani & Siddiqi (2013) analyzed the historical discourse of Pakistan's culture concerning Hofstede's cultural model and leadership styles. Zarif et al. (2013) assessed the role of bid'ah for creative and innovative Muslims and revealed the relationship between bid'ah and the advancement of Islamic civilization by showing bid'ah as a regulatory mechanism for inducing creativity in Islam. Ismail et al. (2016) reviewed innovation in Islam through the works of renowned Muslim scholars and emphasized the significance of Islamic thinking innovation and innovation culture as modeled by Muslim scholars. Iqbal (2020) tried to identify an Islamic framework for assessing creativity and innovation to advance knowledge and creativity among Muslims. Ozdemir (2020) discussed the role of critical and creative thinking by describing the significant features of critical and creative thinking in al-Ghazali's life and teachings.

Table (1). Summary of the Literature

Culture - Innovation	Culture-Economy	Innovation-Economy	Islamic Studies
(Nyssen Guillen & Deckert, 2021)	(Alesina & Giuliano, 2015)	(Andergassen, Nardini, & Ricottilli, 2009)	(Yazdani & Siddiqi, 2013)
(Kaasa & Vadi, 2008)	(Giuliano, 2007)	(Grossman & Helpman, 1994)	(Iqbal, 2020)
(Erdost Çolak, Esen, & Sirkintoğlu Yıldırım, 2015)	(Gorodnichenko & Roland, 2010)	(Maradana et al., 2017)	(Özdemir, 2020)
(Strychalska-Rudzewicz, 2016)	(Greif, 1994)	(Santacreu, 2014)	(Ismail, Abdul Latiff, & Mat Yacob, 2016)
(Rinne, Steel, & Fairweather, 2012)	(Guiso, Sapienza, & Zingales, 2006)	(OECD, 2012)	(Adham, Said, Muhamad, & Yaakub, 2012)
(Tekin & Tekdogan, 2015)	(Gorodnichenko & Roland, 2011)		(Zarif, Nizah, Ismail, & Mohamad, 2013)

Source: Authors' Own

3. Relationship between the Concepts of Culture and Innovation

3.1. Definitions: Institution, Culture, Social Values, Religion and Innovation

There is extensive literature on the socio-cultural dimension of innovation in economics and in most of these studies, certain concepts such as institution, culture, and social values come to the fore when taking the relationship between culture and innovation into account. Hence, it is considered that it would be beneficial to define the corresponding terms in the first place.

Institution

Most of the definitions related to the term “*institution*” are sociological definitions that emphasize the norms and values that have an impact on the social structure. Similarly, the term institution is used to express the factors that affect the economic behavior of economic agents and societies in the literature of economics (Tekin, 2021). In this context, all norms that have an impact on individual and social behaviors such as religion, taboos, customs, traditions, routines, rules of law are accepted institutions (Voigt, 2013). Despite the considerably large and extensive literature on the definition of the concept of institution, economists usually define it simply as “*the rules that determine the rules of the game*” (North, 1990).

Culture

The term “*culture*” is employed almost in all social sciences such as sociology, philosophy, and economics with minor conceptual differences (Alver, 2021). Even though there is no agreed definition of the term culture, it refers to the way of life of a society and shared knowledge, understanding, and practices transmitted from generation to generation in a society (Antonio Lebrón, 2013; Tekin & Tekdogan, 2015). Therefore, it can be defined

as a set of values and beliefs that reflect the behavioral patterns of a society or individuals. Mardin (2003) defines culture as “*a system of symbols that are partially flexible but changes relatively slowly, serving to perpetuate the existing pattern of a society*”(Mardin, 2003, as cited in Kocal, 2012).

Social Values

“*Social values*”, which are the most important factors in the formation of social culture, could be defined as the generalized basic moral principles or beliefs in a society that reflect their common feelings, thoughts, goals, and interests (Collins, 1991; as cited in Yazıcı, 2013). Based on the definition of social values, we may conclude that these are approved moral principles by the majority of a society to sustain the unity of the society (Türkkahraman, 2014).

Religion

“*Religion*” is one of the most important institutions in shaping the social structure and the culture of a society as well as individual behaviors. According to the data by Pew Research Centre (2017), 84% of the world population is affiliated with a religion. Taking into account both this share and the fact that religion is one of the most significant institutions in forming the social values and culture in a society, what the religious institution means and its role in the formation and shaping of institutions becomes more evident. Accordingly, it may be argued that religion is one of the most prominent and comprehensive social institutions (Ives & Kidwell, 2019). Moreover, it should be noted that there is a close relationship between values and religion since values are belief-based narratives shaping the behavior of human beings to stuff and events.

Definitions of the term religion are, in general, functionalist definitions that focus on what religion does as in the case of E. Durkheim’s definition, one of the founding

fathers of the science of sociology, he defines religion as “*a unified system of beliefs and practices relative to secret things*” (Durkheim, 1915; as cited in Kurt, 2008).

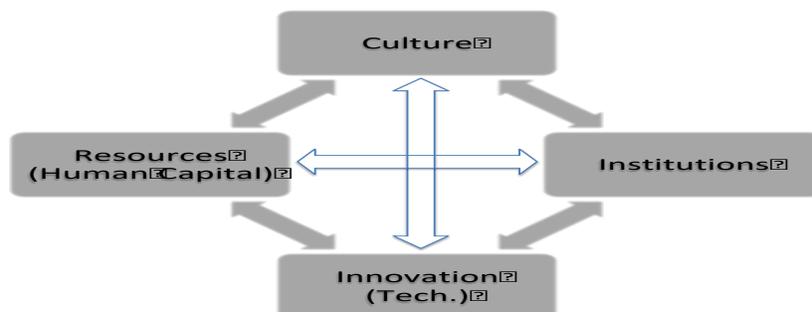
Innovation

It can be stated that there exist three different approaches to define the concept of innovation in the literature. While Schumpeter (1982), founder of the theory of innovation, defines it as a “*combination of development changes*”, Twiss (1989) defines it as “*a process that combines science, technology, economics, and management, as it is to achieve novelty and extends from the emergence of the idea to its commercialization in the form of production, exchange, consumption.*” On the other hand, Afuah (1998) defines it as “*new knowledge incorporated in products, processes, and services*” by classifying innovation according to its characteristics such as technological, market and administrative/organizational. Therefore, by considering and combining these three approaches we may define it as the ability to find new knowledge or a new way and to adapt and apply them to socio-economic life for useful changes or improvements. Hence, adaptation/application of new ideas, useful changes, improvement, and invention are the general futures of innovation.

3.2. Relationship between Institutions, Culture, Social Values, Religion and Innovation

Considering the definitions regarding institution, culture, social values, and religion given above, we may conclude that all these concepts are closely related and interact with each other. For instance, North (1990) divides institutions into two main categories, which are formal and informal institutions. Since North considers institutions as humanly devised constraints structuring human interactions, in his definition, while formal institutions refer to formal constraints such as rules, laws, and constitutions, informal institutions refer to informal constraints such as norms, culture, social values, religion, and conventions. The abovementioned definition of culture implies that especially informal institutions have a role in shaping the culture in society since sub-indicators of culture such as social values and religious affiliation are correlated with both historical and current patterns of an individual and a society. Therefore, it may be stated that there is a close and mutual relationship between institutions, culture, and innovation capacity of society as seen in Figure (1).

Figure (1). Institutions, Culture, and Innovation Capacity

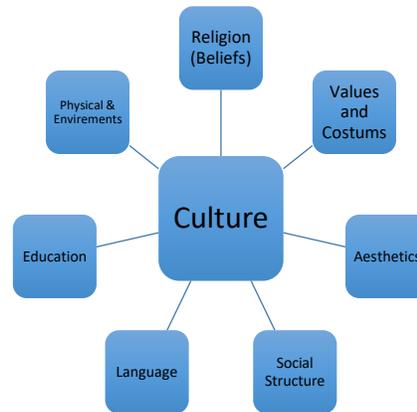


Source: Hayami & Godo, 2005.

Figure (2) demonstrates the main components of culture in a society. As seen, every sub-component has both direct and indirect impacts on the formation and shaping of culture in a society. For instance, one of the main sub-components of culture, religion, has also an

impact on the other components of culture such as values and costumes. It should be underlined here that both the dimensions of the relationship between sub-components and culture and among sub-components are mutual.

Figure (2). The Main Components of Culture



Source: Itulua-Abumere, 2013; Authors

On the other hand, since one of the most important factors that determine the innovative capacity of a society is cultural structure and institutions as seen in Figure (1), it is possible to mention a very close relationship between innovative capacity and institutional structure (economic and political-institutional structure) and culture in a society. According to Franke et al. (1991), cultural differences are decisive on people's behavior patterns, institutions, and economic performance. Similarly, Taylor and Wilson (2010) and Rinne et al. (2012) argue that national culture strongly influences organizational behavior, innovation, and entrepreneurship of society by influencing economic behavior, government policies, national institutions, business systems, and individuals' preferences, expectations, and aspirations.

Greif (2006) emphasizes that culture is the main reason for different institutional structures in societies as in the case of Maghreb traders and the Genoese in XI. century. He concludes that initial institutions based on culture and other social norms of the societies form the subsequent development path of institutional structures in those societies. A study by Leibniz Information Center supports this argument by Grief. According to the results of the study, early political institutions are the main reason for the economic performance of Central and Eastern European countries compared to the other European countries (Maradana et al., 2017b).

Max Weber (1930), in his book "The Protestant Ethic and the Spirit of Capitalism", draws attention to the effect of culture on economic behavior and states that values and beliefs, which are important components of

social culture in society, are effective on people's economic behaviors. According to Weber, protestant ethics, which allows people to develop the idea of a pure business relationship, is the main reason for the development of capitalism in the West.

Acemoglu and Robinson (2016), who argue that the most fundamental reason for the development differences between countries is the institutional structures in the countries in question, implies that the innovation capacity of the society will emerge in the presence of inclusive institutions that prioritize the interests of the general public. According to them, the fact that Samsung came out of South Korea instead of North Korea confirms this hypothesis.

On the other hand, Kuran (2011), who has been criticized quite often by Islamic economists, argues that Muslim Countries have underdeveloped due to the strict structure of Islamic Law, especially against innovative approaches.

3.3. Relationship between Innovation and Economic Development

After Schumpeter, innovation has been considered one of the most important drivers of

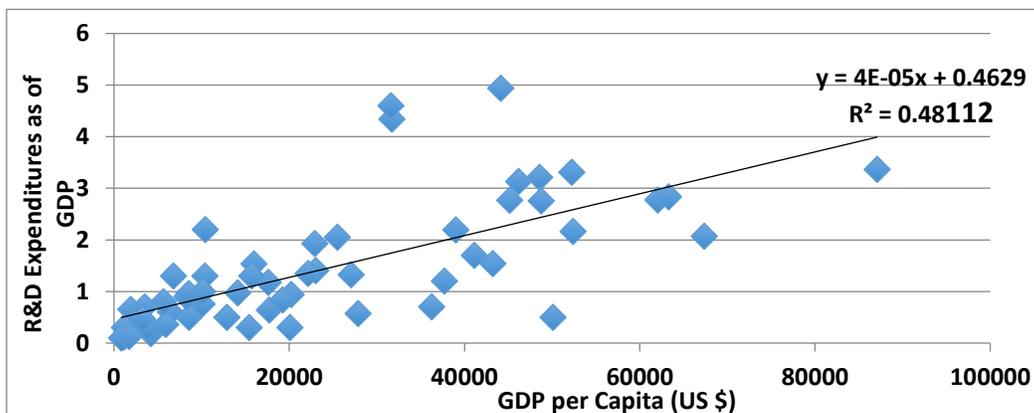
economic development by most economists (Andergassen et al. 2009; Bae and Yoo 2015; Mansfield 1972; Nadiri 1993; Romer 1986; Santacreu 2015; Solow 1956).

Maradana et al. (2017) tried to examine the long-run relationship between innovation and GDP per capita growth in the 19 European countries over the period 1989–2014. According to the results of the study, there exists considerable relation between all of the innovation indicators employed in the study and GDP per capita growth.

Since innovation is an essential determinant of development, it fosters the welfare of society and addresses socio-economic challenges such as poverty and income inequality (OECD, 2012). Therefore, in today's world, the importance of innovation is undeniable to achieve sustainable competitive advantage and development (Erdost et al., 2015).

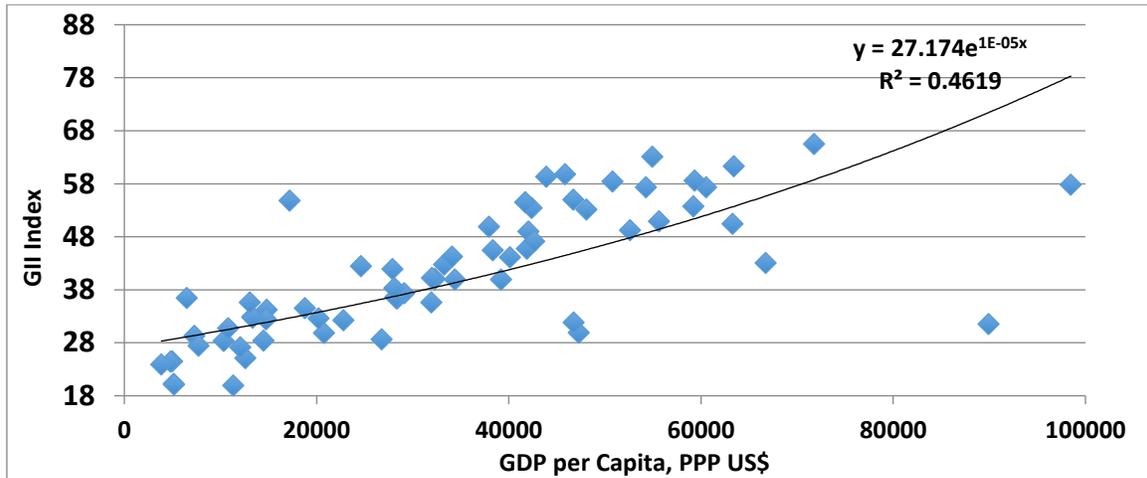
Figure (3) shows the link between R&D expenditures and GDP per capita among countries in the world. As seen in the figure, countries with higher R&D expenditures, in general, also have higher per capita income with some exceptions as in the case of petroleum-rich countries.

Figure (3): R&D Expenditures and GDP per Capita*



Source: World Bank Database, 2021; *The most recent available data

Figure (4). GII and GDP per Capita, PPP US\$



Source: World Bank Database, 2022; <https://www.wipo.int> , accessed on 8 February 2022

As seen in Figure (4), innovation is one of the main drivers of higher GDP per capita in economies. The higher the GII, the higher the GDP per capita is or vice versa.

4. Normative Approach of Islam to Innovation

4.1. Islamic Teachings about Innovation

Changing and developing living conditions, emerging new opportunities, and developments in the field of economy, trade, and finance are the events that take place around us any time, which we sometimes adapt unknowingly. In the context of our study, it is noteworthy that although the developments in the fields of economy, finance, and trade have taken place in Islamic civilizations for a while, the West has led the way and Islamic countries have had to adapt them for the last few centuries. To improve the standard of living and make life easier, Muslims have innovated in every field and while doing this; they have taken into consideration the Islamic teachings. These teachings are based on the broad, but inclusive and encompassing, paradigm of the permissibility norm in the affairs transactions

and dealings. Thus, innovation is more than welcomed and accommodated for form an Islamic perspective. The faith (Iman) as input and beneficial knowledge and deeds as output drive human beings to invent, innovate and achieve scientific and economic progress (al-Hassani, 2008). Since faith leads to knowledge and action and belief and good deeds lead to progress, a Muslim must always do things better and strive for continuous research and development for this. Therefore, there is no room for inertia and standing still. Thusly, the following is stated in another verse:

{(So when you have finished [your duties], then stand up [for worship]. And to your Lord direct [your] longing.) [As-Shurh: 7-8)}

It is an Islamic principle for human beings to continuously produce, progress, and develop with endeavor and perseverance throughout their lives. Thus, to improve the quality of life, we can say that innovation in the context of world affairs is a teaching of Islam. Information about things is actually created as a potential in human beings, which is clearly stated in the Holy Quran:

(And He taught Adam the names - all of them. Then He showed them to the angels and said, "Inform Me of the names of these, if you are truthful) [Al-Baqarah: 2-31].

Therefore, people need to discover this potential. This corresponds exactly to innovation. From the past to the present, the stages of science and humanity from past to present point out that this innovation process is a dynamic one. The conclusion we will draw from the Islamic teachings is that this innovation process should be carried out by keeping the benefit of humanity in the foreground, taking into account the *māslahāh* - public interest.

If there were no innovation in our lives and breakthroughs are not made, life would become dull and unprogressive, and people would gradually lose their excitement and become lazy. As such, even if you want to continue your business life, competition conditions exclude you. This would be achieved not by standing still, but by making difference and breakthroughs*. The experiences of the past ummahs, which are narrated in the Qur'an through the verses referred to as the stories of the prophets (*qiṣaṣ al-anbiyā'*), are important in terms of economic theory, system, and method in particular, and contain principles that will guide the human sciences in general. It is also of great importance in terms of showing the faults in the economic theories and systems of previous ummahs. In this way, Muslims will be able to find alternative solutions with an innovative approach based on these experiences

(Kallek, 2015). As well, the lives and professions of God's prophets stand before us as good examples and have inspired many inventions and innovations. Noah (PBUH) built a gigantic ship and became the master of shipping, David (PBUH) bent the iron and became the father of blacksmiths, Solomon (PBUH) summoned the throne of Belkıs and inspired the search for teleportation, Yusuf (PBUH) showed Egypt how the treasures are managed and taught us lessons for governance, fabrics were mobilized in the hands of Idris (PBUH), the staff of Moses (PBUH) paved the way of technology in drilling.

The divine nature of Islamic norms requires extreme caution when interpreting them. However, sometimes this care that needs to be shown is exaggerated, and very strict approaches are exhibited. On the contrary, making new inferences about Islamic norms without having sufficient knowledge of Islamic sciences, but aiming to be original, may sometimes lead to various destructions. New approaches are needed to be developed with an appropriate attitude. One of the basic tenets of Islamic law is the principle of permissibility (*ibāḥah*). According to this principle, the approach to a subject that is not regulated by Islamic norms, which means unless there is a prohibition found in al-Qur'an and/or Sunnah, should be positive, provided that it does not contradict Islamic norms and therefore does not conflict with the divine will. This area will expand further when the principle of permissibility, which can also be expressed as halal if there is no negative evidence about the goods, is supported by the principle of "*al-Maṣlahah al-Mursalah*", which is another principle in Islamic law (Tekin & Tekdogan, 2016).

* Demircan, A.R. (t.y.). "İnovasyon İslâm'ın gereğidir ve ibadet yoludur", retrieved from <https://www.alirizademircan.net/inovasyon-islamin-geregidir-ve-ibadet-yoludur-ii-4-568h.html> 17.10.2021

4.2. Practical Settings

With the advent of Islam, the pre-Islamic period (*al-Jāhiliyyah*) came to an end and the foundation of a rising civilization was formed. The religion of Islam, by centering the human being, which is the main force in the rise and fall of society, provided both material and moral improvement and organized all the institutions that affect people with the innovations it brought. Those who were behind also took the leading roles and contributed to the progress of civilization.

As it is known, the first command of the religion of Islam is "*Iqrā*", by which we are commanded to read in the name of the Lord, to understand the order of the universe, and therefore leads us to scientific and economic understanding. Both the Qur'an and the Sunnah guide people to follow and desire knowledge. In the Islamic world, progress in science and knowledge continued for a while, accelerating and slowing down until the stagnation period. Muslims contributed not only to the progress of their civilization but also to the progress of humanity. In doing so, they left their mark on the history of humanity with many innovations they brought.

In the case of economic life, Muslims checked the conformity of existing economic realities with Islamic norms and sometimes they took these ready information and institutions as they were or sometimes they took these by correcting them according to Islamic norms. Sometimes they rejected these institutions because they contradicted Islamic norms. More importantly, they did not neglect to fill the gap that emerged in this situation by establishing new institutions. A good example of this is the rejection of the institution of interest and the establishment of the institution

of zakat. It is needless to say that, the realities faced by Muslims in the first years of Islam were not only in the economic field (Orman, 2014). For instance, in one of the most productive periods of Islamic civilization, if the medieval Islamic societies are examined, it is seen that there is a very systematic structure for the formation of intellectual capacity (Tekin & Tekdoğan, 2016). Thinkers such as Ibn Khaldun, Ibn Taymiye, and Ghazali and the classical works they produced can be given as examples for the endeavor for innovation and progression.

In the context of innovations in economic activities, commerce, and finance, Muslims developed long-distance trade and international commerce to an extent that the merchants of many European countries obtained their first education in the use of sophisticated business methods from the Muslim world. These financial innovations of Muslims have been reflected in the commercial terminology of medieval Europe which includes a large number of words of Eastern origin (Chachi, 2005). Muslims' success to establish a financial system without interest in mobilizing resources is a result of their innovational capacity. This capacity was far beyond the scale of European communities, such as some of the institutions, practices, and concepts already fully developed in the Islamic legal sources of the late eighth century did not appear in the West until several centuries later (Chapra & Khan, 2000).

However, this relationship changed in the opposite direction later. The period, which went along with the renewal in all areas of life in the West, carried the character of a return to the values of the Middle Ages in the Islamic world. In this direction, a brilliant trade era has come to an end, and tradesmanship in enterprise

forms, closure, and solidification in the understanding of value has led to professional and artistic fanaticism, which does not take care of the slightest innovation. An understanding has emerged that is accustomed to seeing the attraction of abundant consumption and showing off above daily economic concerns, and that wants to see production and value creation as a burden on others (Ülgener, 2006). Without innovation, an era of stagnation was inevitable.

This changed relationship between the West and the East was put in a simple example by Lewis (2009) in a story of western and eastern merchants of that time. While western merchants traveled extensively and freely in the Muslim lands, had an extreme reluctance to venture into the non-Muslim territory and the Westerners did not want them to come. The consensus of the Muslim jurists was that a Muslim cannot live a good Muslim life in an infidel land (Lewis, 2009). This was an obvious advantage of western merchants to learn and experience more about middle-eastern culture, lifestyle, and business forms, which consists of required elements of innovation.

Another problem was the guild system, which eliminated competition. Although it was an ideal organization that provided harmony and livelihood of the society, the competitive spirit and profit motive were seen as a threat to this system and the existing social order. Among artisans interconnected in the guild system pursuing profits, making more money than necessary for a living was seen as the source of the most serious moral faults (İnalçık, 1969). To an extent, competition is an effective motive for innovation and the lack of competition is one of the causes for the stagnation and the decline of the Muslim world. As put by Stoddard (1922), the inability to compete with

Western industry arose from some factors other than methods of production, such as the mentality of the workers and the scarcity of capital. The mentality of agriculturalists and artisans to follow blindly in the footsteps of their fathers was the main cause of the lack of innovation and no stimulus for improvement. The industries were stereotyped, people rarely thought of innovating new implements or new methods of manufacture (Stoddard, 1922).

5. Measurement of the Impact of Socio-Cultural Identity on Innovation

In this section, we employ Hofstede Index[†] and Global Innovation Index (GII)[‡] to set forth the relationship between culture and innovation capacity of developed countries and Muslim countries. For this reason, we analyze the top 15 countries with the highest score in the global innovation index, which are all developed countries and the first 15 Muslim countries with the highest GDP.[§]

[†] Hofstede (1980) reports the findings of a study conducted between 1967 and 1973. This research led to the formulation of Hofstede's "dimensions of culture" paradigm, which was further developed by subsequent investigations. The Cultural Dimensions Model is a systematic framework for evaluating the distinctions between nations and cultures. Power distance, individualism, uncertainty avoidance, masculinity, long-term orientation, and indulgence are the six indicators in this theory.

[‡] Global Innovation Index is a report published by the World Intellectual Property Organization, which ranks the performance of economies around the world's innovation ecosystems each year, identifying innovation strengths and weaknesses as well as specific gaps in innovation indicators. GII includes roughly 80 factors, including measures of each economy's political environment, education, infrastructure, and knowledge generation.

[§] The list of the Muslim countries: Indonesia, Iran, Türkiye, S. Arabia, Nigeria, Egypt, Malaysia, Bangladesh, Pakistan, Kazakhstan, Iraq, Algeria, Morocco, Azerbaijan, Jordan.

The Hofstede Index, conducted by Geert Hofstede in 1980, consists of six dimensions of national culture, which are power distance, individualism, masculinity, uncertainty avoidance, long-term orientation, and indulgence. These dimensions are explained below in brief (Hofstede, 1994:28):

Power Distance Index (PDI) simply implies that relatively less powerful members of a society expect and accept that the power is unequally distributed among individuals in a society. Therefore, higher PDI means individuals in a society accept a hierarchical order and make no effort to change this.

Individualism Index (II), as the opposite of collectivism, emphasizes individualism. The higher II indicates that individualism is much more important than collectivism in society.

Masculinity Index (MI), as the opposite of femininity, demonstrates that achievement, heroism, assertiveness, and material rewards for success are preferred to cooperation, modesty, caring for the weak, and quality of life. Hence, if the MI in a society is relatively higher, it means that the society is much more competitive, while higher femininity means that the society is much more consensus-oriented.

Uncertainty Avoidance Index (UAI) shows the general attitude of a society in case of ambiguity to avoid such situations. That is, the larger UAI index represents that there exists a high tolerance for innovations or uncertainties in society.

Long-Term Orientation Index (LOI) focuses mainly on attitudes toward traditional values in a society. A low score of LOI indicates that the society tends to prefer maintaining its norms and traditions while keeping a distance from societal change.

Indulgence Index (InI), as the opposite of restraint, measures the tolerance and gratification of individuals in a society. Accordingly, the higher score of the index implies that people in the society enjoy life and have fun instead of constraint their attitudes with strict social norms.

On the other hand, launched in 2007, Global Innovation Index focuses on three main dimensions to find and determine metrics and methods that could capture a picture of innovation in society that is as complete as possible with 81 indicators: science and innovation investments, technological progress, and socioeconomic impact.

5.1. Comparative Analysis of sub-Hofstede Index in Top GII Countries and Muslim Countries

In this section, we employ the sub-Hofstede indexes to compare the countries that have the highest GII index with selected Muslim countries.

5.1.1. Power Distance

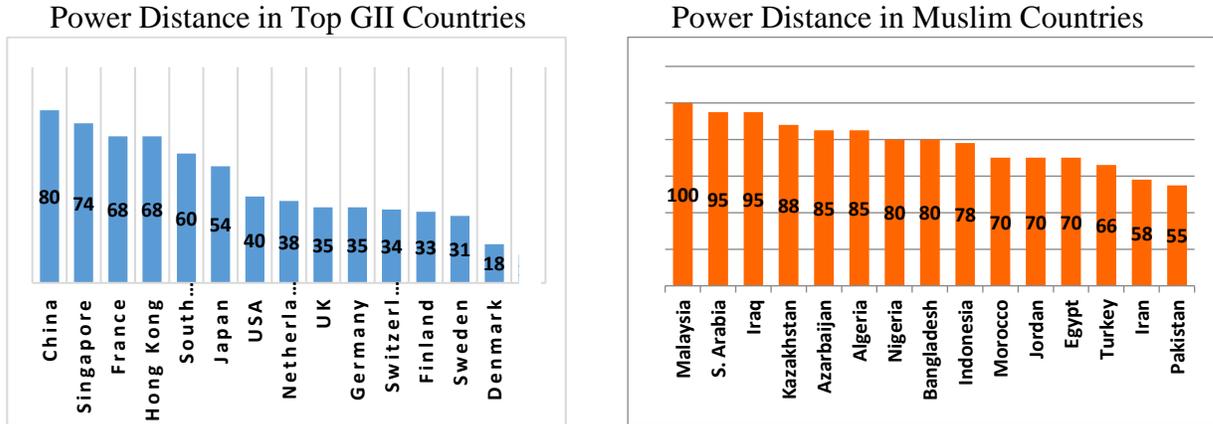
When we analyze Figure (5) showing the PDI scores in top GII countries and Muslim countries, we may conclude that PDI scores in Muslim countries are generally higher than that of top GII countries. However, we should underline the fact that there exists relatively higher PDI in some top GII countries such as China, Singapore, and France.

The following figure illustrates the relationship between PDI and GII in selected countries. As seen in the figure, with some exceptions, we may generally conclude that countries with higher PDI also have lower innovation capacity or vice versa. However, it is clear from the following figure that PDI is not the only explanation of the performance of countries in GII. For instance, although

Pakistan and S. Korea have similar PDI, GII scores of these two countries are quite different

from each other.

Figure (5). Power Distance: Top GII Countries vs. Muslim Countries

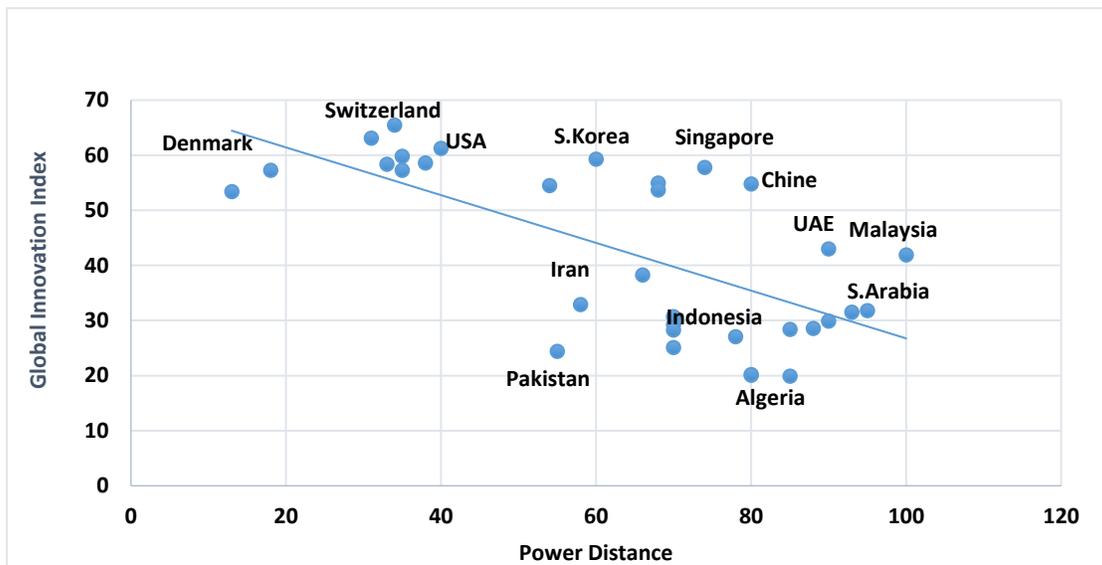


Source: Authors' Own relying on data from <https://www.hofstede-insights.com>

Figure (6) illustrates the relationship between PDI and GII in selected countries. As seen in the figure, with some exceptions, we may generally conclude that countries with higher PDI also have lower innovation capacity or vice versa. However, it is clear from the following

figure that PDI is not the only explanation of the performance of countries in GII. For instance, although Pakistan and S. Korea have similar PDI, GII score of these two countries is quite different from each other.

Figure (6). Relationship between Power Distance and Innovation



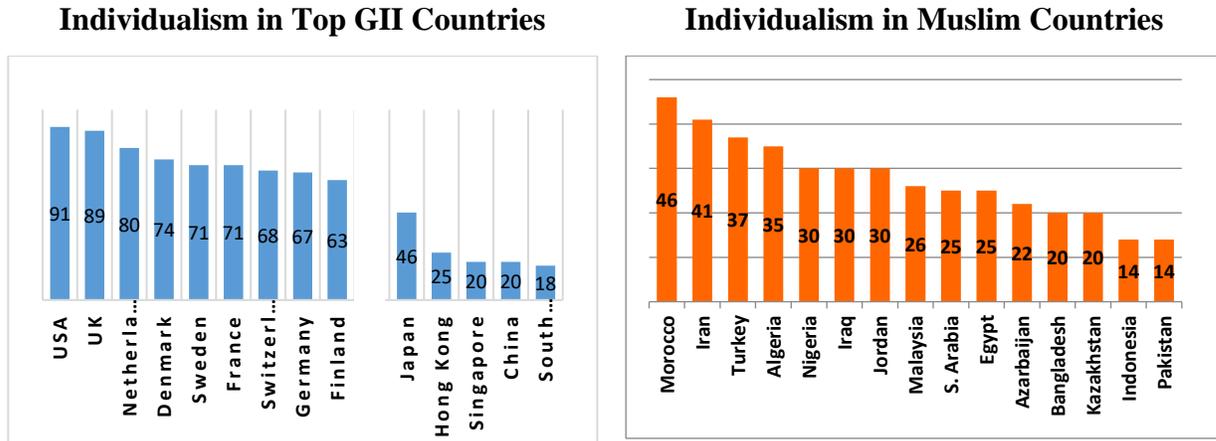
Source: Authors' own relying on data from <https://www.hofstede-insights.com> and <https://www.globalinnovationindex.org>

5.1.2. Individualism

Figure (7) shows the level of II scores of selected country groups. As seen, the higher II score implies a relatively higher GII score or vice versa except for some Asian countries such as China, Korea, and Singapore. Therefore,

even if it is generally possible to conclude that the countries where individualism is much more important than collectivism have higher GII, one may not argue that individualism is the only source of the innovation capacity of countries.

Figure (7). Individualism: Top GII Countries vs. Muslim Countries

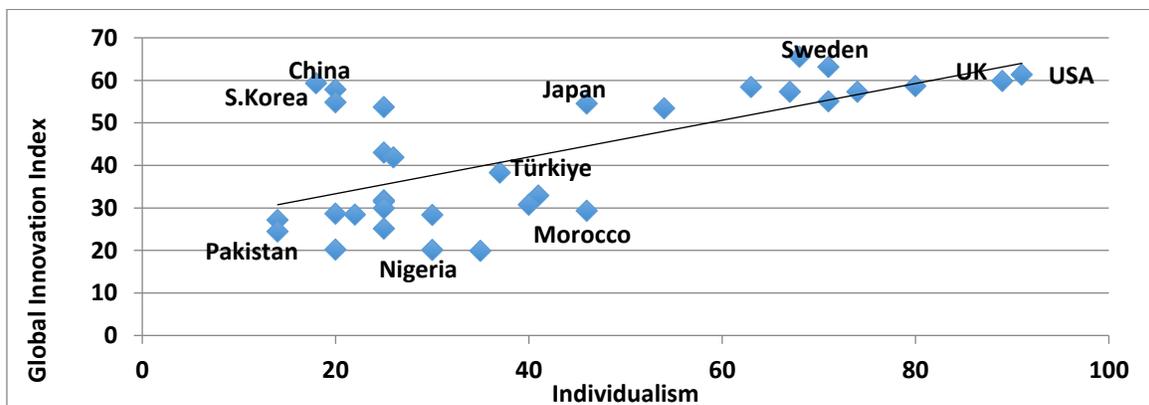


Source: Authors' own relying on data from <https://www.hofstede-insights.com>

However, as in Figure (8), there is a strong positive correlation between individualism and GII. The countries at the bottom left the trend line in the following figure are all Muslim countries that have lower GII scores. Consequently, we may state that even though the individualism index accounts for the

difference between Muslim countries and developed Western countries in terms of innovation capacity such as the UK, USA, and Sweden, it is far from explaining the difference of innovation capacity of Muslim countries and some Asia countries such as China, S. Korea and, Singapore.

Figure (8). Relationship between Individualism and Innovation



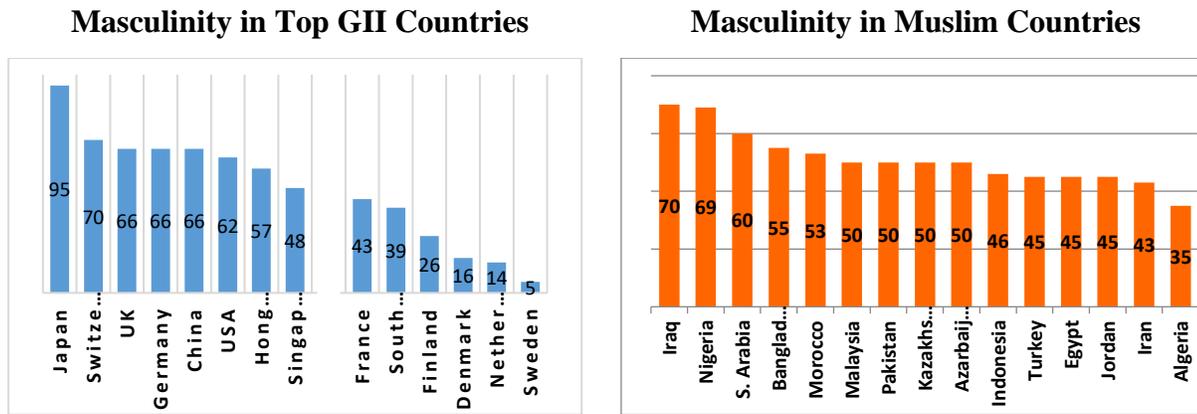
Source: Authors' own relying on data from <https://www.hofstede-insights.com> and <https://www.globalinnovationindex.org>

5.1.3. Masculinity

Figure (9) implies that while masculinity is one of the main drivers of high GII in some countries such as Japan, Switzerland, and the UK, femininity, on the other hand, is much

more effective in revealing the innovation capacity of society in Nordic countries. As for the Muslim countries, it seems that masculinity and femininity have equal importance in terms of GII as in the case of most Western countries.

Figure (9). Masculinity: Top GII Countries vs. Muslim Countries

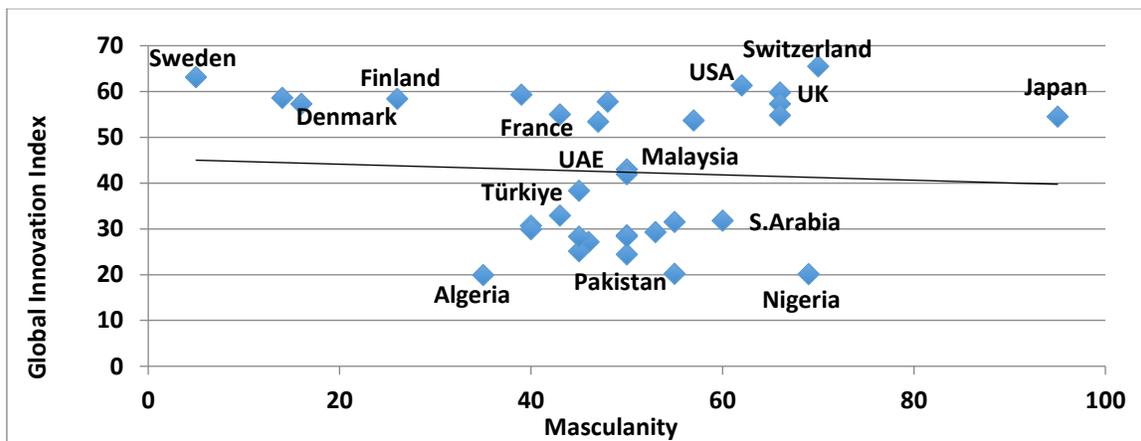


Source: Authors' own relying on data from <https://www.hofstede-insights.com>

As seen in the Figure (10), the correlation between MI and GII is not as strong as that of

PDI and II discussed above.

Figure (10). Relationship between Masculinity and Innovation



Source: Authors' own relying on data from <https://www.hofstede-insights.com> and <https://www.globalinnovationindex.org>

5.1.4. Uncertainty Avoidance

There are significant differences in terms of UAI in the top GII countries as seen in Figure (11). Since higher UAI implies intolerance to unorthodox ideas, it is a little bit to deduce a

meaningful conclusion from the UAI of those countries. However, when we look at the countries that have both high UAI and GII as in the case of Japan, France, and S. Korea in detail, we see that those countries have

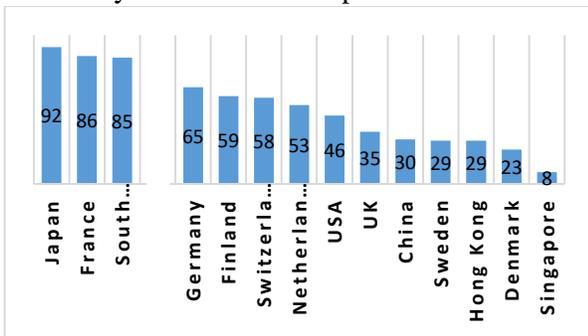
somehow managed to deal with ambiguities they have faced. For instance, although Japan is one of the highest UAI scored countries in the world and mostly attributed to natural disasters such as tsunamis and earthquakes that threaten the country, people in Japan have somehow learned to manage or prepare their daily life according to the ambiguities. Therefore, almost every daily activity of an ordinary Japanese is prescribed for

maximum predictability (<https://www.hofstede-insights.com>).

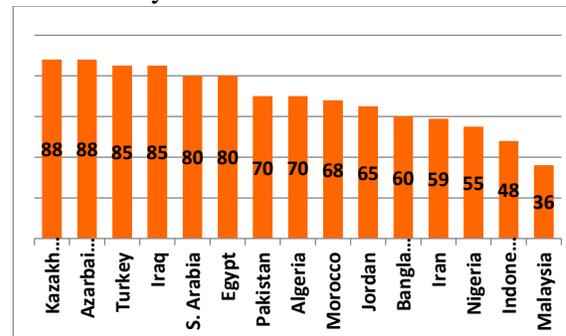
As for the Muslim countries, we see relatively higher UAI scores in these countries. When we consider both the low GGI score and the relatively high UAI score in these countries, it is clear that there is a need for an institution or institutions to manage uncertain situations in Muslim countries.

Figure (11). Uncertainty Avoidance: Top GII Countries vs. Muslim Countries

Uncertainty Avoidance in Top GII Countries



Uncertainty Avoidance in Muslim Countries

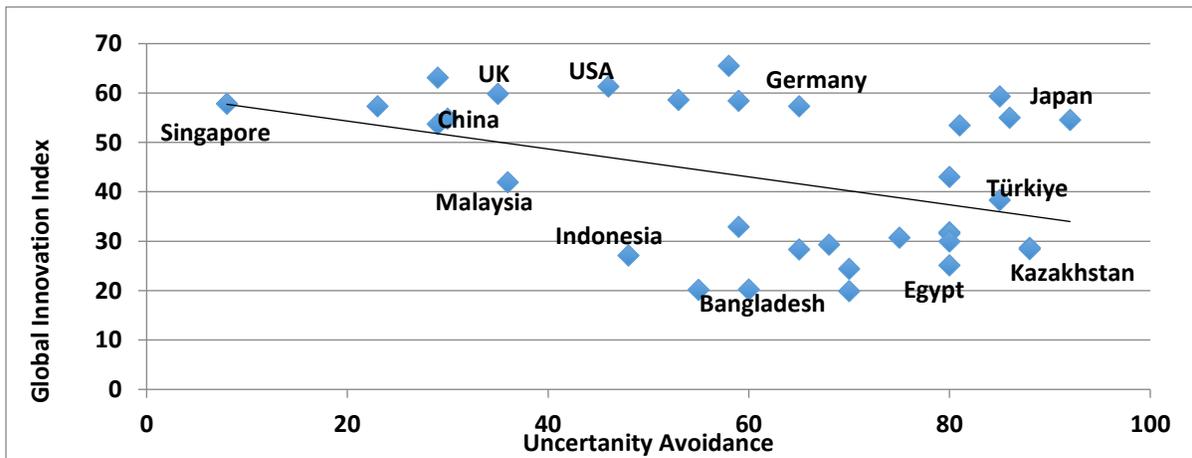


Source: Authors' Own relying on data from <https://www.hofstede-insights.com>

As a result, we may conclude that although there is, in general, a relatively low negative correlation between UAI and GII as seen in the following figure, it seems possible to cope with

impacts of uncertain conditions with normative or positive institutions or both as in the case of Japan or other high GII and UAI scored countries.

Figure (12). Relationship between Uncertainty Avoidance and Innovation



Source: Authors' Own relying on data from <https://www.hofstede-insights.com> and <https://www.globalinnovationindex.org>

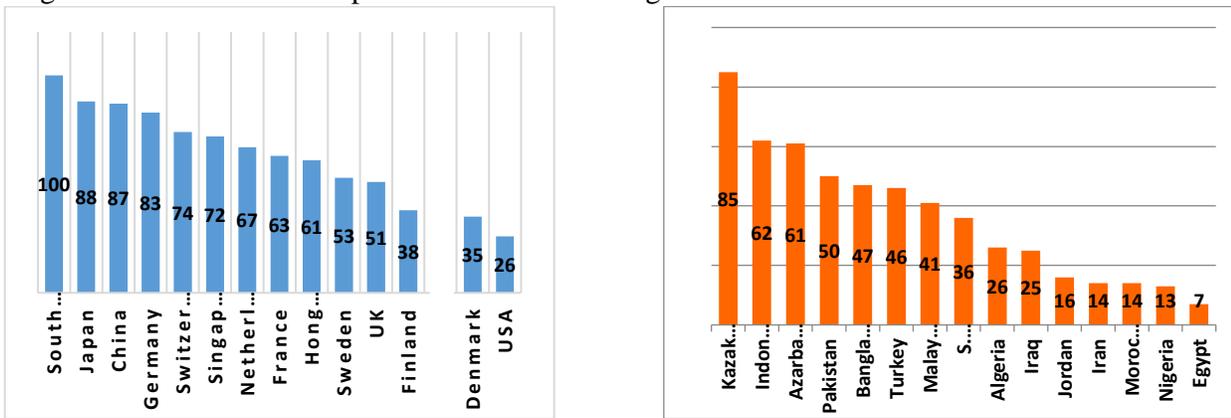
5.1.5. Long-Term Orientation

As seen in Figure (13), there are significant differences in terms of LTO scores of both top GII countries and Muslim countries. Nevertheless, it is possible to state that the difference in the LTO score in Muslim countries is much higher than that of top GII countries. The higher LTO scores in some Asia countries such as S. Korea, Japan, and China

means that these countries have very pragmatic cultures. That is, these countries tend to adopt their traditions according to the new situations. As for the Muslim countries, it seems that most of the Muslim countries are normative societies which means tend to maintain their traditions while considering a societal change with suspicion.

Figure (13). Long-Term Orientation: Top GII Countries vs. Muslim Countries

Long-Term Orientation in Top GII Countries Long-Term Orientation in Muslim Countries

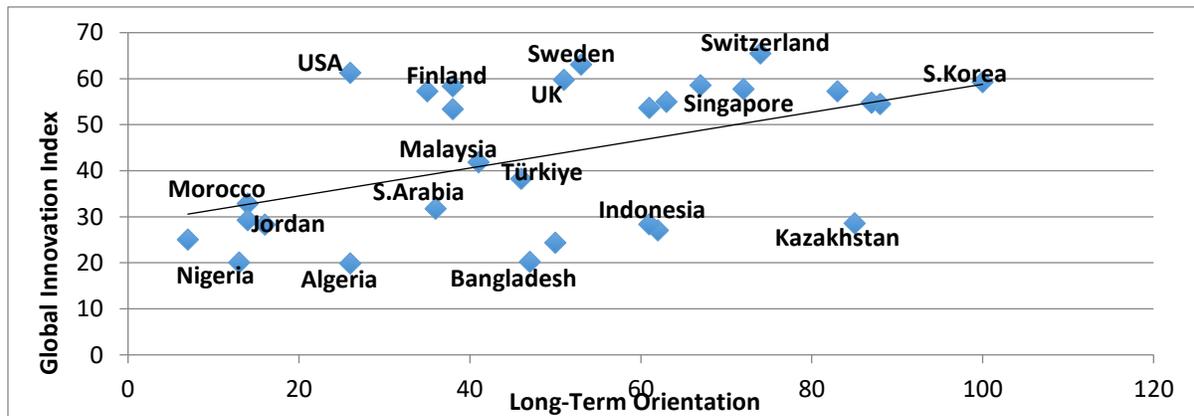


Source: Authors' own relying on data from <https://www.hofstede-insights.com>

As seen in Figure 14, there is, in general, a positive correlation between GII and LTO. On the other hand, we should specify that there are also cases contrary to the general correlation

mentioned above. For instance, even though the USA has a relatively higher GII score, its LTO score is as low as Algeria.

Figure (14). Relationship between Long-Term Orientation and Innovation



Source: Authors' Own relying on data from <https://www.hofstede-insights.com> and <https://www.globalinnovationindex.org>

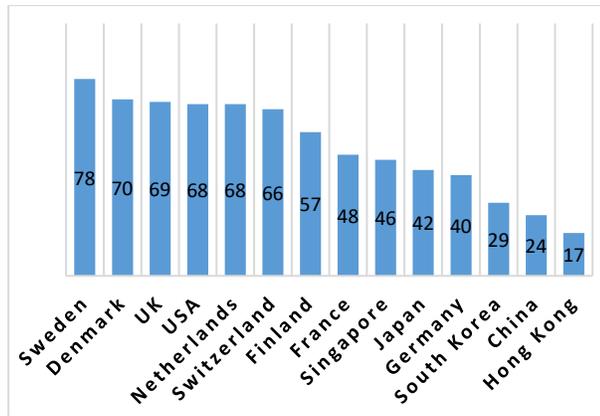
5.1.6. Indulgence

When we compare the two country groups in terms of their indulgence scores, we see some differences as in the case of other sub-Hofstede

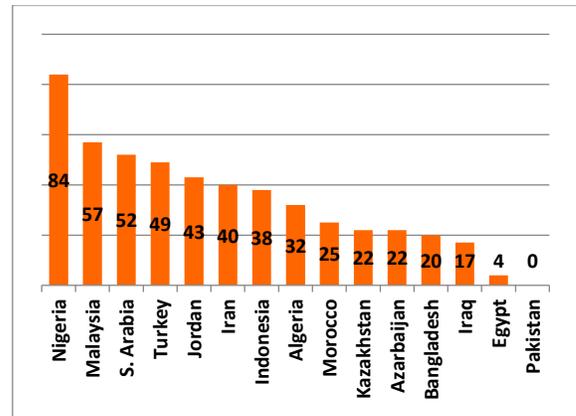
indexes. While most of the top GII countries have relatively higher InI scores, most Muslim countries have not as seen in the following figures.

Figure (15). Indulgence: Top GII Countries vs. Muslim Countries

Indulgence in Top GII Countries



Indulgence in Muslim Countries

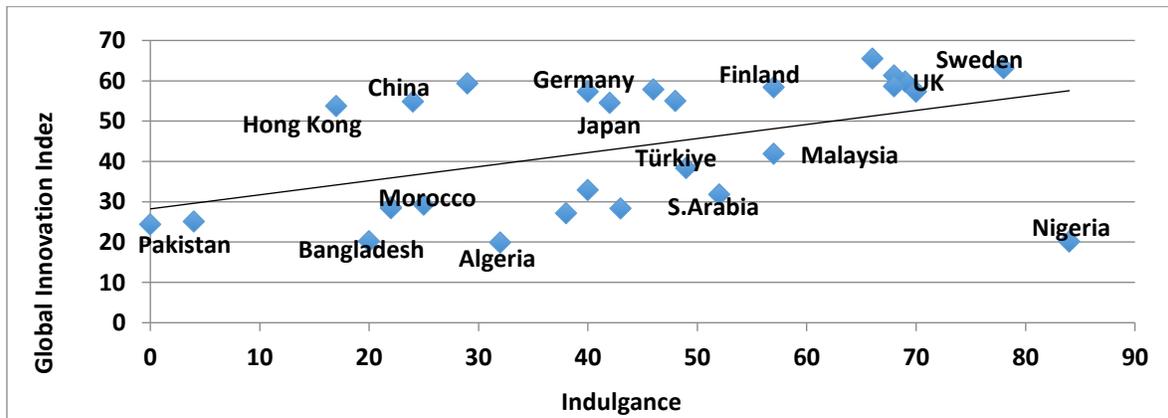


Source: Authors' Own relying on data from <https://www.hofstede-insights.com>

When we analyze InI and GII scores of these two country groups, we may conclude that there is, in general, a positive correlation between

these two index scores as seen in Figure (16). Again we cannot conclude that the higher In I index is the main source of a high GII score.

Figure (16). Relationship between Indulgence and Innovation



Source: Authors' Own relying on data from <https://www.hofstede-insights.com> and <https://www.globalinnovationindex.org>

5.2. Evaluation and Analysis

To see the scope of the relationship between the innovation capacity and the cultural dimensions, we also employed Ordinary Least

Squares (OLS) regression by using the available data of 89 countries that have both GII scores and sub-Hofstede index scores.

The OLS results can be seen in Table (2).

The fitted line is:

$$GII = 27.4 - 0.17PDI + 0.18II + 0.008MI - 0.08UAI + 0.30LTO + 0.13 Indulgence$$

In the equation, GII score is the dependent variable while the sub-Hofstede indexes are

independent variables. According to the regression results which are consistent with the analyzes above, while LTO is the most powerful sub-Hofstede indexes in terms of GII performance among the others, MI is the least related one in this context.

Table (2). OLS Summary Results: GII Scores vs sub-Hofstede Indexes Scores

<i>Regression Statistics</i>						
Multiple R	0,8538956					
R Square	0,7291377					
Adjusted R Square	0,7093185					
Standart Error	6,6552799					
Observations	89					
<i>ANOVA</i>						
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	6	9777,0421	1629,5070	36,7895	2,7019E-21	
Residual	82	3632,0055	44,2928			
Total	88	13409,0476				
	<i>Coefficients</i>	<i>Standart Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower %95</i>	<i>Upper %95</i>
Intercept	27,398075	6,033131	4,541269	0,000019	15,396254	39,399895
Power Distance	-0,168526	0,053040	-3,177362	0,002096	-0,274039	-0,063013
Individualism	0,175484	0,048350	3,629423	0,000493	0,079300	0,271668
Masculinity	0,008254	0,037955	0,217457	0,828392	-0,067251	0,083758
Uncertainty Avoidance	-0,078072	0,035028	-2,228867	0,028559	-0,147753	-0,008391
Long-Term Orientation	0,302136	0,036454	8,288094	0,000000	0,229617	0,374655
Indulgence	0,127045	0,040092	3,168829	0,002151	0,047289	0,206801

Source: Authors' Own

However, as stated above, even if it is one of the main drivers of GII, sub-Hofstede indexes are not the only explanatory of GII as seen in the regression results. According to the results, sub-Hofstede indexes account for approximately 70 percent of GII performance.

6. Summary and Conclusions

Income differences between countries have been one of the main issues that development economists focus on. Although many theories have been put forward to explain this

difference, the view that the underlying institutions in the countries are one of the most important reasons for the income difference is one of the accepted views as of today.

On the other hand, studies carried out in the literature reveal that innovation is an important factor in determining the level of development of economies. Even though there exist numerous factors determining the innovation capacity of an economy, it is expected that

culture is one of the most significant informal institutions among them.

In our study, we employ sub-Hofstede indexes to demonstrate the relation between culture and innovation in selected country groups. For this reason, we take into consideration countries that have the highest GII index and selected Muslim countries. According to our comparative analysis, culture more or less matters in terms of the innovation performance of the selected countries.

If we look at the results of the comparative analysis in terms of sub-Hofstede indexes and GII, it is found that while there is a negative correlation between PDI, MI, and UAI and GII; there exists a positive correlation between II, LTO, InI, and GII. However, it should be underlined the fact that the strength of the relationship between the GII index and the sub-Hofstede indexes differ. For instance, while there is a strong positive correlation between LTO and GII, our comparative analysis demonstrates a weak positive correlation between MI and GII. Similarly, while there exists a relatively strong negative relationship between PDI and GII, there is a weak relationship between UAI and GII.

Nevertheless, it should be noted that even if there is, in general, a positive or negative relationship between sub-Hofstede indexes and GII, it seems that sub-Hofstede indexes are not the only explanatory of the GII. It can be even stated that there are important differences in terms of innovation indices in countries that are at similar levels in terms of some sub-Hofstede indexes. For instance, Pakistan and S. Korea with approximately the same PDI are quite different from each other in terms of GII. While S. Korea is one of the top GII countries, Pakistan, on the contrary, is the worst one.

As for the Muslim countries, our comparative analysis shows that most of the Muslim countries have relatively lower R&D expenditures per capita so does the lower GII compared to the top GII countries.

When all countries examined in the study are evaluated in terms of both GII and sub-Hofstede indexes, we see that;

- Muslim countries with several exceptions such as Türkiye and Malaysia in some cases, cluster around a certain index level,
- It is possible to see similar clusters in Far East countries, Nordic countries, and Anglo-Saxon countries.

Accordingly, we may conclude that culture representing with sub-Hofstede indexes matters in determining the innovation performance of a country by taking into results of our comparative study. Nevertheless, it should be considered that those sub-Hofstede indexes do not seem to be sufficient to measure or explain the innovation performance of some countries as in the case of Far East Countries like Japan and China.

At this point, it may be possible to conclude that the institutional structures that will increase or reveal the innovation capacity of the society can be successful if they are compatible with the cultural roots, historical backgrounds, and geographic position of the societies as in the case of Japan.

In conclusion, as stated in previous chapters, Islam encourages innovative activities for Muslims. However, taking into consideration of Muslim countries both in terms of GDP per capita and innovation performance, it is clear that something has been wrong for Muslim countries to promote innovation so does the

development. Therefore, Muslim countries should establish institutional structures

compatible with their cultures to increase their innovation activities.

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البعد الاجتماعي والثقافي للابتكار في الاقتصاد الإسلامي: تحليل مقارنة للبلدان الرائدة في مجال الابتكار والدول الإسلامية

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المستخلص. في هذه الدراسة، نستخدم مؤشرات هوفستد (Hofstede) الفرعية، ومؤشر الابتكار العالمي (GII) لإظهار البعد الاجتماعي والثقافي للابتكار في البلدان الإسلامية من خلال مقارنته مع دول رائدة حسب مؤشر الابتكار العالمي. على الرغم من أن تحليلنا المقارن يشير إلى أن الثقافة مهمة إلى حد ما فيما يتعلق بأداء الابتكار في البلدان، يبدو أن مؤشرات هوفستد الفرعية ليست كافية وحدها للكشف عن أداء الابتكار للاقتصادات. من ناحية أخرى، على الرغم من أن الإسلام يشجع الأنشطة الابتكارية للمسلمين، فإن معظم البلدان الإسلامية لديها نفقات بحث وتطوير أقل نسبيًا للفرد، وكذلك الحال بالنسبة لمؤشر الابتكار العالمي والذي حققت فيه الدول الإسلامية نسبيًا أقل مقارنةً بالدول الأعلى في مؤشر الابتكار العالمي. تتجمع البلدان الإسلامية مع استثناءات عديدة مثل تركيا وماليزيا حول مستوى معين من الابتكار بالاستناد إلى مؤشرات هوفستد الفرعية، وهو أمر غير جيد للقدرة على الابتكار أيضًا. لذلك، قد يكون من الممكن استنتاج أن الهياكل المؤسسية التي ستزيد أو تكشف القدرة على الابتكار للمجتمع يمكن أن تكون ناجحة إذا كانت متوافقة مع الجذور الثقافية والخلفيات التاريخية والموقع الجغرافي للمجتمعات لأن الثقافة مهمة لتعزيز الابتكار في البلاد. لذلك. ولهذا توصي الدراسة بأنه يجب على الدول الإسلامية إنشاء هياكل مؤسسية متوافقة مع ثقافتها لزيادة أنشطتها الابتكارية.

الكلمات الدلّلة: الاقتصاد الإسلامي، الثقافة، الابتكار، الدول الإسلامية

تصنيف JEL: A13, O1, O31, Z12, Z13

تصنيف KAUJIE: H4, H44, S4