

# Efficiency of SDG Achievement in Muslim Countries

Irni Nuraini, Aam S. Rusydiana

*Researcher at Sharia Economics Applied Research and Training (SMART)*

---

## Keywords

*Sustainable Development Goals, Data Envelopment Analysis, Efficiency, Organization of Islamic Cooperation.*

## Abstract

The United Nations adopted the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs) to ensure that by 2030, the world addresses the numerous issues confronting humanity to promote well-being, economic prosperity, and environmental protection. Muslim countries, under the Organization of Islamic Cooperation (OIC), also actively participate in implementing the 2030 Agenda. This study aims to examine how efficient Muslim countries have been in achieving the SDGs between 2010 and 2017. The information indicates which countries have the highest and lowest SDG achievement rates, using the Data Envelopment Analysis (DEA) method to determine the relative efficiency level. According to the findings, four countries – Kuwait, Qatar, Malaysia, and Türkiye – achieved the maximum efficiency level across the period assessed. The country with the lowest efficiency is Comoros. The analysis also found regional variations of efficiency in SDG achievement, with the region with the highest efficacy value is Central Asia, while East Africa has the lowest.

---

*Corresponding Author: [irninuraini@gmail.com](mailto:irninuraini@gmail.com)*

<https://doi.org/10.56529/mber.v2i2.186>

## 1. Introduction

The Sustainable Development Goals (SDGs) were approved by United Nations (UN) member states to succeed the Millennium Development Goals (MDGs) as the international development community's guiding principles from 2015 through 2030. The 2030 Agenda for Sustainable Development was formed to enhance the quality of life for all people everywhere by resolving a wide range of problems (Barbier & Burgess, 2017). The Organization of Islamic Cooperation (OIC) has also pledged to achieve the SDGs by 2030, citing the targets' congruence with the OIC's vision and objectives of promoting economic and social development, reducing poverty, and enhancing the well-being of Muslims around the globe.

Muslims comprise around a quarter of the global population and Islam represents the largest religion in fifty-seven independent nations (Rehman *et al.*, 2022). It is predicted that the world's Muslim population will rise to about 2.8 billion by 2050 (Pew Research Center, 2015). However, Muslims are statistically one of the world's poorest populations. Almost 324.3 million people in OIC nations were estimated to have a daily income of less than US\$1.90 in 2019, and 16 OIC nations are still classified as low-income (COMCEC, 2021). Thirty years of data reveal that OIC members as a bloc have continuously lagged behind the global average in all economic and social growth (Iqbal & Mirakhor, 2013). Suppose that this population growth cannot be supported by effective quality-of-life management. If that happens, it will increase the pressure on our planet's limited food, water, and energy supplies, while also worsening poverty. Hence, achieving SDGs such as zero hunger, poverty reduction, gender equality, and access to high quality education and health care is crucial for addressing these problems.

Nevertheless, there has been substantial success in achieving the SDGs, and Muslim nations continue to improve with policies to minimize global hazards and encourage prosperity. In the 2000s, almost 30.1% of the OIC population had a daily income of less than US\$1.90; by 2017, that percentage had dropped to 16.2%. The frequency of malnutrition experienced by citizens of OIC member states decreased from 16.3% in 2000 to 13.5% in 2016, and states have also made progress in reducing maternal, infant, and neonatal mortality rates, with maternal mortality decreasing from 397 per 100,000 births in 2000 to 256 in 2015 (SESRIC, 2019).

There are several existing studies analysing the achievement of the SDGs in Muslim countries. For example, Dariah *et al.*, (2016) focus on implementing SDGs in Islamic countries with a new approach that follows Islamic values. Several other studies also discuss the role of Islamic social finance, namely waqf and zakat, in

achieving the SDGs in both Muslim and non-Muslim countries (Abdullah, 2018; Hassan *et al.*, 2021; Intezar & Zia, 2021). The SDGs can also be realised by paying attention to public support for Islamic financial product services, which include various Sharia contracts (Izhar & Munkin, 2021; Saba *et al.*, 2021). It is essential to consider the impact of the COVID-19 pandemic on SDG achievement, particularly post-pandemic plans to maintain progress toward those goals (Odey *et al.*, 2021) (Odey 2021). Rusydiana *et al.*, (2021) studied energy efficiency (SDG 7) in OIC nations, and it was shown that European Muslim countries have the best efficiency value, while Yemen has the most significant rise in overall productivity. However, no research has been conducted on the efficiency of the achievement of SDGs 2, 3, 5, 8, and 9 in Muslim countries.

This research aims to examine Muslim countries' efficiency in achieving the SDGs. The data demonstrate which countries have the highest and lowest SDG efficiency levels, as determined using Data Envelopment Analysis (DEA). DEA takes a period-by-period look at how productive each unit has been to track how efficiency has changed relative to the specified inputs and outputs (Rusydiana *et al.*, 2021). In most DEA models, a value of 1.0 or 100% indicates optimal performance (Tone, 2002).

DEA has become a standard tool for evaluating productivity in a variety of settings (Golani & Roll, 1989). DEA is a tool for managing and analysing results and preparing for future endeavours (Banker *et al.*, 1984). It classifies performance metrics as either outputs or inputs to determine the relative efficiency of decision-making units (DMUs). Inefficient DMUs may improve their performance and move closer to the efficient frontier by raising or reducing their current output or input, respectively (Seiford & Zhu, 2002).

The paper is presented as follows. In the first section, we discuss the study's rationale, novelty, and goals. In the second section, we examine the theoretical foundation that supports research on sustainable development goals and summarizes previous studies. Section 3 describes the research design, data, and tools & methodologies used in this study. Section 4 presents the results and discussion, while the final chapter contains the summary and recommendations.

## **2. Literature Review**

### *The Sustainable Development Goals*

According to the UN Development Agenda, sustainable development consists of three interconnected and mutually reinforcing components: economic growth, social development, and environmental preservation (Elkington & Rowlands,

1999). Brundtland (1987) defines sustainable development as "The ability to make development sustainable, or to make sure that it meets the needs of the present without putting the ability of future generations to meet their own needs at risk." The measurement and implementation of sustainable development are at the centre of specific definitions. Many efforts have been made to develop and evaluate suitable indicators. Statistics at the international, national, and regional levels are often used as the basis for measurement (Bali Swain & Yang-Wallentin, 2020). Indicators are often numerical values used to measure proximity to or deviance from a target. For instance, the annual increase in real Gross Domestic Product (GDP) per capita, Manufacturing Value Added (MVA), Maternal Mortality Ratio (MMR), and the prevalence of undernourishment are some of the critical indicators (United Nations, 2022). Practices for achieving sustainable development are also discussed, with concepts defined, goals set, indicators developed, and values expressed. The creation of social movements, organized groups, and eco-friendly technological advancements are also part of this process (Robert et al., 2005). We can conclude that the SDGs are aspirational steps toward sustainable development that can be measured using various tools, are constantly required to achieve better results than previously achieved and face practical challenges, such as how to implement steps toward better development.

The 2030 Agenda for Sustainable Development, which seeks "peace and prosperity for people and the earth, now and in the future", was officially adopted by the UN General Assembly in 2015 (Barbier & Burgess, 2017). In order to provide indicators and measurements of progress toward the significant objectives of sustainable development, all UN member states agreed on the SDGs as part of this agreement. Firms, investors, regulatory authorities, and civil society organizations also discussed how to account for business activities that affect sustainable development (Robert *et al.*, 2005). To achieve a sustainable economic, social, and environmental future, the SDGs represent stakeholder requirements globally (Fonseca & Carvalho, 2019). The 17 SDGs are defined by the "Transforming Our World: The 2030 Agenda for Sustainable Development" and the UN Sustainable Development Goals Platform, and they range from eliminating extreme poverty to combating the effects of climate change immediately (United Nations, 2015). Below are the 17 goals that make up the SDGs:

In this research, five SDGs are the focus of our discussion: SDG 2, SDG 3, SDG 5, SDG 8, and SDG 9. The following are the objectives of each SDG

### *The Organization of Islamic Cooperation*

The Organization of Islamic Cooperation (OIC) is an international organization comprising 57 Muslim-majority countries (Haq & Tanveer, 2020), and one of the largest intergovernmental organizations, second only to the UN (Arshad, 2016). The organization was established in 1969 and is based in Jeddah, Saudi Arabia. The OIC's member states span four continents and include some of the world's most populous countries, including Indonesia, Pakistan, and Bangladesh (Kayaoglu, 2015). The purpose of the OIC is to promote and preserve the interests of the Islamic world while also working to resolve problems and issues among its member states (Sharqieh, 2012).

The organization aims to foster cooperation and solidarity among its member countries in politics, economics, social, cultural, and science domains. It also promotes human rights and fundamental freedoms while preserving Islamic culture and history (Billah, 2019). Its functions include the Islamic Solidarity Fund, the Islamic Development Bank, and the Islamic Educational, Scientific, and Cultural Organization. The OIC is a political organization with a secondary focus on promoting economic growth and cooperation among its member nations. To this end, it has launched programs to develop infrastructure, expand access to education and healthcare, and encourage more trade and investment among its member states.

### *SDG Achievement in OIC Countries*

There are several achievements of sustainable development goals from Muslim countries. The data below is taken from research conducted by the Statistical Economic and Social Research and Training Centre for Islamic Countries (SESRIC) Institute in 2020.

The rate of malnutrition decreased from 16.8% in the OIC nations in 2000 to 13.7% in 2017. Central, South, and Southeast Asia had the greatest declines in undernourishment. A number of Muslim countries have made major investments in agricultural and rural development, and, as a result, have met SDG 2. These countries include Azerbaijan, Malaysia, Kazakhstan, and Türkiye, where less than 2.5% of the populations are malnourished.

The worldwide reduction target for MMR is below 70 per 100,000 live births (SDG 3). There has been significant improvement at the national level in many OIC nations, with fewer than 70 cases of MMR mortality per 100,000 live births documented in 24 OIC nations in 2017. With fewer than ten fatalities per 100,000 live births, the United Arab Emirates, Turkmenistan, and Qatar were among the highest achievers.

Female representation (SDG 5) in several national parliaments was greater than the global average of 24.9% in 16 OIC nations in 2020 . For example, women accounted for 50% of members of parliament in the United Arab Emirates, 43% in Senegal, 41% in Mozambique, 34% in Uganda and Guyana, 32% in Uzbekistan, 31% in Suriname and Cameroon, 29% in Albania, 27% in Sudan, Kazakhstan and Afghanistan, 26% in Iraq and Djibouti, and 25% in Algeria and Turkmenistan.

From 2000 to 2018, the average annual growth rate of real GDP per capita (SDG 8) among OIC nations was 2.4%, and among the OIC's least developed countries (LDCs), a group of 21 countries, it was 3.3%, higher than the global average of 1.8%. The average annual growth rate of real GDP per capita was above 5% in eight OIC nations during 2000-2018: Afghanistan, Azerbaijan, Djibouti, Kazakhstan, Mali, Tajikistan, Turkmenistan, and Uzbekistan.

The manufacturing sector's contribution to GDP (SDG 9) is measured by the ratio of MVA to GDP in 2015 US dollar terms. Scholars and policymakers often use MVA to evaluate a country's degree of industrialization. The MVA share of GDP in the OIC nations only climbed from 13.1% to 14.3% between 2000 and 2019. Between 2000 and 2019, 21 OIC nations had an increase in their MVA percentage of GDP. More than three percentage point increases were seen in Turkmenistan, Bangladesh, Oman, Saudi Arabia, Syria, Iran, and Gabon. Just three OIC nations, Turkmenistan, Malaysia, and Indonesia, had MVA to GDP ratios over 20% in 2019.

### *Efficiency of SDG achievement in OIC Countries*

Efficiency of SDG achievement is a concept that illustrates the relationship between inputs and outputs in terms of outcomes. This fraction shows that input or output management, or both, may affect efficiency. A unit of economic activity's efficiency may be quantified in terms of its output. To be efficient, a process must maximize output in quantity and quality. An action is efficient if it produces the desired outcome using the fewest possible resources (Rusydiana *et al.*, 2021).

### **3. Method**

Data Envelopment Analysis (DEA) is used in this study. DEA is a straightforward mathematical programming technique for assessing past efforts in light of potential future improvements. With its foundation in analysing the relative efficiency of prior management accomplishments, DEA may provide helpful guidance for developing more focused action plans (Banker *et al.*, 1984). DEA is a nonparametric technique that uses a linear program model to determine the output-to-input ratio across all comparison units. DEA is utilized in various settings, including educational institutions, financial organizations, hospitals, production planning, and others, for

performance evaluation and benchmarking. Decision Making Unit (DMU) stands for DEA units. Using the currently available machinery to its fullest potential to achieve the highest possible production can be accomplished with the assistance of this method (Charnes *et al.*, 1978).

Case requirements dictate the DEA model type used. The model's size and orientation may determine a situation's DEA model type. For instance, a constant return to scale (CRS) DEA model would be suitable if it were anticipated that economies of scale would remain constant regardless of the size of the service facility. If, on the other hand, the assumption is false, a variable returns to scale (VRS) method should be used. In addition, much as in ratio analysis, when we compute outputs relative to inputs and emphasize lowering inputs to increase efficiency, we refer to this as input orientation in DEA analysis (Ozcan, 2008). Meanwhile, efficiency is defined from an output-oriented viewpoint as the ratio of actual output to that which might have been obtained with the available inputs (Farrell, 1957). Since the efficiency of SDG achievement is highly dependent on other variables, it can be said that it is not always constant; and since an output-oriented model is a suitable model to achieve efficiency, including overall (economic) efficiency and social efficiency, these assumptions were used in this study (Johnes, 2006).

As DEA considers economic and social indicators, it may be used to assess progress toward SDG achievements across nations. This research presents data on five aspects of the SDGs: End Hunger, achieve food security and improved nutrition and promote sustainable agriculture (SDG 2); Ensure healthy lives and promote well-being for all at all ages (SDG 3); Achieve gender equality and empower all women and girls (SDG 5); Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all (SDG 8); and Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation (SDGs 9).

The report also evaluates the efficiency of the 49 OIC nations across five dimensions of SDGs attainment. This research makes use of secondary data that was previously published by SESRIC from 2010 to 2017.

## **4. Results and Discussion**

### **Results**

Using the DEA approach, this discussion illustrates the SDG achievement of 49 OIC nations between 2010 and 2017. SESRIC data was consulted for information on the input and output variables regarding five SDG-related outcome variables. Inputs such as labour and capital are among the many factors widely acknowledged

to affect sustainable development (Askari & Rehman, 2013). This study's input variables, then, are based on these nations' labour and capital structures.

Table 1. Grouping inputs and outputs

Input	Output
(1) Labour	(1) SDGs 2
(2) Capital	(2) SDGs 3
	(3) SDGs 5
	(4) SDGs 8
	(5) SDGs 9

The efficiency of 49 OIC nations may be determined using the MaxDea 6.1 software and the DEA approach, which considers a variable return to scale (VRS). After data processing, the SDGs' value/level of attainment in OIC nations is shown in Table 2 below.

Table 2. OIC Countries' SDGs Achievement Efficiency Value

Country	2010	2011	2012	2013	2014	2015	2016	2017	Mean	Rank
Kuwait	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1
Qatar	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1
Türkiye	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1
Malaysia	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1
Turkmenistan	0.964	1.000	1.000	0.991	1.000	0.998	0.998	0.989	0.993	5
United Arab Emirates	0.984	1.000	0.979	1.000	0.990	0.985	1.000	1.000	0.992	6
Bahrain	0.937	1.000	0.986	1.000	1.000	1.000	1.000	1.000	0.990	7
Kazakhstan	0.884	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.985	8
Afghanistan	0.998	1.000	1.000	0.985	0.978	0.967	0.977	0.963	0.984	9
Tunisia	0.897	0.924	0.928	0.921	0.933	0.998	1.000	1.000	0.950	10
Senegal	0.870	0.875	0.785	1.000	1.000	1.000	1.000	1.000	0.941	11
Brunei	0.865	0.908	0.920	0.945	0.946	0.971	0.980	0.985	0.940	12
Egypt	0.872	0.895	0.923	0.975	1.000	0.994	0.930	0.920	0.939	13
Mozambique	1.000	0.939	0.936	0.933	0.938	0.930	0.914	0.914	0.938	14
Pakistan	0.926	0.970	0.941	0.958	0.953	0.907	0.913	0.910	0.935	15
Guinea-Bissau	0.797	1.000	0.922	0.985	0.785	1.000	1.000	0.919	0.926	16
Mali	0.868	0.873	1.000	1.000	0.944	0.908	0.870	0.847	0.914	17
Uzbekistan	0.961	0.943	0.962	0.965	0.924	0.847	0.812	0.765	0.897	18
Bangladesh	1.000	0.995	0.946	0.887	0.765	0.834	0.837	0.846	0.889	19
Guyana	0.813	0.853	0.902	1.000	0.851	0.908	0.831	0.865	0.878	20
Saudi Arabia	0.650	0.872	0.746	0.882	0.901	0.957	0.966	1.000	0.872	21
Lebanon	0.762	0.756	0.796	0.824	0.872	0.919	0.961	1.000	0.861	22
Tajikistan	0.937	0.807	0.899	0.853	0.786	0.795	0.899	0.904	0.860	23
Cote d'Ivoire	0.841	1.000	0.938	0.827	0.797	0.815	0.813	0.850	0.860	24



## Efficiency of SDG Achievement in Muslim Countries

Chad	1.000	0.625	0.869	0.769	0.769	0.769	0.897	1.000	0.837	25
Kyrgyzstan	1.000	1.000	0.783	0.975	0.748	0.740	0.680	0.697	0.828	26
Cameroon	0.677	0.680	0.716	0.724	0.930	0.942	0.916	0.906	0.811	27
Uganda	0.808	0.746	0.807	0.811	0.815	0.830	0.826	0.833	0.810	28
Iraq	0.734	0.823	0.939	1.000	0.659	0.691	0.809	0.743	0.800	29
Indonesia	0.807	0.803	0.772	0.784	0.768	0.761	0.761	0.795	0.781	30
Oman	0.793	0.818	0.774	0.738	0.781	0.705	0.699	0.704	0.751	31
Albania	0.814	0.762	0.774	0.766	0.867	0.896	0.522	0.533	0.742	32
Sudan	0.687	0.690	0.700	0.697	0.743	0.740	0.798	0.809	0.733	33
Jordan	0.595	0.669	0.701	0.760	0.759	0.766	0.792	0.813	0.732	34
Morocco	0.608	0.637	0.673	0.694	0.737	0.766	0.753	0.793	0.708	35
Guinea	0.723	0.648	0.652	0.649	0.670	0.633	0.702	0.717	0.674	36
Mauritania	0.604	0.615	0.637	0.643	0.687	0.644	0.625	0.625	0.635	37
Iran	0.563	0.529	0.543	0.544	0.564	0.564	0.926	0.572	0.601	38
Benin	0.650	0.615	0.605	0.551	0.537	0.573	0.560	0.504	0.574	39
Nigeria	0.612	0.533	0.567	0.633	0.649	0.547	0.502	0.504	0.568	40
Burkina Faso	0.618	0.536	0.530	0.512	0.558	0.503	0.482	0.486	0.528	41
Togo	0.520	0.538	0.462	0.509	0.530	0.508	0.505	0.565	0.517	42
Niger	0.519	0.365	0.772	0.464	0.533	0.425	0.411	0.464	0.494	43
Azerbaijan	0.445	0.464	0.467	0.537	0.482	0.481	0.522	0.533	0.491	44
Sierra Leone	0.358	0.381	0.648	1.000	0.381	0.344	0.393	0.341	0.481	45
Gambia	0.509	0.484	0.398	0.451	0.464	0.535	0.455	0.440	0.467	46
Gabon	0.461	0.470	0.454	0.467	0.439	0.417	0.413	0.500	0.453	47
Djibouti	0.358	0.376	0.385	0.392	0.496	0.586	0.472	0.329	0.424	48
Comoros	0.301	0.315	0.350	0.467	0.305	0.318	0.387	0.374	0.352	49
<b>Mean</b>	<b>0.767</b>	<b>0.770</b>	<b>0.785</b>	<b>0.805</b>	<b>0.780</b>	<b>0.784</b>	<b>0.786</b>	<b>0.781</b>	<b>0.782</b>	

The efficiency value changes from year to year, as seen in the table above. The median efficiency rating is 0.78, with the top four nations being Kuwait, Qatar, Türkiye, and Malaysia. Countries having efficiency levels below 0.5 over the period are Niger, Azerbaijan, Sierra Leone, Gambia, Gabon, Djibouti, and Comoros. With an average efficiency rating of 0.35 between 2010 and 2017, Comoros is the least successful nation in terms of achieving the SDGs. Despite being a middle-income country, Indonesia's efficiency result is less than 1.00, lower than low-income nations such as Mozambique and Afghanistan (COMCEC, 2021) because of the vast disparity between input and output gains. Although Indonesia's inputs are more significant than other countries, its outputs are still lower. With its abundance of resources, Indonesia has a 42% share of resource-based industries in industrial structure. However, productivity could be higher due to their labor-intensive nature and limited capital, despite the direct contribution of capital and labor to output creation (Badriah *et al.*, 2019)

Based on their efficiency values, values can be grouped into four groups: full efficiency (100%), high efficiency (80-99%), medium efficiency (50-80%), and low efficiency (50%) (Rusydiaana & Nugroho, 2017). Only 78 of the 392 DMUs studied achieved an efficiency of 100%, while the remaining 314 ranged from 0% to 99%, with the breakdown as follows: 80-99% efficiency for as many as 135 DMUs, 50-80% efficiency for as many as 131 DMUs, and efficiency values below 50% for as many as 48 DMUs throughout the study's eight-year time frame (2010-2017).

Table 3. Efficiency per region

DMU	Countries mean	Regional mean	Ranking	DMU	National mean	Regional mean	Ranking
<b>Southeast Asia</b>		0.91	2	<b>West Africa</b>			
Brunei	0.94			Benin	0.57	0.64	9
Indonesia	0.78			Burkina Faso	0.53		
Malaysia	1.00			Comoros	0.35		
<b>Central Asia</b>		0.91	1	Cote d'Ivoire	0.86		
Uzbekistan	0.90			Gambia	0.47		
Tajikistan	0.86			Guinea	0.67		
Turkmenistan	0.99			Guine-Bissau	0.93		
Kazakhstan	0.99			Mali	0.91		
Kyrgyzstan	0.83			Mauritania	0.64		
<b>South Asia</b>		0.85	4	Niger	0.49		
Pakistan	0.93			Nigeria	0.57		
Bangladesh	0.89			Senegal	0.94		
Afghanistan	0.98			Siera Leone	0.48		
Iran	0.60			Togo	0.52		
<b>West Asia/ Middle East</b>		0.89	3	<b>East Africa</b>		0.72	8
Lebanon	0.86			Djibouti	0.42		
Iraq	0.80			Mozambique	0.94		
Saudi Arabia	0.87			Uganda	0.81		
UAE	0.99			Central Africa		0.74	6
Bahrain	0.99			Cameroon	0.81		
Qatar	1.00			Chad	0.84		
Kuwait	1.00			Gabon	0.45		
Jordan	0.73			Guyana	0.88		
Oman	0.75			<b>North Africa</b>		0.83	5
<b>Europe</b>		0.74	7	Egypt	0.94		
Albania	0.74			Morocco	0.71		
Azerbaijan	0.49			Sudan	0.73		
Türkiye	1.00			Tunisia	0.95		

According to Table 3, the nations of Central Asia have achieved progress towards the SDGs with the highest levels of efficiency, followed by those of Southeast Asia, then West Asia/ Middle East, South Asia, North Africa, Central Africa, Europe, East Africa, and West Africa. Central Asia has the highest rate of SDG accomplishment level of all regions, while West Africa has the lowest.

### **Discussion**

Four nations – Kuwait, Qatar, Türkiye, and Malaysia – were given a fully efficient score in the five SDGs being assessed (SDGs 2, 3, 5, 8, and 9), making them the most successful countries in SDG achievement between 2010 and 2017.

#### *Kuwait*

Kuwait is one of the countries which achieved the maximum efficiency value in SDG achievement. This shows that Kuwait has made significant achievements. According to Food and Agriculture Organization, Kuwait's food security score increased from 76.8 in 2010 to 80.2 in 2017. Moreover, in 2011, of all the (Gulf Cooperation Council) GCC countries, Kuwait had one of the highest per capita food supply levels at 3471 kcal per capita per day, a value very close to the corresponding value for the United States (Pirani & Arafat, 2016). Kuwait achieved a score of more than 50 on a scale of 0-100 for the Universal Health Coverage Index, which means that health services in Kuwait are above the average of other OIC countries from 2000-2017 (SESRIC, 2019). Kuwait also made significant investments in infrastructure development, such as building new roads, airports, and ports. The government has also promoted innovation and technology transfer through various initiatives, such as establishing the Kuwait Institute for Scientific Research.

#### *Qatar*

Qatar is among the world's wealthiest nations due to its hydrocarbon reserves and increasing economic diversification (Ajibade *et al.*, 2020). Qatar has experienced sustained economic development over the past decade, with the natural gas and oil industries driving the majority of this expansion (Al-Badi & AlMubarak, 2019). The country ranks high on the Global Food Security Index, scoring 76.5 overall (GFSI, 2018). The World Health Organization (WHO) recently ranked Qatar as the GCC member with the highest per capita health expenditure. The country's well-developed healthcare system offers its citizens complementary healthcare services (Goodman, 2015). Qatar has tried to increase the number of women in political and decision-making roles. Judge Sheikha Maha Mansour Al-Thani, for instance, was designated one of the most influential women in Qatar (ÖZORAL, 2022). Qatar has made significant investments in its infrastructure. New

highways, bridges, tunnels, and public transportation have been constructed. The country has also invested in the construction of Hamad International Airport, one of the world's largest and most modern airports (Hazime, 2010).

### *Türkiye*

With a developing population and middle income status, Türkiye is one of the world's twenty largest economies and is estimated to be the seventh largest agricultural producer. This is attributed to initiatives such as the National Food and Nutrition Strategy and Action Plan, launched in 2014 to combat malnutrition and starvation in the nation (Savaşan & Sümer, 2020). According to the National Maternal Mortality Surveillance, the maternal mortality rate continues to decline, from about 24 deaths per 100,000 live births in 2010 to about 17/100,000 in 2017 (Engin-Üstün et al., 2019). The Turkish Statistical Institute stated that female labour force participation increased from 29.2 percent in 2010 to 33.7 percent in 2017. Türkiye implemented ambitious reforms and experienced high economic growth rates, propelling the country to upper-middle income status and reducing poverty; between 2002 and 2018, the percentage of persons living below the US\$5.50 per day poverty line fell by three-quarters to 8.5% (The World Bank, 2022). In terms of sustainable infrastructure development, the Marmaray tunnel, a subsea conduit connecting the European and Asian sides of Istanbul, was inaugurated in 2013 by Türkiye. The country also inaugurated the Ankara-Istanbul high-speed railway line in the same year, reducing travel time between the two cities from six to three hours (Doğan et al., 2018).

### *Malaysia*

Malaysia, with a population of around 30.3 million people, is classified as an upper middle-income country, with exceptional economic growth rates since the 1980s. According to the World Bank, Malaysia has made good progress in reducing the percentage prevalence of undernutrition, from approximately 3.4% in 2010 to approximately 3.1% in 2017, and the MMR has decreased from 30 deaths per 100,000 live births in 2010 to 23/100,000 in 2017. The Malaysian government has initiated many measures to enhance female labour force participation, such as rewarding enterprises that offer flexible working hours and pushing the private sector to promote gender diversity in leadership roles. As a result, the female labour force participation rate crossed 50% for the first time in 2013, reaching 54.7% in 2017 (Lim, 2019). During this decade, Malaysia's GDP rose at an annual pace of 5.8%, higher than the world average during this period. Malaysia has also fostered innovation through science, technology, and innovation policies under the National Policy on Science, Technology and Innovation programmes (Narayanan &

Yew-wah, 2018).

### **Comoros**

Although many Muslim nations have made progress toward the SDGs, others have struggled, such as Comoros, which has the lowest efficiency score among Muslim countries at 0.352. Comoros is one of the world's poorest countries, and food insecurity is a significant challenge (Taylor et al., 2019). Comoros also faces significant challenges in providing adequate healthcare to its population, particularly in rural areas. The country has high maternal and child mortality rates, and diseases like malaria, tuberculosis, and HIV/AIDS are widespread (Mohamed et al., 2021). Comoros has a small economy that is heavily reliant on agriculture and fisheries. Unemployment is high, particularly among young people, and many people work in the informal sector (Buorgoin et al., 2016). Weak economic resilience, political instability, and natural disasters are among challenges that Comoros confront in their pursuit of sustainable development (Burak & Meddeb, 2012). However, it is crucial to stress that even in difficult conditions, progress toward the SDGs can be made. Strong leadership, good governance, and focused investments in sustainable development will be required to achieve meaningful progress towards the SDGs in Comoros.

## **5. Conclusion**

This research examines the efficiency level of SDG achievement in OIC countries. It can also be viewed as a technique to pique other scholars' interest in gauging the success of sustainable development initiatives, as the DEA analysis method research can assess each countries from the most efficient to least efficient.

This study focuses on achieving five SDGs: SDG 2 (End Hunger, Achieve Food Security and Improved Nutrition, and Promote Sustainable Agriculture), SDG 3 (Ensure Healthy Lives and Promote Well-Being for All at All Ages), SDG 5 (Achieve Gender Equality and Empower All Women and Girls), SDG 8 (Promote Sustained, Inclusive, and Sustainable Economic Growth, Full and Productive Employment, and Decent Work for All), and SDG 9 (Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation).

Based on the analysis, four countries have excellent efficiency values of 1.00: Kuwait, Qatar, Türkiye, and Malaysia. This shows that the four countries can manage their inputs (labour and capital) sufficiently and achieve good performance towards the SDGs. On the other hand, the least efficient country is Comoros, which faces major challenges in achieving the SDGs, including limited resources, political instability, weak governance, and significant climate change impact. As

for assessment by region, Central Asia sits at the top, an average efficiency score of 0.91, while East Africa achieved the lowest average level of efficiency of 0.72.

The benefit of this research is to provide an overview of the condition of SDG achievements in Muslim countries, so that stakeholders are stimulated to formulate the necessary steps to improve their efficiency in achieving the SDGs, especially in countries with low efficiency scores. This research recommends that governments in countries that have achieved a high efficiency level are tasked with maintaining that performance, while countries which need to become more efficient in their progress should develop and implement appropriate SDG achievement strategies to increase the level of community well-being.

## REFERENCES

- Abdullah, M. (2018). Waqf, Sustainable Development Goals (SDGs) and maqasid al-shariah. *International Journal of Social Economics*, 45(1), 158–172. <https://doi.org/10.1108/IJSE-10-2016-0295>
- Ajibade, I., Egge, M., & Pallathadka, A. (2020). Climate change and the sustainable development goal on food security: barriers and opportunities for progressive realization in Qatar and Nigeria. *Journal of Sustainable Development Law and Policy (The)*, 10(2), 158. <https://doi.org/10.4314/jsdlp.v10i2.2>
- Al-Badi, A., & AlMubarak, I. (2019). Growing energy demand in the GCC countries. *Arab Journal of Basic and Applied Sciences*, 26(1), 488–496. <https://doi.org/10.1080/25765299.2019.1687396>
- Arshad, S. (2016). Overview of the Organization of Islamic Cooperation. *Stock Markets in Islamic Countries*, 15–29.
- Askari, H., & Rehman, S. R. (2013). A Survey of the Economic Development of OIC Countries. In Z. Iqbal & A. Mirakhor (Eds.), *Economic Development and Islamic Finance* (p. 299). The World Bank. <https://doi.org/10.1596/978-0-8213-9953-8>
- Badriah, L. S., Rahajuni, D., & Suharno, S. (2019). An Analysis of Input Substitution Elasticity in Natural Resource-Based Industry in Indonesia. The Application of CES Function. *Journal of Environmental Management and Tourism*, 10(3), 680. [https://doi.org/10.14505//jemt.v10.3\(35\).22](https://doi.org/10.14505//jemt.v10.3(35).22)
- Bali Swain, R., & Yang-Wallentin, F. (2020). Achieving sustainable development goals: predicaments and strategies. *International Journal of Sustainable Development & World Ecology*, 27(2), 96–106. <https://doi.org/10.1080/13504509.2019.1692316>

- Banker, R. , Charner, A., & Cooper, A. .(1984). Some Models For Estimating Technical and Scale Inefficiencies in Data Envelopment Analysis. *Management Science*, 30(9), 1078–1092. <https://doi.org/10.1287/mnsc.30.9.1078>
- Barbier, E. , & Burgess, J. . (2017). The Sustainable Development Goals and the systems approach to sustainability. *Economics*, 11(1).
- Billah, M. M. (2019). Role of the OIC and Other International Organizations in the Sustainable Development of Islamic Finance. In *Islamic Financial Products* (pp. 13–31). Springer International Publishing. [https://doi.org/10.1007/978-3-030-17624-2\\_2](https://doi.org/10.1007/978-3-030-17624-2_2)
- Buorgoin, C., Parker, L., Martinez-Valle, A., Mwongera, C., & Laderach, P. (2016). A spatially explicit assessment of climate change vulnerability in the agricultural sector of the Union of the Comoros.
- Burak, S., & Meddeb, R. (2012). Natural disaster vulnerability and human-induced pressure assessment in small islands developing states: A case study in the Union of the Comoros. *EGU General Assembly Conference Abstracts*, 7696.
- Charnes, A., Cooper, W. ., & Rhodes, E. (1978). Measuring the Efficiency of Decision Making Units. *European Journal of Operational Research*, 2(6), 429–444.
- COMCEC. (2021). *COMCEC Poverty Outlook 2021*.
- Dariah, A. R., Salleh, M. S., & Shafiai, H. M. (2016). A New Approach for Sustainable Development Goals in Islamic Perspective. *Procedia - Social and Behavioral Sciences*, 219, 159–166.
- Doğan, I., Gültekin, A. B., & Tanrıvermiş, H. (2018). *Sustainable Transportation* (pp. 232–252). [https://doi.org/10.1007/978-3-319-63709-9\\_19](https://doi.org/10.1007/978-3-319-63709-9_19)
- Elkington, J., & Rowlands, I. . (1999). Cannibals with forks: The triple bottom line of 21st century business. *Alternatives Journal*, 25(4), 42.
- Engin-Üstün, Y., Sanisoğlu, S., Keskin, H. L., Karaahmetoğlu, S., Özcan, A., Çelen, Ş., Üstün, Y., Alkan, A., Ongun, V., & Şencan, İ. (2019). Changing trends in the Turkish maternal deaths, with a focus on direct and indirect causes. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, 234, 21–25. <https://doi.org/10.1016/j.ejogrb.2018.12.031>
- Farrell, M. . (1957). The Measurement of Productivity Efficiency. *Journal of The Royal Statistical Society*, 120(3), 253–281.
- Fonseca, L., & Carvalho, F. (2019). The reporting of SDGs by quality, environmental, and occupational health and safety-certified organizations. *Sustainability*, 11(20), 5797.
- GFSI. (2018). *Global Food Security Index (GFSI) Ranking and Trends*.



- Golani, B., & Roll, Y. (1989). An application procedure for DEA. *Omega*, 17(3), 237–250. [https://doi.org/10.1016/0305-0483\(89\)90029-7](https://doi.org/10.1016/0305-0483(89)90029-7)
- Goodman, A. (2015). The Development of the Qatar Healthcare System: A Review of the Literature. *International Journal of Clinical Medicine*, 06(03), 177–185. <https://doi.org/10.4236/ijcm.2015.63023>
- Haq, I. ., & Tanveer, M. (2020). Status of research productivity and higher education in the members of Organization of Islamic Cooperation (OIC). *Library Philosophy and Practice (e-Journal)*, 3845.
- Hassan, M. K., Saraç, M., & Khan, A. (2021). Islamic Finance and Sustainable Development. In M. K. Hassan, M. Saraç, & A. Khan (Eds.), *Islamic Finance and Sustainable Development*. Springer International Publishing. <https://doi.org/10.1007/978-3-030-76016-8>
- Hazime, H. (2010). From city branding to e-brands in developing countries: An approach to Qatar and Abu Dhabi. *African Journal of Business Management*, 5(12), 4731–4745. <https://doi.org/10.5897/AJBM10.533>
- Intezar, M. T., & Zia, S. Bin. (2021). Zakat, SDGs, and Poverty Alleviation of Muslims in India. In *Impact of Zakat on Sustainable Economic Development Advances in Electronic Government, Digital Divide, and Regional Development* (pp. 1–20). <https://doi.org/10.4018/978-1-7998-3452-6.ch001>
- Iqbal, Z., & Mirakhor, A. (2013). Economic Development and Islamic Finance. *World Bank Publications*.
- Izhar, H., & Munkin, M. (2021). Islamic Finance and SDG 10: Evidence from Selected OIC Countries. *Islamic Finance and Sustainable Development*, 127–149. [https://doi.org/10.1007/978-3-030-76016-8\\_7](https://doi.org/10.1007/978-3-030-76016-8_7)
- Johnes, J. (2006). Data envelopment analysis and its application to the measurement of efficiency in higher education. *Economics of Education Review*, 25(3), 273–288. <https://doi.org/10.1016/j.econedurev.2005.02.005>
- Kayaoglu, T. (2015). The organization of islamic cooperation: *Politics, problems, and potential*. Routledge.
- Lim, B. F. . (2019). Women left behind? Closing the gender gap in Malaysia. *The Japan Institute for Labour Policy and Training*, 3(17), 22–29.
- Mohamed, K. S., Abasse, K. S., Abbas, M., Sintali, D. N., Baig, M. M. F. A., & Cote, A. (2021). An Overview of Healthcare Systems in Comoros: The Effects of Two Decades of Political Instability. *Annals of Global Health*, 87(1), 84. <https://doi.org/10.5334/aogh.3100>
- Narayanan, H., & Yew-wah, L. (2018). Innovation policy in Malaysia. *Innovation*



*Policy in Asean*, 128–162.

- Odey, G. O., Alawad, A. G. A., Atieno, O. S., Carew-Bayoh, E. O., Fatuma, E., Ogunkola, I. O., & Lucero-Priso, D. E. (2021). COVID-19 pandemic: Impacts on the achievements of sustainable development goals in Africa. *Pan African Medical Journal*, 38(March). <https://doi.org/10.11604/pamj.2021.38.251.27065>
- Ozcan, Y. . (2008). Health Care Benchmarking and Performance Evaluation. In *International Series in Operations Research & Management Science*. Springer US. [https://doi.org/10.1007/978-1-4899-7472-3\\_2](https://doi.org/10.1007/978-1-4899-7472-3_2)
- ÖZORAL, B. (2022). The Effect of Globalization in the Gulf Countries and the Changing Roles of Women: A Comparative Study on Arabia, The United Arab Emirates and Qatar. *Süleyman Demirel Üniversitesi Vizyoner Dergisi*, 13(36), 1150–1169. <https://doi.org/10.21076/vizyoner.1069923>
- Pew Research Center. (2015). *The Future of World Religions: Population Growth Projections, 2010-2050*. <https://www.pewresearch.org/religion/2015/04/02/muslims/>
- Pirani, S. I., & Arafat, H. A. (2016). Interplay of food security, agriculture and tourism within GCC countries. *Global Food Security*, 9, 1–9. <https://doi.org/10.1016/j.gfs.2016.05.002>
- Rehman, A. H., Hasan, H., & Muhammad, M. (2022). Compatibility of Sustainable Development Goals (SDGs) with Maqasid al-Shariah: Are there any Missing Goals. *Islamic Banking and Finance Review*, 8(2), 109–132.
- Robert, K. ., Parris, T. ., & Leiserowitz, A. . (2005). What is Sustainable Development? Goals, Indicators, Values, and Practice. *Environment: Science and Policy for Sustainable Development*, 47(3), 8–21. <https://doi.org/10.1080/00139157.2005.1052>
- Rusydiana, A. S., Laila, N., Tubastuvi, N., Ibrahim, M. A., & Marlina, L. (2021). Energy Efficiency in OIC Countries: SDG 7 Output. *International Journal of Energy Economics and Policy*, 11(1), 74–81.
- Saba, I., Khan, A., & Jawed, H. (2021). Islamic Finance and SDGs: Connecting Dots. In *Islamic Finance and Sustainable Development* (pp. 55–76). Springer International Publishing. [https://doi.org/10.1007/978-3-030-76016-8\\_4](https://doi.org/10.1007/978-3-030-76016-8_4)
- Savaşan, Z., & Sümer, V. (2020). Environmental Law and Policies in Turkey (Z. Savaşan & V. Sümer (eds.); Vol. 31). Springer International Publishing. <https://doi.org/10.1007/978-3-030-36483-0>
- Seiford, L. M., & Zhu, J. (2002). Modeling undesirable factors in efficiency evaluation. *European Journal of Operational Research*, 142(1), 16–20. [https://doi.org/10.1016/s0377-2217\(01\)00293-4](https://doi.org/10.1016/s0377-2217(01)00293-4)

- SESRIC. (2019). Towards The Achievement of Prioritised Sustainable Development Goals in OIC Countries : *A Progress Report by SESRIC*.
- Sharqieh, I. (2012). Can the Organization of Islamic Cooperation (OIC) resolve conflicts? *Peace and Conflict Studies*, 19(2), 219–236.
- Taylor, S. F. W., Roberts, M. J., Milligan, B., & Ncwadi, R. (2019). Measurement and implications of marine food security in the Western Indian Ocean: an impending crisis? *Food Security*, 11(6), 1395–1415. <https://doi.org/10.1007/s12571-019-00971-6>
- The World Bank. (2017). *World Development Indicators*. Prevalence of Undernourishment (% of Population) - Malaysia. <https://data.worldbank.org/indicator/SN.ITK.DEFC.ZS?locations=MY>
- The World Bank. (2022). *The World Bank in Turkiye*. <https://www.worldbank.org/en/country/turkey/overview>
- Tone, K. (2002). A slacks-based measure of super-efficiency in data envelopment analysis. *European Journal of Operational Research*, 143(1), 32–41. [https://doi.org/10.1016/s0377-2217\(01\)00324-1](https://doi.org/10.1016/s0377-2217(01)00324-1)
- United Nations. (2015). *Transforming Our World: The 2030 Agenda for Sustainable Development*. <https://sustainabledevelopment.un.org/post2015/transformingourworld/publication>
- United Nations. (2022). *The 17 Goals*. <https://sdgs.un.org/goals>