Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

Digital Transformation from Economic Growth to Decent Work in MENA Countries: Opportunities and Challenges

DOI

Marwa Omar

Faculty of Commerce and Business Administration, Helwan University, Egypt

E-mail: marwa264@commerce.helwan.edu.eg

Received: 15 May. 2024 Revised: 25 May 2024 Accepted: 1 June 2024 Published: 25 June 2024

Abstract: Digital transformation plays a crucial role in promoting economic growth and creating decent work. It refers to significant changes in economies, industries, and societies worldwide, including the Middle East and North Africa (MENA) region. This study is conducted to examine the impact of rapid digital transformation on economic growth and decent work in countries in the MENA region and to discuss the different challenges and opportunities that result from the transition to inclusive growth. Aligned with the United Nations Sustainable Development Goal No. 8, which promotes inclusive economic growth, employment, and decent work for all, the MENA region experiences disparities in digital infrastructure, with varying levels of connectivity. The sample consists of 12 MENA countries, namely Algeria, Bahrain, Egypt, Iran, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, the KSA, and the UAE. The data covers the period from 2010 to 2022. Other countries have been omitted since there is not enough data available over a period of time. This disparity can affect employment conditions and hinder inclusive growth. Additionally, a considerable portion of the unemployed labor force consists of highly skilled university graduates. By using an econometric model, the study provides a quantitative analysis of the relationship between digital transformation, economic growth, and decent work, contributing to the empirical understanding of this relationship. By employing this approach, this study identifies challenges such as skills mismatch, informal employment, and the exacerbation of existing inequalities among women, rural communities, and persons with disabilities. The study revealed that the adoption of digital transformation has had a positive long-term impact on both economic growth and decent work in the chosen MENA countries. It provides policy implications and recommendations based on the findings.

Keywords: digital transformation, economic growth, inclusive growth, decent work, MENA countries.

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

1. Introduction:

Digital transformation has emerged as a transformative force all over the world, reshaping economies, industries, and societies. In the Middle East and North Africa (MENA) region, the rapid growth of digital technologies presents both opportunities and challenges for achieving inclusive economic development, employment, and promoting decent work. The MENA region exhibits significant inequalities in digital infrastructure, which can have far-reaching implications for employment conditions and inclusive growth. While some countries in the region, such as the GCC countries, boast fast and high-quality digital connectivity, others struggle with slower and less reliable internet and mobile connectivity. International Telecommunication Unit data in 2022 shows that the Telcom Infrastructure Index is lowest in Libya with 0.16 and highest in UEA with 0.93, and the world average is 0.57.7 (ITU, 2024). The appendix includes Table 1.1, as depicted in Figure 1. Telecommunication Infrastructure Index 2022. (Appendix, Figure 1)

Significantly, although the per capita use of social media in nations within the area surpasses that in other countries with similar levels of gross domestic product (GDP) per capita, the utilization of digital payments falls short compared to similar countries (table 1.2). These inequalities in the use of technology for social versus business purposes are unique to all nations in the Middle East and North Africa, regardless of their GDP per capita. According to the World Bank study, the proportion of active Facebook accounts above the region's income level is approximately 8 percent. However, the average shortfall in the region regarding the population's familiarity with digital payments is approximately 15 percent. (World Bank, 2023). However, unless digital payments become more widespread, the region's financial inclusion will remain in its early stages of development. Such a gap in digital infrastructure can increase inequalities and decrease awareness of decent work opportunities for all. Furthermore, in rural regions, there is typically a lack of digital infrastructure, causing those who have no access or have limited connectivity to get left behind as government, business, and civil society entities offer most services and activities through online platforms. (Hernandez & Roberts, 2018).

According to the World Bank report, about 30% of the unemployed labor force in the region consists of individuals with higher education qualifications (World Bank, 2021). Understanding the role of digital transformation in addressing this unemployment challenge and promoting decent work is crucial for policymakers and stakeholders in the region. Aligned with the United Nations' Sustainable Development Goal No. 8, which emphasizes the importance of promoting inclusive economic growth, this study aims to bridge the existing knowledge gap regarding the impact of digital transformation on decent work in the MENA region. By addressing this study objective, the study seeks to contribute

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

to the formulation of informed policies and strategies that foster inclusive and sustainable economic development in MENA countries.

This study encompasses three main objectives. Firstly, it aims to identify and examine the challenges faced by workers in the digital transformation process in MENA countries. These challenges may include skills mismatch, informal employment, and gender inequality, among others. Secondly, the study seeks to explore the opportunities that arise from the digital transformation, such as job creation, entrepreneurship, and flexible work arrangements, and assess their potential for promoting decent work in the region. Finally, the study will provide policy implications and recommendations based on the findings to effectively address the identified challenges and optimize the advantages of digital transformation for promoting decent work in MENA countries. To achieve these objectives, this study will employ a quantitative approach, utilizing digital transformation indicators from reputable sources such as the World Bank along with decent work indicators from the International Labor Organization specifically tailored to the MENA region. The study will employ a structured methodology, including data collection, analysis, and interpretation. The introduction, a thorough literature review on digital transformation and its implications for decent work, and other main sections will make up this study's structure. Subsequently, the study will examine the specific opportunities and challenges for inclusive employment in MENA countries, drawing upon empirical evidence and data analysis.

The findings and discussions will be presented, leading to the formulation of policy implications and recommendations. Finally, the study will conclude by summarizing the key findings and emphasizing the importance of addressing the challenges and optimizing the opportunities presented by digital transformation for achieving inclusive and decent work in the MENA region. This study provides insights into the complex relationship between digital transformation, economic growth, and decent work in MENA countries. By identifying challenges, exploring opportunities, and offering policy recommendations, this study endeavors to support policymakers and stakeholders in formulating evidence-based strategies to maximize the benefits of digital transformation for inclusive employment and sustainable development in the MENA region.

While economic theory has long posited a positive relationship between economic growth and the creation of jobs, as with the movement towards decent work, the track record has been mixed and has raised serious questions. Recent analysis from social observers and members of the International Labor Organization (ILO) has highlighted the need for direct policies to generate decent work, including the direct creation of jobs, employment guarantee schemes, and increased public sector employment. Similarly, there is much debate as to whether the increased output from the creation and adoption of new technologies will lead to jobless growth, as with automation, or whether these technologies

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

can be steered to create new and better jobs. In the case of the transition economies and the economies of the Middle East and North Africa (MENA), creating jobs is a particularly pressing concern given the vast numbers of new entrants to the labor market. Step one in this process is to uncover how trends in technology have influenced job growth or destruction in the past.

This study fits into this theme with a particular focus on a key piece of technology of our time, the move to digital forms of production and communication, and its influence on the labor markets of MENA countries. Digital transformation causes significant changes by integrating digital technology into every aspect of a business, adding value to their products or services. The idea is not new; it is rapidly growing into all business areas, giving rise to completely new business models. (Śledziewska & Włoch, 2021). The possibilities are limitless, as it is affecting an unprecedented and wide-ranging shift in the way we live and work. In addition, digital transformation refers to the process of completely reshaping a business by implementing technology and digital solutions on a large scale. This new digital-centric undertaking is paramount for economic growth and stability, with a primary focus in the developed world. Lower-middle and low-income countries are in more of a struggle to realize the potential benefits of digital transformation, as they are not yet prepared for the magnitude of what digital transformation entails. Now is the time to investigate how developing countries can harvest the advantages while minimizing the disruptive process of digital transformation. This study will consolidate the building blocks for a strategic approach to fostering more and better jobs. It will draw on evidence and judicious use of experience in similar attempts at development in order to be appropriate for the current era in which MENA countries find themselves.

This study sets out how the world of work is changing, defines the job challenge, and assesses the various means open to countries for meeting this challenge. They must also be able to adapt this to the specific country. Several attempts are made to differentiate digital transformation from technology transfer in various sectors. This study examines how improved technologies and increases in efficiency across various economic sectors may affect the creation or loss of certain types of employment and the overall net effect on decent work. Specific emphasis is given to sectors, which are often cited in discussions about diversification and reducing reliance on resource-related activities. Technology in these sectors is often seen as a solution for unemployment or underemployment of highly educated individuals and the 'brain drain' to public sector jobs, although the effects of these trends on employment and decent work are not always positive.

The scope of this study is the adoption of digital transformation in MENA countries and its potential to cause disruption in labor markets, resulting in a diminishment of decent work. The scope is primarily limited to the effects and the potential policy options in response.

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

This involves understanding the nature of digital transformation, its application, and its potential effects on economic growth and levels of decent work within the MENA countries. The study builds upon and distinguishes between digital transformation and technology transfer in relevance to previous studies.

The focus on the nature of future work is pivotal, and the study aims to understand if there is a tipping point where technological advancements could hinder prospects for decent work in the region. The purpose of this study is to foster an understanding of the evolution of digital transformation in MENA countries and its influence on economic growth and creating decent work. The study could inform policymakers about the nature of future work in the MENA region, linking it to digital transformation, and help anticipate and prepare for changes ahead. It could be of great relevance to the International Labor Organization, given its mandate on social justice and the future of work. It is also of importance for the MENA countries and could be integral to their pursuit of the SDGs and creating decent work in the region. The study could be informative to a number of stakeholders and affected parties and be integral to policy formation and understanding for years to come.

2.Theoretical background:

Existing literature presents a beneficial understanding of the relationship between digital transformation and economic growth. Digital convergence has a positive effect on growth and development. Since Aristotle's writings, the theoretical discourse on the connection between digital transformation and employment has been a topic of academic discussion. At this point in time, Aristotle's focus was on the impact of machines replacing human labor. Even in classic economic theory, the relationship between digital transformation and employment is discussed. Adam Smith pointed out how machines could help favor the division of labor and underlined the labor-saving effects. Addressing the loss of jobs and deskilling in the labor market brought about mechanization at the beginning of the nineteenth century in England. In addition, David Ricardo believed that the economy could compensate for the negative employment effects; however, he also stated that "the opinion entertained by the laboring class that the employment of machinery is frequently detrimental to their interests is not founded on prejudice and error but is conformable to the correct principles of political economy. Additionally, John Maynard Keynes made the notion that machines could lead to unemployment well known in the 1930s. Keynes described it as a temporary period of adjustment difficulties. (Rogers, 2016). Subsequently, Schumpeter (1939) considered technological progress as the focal point of economic dynamics. He explained that innovation is the main source of disequilibrium in the economic system. Schumpeter identified two reasons why innovations can have a disruptive impact on the entire economic system:

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

1. Technological advancements do not uniformly happen throughout the economy; rather, they have a tendency to cluster in significant sectors, resulting in structural modifications between sectors.
2. Innovations play a role in economic cycles, which are characterized by protracted periods of expansion and then contraction. (Aly, 2020).

At present, the studies discussing the influence of artificial intelligence on economic growth and employment include destructiveness and creation mechanisms (Runhua, 2018). While artificial intelligence can promote economic growth, create new jobs, and promote employment, the destruction mechanism is the substitution effect: the new technology replaces the old technology, and the jobs relying on the old technology are replaced accordingly, which will inevitably lead to unemployment. Artificial intelligence promotes economic growth by supporting the industrial revolution and driving the transformation of employment structures. It has led to a rise in labor productivity. Furthermore, technological advances will decrease costs, result in resource utilization, and increase capital productivity. However, innovation will lead to a decline in the demand for labor, which will lead to a higher unemployment rate. The destructive effects of artificial intelligence are different and may be viewed as stages of development, as follows:

- Changes in the way of work, such as changes in tools and applications used during work.
- Change in labor market demand as artificial intelligence will replace human decisions.
- Change in management staffing.
- Creating new jobs. Artificial intelligence technology creates employment opportunities as follows: ● Skilled labor is becoming more profitable.
- Create new jobs.
- Create new scope for the economy.

3. Literature review:

Applied studies for the relationship between digital transformation and economic growth yielded that growing access to information and chances for interaction in technology can create job opportunities, enhance skill transfer, and promote increased efficiency and transparency in business and politics. (Finger, 2007). Several studies have examined this relationship in different countries and regions, yielding important findings. Tripathi and Inani (2016) explored the long- and short-term relationship between digitalization and economic growth in 42 sub-Saharan African countries. Their panel model revealed a positive and significant impact of digitalization on long-term economic growth. Although, in the short term, some studies show a negative impact on economic growth, especially the

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

relationship between Internet use and economic growth in developing countries, this result, based on panel data analysis, indicates that digital transformation increases economic growth. This study did not, however, discover any proof that economic expansion had a direct bearing on digitization (Rahimi and Rad, 2017). However, a few studies have shown how digital technology positively impacts organizations' productivity by enabling them to decrease costs, increase their operations, and create new jobs. This can be explained by the fact that these tools enable businesses to access a wider range of potential customers and suppliers. Digital technologies enhance market prospects by reducing the virtual gap between buyers and sellers in the economy, as well as between job seekers and job providers (De Loecker, 2019).

In 2020, Cusolito, Lederman, and Peña conducted a study using a sample of over 8,000 formal manufacturing firms worldwide. The purpose of their investigation was to evaluate the impact of technology adoption, particularly the use of websites and email, on the performance of these businesses. They found that the expected increase in website usage results in greater improvements in revenue productivity (2.2 percent) compared to both exporting (1.7 percent) and enhancing management experience (0.05 percent). Furthermore, the adoption of digital technology is shown to enhance both labor and capital by raising the size of production. As a result, there is a higher demand for labor and capital from businesses.

Aly (2020) conducted a study examining the correlation between digital transformation, economic growth, employment, and productivity in developing countries. The findings were that there is a positive correlation observed between the digital transformation index and economic development, labor productivity, and job employment. Notably, the positive association with economic development suggests that women appear to benefit more from digital transformation. mains inconclusive, highlighting the need for further evidence to determine its effects on employees in vulnerable groups within the developing countries. Moreover, Kalal et al. (2021) focused on Tunisia, and their findings suggested a positive long-term effect of ICT on economic growth while noting a potential short-term negative impact.

Overall, the academic literature consistently supports the idea that digital transformation plays a crucial role in driving economic growth. While the long-term relationship between digital transformation and economic growth is generally positive, the short-term effects can vary and may include transitional challenges. These findings emphasize the importance of embracing digital technologies to foster economic progress. Engaging stakeholders including workers, employers, policymakers, and civil society, would be essential for developing a comprehensive understanding of the challenges and opportunities.

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

In summary, a comprehensive and critical literature review is an indispensable component of future research on digital transformation and its implications for decent work in developing countries context would be valuable especially the impact on employment, platform economy, sectoral case studies and Gig work, gender, disability and digital equality and leveraging relevant theoretical and methodological insight and identifying research gaps.

4.**Opportunities and Challenges for Employment in MENA Countries:**

Digital transformation has the potential to significantly impact employment opportunities in the Middle East and North Africa (MENA) countries. This section provides an overview of the opportunities and challenges that arise with the integration of digital technologies in the labor market. It highlights the need for proactive policies and strategies to maximize the benefits and address potential drawbacks.

4.1 Opportunities for Employment:

Digital transformation offers job creation opportunities in various sectors, including artificial intelligence, big data analytics, and automation. It fosters entrepreneurship and innovation by reducing entry barriers and enabling the development of innovative startups. Digital technologies also enable remote work, providing flexibility for those in remote areas and those with caregiving responsibilities. This attracts skilled professionals from different locations.

4.1.1. Job Creation:

Digital transformation presents opportunities for job creation across various sectors. The adoption of technologies such as artificial intelligence, big data analytics, and automation can lead to the emergence of new industries and business models. These advancements create demand for skilled professionals in fields such as data analysis, software development, cybersecurity, and digital marketing.

4.1.2. Entrepreneurship and Innovation:

Digital transformation fosters an entrepreneurial ecosystem by reducing barriers to entry and enabling the development of innovative startups. The digital economy provides platforms and marketplaces that facilitate entrepreneurship, allowing individuals to leverage their skills and ideas to create new ventures. This can lead to job creation and economic growth, particularly in sectors such as e-commerce, fintech, and digital services.

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

4.1.3. Remote Work and Flexibility:

Digital technologies enable remote work and flexible employment arrangements. This opens up opportunities for individuals in remote areas and those with caregiving responsibilities to access employment opportunities. Remote work also allows businesses to tap into a global talent pool, attracting skilled professionals from different locations. 4.2. Challenges for Employment:

4.2.1. Skills Mismatch:

Digital transformation demands a workforce equipped with digital skills. However, there is often a significant skills gap in the labor market, hindering the full utilization of digital technologies. MENA countries need to invest in comprehensive digital skills development programs to bridge this gap and ensure that the workforce has the necessary competencies to thrive in the digital economy.

4.2.2. Inequality and inclusion:

While digital transformation offers opportunities, there is a risk of exacerbating existing inequalities. Women, rural communities, and marginalized groups may face barriers to accessing digital technologies and benefiting from employment opportunities as persons with disabilities. It is crucial to address these disparities through targeted policies that promote digital inclusion, bridge the gender gap, and ensure equal access to digital infrastructure and education.

4.2.3. Displacement and job disruption:

The adoption of automation and artificial intelligence may lead to the displacement of certain job roles. Some traditional occupations may become obsolete, requiring workers to upskill or transition to new roles. Governments should implement strategies to support workers in reskilling and transitioning to digital jobs, ensuring a just transition and alleviating the negative impacts of job disruption.

4.2.4. Underemployment:

While digital transformation can contribute to job creation, it is essential to address the issue of underemployment in the context of digitalization. Underemployment refers to a situation where individuals are employed in jobs that do not fully utilize their skills and qualifications. In the MENA region, underemployment is a significant challenge, with many

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

workers engaged in low-skilled and low-productivity jobs. Digital transformation can help address underemployment by creating opportunities for upskilling and reskilling. By providing access to digital training programs and promoting lifelong learning initiatives, workers can acquire new skills that align with the evolving demands of the digital economy. This enables them to transition into higher-skilled and more fulfilling employment opportunities. Additionally, the digital economy offers the potential for gig work and freelancing platforms, which can provide alternative income sources for underemployed individuals. These platforms allow workers to leverage their skills and expertise on a project-by-project basis, providing flexibility and the potential for higher earnings. However, it is crucial to ensure that digital platforms and gig work arrangements provide fair and secure working conditions. Regulations should be in place to protect the rights and benefits of gig workers, including access to social protection and fair remuneration. Furthermore, addressing underemployment requires a comprehensive approach that combines digital skills development, targeted job creation initiatives, and supportive policies to enhance labor market efficiency and match skills with emerging opportunities in the digital economy. The issue of underemployment should not be overlooked in the context of digital transformation in MENA countries. By addressing this challenge, governments can masximaixe the benefits of digitalization by ensuring that individuals are engaged in meaningful and productive employment. This can be achieved through targeted skills development programs, promoting gig work opportunities, and implementing supportive policies that enhance labor market efficiency. By tackling underemployment, MENA countries can create a more inclusive and prosperous digital economy that benefits all segments of society.

5. Model specification and data description:

The study investigates the relationship between digital transformation, economic growth, and employment in MENA countries. The aim is to focus on inclusive development, specifically achieving sustainable development goal 8, which focuses on decent work and economic growth. To estimate the impact, the study applies the Autoregressive Distributed Lag approach to panel data (panel ADRL). Furthermore, panel data provide more comprehensive and insightful information, greater diversity in data, and reduced collinearity among variables. The economic growth and decent work data have been gathered from the World Bank and the International Labor Organization, while the digital transformation data has been acquired from the International Telecommunication Union.

5.1. Th Scope:

The sample consists of 133 observations from 12 MENA countries, namely Algeria, Bahrain, Egypt, Iran, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, the KSA, and the UAE. The data covers the period from 2010 to 2022. Other countries have been omitted since there is not

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

enough data available over some time. The evaluation is carried out with a modified version of the Neoclassical Cobb-Douglas function. This model was created by using the growth theories proposed by Lucas and Prescott (1971), Romer (1986), and Solow (1956). The variable "t" represents a specific country. The independent variables are labor force is denoted as "L", gross capital formation is represented by "K", digital transformation is determined by individuals using the internet is represented by "D". The dependent variable for country i at time t is economic growth is determined by gross domestic product which is denoted as "Y". However, when these variables are fully utilized, economic growth decelerates or diminishes. In a recent empirical study conducted by Bakari (2022), it was shown that digital transformation has a crucial role in promoting economic growth. Hence, it is inferred that the growth model should incorporate the digital transformation variable (D_t), which can be represented as:

$$\mathbf{Log(Y_{it})} = \beta_0 + \beta_1 \mathbf{Log}(K_{it}) + \beta_2 \mathbf{Log}(L_{it}) + \beta_3 \mathbf{Log}(D_{it}) + \varepsilon_t \quad (1)$$

The equation (1) represents the relationship between the dependent variable Y and the independent variables K_t, L_t, and D_t, together with the error term ε_t. The coefficients β_0, β_1, β_2, and β_3 represent the parameters of the equation. The symbol β0 represents the intercept that is unknown for each country, with a total of n country-specific intercepts. The parameters β1, β2, and β3 describe a shared influence across entities while accounting for individual differences. Here, i represents the countries (ranging from 1 to n) and t represents the time periods (ranging from 1 to T). The descriptive statistics in this study reveal the presence of heteroskedasticity, as evidenced by a high standard deviation and significant disparities between the mean and median values. This issue can be addressed by employing a fixed effects model, which implies homoskedasticity, meaning that the variance of the error factor is constant across all observations. Furthermore, the predictor variables exhibit non-normality. 6.Results: Prior to estimating the econometric model, it is necessary to confirm that the time series of the model variables do not possess a unit root and are thus stationary.

6.1. Results of Estimating

Time Series Test for Panel Data: The results of the unit root test (Augmented Dickey Fuller) in table (1) show that the p-values of Y, L, K and D are less than 0.05, indicating that the null hypothesis for non-stationarity is rejected at a 0.05 significance level. Thus, it is concluded that economic growth, labor force, gross capital formation and individuals using the internet are integrated. The results for first difference show their p-values are less than 0.05, suggesting that these variables are stationary at first difference. This confirms the use of panel ARDL model which is appropriate for a mixture of I(0) and I(1) variables. This is

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

because, the panel ADRL model allows for the estimation of both the short-run and long-run relationships between digital transformation and economic growth**.**

Table 1: Panel Unit Root Test

	At Level				
		Y	L	K	D
With Constant	t-Statistic	0.9999	0.5212	0.9640	0.7476
	Prob.	***0.9006***	***0.8206***	***0.5288***	***0.0972***
		n0	n0	n0	*
With Constant & Trend	t-Statistic	0.5522	0.2852	0.5740	0.0127
	Prob.	***0.1270***	***0.2849***	***0.8348***	***0.9949***
		n0	n0	n0	n0
Without Constant & Trend	t-Statistic	1.0000	0.8925	0.9542	0.0002
	Prob.	***0.9499***	***0.9566***	***0.5448***	***0.0000***
		n0	n0	n0	***
	At First Difference				
		d(Y)	d(L)	d(K)	d(D)
With Constant	t-Statistic	0.5577	0.5380	0.0232	0.0069
	Prob.	***0.0575***	***0.1795***	***0.0438***	***0.7519***
		*	n0	**	n0
With Constant & Trend	t-Statistic	0.0710	0.8087	0.0013	0.0599
	Prob.	***0.1276***	***0.4133***	***0.0760***	***0.0038***
		n0	n0	*	***
Without Constant & Trend	t-Statistic	0.8353	0.2153	0.0095	0.0751
	Prob.	***0.0090***	***0.0064***	***0.0034***	***0.0024***
		***	***	***	***

Notes:
b: Lag Length based on SIC
c: Probability based on MacKinnon's (1996) one-sided p-values.

6.2. Estimation Results of Econometric Model:

Applying the Autoregressive Distributed Lag (ARDL) model in E-views. Countries exhibit different levels of significance in the analysis. This is crucial for the study, as it encompasses a wide range of MENA countries with different sizes, economic structures, and energy sectors. Thus, this approach can mitigate bias by considering diversity and attaining reliable and effective estimates. The estimation results are displayed in Table (2).

The study found that an increase in digital transformation (Internet users' percent of the total population) leads to an increase in GDP per Capita growth in the selected MENA countries in the long run, which concurs with the existing literature, which suggests that digital transformation increases productivity, thereby leading to increased economic growth. However, the short-term link between economic

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

growth and digitalization is not significant, which appears to contradict the existing literature, which suggests that employment increases productivity and decent work, thereby leading to increased economic growth. This can be explained by challenges in labor like market skills mismatch, inequality, and job disruption**.**

Table 2: Results of estimating econometric model parameters

Dependent Variable: DLOG(Y)
Method: ARDL
Date: 05/02/24 Time: 22:38
Sample: 2011 2020
Included observations: 133
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Hannan-Quinn criterion (HQ)
Dynamic regressors (1 lag, automatic): LOG(L) LOG(K) LOG(DD)
Fixed regressors: C
Number of models evaluated: 1
Selected Model: ARDL(1, 1, 1, 1)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
		Long Run Equation		
LOG(L)	1.170959	0.386108	3.032721	0.0032
LOG(K)	0.397540	0.081897	4.854129	0.0000
LOG(DD)	0.274982	0.042357	6.492017	0.0000
		Short Run Equation		
COINTEQ01	-0.090201	0.052520	-1.717478	0.0897
DLOG(L)	0.465027	0.574785	0.809045	0.4208
DLOG(K)	0.087642	0.041878	2.092785	0.0395
DLOG(DD)	-0.000990	0.081995	-0.012068	0.9904
C	-0.219860	0.108481	-2.026717	0.0459

Mean dependent var	0.017968	S.D. dependent var	0.099899
S.E. of regression	0.025691	Akaike info criterion	-4.069702
Sum squared resid	0.054121	Schwarz criterion	-2.776362
Log likelihood	358.0534	Hannan-Quinn criter.	-3.544174

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

*Note: p-values and any subsequent tests do not account for model selection.

Source: Author's calculations using E-views

7. Policy Implications and Recommendations:

The findings of this study offer several important policy implications for promoting inclusive digital transformation and sustainable economic growth in the MENA region. Based on the analysis, we recommend the following key policy actions:

7.1. Invest in Digital Infrastructure

1. Prioritize investments to expand high-speed internet connectivity, especially in underserved rural and remote areas, ensuring equitable access to digital technologies.
2. Provide incentives and regulatory support to telecommunication companies to accelerate the deployment and upgrading of digital infrastructure across the region.
3. Coordinate regional efforts through bodies like the Arab Broadband Initiative to align investment plans, share best practices, and leverage economies of scale.

7.2. Develop Digital Skills and Reskilling Programs

1. Establish comprehensive national digital skills training programs to equip workers, especially youth and women, with in-demand competencies for the digital economy.
2. Collaborate with educational institutions, vocational training centers, and the private sector to design demand-driven curriculum and apprenticeship programs that bridge the digital skills gap.
3. Implement targeted reskilling and upskilling initiatives to support workers displaced by automation and digital transformation, helping them transition to new job opportunities.

7.3. Foster an Enabling Environment for Digital Entrepreneurship

1. Provide financial incentives, such as tax credits, venture capital, and accelerator funding, to support the growth of digital startups and SMEs.
2. Streamline business registration and regulatory processes to reduce barriers to entry for digital entrepreneurs.
3. Create innovation hubs, accelerators, and maker spaces to nurture the development of digital enterprises, particularly those focused on inclusive and sustainable solutions.

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

7.4. Promote Gender Equality and Inclusion in the Digital Economy

1. Implement policies and programs to bridge the digital gender divide, including increasing women's access to digital devices, skills training, and entrepreneurship opportunities.
2. Collaborate with the private sector to develop diversity and inclusion initiatives that encourage the recruitment, retention, and advancement of women and underrepresented groups in the digital workforce.
3. Ensure that digital transformation policies and programs explicitly consider the needs and challenges faced by marginalized communities, such as persons with disabilities and informal workers.

7.5. Strengthen Regional Cooperation and Knowledge Sharing

1. Facilitate regional knowledge-sharing platforms and communities of practice to enable the exchange of best practices and innovative solutions across MENA countries.
2. Collaborate with regional organizations, such as the League of Arab States and the Gulf Cooperation Council, to develop harmonized policies and standards for digital transformation.
3. Engage in South-South and North-South cooperation to learn from the experiences of other regions and leverage international expertise and resources.

By implementing these policy recommendations, MENA countries can harness the transformative potential of digital technologies to create more inclusive and decent work opportunities, ultimately contributing to sustainable and equitable economic growth in the region.

8. Conclusion:

The study found a significant and long-term positive relationship between digital transformation (represented by the percentage of Internet users in the total population) and economic growth in the selected MENA countries. This finding aligns with the existing literature and suggests that countries in the MENA region have the potential to utilize digital technologies to increase productivity, economic growth, and employment, and promote decent work. Although the statistical significance of the short-term link between economic growth and digitalization was not established, MENA countries now have the chance to proactively tackle the challenges and unlock the immediate benefits of digital transformation. The study suggests that the short-term disconnect can be attributed to factors such as potential skills mismatch, labor market disruptions, and issues of inequality that may arise during the digital transformation process.

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

8.1. **Limitations and Opportunities:**

1. The study encounters significant challenges due to the limited comprehensive and reliable data on digital transformation indicators and labor market dynamics in the MENA area. This study employed the percentage of internet users as an indicator for estimating digital transformation, however, this method may not comprehensively encompass the complexities of the digital environment.
2. The study's conclusions may have limited relevance due to the exclusive focus on the MENA countries. Expanding the scope to include more countries or performing comparison studies across various regions would provide significant insights and enhance our comprehension of the correlation between digital transformation and economic growth.

8.2. **Potential Areas for Growth:**

The study suggests that MENA countries should give priority to the following:

1.Prioritize invest in the collection of comprehensive data on digital transformation indicators, labor market dynamics, and socioeconomic indicators to enable more robust and reliable analyses.
2.Promote digital skills development and lifelong learning programs to address the skills mismatch and empower the workforce to adapt to the evolving job market.
3.Foster inclusivity and support vulnerable populations in adapting to the changing employment landscape, ensuring an equitable distribution of the benefits of digital transformation.
4.Establish social safety nets and support programs to facilitate a smooth transition and mitigate the potential negative impacts of job disruption and inequality.

By addressing the challenges and embracing the opportunities, countries in the MENA region may attempt to create a future that is inclusive and prosperous, thanks to the transformative power of digital technologies. Given the study's findings, policymakers and stakeholders can utilize this information to make well-informed decisions regarding investments in digital development. Although there are limitations, these findings provide a solid foundation for establishing an environment that encourages sustainable economic growth and social progress.
It is essential to implement proactive policies and strategies that foster the development of digital skills, promote inclusivity, and provide support for workers to adapt to the evolving employment landscape. However, in order to fully reap these advantages, it is important to tackle the obstacles that come with it, such as the mismatch between skills, inequality, and the disruption of jobs. It is crucial to take proactive measures and implement policies and strategies that promote the development of digital skills, foster inclusivity, and provide support to workers in adapting to the

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

evolving employment landscape. MENA countries have the potential to create a future that is more inclusive and prosperous by embracing digital technologies and overcoming the challenges that come with it. The study employed two different methodologies to analyze the indices of digital transformation and their connections with macroeconomic variables in MENA countries. The objective was to contribute to the existing literature, which has primarily focused on developed and emerging countries, with limited attention given to developing nations. The potential increase in job opportunities resulting from digital transformation is anticipated to come from the broadening of job offerings for women, thereby boosting female employment and benefiting vulnerable populations. Governments must prioritize the establishment of support networks for workers who are currently excluded from formal employment or facing insecure working conditions. An instance of such a program is the Takaful, the and Karama program in Egypt, which aims to empower Egyptian women and vulnerable individuals, including persons with disabilities. Similarly, the Tamkeen program in Bahrain also focuses on providing support to those in need. In addition, the model did not find a significant connection in terms of its effect on vulnerable employment.

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

References

A: Articles:

1. Abdeldayem, M., & Aldulaimi, S. (2023). Entrepreneurial finance and crowdfunding in the Middle East. International Journal of Organizational Analysis, 31(4), 927-944.Adair, P., & Vladimir, H. (2023). Fostering decent job creation and formalizing informality in MENA. ***Economic Study Forum Policy Portal***. Retrieved from https://theforum.erf.org.eg/2023/02/21/fostering-decent-job-creation-and-formalising-informality-in-mena/
2. Aldulaimi, S. H., Abdeldayem, M. M., Keir, M. A., & Al-Sanjary, O. (2021). E-learning in higher education and COVID-19 outbreak: Challenges and opportunities. ***Psychology and Education Journal***, 58(2), 38-43.
3. Aly, H. (2020). Digital transformation, development and productivity in developing countries: Is artificial intelligence a curse or a blessing? ***Review of Economics and Political Science***, 3, (2). Retrieved from https://www.researchgate.net/publication/341515103_Digital_transformation_development_and_productivity_in_developing_countries_is_artificial_intelligence_a_curse_or_a_blessing
4. Bakari, S. (2021b). Innovation and economic growth: Does the Internet matter? ***The Journal of Economics and Related Studies***, 3,(2), 109-116. https://dergipark.org.tr/en/pub/bilturk/issue/62202/706165
5. Bakari, S., El Weriemmi, M., & Mabrouki, M. (2022). The impact of digitalization and trade openness on economic growth: New evidence from Richest Asian countries. *__MPRA Paper__* No. 113816. Retrieved from https://mpra.ub.uni-muenchen.de/113816/
6. Burchell, B., Sehnbruch, K., Piasna, A., & Agloni, N. (2014). The quality of employment and decent work: Definitions, methodologies, and ongoing debates. ***Cambridge Journal of Economics,*** 38, (2), 459-477.
7. Finger, G. (2007). Digital convergence and its economic implications. ***Development Bank of Southern Africa***.
8. Hernandez, K., & Roberts, T. (2018). Leaving no one behind in a digital world, Emerging Issues Report. ***Institute of Development Studies***. Retrieved

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

from:https://assets.publishing.service.gov.uk/media/5c178371ed915d0b8a31a404/Emerging_Issues_LNOBDW_final.pdf

9. Kalal, R., Haddadi, A., & Ftiti, Z. (2021). ICT diffusion and economic growth: Evidence from the sectorial analysis of a periphery country. ***Technological Forecasting and Social Change***, 162, 120403.
10. Khalil, A., & El-Gohary, H. (2019). The impact of digital transformation on business models in the MENA region: A review and research agenda. *_**Journal of Business Research***, 98, 489–502.
11. Khoury, G., & El-Khoury, J. (2020). Digital transformation and employment in the Middle East and North Africa. ***International Journal of Economics, Commerce, and Management***, 8,(8), 1-DOI: 10.31014/aior.1992.08.08.250.
12. Langendorf, M., & Farely, A. (2021). Digital transformation and COVID-19 in MENA: Turning a challenge into an opportunity. ***Toward Digital Transformation in MENA, Wilson Center***. Retrieved from: https://www.wilsoncenter.org/article/digital-transformation-and-covid-19-mena-turning-challenge-opportunity
13. Nguyen, T., & Hoang, A. (2021). The impact of digital transformation on the economic growth of countries, in ***Data Science for Financial Econometrics***.
14. Rogers, B. (2016). Redefining employment for the modern economy***. The American Constitution Society for Law and Policy***
15. Runhua, F. (2018). Analysis of the development of artificial intelligence on the social employment situation [J]. ***Contemporary economy***, 4.
16. Serag, S., & Ghaly, S. (2023). Digitalization and poverty alleviation in MENA countries: A dynamic panel analysis. ***Journal of Political & Economic Studies, Faculty of Politics &***

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

Economics, Suez University (JPES), 3, (1), 335–379. DOI:10.21608/PSEJ.2023.180645.1046.

17. Śledziewska, K., & Włoch, R. (2021). ***The Economics of Digital Transformation: The Disruption of Markets, Production, Consumption, and Work***(1st ed.). Routledge. Retrieved from https://doi.org/10.4324/9781003144359

B: Reports:

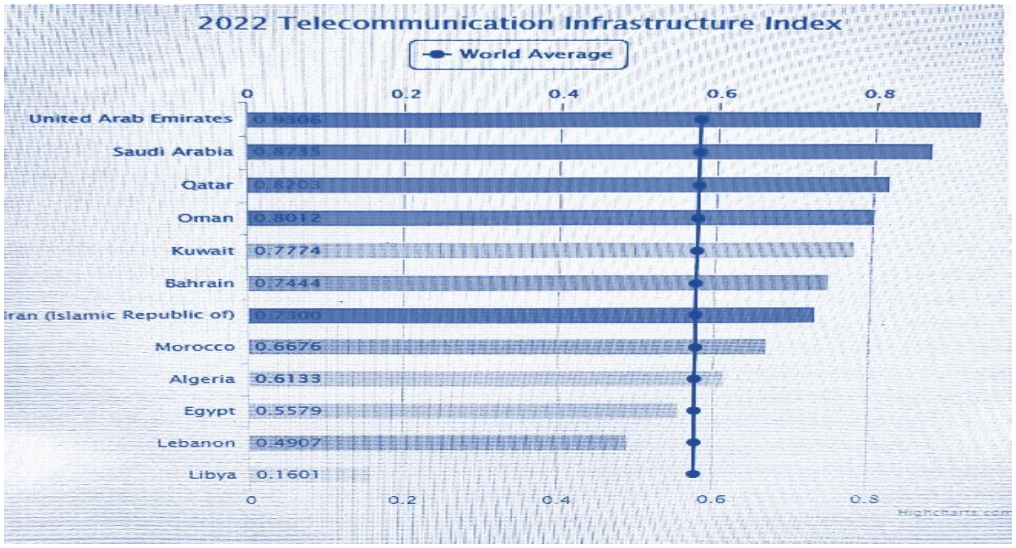
18. Arab Economic Outlook (2019) ***Digital Transformation for Inclusive Growth***. Abu Dhabi.
19. Arab League. (2020). ***Arab Digital Economy Vision: Towards a Sustainable, Inclusive, and Secure Digital Future*** (2nd ed.). Cairo, Egypt.
20. Arab Monetary Fund. United Nations Economic and Social Commission for Western Asia (ESCWA). ***Digital Economy Report of the Arab Region***. Beirut.
21. International Labor Organization (ILO). (2019). ***Digital Labor Platforms and the Future of Work: Towards Decent Work in the Online World***. Geneva: ILO. Arab Monetary Fund. (2020).
22. International Labor Organization (ILO). (2022). ***Digitalization and Employment: A Review Report***. Geneva
23. International Labor Organization (ILO). (2020). ***Future of Work in the Middle East and North Africa***. Retrieved from https://www.ilo.org/beirut/publications/WCMS_761052/lang--en/index.htm
24. World Bank. (2019). ***The World Development Report: The Changing Nature of Work*** World Bank Publications.
25. World Bank. (2019). ***Reaping Digital Dividends: Leveraging the Internet for Development in Europe and Central Asia***. World Bank Publications.
26. World Bank. (2023). ***World Development Indicators (WDI)***. World Bank. https://databank.worldbank.org/source/world-development-indicators
27. United Nations (2023). ***The Sustainable Development Goals Report 2023: Special Edition: Towards a Rescue Plan for People and Planet***.
28. ESCWA. Organization for Economic Cooperation and Development (OECD). (2019). ***Going Digital in the Middle East and North Africa***. Paris: OECD Publishing

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

Appendix

Figure 1: Telecommunication Infrastructure Index 2022

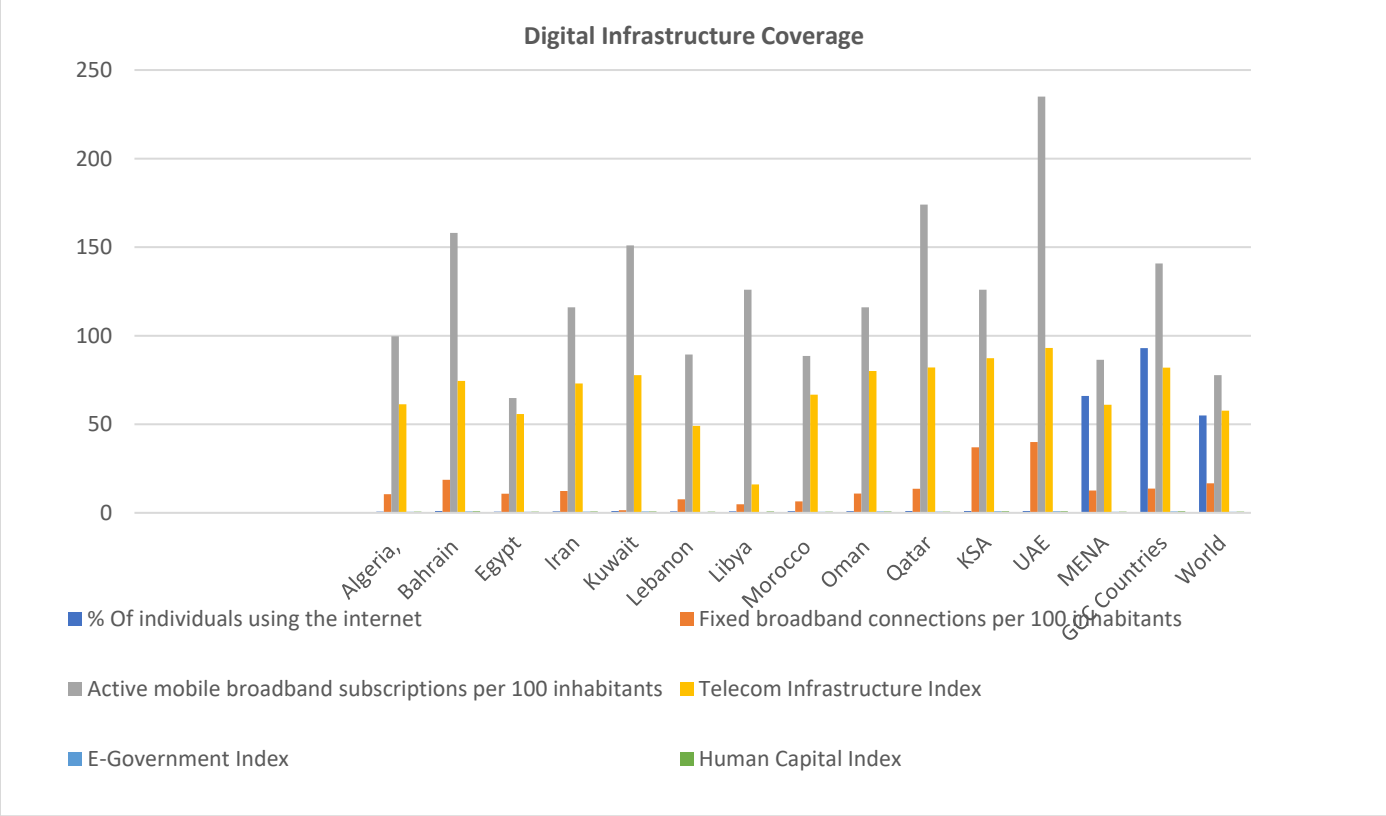


Source: For Telecom Infrastructure Index, United Nations data

Figure 2: Digital Infrastructure coverage in MENA Counties 2022

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain



Source: Prepared by the author: For percentage of individuals using the internet, fixed broadband connections, and active mobile broadband subscriptions, ITU. 2022 Telecom Infrastructure Index, E-Government Inex, and Huma Capital Index, United Nations data. Furthermore, highly skilled university graduates in MENA countries face high levels of unemployment or underemployment.

Digital Economy: Selected Statistical Indicators

Available online at http://www.jasu.asu.edu.bh
ISSN: 2210-1764
Vol. 8, No. 2, 2024

The Journal of Applied Science University
Building 166 | Road 23 | Block 623 | East Al-Ekir- Kingdom of Bahrain

TABLE: 1.1Digital Infrastructure Coverage

Country or region	% Of individuals using the internet	Fixed broadband connections per 100 inhabitants	Active mobile broadband subscriptions per 100 inhabitants	Telecom Infrastructure Index	E-Government Index	Human Capital Index
Algeria,	71.20%	10.5	99.7	61.33	0.5611	0.6956
Bahrain	100%	18.7	158	74.44	0.7707	0.8154
Egypt	72.20%	10.8	64.8	55.79	0.5895	0.6375
Iran	81.70%	12.3	116	73	0.6433	0.7804
Kuwait	99.80%	1.47	151	77.74	0.7484	0.7706
Lebanon	90.10%	7.63	89.4	49.07	0.5273	0.6656
Libya	88.40%	4.79	126	16.01	0.3375	0.7534
Morocco	90.70%	6.45	88.6	66.76	0.5915	0.635
Oman	97.80%	10.9	116	80.12	0.7834	0.8067
Qatar	100%	13.6	174	82.03	0.7149	0.715
KSA	100%	37	126	87.35	0.8539	0.8662
UAE	100%	40	235	93.06	0.901	0.8711
MENA	66	12.6	86.4	61	0.6325	0.7123
GCC Countries	93	13.7	140.8	82	0.7923	0.8332
World	**55**	**16.7**	**77.7**	**57.71**	**0.6102**	**0.7001**

Sources: For percentage of individuals using the internet, fixed broadband connections, and active mobile broadband subscriptions, ITU, 2022.For Telecom Infrastructure Index, E-Government Inex and Huma Capital Index, United Nations data 2022.