ISSN (Print): 1060-6076
ISSN (Online): Applied

The Journal of African Development
2026; Vol 7: Issue 1
https://www.afea-jad.com/

The Impact of Information and Communication Technology on Economic Growth in Selected Arab Countries: An Econometric Study (2000–2024)

Nekaa Rayene[1], Said Ahcene[2]

[1] 20 August 1955 University of Skikda, Algeria

Email: r.nekaa@univ-skikda.dz

[2] University of Constantine 2 – Abdelhamid Mehri, Algeria

Email: ahcene.said@univ-constantine2.dz

Corresponding Author:

Nekaa Rayene

Email: r.nekaa@univ-skikda.dz

Cite This Paper as: Nekaa Rayene, Said Ahcene (2026) The Impact of Information and Communication Technology on Economic Growth in Selected Arab Countries: An Econometric Study (2000–2024) The Journal of African Development l, Vol.7, No.1, 1688-1697

KEYWORDS
Information and Communication Technology (ICT), Economic Growth, Real GDP per Capita, Panel Data Analysis, Arab Countries...

Received: 30/04/2026
Accepted: 20/07/2026
Published: 20/08/2026

ABSTRACT

This study aims to empirically investigate the impact of Information and Communication Technology (ICT) on economic growth across a sample of Arab countries over the period 2000–2024. To achieve this objective, static panel data econometric techniques are employed, involving estimation and model selection among Pooled Ordinary Least Squares (POLS), Fixed Effects Model (FEM), and Random Effects Model (REM).

The empirical findings reveal a statistically significant positive effect of ICT indicators—specifically Internet users and mobile cellular subscriptions per 100 people—on real GDP per capita. Conversely, fixed telephone subscriptions showed a statistically insignificant impact on economic growth. These results underscore the critical role of ICT infrastructure in driving economic development across the region, emphasizing the strategic imperative for expanding broadband coverage and digital transition frameworks.....

1. INTRODUCTION

Inthecontemporary global economy, rapid technological advancements serve as a fundamental catalyst for macroeconomic transformation, with Information and Communication Technology (ICT) emerging as a primary driver of economic growth and total factor productivity. Modern digital infrastructure extends beyond basic communication channels to represent a strategic asset that minimizes transaction costs, optimizes market efficiency, and fosters innovation. Consequently, integration into the digital economy has become a focal pillar of national development strategies worldwide.

As Arab countries progressively seek to diversify their economic bases away from traditional oil and resource dependencies, investing in ICT infrastructure presents a viable avenue to bolster economic expansion. However, given the varying degrees of digital adoption—ranging from expanding Internet accessibility and rapid mobile network deployment to traditional fixed-line telephony—the precise macroeconomic contribution of each technology vector remains a vital empirical question within the region.

1.1. Research Problem:

To what extent does Information and Communication Technology (ICT) indicators affect economic growth in selected Arab countries during the period (2000–2024)?

.

To answer the research problem, the following sub-questions are posed:

To what extent does the proportion of internet users (INT) affect GDP per capita (GDP)?

2. To what extent do mobile cellular subscriptions (MOB) affect GDP per capita (GDP)?

3. To what extent do fixed telephone subscriptions (FIX) affect GDP per capita (GDP)?

1.2. ResearchHypotheses:

$\boldsymbol{H_1}$: There is a statistically significant effect of the Internet users indicator per 100 people (INT) on real GDP per capita (GDP).

$\boldsymbol{H_2}$: There is a statistically significant effect of mobile cellular subscriptions per 100 people (MOB) on real GDP per capita (GDP).

$\boldsymbol{H_3}$: There is a statistically significant effect of fixed telephone subscriptions per 100 people (FIX) on real GDP per capita (GDP).

1.3. Research Objectives

This study primarily aims to achieve the following objectives:

Empirically Measuring ICT Impact on Growth: Evaluating the extent to which ICT indicators contribute to enhancing real GDP per capita across a sample of Arab countries.

Delineating Modern vs. Traditional Technology Effects: Identifying the key differences in economic impact between modern digital infrastructure (Internet users and mobile cellular subscriptions) and traditional wired networks (fixed telephone subscriptions).

Applying Rigorous Econometric Model Selection: Utilizing static panel data techniques to perform diagnostic specification tests among the Pooled Regression Model (**PRM**), Fixed Effects Model (**FEM**), and Random Effects Model (**REM**) to determine the optimal estimator.

Providing Policy Recommendations: Offering robust empirical evidence to assist economic decision-makers in Arab countries in optimizing capital allocation toward high-yield digital infrastructure.

2. Theoretical Framework

2.1. Economic Growth

Economic growth represents the core objective that nations strive to achieve and sustain, as it reflects the capacity of a national economy to expand its productive potential and enhance individual living standards over time.

2.1.1. The Concept ofEconomic Growth

According to François Perroux, economic growth is conceptualized as the sustained long-term increase in a fundamental economic indicator, most notably real Gross Domestic Product (GDP) per capita. It is further defined as the continuous expansion of real gross or net output and aggregate production over time, for which real GDP serves as the premier quantitative benchmark(Aghion && Others, 2021, p. 112).

Economic growth is also defined as the increase in output per capita or output per unit of labor. Given that an expansion in total output is often accompanied by population growth, evaluating genuine economic prosperity necessitates relying on real Gross Domestic Product (GDP) per capita as the core quantitative indicator for computing economic growth rates(Mankiw && Others, 1992, p. 408).

2.1.2. Characteristics of Economic Growth:

- Quantitative Nature: Economic growth is a purely quantitative variable that measures the relative percentage change in real Gross Domestic Product (GDP) over time(Jones, 2016, p. 5).

- Indifference to Income Distribution: It strictly focuses on expanding aggregate output without directly considering the equity of output distribution or identifying the specific beneficiaries of this growth(Helpman, 2004, p. 15).

- Spontaneous Mechanism: Historically, economic growth is viewed as a dynamic market process that can occur spontaneously through market forces without mandatory state intervention or centralized investment planning(Barro, 1996, p. 1210).

- Cumulative Effect: Economic growth exhibits a cumulative trajectory; if a country grows at a consistently faster rate than others, the absolute economic disparity between them widens progressively over time(Thirlwall, 2011, p. 14).

- Long-Term Standard of Living Improvement: Over extended periods, sustained economic growth elevates general living standards and provides greater institutional flexibility to implement income redistribution policies.

- Stimulation of Investment Opportunities: The continuous expansion of national output creates a favorable macroeconomic environment that generates abundant new investment opportunities.

2.1.3. Importance of Economic Growth

Economic growth plays a pivotal role in macroeconomic development, as highlighted by the fundamental objectives it seeks to achieve(Todaro & Smith, 2020, p. 115):

-Job Creation and Unemployment Reduction: Fostering employment opportunities to mitigate systemic unemployment and elevate aggregate economic welfare.

- Redressing Balance of Payments Disparities: Correcting structural imbalances in the balance of payments through strategic economic planning aimed at enhancing stability and competitiveness.

- Enhancing Self-Sufficiency and Food Security: Promoting domestic productive capacity to supply essential food commodities at reasonable prices compatible with consumer purchasing power.

- Increasing National and Per Capita Income: Expanding Gross National Income (GNI), which directly contributes to raising real per capita income.

2.2. Information and Communication Technology

Information and Communication Technology (ICT) refers to a broad spectrum of technologies that collect, process, store, and transmit data. It encompasses essential infrastructure such as the Internet, telecommunications (including mobile networks and fixed landlines), wireless systems, and digital broadcasting platforms. In contemporary economies, ICT has become a fundamental operational pillar, enabling organizations and enterprises to enhance productivity, expand market reach, and optimize information exchange(Yuwono && others, 2024, p. 4).

2.2.1. The Concept ofInformation and Communication Technology

Information and Communication Technology (ICT) encompasses all advanced technologies used to process and transform raw data in various forms into useful information of different types, which is subsequently utilized by beneficiaries across all spheres of life.(Niebel, 2018, p. 198)"

In an economic context, Information and Communication Technology (ICT) is defined as the combined set of technological assets and services—encompassing telecommunications infrastructure, computing hardware, the Internet, and digital networks—that serve as a fundamental catalyst for facilitating knowledge creation, processing, and dissemination across various economic sectors(Aghaei & Rezagholizadeh, 2017, p. 348).

2.2.2. Characteristics of ICT

Information and Communication Technology (ICT) is characterized by a set of core features that make it a key driver of economic activity, most notably(Cardona && others, 2013, p. 110):

-Pervasiveness and Ubiquity: ICT acts as a General Purpose Technology (GPT) that permeates all economic sectors and production processes.

- Network Externalities: The economic value and utility of ICT infrastructure increase exponentially as the number of users (e.g., internet and mobile subscribers) grows.

- High Velocity and Adaptability: Enables real-time data processing, instant communication, and dynamic adaptation to global market fluctuations.

2.2.3. Economic Significance ofInformation and Communication Technology

- Reduction of Transaction and Information Costs: ICT minimizes market search friction, lowers communication overheads, and mitigates information asymmetry between economic agents.

- Enhancement of Total Factor Productivity (TFP): The adoption of digital technologies optimizes labor efficiency and capital utilization through automated operational workflows.

- Stimulation of Financial Inclusion and Digital Markets: Widespread mobile and internet penetration empowers individuals and firms by expanding access to digital financial services and global trade opportunities(Appiah & Song, 2021, p. 2898).

3. The Empirical Study

3.1. Study Sample and Variables

3.1.1. Study Sample: The population of this study comprises all Arab countries. Based on data availability regarding the time series for the model variables during the period (2000–2024), a representative sample of **ten (10) Arab countries** was selected, namely: (*Algeria, Tunisia, Morocco, Egypt, Saudi Arabia, United Arab Emirates, Qatar, Oman, Jordan, and Bahrain*).

3.1.2. Study Variables:

Dependent Variable:

The dependent variable in this study is Economic Growth, which is measured by real Gross Domestic Product per capita (GDP) in constant US dollars.

Independent Variables

:Represent Information and Communication Technology) ICT (indicators, including:

-Individuals using the Internet as a percentage of population (INT).

- Mobile cellular subscriptions per 100 people(MOB).

- Fixed telephone subscriptions per 100 people (FIX).

The following table presents the study variables and their econometric sources:

Table (01): Study Variables and Data Sources

Study Variables		**Symbol**	**Measurement /Indicator**	**Source**
Dependent Variable	EconomicGrowth	**GDP**	Real GDP per capita (constant US$)	World Bank (WDI)
Independent Variables	Internet Users	**INT**	Individuals using the Internet (% of population)	World Bank (WDI)
	Mobile Subscriptions	**MOB**	Mobile cellular subscriptions (per 100 people)	World Bank (WDI)
	FixedSubscriptions	**FIX**	Fixed telephone subscriptions (per 100 people)	World Bank (WDI)

Source: Prepared by the researchers.

3.2. Methodology and Econometric Model Specification

To empirically evaluate the impact of Information and Communication Technology (ICT) indicators on economic growth—measured by real GDP per capita—over the period 2000–2024, this study utilizes static Panel Data econometric methodology to combine cross-sectional and time-series dimensions, enhancing degrees of freedom and controlling for unobserved individual heterogeneity. Following standard empirical growth literature, the linear econometric model is specified as follows:

$$GDP_{it} = \beta_0 + \beta_1 INT_{it} + \beta_2 MOB_{it} + \beta_3 FIX_{it} + \varepsilon_{it}$$

GDP_{it}: Represents Real GDP per Capita for country i in year t (*Dependent Variable measuring economic growth*).

INT_{it}: Represents the percentage of Internet Users (% of population) for country i in year t (*Independent Variable*).

MOB_{it}: Represents Mobile Cellular Subscriptions per 100 people for country i in year t (*Independent Variable*).

FIX_{it}: Represents Fixed Telephone Subscriptions per 100 people for country i in year t (*Independent Variable*).

β_0: Represents the model intercept.

$\beta_1, \beta_2, \beta_3$: Represent the estimated slope parameters of the independent variables.

ε_{it}: Represents the random error term.

3.3. Results Presentation and Hypothesis Testing

3.3.1. Descriptive Statistics

Table (02): Descriptive Statistics for the Study Variables

	Mean	Maximum	Minimum	Std.Dev	Jrq-Bera	Probability
GDP	19862.16	83533.50	1957.141	20729.32	61.82609	0.000000
INT	49.80079	100.0000	0.491706	33.83878	21.13870	0.000026
MOB	102.9179	220.4116	0.278282	54.27595	4.915118	0.045644
FIX	13.71434	29.19923	3.331528	6.666811	16.70489	0.000236

Source: Prepared by the researchers based on Eviews 13 software outputs.

Based on Table (02), we notice the following:

-The mean of Real GDP per capita reached (19862.16), with a standard deviation of (20729.32). The values of the variable ranged between (83533.50) as the maximum value and (1957.141) as the minimum value. The high standard deviation relative to the mean, along with the wide gap between the minimum and maximum values, reflects significant economic heterogeneity among the sample countries during the study period.

- The mean of Internet users (INT) reached (49.80079), with a standard deviation of (33.83878). The values of the variable ranged between (100) as the maximum value and (0.491706) as the minimum value. The wide range between the minimum and maximum values highlights a significant digital divide and varying levels of technological adoption among the sample countries across the study period, despite the overall mean approaching 50%.

- The mean of Mobile cellular subscriptions (MOB) reached (102.9179), with a standard deviation of (54.27595). The values of the variable ranged between (220.4116) as the maximum value and (0.278282) as the minimum value. The mean exceeding 100% reflects high mobile penetration rates and multiple subscriptions per individual in some sample countries, alongside noticeable variation in market expansion across the study period.

- The mean of Fixed telephone subscriptions (FIX) reached (13.71434), with a standard deviation of (6.666811). The values of the variable ranged between (29.19923) as the maximum value and (3.331528) as the minimum value. The relatively low mean and modest standard deviation compared to mobile subscriptions indicate a lower and more stable penetration rate for fixed telecommunications infrastructure across the sample countries.

Looking at the p-values of the Jarque-Bera test in the descriptive statistics table, we find that all of them are statistically significant ($p < 0.05$). This indicates that the study variables do not follow a normal distribution, which is a common and expected characteristic in panel data due to structural and economic heterogeneity among the sample countries.

3.3.2. Estimation Results and Model Selection

Table (03): Estimation Results of the Impact of Information and Communication Technology (ICT) on Economic Growth

Variables	Estimation Method		
	PooledRegression	FixedEffects	Random Effects
Constant	4.623190	8.911818	8.886298
Prob (C)	0.0000	0.0000	0.0000
INT	0.120814	0.031778	0.032226
Prob (INT)	0.1413	0.0042	0.0036
MOB	0.071484	0.033448	0.033328

Prob (MOB)	0.4343	0.0066	0.0067
FIX	1.581391	0.048348	0.055917
Prob (FIX)	0.0000	0.0541	0.0258
R-squared	0.636535	0.994097	0.334238
Adjusted R-Squared	0.632048	0.993794	0.326019
F-statistic **Prob (F-statistic)**	141.8550 0.000000	3283.882 0.000000	40.66515 0.000000
Durbin- Waston stat	0.050920	0.184589	0.162512

Source: Prepared by the researchers based on Eviews 13 software outputs.

Furthermore, the estimation results of the impact of Information and Communication Technologyon Economic Growth in the studied countries are presented using the three panel data models: the Pooled Regression Model, the Fixed Effects Model, and the Random Effects Model.

Pooled Regression Model

The p-value of the F-statistic, which measures the overall significance of the model, is less than the significance level of (5%). This leads us to reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1), confirming that the model is suitable for representing the relationship between the dependent variable—represented by economic growth measured by Real GDP per capita—and the explanatory variables, represented by the three ICT indicators (Internet users, mobile cellular subscriptions, and fixed telephone subscriptions).

The p-value of the constant term shows statistical significance at the (5%) level, confirming the importance of the constant in the model.

The p-value of the t-statistic shows statistical significance at the (5%) level for all three indicators: Internet users (INT), mobile cellular subscriptions (MOB), and fixed telephone subscriptions (FIX), indicating the significance of these variables in the model.

The coefficient of determination (R^2), which measures the explanatory power of the model, reached (0.636535). This means that the independent variables in the model explain (63.65%) of the variations occurring in the dependent variable—represented by economic growth expressed as Real GDP per capita—while the remaining (36.35%) is attributed to other factors outside the model framework.

Fixed Effects Model

The p-value of the F-statistic, which measures the overall significance of the model, is less than the significance level of (5%), confirming that the model is suitable for representing the relationship between the dependent variable (Real GDP per capita) and the explanatory variables (ICT indicators).

The p-value of the constant term shows statistical significance at the (5%) level, confirming its importance in the model.

The p-values of the t-statistics display statistical significance at the (5%) level for both Internet users (INT) with a p-value of (0.0042) and mobile cellular subscriptions (MOB) with a p-value of (0.0066), reflecting the statistical significance of these two variables in the Fixed Effects Model.

Finally, the coefficient of determination (R^2), which measures the explanatory power of the model, reached (0.994097). This indicates that the independent variables and fixed individual effects in the model explain (99.41%) of the variations occurring in economic growth, while the remaining (0.59%) is attributed to other factors outside the model framework.

Random Effects Model

The p-value of the F-statistic, which measures the overall significance of the model, is less than the significance level of (5%), confirming that the model is suitable for representing the relationship between the dependent variable (Real GDP per capita) and the explanatory variables (ICT indicators).

The p-value of the constant term shows statistical significance at the (5%) level, confirming its importance in the model.

The p-values of the t-statistics display statistical significance at the (5%) level for all three ICT indicators: Internet users (INT) with a p-value of (0.0036), mobile cellular subscriptions (MOB) with a p-value of (0.0067), and fixed telephone

subscriptions (FIX) with a p-value of (0.0258), reflecting the statistical significance of these variables in the Random Effects Model.

Finally, the coefficient of determination (R^2), which measures the explanatory power of the model, reached (0.334238). This indicates that the independent variables in the model explain (33.42%) of the variations occurring in economic growth, while the remaining (66.58%) is attributed to other factors outside the model framework.

Model Selection Tests

Following the estimation of the three panel models, several diagnostic tests were performed to compare their performance and identify the most suitable model for the empirical data, namely:

Redundant Fixed Effects Test :This test is used to choose between the pooled regression model and the fixed effects model, and to determine whether the banks under study follow the same behavior in terms of the intercept term or whether each bank in the sample has its own specific behavior. This test is based on the following hypotheses:

H_0 : The pooled regression model is the appropriate model.

H_1 : The Fixed Effects Model is the appropriate model.

The results of this test are presented in the table below:

Table(04): Redundant Fixed Effects Test Results

Test Type	Test Statistic	Degrees of Freedom	Probability
Cross-Section F	1574.885231	(9.234)	0.0000
Cross-Section Chi-Square	1017.693225	9	0.0000

Source: Prepared by the researchers based on Eviews 13 software outputs.

As shown above, the Redundant Fixed Effects test results indicate that the p-values for both test statistics are statistically significant ($p < 0.05$). Consequently, the null hypothesis is rejected, confirming that the Fixed Effects model is more appropriate for the study's panel data compared to the Pooled Regression Model**.**

Hausman Test: The Hausman test is used when there is a significant difference between fixed effects and random effects estimators. It measures the extent to which the individual-specific effect is correlated with the explanatory variables. The null hypothesis assumes that there is no such correlation; under this assumption, both fixed effects and random effects estimators are consistent, but the random effects estimator is more efficient(Hausman, 1978, p. 1251). This test is based on the following hypotheses:

H_0 : The random effects model is the appropriate model.

H_1 : The Fixed Effects Model is the appropriate model.

The results of this test are presented in the table below:

Table (05) : Hausman Test Results

Test Type	Test Statistic	Chi-Square. Degrees of Freedom	Probability
Cross-Section Random	26.771523	3	0.0000

Source: Prepared by the researchers based on Eviews 13 software outputs.

As shown in Table 05 above, the Hausman test results indicate that the p-value is statistically significant ($p < 0.05$). Consequently, the null hypothesis is rejected, confirming that the Fixed Effects model is the most appropriate model for the study data.

3.3.3. Analysis of the Results of Estimating the Impact of Information and Communication Technology on Economic Growth

Based on the results of the Hausman test, which indicated that the Fixed Effects Model is the most appropriate model for explaining the relationship between the explanatory variables (the three ICT indicators) and the dependent variable, economic growth (measured by real GDP per capita), the estimated model can be specified in the final equation as follows:

GDP = 8.911818 + 0.031778 **INT** + 0.033448 **MOB** + 0.048348 **FIX** + ε_{it}

There is a statistically significant positive effect of the Internet users indicator per 100 people (INT) on economic growth, measured by real GDP per capita (GDP). The estimated coefficient is (0.031778) with a p-value of (0.0042), which is below the significance threshold of (0.05). This indicates that holding all other factors constant, a one-unit increase in Internet usage leads to an increase in real GDP per capita by (0.031778) units.

Economically, this positive impact can be attributed to the pivotal role of digital network expansion in enhancing business efficiency, facilitating knowledge flows and financial-commercial transactions, as well as boosting labor productivity and reducing transaction costs across the sampled countries.

There is a statistically significant positive effect of the mobile cellular subscriptions indicator per 100 people (MOB) on economic growth, measured by real GDP per capita (GDP). The estimated coefficient is (0.033448) with a p-value of (0.0066), which is below the significance threshold of (0.05). This indicates that holding all other factors constant, a one-unit increase in mobile cellular subscriptions leads to an increase in real GDP per capita by (0.033448) units.

Economically, this positive impact can be attributed to the widespread penetration and accessibility of mobile communications, which reduces the digital divide and enhances market efficiency across commercial and service sectors. Furthermore, mobile connectivity directly fosters financial inclusion through mobile banking and digital payment services within the sampled countries.

here is a statistically non-significant positive effect of the fixed telephone subscriptions indicator per 100 people (FIX) on economic growth, measured by real GDP per capita (GDP). The estimated coefficient is (0.048348) with a p-value of (0.0541), which exceeds the standard significance threshold of (0.05).

Economically, this outcome can be attributed to the structural and technological shift toward reliance on wireless networks and mobile communications rather than traditional fixed-line infrastructure within the sampled countries. Fixed-line connections have increasingly been relegated to supporting backbone internet connectivity rather than acting as primary, standalone tools for business and personal communication, thereby diminishing their direct statistical significance on economic growth.

3.3.4. Hypothesis Testing

Based on the empirical findings obtained from the estimation of the Fixed Effects Model, the decisions regarding the study hypotheses are presented as follows:

Regarding the First Hypothesis (H_1): The empirical results reveal a statistically significant positive effect of the Internet users indicator per 100 people (INT) on real GDP per capita (GDP) at ($p = 0.0042 < 0.05$); **hence, we accept the first hypothesis**.

Regarding the Second Hypothesis (H_2): The statistical output indicates a significant positive impact of mobile cellular subscriptions per 100 people (MOB) on real GDP per capita (GDP) at ($p = 0.0066 < 0.05$); **hence, we accept the second hypothesis**.

Regarding the Third Hypothesis (H_3): The estimation demonstrates that the effect of fixed telephone subscriptions per 100 people (FIX) on real GDP per capita (GDP) is statistically non-significant ($p = 0.0541 > 0.05$); **which leads us to reject the third hypothesis**.

Table (06): Summary of Hypothesis Testing Results

Symbol	**HypothesesTested**	**Results**
H1	There is a statistically significant impact of **INT** on **GDP**	**Accepted**
H2	There is a statistically significant impact of **MOB** on **GDP**	**Accepted**
H3	There is a statistically significant impact of **FIX** on **GDP**	**Rejected**

Source: Prepared by the researchers based on empirical results.

4. Conclusion

This study empirically investigated the impact of Information and Communication Technology (ICT) on economic growth across a sample of ten Arab countries over the period 2000–2024. To achieve this objective, economic growth was specified as the dependent variable measured by real GDP per capita (GDP). Meanwhile, the independent variables comprised three core ICT indicators: Internet users as a percentage of the total population (INT), mobile cellular subscriptions per 100 people (MOB), and fixed telephone subscriptions per 100 people (FIX).

Methodologically, the analysis utilized static panel data econometric techniques by estimating and comparing three main estimators: the Pooled Regression Model (PRM), the Fixed Effects Model (FEM), and the Random Effects Model (REM). The diagnostic specification tests—specifically the Restricted F-test and the Hausman test—conclusively identified the Fixed Effects Model (FEM) as the most efficient and statistically appropriate specification for analyzing the targeted relationships.

The empirical estimation under the Fixed Effects Model (FEM) revealed a statistically significant positive effect of both Internet users (INT) and mobile cellular subscriptions (MOB) on real GDP per capita at the 5% significance level. These findings underscore the vital role of modern wireless and digital infrastructure in optimizing economic operations and driving productivity across the analyzed Arab economies. Conversely, fixed telephone subscriptions (FIX) exhibited a statistically insignificant impact on economic growth, reflecting ongoing structural technology adoption shifts where flexible cellular and broad-band networks systematically supersede traditional fixed-line telephony.

5. Recommendations:

Based on the empirical findings derived from the **Fixed Effects Model (FEM)**, which demonstrated the statistical significance of Internet and mobile indicators versus the insignificance of fixed-line telephony, this study offers the following recommendations for decision-makers and economists in Arab nations:

-Prioritizing Investment in Modern Digital Infrastructure: Directing public and private capital toward expanding high-speed broadband networks and 5G coverage, as they represent the primary drivers of real GDP per capita growth.

- Restructuring the Telecommunications Sector and Reallocating Resources: Reducing capital expenditure allocated to traditional, unproductive fixed-line networks and reallocating these financial resources toward smart wireless technologies and digital solutions.

- Accelerating Comprehensive Digital Transformation: Enhancing the digital business ecosystem and minimizing transaction costs by integrating Internet and mobile applications into key economic sectors (such as digital banking and e-commerce).

- Fostering Digital Inclusion and Regulatory Frameworks: Lowering subscription costs for Internet and mobile services to ensure universal accessibility, while updating regulatory and legislative frameworks to safeguard data and attract Foreign Direct Investment (FDI) into the ICT sector..

REFERENCE:

1) Yuwono, T., && others. (2024). Information and communication technology in SMEs: a systematic literature review. Journal of Innovation and Entrepreneurship, Vol 13(N° 31).

2) - Aghaei , M., & Rezagholizadeh, M. (2017). The impact of information and communication technology (ICT) on economic growth in OIC countries. Economic Change and Restructuring, Vol 50(N° 4), pp. 347–362.

3) - Aghion, P., && Others. (2021). The power of creative destruction: Economic growth and the wealth of nations. Journal of Economic Growth, Vol 26(N° 2), pp. 105–142.

4) - Appiah, O., & Song, N. (2021). The impact of ICT on economic growth: Comparing rich and poor countries. Applied Economics, Vol 53(N° 25), pp. 2895–2907.

5) - Barro, R. (1996). Determinants of economic growth: A cross-country empirical study. The Economic Journal, Vol 106(N° 438), pp. 1207–1230.

6) - Cardona, M., && others. (2013). ICT and productivity: conclusions from the empirical literature. Information Economics and Policy, Vol 25(N° 3), pp. 109–125.

7) - Hausman, J. (1978). Specifica<tion Tests in Econometrics. Econometrica, Vol 46(N°6).

8) - Helpman, E. (2004). The mystery of economic growth. Journal of Economic Perspectives, Vol 18(N° 2), pp. 3–24.

9) - Jones, C. (2016). The facts of economic growth. Journal of Economic Literature, Vol 54(N° 1), pp. 3–69.

10) - Mankiw, N., && Others. (1992). A contribution to the empirics of economic growth. The Quarterly Journal of Economics, Vol 107(N° 2), pp. 407–437.

11) - Niebel, T. (2018). ICT and economic growth—Comparing developing, emerging and developed countries. Telecommunications Policy, VOL 42(N° 3), pp. 197-211.

12) - Thirlwall, A. (2011). The nature of economic growth: An alternative framework for understanding the performance of nations. Cambridge Journal of Economics, Vol 35(N°1), pp. 1–28.

13) - Todaro, M., & Smith, S. (2020). Economic Development. Pearson.

14) -World Bank. (2024). World Development Indicators [Data set]. World Bank Group. https://databank.worldbank.org/source/world-development-indicators