The Role of Financial Development in Expanding Tourism Revenues under Digital Transformation and Governance: A Case of Selected Arab Countries (2016-2024)

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Abstract:

Through this research, we aim to highlight the ability of financial development based on digital infrastructure supported by good management frameworks to improve the revenues of the tourism sector in Arab countries during the period (2016-2024), by building a standard model that explains the nature of this relationship.

Through the estimated model, we found that increasing the volume of credit granted to the private sector, providing digital infrastructure for the financial sector while highlighting the rule of law and reducing administrative corruption contribute to enhancing tourism revenue levels by 0.1183, 0.5633, 32.33, and 14.815, respectively. Therefore, we recommend digitization and governance, the financial sector to support economic diversification through the tourism sector in Arab countries.

Keywords: Financial development; tourism revenues; digital environment; Governance; panel models.

Jel Classification Codes: C23 , C33, G21, G24.

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1. Introduction :

In recent years, Arab countries have undertaken comprehensive economic reform agendas aimed at fostering sustainable development and improving overall living standards. These reforms have been shaped by a critical evaluation of earlier development policies, with a particular focus on identifying structural weaknesses and inefficiencies that constrained their effectiveness. As a result, economic diversification has emerged as a central strategic objective, encouraging the promotion of non-traditional sectors capable of generating higher value-added contributions to gross domestic product. Within this context, the tourism sector has become increasingly significant due to its ability to attract foreign currency inflows and to strengthen external balances.

However, the capacity of the tourism sector to effectively contribute to economic performance remains closely linked to several economic and institutional determinants. Among these, financial development plays a pivotal role, as it facilitates access to funding, enhances liquidity conditions, and supports the delivery of advanced financial and banking services necessary for sectoral expansion. Moreover, ongoing transformations in the global economic environment have introduced new requirements that influence the effectiveness of financial systems. In particular, the shift toward digitalization in financial and banking activities, combined with the implementation of efficient governance mechanisms aimed at mitigating corruption and improving institutional quality, has become increasingly essential.

Accordingly, the effectiveness of financial development in stimulating economic sectors especially tourism in Arab economies depends largely on the extent to which digital transformation and governance practices are successfully integrated, In light of these considerations, the central research question of this study can be formulated as follows: **to what extent can financial development, through digitalization and governance frameworks, enhance tourism revenues in Arab countries?**

-Sub-questions :Building upon the central research problem, the following sub-questions are formulated to address the different dimensions of the study:

-What constitutes the conceptual foundation of the tourism sector? And what are the key determinants required to develop it and enhance its competitiveness?

-What is the nature of financial development within the context of the digital economy, and what are its contemporary structural dimensions?

-To what extent do financial development indicators contribute to stimulating and expanding the base of tourism revenues within the Arab context?

-Hypothesis :Based on the research problem of the study, the main hypothesis and its derived sub-hypotheses can be formulated as follows:

Main hypothesis: There is a positive and statistically significant effect of financial development on the growth and maximization of tourism sector revenues in the selected Arab countries.

Sub-hypotheses:

-Enhancing the quality of digital infrastructure within the financial system contributes to stimulating tourism-related financial flows and increasing revenue levels.

-Institutional frameworks and sound governance practices (reflected in the rule of law and anti-corruption measures) help create an attractive environment for tourism investment, which positively impacts sector revenues.

- A conducive tax policy enables an increase in tourism revenues across Arab countries.

-Research Significance: The scientific and practical relevance of this study stems from the current strategic orientations adopted by policymakers across the Arab region, which focus on designing economic frameworks aimed at maximizing the developmental returns of the tourism industry, The study further highlights the importance of advancing financial and banking reforms that integrate digital transformation and sound institutional governance. Such reforms are essential for strengthening the financial sector's capacity to perform its intermediation role efficiently across various economic activities, including the tourism sector, thereby contributing to broader development objectives.

-Research Objective: This study aims to examine the impact of financial development on tourism revenues, particularly in the context of digital transformation and the adoption of governance practices. To this end, an econometric model is constructed to identify and analyze the nature and direction of the relationship between the study variables. The ultimate goal is to derive policy recommendations that can assist Arab countries in adopting appropriate strategies to strengthen and promote the tourism sector, thereby enhancing the revenue generated from its development.

-Research Methodology: Considering the nature of the subject and the objective of answering the central research question while testing the proposed hypotheses, this study relies on a deductive reasoning approach to explore and interpret the different dimensions of the phenomenon under investigation. Complementarily, an inductive approach is also applied through the use of statistical methods and econometric techniques in order to empirically assess the relationship between the evolution of banking sector activities and tourism revenues, with particular emphasis on the role of digital transformation.

Research Scope: In order to address the main research question and achieve the objectives of the study, it is necessary to define both the spatial and temporal boundaries as follows:

Spatial scope: This study is limited to a selected sample of Arab countries, namely: Algeria, Jordan, Egypt, the United Arab Emirates, Sudan, Oman, Kuwait, Qatar, and Morocco.

Temporal scope: The analysis covers the period from 2016 to 2024.

Previous studies :Despite the limited number of studies directly addressing the impact of financial development on tourism revenue growth amid digital transformation and governance in several Arab countries between 2016 and 2024, the most relevant research can be outlined as follows.

- A study by (Silva Opuala, Philip, & Omoke, 2022), This research investigates the dynamic linkage between financial development and the N-shaped tourism-led growth hypothesis in Mauritius, emphasizing the explanatory role of the financial system in shaping tourism growth dynamics. The study relies on annual time-series observations spanning the period 1980–2018, and employs both the Autoregressive Distributed Lag (ARDL) approach and the Quantile Autoregressive Distributed Lag (Quantile ARDL) framework in order to capture potential nonlinear relationships among the variables. The empirical evidence suggests that financial development exerts a positive influence on tourism expansion, which subsequently contributes to higher tourism revenues and strengthens long-run sectoral performance.

- A study by (Berri & Abdelkader, 2023), This study aimed to examine the relationship between financial development and the growth of tourism demand, and its subsequent positive impact on tourism revenues, by conducting an empirical analysis on a sample of tourist countries using panel data models.

- A study by (Ramphul, 2017), This study aimed to examine the nature of the relationship between tourism, financial development, and economic growth in India, and the results showed that financial development plays a pivotal role in strengthening the tourism sector and increasing its revenues, which in turn positively impacts the acceleration of economic growth in the country.

-Similarly, the study by (Eroz, Nazeer, & Khalid, 2020) aimed to analyze the relationship between financial development, tourism development, and economic growth in Pakistan. The results showed that strengthening the financial sector effectively contributes to enhancing tourism development by increasing tourism revenues, which in turn positively impacts the support and stimulation of economic growth in the country.

- This study (Pat, Kwaku, & Emmanuel, 2025) demonstrates that the maturity of the financial sector plays a pivotal role in promoting tourism development and increasing the revenues generated by this sector, thereby directly supporting economic growth. The results indicate that economies with more developed financial systems are better able to leverage tourism, as the financial sector enhances a country's capacity to attract more tourists and achieve higher revenues, which in turn positively impacts the acceleration of economic growth and strengthens financial stability in the long term.

-The study (Al-Mulali, Solarin, & Gholipour, 2021) found that financial development significantly facilitates access to credit and reduces transaction costs, thereby enhancing the ability to travel, expand business activities, and invest in tourism infrastructure.

Despite the growing number of studies addressing the relationship between financial development and tourism revenues, most of them have focused on the direct impact of financial development on tourism or economic growth (such as Silva Opuala et al., 2022; Berri and Abdelkader, 2023; Ramphul, 2017; Eroz et al., 2020). However, these studies have largely overlooked the role of digital transformation and governance quality, particularly in the Arab context. Accordingly, this study is distinguished by integrating digital financial infrastructure as a key channel through which financial development affects tourism revenues, in addition to incorporating governance indicators such as the rule of law and corruption control as supporting factors. It also focuses on a sample of Arab countries during the period 2016–2024, a recent period that reflects developments in digital transformation and financial reforms, and adopts a comprehensive econometric model that combines financial development, digital transformation, and governance to assess their joint impact on tourism revenues, providing more accurate and policy-relevant results.

2. Determinants of Tourism Sector Performance Improvement

Given the significant role that the tourism sector plays in contributing to gross domestic product, many countries particularly those heavily reliant on a single source of income have adopted various mechanisms aimed at strengthening and developing this sector. In this context, the following section addresses the key factors associated with enhancing the performance of the tourism sector.

2.1 Concept of Tourism

According to the World Tourism Organization, tourism can be defined as a set of activities undertaken by individuals while traveling to destinations outside their usual environment, for purposes such as leisure, business, or other motives (Dahman, 20214, p. 9) , From the perspective of the Social and Economic Committee, a tourist is defined as any person who undertakes a trip between two or more countries for a duration exceeding 24 hours and less than one year, for purposes such as leisure, vacation, business activities, trade, or other objectives. Tourism activities include services such as hotels and restaurants, travel agencies, tour operators and organizers, tourist guiding services, as well as other services related to transportation, communications, leisure activities, and museums (Amich, 2015, p. 22) , From an economic standpoint, tourism has been conceptualized by Schullern zu Schrattenhofen as the range of direct and indirect economic effects generated when visitors travel to a destination outside their usual place of residence. This perspective encompasses the economic exchanges that arise from such movements, including the provision of goods and services designed to fulfill

visitors' needs and ensure the satisfaction of their requirements during the period of their stay (Edir & Ghazazi, 2017, p. 180) .

2.2 Types of Tourism

Tourism can be classified into several categories based on a range of criteria, such as the purpose of travel, the nature of the tourism activity, or the characteristics of the destination. This classification aims to better understand the diversity of the tourism phenomenon and to identify the specific features of each type, which in turn helps in designing appropriate policies and strategies for each category. Accordingly, types of tourism can be divided into (Sebti & Sahraoui, 2017, pp. 812-813) :

2.2.1 Classification of Tourism According to the Geographical Criterion

-Domestic tourism: It refers to the movement of a tourist from their usual place of residence to another location within the same country, provided that the distance traveled is not less than 40 km. This movement is undertaken for various purposes, excluding work-related or income-generating activities.

-Regional tourism: This type involves the movement of tourists between neighboring countries that share common geographical or cultural characteristics, forming a broader regional tourism zone, such as Arab countries, African countries, or countries in South Asia.

-International (outbound) tourism: It refers to the temporary travel of tourists from one country to another for tourism purposes, with the intention of returning to their country of origin after a limited period.

2.2.2 Classification of Tourism According to Purpose or Objective

-Religious tourism: This type involves travel within a country or abroad for the purpose of visiting sacred sites, such as Muslims traveling to the Kingdom of Saudi Arabia to perform Hajj or Umrah.

-Medical tourism: It refers to traveling with the aim of both physical and psychological well-being through treatment and healthcare services provided by modern hospitals and medical centers.

-Sports tourism: This involves temporary travel from one place to another in order to participate in various sporting activities or to attend and enjoy watching sports events.

-Cultural tourism: This type focuses on exposing tourists to the culture, heritage, and civilizations of a destination, including handicrafts, traditions, customs, architectural styles, language, and more.

In addition to these, other forms of tourism under this classification include beach tourism, desert tourism, as well as exhibition and festival tourism, among others.

2.3 Determinants of Tourism Sector Promotion and Their Impact on Tourism Revenues

The promotion of the tourism sector is closely linked to the accurate identification of the key factors influencing this sector. Therefore, this section will focus on discussing the main determinants that affect the tourism sector, including:

2.3.1 Financial Development

2.3.1.1 Concept of Financial Development: The World Bank defines financial development as the process of enhancing and expanding the scope of financial services to efficiently and effectively meet the needs of economic units (belghalem, 2024, p. 273), According to the perspective of financial inclusion, this concept can be described as a strategy aimed at enabling all social groups to have easy and sustainable access to a comprehensive range of banking products and services at the appropriate time. This approach is based on expanding financial access by adopting both traditional and innovative mechanisms that focus on increasing financial awareness and literacy, ensuring that the actual needs of individuals and institutions are met. Ultimately, it aims to promote financial stability, well-being, and achieve comprehensive economic and social inclusion (belghalem & ilifi, 2023, p. 320), Achieving financial development relies on a set of key factors that contribute to improving its effectiveness and increasing its impact on the economy.

2.3.1.2 The impact of financial development on enhancing tourism revenue

Financial development contributes significantly, according to various studies such as (Tsaurai, 2022, pp. 80-99), (YENİŞEHİRLİOĞLU & BAYAT, 2019, pp. 1183-1190), (Kunofiwa, 2018, pp. 100-110), (Kunofiwa, 2018, pp. 100-110), (Rasoo & Maqboo, 2021, pp. 1-11), (Ehigiamusoe, 2022, pp. 382-396), in boosting the tourism sector. This is because higher levels of financial development in the host country enable tourists to access financial services while enjoying their holidays, from a demand perspective (Berry & Debouche, 2023, p. 189), From a supply side perspective, the proper development of banks and financial markets offers more opportunities for tourism operators to secure funds for investing in their businesses and developing more tourism products and services. Additionally, the growth of the tourism industry can further enhance financial development (Liao, et al., 2018, pp. 1-23).

2.3.2 Digital Transformation: Information and communication technology has become the cornerstone of the development of the tourism sector. It is no longer an option for those involved in the sector, but rather a necessity imposed by the current economic conditions to develop and grow the tourism and hospitality sector. Therefore, the importance of digital transformation in enhancing the tourism sector can be summarized as follows (Bekhti & Chouabi, 2010, p. 280):

- The reliance of tourism services, in all their forms, on the exchange of tourism information, which is characterized by variability, makes it difficult to measure its quality until after the experience. Therefore, the internet is the ideal medium for this, as it reduces this variability by offering a virtual visit to the tourism service,

allowing visitors to easily explore tourist attractions and areas through an interactive, visual, and imaginative representation of the site. It also provides detailed data and information about the tourist areas to be visited. Moreover, it enables tourists to plan their trips, select the areas they wish to visit, and organize their visiting schedule to maximize the number of attractions they can see, while also allowing them to allocate an approximate budget for their expenses.

- The use of information and communication technology reduces the cost of producing tourism services. On one hand, it contributes to enhancing tourism promotion, and on the other hand, technology helps reduce costs, especially those related to communication (direct contact with intermediaries and tourists) and distribution, as the service requester is the one who calls to purchase it. This reduces the costs of printing brochures and tourism magazines, in addition to cutting down on excess labor, enhancing the capabilities of employees, and training them to use computers, the internet, and various applications and software.

- The expansion of technology use may lead to the emergence of latent needs that did not exist before, prompting those in the tourism sector to develop new and diverse products that meet these new needs. Additionally, this expansion leads to improved service quality, a broader customer base, and enhanced competitiveness for tourism institutions. It also improves their business relationships, adding credibility and quality to their services, which has a positive impact on the overall income of the tourism sector.

2.3.3 Institutional Governance: The presence of this factor is considered one of the most important contributors to enhancing tourism demand for any country. This is because the existence of levels of administrative corruption, which refers to any functional behavior that violates official regulations and laws, deviates from professional ethics, values, and social norms to achieve personal interests (Ittahhin, 2016, pp. 2-3), will result in providing financial services to only a specific group, while depriving other groups from benefiting from these services. This creates discomfort for tourists in that country. Additionally, providing a suitable legal environment contributes to attracting foreign economic institutions and increasing the number of tourists.

2.3.4 Political Stability: Political stability strengthens social cohesion and provides a favorable environment for business activities, which helps attract more tourists.

2.3.5 Security Stability: Investors need a safe and stable environment, as the lack of security stability acts as a driving factor for capital flight abroad.

2.3.6 Tax Environment: Tourism investments can be encouraged through tax reductions or tax exemptions, given their important role in expanding projects and increasing their financial cash flows.(Burkan, 2018, p. 59), Consequently, the presence of such policies can help attract foreign investors to invest across all sectors,

including the tourism sector, which in turn positively impacts the development of this sector and enhances tourism revenues.

2.3.7 Natural Factors: These include climatic conditions, the variation of seasons, warm areas, mineral baths, etc (Bahchachi & Zemmouri, 2020, p. 252)..

3. The Impact of Financial and Institutional Development on Tourism Sector Revenue in Arab Countries.

3.1 Methodological Framework and Tools Used: To test the study's hypotheses, the methodological approach and analytical tools were selected according to specific criteria

3.1.1 Description of the Model Variables: Based on econometric literature and the multiple regression methodology, and guided by the results of previous empirical studies, the study variables were identified and classified within the analysis matrix, as shown in the table below:

Table N°1: Definitionofstudyvariables

symbol	index	variables	Explanation
dependentvariable			
Y		Tourism revenues	Tourism revenues are defined as the financial amounts received by a country in exchange for the goods it sells or the services it provides during a specific period of time.
independentvariables			
x_1	The volume of domestic credit granted to the private sector.	financial development	According to the World Bank, this indicator measures the level of financial development from the perspective of financial depth. The higher this indicator, the higher the levels of financial development. Among the studies that relied on this indicator in measuring financial development,
x_2	Tax Revenues	Tax Policy	They are the amounts collected by governments through the imposition of taxes.
x_3	Individuals who use the Internet	Digital Infrastructure	This indicator is classified among the core pillars of advanced technological infrastructure. It aims to measure the rate of digital access among individuals who have used the Internet (regardless of geographic location) during the last quarter of the year. This measurement includes access to the network through various technological means, ranging from personal computers, smartphones, and digital assistants to gaming platforms and digital television devices.
x_4	Rule of Law	Institutional Governance	It is the subjection of everyone individuals, institutions, and authorities to the rule of law.
x_5	Administrative Corruption (Index ranging from -2.5 to +2.5)		Administrative corruption is defined as the manipulation of public office holders of their official powers and authorities to obtain personal gains. In this context, the prestige and social influence derived from the position are used as tools to achieve individual objectives, bypassing legal frameworks and organizational rules. This type of corruption manifests in various forms, the most notable of which include bribery, financial fraud, embezzlement, as well as favoritism, nepotism, and administrative laxity.

Source: Prepared by the researcher

3.2.1 Model Selection and Specification Tests

To determine the most consistent and efficient estimator among the three panel architectures namely the Pooled Ordinary Least Squares (POLS), the Fixed Effects (FE), and the Random Effects (RE) models systematic comparisons were conducted. The statistical diagnostics generated via STATA 15 are synthesized in the table below:

Table N°2: Panel Data Model Estimation Results.

explanatory variables	Pooled Regression Model (PME)	Fixed Effects Model (PEM)	Random Effects Model (REM)
X1	0.1183984 (0.005)	0.062872 (0.327)	0.1075201 (0.031)
X2	0.170469 (0.000)	-0.0456689 (0.41)	0.1428699 (0.000)
X3	0.5633686 (0.000)	-0.0230828 (0.821)	-0.4015569 (0.000)
X4	32.33999 (0.000)	-8.32717 (0.821)	19.11248 (0.000)
X5	-14.815 (0.000)	11.51591 (0.099)	-7.800956 (0.079)
Constant (c)	36.41555 (0.000)	13.6013 (0.036)	27.44279 (0.000)
Number of obsevation	81	81	81
R-squared	0.6380	0.8250	-
Adjusted R-squared	0.6139	0.7911	-
Prob (F-Stat)	0.0000	0.4983	0.0000

Source: Prepared by the researcher based on **STATA 15** outputs. (See Appendix 1).

To determine the most appropriate model for the nature of the data used (and to balance between the three available options), a series of diagnostic tests were conducted, summarized as follows:

-Breusch-Pagan Test: This test is used to compare the pooled OLS regression model with the random effects model, in order to determine which one better represents the relationship.

This test is conducted within the statistical software environment (Stata 15) to estimate the values of chibar 2(01) and the significance level (Prob > chibar2), The results obtained are summarized in the following table.

Table N°3 : Results of the Breusch and Pagan Test

chi2(01)	4.08
Prob > chibar2	0.0216

Source: Prepared by the researcher based on the outputs of STATA 15; see Appendix No. 2.

The results in the table show that the p-value (Prob > chibar 2) is statistically significant at a level below 5%. Accordingly, the null hypothesis is rejected, and the alternative hypothesis (H_1), which confirms the

presence of random effects, is accepted, this warrants favoring the Random Effects Model as the appropriate framework for analysis.

-Hausman Test: It is used to differentiate (or choose) between the Fixed Effects Model and the Random Effects Model.

This test serves as a decision tool to differentiate between the models by calculating the chi2(10) statistic and the Prob > chi2 value. The results obtained using Stata 15 are summarized in the following table:

Table N°4 : Hausman Test Results

chi2(2)	**26.12**
Prob>chi2	0.0001

Source: Prepared by the researcher based on the output of Stata 15. (See Appendix No. 03).

It can be inferred from the Prob > chi2 value presented in the table above that the test's p-value is statistically significant at the 5% level, Accordingly, the null hypothesis is rejected, and the alternative hypothesis (H_1) is accepted. This confirms the superiority of the Fixed Effects Model and its suitability for the data compared to the Random Effects Model.

-Restricted F-Test: This test represents a comparison between the pooled regression model and the fixed effects model by examining the presence of individual effects.

Table N°5 : Results of the Restricted F- Test

F(8, 67)	8.95
Prob > chibar2	0.0000

Source: Prepared by the researcher based on the outputs of STATA 15; see Appendix No. 1.

The test results show that the F-statistic value F(8, 67) of 8.95 is highly significant, with the corresponding p-value (Prob > F) equal to 0.0000, which is far below the 5% significance level. Accordingly, the null hypothesis is rejected, and the alternative hypothesis (H_1), which confirms the presence of substantial fixed effects, is accepted. This makes the Fixed Effects Model the optimal and most efficient choice for the analysis.

3.2 Testing the Validity of the Chosen Model: Based on the results of comparing the previous models, the fixed effects model was selected as the ideal framework for the study. Before proceeding with the interpretation of the results, the necessary diagnostic tests will be conducted to ensure the model is free from standard issues related to autocorrelation and heteroscedasticity, ensuring unbiased estimates:

-The autocorrelation of errors test: This test is used to detect the issue of autocorrelation, which refers to the presence of a relationship between the error term values of the same variable across consecutive time periods. Among the various available tests, the Wooldridge test is considered one of the most efficient for panel data models , The test was conducted in STATA 15 using the xtserial command, according to the results shown below.

```
xtserial y x1 x2 x3 x4 x5
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,       8) =    130.588
           Prob > F =      0.0000
```

Source: Prepared by the researchers based on the results of the xtserial command in STATA 15.

Based on the outputs of the Wooldridge test, a statistically significant p-value was recorded below the 5% threshold, This indicator statistically rejects the null hypothesis that denies the presence of autocorrelation, confirming, in a statistically significant manner, that the model suffers from error persistence over time.

-**Diagnosis of Heteroscedasticity (Modified Wald Test)**: Given the crucial role that homoscedasticity plays in the reliability of model results, the Modified Wald Test was conducted to detect any variation in the error variances. The xttest3 feature in STATA 15 software was used to perform this process. Below are the outputs obtained:

```
. xttest3
Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (9)  =    88723.83
Prob>chi2 =      0.0000
```

Source: Prepared by the researcher based on STATA 15 results.

We conclude from the Modified Wald test results that the Fixed Effects model suffers from heteroscedasticity. This is because the p-value (Prob > F) is less than 5%, leading to the rejection of the null hypothesis and the acceptance of the alternative hypothesis.

4. Results and discussion

The diagnostic tests applied to the random effects model showed the presence of standard violations, manifested in autocorrelation of errors and heteroscedasticity. To overcome and correct these issues in the optimal model, the method of corrected standard errors for panel time series data (PCSE), known programmatically as xtpcse (Danie, 2007, p. 285), was used. This method is particularly suitable when the number of cross-sectional units (N) exceeds the number of time periods (T).

```
. xtpcse y x1 x2 x3 x4 x5
Linear regression, correlated panels corrected standard errors (PCSEs)

Group variable:   ind                          Number of obs     =         81
Time variable:    YEAR                         Number of groups  =          9
Panels:           correlated (balanced)        Obs per group:
Autocorrelation:  no autocorrelation                         min =          9
                                                             avg =          9
                                                             max =          9
Estimated covariances      =        45         R-squared         =     0.6380
Estimated autocorrelations =         0         Wald chi2(5)      =     203.40
Estimated coefficients     =         6         Prob > chi2       =     0.0000

------------------------------------------------------------------------------
             |            Panel-corrected
           y |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   .1183984   .0368306     3.21   0.001     .0462117    .1905851
          x2 |   .1710469    .030068     5.69   0.000     .1121147    .2299791
          x3 |   .5633686   .1094344    -5.15   0.000    -.7778561    -.348881
          x4 |   32.33999   5.274916     6.13   0.000     22.00134    42.67863
          x5 |    -14.815   2.427244    -6.10   0.000    -19.57231   -10.05769
       _cons |   36.41555   7.922991     4.60   0.000     20.88677    51.94432
------------------------------------------------------------------------------
```

Source: Prepared by the researcher based on the output of the (xtpcse) command in STATA 15.

After addressing the issues of autocorrelation of errors and heteroscedasticity, and based on all the previous statistical tests, the optimal model can be written in the following form:

$$Y = 36.41555 + 0.1183984x_1 + 0.1710469x_2 + 0.5633686x_3 + 32.33999x_4 - 14.815x_5$$

Tourism revenues in Arab countries are influenced by the indicators included in the model (financial development, digital infrastructure in financial institutions, tax environment, and institutional governance) with a coefficient of determination of 0.6380.

- The regression equation results support the first hypothesis, which states that financial development effectively contributes to enhancing tourism revenues in Arab countries during the study period. It shows that for every one-unit increase in the financial development index, tourism revenues increase by 0.11839 units, This is because higher levels of financial development help tourists access financial services more easily, thereby boosting tourism revenues.

- The regression equation results also support the first sub-hypothesis, which states that the availability of digital infrastructure in financial institutions contributes to increasing tourism revenues in Arab countries. For every one-unit increase in internet usage in financial institutions, tourism revenues increase by 0.17104 units. The availability of digital infrastructure in financial institutions enables these institutions to provide high-quality financial services to a broader audience, which attracts foreign tourists, positively impacting tourism revenues.

- The regression equation results also support the second sub-hypothesis, which states that the establishment of institutional governance, expressed through the rule of law and administrative corruption, helps enhance revenues. Specifically, for every unit increase in the rule of law index, tourism revenues increase by 32.339 units. Additionally, a one-unit decrease in administrative corruption leads to a 14.815-unit increase in tourism revenues. Therefore, strengthening the rule of law and implementing good institutional governance increases the

role of the judiciary in tackling various issues (such as bribery, fraud, embezzlement, mediation, favoritism, and administrative laxity) in economic sectors, especially in the financial and banking sectors, which enhances the image of dealing with financial institutions and attracts tourists, thus boosting tourism revenues.

- Lastly, the regression equation results support the third sub-hypothesis, which states that the availability of a suitable tax policy leads to an increase in tourism revenues in Arab countries. The adoption of moderate tax policies aimed at reducing the tax burden on the private sector by offering tax exemptions and incentives for small and medium-sized enterprises helps encourage their contribution to the GDP and job creation. This, in turn, positively impacts investment, including in the tourism sector, leading to an increase in tourism revenues.

5. Conclusion :

The analytical and econometric investigation into the role of financial development in enhancing tourism revenues amid digital transformation and governance frameworks based on a sample of Arab countries during the period (2016-2024), led to the formulation of an accurate scientific perspective on this correlation, These findings coincide with the increasing global momentum, in both developed and developing countries, to innovate leading strategies aimed at sustaining tourism growth. The main results of the study can be summarized in the following points:

- Arab countries enjoy acceptable levels of financial development, enabling them to grow the tourism sector and, consequently, increase tourism revenues.

- The enhancement of institutional governance in Arab countries contributes to improving tourism revenues, as the efficiency of regulatory and judicial bodies in these countries, along with granting them sufficient powers to develop strategic plans that include transparency and accountability standards, leads to the development of various sectors, including the tourism sector.

- The expansion of information and communication technology in the financial infrastructure significantly supports the enhancement of tourism revenue levels in Arab countries.

- The encouragement of reasonable tax revenues within the tax policies of Arab countries aims to attract foreign investors to invest in these countries across all sectors, including the tourism sector.

Based on the results extracted from this study and presented above, the following recommendations can be made:

- The Bank of Algeria should work on enhancing strategies and mechanisms aimed at keeping up with developments in the use of digital financial technologies, allowing foreign clients (tourists) to withdraw their money at any time.

- The private sector, particularly in private investments in the tourism sector, should be given more opportunities to improve the quality of tourism facilities.

- The government should prepare the technological infrastructure for communications to provide a suitable environment for the requirements of digital transformation, by increasing allocations for information and communication technology spending, so that all sectors, including tourism, can benefit from the advantages of digital transformation, especially in light of the fierce competition between countries to attract a significant number of incoming tourists.

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16. 6.Appendices:

Appendix 1: Estimation of the Three Panel Data Models

Pooled Model

```
reg y x1 x2 x3 x4 x5
```

```
      Source |       SS           df       MS      Number of obs   =        81
-------------+----------------------------------   F(5, 75)        =     26.44
       Model |  6061.68654         5  1212.33731   Prob > F        =    0.0000
    Residual |  3439.06967        75  45.8542623   R-squared       =    0.6380
-------------+----------------------------------   Adj R-squared   =    0.6139
       Total |  9500.75621        80  118.759453   Root MSE        =    6.7716

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   .1183984   .0407826     2.90   0.005     .0371552    .1996416
          x2 |   .1710469   .0331877     5.15   0.000     .1049335    .2371603
          x3 |   .5633686   .0792051    -7.11   0.000    -.7211533   -.4055839
          x4 |   32.33999    4.50741     7.17   0.000     23.36077    41.31921
          x5 |    -14.815   3.308533    -4.48   0.000    -21.40593   -8.224063
       _cons |   36.41555   6.126327     5.94   0.000     24.21128    48.61982
------------------------------------------------------------------------------
```

Fixed Effects Model

```
. xtreg y x1 x2 x3 x4 x5 , fe

Fixed-effects (within) regression               Number of obs      =        81
Group variable: ind                             Number of groups   =         9

R-sq:                                           Obs per group:
     within  = 0.0617                                         min =         9
     between = 0.0663                                         avg =       9.0
     overall = 0.0406                                         max =         9

                                                F(5,67)            =      0.88
corr(u_i, Xb)  = -0.6032                        Prob > F           =    0.4983

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   .0626872   .0634933     0.99   0.327     -.064046    .1894204
          x2 |  -.0456689   .0550938    -0.83   0.410    -.1556365    .0642988
          x3 |  -.0230828   .1017924    -0.23   0.821    -.2262613    .1800957
          x4 |   -8.32717   6.943659    -1.20   0.235    -22.18677    5.532432
          x5 |   11.51591   6.889645     1.67   0.099    -2.235882     25.2677
       _cons |    13.6023   6.338789     2.15   0.036     .9500191    26.25457
-------------+----------------------------------------------------------------
     sigma_u |  12.756671
     sigma_e |  4.9808004
         rho |  .86771763   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(8, 67) = 8.95                     Prob > F = 0.0000

. areg y x1 x2 x3 x4 x5 , absorb ( Country )

Linear regression, absorbing indicators         Number of obs      =        81
                                                F(   5,     67)    =      0.88
                                                Prob > F           =    0.4983
                                                R-squared          =    0.8250
                                                Adj R-squared      =    0.7911
                                                Root MSE           =    4.9808

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   .0626872   .0634933     0.99   0.327     -.064046    .1894204
          x2 |  -.0456689   .0550938    -0.83   0.410    -.1556365    .0642988
          x3 |  -.0230828   .1017924    -0.23   0.821    -.2262613    .1800957
          x4 |   -8.32717   6.943659    -1.20   0.235    -22.18677    5.532432
          x5 |   11.51591   6.889645     1.67   0.099    -2.235882     25.2677
       _cons |    13.6023   6.338789     2.15   0.036     .9500191    26.25457
-------------+----------------------------------------------------------------
     Country |          F(8, 67) =      8.953   0.000           (9 categories)
```

Appendix 2: Selection Results Between the Random Effects Model and the Pooled Model

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        y[ind,t] = Xb + u[ind] + e[ind,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                 --------+------------------------------
                       y |   118.7595       10.89768
                       e |   24.80837         4.9808
                       u |   7.541309       2.746144

        Test:   Var(u) = 0
                                 chibar2(01) =     4.08
                              Prob > chibar2 =   0.0216
```

```
. xtreg y x1 x2 x3 x4 x5 , re

Random-effects GLS regression                   Number of obs     =         81
Group variable: ind                             Number of groups  =          9

R-sq:                                           Obs per group:
     within  = 0.0001                                         min =          9
     between = 0.8824                                         avg =        9.0
     overall = 0.6248                                         max =          9

                                                Wald chi2(5)      =      33.10
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0000

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   .1075201   .0498526     2.16   0.031      .0098107    .2052294
          x2 |   .1428699   .0408751     3.50   0.000      .0627561    .2229836
          x3 |  -.4015569   .0877529    -4.58   0.000     -.5735495   -.2295644
          x4 |   19.11248   5.441687     3.51   0.000      8.446975     29.778
          x5 |  -7.800956   4.445398    -1.75   0.079     -16.51378    .9118639
       _cons |   27.44279   6.421071     4.27   0.000      14.85772    40.02786
-------------+----------------------------------------------------------------
     sigma_u |  2.7461445
     sigma_e |  4.9808004
         rho |   .2331185   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Appendix 3: Selection Results Between the Random Effects Model and the Fixed Effects Model

```
hausman fe re

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |       fe           re         Difference          S.E.
-------------+----------------------------------------------------------------
          x1 |    .0626872     .1075201       -.0448329        .0393207
          x2 |   -.0456689     .1428699       -.1885387        .0369398
          x3 |   -.0230828    -.4015569        .3784741         .051586
          x4 |    -8.32717     19.11248       -27.43965        4.313056
          x5 |    11.51591    -7.800956        19.31686        5.263615
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       31.61
                Prob>chi2 =      0.0000
                (V_b-V_B is not positive definite)

. hausman fe re, sigmamore

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |       fe           re         Difference          S.E.
-------------+----------------------------------------------------------------
          x1 |    .0626872     .1075201       -.0448329        .0573382
          x2 |   -.0456689     .1428699       -.1885387        .0517281
          x3 |   -.0230828    -.4015569        .3784741        .0844827
          x4 |    -8.32717     19.11248       -27.43965        6.279404
          x5 |    11.51591    -7.800956        19.31686        6.943437
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       26.12
                Prob>chi2 =      0.0001
```