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The Competitiveness of Jordanian Tourism Activity in Enhancement Economic Growth

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Abstract: Competitiveness studies are regarded as one of the most essential at the worldwide level, particularly in the tourist sector, which is relying on to boost economic growth and living standards. The purpose of this study was to examine the competitive features of the Jordanian tourist industry, as well as the long-term equilibrium relationships between the factors of tourism activity and economic growth, using the Autoregressive distributed lag model (ARDL) over the period 1990-2021. The study looked at the favorable benefits of tourism on employment, poverty reduction, and the Jordanian economy's balance of payments. Using the koyck model, the study discovered a decline in the influence of the number of tourists on Jordanian tourism income. It also determined that there is a long-term and bidirectional equilibrium link between tourism activity and economic growth, as the coefficient of the speed of adjustment for short-term deviations from its long-term route was 37%. It suggested strengthening the sector's competitiveness by attracting more visitors and raising the number of tourism investments in Jordan.

Keywords: Competitiveness, Autoregressive distributed lag model (ARDL), koyck model, Tourism activity, Economic growth.

1 Introduction

The international tourism industry is widely regarded as one of the most important industries in terms of boosting economic growth, luring investments, and creating job openings throughout the world. The tourist industry's contribution to the global GDP reached 10.3% in 2019, and throughout the course of the period (2014-2019), the tourism industry was responsible for the creation of one out of every four new employments around the world [1].

Countries compete with one another to entice the greatest number of tourists from a variety of nations all over the world. This is done with the goal of having a significant influence on the state of the macroeconomy and the economy as a whole, in addition to the mutually beneficial impact that tourism has on the development of other economic sectors [2-5]. Other areas of the economy, including as industry, commerce, finance, insurance, and logistical services, also benefit from the expansion that is stimulated by tourism activities [2]. Because of this, the forward and backward links between different economic sectors get stronger as a direct result of the economies of scope and vertical integration [6,7]. Through increased investments in tourist facilities, travel and tourism agencies, and support activities, the tourism sector of the Jordanian economy helps to strengthen the country's balance of payments, contributes to the provision of hard currencies for the Jordanian treasury, and creates job opportunities. There are approximately 55,000 occupations directly related to tourist, and an additional 125,000 jobs indirectly related to tourism [8].

The effects of crises and external shocks related to epidemics and natural disasters have had an impact on the tourism sector, as they have had an impact on other sectors as well. For example, both the Jordanian economy in general and the tourism sector were affected by the Corona pandemic (Covid 19) over the course of the two years 2020-2021[9]. This led to a reduction in the number of jobs available in the tourism industry, as well as a reduction in the sector's contribution to real GDP, which went from 14% in 2019 to 8% in 2020. The decline in tourism activity coincided with a reduction in the number of tourists who came to Jordan. As a result of this, the sector's revenues declined, investment and activities related to the sector also decreased, and the sector's revenues. In addition, the contribution of tourist revenue to the real

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GDP fell from 31.6% in 2019 to 8% in 2020, reflecting a general downward trend in that direction. As a result of a decline in tourism-related income and sales taxes, as well as taxes collected from airports and departures, as well as admission fees to tourist attractions, this was accompanied by a dip in Jordan's rating among the global tourist industry competitiveness indicators for 130 nations, which went from 77 in 2016 to 60 in 2020. The ranking had previously been at 77 in 2016.

Strategies have been devised to meet the issues that are facing tourism based on the growth of the tourist industry [10-13]. These strategies were designed so that the tourism sector may continue to play the critical role it now plays in the Jordanian economy. Attracting tourists from across the world, retraining Jordanian workers who have left the industry, and establishing a multi-risk travel insurance policy for visitors arriving on Jordan's national airlines are some of the goals of the tourism industry in Jordan. On the other hand, the preparation of a unified paper and electronic tourism guide, the promotion of innovation and digital transformation, the stimulation of sustainable tourism development practices, in addition to attracting foreign direct investment in the tourism sector, providing incentives and tax exemptions, and benefiting from programs developed by the World Health Organization and the European Bank for Development and Reconstruction are all things that should be done. There will be a total investment of 93.6 million Jordanian dinars [8] made by the government in the tourist industry through September of 2020.

Following the slow but steady recovery from the Covid-19 crisis, tourist promotion techniques were implemented, and these initiatives have had a favorable impact on the overall tourism industry. The Travel and Tourism Sector Competitiveness Index for 2022 that was produced by the World Economic Forum moved Jordan's ranking up from 83rd in 2019 to 64th in 2021 out of 117 nations. In 2019, Jordan's position on the index was 83rd.

Because the ARDL method is used in the analysis of the impact that the tourism sector has on the competitiveness of the Jordanian economy, the importance of the study increases due to the small number of studies dealing with the tourism sector using econometrics in Jordan. This is one of the reasons why the study is so important. The importance of Jordan's tourist industry to the country's overall economic expansion was the primary subject of this study.

The purpose of the study is to demonstrate the influence that the tourism industry has on economic growth and to demonstrate the role that the tourism industry plays in improving the competitiveness of the economy. This will be accomplished by analyzing the effect of the number of tourists on tourism income utilizing the Kwik model, investigating the long-term relationship of tourism activity utilizing the ARDL model, and determining the type of causal relationship between tourism activity and economic growth utilizing Granger causality.

Jordan is counting on an improvement in the competitiveness of the tourism sector [14, 15]in order to achieve sustainable development after the phase of recovery from the Covid-19 crisis, whose repercussions have affected all sectors, including the tourism sector [2, 16]. Jordan is counting on this improvement in order to achieve sustainable development after the phase of recovery from the crisis. This study focuses on the role that tourism plays in increasing the competitiveness of the Jordanian economy by analyzing the influence that tourist income has on real gross domestic product for the period of time spanning 1990-2021. Despite the abundance and variety of literature linked to this topic, there are relatively few studies in Jordan that deal with the influence of tourism activities on the macroeconomic, particularly those that use the Koyck model and the ARDL approach [2].

This study is exhaustive in terms of studying the impact on employment, balance of payments, investment, and real output to improve the level of competitiveness of the Jordanian economy. In addition, it tests the type of causal relationship according to Granger's method between tourism variables and economic growth of the Jordanian economy for the period that was mentioned. This study was carried out in Jordan.

The paper is organized as follows: the first section is an introduction; the second section focuses on the literature review; the third section exposes the impact tourism can have on certain fields of competitiveness; the fourth section presents the data and methodology; the fifth section explains the results; and the final section displays a conclusion and some suggestions.

2 Literature Review

There have been a number of studies that have focused on investigating the economic and non-economic variables that have an effect on tourism demand by using panel data. For example, [2,17] discussed the relationship between macroeconomic factors and tourism demand for nine selected ASEAN countries based on the analysis of the panel data. These studies highlighted the positive impact that the income of Southeast Asian countries has on their ability to attract tourists. They came to the conclusion that free trade increases demand, but the appreciation of Asean currencies makes it less appealing for visitors to travel there. [18] revealed the economic and non-economic factors that determinants demand tourism for five Asean Countries. International tourism arrival is included as a dependent variable, and independent variables include: GDP per capital, Inflation, Tourism industry expenditures, exchange rate, and others. International tourism arrival is included as a dependent variable. In this article, a Panel data model with a Fixed effect and a Random effect was used to explore the factors that determine the amount of foreign tourist that comes to each of the five Asean countries. [19] used the panel data approach to conduct an analysis of the factors impacting the demand for tourism in Turkey. The analysis included a comparison of ordinary least squares, fixed effects models, and random effects. They came to the

conclusion that the most important determinant in the demand for tourism was the state of development in the countries whose citizens traveled to Turkey as tourists. They found that some aspects of the country, such as language and geographical proximity, directly affect the flow of visitors, while other aspects, such as exchange rate differences and distance, reduce tourist attraction. [20] analyzed the factors that determine the number of international tourists who visit Colombia and found that language and geographical proximity are two of those factors.

[21] investigated the demand for tourism in Malaysia by looking at a variety of economic aspects. Using the gravity model as an example. According to the linear logarithmic equation, the demand for tourism is related to the total national income (GNI) and is negatively related to the exchange rate, while the consumer price index (CPI) or the inflation rate reduces the number of tourists who travel to Malaysia, and the length of distance reduces the demand for tourism. Additionally, the number of tourists who travel to Malaysia is reduced by the length of distance. [22] studied the factors that drive tourism demand, with a primary emphasis on the determinants of tourist expenditure, also known as visitor spending. Visitors' role. [23-25] shown that there are inelastic links between national income and tourist spending, which means that as national income grows, tourism expenditure also grows, but at a slower rate. [26] proposed to develop tourism in Azerbaijan by increasing the number of tourists visiting the country, the absence of seasonality in tourist areas, and the increase in the number of days of tourism; The importance of reducing high inflation and reducing the impact of fluctuations resulting from economic crises in neighboring countries.

[27] studied how the Number of Beds affects the Revenues from Tourism and found some interesting results. According to the findings, the size of the tourist units, which was determined by the ratio of beds to tourism units, has a significant and direct influence on the expansion of the economy; however, the number of beds is not a particularly relevant factor in determining the amount of revenue generated by tourism. The authors of study [28] used the vector autoregression (VAR) model, the error correction model (ECM), and the Granger causality test to analyze the link between the number of tourists visiting China and the country's real GDP throughout the period of time (1994-2015). The findings indicated that there is a significant positive correlation in the long run between the number of tourists and real GDP in Beijing, China. Additionally, the results of the error correction model (ECM) demonstrated that there is a connection between tourism and economic expansion in the short term. In addition, the findings of the VAR test revealed that the expansion of the tourist industry had an impact on the real GDP. Studies that employed the ARDL model, [29] used the autoregressive distributed lag model (ARDL) to assess cointegration, long-term linkages, and an error correction model of tourism demand from visitors coming in Turkey from Europe and the United States. According to the findings, the factors that are most influential in determining the total number of tourists that arrive are the real per capita income and the real effective exchange. The pricing and financial crises were shown to have very modest effects, according to the research.

[16] utilized an autoregressive distributed lag (ARDL) model to highlight the impact that income, relative pricing competition, and substitutes prices play in the demand for tourism in Indonesia. They discovered that Malaysia, Singapore, Australia, Japan, and India all had high income elasticity, which indicates that travel is a luxury item in those countries.

Literature related to Impact tourism on economic growth

[30] used time-series data for various macro factors to investigate the hypothesis of tourism-led development in Sao Tome and Principe (STP). It was determined that there is a one-way link between TR and GDP, as well as between FDI and all other variables (GDP, TR, ER).

[31] used an autoregressive distributed lag (ARDL) model to argue about tourism and its influence on economic development in Pakistan. The findings revealed that international tourist earnings and tourism expenditures on passenger transportation aspects have a beneficial influence on economic development, and that there are long-term correlations between variables. [32] used Panel co-integration and the PVAR approach to examine the association between tourism and economic development in five southern European nations. Real GDP, labor force, gross fixed capital creation, and tourism were discovered to have a long-term association. There is also a bidirectional causal link between tourism, labor force, and economic growth. [33] established the link between revenue and economic development. The findings revealed a bidirectional causal association between tourist revenues and economic development in Jilin, Anhui, and Hubei, but the findings indicated a neutrality causality compatible with just one of Heilongjiang's provinces. For the provinces of Shanxi, Jiangxi, and Henan, there is a negative connection consistent with the conservation hypothesis. [34] used panel ARDL cointegration analysis to investigate the link between tourist flows and economic development in five BRICS (Brazil, Russia, India, China, and South Africa) nations from 1995 to 2015. According to the panel ARDL cointegration test, researchers discovered a long-term association between tourist growth and economic development. The findings also suggested a bi-directional relationship between inbound tourism and economic growth according to the Granger causality test. This finding supports the validity of the feedback hypothesis in the BRICS nations.

[35] investigated the relationship between tourism and growth in Nigeria through time (1995-2018). By using visitor arrivals, the findings validate the tourism-led growth hypothesis, however the neutrality hypothesis is not refuted if there is no causal link for total growth and for both tourism earnings and expenditures.

[36] used a vector autoregressive model and Granger Causality to investigate the relationship between tourism and

economic development in Saudi Arabia from 1990 to 2018. The Granger causality test demonstrates that there is a bidirectional link between tourism and economic development in Saudi Arabia. According to the research, commercial openness has a detrimental influence on tourism. Fuinhas et al. (2020) discussed the significance of tourism in generating economic development in Latin American and Caribbean nations. Tourism's influence on economic development was examined using the autoregressive distributed lag (ARDL) model. According to the findings of 22 nations, tourism capital investment per capita and the number of incoming visitors (number of people) are the primary engines of economic development in the short and long term. [37-40] shown that economic expansion may benefit the nation.

[41] Investigated the elasticity of demand for incoming tourism in Middle Eastern and North African nations, demonstrating the effect of internal and external conflicts, global GDP, and comparable pricing. The approaches of fully modified OLS (FM-OLS), Dynamic-OLS (DOLS), and the newly established method of instantaneous quantitative regression were employed in the investigation (MMQR). The findings revealed that the effect of external and internal conflicts on incoming tourist demand is negative and inelastic, with external conflict having a higher influence. Furthermore, global GDP has a positive and elastic impact in tourist demand, demonstrating that tourism is a luxury product. The rise in relative pricing, on the other hand, diminishes demand for incoming tourists.

[42] examined the influence of tourist development on Jammu and Kashmir's economic growth, highlighting the implications of tourism on employment, infrastructural development, and regional development. The research stated that an emphasis on hospitality management, cultural heritage, and infrastructural development is required. This will result in more employment possibilities, more investment, and a reduction in poverty in the state. [43] Using the Distributed Autoregressive Model (ARDL), explained the contribution of tourism to economic development in Qatar, evaluating the tourist-led growth (TLGH) hypothesis on the Qatari economy. The research revealed that, although tourism had no statistically significant influence on economic growth in the near term, it does have a statistically significant impact in the long run. The report advocated for continued investment in the tourist industry to encourage economic development, diversify revenue sources, and minimize reliance on energy. [44] used Autoregressive distributed lag (ARDL) limits to investigate the association between tourism and economic development in Thailand. The research found that tourism and growth have a long-term co-integration connection, although the beneficial effect of tourism in the near term is smaller than in the long run. Furthermore, no substantial positive association exists between foreign direct investment and economic development. [45] used the Distributed Auto Regression (ARDL) approach to investigate the influence of tourism on Pakistan's economic growth rate. According to the report, tourism has a crucial influence in economic development. In Pakistan, however, the inflation rate has a detrimental impact on economic development. [46] investigated the link between tourism and economic development in Hong Kong. They determined that in Hong Kong, both the tourist-led economy growth hypothesis (TLGH) and the economic-driven tourism growth hypothesis (EDTGH) are unstable. [47] The link between tourism and economic development in Italy was examined. This article examines the influence of international visitor expenditure on per capita value added growth in Italian regions. The findings revealed a positive and statistically significant effect, although it was minor in economic terms, with the least developed governorates bearing the biggest burden. [47] used an Autoregressive Distributed Lag (ARDL) technique to investigate the influence of tourism on Nepal's economic development; the findings found that tourism had no meaningful impact on Nepal's economic growth in the short and long run. Despite this, the amount of commerce has a significant long-run impact on economic growth. The research ended by rejecting the tourism-driven growth hypothesis in Nepal.

Advantages of the competitiveness of the Jordanian tourism sector:

Jordan possesses numerous characteristics and advantages that qualify it for an advanced competitive position in the regional and global markets [48-50], some of which are related to the abundance of natural potential, such as the moderate climate, the privileged geographical position in the Middle East, and the abundance of natural minerals such as phosphate and potash. Others are associated with notable historical and archaeological locations, such as Petra, Wadi Rum, Qasr al-Hallabat, Umm Qais, the pillars of Jerash, Ajloun Castle, and others.

Jordan features several religious and cultural sites, including the Jordan Valley, the Dead Sea, Mount Nebo, the Baptist Church, and the Roman Amphitheater. There are also museums, swimming pools, places of leisure and relaxation, and reserves like as the Dana and Azraq Reserve, among others, which are a source of appeal for visitors visiting Jordan from all over the globe.

Impact of tourism on employment:

According to research conducted and published by the World Tourism Organization (UNWTO), the tourism industry accounts for 330 million employments on a worldwide scale, which is comparable to one tenth of all occupations in the world. The number of people employed in the tourist industry in Jordan has climbed from 8.3 thousand employees in 1990 to 52 thousand workers in 2021, which means that tourism has helped to alleviate the issue of unemployment on the Jordanian labor market. Employees from Jordan make up the biggest portion of the total volume of employment in the tourist industry, with a ratio that topped 80%, whilst the percentage of workers from other countries was, on average, 16%. The majority of available jobs go to men, who make up an average of 90 percent of the workforce, while the

number of women who work in the tourist industry is still relatively low [1].

According to statistics that were provided by the Jordanian Ministry of Tourism and Antiquities, tourist restaurants and the hotel sector are responsible for the employment of more than 75 percent of the employees in the tourism industry. The amount of linkage that exists between the tourism industry and other industries determines the number of indirect job opportunities. The tourism industry in Jordan is responsible for providing approximately 0.6 jobs indirectly for every single job opportunity, which is equivalent to six indirect opportunities for every ten direct job opportunities. These numbers are in line with the worldwide ratios, which show that the total direct and indirect employment possibilities produced by the sector comprise around 10% of the overall workforce in the economy [51]. These percentages are compatible with the global ratios since they show that

Impact of tourism on supporting the of balance of payments:

The tourism sector contributed to supplying Jordan's foreign The contribution of the tourism sector to total exports reached an average of 43.5% of total exports, which is significantly higher than the contribution of the industry sector, which was approximately 18% of total exports for the period 1990-2020. This meant that the tourism sector was able to help Jordan maintain its positive foreign currency balance. The tourism balance, which can be found within the balance of services items, illustrates the contribution that tourism makes to the overall balance of payments by expressing the difference between tourist revenues and payments. In this sense, Jordan depends on the comparative advantage given by the tourist industry to increase hard currency reserves and strengthen the sector's competitiveness locally and worldwide in comparison to other economic sectors [52].

Impact of tourism on reducing poverty

The tourist industry has three benefits that help reduce poverty, particularly in nations that are considered to be in the third world: Direct Impact The labor-intensive tourist industry employs a large number of individuals with low or intermediate levels of education or training. The dependency of the tourist industry on inputs from other economic sectors such as food production, building, and transportation is an example of the indirect influence that may be seen. The third effect is the dynamic impact, which emphasizes the positive benefits of tourist activities via improvements to infrastructure, increasing engagement of women in the labor market, and the recovery of the handcraft sector. People living in poverty in many different nations, such as Namibia and Laos, are dependent on tourism as a source of income via the supply chain. On the other hand, the high cost of living and high prices that are experienced by residents of the host nation are two of the negative consequences that are caused by tourist activities. Numerous studies have investigated the role that tourism plays in reducing levels of poverty. [53] This refers to how the growth of the tourist industry in sub-Saharan Africa helps to bring down levels of poverty. [54] Using the ARDL model, investigate whether or not there is a correlation between international tourism in Mexico and the level of poverty, and investigate whether or not there is a unidirectional, long-term relationship between international tourism and the alleviation of poverty, as suggested by the Yamamoto causality test. It was found in [55] that tourism has an influence on reducing poverty. According to the findings, tourism does, in fact, contribute to a reduction in the number of people living in poverty.

Impact of tourism on supporting economic diversification

Many nations, particularly developing countries and countries where the national income is centered on a single resource, have benefited from the activity of tourism since it has contributed to the diversification of their sources of revenue. The tourism industry is often regarded as the sector that contributes the most rapidly to an increase in the pace of economic expansion. Additionally, the tourism industry is one of the most significant foundations of an economy that is based on services that produce money. It is anticipated that service activities that support tourism would be established, such as restaurants, tourist firms, banks, insurance companies, and other types of businesses [56].

3 Methodologies

The study used a time series approach for the period 1990 - 2021, where data for the Jordanian tourism sector was obtained from a variety of sources, including: The Central Bank of Jordan, the Ministry of Tourism and Antiquities, the Department of Statistics, the World Council for Tourism and Travel (WCTT), and the Economic and Social Council / Jordan.

The study is used two main Methods:

1.Koyck geometrical distributed lag model:

The study is based on the hypothesis of a positive effect of the number of inbound tourists coming to Jordan on tourism income in Jordan for the years 1990-2021.

The Koyck model is used for distributed lags, assuming that the coefficients of the lag variable are decreasing as a geometric progression according to the following law:

$$Yt= a+ B\ Xt +B\boldsymbol{\delta Xt-1} + B\boldsymbol{\delta^2}Xt\text{-}2+ B\boldsymbol{\delta^3 Xt-1} + \boldsymbol{Ut}$$

$\boldsymbol{\delta}$: The rate Decreasing of distributed lags.

(1- $\boldsymbol{\delta}$) : Adjustment speed

$$Yt = a* +B\ NT + Vt$$

$$a* = a\ (1 - \boldsymbol{\delta}\ )$$

Koyck model assumes that the weights of explanatory

variables lagged in time are falling with geometric progression according to the law as follows:

Bj = B0 $\boldsymbol{\delta^i}$

$0 < \boldsymbol{\delta} < 1$

Yt= B0 +B1 Yt-1 +B2 NT+ Ut.

Yt : Tourism Jordanian Income .

Yt-1: Tourism Income for one lag.

NT: Number of inbound tourists.

2.Autoregressive distributed lag model: (ARDL)

The study analyzed the autoregressive distributed lag (ARDL) to reveal a long-term relationship between tourism activity and real GDP, With the fulfillment of the condition that the studied variables are not stable at the second degree. The boundary test is used to detect a cointegration, estimate long-run Coefficients. In addition to estimating the error correction model, which includes short-term coefficients and the adjustment speed factor. The appropriate lag periods for the model are determined based on Akaike Information Criterian (AIC).

Autoregressive distributed lag model (ARDL) appearing as follows:

$$Yt= \boldsymbol{\alpha + \sum_{i=1}^{p} \gamma\, yt-1 + \sum_{j=1}^{k} \sum_{i=0}^{q} BijXj, t-1 + \varepsilon t}$$

The equation for testing cointegration as follows:

$$\boldsymbol{\Delta Yt = \alpha + \sum_{i=1}^{p-1} \gamma i\ \Delta Yti + \sum_{j=1}^{k} \sum_{i=0}^{q-1} Bij\, \Delta Xj, t-i + PYt-1 + \sum_{j=1}^{k} \delta Xj, t-1 + \varepsilon t}$$

Hypothesis test: Ho: $\boldsymbol{\rho = \delta j = 0}$

Ha: $\boldsymbol{\rho \neq \delta j \neq 0}$

Diagnostic tests will be used as follows:

Breusch-Godfrey Serial Correlation LM Test.

Heteroskedasticity Test: Breusch-Pagan-Godfrey.

Cusum test and Cusumsq test.

4 Discuss Results

Koyck geometrical distributed lag model:

Yt = a∗ +B NT+ δ Yt-1+ Vt

a∗ = a (1 - δ)

Yt= B0 +B1 Yt-1 +B2 NT+ Ut.

Yt = -379.3 + 0.0005 NT + 0.3577 Yt-1

T (- 2.9) (8.3) (4.6)

P-value (0.007) (0.000) (0.0001)

R^2 = 0.92 , F-test= 161.5, P-value= 0.000

D.W= 1.29

LONG -RUN IMPACT:

LR = $\frac{a*}{(1-\delta)}$ = -379.3

The Long -term impact revealed that an increase 10% in number of tourists leads to decrease in tourism Jordanian income of 37.9% over the long- term. We can conclude that the inverse relationship between the number of tourists inbound to Jordan and tourism income was due to the fact contribution of inbound tourists related to spending in Jordan is small. in addition to the fact that many tourists coming to Jordan are from low-income countries. In this regard, tourists inbound by large numbers to Jordan after epidemic covid 19, but their contribution to tourism income is few. However, some of them stay for a short period of time, which confirms the decrease in tourism income despite the increase in arrivals. This result contradicts the research hypothesis, which indicates a positive direct relationship between the number of inbound tourists to Jordan and tourism income.

SHORT -RUN IMPACT

The results showed that the impact of the number of tourists coming to Jordan on tourism income in the short term is poor. An increase in the number of tourists by 0.10 leads to an increase in tourism income by (0.00005), which is a very low percentage. It is inferred from this that there is a weak relationship between the number of tourists and tourism income in the short term.

Some indicators of short-term impact

1.The median lag: It represents the time required to (50%) half the change of the dependent variable represented in the tourism income resulting from the change of the independent variable (number of tourists) by one unit. The smaller value (δ) means the greater the speed of the Adjustment.

Median Lag= $\frac{Log\ 2}{Log\delta}$ = 0.84= Equivalent to 0.8 of one month, approximately 25 days.

2. Variance Lag: It expresses the difference between the actual and estimated value for tourism income.

VL= $\frac{\delta}{1-\delta^2} = \frac{0.3577}{1-0.128} = 0.41$, It is 0.41 of one month, and the variance of lag period is 12.3 days.

3. Average Lag: It measures the speed of Adjustment to the change in the number of tourists, which is equal to 0.56 of one month, or about 16.7 days.

AL= $\frac{\delta}{1-\delta}$= 0.56

4. Constant (Intercept) $a* = \frac{\alpha}{(1-\partial)} = \frac{-379.3}{1-0.3577}$ = - 590.5

5. Weights of lag variables: we can calculate weights of lag variables as follows:

Wi = $(1-\partial)^i$, W1= 0.64, W2=0.41

The number of Tourists contributes 105% to tourism income change through two years.

The Koyck model was estimated as follows:

Yt = - 590.5 + 0.0005 NT+0.6423Yt-1+0.4125 Yt-2 + Vt.

Autoregressive distributed lag model: (ARDL)

Time series Stability test: (Unit Root test) and Co-Integration test:

The study used the Dickey-Fueler tests and the Philips Berron test to investigate the stability of the data studied in the time series from (1990-2021). The results of the two tests showed that the calculated values of Mackinnon (1996) calculated for the study variables suffer from the problem of a unit root, that the data stabilized at the first difference, except for tourism income, which stabilized at the level. The study uses the (ARDL) methodology, as it does not require the stability of the data at the same degree, and it did not stabilize at the second difference.

To determine the degrees of Lags (model rank) the study used (AIC) indicator. The lowest value for this test is (4,0,0,0). The long-run Equilibrium relationships are obtained after the cointegration test using the bound tests, which computed F-statistic value and compared with the critical F-statistic value developed by (Pesaran et al 2001). The study is applied Bound tests according to Table (2), the calculated F value is greater than the upper bound value of the critical F value, hence the null hypothesis which states that there is no co-integration is rejected, meaning that there is a long-term equilibrium relationship between the variables. The study is investigated that there is a logical co-integration relationship, based on t bound test. The finding revealed that calculated t value is greater than the upper bound of the critical t value, meaning that there is a usual logical co-integration relationship.

Table (1) stationary test according to Dickey-Fueler Test and Philips Berron (P-P) Test.

Dickey-Fueler tests (ADF) Test		Philips Berron (P-P) Test	
Variable	Stability Rank	Variable	Stability Rank
RGDP	I(1)	RGDP	I(1)
Yt	I(0)	Yt	I(1)
Nb	I(1)	Nb	I(1)
Capital	I(1)	Capital	I(1)

Source: Author's own calculation in E-Views 12.

Table (2) Boundary Tests – Co-Integration Test using (ARDL –Bound test).

F-Statistics	Probability	Result
10.57	0.0000	There is cointegration
K=3	F-Statistics	Critical value
Significant level	I(0) Lower value	I(1) Upper value
10%	3.47	4.45
5%	4.01	5.07
2.5%	4.52	5.62
1%	5.17	6.36
T-Statistics	Probability	Result
- 6.99	0.0000	There is a Logic cointegration
Significant level	I(0) Lower value	I(1) Upper value
10%	-3.13	-3.84
5%	-3.41	-4.16
2.5%	-3.65	-4.42
1%	-3.96	-4.73

Source: Calculation of the researchers using E-views 12 software.

Table (3) Results of estimating the model Parameters in the long term for the (ARDL).

Variable	coefficient	S.E	T-Statistic	Probability
Yt (Tourism Income)	0.2626	0.07	3.74	0.001
Nb (Bet Number)	0.0167	0.007	2.11	0.047
Capital	0.0145	0.006	2.22	0.038
C	650.2	125.36	5.186	0.000
trend	77.29	17.458	4.427	0.000
R^2	0.79	F-Statistics	17.05	0.000
D.W	1.91			

Source: Calculation of the researchers using E-views 12 software.

Table (4) Error Correction Model and short run Coefficients .

Variables	Coefficient	Standard error	t-statistics	Prob
C	650.2	89.29	7.28	0.000
Trend	77.29	11.54	6.69	0.000
D (RGDP (-1))	0.364	0.12	3.02	0.006
D (RGDP (-2))	0.431	0.141	3.759	0.006
D (RGDP (-3))	0.549	0.146	3.759	0.0013
ECT	-0.3772	0.0539	-6.99	0.0000

Source: Author's own calculation in E-Views 12.

Error Correction model and Long- term Relations:

There is a positive direct relationship in the long term at a level of significance of 1% between the real GDP and all the independent explanatory variables, which are: tourism income, number of beds, and fixed assets in the tourism sector.

The results of the test showed that the coefficient of speed adjustment in the real GDP equation was significant at the level of 1%, and it appeared with the expected negative sign, which confirms a long-term equilibrium relationship between growth and the explanatory variables. This coefficient indicates that the speed of adjustment of the imbalance state is about 37% during the next periods.

The overall explanatory power of the model was high, through the value of the coefficient of determination and the modified coefficient of determination. The results showed that the value of the Durbin-Watson coefficient is equal 1.91 close to 2, which indicates that the model is free from the problem of autocorrelation. The F-test showed that the model is statistically acceptable at the 1% level of significance.

Diagnostic tests:

1) Breusch – Godfrey LM test: According to Breusch – Godfrey test, we don't reject null-Hypothesis which indicates no serial correlation between random errors. The Probability of F-statistics was 0.57 and chi-square o.41.
2) Heteroskedasticity test: According to Breusch-Pagan- Godfrey test, to examine Heteroskedasticity problem, we don't reject Null-Hypothesis which indicates Homoskedasticity as the the probability of F-statistics test 0.48, and chi-square 0.63.
3) Ramsey Rest test: This test revealed that the model is free from the problem of inappropriateness of the functional shape, as the Probability of T-statistic reached 0.50 and the probability of F-statistics test 0.50.
4) Structural stability test:

A) Cumulative sum of residuals test (Cusum):

B) Cumulative sum of residual squares test (CUSUMSQ)

These two tests demonstrated any structural change in the data over time, Investigating the consistency and stability of long-term parameters with short-term parameters. It is observed that the regression line passes between the two critical region boundary lines, indicating the stability of the model with a significant boundary of 5%. It is inferred from the figure that the estimated coefficients of the ARDL model used are structurally stable, which indicates the stability between the study variables. In addition to emphasizing consistency in the model between error correction results in the short and long periods.

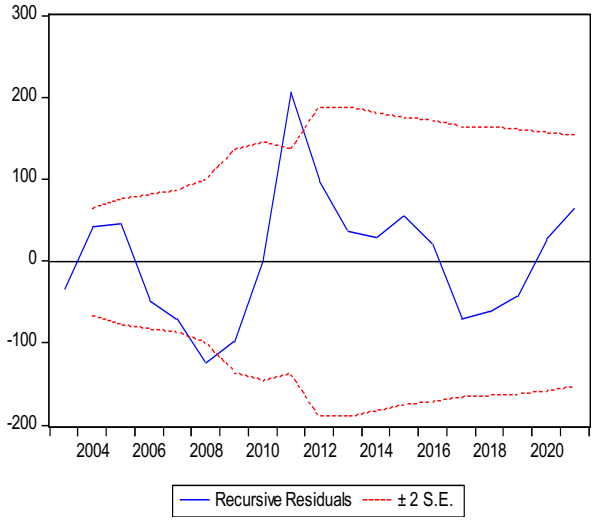

Figure (1): Structural stability test: (Recursive Residuals)

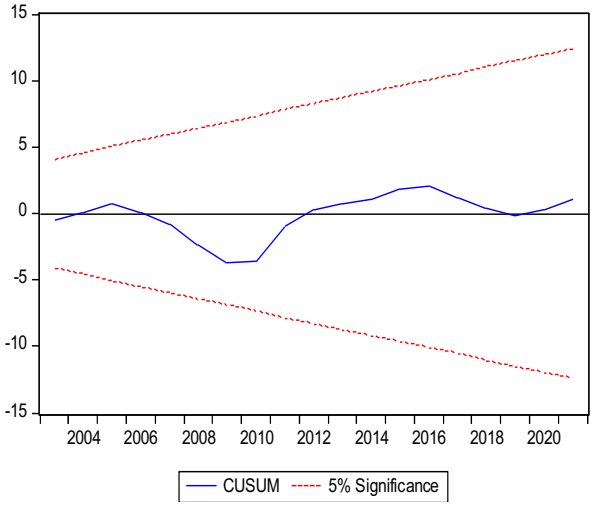

Figure (2) : Structural stability test: Cumulative sum of residuals test (Cusum):

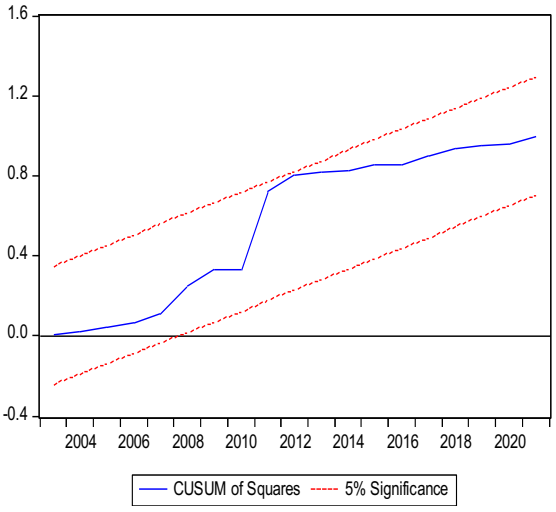

Figure (3): Structural stability test: Cumulative sum of residual squares test (CUSUMSQ)

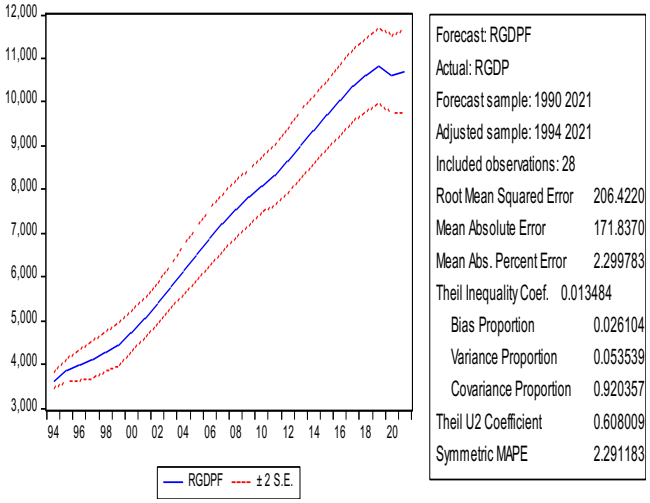

Figure (4): Test the predictive performance of the estimated unconstrained error correction model:

The quality of the Predicted results depends on the strength of the forecast performance of the unconstrained error correction model. One of the most important measures of predictive performance is the unequal coefficient proposed by Theil, which indicates that if the value of Theil coefficient is zero, this indicates the model's significant predictive power. If the parameter value is greater than one, this indicates a decrease in the predictability of the model. The Thiel coefficient according to the data of the study is less than one and close to zero, which means that the model has a high predictability.

Impulse Response Function:

The reaction response function traces the time course of various sudden shocks that may occur to the variables included in the study. It reflects how each variable responds to any sudden shock in any variable in the model over time.

Figure (5) shows the reaction response of the real GDP to a sudden change of one standard deviation in each of: tourism income, number of beds in the Jordanian tourism sector, capital represented by fixed assets in the tourism sector. It is clear from the figure that the impact of tourism income on real GDP is negative, as any sudden change of one standard deviation in tourism income negatively affects real GDP. It is inferred from this that the contribution of tourism income to economic growth is modest, as most of the tourists coming to Jordan are from low-income countries, and their tourism spending in Jordan is small, which means that tourism income is small. On the other hand, we found the effect of the number of beds in hotels and various tourist accommodation establishments positively on the real GDP. As any sudden change in the number of beds of one standard deviation will positively affect the real GDP, but this effect is not direct, but appears after three years. Finally, the impact of fixed assets in the tourism sector, represented by capital, on the real GDP is negative, and it appears after nearly three years, and it continues for a long time.

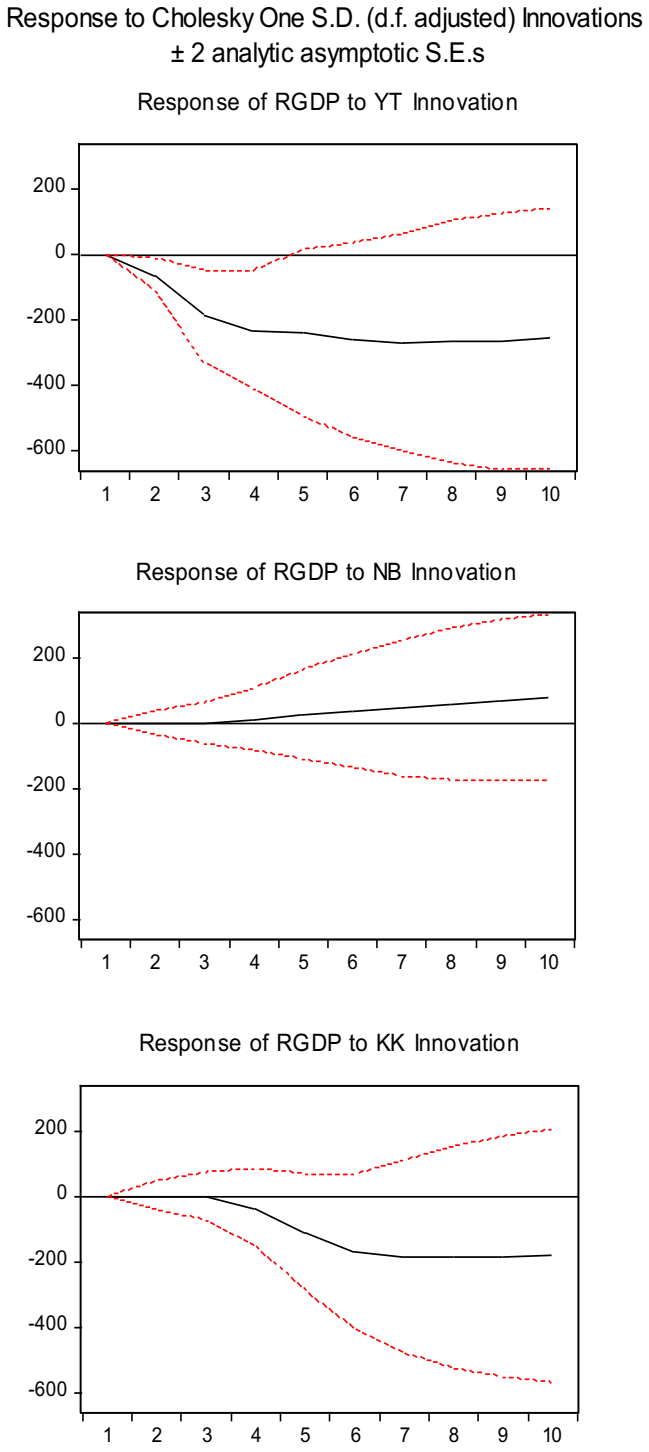

Figure (5) Response of the Real GDP to a sudden change of one standard deviation in each of: tourism income (YT), number of beds in the Jordanian tourism sector (NB), and capital (fixed assets) in the tourism sector (KK)

Table (5) Granger Causality

Pairwise Granger Causality Tests
Date: 05/21/22 Time: 17:33
Sample: 1990 2021
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
YT does not Granger Cause RGDP	30	7.31969	0.0031
RGDP does not Granger Cause YT		4.45074	0.0222
NB does not Granger Cause RGDP	30	0.34453	0.7119
RGDP does not Granger Cause NB		9.28814	0.0010
KK does not Granger Cause RGDP	30	0.11184	0.8946
RGDP does not Granger Cause KK		0.99055	0.3855
NB does not Granger Cause YT	30	0.22661	0.7989
YT does not Granger Cause NB		100.179	1.E-12
KK does not Granger Cause YT	30	5.83615	0.0083
YT does not Granger Cause KK		0.29683	0.7458
KK does not Granger Cause NB	30	0.65014	0.5306
NB does not Granger Cause KK		0.22729	0.7983

Source: Author's own calculation in E-Views 12.

The results of Granger's causality test showed a bidirectional relationship between tourism income and economic growth. This reciprocal relationship is consistent with the economic logic, where the increase in tourism income contributes to the increase in the gross domestic product, and on the other hand, economic growth contributes to the development of the tourism sector. This result corresponds with the opinions of [34] who support the assumption refer to feedback-hypothesis' in BRICS countries. These all the studies advocate the bi-directional relationship. It differs with the result of [57] as revealed that Unidirectional Causality, In Contrast, [47] concluded Weak impact of tourism on economic growth in Nepal. The hypothesis of tourism-led growth for Nepal has been rejected. We are concluded through the economic literature that the causal relationship between tourism income and growth changes over time in the short and long term, which was confirmed by [58].
The results showed Unidirectional relationship between the number of beds available for various tourist accommodation establishments in Jordan and economic growth, but this unidirectional relationship tends from economic growth to the number of beds, as the effects of steady economic growth will be reflected in the increase in various investments in tourism activity, as it increases the number of hotels, the increase in the number of beds, and various other accommodation establishments. On the other hand, the results showed a neutral relationship between the fixed assets of tourism activity and economic growth. As there is no relationship between the fixed assets in the tourism sector and economic growth because the tourism activity is one of the service sectors that depend little on machines and fixed assets, in contrast to the industrial sector.

5 Conclusion and Suggestion

The study was presented to highlight the competitive aspects of the Jordanian tourism activity using some econometric models. Time series data collected through the Department of Statistics, the Central Bank of Jordan, and the Ministry of Tourism for the period 1990-2021 were used. The study showed the impact of tourism activity on employment, balance of payments and reducing poverty spots, in addition to supporting economic diversification. The study used the Kwik distributed gap method to measure the effect of the number of tourists coming to Jordan on the Jordanian tourism income. The study revealed the low impact of the number of tourists on Jordanian tourism income. Furthermore, the study revealed that there is long relationship between independent variables with dependent variable based on cointegration ARDL bound test. The correction of coefficient error related to adjustment speed is showed that the deviations for total short-term are corrected to their long-term equilibrium value with a correction rate equivalent to (37%). The Granger causality test showed a bidirectional between tourism income and economic growth, a Unidirectional relationship between the number of beds available in the tourism sector and economic growth, and a neutral relationship between the fixed assets of tourism activity and economic growth in Jordan. When validating diagnostic tests, the validity of the results was measured by serial correlation, normality, and heterogeneity. Finally, the performance test of the error-correcting model found that the Thiel parameter is less than one and close to zero, which indicates the model's high predictability.

The study recommends increasing focus and targeting tourism activity in Jordan by decision makers for the vital role it plays in influencing economic growth. The responsibility of policy makers in the sector is to raise the competitiveness of the sector by promoting the attraction of tourists from different countries of the world, especially from high-income countries, and expanding tourism investments and support services.

References

[1] Philipp, J., World Travel & Tourism Council, in Encyclopedia of Tourism Management and Marketing. 2022, Edward Elgar Publishing.
[2] Jawabreh, O., et al., Evaluation of The Contents of the Five Stars Hotel Website and Customer

Orientation. Information Sciences Letters, 2022. **11**(4): p. 1077-1085.
[3] Alananzeh, O., et al., The association among employees' communication skills, image formation and tourist behaviour: perceptions of hospitality management students in Jordan. International Journal of Culture, Tourism and Hospitality Research, 2019.
[4] Abujamous, I.M., et al., Developing tourism through sports events to assist in the rejuvenation of the strategic position of the Aqaba Special Economic Zone Authority (ASEZA). African Journal of Hospitality, Tourism and Leisure, 2019. **8**(4): p. 1-14.
[5] Saleh, M.M.A., et al., Environmental accounting as perspective for hotels of Aqaba special economic zone authority (ASEZA). Problems and perspectives in management, 2018(16, Iss. 4): p. 169-185.
[6] Ali, B.J., et al., Integration of Supply Chains and Operational Performance: The Moderating Effects of Knowledge. Information Sciences Letters, 2022. **11**(04): p. 1069-1076.
[7] ALNawaiseh, K.H., et al., The Relationship Between the Enterprise Resource Planning System and Maintenance Planning System: An Empirical Study. Information Sciences Letters, 2022. **11**(5): p. 1-11
[8] Economic and Social Council of Jordan Reports, 2021. 2022: http://www.esc.jo/homeen.aspx.
[9] Alkhodary, D., et al., Visitor Management System Design and Implementation during the Covid-19 Pandemic. Information Sciences Letters, 2022. **11**(04).
[10] Jawabreh, O., H. Abdelrazaq, and A. Jahmani, Business Sustainability Practice And Operational Management Inhotel Industry In Aqaba Special Authority Economic Zone Authority (ASEZA). Geo Journal of Tourism and Geosites, 2021. **38**(4): p. 1089-1097.
[11] Alananzeh, O., et al. Factors influencing MICE tourism stakeholders' decision making: The case of Aqaba in Jordan. in Journal of Convention & Event Tourism. 2019. Taylor & Francis.
[12] Alananzeh, O.A., et al., The impact of customer relationship management on tourist satisfaction: The case of Radisson Blue Resort in Aqaba city. Journal of Environmental Management & Tourism, 2018. **9**(2 (26)): p. 227-240.
[13] Alsarayreh, M., et al., Information technology and the performance of establishments hotel and tourist in Jordan. Australian Journal of Basic and Applied Sciences, 2011. **5**(6): p. 1401-1406.
[14] Jawabreh, O.A., et al., Green energy products and the relationship of the customer's consideration for the environment and perceived risk involved with the mediating position of customer purchasing intentions: the point of view of foreign tourist in Jordan. International Journal of Energy Economics and Policy, 2022. **12**(4): p. 334-341.
[15] Jawabreh, O., et al., The Strategic Deployment of Information Systems Attributes and Financial Performance in The Hospitality Industry. Information Sciences Letters, 2022. **11**(5).
[16] Esquivias, M.A., et al., Tourism demand in indonesia: Implications in a post-pandemic period. Geo Journal of Tourism and Geosites, 2021. **37**(3): p. 951-958.
[17] Pinjaman, S. and M. Pawan, Pinjaman, S and Pawan,M . . Pinjaman, S and Pawan,M . , 2021. **10**(3): p. 212 – 222.
[18] Balan, S., Understanding the pattern of International Tourism Demand in ASEAN 5 countries.(Malaysia, Indonesia, Singapore, Thailand, Vietnam). Open University Malaysia DOI:10.13140/RG.2.2.11677.46563. , 2019.
[19] Şengel, Ü. and B. Zengin, Avrupa Ülkelerinden Türkiye'ye Yönelik Turizm Talebini Etkileyen Faktörler: Panel Veri Analizi. IBAD Sosyal Bilimler Dergisi, 2020: p. 304-316.
[20] Vanegas, J., et al., Modeling determinants of tourism demand in Colombia. Tourism and hospitality management, 2020. **26**(1): p. 49-67.
[21] Hanafiah, M.H.M. and M.F.M. Harun, Tourism demand in Malaysia: A cross-sectional pool time-series analysis. International Journal of trade, economics and Finance, 2010. **1**(1): p. 80-83.
[22] Mayer, M. and L. Vogt, Economic effects of tourism and its influencing factors. Zeitschrift für Tourismuswissenschaft, 2016. **8**(2): p. 169-198.
[23] Jawabreh, O., R. Mahmoud, and S.A. Hamasha, Factors influencing the employees service performances in hospitality industry case study AQBA five stars hotel. Geo Journal of Tourism and Geosites, 2020. **29**(2): p. 649-661.
[24] Jawabreh, O., Innovation management in hotels industry in aqaba special economic zone authority; hotel classification and administration as a moderator. Geo Journal of Tourism and Geosites, 2020. **32**(4): p. 1362-1369.
[25] Jahmani , A., et al., The influence of traveler reviews on mobile applications on travel decision-making to Dubai. Journal of Theoretical and Applied Information Technology, 2020. **98**(15).
[26] Gandilova, S.T.K., Tourısm and economıc development: analysıs and assessment of linkages. Економічний часопис-XXI, 2018. **174**(11-12): p. 29-33.
[27] Georgiou, M.N., Does in Tourism the Number of Beds Per Se Really Matter Regarding Revenues from Tourism? Available at SSRN 2567360, 2015.
[28] Songling, Y., M. Ishtiaq, and B.T. Thanh, Tourism industry and economic growth nexus in Beijing, China. Economies, 2019. **7**(1): p. 25.
[29] Abedtalas, M., The determinants of tourism demand in

Turkey. Journal of economics and behavioral studies, 2015. **7**(4 (J)): p. 90-105.
[30] Ribeiro, E.D.C. and B. Wang, Tourism led growth hypothesis: has the tourism industry an impact on the economic growth of Sao Tome and Principe? International Journal of Economics and Financial Issues, 2020. **10**(1): p. 180.
[31] Rehman, A., et al., Investigating the influence of international tourism in Pakistan and its linkage to economic growth: evidence from ARDL approach. SAGE open, 2020. **10**(2): p. 2158244020932525.
[32] Kostakis, I., Is tourism a key factor for economic growth? Fresh evidence from South Europe using panel cointegration and PVAR analyses. World Journal of Applied Economics, 2020. **6**(2): p. 123-138.
[33] Wu, T.-P. and H.-C. Wu, The link between tourism activities and economic growth: Evidence from China's provinces. Tourism and Hospitality Research, 2019. **19**(1): p. 3-14.
[34] Rasool, H., S. Maqbool, and M. Tarique, The relationship between tourism and economic growth among BRICS countries: a panel cointegration analysis. Future Business Journal, 2021. **7**(1): p. 1-11.
[35] Osinubi, T.T. and O.B. Osinubi, Inclusive growth in tourism-led growth hypothesis: Evidence from Nigeria. African Journal of Economic Review, 2020. **8**(2): p. 141-160.
[36] Jamel, L., The Relation between Tourism and Economic Growth: A Case of Saudi Arabia as an Emerging Tourism Destination. Virtual Economics, 2020. **3**(4): p. 29-47.
[37] Alrabei, A.M., et al., The Impact of Mobile Payment on the Financial Inclusion Rates. Information Sciences Letters, 2022. **11**(4): p. 1033-1044.
[38] Thuneibat, N.S.M., et al., The Mediating Role of Innovation On the Relationship Between Information Technologies and Reducing Tax Evasion. Information Sciences Letters, 2022. **11**(2): p. 13-23.
[39] Alqaraleh, M.H., et al., The Mediating Role of Organizational Culture On the Relationship Between Information Technology and Internal Audit Effectiveness. Corporate Governance and Organizational Behavior Review, 2022. **6**(1).
[40] Alkooheji, H., M. Salem Oudat, and B. JA Ali, Ownership Structure and the CEO Compensations: An Empirical Study on Bahrain Commercial Banks. Information Sciences Letters, 2021. **10**(4): p. 3.
[41] Usman, O., A.A. Alola, and G. Ike, Inbound tourism demand elasticities of MENA countries: the role of internal and external conflicts. International Journal of Emerging Markets, 2022.
[42] Moghal, A., et al., Nexus Between Tourism and Economic Development in Jammu and Kashmir: A Review. Academy of Marketing Studies Journal, 2022. **26**(1): p. 1-8.
[43] Ozturk, O. and M. Al-Kuwari, The Contribution of Tourism to Economic Growth: The Case of Qatar. Journal of Environmental Management & Tourism, 2021. **12**(2): p. 598-607.
[44] Pashtoon, R., Z. Zaki, and N. Haqbin, Empirical study on international tourism and economic growth of Thailand: an ARDL-ECM bounds testing approach. Journal of Enterprise and Development (JED), 2022. **4**(1): p. 28-48.
[45] Azam, M., et al., Investigating the role of tourism in economic growth: empirical evidence from Pakistan. Polish Journal of Sport and Tourism, 2022. **29**(1): p. 39-47.
[46] Wang, Y., L. Wang, and C. Pan, Tourism–Growth Nexus in the Presence of Instability. Sustainability, 2022. **14**(4): p. 2170.
[47] Bronzini, R., E. Ciani, and F. Montaruli, Tourism and local growth in Italy. Regional Studies, 2022. **56**(1): p. 140-154.
[48] Alawamleh, H.A., et al., The Challenges, Barriers And Advantages Of Management Information System Development: Comprehensive Review. Academy of Strategic Management Journal, 2021. **20**(5): p. 1-8.
[49] Gharaibeh, A.T., et al., An Empirical Study of the Relationship Between Earnings Per Share, Net Income, And Stock Price. Appl. Math, 2022. **16**(5): p. 673-679.
[50] Salameh, A., et al., From Citizens Overview: Which Antecedents' Can Assist to Increase Their Satisfaction Towards the Ubiquity of Mobile Commerce Applications? International Journal of Interactive Mobile Technologies, 2020. **14**(17): p. 45-55.
[51] Fischer, J., et al., Jordan tourism cluster. Report For Microeconomics of Competitiveness, 2009. **8**.
[52] Alzboun, N.M., Domestic tourism in Jordan: Patterns, challenges and opportunities. Journal of Environmental Management and Tourism (JEMT), 2019. **10**(02 (34)): p. 281-291.
[53] Folarin, O. and O. Adeniyi, Does tourism reduce poverty in Sub-Saharan African countries? Journal of Travel Research, 2020. **59**(1): p. 140-155.
[54] Llorca-Rodríguez, C.M., J. Chica-Olmo, and A.C. Casas-Jurado, The effects of tourism on EU regional cohesion: a comparative spatial cross-regressive assessment of economic growth and convergence by level of development. Journal of Sustainable Tourism, 2021. **29**(8): p. 1319-1343.
[55] Zhao, L., C. Fang, and C. Mao, Tourism and poverty reduction: an empirical evidence from China. Tourism Tribune, 2018. **33**(5): p. 13-25.
[56] Svagzdiene, B., D. Streimikiene, and E. Jasinskas, Tourism–a tool for economic diversification for other sectors. Humanities studies, 2021(7 (84)): p. 129-135.
[57] Matzana, V., A. Oikonomou, and M. Polemis, Tourism

Activity as an Engine of Growth: Lessons Learned from the European Union. Journal of Risk and Financial Management, 2022. **15**(4): p. 177.

[58] Enilov, M. and Y. Wang, Tourism and economic growth: Multi-country evidence from mixed-frequency Granger causality tests. Tourism Economics, 2022. **28**(5): p. 1216-1239.