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Using the Projection Gradient model To predict tourist demand in Iraq except for the Kurdistan Region

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Abstract

The research aims to predict the touristic demand in Iraq through using the sample of projection gradient after limiting a time series from 2012 to 2019, therefore the idea of research is taken from researches and studies of touristic economies in Iraq and the data of the central office of statistics .these references have been ponted that the touristic sector in Iraq has suffered from significant defect which is inability of knowing the comers numbers of the next years. In fact, this is because of non – using the methods of is what leads, to many problems represented by unconsciousness of comers importance to Iraq lands, inabilityof knowning the comers. Actually,the touristic demand has various different froms in the touristic groups of tourism committee of the ministry of culture and tourism. According to what is mentioned, may question have been arisen about the touristic demand in Iraq theoretically and practically especially when the problem of Study is restricted. The movment of the correct statistics. This is what give the study importance represented by the future of tourism sector and touristic developments. Hence, the aims of research come to deal with the problems that sector of tourism in iarq suffers from .one of these is knowing the general line of touristic demand through orientating the responsible officials of touristic sector and adapting standard sample to take the touristic sector it role in Iraqi economy as being one of the solution in preceding the economic problems

Keywords: *Projection Gradient model, tourist demand in Iraq, Kurdistan Region*

Introduction:

The tourism sector is one of the most important economic sectors in production, and it has coincided with the technological changes that our modern world witnessed. As a result, countries have accelerated their vision of natural, human and archaeological resources and sought to embrace other human activities and activities. Tourism was presented as a strategic option that addresses the global unemployment problem, and this does not have a high capacity to absorb various economic sectors due to the sector and the interconnection in the tourism services industry Some of the exporting countries have paid attention to tourism after adopting their strategic options regarding the volume of demand for tourism in order to achieve economic systems using quantitative measures that decision makers rely on in the tourism development process and in a manner consistent with the effective directions of investment. Planning .

Here we find an economic perception of the concept of tourism demand that seeks to achieve the highest economic benefits of tourism must go through the stage of planning and implementation, and as is known, many sectors have undergone a method for measuring the economic phenomenon at a time when a series characterized by stability away from the occasional changes to forecast and this is what we tried to explain in This research using a statistical model suitable for predicting the size of the tourist request coming to Iraq (except for the Kurdistan Region, because its data is not subject to the Central Agency for Statistics in the Ministry of Planning and Development Cooperation), but it is a model for dropping the slope GRADIENT PROJECTION and based on what we were trying in this research to highlight the most important Theoretical concepts of research using the appropriate model in predicting the measurement of travel and tourism, in the hope of enhancing intelligence for goals and asking the gene Raleigh's questions through the theoretical and philosophical enrichment of research, so that we leave before researchers and specialists an opportunity to search and explore other concepts of tourism activity in Iraq.

The first topic: The methodological framework of the study

First: the research problem In light of the growing state of tourism activity in Iraq, especially religious tourism, and the rest of the other tourist patterns (except for the Kurdistan Region), it is noted that the internal and external tourism movement does not translate correctly the statistics and the reason is due to a set of problems and obstacles that the tourism sector suffers in Iraq, which is As follows :

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- The lack of real figures on the numbers of arrivals to Iraq due to the lack of control over the ports coming to Iraq for tourism purposes.
- Approving the tourism activity as part of the exports of invisible goods and linking it to the Department of Services Trade in the Central Statistical Organization of the Ministry of Planning and Development Cooperation, and accordingly some numbers that were formed as intertwining with other commercial activities.
- Poor coordination between the Ministries of Interior, Tourism and Planning (the Central Statistics Authority) (and random) in what it provides to tourists ز
- The absence of a reliable standard model for forecasting actual tourist demand.

Second: The importance of research

This study contributes to forming a future vision for the tourism sector in general and the state of tourism demand in particular because it gives decision-makers theoretical indicators supported by statistical facts that help in diagnosing the reality of tourism movement through knowledge of the most important demographics. Seasonal variations and fluctuations, and how to deal with each type of tourism and interest patterns. The official authorities direct the diversity of the tourist request in line with the current tourist offer, so we tried our study after our visit to the competent authorities by the official authorities through the absence of a statistical measure of the status of the tourist request, and therefore we will focus on choosing a standard model that addresses the issue of inaccurate estimates of the number of tourists to be an ideal tool For decision-making - the tourism industry makers in Iraq.

Third: The research amis

The objectives of the study are as follows:

- Knowing the general trend of the state of tourism demand by identifying the variables that affect the movement of travel and tourism
- He drew the attention of the Ministry of Tourism and Antiquities to the numbers of tourists coming to Iraqi lands.
- Building a Standard Model is an ideal tool in the study and analysis of available data using an input in a time series represented in the slope projection model.
- Trying to understand the reality of tourism as an economic activity and what its contributions can represent.

Table No. (1) relationship of tourism demand to prices

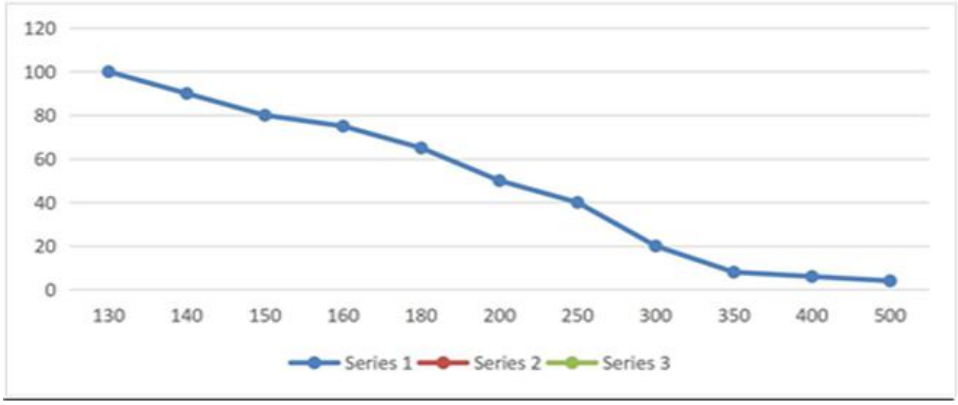
Tourist demand	The price is in Iraqi dinars
100	130
90	140
80	150
75	160
65	180
50	200
40	250
20	300
8	350
6	400
4	500

- **Source: Prepared by the researcher, relying on data of the Ministry of Commerce**

During the schedule, when prices are low, the demand for tourism increases at the level of the services provided, and as prices rise, the demand for tourism decreases. As for the curve of demand for the actual total number, it shows the desire of tourists to purchase tourism service.

1. puplished by authority guid to the national tourism indicators minister responsibli for statistics Canada.1996.p7
2. Mathieson and wall. Tourism economic physical and social impact longman . London. And work. 1981.p18
3. Dip / André Klim, Tourism demand and its importance in the marketing study of the tourism project, Qalatiya village as a model, a seminar presented to the Faculty of Tourism - Al-Baath University, 2017: p. 1.

Figure (1) shows the curve of tourism demand and its impact on prices



- **Source: From the researcher's work using data from Table 1**

Third: Types of Tourism Demand

There are several divisions of tourist demand, each of which explains the nature of the tourist activity in terms of the motives for the movement of travel and tourism, and despite the multiplicity of these types, it is necessary to address them, and the reason is because the title of our research absorbs all types of demand, so we had to address them in a way that is as follows. :

a. The tourist application is divided according to the geographical factor into:

- Domestic Domestic Demand : The number of tourists who are citizens of the country's nationality and who carry out tourist trips within the borders of the country residing in it.
- Global tourism Demand : It is the number of foreign tourists who hold different foreign nationalities and move across the international borders of different countries(1)

B. The tourist application is divided according to the extent of its verification:

- Actual Tourist Demand[2] : It is that request that combines the desire to travel to the desired tourist areas, and the ability to use tourist services and facilities, that is, it combines the basic requirements of the request, the desire to obtain the product and the ability to pay, meaning the ability to pay the requirements for obtaining this tourist product .
- Latent Demand Latent Demand : It represents a group of individuals who are unable to carry out tourist operations, as a result of a circumstance of various circumstantial factors such as:

- Inability to provide and pay the expenses of the trip.
- Weak advertising, media, and guidance.
- Not being fully convinced of the quality of the services provided in some tourist destinations.
- High prices Many researchers have emphasized that the demand can shift from latent to real when the appropriate and appropriate land is available for tourism.

C. The tourist application is divided according to the type of service provided :

- General Tourist Demand : The total demand for tourism in general, regardless of type or time, and that the request is directed to the state itself, as it represents the entire tourist destination region and all its tourism components, and it is characterized by developed countries, as it has various and multiple tourism services and different tourism ingredients. Examples of this include visiting France or Spain Or America.
- Special Tourist Demand : The request is linked to a specific tourist program, such as asking a group of tourists to visit the Amazon jungle in South America, travel to climb mountains, visit Canada to see Niagara Falls or travel to America to visit Disneyland.
- Tourism Demand is derived : This type of tourism demand is related to the additional services of the tourism program, such as the demand for hotels, the demand for tourism and aviation companies, tourism transport, and other tourism services.

This (2) and states seek to convert the derived tourism demand into a special tourist request and then convert it into a general tourist demand by providing more tourism programs at various prices so all economic development plans in the tourist countries sought to provide common ground for the tourism sector and the rest of the other economic sectors In order to take advantage of the services needed to complement the tourism program and at the same time, it is a way to improve the service and development reality in these countries.

Fourth: Tourist demand properties

[2]- Al-Houry / Dr. Muthanna and Ismail Al-Dabbagh, Travel Economics and Tourism, Al-Warraq Foundation for Publishing and Distribution, 2000, p. 21-

Tourism application is a seasonal tourism Demand Request [3] . Tourist demand is characterized as seasonal, meaning that there are certain months of the year that the tourist demand reaches its highest peak, such as the summer season and mid-year holidays [4] Tourist application is an exception to the diminishing marginal utility law Tourism Demand an Exception from the Law of Diminishing Marginal Utility . In other words, the benefit that an individual obtains as a result of consuming the first unit of a particular good is greater than the benefit of the second unit, which is more useful than the third unit until it reaches the last unit that is beneficial Zero for individuals to reach the status of satiation, and this example does not apply to tourist demand. It was noted that the marginal benefit of the tourist trip takes an upward shape whenever the tourist carries out a new tourist trip .

1. The request for tourism is not tangible

Tourism request is not tangible It is difficult for a tourist to touch the service provided to him, due to the lack of material effects available in the marketing of merchandise products, it is inconceivable, for example, that the hotel sends samples of services related to accommodation patterns, room service to sniff, see and taste them before contracting with the hotel[5].

2. Tourist request is sensitive.

The impact and impact of tourism demand on many of the security, political, social, and economic factors surrounding tourism activity that affect the tourist movement, tourist attitudes, preferences, and tastes in choosing between different countries. . Violent political changes in some tourist countries directly reduce their tourism activity, as do wars and expectations related to wars .

Tourism demand is flexible towards prices

Price demand elasticity is generally defined as ((the extent to which a consumer responds to a change in the prices of goods and services)) and is measured using the demand elasticity coefficient, which is defined as the ratio between the change in the required quantities resulting from the change in its price (3) that the high-elastic tourism demand is subject to change In prices, that is, the lower the prices in the region, the greater the flow of tourists to it and vice versa . Demand for tourism income elastic demand trend[6]

Income elasticity of demand is defined as (the extent of the consumer's response to a change in demand after a change in his income) and to the extent that the tourist demand is flexible (under normal conditions) the direction of price changes and this is called (price elasticity), it is also flexible in the direction of changes in income (income elasticity of demand) It has become clear with the scientific reality that if there is an increase in per capita income, the demand for tourism will increase and in proportions that exceed the relative change in income.

Fifth: The factors determining the tourist demand

The specific economic factors for tourism demand [7]

a. Prices

means the prices of the tourism product, as it has an inverse relationship with the demand for the assumption of the stability of other factors.[8] Where it is observed through Figure [9]below, the more the price of the tourism product decreases, the more the tourist demand increases. We note that the countries where the price level decreases in general, such as Eastern Europe and Southeast Asia, where the tourist demand is very high, especially during the peak tourist days, which allows purchasing power Which tourists enjoy from shopping, which is one of the tourist behaviors during travel and tourism .

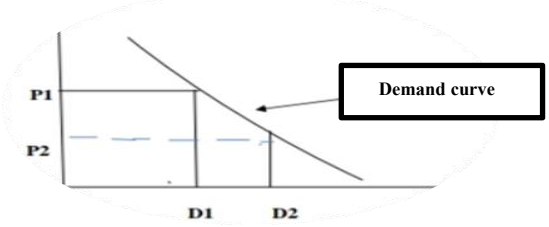


Figure No. (2) shows the decrease in prices, which increases the tourist demand

b. Income

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1. **Mathieson and wall. Lbid. P16-17[3]**

[3]- . Allam, Dr. Ahmed Abdel-Samea, / Tourism Economics, 1st floor, Dar Al-Wafaa for the world of printing and publishing, 2008, p. 180.

[4]- Al-Houry, D. Muthanna Taha and AM Ismail Al-Dabbagh / Travel and Tourism Economics, 1st floor, Al-Warraq Institution for Publishing and Distribution, 2000, pp. 38-39.

[5]- Hassan. Ghagada Saleh / Economics of Tourism 1, Dar Al-Wafaa Dunia for Printing and Publishing, 2008, pp. 81-81.

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[7] - Come on. Ramzi Badr / Factors Affecting Tourism Demand, Master Thesis, University of Baghdad, College of Administration and Economics, 1984, p. 80

[8] - Al-Houry, D. Muthanna Taha, and Ismail Al-Dabbagh, previous source, p. 23

[9] Hanna, Inaam Dawood and Dhafir Abd Al-Shabar / The role of national tourist offices in marketing the services of the General Tourism Corporation, Al-Mustansiriya University, Journal of Administration and Economics, Issue 8, 1988, p. 28

The relationship between income and tourism demand is a direct relationship. Every increase in income leads to a change in the demand for tourism goods and services at a rate greater than the percentage allocated from the increase to satisfy the necessary needs [3]

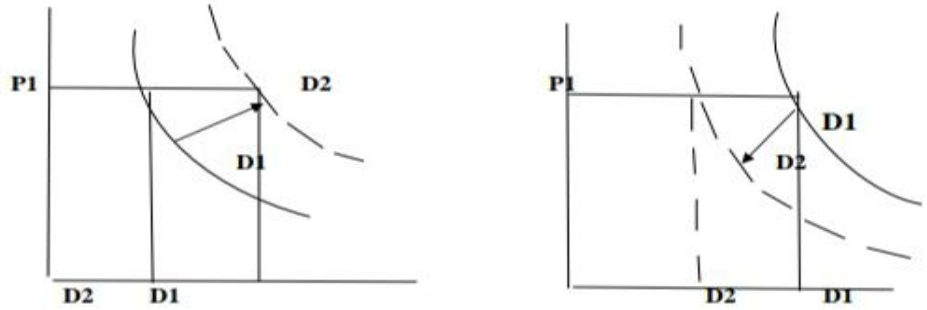

Figure (3) shows the relationship between tourism income and prices in the tourist application

C. Cost and Price Flexibility

The cost is one of the important determinants of the tourist activity, so the more the cost is reasonable, the more this will motivate the increase in the tourism activity, but if the cost is high then there is no doubt that this will make the tourist search for another place less expensive [10] as the travel and tourism costs increase with the traveled distance for the trip So, if the travel and tourism costs increase with the traveled distance for the trip, if the distance increases, the transport costs increase, so the travel process becomes expensive and this leads to a decrease in the tourist demand for it [11]

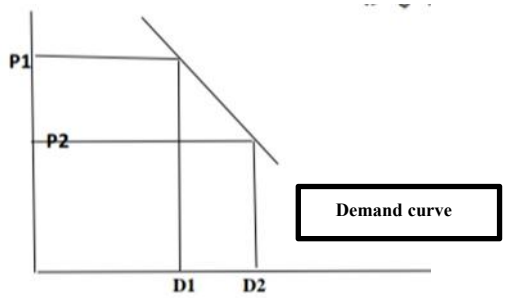

Figure (4) shows the cost and price flexibility in the tourist demand

It is the ratio on which the national monetary units are exchanged for foreign monetary units at a time .[12] The exchange rate shows its effect only in foreign tourism, as it is known that the tourist spends the national currency within the host country if it decreases

- The currency of the host country for tourists has helped increase tourist demand and vice versa, while other factors remain constant. The situation requires that the purchasing power of the tourist will be higher in relation to product prices.
- Social and cultural factors

  a. Demographic factors
- Age : There is a direct relationship between the movement of travel, tourism, and age groups. The higher the percentage of young people in society, the greater the tourist demand, and this is consistent with the study of the Altagrit in the tourist island of Baghdad, where the youth category represented 91% of the tourist demand. The study also showed that young people (singles) are more effective in practicing tourism activities than other married couples, and this is due to spending on these tourism activities at a rate lower than that of married couples when practicing tourism activities Sex:[13] The youth demand for travel and tourism is more compared to females. The higher the percentage of males in society, the greater the tourist demand and vice versa.
- Social status :The ratio of singles to married couples is one of the most important indicators for knowing and determining the proportion of the size of tourist demand, as the more the number of singles in society

[10] -. Kaduna, Amin Rashid / International Economics, University of Baghdad, 1980, p. 204

[11] - Allam, Dr. Ahmed Abdel-Sami / Tourist Economics, 1st floor, Dar Al-Wafaa for the world of printing and publishing, 2008, pp. 192-193

[12] - A.J.bukart and. S. medlike,tourism past present and future. London.1976.p1212

[13] - • Al-Mashhadani, Dr. Khalil Ibrahim Ahmed / Factors and Variables Affecting Visitor Ownership in Choosing the Type of Tourist Activities in Baghdad Island, Al-Mustansiriya University, Administration and Economy, 1994, p. 398

increases, the greater the proportion of tourist demand and vice versa with the assumption that other factors remain constant.

- Occupation : Tourism studies show that the analysis of the tourist demand in the tourist destination areas increases its peak during the summer days as it is represented by the largest segment of employees, however, there are occupations that do not allow their employees to travel outside their countries, represented by the security services, the police, the army ... etc.[14]

b. Imitation or simulation : The tourism demand, in general, represents a response to the society has contemporary social values that have begun to emulate the requirements of the times on the modern civilization, which has resulted in new luxury human needs outside the framework of basic and necessary needs, foremost of which is tourism activity, and this helps the growth of tourism demand and revenues.

c. . Level of education and culture :

- Culture is defined as a relatively unique group that holds the meanings of values, beliefs, customs or traditions and practices that the members of the organization contribute to [15] and is represented by the values, attitudes, beliefs, and standards that arise in the minds.
- Physical culture: It represents the concrete subjects, artistic facts, buildings, and configurations produced by culture. • Cultural landscapes: It represents the intersection between cultural and natural heritage, and it simply creates natural cultural evidence .[16] Through this, the image of education and culture and its reflection is clear in increasing the tourist awareness of civilized societies that believe in the concepts of modernity and consider it one of the pillars of social development.

d. The desire to show off

This type of tourism demand has represented one of the reasons for travel and unconventional tourism, which contributed to feeding tourism demand in general. This type of tourism is called a rich man's commodity or a boastful commodity because the purchasing behavior of these layers depends on the lavish style.

e. Means Marketing

All organized efforts and activities that are performed in a harmonious harmony by tourism service providers represent all of its elements and its various parts that aim to satisfy the tastes of recipients or those who wish to the tourism of all kinds [17] that the nature of tourism activities and services is almost completely different in the process of delivering them to the consumer.

And Technology is means by which a person controls his surroundings in order to produce the things he needs and it does not only mean the systematic application of science and branches of knowledge to scientific issues but rather means the social and economic milieu in which the application takes place [18] In another concept, it is known as that cognitive pattern that mediates Between science on the one hand and the industry, on the other hand, connects them and both have a central relationship with the goal of producing new goods and services and means of production [19] that tourism activity has the largest share since the tourism industry relies heavily on various sectors of transport and communications and communications that have brought the distance between the globe and facilitated From the procedures of the tourist trip, it presented a number of recreational and recreational activities and sporting events that contribute to increasing the volume of tourist demand :

- Political and security situation
- Political and Security Situation
- Politics is defined as the activity that enables people to formulate the general rules in which they live, amend, or preserve them [20] It is also known as the science that studies states, their concept, their organization, their institutions, their formations, their practices and their policy [21]As for security, it can be defined as the situation in which It prevents unauthorized persons from accessing official information for the benefit of the country.

The third topic: the practical side.

First: Theoretical analysis of the slope projection model

Model AR^2:

The form of the model can be written in terms of the random formula for the differences as follows- :

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[14] - 1. Al-Bahsin, Ahmed Abdullah / Leisure Time for Young People, Master Thesis, King Saud University, College of Arts, pp. 7-8.

[15] - Huczynski.A.A. & Buchanan D. A.orgaization behavior.6th ED financial time prentice hall. 2006.p: 61

[16] - 1. Mcintosh. Robert.W.tourism principles.philosophies. john Wiley sons . in 7th.2002. p277.

[17] - . Obaidat, Dr. Muhammad / Tourism Marketing, Behavioral Entry, First Edition, Wael House for Printing and Publishing, Amman, 2000, p. 16

[18] - Roberson , David , the rout ledge dictionary of politics , third Edition , Taylor &Francis Group , USA , 2004 , P : 388.

[19] - . Harry . G . johson " technology and economic interdependency , the Macimillam press . it : London , 1975 , p:1

[20] - . A . T. hatziers , technological Groth and social changes Routledge , London , 1985 p: 44

[21] - . W. McCauley , James . an introduction to politics , state, & society , first published. Sage publications ltd , London, 2003 , p:2

(1 - Ø1 B - Ø2 B2) Xt = at ..... (1)

For the chain to be stable, the roots of equation 1–1B - ϕ2 B2 = 0 (B) ϕ should fall outside the circle with a radius equal to (1). Whether the roots are real or complex, the stability condition is ϕ2 <2, –1 <ϕ1 <1 -2>

Model estimation methods:

Likelihood function

The greatest possible estimates for the time series (1) can be obtained as follows- :

(σ2) = (1 +) {(1 -) 2 - 2} ½exp (- (S (Ø_1, Ø_2)) / (2σ_a ^ 2)] .... (2),

whereas-:

=

The logarithm of equation (2) and its derivation with respect to and equal to zero are taken:

whereas-:

Dij = Xi Xj + Xi + 1 Xj + 1 + ... + Xn + 1-j Xn + 1-i

By solving equations (3) and (4), we get:

And when the sample size is very large, the approximate maximum possible estimator can be found as follows.[22]

$$\hat{\phi}_1 = \frac{\frac{(n-4)}{(n-2)} D_{13} D_{23} - \frac{(n-3)}{(n-1)} D_{12} D_{33}}{\left(\frac{n-2}{n-3}\right) D_{23}^2 - \frac{(n-3)}{(n-4)} D_{22} D_{33}} \quad \text{..... (5)}$$

$$\hat{\phi}_2 = \frac{\frac{(n-2)}{(n-1)} D_{12} D_{23} - \frac{(n-3)}{(n-2)} D_{22} D_{13}}{\left(\frac{n-2}{n-3}\right) D_{23}^2 - \frac{(n-3)}{(n-4)} D_{22} D_{33}} \quad \text{..... (6)}$$

1. Minor squares:

Minor squares are estimated as follows: -

…… ... (7)

…… ... (8)

2. Slope projection method:

There is no doubt that the main component of nonlinear programming is the inclination of the function and its regression. In order to know the nature of the regression of the studied function, we assume that there is a point (Xj) in Figure No. (1).

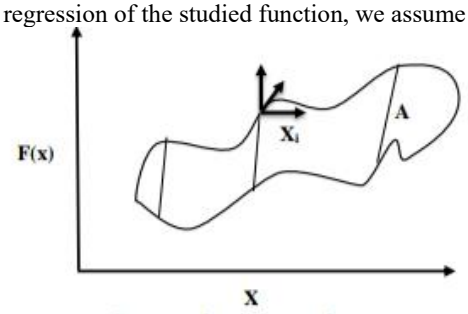

Figure (5) the regression nature of the studied function

At this point, the search is made to find the unknown maximum value of the function (x) f, which we assume appears at the point (A). In addition, optimization is emphasized, which is represented by local and independent values on the coordinates of the possible solution vector. In order to benefit from the local information, we assume moving from point (Xj) to a new point and be (Xj + 1), at which time the optimization will be approached at a faster rate .[23]

In particular, we assume that the distance (s) has been moved from the point (Xj) to the new point (Xj + 1), which by this movement will constitute the optimal solution required. Accordingly, the new value can be written in the following vehicle- : Figure No. (2) Where mi represents the direction of the spacecraft (i) (see Figure 6)

[22] - Box, G.E.P. & Jenkins, G.(2004). "Time series Analysis Forecasting and control". Holden-day, Inc. San Francisco .p22.

[23] - . Box, G.E.P. & Jenkins, G libid.p23.

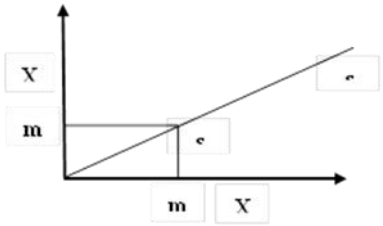

Figure (6) shows the direction of the vehicle's general direction

Assuming that progress is made in small steps (ds),[24] the objective function y = f (x) increases and decreases by a certain amount. Therefore, the estimated distance for this movement is: -

…… .. (10)

Assuming that (y) is a derivative function, the change in (y) associated with the displacement group (DXi) is as follows: -

= .... (11)

Thus, the set of displacements will be made as small or large as possible. This is the direction of the steepest ascent or descent principle. To view the optimization issue, the function (11) should be maximized or minimized so that the formula (10) is achieved as follows: [25]

Maximize/ Minimize: $\frac{dy}{ds} = \sum_{i=1}^{n} \left(\frac{\partial y}{\partial x_i} \right) \frac{dx_i}{ds}$ (1) S.t.

$$ds = \sqrt{\sum_{i=1}^{n} dx_i^2} \quad \text{…….. (12)}$$

When formulating the Lacrange function, we obtain the following: -Maximize/ Minimize: $\sum \left(\frac{\partial y}{\partial x_i} \right) \frac{dx_i}{ds} - \lambda \left[1 - \sum_{i=1}^{n} \left(\frac{dx_i}{ds} \right)^2 \right]$

By deriving according $\frac{dx_i}{ds}$ to:

$$\frac{\partial y}{\partial s} - 2\lambda \left(\frac{dx_i}{ds} \right) = 0 , \qquad i = 1, 2, \ldots, n$$

By deriving according λ to-:

$$\sum \left(\frac{dx_i}{dds} \right)^2 = 1$$

And thus it is: - $\frac{1}{4\lambda^2} \sum \left(\frac{\partial y}{\partial x_i} \right)^2 = 1$

$$\therefore 2\lambda = \pm \sqrt{\sum \left(\frac{\partial y}{\partial x_i} \right)^2}$$

Thus, the change in the vehicle (i) is given as follows: - $\frac{\partial X_1}{\partial S} = \frac{\partial y}{\partial X_i} * \frac{1}{2\lambda}$, $i = 1, 2, \ldots, n$

$$X_{j+1}^{(i)} = X_j^{(i)} + \left[\frac{\partial y}{\partial X_i} * \frac{1}{2\lambda} \right] S$$ And thus it is

$$= X_j^{(i)} + m_i s$$

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[24] - 1. Phillips, D.T. and Ravindran, A.(1972)."Operation Research: Principles and Practice ", John-Wiley and Sons.
[25] - Rosen, J.B.(1980)."The gradient Projection method for nonlinear programming". Post I. J. soc. Ind. Appl. Math., 8, pp.181-217

$$\therefore m_i = \frac{\frac{\partial y}{\partial X_i}}{\sqrt{\sum\left(\frac{\partial y}{\partial X_i}\right)^2}} \text{ , } i = 1, 2, \ldots, n \quad \ldots\ldots (13)$$

The greatest decrease is: $- m_i = \frac{\frac{\partial y}{\partial X_i}}{\sqrt{\sum\left(\frac{\partial y}{\partial X_i}\right)^2}}$, $i = 1, 2, \ldots, n$ …….. (14)

The practical side:

The data represents the number of tourists in Iraq for the period 2012 to 2019 and it composes a time series of (96) views (Table No. 2).

Table (2) Views of the tourist numbers series in Iraq, for the period 2012- 2019

the years Months 2019, per thousand	2012	2013	2014	2015	2016	2017	2018	2019
January	795	518	501	521	180	130	580	527
February	435	503	725	390	141	219	620	276
March	621	537	433	329	169	349	551	303
April	453	431	508	424	147	240	616	355
Mace	399	520	442	479	129	390	472	356
June	464	448	458	543	224	317	582	483
July	302	420	310	355	187	374	410	324
Augaset	477	434	265	313	311	483	401	490
September	465	486	242	271	236	359	355	426
October	375	383	231	279	156	520	494	527
November	591	468	355	216	120	502	560	341
December	262	541	461	174	170	570	488	603

statistical analysis:

The time series was drawn as in Figure (7) and it was shown that it is stable in average and variance, and at the same time it does not bear the seasonal characteristic, so the chain is considered completely stable. By using the Box-Jenkins method, the model rank was determined based on the behavior of the coefficients of the self-correlation and partial self-correlation functions, as shown in figures (8) and (9). Through Figure No. (8), it appears that the coefficients of the self-correlation function are sloped to zero in the form of sinusoidal waves, which gives the impression that the chain follows the self-regression model.

As for Figure (9), it is clear that there are pieces in the parameters of the partial self-correlation function after the second displacement, which indicates that the diagnosed model is the second-order self-regression model (2) AR, which is formulated as in equation 7.

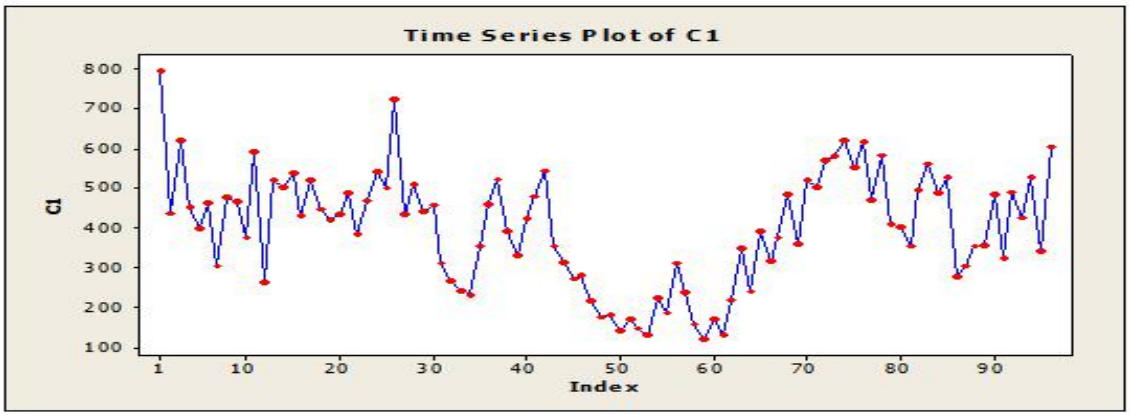

Figure (7) shows the observations of the time series of preparing tourists in Iraq for the period 2012 to 2019

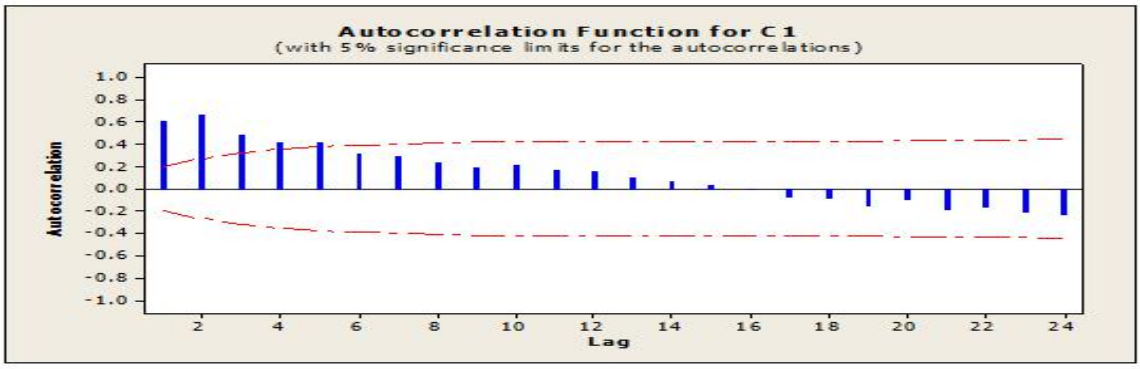

Figure (8) shows the coefficients of the self-linking function for a time series to prepare tourists in Iraq

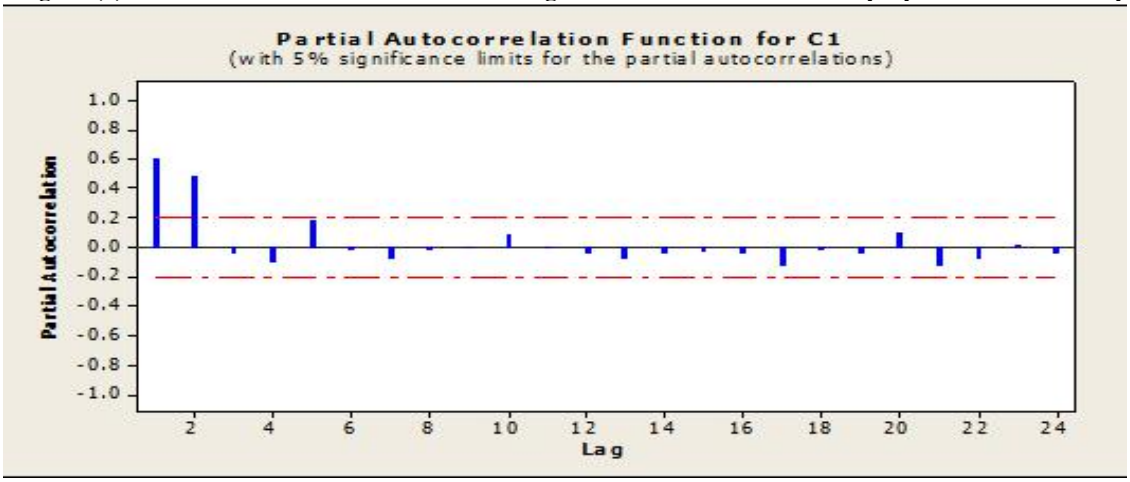

Figure (9) shows the observations of the parameters of the partial self correlation function for the series of tourist numbers in Iraq

Estimate model parameters :

AR (2) by minimizing the target function as follows: -

Min

= According to the method used, (0,0) = (, Ø21 Ø) is placed at the first iterator, so the value of the target function will be equal to. Then finding the value of (m_2^1 =0.706377) and ($a^1_{t=17247500}$), and thus: -

$$\text{Min} \sum_{t=1}^{n} a_t^2 = \sum (Z_t - \Phi_1 Z_{t-1} - \Phi_2 Z_{t-2})^2$$

$$= \sum Z_t^2 - 2\Phi_1 \sum Z_t Z_{t-1} - 2\Phi_2 \sum Z_t Z_{t-2} + 2\Phi_1\Phi_2 \sum Z_{t-1} Z_{t-2} + \Phi_1^2 \sum Z_{t-1}^2 + \Phi_2^2 \sum Z_{t-2}^2$$

$$\sum a_t^2 = 1724750($$

($m_1^{(1)} = 0.707834$) and ($m_2^{(1)} = 0.706377$)

$$\Phi_1^{(2)} = o + m_1^{(1)} s = m_1^{(1)} s$$

$$\Phi_2^{(2)} = o + m_2^{(1)} s = m_2^{(1)} s$$

And by compensating both $\Phi_1^{(2)}$, $\Phi_2^{(2)}$ In the objective function and the calculation of the first derivative with respect to (s), it is found that the value of (s) equals (s = 0.6947408). Thus, the new values for the two parameters are as follows- :

$\Phi_1^{(2)} = 0.4917616$

$\Phi_2^{(2)} = 0.4907492$

Upon starting with the second iterator, the new values (Φ^1,Φ^2,) are found, and all indicators are found until the lowest sum of the error squares is reached, and Table No. (2) shows a summary of the results for all repeaters, in order to reach the optimal solution and the appropriate values at each repeater with the values of (s, m1 , m2). In order to know the statistical properties, the sum of the error squares was calculated at each repeater in addition to the MSE scale for the estimated values of the two parameters.

And Table No. (3) shows some statistical indicators of the slope projection method, where it is noted that the number of repeaters equals (8), after which the repeaters are not useful due to the stability of the values of the two estimated parameters.

As a result, and through Table No. (3), it is noted that the estimated values of Form (2) AR are- :

$\hat{\Phi}_1 = 0.491581$

$\hat{\Phi}_2 = 0.493982$

Thus, the estimated model is as follows: -

$Z_t = 0.491581\ Z_{t-1} + 0.493982\ Z_{t-2}$

Compare the method with other methods:

The model was estimated using other traditional methods:

1) The OLS method.
2) Approximate MLE.
3) Exact MLE.

The estimation results were shown in Table 4 with MSE values for the three methods. Through the tables, it is clear that the value (MSE) of the model when using the ramp projection method, and therefore the estimated model was used to find predictive values for the numbers of tourists in Iraq for the years (2020-2021) as in Table No(6) .Table No. (3) shows the repeats for the optimum solution with the estimated parameter values (m1, m2, S, ϕ1, ϕ2.)

Table No. (4) Some statistical indicators when applying slope projection method

Rep.	m_1	m_2	S	ϕ_1	ϕ_2
0	-	-	-	0	0
1	0.707835	-0.706377	0.694741	0.491761	0.490749
2	-0.706371	0.711378	0.609822	0.491698	0.490780
3	0.712843	-0.700809	0.131578	0.491687	0.491552
4	-0.703775	0.718334	0.087578	0.491663	0.491979
5	-0.712734	-0.700820	0.031665	0.491606	0.492976
6	0.698436	0.684569	0.008456	0.491585	0.493965
7	0.711013	0.63247	0.000042	0.491583	0.493969
8	0.706992	-0.703083	0.000008	0.491583	0.493982

Table No. (5) Estimated values of the parameters 1ϕ, 2ϕ with MSE values for different estimation methods

Rep.	ϕ_1	ϕ_2	Sum Square Error	MSE	Standard Error
0	0	0	17247500	183484.0	428.351
1	0.491761	0.490749	1483604	15783.4	125.632
2	0.491698	0.490780	1480052	15745.2	125.480
3	0.491687	0.491552	1476323	15705.6	125.322
4	0.491663	0.491979	1472094	15660.6	125.142
5	0.491606	0.492976	1470117	15639.5	125.058
6	0.491585	0.493965	1463605	15570.3	124.781
7	0.491583	0.493969	1463602	15570.2	124.780
8	0491583	0.493982	1463602	15570.2	124.780

Table No. (6) predictive values of revenues using the slope projection model

Methods	$\hat{\Phi}_1$	$\hat{\Phi}_2$	MSE
Approximate MLE	0.465673	0.422971	15581.7
Exact MLE	0.466522	0.496651	15364.6
OLS	0.500325	0.492121	16009.1
Gradient Projection	0.491583	0.493982	15570.2

month	Forecast	Lower Limit	Upper Limit

January	464.87	367.25	562.50
February	526.39	415.86	636.94
March	488.41	548.84	590.97
April	500.12	359.09	605.15
Mace	487.11	384.82	589.40
June	486.52	384.34	588.67
July	479.79	379.03	580.54
Augast	476.18	376.18	576.18
September	471.09	372.162	570.01
October	466.80	368.77	564.83
November	462.18	365.13	599.24
December	457.79	361.67	553.93

Conclusions;

1) Despite the increasing volume of demand for religious tourism, the broader pattern of travel and tourism traffic to Iraq is represented by the demand for religious tourism .
2) The existence of a set of economic determinants that affected differently, including economic determinants (income, exchange rate, prices, cost and price flexibility), and there are social units among them (social factors, marketing means, political situation) .
3) It is difficult to measure the size of the internal tourist demand and rely only on the annual hotel survey, and this does not reflect the true size of the tourist demand.
4) Weak use of a model to predict the movement of incoming tourism to Iraq, which reduced the chances of knowing the size of the tourist demand.
5) The sloping projection method is very similar to the OLS method, as both aim to make the sum of squares of errors as minimal as possible, except that the studied method relies on repetitions somewhat similar to Newton's method.
6) The method does not depend on the nature of the distribution of the string observations, whether natural (non-Gaussian) or non-natural (non-Gaussian), and thus this method can be considered unscientific.
7) Through the application, it was found that the sloping projection method was the second-best method after the maximum possible controlled method (Exact MLE) based on the MSE standard as in Table.

Recommendations:

1) The necessity of diversifying the tourist demand and moving towards comprehensive tourism so that the request does not affect only the religious occasions specified on certain days of the year.
2) Urging the authorities responsible for the tourism sector to facilitate the procedures of the tourist trip and reduce the economic impacts if there is a negative impact that stands in the way of travel and tourism in Iraq
3) Paying attention to the internal tourism demand account through relying on the sub-tourism account and the real trend towards using the Projection Gradient model.
4) The estimation results were encouraged by using the studied method, so we recommend using it at the level of seasonal and non-seasonal time series.
5) We recommend adopting the prediction results for the research based on the estimated formula for the AR (2) model resulting from matching the observations of the series of tourist numbers in Iraq.
6) We recommend a study of Moving Averages and ARMA models in forecasts, using a sloping projection method for Sightseeing series in Iraq .

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