*IOSR Journal of Applied Geology and Geophysics (IOSR-JAGG)*
*e-ISSN: 2321–0990, p-ISSN: 2321–0982.Volume 2, Issue 6 Ver. II (Nov-Dec. 2014), PP 34-39*
*www.iosrjournals.org*

# Measurement of Development Level in Rural Tourism, by using Factor Analysis model (Case Study: Kalat County)

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***Abstract:*** *Today for many of policymakers and planners, Tourism is considered the necessary condition for moving toward Construction and Development of rural areas. The purpose of this article is to measure the level of development in rural tourism with regard to facilities and infrastructure of tourism. Research method in this research is descriptive-analytical and in terms of purpose this research would be a functional and practical one.In this research 63 villages of Kalat city were studied and analyzedbyindices ofdevelopment of tourism. For this purpose, 29 sub-indices were utilized further categorized into 6 main indices, and finally by using factor analysis technique, relations between variables together with their optimal combination were analyzed.The study of the Kalat's share of tourism infrastructures reveals that the villages Hassan Abad -Laeen No, Baba-Ramezan and Chenar respectively having composite indices of4/770, 3/013 and 2/665, are among the top three in terms of ranking, while AlangSofla,and Kartash are the last villages in terms of ranking. In this research we endeavor to give a more clear and elaborate picture of conditions andpotentials together with possibledifferences in these areas, through determiningthe level of development of tourism infrastructure in villages as well as explaining the current condition of these districts in respect of their enjoyment or lack of present study indices, thereby assisting the policy makers and tourism authorities in their subsequent planning anddistributed allocation of resources in obliteration of inequalities.*

***Key Words:*** *Rural Tourism, Development of RuralAreas, Factor Analysis, Kalat County*

## I. Introduction

Lack of ranking, classification, and consequently disproportionate distribution of infrastructures as well as tourism services are among apparent drawbacks of many studies and projects related to the development of tourism industry in Iran (Ghafari 2008: 2).Today, awarenessof strengths and weakness ofrural areas should be considered as a kind of necessity inplanning for development ofrural tourism "in such a way that using economic, social, cultural, health care, etc. indices can bea suitable criteria for determining status of them as well asa solution for problems and shortcomings in these areas, in order to achieveeconomic prosperity and social health as an standard of development " (taqvaie 2012: 16)

Kalatcountywith an area equivalent to 3502/96 $Km^2$ is one of the townships of the province ofKhorasan-e-Razavi, Iran. This city is located in E, 58,40,60,25 and N, 36, 22, 37, 32. It is surrounded by Turkmenistan from north, from the East by the town of Sarakhs, from south by Mashhad cities, and Chenaran, and by Dargaz from west (census periodical of Khorasan-e-Razaviprovince, 2011).The average altitude ofthis town is780 meters above sea level. Kalat countyis composed of two parts (Central and Zavin) together with four districts (Hezarmasjed, Kabudgonbad, Zavin and Pasakuh) as well as two towns of Kalat and Shahrouz, and finally 63 inhabited villages. In 2011 the rural population of KalatCounty was 26611, while the urban population has been reported to be 11621, according to the census periodical of Khorasan-e-Razaviprovince, 2011. Kalat is connected to Mashhad through the Asphalt Road Mashhad-Kalat.Kalat County abounds in natural resorts as well as historical, cultural-religious attractions.HezarMasjed heights, plethora of springs, rivers, waterfalls, green pastures, natural forests of cedar and pistachio, untouched valleys andmountains , all have bestowed the Kalat county an elegant as well as a unique spectacle.Kalat County has more than 116 historical and natural works in total.

Inspring and summer the Kalat County is one of the most appealing cities of Khorasan-e-Razavi province. (Department of Kalat Cultural Heritage, tourism and handicrafts, 2013). According to the announcement of public relations and cultural affairs sector of the department of cultural heritage, handicrafts

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and tourism ofKhorasan-e-Razavi province,more than 700 thousand peoplevisited KalatCounty in 2013,one third of this population visited the villages of this region. Providing satisfaction as well as creating a proper mental image for tourists of this cities, apart from necessary touristic attractions, requires availability of facilities as well as proper infrastructures in general. As a result, it would be essential to have an in depth observation on touristic infrastructures together with its manner of distribution, so that we may have a more comprehensive picture of levels of prosperity and lack thereof in the villages of the region.The main objective of this study is to assess and analyze inequality in distribution of touristic infrastructures, through answering to the following questions and by using Delphi techniques together with factor analysis and determiningits composite index.

1-Is the touristic infrastructures distributed evenly among Kalat villages for an equal development of tourism in rural areas of this region?

2-What are the ranking of Kalat villages in terms of their touristic infrastructures?

## II. Research Methodology

The present survey is a practical study in terms of purpose, while it is descriptive-analytical in terms of nature and approach. Statistical population of this survey would be the villages of Kalat, and the required data are collected and updated through field studies and census for collecting data about population and housing, conducted in 2011, in 63 inhabited villages of the county. In this research tourism index for each village is specified and Delphi technique (asking for opinions of experts in the tourism and cultural heritage department) is used to determine the level of significance of the above indices clear for the determination of the index of the above method of Delphi opinion poll of experts tourism Cultural Heritage Administration, university professors and individuals expert local) has been utilized.With respect to multiple criteria, factor analysis is utilized in determining the main indices in the development of rural tourism. In the end, the villages have been categorized according to their ranking, through calculation of composite index.In order to facilitate analysis of data SPSS and Excel environments were used for statistical analysis.

- **Introducing Research Indices**

To achieve a thorough understanding of current status of tourism infrastructures and their analysis, It is necessary to a have adequate knowledge of the related indices. Therefore to come up with a list of the indexes related tothe measurement of rural tourism development, we made use of written sources in the field rural tourism, field investigations together with experts and scholars views in this regard.In the end, the indices which were relevant to the subject of this research were collected (29 indices in total) and used to assess Kalat villages.All indices were classified into 6 groups. (Table No. One) Indices mentioned include: Tourism attractions, tourism services and facilities, infrastructure services, health care services, communication, administrative and political services.

**Table 1:** Indices for the Measurement of Rural Tourism Development

| Row | Criterion | Sub-criterion |
|---|---|---|
| 1 | **Tourism attractions** | natural attractions - historical and cultural attraction |
| 2 | **Facilitiesand Services Tourism** | rural rental housing, entertainment camping facilities,restaurants, Bistro, reception centers, native food stores, centers for selling local handicrafts, public restroom,parking lots |
| 3 | **Infrastructure Services** | roads, water fit for drinking, gas mains, electricity, garbage disposal system, the tour guide plan study, the tour guide plan implementation |
| 4 | **Health care Services** | health office, physician, social workers, treatment center |
| 5 | **Communication Services** | Telephone line, IT office, public Internet access, access to public transportation |
| 6 | **Politicaland Administrative Services** | sheriff, police station,cooperative, bank |

Source: Author's field studies in 2013

## III. Research Findings

After the selection of relevant criteria we should form the matrix of the data. In this study the data matrix is composed of 6 columns that contain indicators of rural tourism development and 63 rural spots in Kalat are presented in itsrows.In order to have a satisfactory factor analysis we should have a collection of data suitable in terms of sample size as well as the relationship between variables.With regard to the results in the KMO and Bartlett tests which are presented in Table two, the KMO value is equivalent to 0/800 which is an indication of selected criteria for factor analysis technique have been satisfactory.Bartlett's testis used to test if the correlation coefficient is unitary, while Sig= 000 Indicates the significance of the test.

**Table 2:** KMO and BTS Tests

| | | |
|---|---|---|
| **The adequacy test of Sample,KMO** | | **0/800** |
| **Bartlett`s Test** | **Theapproximate amount of Chi square** | **141/622** |
| | **degreeof freedom (df)** | **15** |
| | **The significance level ( Sig )** | **000** |

For the town of Kalat we will have a 6*6 matrix index.Its diameter quantities will be 1 all the figures beneath the diameter will be repetition of figures above the diameter, for any solidarity Index, and the index of a Solidarity index 2 to 1 always equals solidarity with index 1 index 2.

**Table 3:** Correlation Matrix between Variables

| Indices | tourism attractions | tourism facilities and services | Infrastructure Services | Health and Treatment Services | Communication Services | Political administrative services |
|---|---|---|---|---|---|---|
| **tourism attractions** | 1/000 | 0/416 | 0/329 | 0/329 | 0/486 | 0/496 |
| **tourism facilities and services** | 0/416 | 1/000 | 0/119 | 0/119 | 0/163 | 0/235 |
| **Infrastructure Services** | 0/329 | 0/119 | 1/000 | 1/000 | 0/586 | 0/645 |
| **Health care and therapeutic Services** | 0/281 | 0/120 | 0/638 | 0/638 | 0/632 | 0/556 |
| **Communication Services** | 0/486 | 0/163 | 0/586 | 0/586 | 1/000 | 0/598 |
| **Political administrative** | 0/496 | 0/235 | 0/645 | 0/645 | 0/598 | 1/000 |

Results of the analysis of indices through analysis of the main components are presented in Table No. 4.In the following table, the first number is the most important factor in this analysis, which alone, constitutes 53/622 Percent of variance. The next componentconstitutes about 18/940 Percent of variance.As the next components are less than 1, cannot be significant and meaningful, hence we cannot use them in our subsequent analyses.

**Table 4:** Eigenvalues and the Sum of the Coefficients

| Rotationsums ofSquared Loadings | | | Extractionsumsof Squared Loadings | | | Initial Eigenvalues | | | factors |
|---|---|---|---|---|---|---|---|---|---|
| Cumulative (Percentage) | Variance (Percentage) | Total | Cumulative (Percentage) | Variance (Percentage) | Total | Cumulative (Percentage) | Variance (Percentage) | Total | |
| 50/187 | 50/187 | 3/011 | 53/622 | 53/622 | 3/217 | 53/622 | 63/622 | 3/217 | **1** |
| 72/562 | 22/374 | 1/342 | 72/562 | 18/940 | 1/136 | 72/562 | 18/940 | 1/136 | **2** |
| | | | | | | 82/152 | 9/590 | 0/575 | **3** |
| | | | | | | 89/645 | 7/493 | 0/450 | **4** |
| | | | | | | 94/925 | 5/280 | 0/317 | **5** |
| | | | | | | 100/00 | 5/075 | 0/305 | **6** |

for a better and clearerunderstanding of factors in explaining variances we used a graphic chart of special value of each factor, based on which we can specify the number of factors value of which are higher than one.In the graphical chart number (2), special values are depicted according to their significance from higher to lower. As we can see in the chart, the imaginary line after the second factor, has a descending trend and tends to become flat, and the special value is below one, after the second factor. Therefore maximum number of factors can be two.

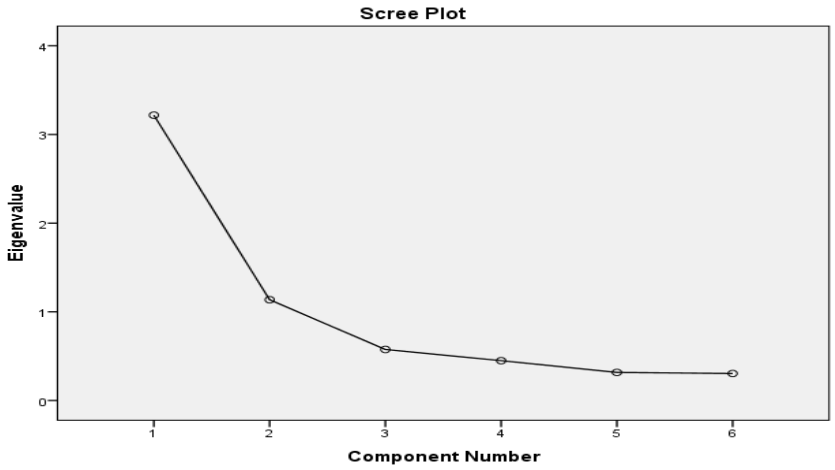


**Figure 1 -** Graphical Display of Special Value of Each Factor Extracted

Table (5) presents matrix of components and variables share in factors before the rotation.This chart indicates the level significance of factors.To interpret this table we can say that, the more the factor load, the higher their significant level will be.Accordingly, the values of the components whose value is more than 0/50, were selected and indicators corresponding to each of the components were determined

**Table 5:** The Correlation Coefficient Matrix of Indices and Each Factor (Factor Burdens) Before Rotation

| factors | | indices |
|---|---|---|
| Factor 2 | Factor 1 | |
| 0/514 | 0/656 | **tourism attractions** |
| 0/812 | 0/359 | **tourism facilities and services** |
| -0/295 | 0/806 | **Infrastructure Services** |
| -0/330 | 0/782 | **Health care and Therapeutic Services** |
| -0/128 | 0/832 | **Communication Services** |
| -0/032 | 0/840 | **Political administrative services** |

as it is observed, the indices of infrastructure services, medical services and health care and therapeutic services, communication services,administrative and political services, had the highest factor burden within the first factor, while touristic attractions, touristic facilities and services contained values higher than 0/50 in the second factor, which can be regarded significant.In this study, for the purpose of factor rotation, the Quartimaxmethod inSPSS was used.The result of the rotation is a matrix of rotated factors for each of which certain weight is considered for the related variable therefore clearly connects each factor to specific variables. It is worth mentioning that after the rotation of factors, the percentage of variance specified by each factor changes while, the cumulative percentage of variance remains unchanged.The table No. (6) Shows the values of extracted factors for each variable after rotation.

**Table 6:** The Correlation Coefficient Matrix of Indices and Each Factor (Factor Burden) After Rotation

| factors | | indices |
|---|---|---|
| Factor 2 | Factor 1 | |
| 0/694 | 0/461 | **tourism attractions** |
| 0/884 | 0/085 | **tourism facilities and services** |
| -0/027 | 0/858 | **Infrastructure Services** |
| -0/067 | 0/846 | **Health care and Therapeutic Services** |
| 0/140 | 0/830 | **Communication Services** |
| 0/234 | 0/807 | **Political administrative services** |

With regard to the degree of correlation between each group of indices, proper titles can be chosen for each factor. Factors created in this study and their denomination are as follows.

**The First Factor:** the special value of this factor is 3/217 which alone constitutes 63/622percent of the variance, and has the highest impact of the two factors.This factor, including the variables of infrastructure services, health care and therapeutic services, communication services together withadministrative and political services, enjoys a high and positive correlation coefficient.Therefore we may call the first factor **"Infrastructure Development Services"**.

**The Second Factor** the special value of this factor is 1/136 which alone constitutes 18/940 percent of the variance.The indices which have a high correlation coefficient within the second factor, are touristic attractions and tourism facilities, hence we can callthe second factor "**Tourism Attractions and Services**".

The Statistical method of factor analysis is one of the most suitable methods of evaluation and assessment of development, although it cannot be used for classification and ranking purposes. But this method provides factors as new variables, for the purpose of classification and ranking, through reduction of variables as well as removing correlations among them (Pardazimoghadam 2007:15).In this research after generating the rotated factor matrix, it would be necessary to calculate factor Scores. So it is necessary to do some calculations to find out the rankings of villages based on 6 indices. In fact, factor scores are figures collected after multiplication of factor weights by the modified index values.Table (7) demonstrates factor score coefficientsfor each of the indices. After factor analysis and extraction of factors, we calculated the sum of factor values attributed to each village (composite index) through the factor matrix based on villages, which is an indication of relative status of each village to other villages. After the calculation of the composite indexes, figures are sorted by descending order and the relative status of each village is identified. The table No. (8)

**Table 7:** Factor Score Coefficient Matrix

| Factors | | indices |
|---|---|---|
| Factor 2 | Factor 1 | |
| 0/493 | 0/051 | **tourism attractions** |
| 0/713 | -0/119 | **tourism facilities and services** |
| -0/168 | 0/319 | **Infrastructure Services** |
| -0/199 | 0/322 | **Health care and Therapeutic Services** |
| -0/026 | 0/281 | **Communication Services** |
| 0/056 | 0/257 | **Political administrative services** |

It is observed that, based on the results of this analysis, villages of Hassanabad-e-laeen-no, Babaramazan and Chenar, with composite indices of 4/770, 3/013 and 2/665, are placed first to third respectively with regard to their ranking, while villages of Alang, Sofla, and Kartash are the last three in terms of ranking.

**Table 8:** Rankings and Composite Index Calculated Using Factor Analysis

| Ranking | Name of the village | composite index | Ranking | Name of the village | composite index | Ranking | Name of the village | Composite index |
|---|---|---|---|---|---|---|---|---|
| 1 | Hassan Abad Laeen No | 4.7704 | 22 | Zharf | 0.48838 | 43 | AsiabGhashgha | -1.05351 |
| 2 | Baba Ramezan | 3.01389 | 23 | Sanganeh | 0.29687 | 44 | Ghabakh | -1.07141 |
| 3 | Chenar | 2.66559 | 24 | Sirzar | 0.2322 | 45 | Karim Abad | -1.16346 |
| 4 | Ortekand | 2.2916 | 25 | Hesar Haji Ismaeel | 0.17171 | 46 | Charm No | -1.20015 |
| 5 | Sarrood | 2.22559 | 26 | KheshtNaderi | 0.01185 | 47 | Sini No | -1.20015 |
| 6 | SinehKohneh | 1.9922 | 27 | Sangdivar | -0.00569 | 48 | Taher Abad Miyan/ GhaleMiyan | -1.27285 |
| 7 | Ghalezoo | 1.71099 | 28 | Taghi Abad | -0.08583 | 49 | Asad Abad | -1.27285 |
| 8 | Gharesoo | 1.69387 | 29 | LaeenKohneh | -0.12811 | 50 | Soltan Abad | -1.39671 |
| 9 | HamamGhaleh | 1.50827 | 30 | BaghKand | -0.1830 | 51 | Taher Abad Turkha | -1.41105 |
| 10 | Abgarm | 1.43801 | 31 | Aghdash | -0.19163 | 52 | Baghgah | -1.43126 |
| 11 | Chaharrah | 1.35914 | 32 | Sarjangal | -0.20713 | 52 | Sirzar | -1.43126 |
| 12 | Ghelich Abad | 1.27945 | 33 | Kaloo | -0.33961 | 52 | Taher Abad Turkha | -1.43126 |
| 13 | Amir Abad | 1.23758 | 34 | Bardeh | -0.38902 | 52 | KhalajSofla | -1.43126 |
| 14 | Ghaleno | 1.23332 | 35 | KarnavehShirin | -0.47833 | 53 | Bamchenar | -1.53492 |
| 15 | Chahchaheh | 1.16718 | 36 | Baba Faraji | -0.53287 | 53 | AlangOlia | -1.53492 |
| 16 | Jalil Abad | 1.16633 | 37 | Robat | -0.67976 | 53 | Taher Abad Barbariha/ Taher Abad Olia | -1.53492 |
| 17 | Gharetikan | 1.07344 | 38 | Ikmeh | -0.69975 | 53 | Taraghti | -1.53492 |
| 18 | Charm Kohneh | 0.99445 | 39 | ShoorestanGheshlaghChenar | -0.7057 | 53 | Aziz Abad | -1.53492 |
| 19 | Garv | 0.93641 | 40 | Noghteh | -0.85816 | 53 | Haji Abad | -1.53492 |
| 20 | Archangan | 0.89055 | 41 | Ahmad Abad | -0.94183 | 54 | AlangeSofla | -1.67312 |
| 21 | Idelik | 0.86188 | 42 | Momen Abad | -0.96182 | 54 | Kartash | -1.67312 |

## IV. Conclusion

Rural tourism as an empowering phenomenon and as a God-given potential, can attract physical sources as well as populations to the countryside. According to the findings of this study rural areas of Kalat county as a major township, has a significant natural and cultural potential for development in tourism.In this regard, as stated in the introduction,the purpose of this study was to calculate the level of tourism development in the villages of KalatCounty in 2013.After reviewing different methods of ranking and classification, the factor analysis was chosen for evaluation and ranking of villages of Kalat county.

Consequently, 63 rural spots in Kalat County were identified and analyzed in terms of tourism infrastructures.For the same reason, to generate a list of indices related to rural tourism development, we made use of written sources on the rural tourism, field investigations, and interviews with experts and scholars in the field.Indices of high relevance to the subject of this study were extracted throughDelphi method.In this studywe made use of 29 sub-indices which were classified into 6 indices, to assess the criteria effective on the development of rural tourism.These criteria are as follows:tourism attractions, tourism facilities and services,

infrastructure services, health care- therapeutic services, communication, administrative and political services. Through the techniqueof factor analysis and analysis of correlations between and among variables, and through their optimal combination, we came to two significant factors.

These two factors taken together, constitute 72/562% of the variance, and this percentage can be an acceptable figure in factor analysis, and we are reassured by it that the selected indices have been appropriate.With regard to the degree of correlation between each group of indices, we can chooseproper titles for each factor.The first factor, the special value of which is 3/217, alone constitutes 63/622 percent of variation.This factor, including the variables of infrastructure services, health care and therapeutic services, communication services together withadministrative and political services, enjoys a high and positive correlation coefficient.Therefore we may call the first factor "infrastructure development services".

The second factor, the special value of which is 1/136, alone constitutes 18/940percent of variation. The indices which have a high correlation coefficient within the second factor, are touristic attractions and tourism facilities, hence we can callthe second factor "**tourism attractions and services**". In the end, through factor score calculations, and factor matrices based on villages,the sum of factors attributed to each village (composite index) were calculated.After the calculation of composite indexes, figures were sorted in descending manner, and the relative status of villages were identified; as a result we were able to sort the villages of Kalat county in terms of their ranking.

Based on the results of factor analyses as well as composite indices, the degree of enjoyment of Kalat villages from tourism infrastructures indicates that, villages of Hassanabad-e-laeen-no, Babaramazan and Chenar, with composite indices of 4/770, 3/013 and 2/665, are placed first to third respectively with regard to their ranking, while villages of Alang, Sofla, and Kartash are the last three in terms of ranking.

Lack of balance and inequality in terms of Kalat villages` enjoyment of tourism infrastructures can be due to the fact that one village may enjoy tourism attractions like elegant nature or cultural-historical attractions, which would lead to its further enhancement of infrastructural facilities and resources, compared to other villages.Meanwhile,these pre-given advantages with regard to tourism infrastructures, can be effective in having accommodation and reception services,as it is the case in typical touristic villages.

By identifying the level of development of each village in terms of tourisminfrastructures and by way of explaining the current status of these areas in terms of their enjoyment or lack of the indices in this study , we may assist tourism authorities and planners in their subsequentplanning, and distributed allocation of resources in obliteration of inequalities; planners in turn, through taking appropriate strategies and strategic measures in the field of tourism, can provide the necessary grounds and conditions for investment and development in these regions.

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