

Using Factor Analysis for Residents' Attitudes towards Economic Impact of Tourism in Nepal

Basanta Dhakal

Research Scholar, Central Department of Statistics, Tribhuvan University, Nepal

Abstract Tourism is one of the fast growing industries and valuable sectors of Nepalese economy, which plays an important role in the development of communities in the Nepalese context. Keeping this point into consideration, this study attempts to examine residents' attitudes towards economic impact of tourism in Nepal by conducting face to face field survey of 601 respondents from certain tourist destinations with response rate 91.76%. A questionnaire was designed to collect the data and the respondents' level of agreement has been measured by five point Likert scale. In this study, factor analysis has been used to analyze the impact of tourism in economic development of Nepal. This study finds that the respondents have undergone with both positive and negative economic impacts of tourism. The results of this study also reflect that the development of tourism has helped most of the informants to improve their economic opportunities, sanitation, and livestock production along with the opportunities to utilize alternative energy. It has also caused for the significant rise in price of goods, land and housing. The factor analysis found that 67.84% total variance of perception of residents has been explained by positive impact of tourism and 59.39% total variance has been explained by negative impact of tourism.

Keywords Economic benefits, Migrant's dominance, Positive impact

1. Introduction

The economic impact of tourism is generally perceived positively by the residents. First of all, tourism acts as an export industry by generating new revenues from external sources. A host nation will gain foreign exchange, which will contribute to improve the nation's balance of payments [1, 2]. It decreases unemployment by creating new job opportunities [3]. Increasing demand for tourism encourages new infrastructure investment [4] and communication and transportation possibilities [5]. The amount of taxes collected by government will also increase with the higher level of economic activity. The local residents of a tourist hub might have a better standard of living and higher level of income by tourism activities.

However, if not well planned and controlled, tourism may lead to negative impact or reduce the effectiveness of positive ones. The prices of goods and services might go up with the increased demand from foreign customers [6]. Increasing demand for accommodation, especially in tourism seasons, might push up the rents as well as the land prices for building new houses and hotels [7]. New revenues from tourism usually flow to the owners and businessmen while the residents suffer from increasing cost of living. This might

cause a disparity in people's income and employment opportunities thereby motivating people to migrate to the tourism areas. Numerous academic studies have been performed to identify residents' attitude towards impact of tourism. Some of significant analysis on residents' perceptions are Ross [8] for Australia; Mason and Cheyne [9] for New Zealand; Ritchie and Inkari [10] for England; Sanchez, Bueno and Plaza-Mejia [11] for Spain; Duran and Ozkul [12] for Turkey; Styliadis and Terrizidou [13] for Greece; Liu and Var [14] and, Wang and Chen [15] for USA; Xue, Kerstetter and Buzinde [16] and, Zuo, Gursoy and Wall [17] for China. The several studies illustrated that the respondents are facing both positive and negative impact of tourism. Tourism is one of the fast growing industries and valuable sectors of Nepalese economy. Moreover, it significantly plays an important role in the economic development of communities in the Nepalese context. Keeping this point into consideration, this study has made an attempt to examine the residents' attitudes towards economic impact of tourism in Nepal using factor analysis. This study expects that the findings of this paper may facilitate the planners and decision makers to formulate the policies and programs for the local communities, who are involving in the Nepalese tourism business.

2. Methods

Jinwoo Park and Misook Jung [18] have provided a method for determining a sample size under certain

* Corresponding author:

basantadh@gmail.com (Basanta Dhakal)

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assumptions when the quantity of interest is measured by Likert scale.

$$n = Z^2 \alpha / 2 \cdot \frac{C^2}{K D^2} [1 + (K - 1) \rho] \quad (1)$$

Where n represents the sample size, K represents the number of items used for Likert scale varies from 1 to 10. D represents the relative tolerable error bounds from 1% to 10%. C represents the coefficients of variation of a population varies from 0.1 to 1.0 and ρ represents pair-wise correlation coefficient varies from 0.1 to 0.7 (Park and Jung, 2009). This study has applied above formula of estimating sample size assuming $K=10$, $D=5\%$, $C=1.0$ and $\rho=0.3$.

$$n = (1.96)^2 \times \frac{(1)^2}{10(0.05)^2} [1 + (10 - 1)0.3] \\ = 568.56 \approx 569$$

During data collection, stratified random sampling approach has been used to select the respondents that represent the whole group of population that lives in three tourist destinations: Annapurna Base Camp Rout (Ghandruk VDC), Bhaktapur (Nagarkot VDC), Wildlife Conservation Center Chitwan (Bachhauli VDC, ward number 1-4). Nepal is divided into three ecological zones: Mountain, Hill and Terai/Inner Terai. So, Ghandruk is taken as Mountain, Nagarkot is taken as Hill and Bachhauli is taken as Terai/Inner Terai. Assuming that 15% non-response rate, a sample of 655 residents has been randomly drawn from electoral rolls based on Constitution Assembly Election II, 2013 provided by ECN [19] using randomization technique. All adult members of the household were approached. The questionnaire was distributed door to door and this method was chosen because of its higher response rate than other methods [20]. If an individual refused to participate or could not present in his/her resident, the next member of same or neighboring household was intercepted and asked to participate [21]. The sampling frame has been designed to obtain a greater degree of representativeness from local residents to achieve a broad range of representation from the whole population. The actual population number in every location has been based on National Population and Housing Census of Nepal 2011, CBS [22]. The strata wise distribution of population and samples; and completed questionnaire are shown in the Table 1.

Table 1. Population and Sampling Frame

Location	Population (%)	Strata- wise Distribution of Samples	Completed Questionnaire
ABC Rout (Ghandruk VDC)	4265(31%)	0.31x655=203	192
Bhaktapur (Nagarkot VDC)	4571(33%)	0.33x655=216	201
WCC Chitwan (Bachhauli VDC, ward no. 1-4)	4906(36%)	0.36x655=236	208
Total	13742(100%)	655	601

The data collected in four-week-period (mid January to mid February), 2017, which is low tourist arrival season in Nepal. 601 respondents completed the survey, with a response rate 91.76%.

This study has been used exploratory factor analysis which tries to uncover the complex patterns by exploring the data set and testing prediction [23]. This study has adopted the extraction method based on principal component analysis and the rotation method based on Varimax with Kaiser Normalization.

Factor analysis model assumes that there are m underlying factors whereby each observed variables is a linear function of these factors together with a residual variate [24]. This model intends to reproduce the maximum correlations.

$$X_j = \lambda_{j1} F_1 + \lambda_{j2} F_2 + \lambda_{j3} F_3 + \dots + \lambda_{jm} F_m + \epsilon_j \quad (2)$$

Where $j=1, 2, 3, \dots, p$. The factor loadings are $\lambda_{j1}, \lambda_{j2}, \lambda_{j3}, \dots, \lambda_{jm}$ which denotes that λ_{j1} is the factor loading of j^{th} variable on the 1st factor. The measurement error for X_j is denoted by ϵ_j .

The Community is the summation of squared correlations of the variable with the factors [25]. It can be expressed in the following form:

$$h_j^2 = \lambda_{j1}^2 + \lambda_{j2}^2 + \dots + \lambda_{jm}^2 \quad (3)$$

Where h^2 is communality and $\lambda_{j1}, \lambda_{j2}, \dots, \lambda_{jm}$ is the factor loadings for j variables which shows the how much the variable contributes to each factor.

Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy [26] has been intended to check the suitability of data set for factor analysis. KMO varies from 0 to 1 where as the values between 0.5 to 0.7 are mediocre, between 0.7 to 0.8 are good, 0.8 to 0.9 are great and above 0.9 are superb [27]. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is given by the formula:

$$KMO_j = \frac{\sum_{i \neq j} R_{ij}^2}{\sum_{i \neq j} R_{ij}^2 + \sum_{i \neq j} U_{ij}^2} \quad (4)$$

Where R_{ij} = correlation matrix and U_{ij} = partial covariance matrix.

The Bartlett's test of Sphericity [28] has been used for testing the null hypothesis that the original correlation matrix is an identity matrix. The Bartlett's test of Sphericity is given as:

$$\chi^2 = [1 + \frac{2p+5}{6} - n] \ln(1 - |R|) \quad (5)$$

Where p = number of variables, n = total sample size and R = correlation matrix.

Multicollinearity can be detected by looking at determinant score of correlation matrix. If correlation is singular, the determinant $|R|=0$. The determinant score has been computed for testing the problem multicollinearity. A simple heuristic is to make sure that determinant $R > 0.00001$ [29].

The Cronbach's alpha coefficient has been computed for testing the internal consistency or reliability, $\alpha > 0.5$ [30]. It provided the measure of scale reliability which can be

expressed as:

$$\alpha = \frac{n^2(\overline{COV})}{\sum S^2 + \sum COV} \quad (6)$$

Where n is number of sample, S^2 is variance within the items, COV is covariance between a particular item and any other item on the scale, and \overline{COV} is average covariance between the items. All the statistical analysis has been performed by using IBM*SPSS*statistics version 20.

3. Results and Discussions

3.1. Socio-demographic Profiles of Respondents

In this study, the socio-demographic profiles of local respondents has been based on gender, marital status, education status, entrepreneur types, religion, cast/ethnicity, age in year, income level and family size. According to socio-demographic profiles of respondents, there was distribution of men and women with 54.4% and 45.6% respectively. Most of the respondents were married with 77.9%, while 19.3% were still unmarried and 2.8% were widow/widower. With regard to education background, 9.5% were still illiterate, 17.1% were literate without school, 18.8% were completed with primary education, 26.5% were completed with secondary education, 18.5% were completed with higher secondary education and 9.7% respondents had university degree. Similarly, 7.5% respondents were involved in home stay, 22.5% respondents were traders, 25.5% respondents were involved in hotel/guest house, 7.5% respondents were involved in restaurant, 25% respondents were involved in agriculture and animal farming, 6.2% respondents were involved in travel and tour agency, 6% respondents were not involved in tourism business. Most of the respondents were Hindus with 71.5% while Buddhists were 22.6% and Christian were 5.8%. With regard to caste and ethnicity, 24.9% respondents were in Brahmin /Chhetry /Dashanami group, 70.2% respondents were in Madhesi/Janjati/ Adibashi group and only 4.9% were in Dalit group. The age group of 38.3% respondents was in 21-29 years old, 28.8% respondents was in 30-39 years old,

21.9% respondents was in 40-49 years old and 10.9% respondents was in 50 years and over. The income level of 44.6% respondents was less than 20(000NRS), 39.8% of respondents earned 20-40(000NRS), 8.9% of respondents earned 40-60 (000NRS) and 6.7% of respondent earned more than 60(000NRS). Similarly, 36.1% respondents had less than or equal 4 family members, 40.4% respondents had 5 to 6 family members and 23.5% respondents had more than 7 family members.

3.2. Positive Economic Impact of Tourism

The most important positive economic impact of tourism is economic benefits such as job opportunity, investment opportunity and increasing income level of people. Similarly, it positively impacts on standard living such as awareness of hygiene and construction of private toilet as well as development of livestock product and alternative energy. To analyze the positive economic impact of tourism, KMO measure of sampling adequacy, Bartlett's test of Sphericity, and determinant score have been calculated to identify the suitability of the data set for operating the factor analysis.

Table 2. KMO, Bartlett's Test and Determinant Score

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.71
Bartlett's Test of Sphericity:	
Approx. Chi-Square	745.71
df	21
Sig.	0.00
Determinant Score	0.29

Table 2 shows the value of KMO statistic is equal to 0.71>0.6 which indicates that factor analysis is appropriate for the data. The Bartlett's test is highly significant ($p<0.001$), and therefore there are some relationships between the variables. The determinant score is 0.29>0.00001 which indicates that there is an absence of multicollinearity. The Eigen values associated with each factor represent the variance explained by those particular linear components.

Table 3. Initial Solution for Positive Impact of Tourism

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	%of Variance	Cumulative %	Total	%of Variance	Cumulative %	Total	%of Variance	Cumulative %
1	2.41	34.39	34.39	2.41	34.39	34.39	2.13	30.41	30.41
2	1.32	18.84	53.23	1.32	18.84	53.23	1.36	19.42	49.83
3	1.02	14.61	67.84	1.02	14.61	67.84	1.26	18.01	67.84
4	0.75	10.68	78.51						
5	0.65	9.22	87.73						
6	0.47	6.64	94.37						
7	0.39	5.63	100.00						

Table 3 shows that before extraction, it is identified 7 linear components within the data set. After extraction and rotation, there are 3 linear components (factor) within the data set whereas the Eigen value is greater than 1. The result shows that 67.84% common variance shared by 7 variables can be accounted by three factors. This is the reflection of KMO of 0.71 (mediocre to good). This initial solution suggests that the final solution will extract not more than 3 factors.

The scree plot is also used to determine the number of factors to retain; it is a graphical representation of Eigen values associated with each of the factors extracted.

The scree plot shows that there are three factors in which the Eigen values are greater than or equal to one. The diagonal anti-image correlation column gives the information of sampling adequacy of each and every item. Communalities reflect the common variance in the data structure after extraction. Factor loading expressed the relationship of each variable to the underlying factors. These measures are displayed in Table 4.

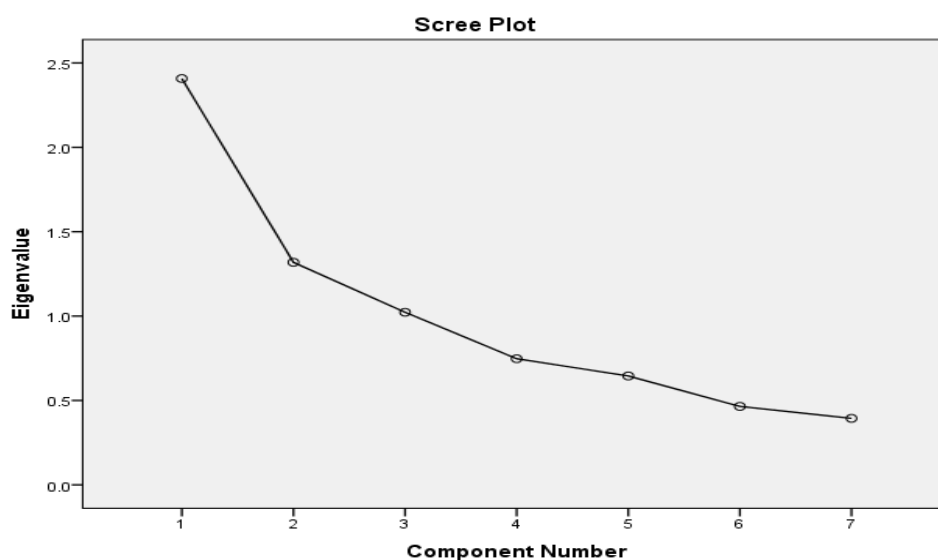


Figure 1

Table 4. Summary for Positive Impact of Tourism

Positive Impact of tourism (Cronbach's Alpha, $\alpha=0.65$)	Diagonal anti-image correlation	Communality after extraction	Factor loadings	Mean	Std. deviation
Factor 1: Economic Benefits (E.V.=2.41 & Variance=30.41%)					
•Tourism creates job opportunities for local people.	0.74	0.69	0.82	4.20	0.93
•Tourism has created opportunity for investment in various sectors.	0.70	0.73	0.85	4.24	0.84
•Tourism has increased the income level of local people.	0.74	0.70	0.82	4.13	0.85
Factor 2: Sanitation (E.V.=1.32 & Variance=19.42%)					
•Increasing the construction of private toilets in the local level due to development of tourism.	0.59	0.72	0.85	4.59	0.65
•Tourism has increased the awareness of hygiene.	0.66	0.63	0.77	4.35	0.76
Factor 3: Livestock and Alternative Energy (E.V.=1.02&Variance=18.01%)					
•Increasing livestock product in local level due to development of tourism.	0.74	0.64	0.78	3.43	1.01
•Increasing uses of biogas / solar energy in the local level due to development of tourism.	0.66	0.64	0.78	3.49	1.09

Note 1: strongly disagree=1, disagree=2, neither agree nor disagree=3, agree=4, strongly agree=5.

Note 2: Factor loadings<0.4 are suppressed.

Table 4 confirms that there are sampling adequacies of each and every item because the diagonal elements of the anti-image correlation of each and every item are greater than 0.5. The communality indicates that 69.0% of the variance associated with statement first is common. Similarly, 73.0%, 70.0%, 72.0%, 63.0%, 64.0% and 64.0% of the common variance associated with statement second, third, fourth, fifth, sixth and seventh respectively. All the values of communality are greater than 0.5, which indicate that there are distinct and reliable factors can be produced.

The factor loadings column illustrates that the variables such as job opportunity, investment opportunity and increasing income level have a correlation of 0.82, 0.85 and 0.82 with factor 1 (Economic Benefits) respectively. The variables such as construction of private toilet and awareness of hygiene have a correlation of 0.85 and 0.77 with factor 2 (Sanitation and Hygiene) respectively. The variables such as livestock product and uses of biogas / solar energy have correlation of 0.78 and 0.78 with factor 3 (Livestock and Alternative Energy) respectively.

The first factor named "economic benefits" explained 30.41% of the total variance with Eigen value (E.V.) 2.41. This factor contained 3 perception items such as job opportunity, investment opportunity and increasing the income level of local people have a tendency to strongly agree according to their mean score of scales. The second factor labeled "sanitation and hygiene" explained 19.42% variance with Eigen value (E.V.) 1.32. This factor contained 2 perception items such as construction of private toilets and awareness of hygiene has a tendency to strongly agree according to their mean score of scale. The third factor named "livestock and alternative energy" explained 18.01% total variance with Eigen value (E.V.) 1.02. This factor contained 2 perception items such as increasing livestock products and uses of alternative energy have a propensity to scale of agree according to their mean score of scales. The Cronbach's alpha coefficient for the factors with total scale reliability is 0.65 > 0.5. It indicates that the variables exhibit a correlation with their factor grouping and thus they are internally consistent.

3.3. Negative Economic Impact of Tourism

However, if tourism is not well planned and controlled, it may lead to negative impact such as economic disparity and migrant's dominance or reduce the effectiveness of positive ones. Due to tourism there is rising price of land, housing and goods as well as loss of arable land and disparity of people income. To analyze the negative economic impact of tourism, KMO measure of sampling adequacy, Bartlett's test of Sphericity, and determinant score have been calculated to identify the suitability of the data set for operating the factor analysis.

Table 5. KMO, Bartlett's Test and Determinant Score

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.77
Bartlett's Test of Sphericity:	
Approx. Chi-Square	678.01
df	15
Sig.	0.000
Determinant Score	0.31

Table 5 shows the value of KMO statistic is equal to $0.77 > 0.6$ which indicates that factor analysis is appropriate for the data. The Bartlett's test is highly significant ($p < 0.001$), and therefore there are some relationship between the variables. The determinant score is $0.31 > 0.00001$ which indicates that there is an absence of multicollinearity. The Eigen values associated with each factor represent the variance explained by those particular linear components.

Table 6 shows that before extraction, it is identified 6 linear components within the data set. After extraction and rotation, there are 2 linear components (factor) within the data set whereas the Eigen value is greater than or equal to 1. The result shows that 59.39% common variance shared by 6 variables can be accounted by three factors. This is the reflection of KMO of 0.77 (good). This initial solution suggests that the final solution will extract not more than 2 factors.

The scree plot is also used to determine the number of factors to retain; it is a graphical representation of Eigen values associated with each of the factors extracted.

Table 6. Initial Solution for Negative Impact of Tourism

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	%of Variance	Cumulative %	Total	%of Variance	Cumulative %	Total	%of Variance	Cumulative %
1	2.60	43.28	43.28	2.60	43.28	43.28	2.02	33.66	33.66
2	1.01	16.10	59.39	1.01	16.10	59.39	1.54	25.73	59.39
3	0.76	12.63	72.01						
4	0.68	11.40	83.42						
5	0.52	8.66	92.07						
6	0.48	7.93	100.00						

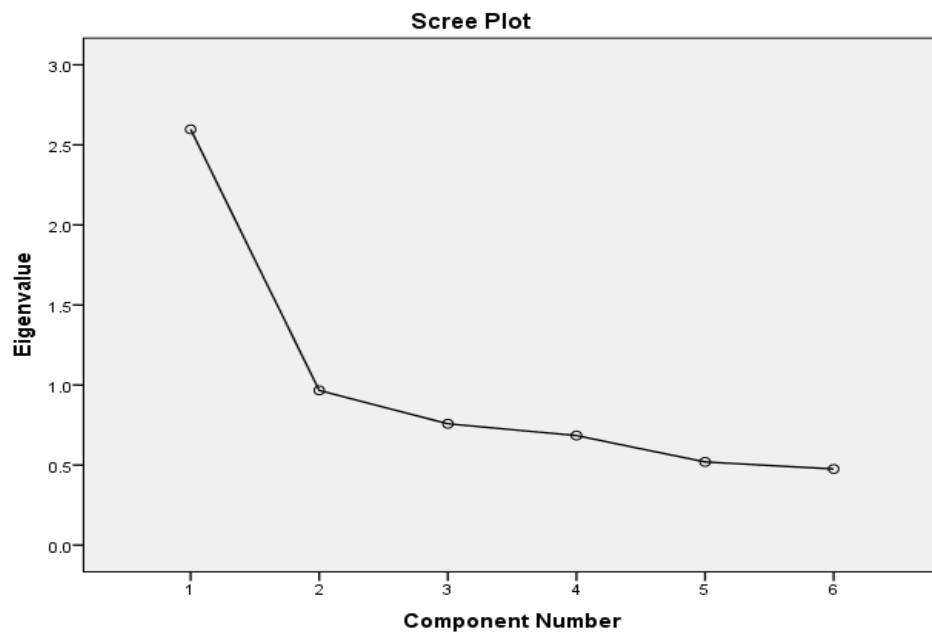


Figure 2

Table 7. Summary for Negative Impact of Tourism

Negative Economic Impact (Cronbach's Alpha, $\alpha=0.73$)	Diagonal Anti-image Correlation	Communality After extraction	Factor Loading	Mean	Std. deviation
Factor 1: Economic Disparity (E.V. = 2.60 & Variance =33.66%)					
• There is significant rise in price of land and housing due to tourism.	0.76	0.66	0.81	1.94	1.07
• There is significant rise in price of goods due to tourism.	0.75	0.57	0.72	1.84	0.92
• Due to tourism there is disparity of people income.	0.79	0.52	0.60	2.54	1.32
• Due to tourism there is loss of arable land property.	0.80	0.54	0.62	2.48	1.21
Factor 2: Migrant's Dominance (E.V. =1.01& Variance =25.73%)					
• There is dominance of outsiders in tourism investment in local level	0.75	0.55	0.66	2.91	1.47
• Lower wage of local employees in comparison to outsiders.	0.73	0.73	0.86	3.24	1.28

Note 1: strongly agree=1, agree=2, neither agree nor disagree=3, disagree=4, strongly disagree=5.

Note 2: Factor loadings<0.4 are suppressed.

The scree plot shows that there are two factors in which the Eigen values are greater than or equal to one. The diagonal anti-image correlation column gives the information of sampling adequacy of each and every item. Communalities reflect the common variance in the data structure after extraction. Factor loading expressed the relationship of each variable to the underlying factors. These measures are displayed in Table 7.

Table 7 confirms that there are sampling adequacy of each and every item because the diagonal elements of the anti-image correlation of each and every item are greater than 0.5. The communality column shows that 66.0% of the variance associated with statement first is common. Similarly, 57.0%, 52.0%, 54.0%, 55.0%, and 73.0% of the common variance associated with stamen second, third,

fourth, fifth and sixth respectively. All the values of communality are greater than 0.5, which indicate that there are distinct and reliable factors can be produced.

The factor loadings column illustrates the relationship of each variable to the underlying factors. So, the variables such as increasing price of land and housing, increasing price of goods, disparity of people's income and loss of arable land have a correlation of 0.81, 0.72, 0.60 and 0.62 with factor 1 (Economic Disparity) respectively. The variables such as outsiders' dominance in tourism investment and lower wage of local employees have a correlation of 0.66 and 0.86 with factor 2 (Migrants' Dominance) respectively.

The first factor named "Economic Disparity" explained 33.66% of the total variance with Eigen value (E.V.) 2.60. This factor contained 4 perception items such as rising price

of land and housing, rising price of goods, disparity of people's income, loss of arable land whereas rising price of land and housing, and rising price of goods have a tendency towards agree according to their mean score of the scale; disparity of people income and loss of arable land tendency towards neither agree nor disagree. The second factor labeled "Migrant's Dominance" explained 25.73 % variance with Eigen value (E.V.) 1.01. This factor contained 2 perception items such as outsiders' dominance in tourism investment and lower wage of local employees whereas outsiders' dominance in tourism investment tends to neither agree nor disagree but lower wage of local employees tends to disagree according to their mean score of the scale. The Cronbach's alpha coefficient for the factors with total scale reliability is $0.73 > 0.5$. It indicates that the variables exhibit a correlation with their factor grouping and they are internally consistent.

4. Conclusions

This study was initiated to investigate the residents' attitudes towards the economic impact of tourism and assess their influences of tourism on the future tourism development in Nepal. The results of this study demonstrated that at a community level there is a strong support for tourism development. The study illustrated that the respondents are facing with both positive and negative impacts of tourism. The results of factor analysis found that three positive factors named as economic benefits, sanitation, and livestock product and alternative energy explained 67.84% variance of perception of residents. Similarly, two negative factors named as economic disparity and migrants' dominance explained 59.39% variance of perception of residents. The results also indicated that the host community perceived that tourism development helps to improve their economic opportunities, sanitation, and livestock production along with the opportunities to utilize alternative energy. Similarly, they perceived that tourism development negatively impacts on the price of land and housing as well as price of goods. The local residents have neutral perceptions about disparity of people's income, loss of arable land and dominance of outsiders' in tourism development. It shows that tourism industries of Nepal are still not well planned and controlled but it has great potentiality for further development. So, effort should be made to promote the tourism industry as one of the most important industries which may play major economic role for sustainable development of local community.

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