Applicability of Smeral's Model in Explaining Tourism Share of Member States in SAARC Region

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This paper attempts, with help of Smeral Model, to study the determinants of demand share of individual member states in total SAARC arrivals from seven major tourism markets. Empirical study of the tourism with the help of modified version of this model demonstrates the interdependency among the SAARC countries. This study found that relative price and regional share are two important link factors for the individual states in the region. Individual share of the tourism increases with an increase in regional share in the world tourism and with a decrease in relative price of tourism and vice-versa.

1. INTRODUCTION

Modeling tourism demand has quite been popularized these days. Many countries depend on the demand forecast in formulating tourism policy. We will present quick review of some demand models used in tourism study. Burger used an input-output model (Burger, 1978). Nepal Rastra Bank used a log linear model using cross-section and time series data for the period 1974-87 period (NRB, 1988). Chattopadhyay (1995) discussed on the factors affecting demand for tourism and used log linear model. Similarly, Paudyal (1993, 1998, 1999) used log log form of tourism demand model for Nepal and SAARC region. Pye and Lin (1983) estimated the tourist arrivals in Hong Kong. They also used log linear model. Krause and Jud (1973) estimated equations for tourist arrival for each of 17 Latin American countries. They also used log-log model.

We, in this paper, will use data of tourist arrivals from USA, UK, Canada, Germany, Japan, France, and Italy as countries of origin to SAARC region. These countries were selected because of the fact that 59 percent arrivals in this region were from these markets. The time period taken for this study is seventeen years, covering 1980 to 1996. We will use simple model for determining factors affecting the distribution of total arrivals in SAARC region among seven member states. For

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this we will adopt the Smeral's Model 1 and Model 2 which are as follows (Smeral, 1988: 40)

2. THE MODEL

a) $x_i = a_i + b_i X + c_i(p_i/P) + u_i$

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$x_n = a_n + b_n X + c_n(p_n/P) + u_n$ …….. (i)

Where,

n = number of countries of destination,

xi = real revenue from international tourism of country i expressed in US $,

X = $\Sigma^n_{i=1} x_i$

pi = prices of tourism goods in country i in US $

P = average prices of tourism goods in all n countries of destination in US $,

P = $\Sigma^n_{i=1} g_i p_i$ gi = x_i/X, $\Sigma^n_{i=1} g_i = 1$

We modify this model slightly owing to our data limitations, and to our purpose of study. Since our purpose of study is to determine the factors affecting tourist arrivals we will replace real revenue from tourism by the number of tourist arrivals in the individual SAARC member states (TA_i) and therefore in our case n = 7 and xi = number of arrivals in individual member states, while X = total arrivals in the SAARC region (TASA). Similarly, price of the tourism goods (p_i) will be proxied by consumer price index in the destination country and average price of tourism products in all n destination countries is P, which will be replaced by average consumer price index of SAARC member states.

Model 1:

$TA_i = a_i + b_i\, TASA + c_i(p_i/P) + u_i$

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$TA_n = a_n + b_n TASA + c_n(p_i/P) + u_n$ …….. (ii)

Model 2:

$ln\, TA_n = ln\, a_i + b_i\, ln\, TASA + c_i ln(p_n/P) + lnu_i$

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$ln\, TA_n = lna_n + b_n\, ln\, TASA + c_n\, ln(p_i/P) + lnu_n$ …… (iii)

3. CPI DATA

Data for this study are taken from International Financial Statistics (various issues) and those of tourist arrivals in the seven countries are taken from the tourism statistics published by respective governments of member countries in SAARC region and World Tourism Organization Year Book (various issues).

4. EMPIRICAL STUDY OF TOURISM DEMAND IN SAARC COUNTRIES

In this section, we will discuss the factors affecting the distribution of tourism demand or tourist arrivals among the individual member countries of the SAARC. For this purpose in the following line, the Smeral model is developed. In these models demand for tourism or tourist arrivals in the individual country are shown as the function of total demand for SAARC tourism.

Bangladesh is one of the youngest SAARC countries in the region. A large number of foreign tourists are attracted to this country each year. The factors that are constantly attracting the tourists to this country are discussed with the help of following model. The demand function shows that the quantity demanded of tourism is the function of total tourist arrivals in the SAARC region (TASA) and relative price variable in Bangladesh (pb/P).

TAB*= 47910 + 0.03 TASA - 54129 (pb/P)**
(2.66) (5.58) (3.48)

$\bar{R}^2$ = 89.00 F = 66.230 DW = 0.9590 …… (iv)

Since this equation is found suffering from auto correlation problem, it is again estimated by using the Cochrane-Orcutt iterative procedure. The estimated equation is given as follows:

TAB = 46935 + 0.03 TASA - 54689 (pb/P)
(1.94) (4.17) (2.60)

$\bar{R}^2$ = 91.67 F = 66.230 DW = 1.91 ……..……. (v)

autocorrelation coefficient = 0.51...

Both independent variables– TASA and pb/P-have expected signs and are found statistically significant at one percent and 5 percent respectively at two tail test. The positive sign with TASA variable implies that as tourist arrival in the SAARC region increases, so does the tourist arrivals in Bangladesh also. The negative sign of the p_b/P variable implies that a rise in price level in Bangladesh compared to the average price level of SAARC countries reduces the demand for tourism in Bangladesh. It is because of the fact that visiting other SAARC countries is relatively cheaper to the visitors from the other countries compared to visiting Bangladesh. It is, therefore, relative price variable which reveals the fact that individual SAARC countries are competing destination within the region. The estimated coefficient of TASA implies that if the tourist arrivals in SAARC region increase by 100 tourists in Bangladesh

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Notes: * TB = Tourist arrivals in Bangladesh, ** pb = CPI in Bangladesh,
P = CPI in SAARC Region.

increase by about 3. The coefficient of (p_b/P) variable shows that a rise in relative price by 1 unit decreases in the tourism demand by about 55000. These two variables explain about 92 percent of change in tourist arrivals in Bangladesh. DW statistics shows that there is no evidence of serial correlation.

ln TAB = - 3.25 + 0.95 ln TASA - 1.27 ln (pb/ P)
(1.28) (6. 48) (3.47)

$\bar{R}^2$ = 89.48 F = 69.07 DW = 1.01 ……. (vi)

The equation in log-log model is also found suffering from autocorrelation problem. Hence the Cochrane-Orcutt iterative procedure is used to correct the auto correction problem. The estimated equation by this procedure is given as follows:

ln TAB = - 3.57 + 0.97 ln TASA - 1.27 ln (pb/ P)
(1.28) (4. 83) (2.68)

$\bar{R}^2$ = 91.75 F = 28.56 DW = 1.94 …..…. (vii)

autocorrelation coefficient = 0.45

This equation shows that estimated coefficient of both variables are statistically significant at 1 percent and 2 percent level respectively at tail test. The independent variables in the model explain about 92 percent variation in the tourist arrivals in Bangladesh. As the estimated coefficients of the variables give the elasticity, the coefficient of log TASA variable is 0.97 which is less than one reveals that tourism demand for Bangladesh is inelastic in terms of total arrivals in the region. This implies that one percent increase in tourism demand in SAARC region increases tourism demand in Bangladesh by only 0.97 percent. On the other hand, tourism demand for Bangladesh is price elastic since the coefficient of relative price variable pb/P is greater than one. It implies that one percent rise in relative price in Bangladesh reduces tourism demand in Bangladesh by about 1.3 percent.

Bhutan is famous for the controlled tourism promotion in the SAARC region. No doubt volume of the tourist arrivals in the country is largely affected by the government's controlled tourism growth policy. However, we will try to analyse how far other factors, which are common to the other SAARC countries have also affected tourism demand in Bhutan.

TABH* = 1794.7 + 0.002 TASA - 2699.1 (pbh/P)**
(0.38) (7.49) (0.58)

$\bar{R}^2$ = 77.64 F = 28.79 DW = 0.68 …… (viii)

Since this equation seems to have auto correlation problem, it is re-estimated by applying the Cochrane-Orcutt iterative procedure. The estimated equation with this procedure is given as follows:

Note : *TABH = Tourist arrivals in Bhutan. **pbh = CPI of Bhutan.

TABH = 680.08 + 0.0024 TASA - 1559.0 (pbh/P)
(0.19) (4.56) (0.45)

$\bar{R}^2$ = 86.95 F = 28.786 DW = 1.3999 ……. (ix)

autocorrelation coefficient = 0.68

The estimation of tourism demand function for Bhutan reveals that more than 87 percent of variation in the tourist arrivals in Bhutan is explained by TASA and PBH/P variables. The estimated coefficient of TASA shows that an increase in tourist arrivals in the whole SAARC region by 100 brings an increase in tourist arrivals in Bhutan by 2. However, a decrease in relative price(pbh) by 1 unit brings 1559 more tourists to Bhutan. However, price is not found statistically significant. There is no evidence of serial correlation.

ln TAB H = -12.42 + 1.42 ln TASA - 0.016 ln (pbh/ P)
(3.96) (6. 33) (0.006)

$\bar{R}^2$ = 71.00 F = 20.19 DW = 0.68 ……(x)

Again, this equation is also found to be suffered from autocorrelation problem, therefore, the following equation is estimated by the Cochrane-Orcutt iterative procedure. The estimated equation is as follows:

ln TAB H = -12.37 + 1.42 ln TASA - 0.31 ln (pbh/ P)
(2.55) (4. 08) (0.15)

$\bar{R}^2$ = 82.36 F = 20.19 DW = 1.34 ……... (xi)

autocorrelation coefficient = 0.62

The estimated t statistics show that only log TASA variable is significant at 1 percent level. However, both variables have correct signs and explain together more than 82 percent variation in tourist arrivals in Bhutan. The estimated coefficient of the log TASA variable which is greater than one reveals that tourism demand in Bhutan is TASA elastic. It implies that one percent increase in tourist arrivals in SAARC region brings 1.4 percent increase in tourist arrivals in Bhutan. In other words, tourism demand in Bhutan increases more than proportionately.

India is both the largest tourist destination in the region and strategically important country as it is the gateway for other countries, such as Bhutan, Nepal, Sri Lanka, Maldives, and Bangladesh. Tourism demand in India is expressed in the following functional form.

TAI* = 973780 + 0.60 TASA - 860410 (pi/P)**
(0.87) (10.48) (0.83)

$\bar{R}^2$ = 96.03 F = 194.38 DW = 1. 08 …….. (xii)

The above regression equation is suffering from the both multicorrelation and serial correlation problems. When we have corrected the multicorelinearity problem the above equation has changed as follows:

Notes: *TAI = Tourist arrivals in India. **pi = CPI of India.

TAI = 91935 + 0.60 TASA - 85179.0 (pi/P)
(17.85) (10.48) (16.70)
R^{-2} = 96.03 DW = 1. 08 …….. (xiii)

After we have corrected multicolinearity problem, we corrected serial correction by the Cochrane- Orcutt iterative procedure and the results are as follows:

TAI = 9706500 + 0.60 TASA - 9022700.0 (pi/P)
(12.93) (9.73) (12.13)
$\bar{R}^2$ = 96.76 F = 194.38 DW = 1.34 ……. (xiv)
autocorrelation coefficient = 0.53

The estimated t statistics show that both variables considered are significant at one percent level. The included variables together explain about 97 percent variation in the tourism demand in India. The estimated coefficient of TASA variable shows that tourist demand by 100 in SAARC region increases the tourism demand in India by about 60 visits.

ln TAI = -3.73 + 1.22 ln TASA - 1.81 ln (pi/ P)
(2.29) (10.50) (1.03)
$\bar{R}^2$ = 96.5 F = 221.79 DW = 1.14 …….. (xv)

As this equation was also found suffering from both multicolinearity and autocorrelation problems, in the first step multicolinearity problem was solved and estimated equation runs as follows:

ln TAI = 13. 38 + 1.22 ln TASA - 14.62 ln (pi/ P)
(825.78) (10.50) (18.25)
$\bar{R}^2$ = 96.5 DW = 1.14 *-(xvi)*

After the correction multi colineasily problem this equation is found suffering from autocorrelation problem, therefore, the following equation is estimated by the Cochrane-Orcutt iterative procedure. The estimated equation is as follows:

ln TAI = 13. 40 + 1.20 ln TASA - 15.22 ln (pi/ P)
(515.58) (10.20) (13.76)
$\bar{R}^2$ = 97.16 F = 221.79 DW = 1.60 …….. (xvii)
autocorrelation coefficient = 0.48116

Now this equation is free from both multi-colineasily and autocorrelation problems. The estimated t statistics show that both log TASA and log pi/P variables are found to be statistically significant at 1 percent level. The variables explain more than 97 percent variation in the tourism demand in India. The coefficient of log TASA is greater than one and so is the coefficient of log pi/P and therefore, tourism demand in India is both total arrivals elastic and relative price elastic. One percent increase in total arrivals in SAARC region bring 12 increase in India whereas one percent decrease.

Maldives is known to be the successful country in developing tourism industry. The government in the country seems to be very active in promoting tourism through developing necessary infrastructure for tourism. Tourism is only major industry in

beautiful marine country. It is of many tiny islands in relative price 15.22 percent of tourist arrival in India.

*TAM = - 51169 + 0.17 TASA - 34840 (pm/P)**
(1.78) (19.60) (1.85)

$\bar{R}^2$ = 97.57 F = 322.49 DW = 1.87 …… (xviii)

There is no evidence of autocorrelation in this equation. In estimated t statistics show that coefficients of both variables are significant at 1 percent and 10 percent level. The explanatory variables explain about 98 percent variation in tourism demand in Maldives. The estimated coefficients of both variables have expected signs. The coefficient of TASA reveals that an increase in SAARC tourism demand by 100 visits increases tourism demand by 17 visits. However, the coefficient of relative price, pm/P variable shows that a rise in relative price by one unit decreases the tourism demand in Maldives by 34840 visits. The elasticity of these variables is discussed with the help of following log-log model.

ln TAM = - 13. 50 + 1.80 ln TASA - 1.27 ln (pm/ P)
(5.11) (9.62) (3.01)

$\bar{R}^2$ = 93.61 F = 118.11 DW = 1.50 ……. (xix)

Since this log-log equation is also found suffering from autocorrelation problem, the following equation is estimated by the Cochrane-Orcutt iterative procedure. The estimated equation is as follows:

ln TAM = - 13. 51 + 1.80 ln TASA - 1.27 ln (pm/ P)
(5.11) (9.61) (3.01)

$\bar{R}^2$ = 93.61 F = 118.11 DW = 1.50 ……..….. (xx)

auto-correlation coefficient = 0.0009

The estimated coefficients in this model have correct signs and both variables are found significant at 1 percent level. Therefore, this model performs better compared to linear model given above. The variables explain about 94 percent variation in the model. The elasticity of demand for tourism in Maldives as shown by the coefficients of log TASA and log pm/P are more than one. It implies that tourism demand in Maldives is both SAARC tourism demand elastic and price elastic. One percent rise in SAARC arrivals brings 1.8 percent rise in tourist arrivals whereas one percent decrease in relative price brings about 1.3 percent increase in Maldives.

Tourism is one of the largest foreign exchange earners in Nepal. The main strength of the industry is the scenic beauty and Himalayas. The tourism demand equation for Nepal is estimated as follows.

***TAN = 18914 + 0.07 TASA
(2.72) (13.13)

$\bar{R}^2$ = 91. 46 F = 172.40 DW = 0.78 …….. (xxi)

Notes: *TAM = Tourist Arrivals in Maldives. **pm = CPI in Maldives.
***TAN = Tourst arrivals in Nepal.

Since this equation is found surrering from autocorrelation problem, the following equation is estimated by the Cochrane-Orcutt iterative procedure. The estimated equation is as follows:

$$TAN = 22635 + 0.07TASA$$
$$(1.99) \quad (7.90)$$
$$\bar{R}^2 = 94.54 \quad F = 172.40 \quad DW = 1.59 \ldots\ldots\ldots \text{(xxii)}$$

autocorrelation coefficient = 0.62

The price variable in this equation has been dropped as it appears to be have highly correlated with TASA variable. The TASA variable alone explains more than 94 percent variation in the tourism demand in Nepal. This variable has expected sign and is significant at one percent level. The estimated coefficient shows that every 100 tourist arrivals in the SAARC region brings 7 visits for Nepal.

$$\ln TAN = -0.66 + 0.88 \ln TASA$$
$$(0.71) \quad (13.09)$$
$$\bar{R}^2 = 94.91 \quad F = 171.48 \quad DW = 0.95 \ldots\ldots\ldots\ldots \text{(xxiii)}$$

This equation is also found to have autocorrelation problem, the equation is estimated by the Cochrane-Orcutt iterative procedure as follows:

$$\ln TAN = -0.17 + 0.84 \ln TASA$$
$$(0.12) \quad (8.37)$$
$$\bar{R}^2 = 93.67 \quad DW = 1.69 \ldots\ldots\ldots\ldots\ldots\ldots \text{(xxiv)}$$

autocorrelation coefficient = 0.53

This equation in log-log model shows that log TASA variable is highly significant and has expected sign. This variable explains about 94 percent of variation in the tourism demand in Nepal. The coefficient of TASA shows that tourism demand in Nepal is TASA inelastic. In other words, one percent increase in SAARC tourism demand increases less than one percent in tourism demand in Nepal.

Pakistan is known for land of mountain and culturally rich cities. The government in Pakistan has been active to increase tourist flow in the country. It has adopted tourism conducive policies in the past. However, the growth of tourist arrivals in Pakistan seem not so encouraging. The tourism demand function in Pakistan is estimated as follows:

$$^{*}TAP = 259840 + 0.063\ TASA - 17516\ (pp/P)^{**}$$
$$(2.37) \quad (2.78) \quad (2.06)$$
$$\bar{R}^2 = 68.80 \quad F = 18.64 \quad DW = 1.94 \ldots\ldots\ldots\ldots \text{(xxv)}$$

The estimated t-statistics reveal that the TASA and pp/P variables are significant at two percent and five percent level respectively. The independent variables considered explain more than 69 percent variation in tourism demand in Pakistan. The estimated coefficient of TASA shows that an increase in tourist arrivals in the region by 100 visits increases tourism demand in Pakistan by 6 visits. Similarly, the coefficient of

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Notes: * TAP = Tourist arrivals in Pakistan. ** pp = CPI of Pakistan.

relative price variable- pp/P shows that tourism demand in Pakistan increases by 17516 visits with the decrease in relative price by one unit.

$$\ln TAP = 5.57 + 0.46 \ln TASA - 1.57 \ln (pp/P)$$
$$(2.28) \quad (2.64) \quad (2.62)$$
$$\bar{R}^2 = 77.30 \quad F = 28.24 \quad DW = 1.79 \quad \ldots\ldots\ldots\ldots\ldots\ldots (xxvi)$$

This equation in log-log model shows that all variables are statistically significant at 2 percent level. These variables explain more than 77 variation in the tourism demand in Pakistan. The coefficients of log TASA and log pp/P variables reveal that the tourism demand in Pakistan is SAARC tourism demand inelastic, while it is relative price elastic. In other words, one percent change in SAARC tourism demand brings about only 0.46 percent change in tourism demand in Pakistan, while a change in relative price brings 1.6 percent change in it.

Generally it is thought that Sri Lanka's tourism trade is badly affected by Civil war. It will be examined in our tourism demand function for Sri Lanka which is given below.

$$^{*}TAS = 4080.5 + 0.0059 \, TASA + 179630 \, (ps/P)^{**}$$
$$(0.02) \quad (0.07) \quad (0.61)$$
$$\bar{R}^2 = 0.03 \quad DW = 0.59 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (xxvii)$$

This equation explains only 3 percent variation in tourism demand in Sri Lanka. The relative price variable has unexpected sign and non of variables are significant. The model suffers from autocorrelation.

$$TAS = 116630 + 0.05 \, TASA$$
$$(2.97) \quad (1.50)$$
$$\bar{R}^2 = 0.07 \quad DW = 0.59 \quad \ldots\ldots\ldots\ldots\ldots\ldots (xxviii)$$

In this equation the relative price variable has been dropped, the TASA variable explains only 7 percent variation in tourism demand in Sri Lanka. However, this equation is found to have autocorrelation problem. Therefore, the equation is estimated again by the Cochrane-Orcutt iterative procedure as follows:

$$TAS = 131000 + 0.035 \, TASA$$
$$(1.98) \quad (0.67)$$
$$\bar{R}^2 = 51.31 \quad DW = 1.33 \quad \ldots\ldots\ldots\ldots\ldots\ldots (xxix)$$

autocorrelation coefficient = 0.70

The R^{-2} improves significantly after the correction of autocorrelation problem. However, the t-statistics show that estimated coefficient is not statistically significant. It implies that demand for tourism in Sri Lanka can hardly be explained by the tourist arrivals in SAARC region since the explanatory power of the equation is moderate and estimated coefficient is not significant.

$$TAS = 14008 + 0.06 \, TASA - 52298 \, CWS^{*}$$

Notes : * TAS = Tourist arrivals in Sri Lanks. ** ps = CPI of Sri Lanka.
*** CWS = Civil war in Sri Lanka.

Notes: * CWS = Civil war in Sri Lanka.

(2.35) (1.23) (1.74)

$\bar{R}^2$ = 56.97 DW = 1.22 …….. (xxx)

autocorrelation coefficient = 0.68

A dummy called CWS has been added in the model. With the inclusion of CWS in the equation, the explanatory power of independent variables increase to about 57 percent after we have corrected autocorrelation problem by above mentioned procedure.

lnTAS = 9.22 + 0.20 lnTASA

(1.62) (0.49)

$\bar{R}^2$ = 53.06 DW = 1.30 ……..…… (xxxi)

autocorrelation coefficient = 0.73

This is the log-log model for the estimation of the demand equation for Sri Lanka. The estimation shows that log TASA is not significant and explains only 53 percent change in tourism demand in Sri Lanka.

ln TAS = 11. 86 + 0.00000034 TASA - 30520 CWS

(30.86) (1.07) (1.62)

$\bar{R}^2$ = 57.72 DW = 1.18 ……..… (xxxii)

autocorrelation coefficient = 0.63

This is loglin model for the estimation of the demand equation for Sri Lanka, which gives the highest adjusted R^2 and but both variables are found significant only at 10 percent level at one tail test. Therefore, in the case of Sri Lanka the regression results are inconclusive.

5. *SUMMARY AND CONCLUSION*

The results of empirical studies reveal that tourism in every individual member country is linked with one another. The study shows that tourist arrival in the individual country is the positive function of total arrivals in the region. In other words, whenever the tourist arrivals increase in the region as a whole, the arrivals in the individual countries also increase. In addition, it is the negative function of relative price variable. As the average price level of tourism products increase in the particular individual country in comparison to average price level of SAARC region, the tourist arrivals in that member country decrease. It is found from the tourism demand function for individual countries that tourism demand is price elastic and total arrival inelastic in the cases of SAARC countries. Hence, the joint efforts to increase the tourist arrivals in the region as a whole will benefit all economies in the region.

The share of individual SAARC countries in total SAARC arrivals is found largely determined by the Smeral model. In case of Bangladesh both relative price and total SAARC arrival variables are found statistically highly significant. However, relative price variable is not found significant in the case of Bhutan and demand is found price inelastic. In India tourism demand is found highly price elastic and both variable are

significant. Demand for the Maldives tourism is found highly affected by both variables and demand is price elastic. In case of Nepal, only one variable, that is total SAARC arrival, is found significant. Tourism demand in Pakistan is determined by relative price and total SAARC arrivals and demand is found price elastic. On the other hand, none of the variables is found significant in demand function for Sri Lanka.

As empirical studies show that tourist arrivals in individual SAARC member countries is the positive function of total arrivals in the region, the efforts to increase the total arrivals bring the larger number of tourists in the individual member countries. The following measures are recommended to increase the tourist arrivals in the region.

Insignificant share of the SAARC region in world tourism is itself a reflection of the problem. One of the reasons might be the unfair competition among the member countries. In this light, the success of SAARC tourism depends on the positioning the SAARC region as a single destination and realising individual countries as a subset of the region as a whole. Competing each other to receive more share of tourist from the given SAARC arrivals individually will continue to attract less tourists in the region. Instead, each individual country can attain a better position through the maximisation of the social benefits if they together put their efforts in attracting more tourists in the region. Therefore, it is necessary to think and sell whole region as a single destination. SAARC member countries will have to realise that they are not competitors among each other but the complementary.

It is necessary to promote the entire region through joint package tours including more than one SAARC country. Many package tours, such as Buddhist circuits, Wild life tours, Cultural tours, Mountain tours, sight seeing and beaches tours, can be operated combining more than one country in one tourist package.

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