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Research paper

Forecasting of International Tourists Arrival in Saarc Region and Prospect of Bangladesh

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Abstract

The tourism is the dynamic and earning source of foreign currency in SAARC region. In regarding Bangladesh it is one of the prospective sectors that can contribute to our economy. In this paper, we forecast the international visitor's arrival in SAARC countries and compare it with Bangladesh. In addition, we have discussed the factors that influenced the visitors to visit this territory. The key factors are infrastructure, retail industries, diversification, marketing and media, quality control, affiliation benchmark, and security and safety (Y. Benchabane, 2014). Assess the performance of Bangladesh in these key factors and comparing with other countries of SAARC region.

Keywords: *Time series, ARIMA, ACF, PACF, ADF, Stationary, Autoregressive, Moving average.*

1. Introduction

Tourism is anything but an insignificant leisure activity or hobby now-a-days. Or maybe it has prospered and is known as an industry around the world. Bangladesh isn't an exemption in such manner yet this industry is anything but a flourishing one or a decent supporter of our national economy. Each country condition of the world makes them charm sights and sounds to draw abroad guests and along these lines she can gain a considerable measure of remote money. In this way it has turned into a cash turning wellspring of pay in numerous creating and even in created nations. This tourism industry conveys a ton for the nation of Nepal, India, and Maldives and so on neighboring nations of Bangladesh in SAARC district. It has a lion's offer at the Gross domestic product of Nepal and Maldives. The little nation, Maldives is known to the whole world only for its tourism industry.

Gone for building up the tourism business of the nation the Blast ladesh Parjatan Sangstha was framed not long after the freedom war of 1971.The association was rebuilt as Bangladesh Parjatan Partnership (BPC) in 1973, and they a short time later drew up a five-year get ready for building up the business as a major aspect of the administer ment's Initial Multi Year Design (1973-78). Under the arrangement the gov-ernment was relied upon to give the vital offices and de-velop the regular magnificence of the nation in a way that would be alluring to sightseers (BH Khondker, 2015). Notwithstanding having enormous possibilities or sources, Bangladesh couldn't rise as an alluring vacationer community for the world travelers. Indeed, even she has neglected to strengthen the eagerness among the neighborhood vacationers.

In spite of the fact that not wealthy in this industry, Bangladesh has noteworthy and rich assets for this industry. Bangladesh is holy with natu-ral excellence, going from mountains to waterways to shorelines to bio-decent variety. It flaunts the longest normal shoreline on the planet in Cox's Bazaar and additionally the biggest mangrove woods on the planet at the Sundarbans. Kuacustomized organization is a place known as "the little girl of the ocean" situated in southern piece of Bangladesh. The authentic place of Bogra, named "Pundra" is referred to and well known as an old city of 2500 years. It has an exhibition hall and alluring areas to investigate. "Pahrpur of Rajshahi, Maynamoti of Comilla, Shaat Gambuj Mas-jid" of Khulna and so on are the other theoretical spots for verifiable significance and archeological investigation. Aside from these spots, The Wari-Bateshwar locale in Narsingdi, Bangladesh is the place of an old fortification city going back to 450 BC amid the period of Maurya tradition. The 2500-year-old remains being uncovered close to the old course of the Brahmaputra Stream are a noteworthy archeological revelation in south Asia. It challenges the prior thoughts of early urban development in Bengal (wikipedia.org).

Additionally, we have very nearly 33 clans and their rich societies. The greater part of them live in South-East of the nation. Going to their environments and encountering their celebrations are very intriguing. An appealing bundle can be offered on the clans and guests cheerfully will pay for this.

By dealing with the movement clog, Dhaka city could be the eye-getting bundle for the guests. By Rickshaw a guest can appreciate the excellence of Dhaka city-the capital of the nation. National Standard liament Working by Louis I Kahn of USA is the pride of our coun-attempt. A pleasant stream voyage on the Buriganga and going by Karjan Lobby, Lalbagh Post, Ahsan Manjil can convey the travelers to the eccentric vibe where current design amalgamate with pre-innovation and middle age. Rickshaw is an uncommon human pulling vehicle on the planet and riding on it is charming.

There is a plenty of writing and concentrates that demonstrate the positive a flourishing tourism division can have positive effect on

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financial development and advancement of nations. Having a great deal of issues, we have a brighter future in tourism. On the off chance that the issues can be managed effectiveness and farsightedness, Bangladesh will be the lala land of a wide range of nearby and outside travelers.

2. Literature Review

J.Kweka (2004) opined that tourism extension has extraordinary impact at the financial framework with the guide of adding to gross domestic product, general welfare and fares. Advancement of framework essentially strengthens the impacts of tourism development and tourism tax collection has an undoubt-edly great impact on impose deals and welfare. As minimum devel-oping worldwide areas (ldcs) need enough assets to enhance increment, tourism may also offer as a wellspring of duty income to fund foundation assignments with a view to profit the monetary framework overall, and additionally sightseers. Bangladesh is focusing to be a center profit joined conditions of america by utilizing 2021. It would be doable if all elements work altogether at around the world, provincial and countrywide degrees. Tourism is one in everything about. Inside the start of bangladesh, tourism turn out to be never again fused in industry however from 1999 it's incorporated as an industry, which speaks to the significance of the tourism. Ali and mohsin (2008) inferred that tourism is a principle venture inside the administration zone at the overall level notwithstanding a prime organization of employments and a mammoth generator of outside trade on the countrywide level. While considering forex profit from tourism may show up rather little. The yearly increment expense over the past couple of years is vital. In spite of the fact that tourism has never again accepted a major capacity inside the countrywide money related framework yet, it's miles trusted that tourism will create to contribute radically to the countrywide economy later on. Ali and mohsin (2009) commented that tourism has been considered as the field's biggest and quick developing industry of present day business universal. It's far now a standout amongst the most fundamental supplier enterprises, and has develop to be one of the greatest pivotal imperceptible fare areas in numerous countries of the part. It's far a ware available to be purchased, which is devoured on the factor of creation. Tourism is growing quick as a worldwide endeavor and it's miles relatively a cheap method to acquire remote monetary standards. Tourism is one of the main assets of forex wage. Tourism division should be all around investigated so one can have fine commitment toward developing of gross home item (gross domestic product). Tuhin and majumder (2004) said that tourism crucially affects monetary improvement of a rural. Bangladesh is another guest goal on the guide of the world. Bangladesh has enormous possibility to grow tourism in view of its engaging natural excellence and rich social history. Jiménez, pulina et al,(2009) opined that amid ongoing years there was an improvement of pastime inside the part of tourism for increment and development for creating universal areas like bangladesh. The association between fares, tourism and money related blast is as yet continuous. Chowdhury and shahriar (2012) found that bangladesh is a major shortfall economy nation. Inside the instances of a shortage budgetary framework that regularly speaks to an import orientated structure is foreseen to spend additional on imports to help its exercises than what it gains through fare. Tourism might be the decent other option to get the most extreme out of the fare. There have been finished numerous exploration with respect to overall tourism conceivable outcomes and in addition in regards to the notoriety of the business in bangladesh anyway there had been a bit watch around how this venture might be an option of biggest fare part for the u . S ..

3. Methodology

3.1 Time Series Analysis

ARIMA demonstrate is utilized to perform determining. The time arrangement models utilized as a part of this paper are quickly depicted. A critical standard ametric group of stationary time arrangement is the Autoregressive Moving Normal (ARMA) process and it assumes a key part in the displaying of time arrangement information. At the point when a period arrangement isn't stationary, typically differencing activities are connected at the suitable slack so as to accomplish stationary. The mean is normally subtracted and an ARMA display is fit to the informational index. A stationary zero mean ARMA (p,q) show is characterized as (Brockwell and Davis, 2002) a succession of irregular factors $\{X_t\}$ which satisfy, $X_t - \phi_1 X_{t-1} - ..... - \phi_p X_{t-p} = Z_t + \theta_1 Z_{t-1} + ... + \theta_q Z_{t-q}$ for every t and where $\{Z_t\}$ is a sequence of uncorrelated random variables with zero mean and constant variance σ^2. A process is said to be an ARMA process with mean μ, if $\{X_t - \mu\}$ is an ARMA (p, q) process. A process is called an ARMA (p, d, q) process if d is a nonnegative integer such that $(1-B)^d X_t$ is an ARMA (p, q) process and where B is the usual backward shift operator.

$$E(\xi_t / \xi_u, u \lhd t) = 0,\ t \in z$$

This model determination additionally incorporates the Akaike Data Basis (AIC), Redressed Akaike Data Paradigm (AICC), and Bayesian Data standard (BIC). The AIC measurement is characterized as, $AIC = -2\ln L + 2(p+q+1)$, where L is the Gaussian Likelihood for an ARMA (p, q) process. On the other hand, the AICC statistic is defined as,

$$AICC = -2\ln L + \frac{2(p+q+1)n}{(n-p-q-2)}.$$

Since, the AICC standard has a more extraordinary punishment than the AIC measurements; it would balance fitting vast models. The Bayes Information Criterion (BIC) is given by,

BIC= - 2 (Log probability) +p log (n).

When all is said in done, BIC punishes models with a bigger number of parameters more firmly than AIC

4. Results and Discussion

The data that are used in this research is collected from the 'The World Bank' (https://data.worldbank.org/indicator/ST.INT.ARVL?locations=BD). In this study, we want to forecast international tourist arrival in Bangladesh and neighboring SAARC countries. The yearly data of international visitors are given in Data table.

Data Table: Yearly Tourists arrival data (N [N], '000')

Year	Bangladesh	India	Nepal	Maldives	Srilanka
2015	-	13284	539	1234	1798
2014	125	13107	790	1205	1527
2013	48	6968	798	1125	1275
2012	125	6578	803	958	1006
2011	155	6309	736	931	856
2010	303	5776	603	792	654
2009	267	5168	510	656	448
2008	467	5283	500	683	438
2007	289	5082	527	676	494
2006	200	4447	384	602	560
2005	207	3919	375	395	549
2004	271	3457	385	617	566
2003	244	2726	338	564	501
2002	207	2384	275	485	393
2001	207	2537	361	461	337

2000	199	2649	464	464	400
1999	173	2482	492	430	436
1998	172	2359	464	396	381
1997	182	2374	422	366	366
1996	166	2288	394	339	302
1995	156	2124	363	315	403

5. Forecasting Tourism

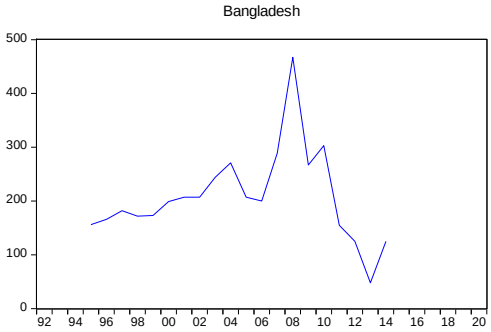

Fig 1: Time graph of tourism data.

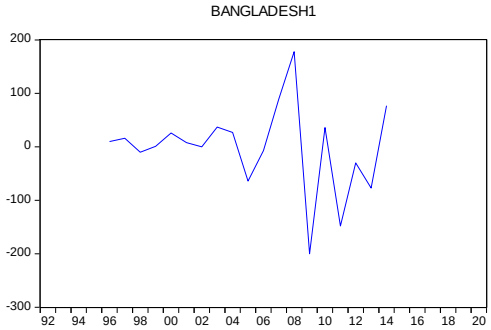

Fig 2: Lag-1 of tourism data.

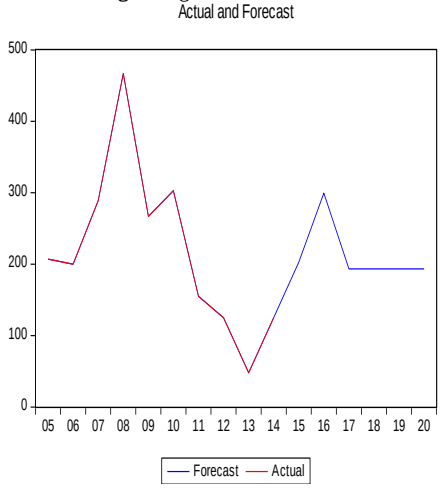

Fig 3: Forecasted graph.

Table 2: Lag-1 table of tourism data

Null Hypothesis: BANGLADESH1 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.171542	0.0007
Test critical values:	1%level	-3.857386	
	5%level	-3.040391	
	10%level	-2.660551	

*MacKinnon (1996) one-sided p-values.

Table 3: Correlogram table for ACF and PCF

Date: 12/03/17 Time: 18:14
Sample: 1992 2020
Included observations: 19

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.263	-0.263	1.5336	0.216
		2	0.135	0.071	1.9602	0.375
		3	-0.306	-0.275	4.3008	0.231
		4	0.172	0.035	5.0859	0.279
		5	-0.274	-0.224	7.2325	0.204
		6	0.092	-0.116	7.4919	0.278
		7	0.097	0.188	7.8052	0.350
		8	0.004	-0.097	7.8057	0.453
		9	-0.119	-0.132	8.3700	0.497
		10	-0.013	-0.034	8.3771	0.592
		11	0.037	-0.034	8.4463	0.673
		12	-0.028	-0.003	8.4922	0.746

Table 4: Regression Co-efficient.

Dependent Variable: LOG(BANGLADESH)
Method: ARMA Maximum Likelihood (BFGS)
Date: 12/03/17 Time: 18:26
Sample: 1995 2014
Included observations: 20
Convergence achieved after 60 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.264061	0.205918	25.56387	0.0000
MA(1)	1.173276	772.5567	0.001519	0.9988
MA(2)	0.999998	1316.923	0.000759	0.9994
SIGMASQ	0.077572	50.94951	0.001523	0.9988

Model Selection Criteria Table
Dependent Variable: LOG(BANGLADESH)
Date: 12/03/17 Time: 18:26
Sample: 1992 2014
Included observations: 20

Model	LogL	AIC*	BIC	HQ
(0,2)(0,0)	-5.420608	0.819183	1.016661	0.868848
(2,2)(0,0)	-3.437491	0.820651	1.116867	0.895149
(0,4)(0,0)	-3.537860	0.829379	1.125595	0.903877
(1,3)(0,0)	-3.839326	0.855594	1.151809	0.930091
(3,4)(0,0)	-1.140011	0.881740	1.326064	0.993486
(2,4)(0,0)	-2.660409	0.926992	1.321947	1.026322
(4,3)(0,0)	-1.749215	0.934714	1.379038	1.046461
(2,3)(0,0)	-3.783420	0.937689	1.283274	1.024602
(1,4)(0,0)	-3.823285	0.941155	1.286740	1.028069
(3,0)(0,0)	-5.926117	0.950097	1.196944	1.012178
(1,0)(0,0)	-8.080238	0.963499	1.111607	1.000748
(3,1)(0,0)	-5.341966	0.986258	1.282474	1.060755
(4,0)(0,0)	-5.875497	1.032652	1.328868	1.107149
(2,1)(0,0)	-6.999282	1.043416	1.290262	1.105497
(4,2)(0,0)	-4.033363	1.046379	1.441334	1.145709
(2,0)(0,0)	-8.080184	1.050451	1.247928	1.100116
(1,1)(0,0)	-8.080222	1.050454	1.247931	1.100119
(0,3)(0,0)	-7.230114	1.063488	1.310335	1.125569
(0,1)(0,0)	-9.259616	1.066054	1.214161	1.103302
(4,1)(0,0)	-5.335629	1.072863	1.418249	1.159577
(3,2)(0,0)	-5.553756	1.091631	1.437216	1.178545
(3,3)(0,0)	-5.538901	1.177296	1.572250	1.276626
(0,0)(0,0)	-12.020477	1.219172	1.317911	1.244004
(1,2)(0,0)	-10.847899	1.378078	1.624925	1.440159
(4,4)(0,0)	-10.465233	1.779585	2.273279	1.903748

For time series analysis our prerequisite is data is to be stationary. The graph (**Fig-1**) shows that the data is not stationary. The data are, therefore, differenced once at lag-1 and the plot is shown in **Fig-2**.

This study has tested ADF and found 5.171542 which is greater than 3.857386 at 0.01 critical levels i.e. expectedly the study reject the null hypothesis. The graph and the table showed in **Fig-2** and **Table-2**. Finally, it is established that data set is stationary in **Lag-1**.

Hence, the fitted ARIMA (2, 1, 0) model and the forecasting graph (**Fig-3**) can be stated as follows:

$$y_t = 5.264061 + 1.173276\mu_t + 0.999998\mu_{t-1}$$

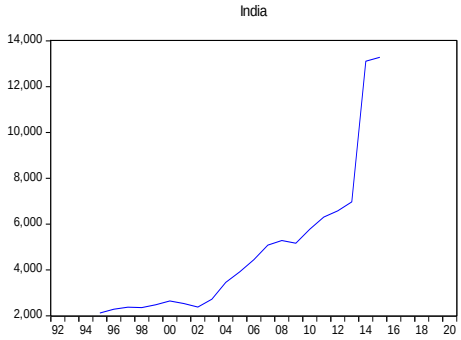

Fig 4: Time graph of tourism data.

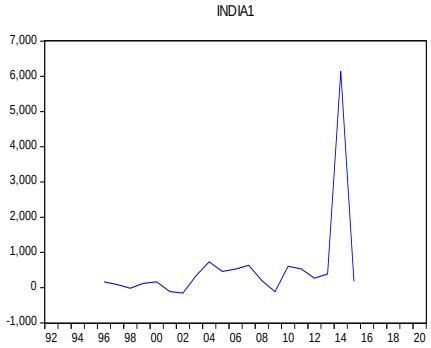

Fig 5: Lag-1 of tourism data.

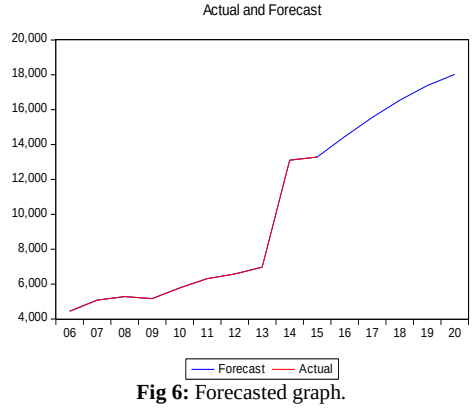

Fig 6: Forecasted graph.

Table-5: Lag-1 table of tourism data

Null Hypothesis: INDIA1 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.262689	0.0041
Test critical values:	1%level	-3.831511	
	5%level	-3.029970	
	10%level	-2.655194	

*MacKinnon (1996) one-sided p-values.

Table 6: Correlogram table for ACF and PCF

Date: 12/03/17 Time: 18:38
Sample: 1992 2020
Included observations: 20

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.033	-0.033	0.0248	0.875
		2	-0.010	-0.011	0.0274	0.986
		3	0.039	0.038	0.0668	0.996
		4	0.043	0.046	0.1184	0.998
		5	-0.092	-0.088	0.3657	0.996
		6	-0.031	-0.038	0.3953	0.999
		7	0.039	0.033	0.4478	1.000
		8	0.009	0.016	0.4505	1.000
		9	-0.002	0.009	0.4507	1.000
		10	0.050	0.043	0.5620	1.000
		11	-0.013	-0.021	0.5703	1.000
		12	-0.094	-0.093	1.0611	1.000

Table 7: Regression Co-efficient.

Dependent Variable: LOG(INDIA)
Method: ARMA Maximum Likelihood (BFGS)
Date: 12/03/17 Time: 18:43
Sample: 1995 2015
Included observations: 21
Convergence achieved after 137 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.726926	1.093357	7.981771	0.0000
AR(1)	1.973573	0.187295	10.53722	0.0000
AR(2)	-0.985157	0.164071	-6.004464	0.0000
MA(1)	-0.999999	17575.09	-5.69E-05	1.0000
SIGMASQ	0.019295	9.676711	0.001994	0.9984

Model Selection Criteria Table
Dependent Variable: LOG(INDIA)
Date: 12/03/17 Time: 18:43
Sample: 1992 2015
Included observations: 21

Model	LogL	AIC*	BIC	HQ
(2,1)(0,0)	8.804153	-0.317013	-0.071585	-0.251901
(2,3)(0,0)	10.242762	-0.270230	0.073369	-0.179073
(1,0)(0,0)	6.015851	-0.251321	-0.104064	-0.212254
(2,2)(0,0)	8.871656	-0.239305	0.055209	-0.161170
(2,0)(0,0)	6.855447	-0.237954	-0.041612	-0.185864
(3,1)(0,0)	8.851615	-0.237635	0.056879	-0.159500
(1,1)(0,0)	6.785516	-0.232126	-0.035784	-0.180037
(4,1)(0,0)	9.310672	-0.192556	0.151043	-0.101399
(3,3)(0,0)	10.073191	-0.172766	0.219919	-0.068587
(3,0)(0,0)	6.985393	-0.165449	0.079978	-0.100337
(3,2)(0,0)	8.835947	-0.152996	0.190603	-0.061839
(1,2)(0,0)	6.799760	-0.149980	0.095448	-0.084868
(4,0)(0,0)	7.762800	-0.146900	0.147613	-0.068765
(4,2)(0,0)	9.314199	-0.109517	0.283168	-0.005337
(4,4)(0,0)	10.366868	-0.030572	0.460283	0.099652
(4,3)(0,0)	8.889279	0.009227	0.450997	0.126429
(0,4)(0,0)	4.486391	0.126134	0.420648	0.204289
(0,3)(0,0)	3.408339	0.132638	0.378066	0.197751
(2,4)(0,0)	5.400572	0.216619	0.609304	0.320798
(0,2)(0,0)	1.039351	0.246721	0.443063	0.298810
(1,4)(0,0)	3.461530	0.294872	0.638472	0.386029
(1,3)(0,0)	1.074146	0.410488	0.705001	0.488622
(0,1)(0,0)	-6.008550	0.750713	0.897969	0.789780
(3,4)(0,0)	-9.672112	1.556009	1.997779	1.673211
(0,0)(0,0)	-17.077046	1.589754	1.687925	1.615799

For time series analysis our prerequisite is data is to be stationary. The graph in **Fig-4** shows that the data is not stationary. The data are, therefore, differenced once at lag-1 and the plot is shown in **Fig-5**.

This study has tested ADF and found 4.262689 which is greater than 3.831511 at 0.01 critical levels i.e. expectedly the study reject the null hypothesis. The graph and the table showed in **Fig-5** and **Table-5**. Finally, it is established that data set is stationary in **Lag-1.**

Hence, the fitted ARIMA (1, 1, 2) model and the forecasting graph (**Fig-6**) can be stated as follows:

$$y_t = 8.726926 + 1.973573 y_{t-1} - 0.985157_{t-2} - 0.999999 \mu_t$$

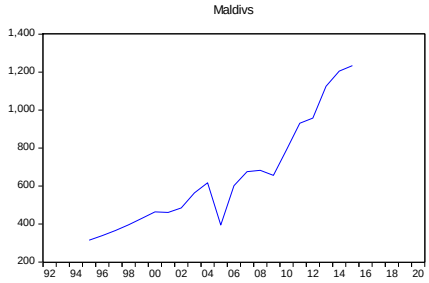

Fig 7: Time graph of tourism data.

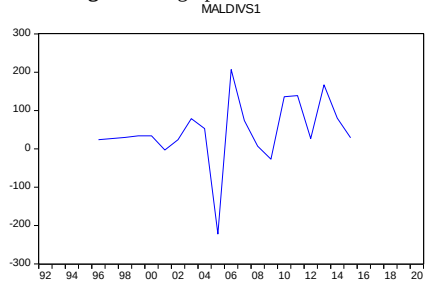

Fig 8: Lag-1 of tourism data.

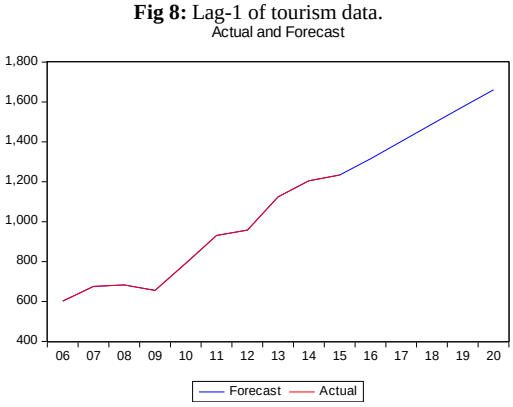

Fig 9: Forecasted graph.

Table 8: Lag-1 table of tourism data

Null Hypothesis: MALDIVS1 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.301670	0.0005
Test critical values:	1%level	-3.831511	
	5%level	-3.029970	
	10%level	-2.655194	

*MacKinnon (1996) one-sided p-values.

Table 9: Correlogram table for ACF and PCF

Date: 12/03/17 Time: 18:55
Sample: 1992 2020
Included observations: 20

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.245	-0.245	1.3887	0.239
		2	-0.189	-0.264	2.2578	0.323
		3	0.177	0.062	3.0731	0.380
		4	0.287	0.354	5.3411	0.254
		5	-0.171	0.086	6.1987	0.287
		6	-0.180	-0.170	7.2198	0.301
		7	0.239	0.003	9.1610	0.241
		8	-0.142	-0.249	9.8975	0.272
		9	-0.100	-0.088	10.295	0.327
		10	0.007	-0.006	10.297	0.415
		11	-0.011	-0.079	10.304	0.503
		12	-0.051	0.043	10.446	0.577

Table 10: Regression Co-efficient.

Dependent Variable: LOG(MALDIVS)
Method: ARMA Maximum Likelihood (BFGS)
Date: 12/03/17 Time: 19:01
Sample: 1995 2015
Included observations: 21
Convergence achieved after 76 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.692585	2.119902	3.157026	0.0065
AR(1)	1.992469	0.064805	30.74553	0.0000
AR(2)	-0.998735	0.031584	-31.62127	0.0000
MA(1)	-1.727253	166.1988	-0.010393	0.9918
MA(2)	0.727256	133.2674	0.005457	0.9957
SIGMASQ	0.015027	0.869910	0.017274	0.9864

Model Selection Criteria Table
Dependent Variable: LOG(MALDIVS)
Date: 12/03/17 Time: 19:01
Sample: 1992 2015
Included observations: 21

Model	LogL	AIC*	BIC	HQ
(2,2)(0,0)	10.339332	-0.361611	-0.067098	-0.283476
(2,4)(0,0)	12.146053	-0.345504	0.047180	-0.241325
(1,0)(0,0)	6.832806	-0.319401	-0.172144	-0.280333
(4,1)(0,0)	10.566217	-0.297185	0.046414	-0.209028
(4,3)(0,0)	12.536922	-0.294743	0.147027	-0.177542
(1,1)(0,0)	7.020392	-0.251699	-0.055357	-0.199610
(2,0)(0,0)	7.016032	-0.251336	-0.054994	-0.199246
(3,3)(0,0)	10.859245	-0.238270	0.154414	-0.134091
(3,1)(0,0)	8.850801	-0.237567	0.056947	-0.159432
(2,1)(0,0)	7.785307	-0.232109	0.013319	-0.166997
(3,0)(0,0)	7.050225	-0.170852	0.074576	-0.105740
(4,4)(0,0)	11.643511	-0.136959	0.353897	-0.006735
(4,0)(0,0)	7.461590	-0.121799	0.172714	-0.043665
(4,2)(0,0)	7.805128	0.016239	0.408924	0.120419
(0,4)(0,0)	3.992401	0.167300	0.461813	0.245434
(0,2)(0,0)	0.796321	0.266973	0.463316	0.319063
(0,3)(0,0)	1.656941	0.278588	0.524016	0.343700
(1,3)(0,0)	0.829697	0.430859	0.725372	0.508993
(1,4)(0,0)	1.698755	0.441770	0.785389	0.532927
(0,1)(0,0)	-3.613009	0.551084	0.698341	0.590151
(1,2)(0,0)	-3.589496	0.715791	0.961219	0.780903
(0,0)(0,0)	-11.158084	1.096505	1.194677	1.122550
(3,2)(0,0)	-6.653232	1.137769	1.481368	1.228926
(2,3)(0,0)	-9.201858	1.350155	1.693754	1.441312
(3,4)(0,0)	-9.459383	1.538282	1.980052	1.655484

For time series analysis our prerequisite is data is to be stationary. The graph in **Fig-7** shows that the data is not stationary. The data are, therefore, differenced once at Lag-1 and the plot is shown in **Fig-8**.

This study has tested ADF and found 5.301670 which is greater than 3.831511 at 0.01 critical levels i.e. expectedly the study reject the null hypothesis. The graph and the table showed in **Fig-8** and **Table-8**. Finally, it is established that data set is stationary in **Lag-1**.

Hence, the fitted ARIMA (2, 1, 2) model and the forecasting graph (**Fig-9**) can be stated as follows:

$$y_t = 6.692585 + 1.992469 y_{t-1} - 0.998735 y_{t-2} - 1.727253 \mu_t + 0.727256 \mu_{t-1}$$

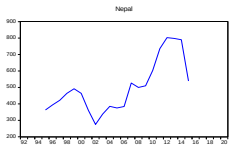

Fig 10: Time graph of tourism data.

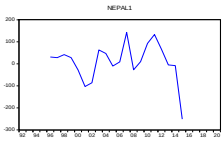

Fig 11: Lag-1 of tourism data.

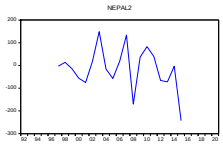

Fig 12: Lag-2 of tourism data.

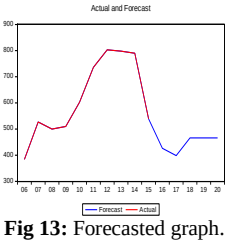

Fig 13: Forecasted graph.

Table 12: Lag-2 table of tourism data

Null Hypothesis: NEP3 has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.276035	0.0056
Test critical values:	1% level	-3.959148	
	5% level	-3.081002	
	10%level	-2.681330	

*MacKinnon (1996) one-sided p-values.

Table 13: Correlogram table for ACF and PCF

Date: 12/03/17 Time: 19:18
Sample: 1992 2020
Included observations: 19

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.092	-0.092	0.1868	0.666
		2	-0.199	-0.210	1.1198	0.571
		3	0.087	0.048	1.3074	0.727
		4	0.201	0.183	2.3817	0.666
		5	-0.247	-0.197	4.1181	0.533
		6	-0.200	-0.200	5.3398	0.501
		7	0.364	0.274	9.7440	0.204
		8	-0.097	-0.133	10.082	0.259
		9	-0.116	0.045	10.623	0.302
		10	-0.073	-0.140	10.857	0.369
		11	0.006	-0.234	10.859	0.455
		12	-0.179	-0.099	12.678	0.393

Table 14: Regression Co-efficient

Dependent Variable: LOG(NEPAL)
Method: ARMA Maximum Likelihood (BFGS)
Date: 12/03/17 Time: 19:25
Sample: 1995 2015
Included observations: 21
Convergence achieved after 27 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.144372	0.096904	63.40666	0.0000
MA(1)	1.326147	0.259383	5.112701	0.0001
MA(2)	0.832193	0.342785	2.427744	0.0266
SIGMASQ	0.019515	0.009733	2.005078	0.0611

Model Selection Criteria Table
Dependent Variable: LOG(NEPAL)
Date: 12/03/17 Time: 19:25
Sample: 1992 2015
Included observations: 21

Model	LogL	AIC*	BIC	HQ
(0,2)(0,0)	10.001245	-0.500104	-0.303761	-0.448014
(1,1)(0,0)	9.947411	-0.495618	-0.299275	-0.443528
(2,0)(0,0)	9.872244	-0.489354	-0.293011	-0.437264
(1,0)(0,0)	8.408712	-0.450726	-0.303469	-0.411659
(1,2)(0,0)	10.355181	-0.446266	-0.200837	-0.381153
(0,4)(0,0)	11.266464	-0.438872	-0.144359	-0.360738
(0,3)(0,0)	10.229301	-0.435775	-0.190347	-0.370663
(2,1)(0,0)	10.030274	-0.419190	-0.173762	-0.354077
(2,2)(0,0)	10.922973	-0.410248	-0.115734	-0.332113
(3,0)(0,0)	9.916988	-0.409749	-0.164321	-0.344637
(1,4)(0,0)	11.758354	-0.396529	-0.052930	-0.305373
(1,3)(0,0)	10.678474	-0.388873	-0.096359	-0.311738
(2,4)(0,0)	12.658029	-0.388189	0.004516	-0.283990
(4,0)(0,0)	10.650256	-0.387521	-0.093008	-0.309387
(3,1)(0,0)	10.586609	-0.382217	-0.087704	-0.304083
(4,3)(0,0)	13.029029	-0.335752	0.106018	-0.218651
(4,1)(0,0)	11.026547	-0.335546	0.008053	-0.244389
(2,3)(0,0)	10.971742	-0.330978	0.012621	-0.239822
(3,2)(0,0)	10.945534	-0.328795	0.014805	-0.237638
(3,3)(0,0)	11.498722	-0.291560	0.101124	-0.187381
(3,4)(0,0)	12.177303	-0.264775	0.176995	-0.147573
(4,2)(0,0)	11.107531	-0.258961	0.133724	-0.154782
(4,4)(0,0)	12.759766	-0.229980	0.260875	-0.099756
(0,1)(0,0)	4.860175	-0.155015	-0.007758	-0.115947
(0,0)(0,0)	-4.255256	0.521271	0.619443	0.547316

For time series analysis our prerequisite is data is to be stationary. The graph in **Fig-10** shows that the data is not stationary. The data are, therefore, differenced once at lag1 and the plot is shown in **Fig-11**. The graph in **Fig-11** shows that the data is not stationary yet. The data are, therefore, differenced once at lag2 and the plot is shown in **Fig-12**.

This study has tested ADF and found 4.276035 which is greater than 3.959148 at 0.01 critical level i.e. expectedly the study reject the null hypothesis. The graph and the table showed in **Fig-12** and **Table-12**. Finally, the data set is stationary in Lag-2.

Hence, the fitted ARIMA (2, 2, 0) model and the forecasting graph (**Fig-13**) can be stated as follows:

$$y_t = 6.144372 + 1.326147 \mu_t + 0.832193 \mu_{t-1}$$

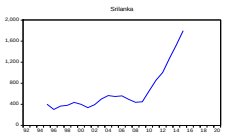

Fig 14: Time graph of tourism data.



Fig 15: Lag-1 of tourism data.

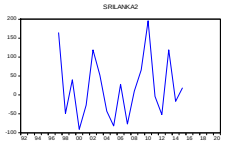

Fig 16: Lag-2 of tourism data.

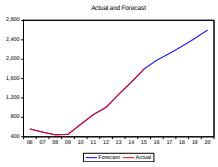

Fig 17: Forecasted graph.

Table 16: Lag-2 table of tourism data

Null Hypothesis: SRILANKA2 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.850762	0.0013
Test critical values:	1% level	-3.857386	
	5% level	-3.040391	
	10%level	-2.660551	

*MacKinnon (1996) one-sided p-values.

Table 17: Correlogram table for ACF and PCF

Date: 12/14/17 Time: 11:10
Sample: 1992 2020
Included observations: 19

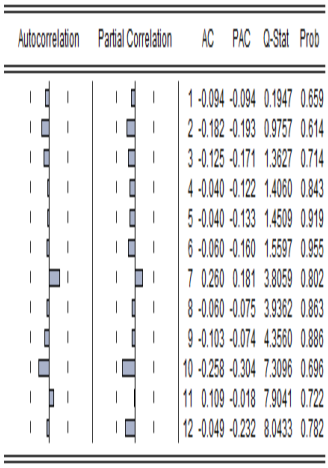

Table 18: Regression Co-efficient

Dependent Variable: DLOG(SRILANKA)
Method: ARMA Maximum Likelihood (BFGS)
Date: 12/14/17 Time: 11:18
Sample: 1996 2015
Included observations: 20
Convergence achieved after 7 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.068492	0.047369	1.445932	0.1664
MA(1)	0.371694	0.242212	1.534580	0.1433
SIGMASQ	0.024725	0.009209	2.684844	0.0157

Model Selection Criteria Table
Dependent Variable: DLOG(SRILANKA)
Date: 12/14/17 Time: 11:24
Sample: 1992 2015
Included observations: 20

Model	LogL	AIC*	BIC	HQ
(0,1)(0,0)	8.546249	-0.462187	-0.314931	-0.423120
(0,0)(0,0)	7.530396	-0.460866	-0.362685	-0.434822
(1,0)(0,0)	8.441978	-0.453498	-0.306241	-0.414431
(2,0)(0,0)	8.702289	-0.391857	-0.195516	-0.339768
(0,2)(0,0)	8.615932	-0.384661	-0.188319	-0.332571
(1,1)(0,0)	8.569954	-0.380829	-0.184487	-0.328740
(0,3)(0,0)	9.418242	-0.368187	-0.122759	-0.303075
(3,0)(0,0)	8.843072	-0.320256	-0.074828	-0.255144
(1,2)(0,0)	8.825385	-0.318782	-0.073354	-0.253670
(2,1)(0,0)	8.769922	-0.314160	-0.068732	-0.249048
(2,2)(0,0)	9.525814	-0.293818	0.000696	-0.215683
(0,4)(0,0)	9.521709	-0.293476	0.001038	-0.215341
(1,3)(0,0)	9.253405	-0.271117	0.023396	-0.192983
(4,0)(0,0)	8.912908	-0.242742	0.051771	-0.164608
(3,1)(0,0)	8.882961	-0.240247	0.054267	-0.162112
(2,3)(0,0)	9.689317	-0.224110	0.119489	-0.132963
(1,4)(0,0)	9.636686	-0.219724	0.123875	-0.128567
(3,2)(0,0)	9.534809	-0.211234	0.132365	-0.120077
(2,4)(0,0)	9.949457	-0.162455	0.230230	-0.068275
(4,1)(0,0)	8.913183	-0.159432	0.184167	-0.068275
(3,3)(0,0)	9.875122	-0.156260	0.236424	-0.052081
(3,4)(0,0)	10.215082	-0.101257	0.340513	0.015945
(4,2)(0,0)	9.167299	-0.097275	0.295410	0.006904
(4,3)(0,0)	9.588349	-0.049029	0.392741	0.068173
(4,4)(0,0)	10.251105	-0.020925	0.469930	0.109299

For time series analysis our prerequisite is data is to be stationary. The graph in **Fig-14** shows that the data is not stationary. The data are, therefore, differenced once at lag1 and the plot is shown in **Fig-15**. The graph in **Fig-15** shows that the data is not stationary yet. The data are, therefore, differenced once at lag2 and the plot is shown in **Fig-16**.

This study has tested ADF and found 4.850762 which is greater than 3.857386 at 0.01 critical level i.e. expectedly the study reject the null hypothesis. The graph and the table showed in **Fig-16** and **Table-16**. Finally, the data set is stationary in Lag-2.

Hence, the fitted ARIMA (1, 2, 0) model and the forecasting graph (**Fig-17**) can be stated as follows:

$$y_t = 0.068492 + 0.371694\mu_t$$

Finally, We observed that the above forecasted graph in **Fig-3** shows the arrival of visitors in Bangladesh is declining while the other countries visitors graph is rising high in **Fig-6,9,17** other than in **Fig-13.** Tourism sites are explored and extracted properly to the entire world in SAARC region countries but we failed yet to do so that was obvious in **Fig-3.** We could not offer exclusive tourist product and packages to local and foreign tourists in an organized way. Lack of investment and low quality service also the causes of deterioration in the tourism sector. Infrastructural development is required in no time. Visa requirement and complex visa procedure should be simplified.

6. Conclusion

It is obvious that tourism in the Bangladesh can be an expanding sector. It might be a noteworthy source of foreign exchange earnings and employment sector in our country. Bangladesh has possibilities to connect, individually and collectively, for the development of tourism sector. Nevertheless, the progress in cooperation in this area in our belt is quite slow, with no significant achievement even in any specific area. The regional tourism within Bangladesh needs to be addressed. It is expected that the Bangladesh government will take lesson from other groups in the world and take substantive initiative to take out the barriers existing in the way of development.

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