

A Macro Analysis of Tourist Arrival in Nepal

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Abstract

The number of tourists visiting Nepal has shown rapid growth in recent years, and Nepal is expecting more tourist arrivals in the future. This paper, thus, attempts to analyze the tourist arrivals in Nepal and predict the number of visitors until 2025. This paper has examined the international tourist arrival trend in Nepal using the Gompertz and Logistic growth model. The international tourist arrival data from 1991 to 2018 is used to investigate international tourist arrival trends. The result of the analysis found that the Gompertz model performs a better fit than the Logistic model. The study further forecast the expected tourist arrival below one million (844,319) by 2025. Nevertheless, the government of Nepal has the goal of two million tourists in a year. The present study also discusses system dynamics scenarios for the two million potential visitors within a year. Scenario analysis shows that proper advertisement and positive word-of-mouth will be key factors in achieving a higher number of tourists. The current study could fill the gap of theoretical and empirical forecasting of tourist arrivals in the Nepalese tourism industry. Also, the study findings would be beneficial for government officers, planners and investors, and policy-makers in the Nepalese tourism industry.

Keywords: Tourist Arrivals, System Dynamics, Nepal Tourism, Tourist Forecasting, Econometric Analysis

JEL Classification Code: C5, L8, O3, Z3

1. Introduction

Nepal, a sandwiched landlocked country in South Asia, possesses tremendous natural beauty and diverse cultural practices. This small land consists of the world's highest peak "Everest" ("Sagarmatha" in Nepali) along with more than ten mountains above 8,000 meters. The range of biodiversity within this tiny country is incredibly unbelievable. Thick forests, numerous rivers and streams, green hills, and deep gorges make this nation undoubtedly the most beautiful

destination for nature-based tourism. During the past 40 years, Nepal has seen fantastic growth in international tourist arrival, and the contribution to total foreign exchange is approximately 30% (MOCTCA, 2018). However, there have been ups and downs on tourist arrivals in the past several years due to the unstable state of the Nepalese political system and the natural disaster in 2015 and will also with global pandemic COVID-19 in 2020. Nevertheless, the tourism activities in recent years after the promulgation of the constitution of the Republic of Nepal has been showing exceptional increment.

Tourism as an industry in Nepal makes a significant contribution to the Nepalese economy. The increase in international visitors helps open doors to investors and entrepreneurs, thus generating more income, employment, and tax revenue. However, tourism growth is more dependent on a variety of factors such as tourist-friendly infrastructures, information and communication, better transportation, safety, and security (e.g., Cheng & Jiang, 2017; Goeldner, Ritchie, & McIntosh, 2000; Lee & Syah, 2018; Lee & Kwag, 2013). Furthermore, tourist demand is vulnerable and depends upon the nation's political situation and external affairs (Hall & O' Sullivan, 1996). Nepal is primarily a destination for mountaineers because of its image around the world as a Himalaya nation. However, Nepal has a variety of cultures and diverse ecological aspects. If we see the history of tourist

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flow in Nepal, it has deliberately depended on the country's political situation. During Maoist activities, the country saw the lowest footfall in tourist arrival. The rate of arrival then increased with the promulgation of the new constitution in 2015, and the disastrous earthquake in 2015 devastated tourist arrival in Nepal.

Nepal has celebrated two “visit Nepal” campaigns in the past to enforce visitors' numbers in 1998 and 2011. In 1998, the nation's first tourism year was not up to the mark in terms of tourist arrival, but it managed to enhance Nepal's image in the world nonetheless. Then in 2011, the nation celebrated visit Nepal year with the objectives of enforcing 1 million visitors to Nepal. However, the result was not enough though the increase in tourist arrival was 22% more than in 2010. Again, the government of Nepal has declared visit Nepal 2020 with the expectation of 2 million tourist arrivals, but the plan is canceled due to the global pandemic COVID-19.

The tourist arrival of forecasting literature is heavily based on the tourism demand-modeling phenomenon. An autoregressive integrative moving average (ARIMA) extensively used to forecast tourist arrivals (Tularam, Wong, & Nejad, 2012). Chang and Liao (2010) discussed the ARIMA model of tourism forecasting in the case of Taiwan. Neupane, Shrestha, and Upadhyaya (2012) studied the monthly arrival of international tourists in Nepal with risk analysis.

Forecasting of tourist arrivals in Nepal is essential because the nation is aiming for an ambitious mission to have two million visitors in a single year. This study aims to analyze the tourist arrival pattern in Nepal with empirical analysis and to examine the factors for achieving two million expected visitors using System Dynamics (SD) quantitative approach for a particular year X. Specifically, the tourist arrival pattern from 1991 to 2018 is analyzed using Gompertz, and the Logistic model and further analysis were carried out with multiple scenarios to achieve the goal of two million visitors. This study will fill the gap of theoretical and empirical forecasting of tourist arrivals in the Nepalese tourism industry. The results will be beneficial for government officers, planners and investors, and policymakers in the Nepalese tourism industry.

2. Overview of Nepalese Tourism Industry

Nepal has a long history of the arrival of visitors. After the British Mt Everest Expedition in 1953, the rate of arrivals has been increasing. This region is currently one of the leading mountains and trekking tourism hubs in the Himalayas (Stevens, 1993). Some literature argued that the founder of the Nepalese tourism industry was Boris Lissanevitch. The tourism industry in Nepal owed its rise to the arrival of Boris Lissanevitch, a Russian, when Nepal was still a forbidden mountain kingdom (Himalaya, 2008).

Lissanevitch discovered that Nepal is a perfect destination for visitors, and then the tourism industry has significantly seen a rise and has become an essential input to the Nepalese economy.

The nation is well-known for Mt. Everest, and Nepal's high Himalayan regions have established themselves as one of the world's leading centers of mountaineering and trekking routes with immense potential for tourism growth. Nepal's small-scale adventure tourism brand is capable of linking this country with the global economy, probably the most remote part of the globe, and providing new opportunities for economic development in the region. However, although the pace of development of the tourism industry does not look promising from the economic development perspective, this sector has unlimited potential, and it contributes a significant share in foreign exchange receipts.

The tourism industry is one of Nepal's primary sources of international revenue. According to WTTC (2019), the foreign earnings stood at NPR240.7 billion and generated 1.05 million jobs directly and indirectly. Nevertheless, the industry's average contribution as a percentage of GDP was 7.9%. Overall, the contribution of Nepal's travel and tourism sector to the GDP was NPR195 billion, and it grew at 3.9% more than in 2017. The updated government policies have shown significant concern about tourism's real value and its contribution to the country's economic growth and overall development of tourism. The tourism industry is an important component in alleviating poverty and bringing social equity.

3. Overview of Visit Nepal Campaign and Tourist Arrivals

Nepal opened its doors to foreigners in the 1950s after the restoration of democracy. Since then, with its mysterious environment, the Government of Nepal has continuously made efforts to advance Nepal's tourism capacity and its contribution to the economy. Nepal has seen a record 1,173,072 visitors in 2018 alone, creating more than one million jobs and pumping into the economy NPR240 billion. Today, as Nepal had a plan for the third edition of a year-long tourism project, Visit Nepal 2020, with the motto ‘a lifetime experience,’ was to welcome over two million visitors, but a global pandemic COVID-19 spread from China by the end of December 2019, putting the world in lockdown, then the programmed was canceled. We have looked back on previous versions – Visit Nepal 1998 and Nepal Tourism Year 2011 – to see how the Nepalese tourism industry has grown.

In 1996, the Government of Nepal announced 1998 as a “visit Nepal '98” to improve the image of the country as a unique destination for tourists. The slogan “Sustainable environment by sustainable tourism” was set up to welcome more than half a million visitors. This pioneering theme highlighted the need for tourism to work in harmony with the

environment and promote tourism that is environmentally friendly and value-based. Some notable changes were introduced by the then government, especially in the aviation sector, such as a growing number of international flights and seat capacities. The country successfully welcomed 463,684 tourists then.

The Republic of Nepal announced in 2009 that 2011 would be the year of tourism in Nepal. The government brought a ‘one-district, one-destination’ identification system with infrastructural growth and promotion of unique places. Nepal’s government has carried out comprehensive promotional programs for adventure and cultural tourism. Although it missed its one-million destinations for tourists, the country received over 700,000 visitors, a record number of tourists at the time. Tourism accounted for more than 7% of GDP (more than \$1 year) impressively. The campaign helped to clean up the image of Nepal and improve its tourism industry, which was ravaged by a decade-long political instability and civil war.

The government developed plans to operate two new international airports in Pokhara (a beautiful city of the lake) and Lumbini (birthplace of the Lord Buddha) by adding a new Airbus 330-220 to serve a large number of tourists (MOF, 2009). The government is also planning to run Tribhuvan International Airport for a further 3 hours a day from regular 18 hours to ensure the availability of incoming and departing tourist services. In hotspots such as Pokhara, Kathmandu, and Chitwan, the hotel sector plans to add 4,000 new rooms in its four and five-star categories. Those expected to make their debuts shortly are multinational hotel chains such as Marriott, DoubleTree, and Hilton (MOCTCA, 2018).

This study aims to empirically analyze the tourist arrivals in Nepal, whether two million visitors in a single year is achievable or not.

4. Methodology and Data

Many researchers used various prediction models for tourist arrivals in their studies. An econometric model is a popular and useful method to understand tourism demand with econometric variables (Hamal, 1996). The autoregressive integrative moving average model (ARIMA) has been widely used in forecasting studies (Suh et al., 2014; Jeong, 2016; 2017). Tularam et al. (2012) have used a time-series analysis of tourist arrivals in Australia. Albert et al. (2015) used ARIMA and a double exponential smoothing model to forecast tourist arrival in Kenya. Recently, Kraja and Beshiri (2019) used Gompertz and logistic models to estimate tourist arrivals in Albania. Neural network and genetic algorithms also being popular to forecast tourist arrivals. Jeon (2020) analyzed Korean tourism stock performance using Quantile Regression (QR) method.

The tourist arrival pattern in Nepal shows a non-linear pattern, and the arrival curve has fluctuated throughout the period. The S-shape growth models have a great advantage to fit the prediction model and to study trends of tourist arrivals. Thus, in this study, we have analyzed the Nepalese tourist arrival pattern using Gompertz and Logistic growth models, forecasted with the best-fitted model, and quantitative scenario analysis with the System Dynamics (SD) approach is conducted to achieve the goal of two million visitors for a specific year.

Table 1: International tourist arrival in Nepal (1993~2018)

Year	Arrival	% Change	Year	Arrival	% Change
1993	293567	-12.2	2006	383926	2.3
1994	326531	11.2	2007	526705	37.2
1995	363395	11.3	2008	500277	-5.0
1996	393613	8.3	2009	509956	1.9
1997	421857	7.2	2010	602867	18.2
1998	463684	9.9	2011	736215	22.1
1999	491504	6.0	2012	803092	9.1
2000	463646	-5.7	2013	797616	-0.7
2001	361237	-22.1	2014	790118	-0.9
2002	275468	-23.7	2015	538970	-31
2003	338132	22.7	2016	753,002	40
2004	385297	13.9	2017	940218	25
2005	375398	-2.6	2018	1173072	25

Source: Nepal Tourism Statistics; MOCCA, 2018

This paper analyzes tourist arrival data from 1991 to 2018 (Tourism Statistics Ministry of tourism, 2018). The tourist arrivals at a particular time are taken as an essential construct to measure tourism demand and given by the total number of tourist arrival from an origin to a destination (Song & Li, 2008). The data is studied empirically using Gompertz and logistic growth models to analyze the visiting trend using the Non-Linear List Square (NLS) tool form R-Studio. The value of R2 and the residual standard error is considered to measure the quality of the best-suited model. The details of the Logistic and Gompertz models are briefly explained in the following section.

4.1. Logistic Growth Model and the Gompertz Model

The sinusoidal development of tourist destinations theoretically approximated by using a logistic growth model (Lundtrop & Wanhill, 2001). The logistic growth model first purposed by Verhulst in 1838 as a population model and defined that the growth rate is proportional to the number of arrivals at the time t, T (t), and the number of other people may visit the tourist place.

$$\frac{dT(t)}{dt} = b \frac{T(t)}{c} (c - T(t))$$

Where T(t) is the number of tourists at time t, b is the characteristic rate of growth of the touristic area. c is Carrying Capacity or maximum tourist capacity of the tourist destination, and the derivation of tourist’s number with respect to time.

Gompertz model (see equation in Table 2) is another S-shaped prediction model that is a type of mathematical model for time-series data and names formulated by Benjamin Gompertz (1779-1865) (Agarwal, Hodis, & Regan, 2019).

$$\frac{dT(t)}{dt} = b \frac{T(t)}{c} (c - T(t))$$

Where c is the carrying capacity or maximum tourist capacity; b is the speed of expansion of the number of tourists; t is the moment of time when the number of tourists achieved the share $1/e \approx 36.8\%$ of its maximum level, and a is the timing and location variable. Both the Gompertz and Logistic curves involve the estimation of three parameters and range between a lower asymptote of 0 and an upper asymptote of c. The solution of the model equation and their features are summarized in Table 2.

4.2. System Dynamics Scenario Analysis

This study uses the System Dynamics (SD) approach to investigate the trends of visitors to Nepal. The SD analysis for tourist arrival is carried out using two stocks, four flow variables, and three constant variables. Specifically, we used ‘Potential Visitors’ and ‘Visitors’ as two stocks, ‘Total visitors,’ ‘Visited from Government Effort,’ ‘Visited from word of Mouth’ and ‘Visiting Rate’ as a dynamic flow variable, and ‘Ad effectiveness,’ ‘Contact Rate,’ and ‘Visiting Fraction’ as a constant variable. The SD parameters for tourist arrivals based on the dynamics of tourism demand (Haraldsson & Olafsdottir, 2018). The SD parameters, units, equations used in the analysis depicted in Table 3. The model flow diagram with relationships among its SD parameters is shown in figure 1.

The paper explains the SD approach with four different scenarios to meet the mission of two million visitors in a year. It is assumed that the first day of January starts with zero visitors and two million visitors at the end of the year on December last. The four different scenarios on quantitative SD analysis are tabulated as below (Table 4). The SD of tourism arrival is represented by the Bass Diffusion Model (Sternman, 2000) to achieve the goal of the two million visitors within a year.

Table 2: Gompertz and Logistic Models

Source of Influence	Pure imitative models	
Model	Gompertz	Logistic
Model equation $\frac{dT(t)}{dt} =$	$b \frac{T(t)}{c} (\ln(c) - \ln(T(t)))$	$b \frac{T(t)}{c} (c - T(t))$
Model Solution T(t) =	$ce^{-ae^{-bt}}$	$\frac{c}{1 + e^{-(a+bt)}}$
Symmetry*	AS	S

Note: AS: asymmetric, S: symmetric

Table 3: Gompertz and Logistic Models

Parameters	Equation	Unit	Remarks
Potential Visitors	Integ (-Visiting Rate, 2000000)	People	Mission to meet 2 million visitors. (Stock)
Visitors	Integ (Visiting Rate,0)	People	The initial visitor in January is zero. (Stock)
Total Visitors	Potential Visitors + Visitors	People	Dynamic Variable
Visited from the Word of Mouth	$(\text{Visitors} \times \text{Visiting Fraction} \times \text{Contact Rate} \times \text{Potential Visitors}) / \text{Total Visitors}$	People/ Month	Dynamic Variable
Visited From Government Effort	Ad effectiveness \times Potential Visitors	People/ Month	Dynamic Variable
Visiting Rate	Visited from Government Effort + Visited from word of mouth	People/ Month	Dynamic Variable
Ad effectiveness	As per scenario	1/Month	Constant variable
Contact Rate	As per scenario	1/Month	Constant Variable
Visiting Fraction	1	Unit less	Constant Variable

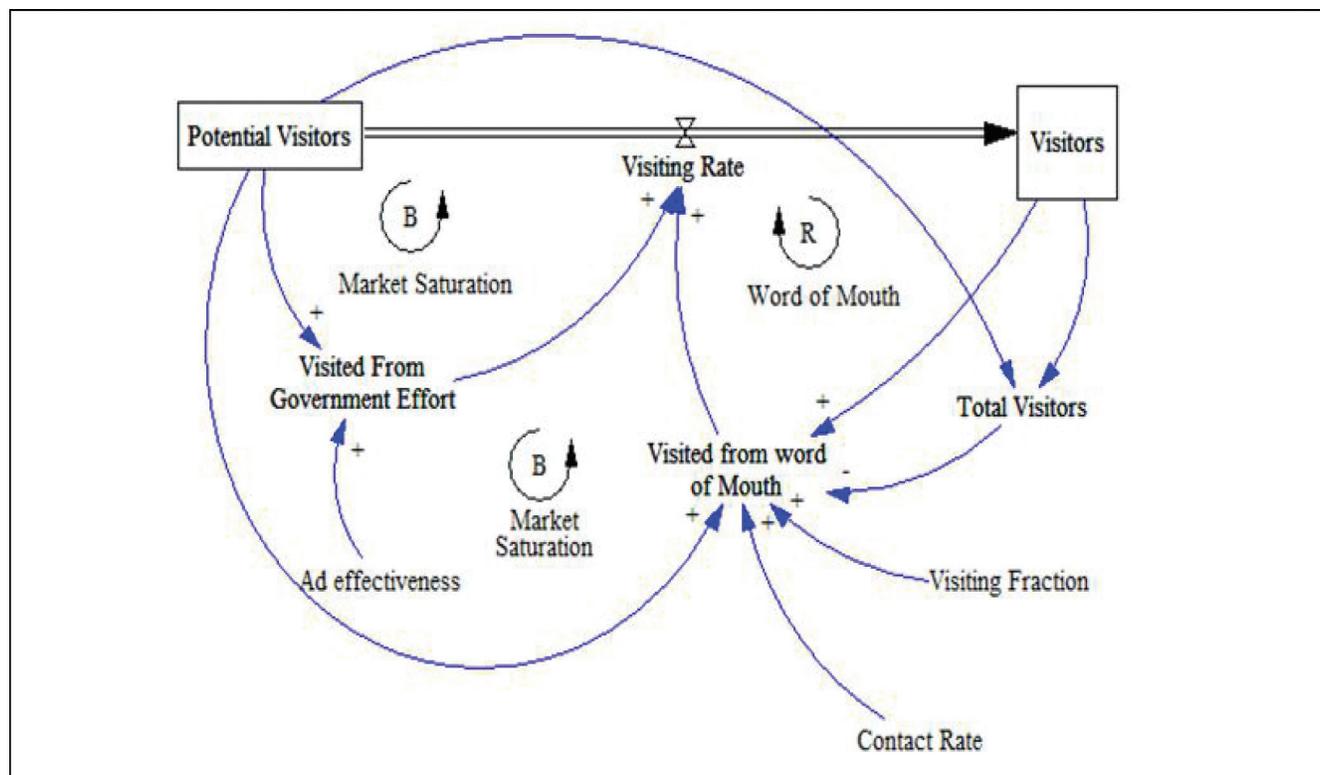


Figure 1: System Dynamic Model

5. Results

The number of tourist arrival in Nepal from 1991 to 2018 is analyzed and shows a non-linear pattern. The fluctuation of tourist arrival is one of the difficult tasks to fit into a model with a statistical tool. We compared with two models Gompertz and Logistic models, to analyze the pattern of the data. The value of Root Mean Square Error (RMSE) and R2 measures the fit of each model.

Comparing the Gompertz and Logistic econometric growth model, the Gompertz model performed better fit than the logistic model. Table 5 presents the comparison between Gompertz and Logistic growth parameters of tourist arrivals in Nepal. Based on the Gompertz growth model, the number of visitors by the end of 2025 will be 844,319. Considering this result, we can conclude that if the

government set the plan to welcome two million visitors in a year, it will be an ambitious mission. The actual visitors since 1991 to 2018 and Gompertz growth fitted data plotted in Figure 2.

We have further studied the possibility of achieving the goal by using the SD approach. SD quantitative analysis with different scenarios is performed to achieve the tourist inflow mission in Nepal. As Table 4, four scenarios are considered with four different parameters of the system dynamics model. The potential visitors are assumed as the two million target arrivals. In each scenario, advertisement effectiveness, contact rate, and visiting fraction parameters are changed. The result of scenario analysis shows that effective advertisement would be a pivotal to reach objectives along with positive word of mouth of visitors. The expecting tourist flow from January to December is plotted in Figure 3.

Table 4: Different scenarios for SD analysis

Parameters	Scenarios			
	1	2	3	4
Potential Visitors	2000000			
Ad effectiveness	0.04	0.04	0.05	0.05
Contact Rate	1	1	1	1
Visiting Fraction	0.4	0.5	0.4	0.5

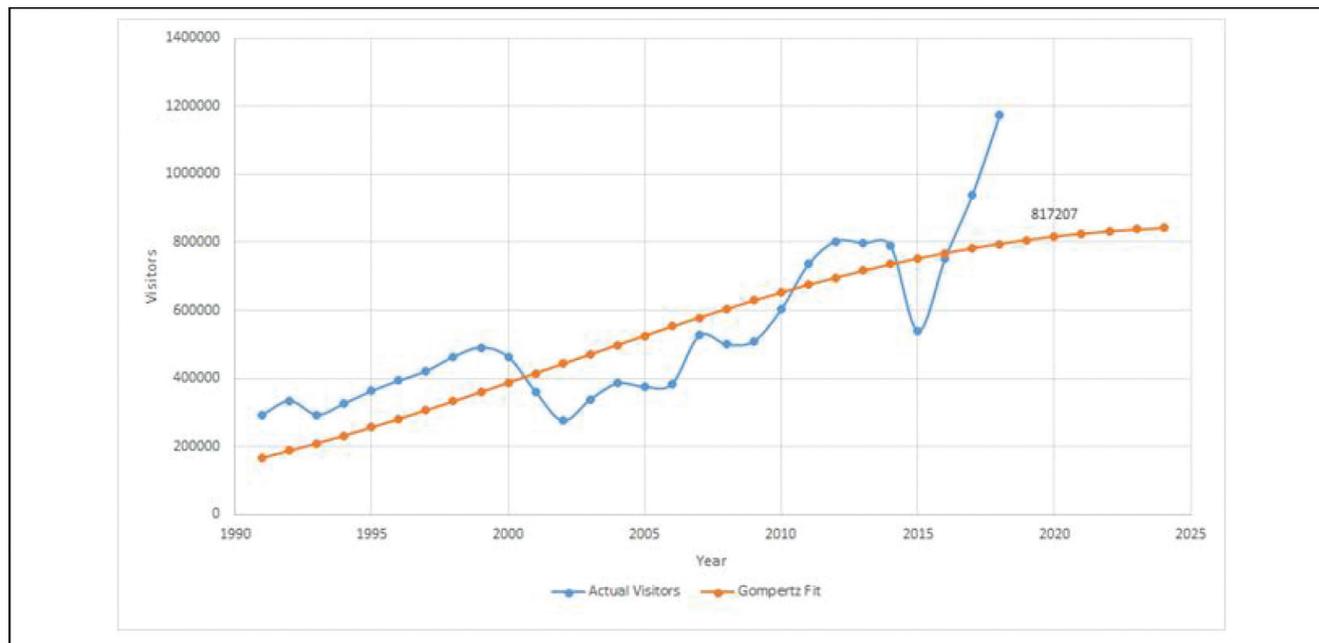


Figure 2: Gompertz model fit for tourist arrival

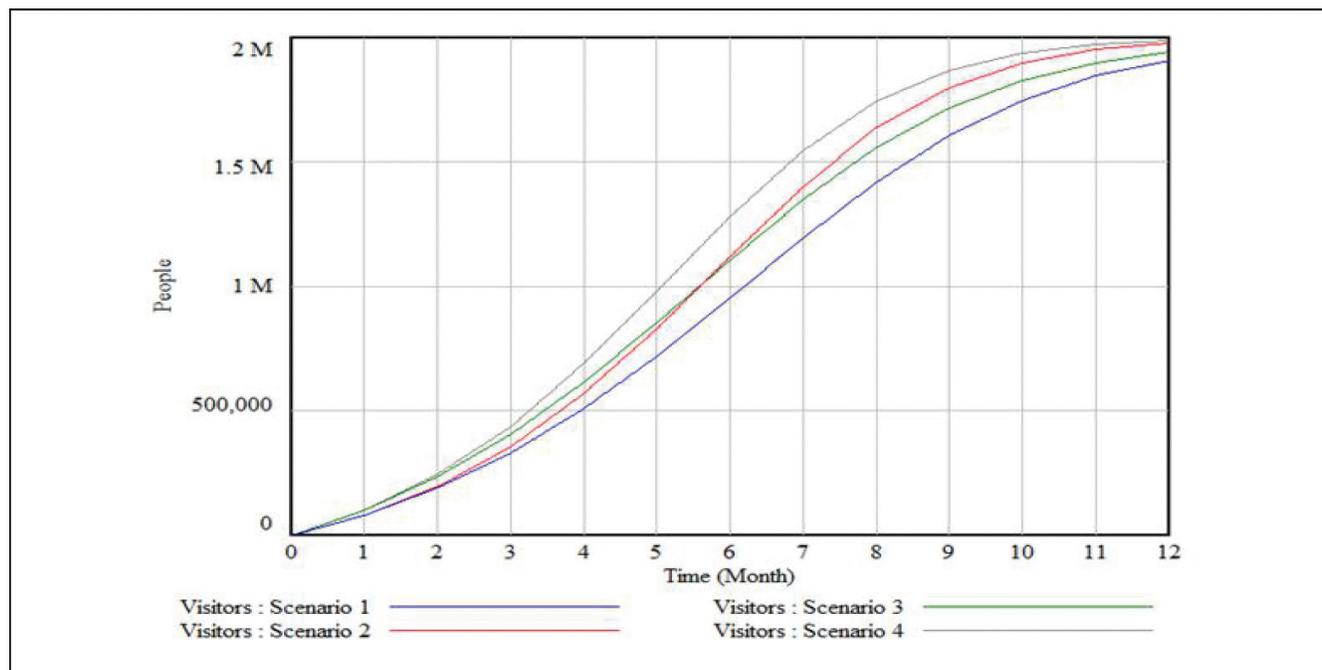


Figure 3: Scenario analysis of tourist arrival

6. Conclusions and Implications

This paper discusses the tourist arrivals in Nepal and predicts the number of visitors until 2025. We have compared the tourist arrival data using two econometric growth models and found that the Gompertz model performs better fit than the Logistic model. In 2020, the government of Nepal had a mission to welcome two million tourists, but the Visit Nepal 2020 project was canceled due to the global COVID-19 pandemic. This study further examines the possibility of welcoming the two million visitors for a particular year using the SD approach with four different scenarios.

Based on the better fitted Gompertz growth model, the total tourist by the in 2025 will be 844,319. Some other studies about tourist demand and arrivals (Kraja & Beshiri, 2019; Petropoulos et al., 2006; Zhang & Xue, 2009) also investigated similar results with the Gompertz model fit. If we see the tourist arrival trend from 1993 to 2018, the goal of two million visitors in a year looks quite ambitious. The fluctuation of visitors throughout the years is one of the leading causes of low prediction. Moreover, this low prediction also indicates other factors as awareness about tourism in Nepal, political instability, and insufficient infrastructure.

Nepal is the best-value destination in terms of nature-based tourism (Adventure Alternative, 2017). World mountain tourists, cultural tourists, as well as nature lovers

can visit Nepal. Thus, to fulfill the mission to welcome two million visitors in a year, we examined four different scenarios with the quantitative SD approach. With changing advertisement effectiveness and networking contact rate, as shown in Table 4. The result depicts that lower the ‘Ad effectiveness’ and networking ‘Contact Rate’ lower the visitors and vice versa.

The arrival of tourists in Nepal is non-linear and has fluctuations in different years. In 2018 there has been already more than one million tourists visited Nepal. The rate of tourist arrivals has increased after 2015, after the promulgation of the constitution of Nepal. If we look at the tourist arrivals in Nepal from 1991 to 2018, we can see that political stability is a critical factor (left for future study to verify). The natural disaster, earthquake in 2015 also slowed down the rate of tourist arrival.

If we go back to the previous version of visit Nepal campaigns, the percentage increase in visitors is significant. In 1998, there has been a 9.9% increase in visitors to Nepal, and in 2011, this number rose to 22.2%. The tourist arrival trends in the recent four years show tremendous hope of being successful on the mission of two million visitors. The advancement of social media and technology would be a plus point for the campaign. Advertisement and promotion of Nepal in a foreign land is effortless these days. For this instance, the mission of welcoming two million tourists in a year seen to be achievable.

According to the findings, however, to achieve two million visitors in a year appears to be a challenging task. Only if the government and the private sector join forces, then Nepal can welcome a massive number of international tourists. For this, all the sectors must work immensely in order to overcome the full range of limitations that we suffer in the tourism sector, such as lack of infrastructure, transportation, and accommodations in potential destinations, to name a few.

This study offers an understanding of tourist forecasting techniques using an econometric approach. In addition, the scenario analysis using the SD approach improves the reliability and practicability of this work. This research also extended the limited literature available on tourist forecasting and the SD approach on tourist arrivals.

Finally, this study is not only concerned about empirical findings, but also recommends possible ways to get two million visitors in a year. The policy planner and tourism authority should focus on making the right strategy highlighting the natural beauty of Nepal. The result of scenario analysis indicates that proper advertisement and positive word of mouth of visitors are crucial to increase tourist number significantly. Furthermore, the government, public and private sectors should concentrate on strengthening the management for the warm hospitality of visitors.

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