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# AN INFLUX OF TOURIST ARRIVALS BETWEEN EASTER ATTACK AND COVID-19 IN SRI LANKA

Nagalingam Nagendrakumar<sup>1</sup>, Lokeshwara, A, A<sup>2</sup>, Gunawardana S.A.D.C.K<sup>3</sup>, Kodikara U.P<sup>4</sup>,  
Rajapaksha R.W.N.H<sup>5</sup>, Rathnayake K.R.M.C.S<sup>6</sup>

<sup>1</sup>Professor, SLIIT, Business School, Malabe, Sri Lanka, <sup>2</sup>Lecturer, SLIIT, Business School, Malabe, Sri Lanka, <sup>3</sup>Undergraduate, SLIIT, Business School, Malabe, Sri Lanka, <sup>4</sup>Undergraduate, SLIIT, Business School, Malabe, Sri Lanka, <sup>5</sup>Undergraduate, SLIIT, Business School, Malabe, Sri Lanka, <sup>6</sup>Undergraduate, SLIIT, Business School, Malabe, Sri Lanka.

Email: [nagalingam.n@slit.lk](mailto:nagalingam.n@slit.lk)<sup>1</sup>, [anuja.l@slit.lk](mailto:anuja.l@slit.lk)<sup>2</sup>, [chathu.gunawardena1997@gmail.com](mailto:chathu.gunawardena1997@gmail.com)<sup>3</sup>,  
[udarikodikara72@gmail.com](mailto:udarikodikara72@gmail.com)<sup>4</sup>, [nethmiharindirajapakshe@gmail.com](mailto:nethmiharindirajapakshe@gmail.com)<sup>5</sup>, [chandishashikala@gmail.com](mailto:chandishashikala@gmail.com)<sup>6</sup>

## Abstract

Sri Lankan tourism industry was subjected to various shock events such as the Easter Sunday attack and the COVID-19 pandemic and this study aims to examine the impact of Easter Sunday attack and the COVID-19 on Tourist Arrivals (TA). Box-Jenkins ARIMA model was used to examine the impact of shock events on TA and was analyzed using STATA. ARIMA (2,1,1) model was used to forecast TA from April 2019 to May 2021 and was compared against the actual in achieving the research aim. The forecasted TA indicated a sudden drop from March 2019 to May 2021, revealing that the two selected shock events' impact was evidently negative. The study further concludes that Sri Lanka experienced a significant drop in TA following the Easter Sunday attack but recovered gradually; however, the TA has been negatively impacted due to the COVID-19 pandemic, and the impacts may remain for a moderately extensive period.

**Keywords:** Easter Sunday Attack, COVID-19, Autoregressive Integrated Moving Average (ARIMA), Tourist Arrivals (TA)

## Introduction

Sri Lankan tourism industry is the country's third-largest foreign exchange earner and has contributed significantly to the country's economy (Munasinghe et al., 2020). The tourism industry is considered as one of Sri Lanka's blooming economic sectors. In addition, Sri Lanka has been recognized as one of the fastest-growing tourism markets worldwide and a top tourist dream destination (Ranasinghe, 2019). However, Sri Lankan tourism industry is compelled to face shock events which may result in severe drawbacks.

One such incident was the Easter Sunday attack which shook Sri Lanka's tourism industry. On April 21, 2019, a series of six explosions targeting churches and luxury hotels in Sri Lanka shocked the nation and also attracted international attention. The attacks appeared to be well-coordinated and executed in high-profile areas to cause a significant number of fatalities (Attanayake et al., 2019). During Easter Sunday celebrations, church bombings occurred in Negombo, Batticaloa, and Colombo; the bombers struck the hotels: Shangri-La, Cinnamon Grand, Kingsbury, and Tropical Inn. At least 500 people were injured, with 259 people killed, including at least 45 foreign nationals and three police officers, and it is evident that the pattern

of the explosions also targeted tourists (Nishla & Rinosa, 2019). The Easter Sunday attack had a severe impact on the tourism industry. Tourist arrivals dropped by 70% in the following weeks, and hotels were utterly empty (BBC, 2019). In May 2019, Sri Lanka received 37,802 international visitors which was significantly lower than the same period in 2018, and the annual decrement of the number indicated a 13.4% of a drop from 2018 (Nishla & Rinosa, 2019).

According to the authorities and tourist industry experts, Sri Lanka showcased a massive slump in international TA in the wake of the terrorist bomb blasting aftermath, which took place ten years after ending the 30-year civil war in Sri Lanka. This situation was drastically followed by another shock event, the Coronavirus disease (COVID-19). In 2019, the Easter Sunday attack interrupted the sectors' explosive growth, which cost the industry \$1.5 billion in tourism income (Silva, 2019). The COVID-19 pandemic continues to spread without prejudice among countries with developed economies and undeveloped ones, causing people worldwide to suffer since the first COVID-19 patient was identified in Wuhan, China in December 2019 (Sivesan, 2020). During January, 2020 TA had dropped by 6.5 percent and during February, 2020 TA has decreased by 17.7 percent (SLTDA, 2020). Sri Lankan tourism industry tightened the arrivals of international tourists from mid-March of 2020 and suspended all international TA from all the countries from March 19, 2020, to minimize the spread of the COVID-19 pandemic (WBG, 2021). Tourism-related businesses, which are highly linked with other industries, have been badly impacted by the COVID-19 virus. Due to the closure of hotels, airlines, travel agencies, and other businesses, majority of the people employed in the tourism sector was made unemployed. Unexpected events like the Easter Sunday attack and the spread of COVID-19 make it difficult to attract tourists to the industry. There is a significant impact on Sri Lankan tourism due to COVID-19 pandemic (Samarathunga, 2020). However, it produced an opportunity to re-examine tourism strategies and readjust Sri Lankan tourism. Furthermore, the study aims to examine the impact of the Easter Sunday attack and COVID-19 on the TA using the Box-Jenkins Autoregressive Integrated Moving Average (ARIMA) model to forecast monthly TA. Accordingly, the following research questions: (1) what is the impact of Easter Sunday attack on the TA in Sri Lanka, (2) what is the impact on COVID-19 on TA in Sri Lanka?

The ARIMA model's forecasted values were compared with the actual TA values to evaluate the impact of the above two shock events on the tourism industry. There has been no study that compares the impact of Easter Sunday attack and COVID-19 in Sri Lanka, which is a research gap that can be filled with the study.

## **Methodology**

Monthly TA was used in the current study and the required secondary data were collected through annual reports published by the Sri Lanka Tourism Development Authority (SLTDA). This research utilized a sample of monthly tourist arrivals in Sri Lanka from January of 2016 to June 2021. The 39 observations for January 2016 to March 2019 were used to create a model to forecast the TA. The study uses the ARIMA model to forecast TA to examine the impact of Easter Sunday attack and COVID-19. It is a statistical model that uses to predict and forecast

trends, and the estimated TA was then compared with the actual TA. In this study, the TA is defined as foreigners coming for business, entertainment, spending the vacation with relatives, friends, and attending conferences or study.

Quantitative techniques for predicting the number of TA have received considerable attention compared to qualitative methods, according to Chu (1998). Further, the quantitative methods systematically use mathematics to process historical data sequences and are further divided into causal models and time series models (Chu, 1998; Lee et al., 1996; Witt & Witt, 1995). Time-series models are more relevant and compatible than casual models based on the accuracy of the projection from data of two years or less (Choy, 1984). Univariate time series are used to construct a model that interprets the behavior of the past time series and allows satisfactory predictions of the future (Law, 2000); Wong, 1997; González & Moral, 1996). It is also recommended to use monthly or quarterly data instead of the most commonly used annual data to predict TA flows (Coshall, 2000). Box–Jenkins univariate ARIMA model analysis, widely used for forecasting and modeling, consists of four stages, identification, estimation, diagnostic checking, and forecasting (Anderson, 1977). In the study, forecasted TA was estimated using STATA statistical software. In addition, it was used to model the TA monthly time series individually and estimate each time series data to see how the Easter Sunday attack and COVID-19 impacted the TA by comparing the forecasted data with actual values.

## Results and Discussion

The study is based on data for consecutive months over the five (05) years (January 2016 to May 2021). The Box- Jenkins modeling requires substantial amounts of monthly TA data for the identification and estimation process. Therefore, the first 39 observations (January 2016 through March 2019) were used for the first step in Box-Jenkins process. These 39 observations were used to forecast TA for the period from April 2019 to June 2021. Data of the first 39 observations were nonstationary and was required a remedy of differencing, and equation 1 was applied, where the nonstationary data ( $X^t$ ) that needs differencing  $d$  times to obtain a stationary time-series data ( $W^t$ ).

$$W^t = (1 - B)^d X^t \quad (1)$$

In equation 1,  $B$  denoted the backward change operator, and  $d$  is the order of difference. The researchers have used the monthly number of TA to determine the appropriate ARIMA model based on the Akaike Information Criterion (AIC) value. The researchers identified other initial models suitable for determining the most appropriate ARIMA model to illustrate monthly TA in the estimation process. The standard ARIMA model is ARIMA( $p, d, q$ ) which is mentioned as follows,

$$\varphi(B)(1 - B)^d X_t = \theta_0 + \theta(B)a_t \quad (2)$$

Parameter estimates are essential based on the t-value. The conditional likelihood algorithm was used to estimate the parameters. The exact likelihood algorithm is used only for the Moving Average (MA) parameters, and the model is entirely composed of the MA parameters. Therefore, the exact likelihood algorithm is used for the final estimation process. Once an ARIMA model is suitable for analysis, it is significant to investigate how well the selected

model fits into a given time series. The suitable ARIMA model for the study in forecasting the TA is ARIMA (2,1,1).

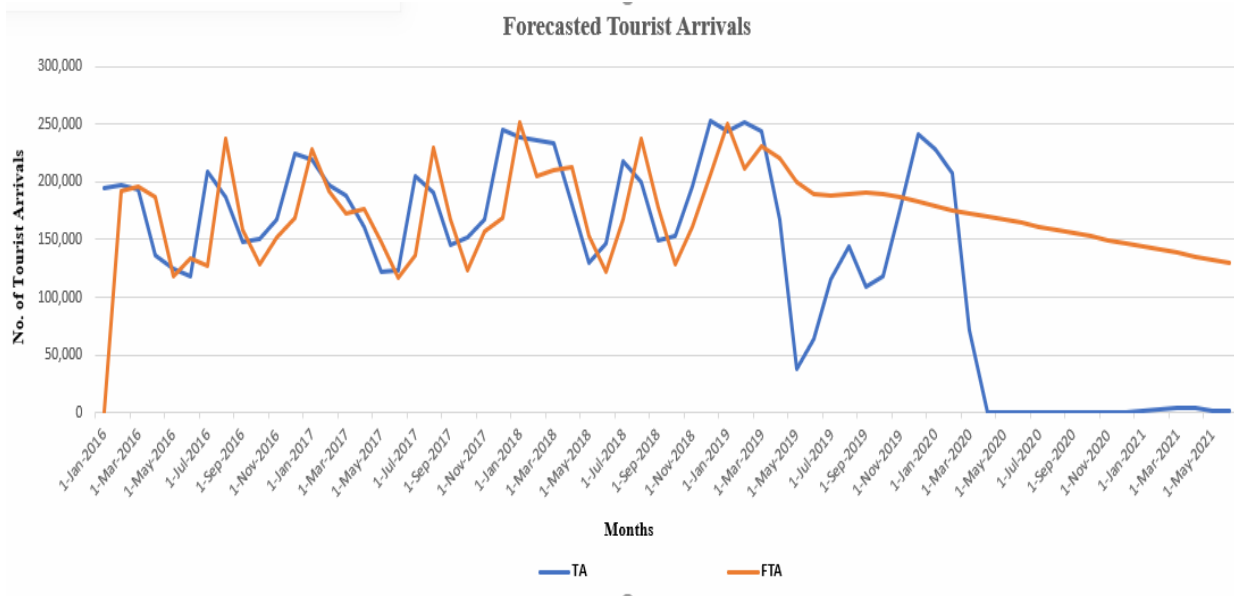


Figure 1 - Forecasted Tourist Arrivals

Once the model determination was done, ARIMA (2,1,1) model was used to predict the forecasted TA from April 2019 to May 2021. The forecasted values were compared with the actual TA in the selected period. Figure 1 exhibits findings of forecasted and actual TA.

According to Figure 1, forecasted TA starting from April 2019 have decreased gradually. Since April 2019, where the Easter Sunday attack occurred in late April, the total number of TA was not significantly reduced. The most significant decline in TA is recorded throughout the period from March 2020 to May 2021. And the figures further indicated that from May 2019 to May 2021, a decline was noted due to the impact of COVID-19. In the entire period, the maximum difference is seen in April 2020, where the actual TA is less than the forecasted value. This indicates that COVID-19 has significantly impacted the TA. In comparing the impact of the Easter Sunday attack, the tourism industry faced a sudden decline in actual TA but recovered smoothly; however, the negative consequences resulting from COVID-19 will continuously harm the industry in months to come.

## Conclusions

In this study, a forecasting model was applied to assess the impact of the Easter Sunday attack and COVID-19 on TA in Sri Lanka. The ARIMA (2,1,1) model was selected for the analysis and the forecasted TA was compared with the actual TA data to gauge the impact of shock events on tourist arrivals. The study concludes that Sri Lanka experienced a significant drop in TA following the Easter Sunday attack but recovered gradually; however, the TA has been negatively impacted due to COVID-19 pandemic and the impacts may remain for a moderately extensive period. The study further indicates that the Easter Sunday attack and COVID-19 continued to affect tourists' confidence in traveling to Sri Lanka severely. Pertinently, the study signals that the tourism industry is highly dependent on the arrival of tourists and is extremely

sensitive to disasters, whether man-made or otherwise. The study findings would be valuable for academic researchers as a stepping stone for future research opportunities in relation to Sri Lanka tourism industry. Further, it would be advantageous for policymakers and the government in developing the tourism policy framework.

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