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Forecasting the Foreign Tourist Arrivals to Vietnam Using the Autoregressive Integrated Moving Average Method

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Abstract:

The tourism has been recognized as the most important service sector in the economic development strategy of the Vietnamese government for the decades. The number of foreign visitors to Vietnam has increased rapidly over the years, however, the quality of the forecasting work has not met the requirements of the planning development. The serious over-loading of Vietnamese infrastructure as well as serving network has come by the problems in the forecasting. There is a large gap between the forecasting information and the real growth of the tourism sector in Vietnam. In order to solve this issue, our paper employs the ARIMA method to identify a more suitable tool for forecasting the foreign tourist arrivals to Vietnam. The data is used by the monthly form collected from the January 2009 to June 2018. The regression result determines the ARIMA (2,1,12) is the optimal model and applied to forecast the number of visitors come to Vietnam for three months of the third quarter in 2018. Finally, our study result provides a useful forecasting tool for not only the Vietnamese policymakers but also the businesses in the tourism sector in Vietnam in the future.

Keywords: tourism; foreign tourist; forecast; ARIMA; policymaker; Southeast Asia; Vietnam.

JEL Classification: F68; L83; L88.

Introduction

For many years, the tourism sector and its enabling ecosystem have proven to be significant drivers of economic growth, contributing over 10% to global GDP and accounting for 1 per 10 jobs on the planet (WEF 2017). Located in Southeast Asia, one of the leading tourist growth regions worldwide (UNWTO 2018), Vietnam has a long development history for over 4000 years with many dynasties. With the population is over 93 million people (2017), Vietnam is a multiethnic country includes 54 ethnic communities with many rich and diverse cultural heritage in many different locations. In addition, located in the tropical area, Vietnam has a coastline stretching nearly 3300 km including many scenic spots, beautiful natural bays as well as islands along the territorial waters. Furthermore, by the end of 2017, the United Nations Educational Scientific and Cultural Organization (UNESCO) has recognized 24 natural tangibles and 12 intangible cultural heritages and 4 heritage sites of Vietnam. At present, Vietnam has more than 3,000 national heritage sites as well as about 7,500 community heritage sites (Sieu 2018). With many strong points, the Vietnamese tourism sector has developed strongly over the past two decades with many achievements. Tourism has done many significant contributions in attracting fundings to protecting heritage values and relic sites in communities. In recent years, tourism has an important position in developing socio-economic and reducing poverty in Vietnam.

Be expected as "a new economic tiger" in Asia, the Vietnamese economic growth is always in the group of fastest growing countries in the world over three decades. In the detail, this economy has an annual average growth rate of 6.6% per year for more than 20 years so this is not a story surprise that the Vietnamese cities are developing as never before. Vietnam also has a convenient geographic when it is in the center of the Asia-Pacific region. So, this economy has attracted many foreign resources to economic development including a large foreign direct investment, official development assistance or remittance inflow (Tung et al. 2015). As a step comes after the successful achievement in economic growth, the Vietnamese

tourism is booming along with the economic fortunes of its country. Besides, the Vietnamese government signed the socio-economic development strategy which shows that tourism will see as the most important service of its economy in the long run. However, Vietnam is trying to develop a sustainable tourism sector in joining between business exploiting and also preserving traditional cultural values, protecting landscapes as well as the natural environments. These targets were set in Vietnam's master plan on tourism development toward 2020 and with the vision to 2030.

Besides, according to the Travel & Tourism Competitiveness Report 2017 (WEF 2017), Vietnamese tourist sector is ranked 67th among 136 economies worldwide (a rose by eight places compared previous year) and also continuously put in among the 10 most-improved countries. In particular, the report announced that the main drivers of the Vietnamese Travel & Tourism competitiveness were its cultural resources (ranking at 30th in global) and natural resources (ranking at 34th in global). Besides, there was a very good news, the internet helped the image of Vietnam increased the presence in the online tools, searches related to Vietnam's natural tourism were growing and increasing the appeal from its natural resources. The newest statistic showed that 12.9 million foreigners visiting Vietnam in 2017, a new record of the tourism development in this country.

Figure 1. The annual number of foreign tourist arrivals to Vietnam
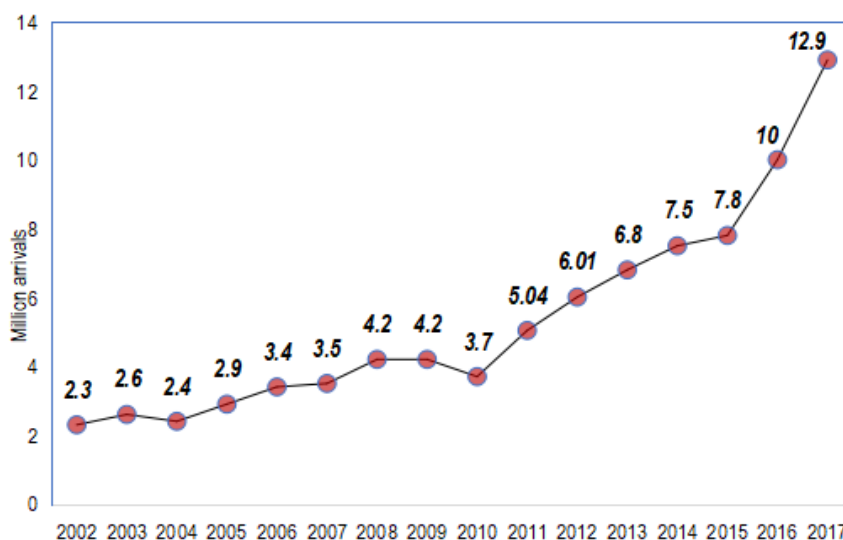
Source: The Vietnam National Administration of Tourism

The statistics of the Vietnam National Administration of Tourism show the strong development of Vietnam's tourism sector over the past two decades (see Figure 1). In the detail, there were only 2.3 million international tourist arrivals to Vietnam in 2002, however, there had got 6.01 million people in 2011 (rise nearly 3 times compare 2002) and reached 12.9 million visitors in 2017 which increased nearly 5.6 times compare 2002 (Sieu 2018). According to the WEF's report (2017), Vietnam was ranked in a group of countries in Asia-Pacific which consisted of some of the economies that had flourished most in recent years and five out of the 15 most improved countries in the tourist competitiveness index (including Japan 4th, Korea 19th, India 40th, Vietnam 67th, and Bhutan 78th). In particular, in 2016, the data from the World Tourist Organization's report showed that Vietnam was the leading one in the tourism growth rate in Southeast Asia with the growth was 26% compared with Thailand at 8.9% and Singapore at 7.1 % (WNWTO 2017).

Besides, the statistics from the General Statistics Office of Vietnam represented that the tourism revenue has increased five times for the period 2010-2017, from VND 96 trillion (similar as USD 4.3 billion) in 2010 to VND 510 trillion (similar as USD 23 billion) in 2017. The average growth of tourism's revenue was calculated at 26.9% per year in this period. The Vietnamese tourism sector contributes over 7% of GDP and makes the employment for 4.8 million people. Tourism also supports the development of national socio-economics from urban to rural regions, from coastal areas, islands to mountainous areas. Tourism development contributes positively to changing both urban and rural images and reducing the inequality gap among the provinces in Vietnam (Sieu 2018). The Vietnamese policymakers in the tourist sector hope to have around 16 million foreign tourist arrivals and VND 620 trillion (similar as USD 27 billion) in the total tourism revenue in 2018. These are considered achievable goals, but it is depended on the collective efforts among management agencies, businesses and communities as well as professional tourist organizations are needed to ensure sustainable development in the future (Vietnamnet 2018). A report published in June 2018 by the World Tourism Organization ranked the average growth rate of the Vietnamese tourism at the seventh in the global and this country was the only destination in Southeast Asia staying on the top ten markets. In the national economic development strategy of Vietnam, the tourism revenue is expected to contribute approximately as 10% of the Gross domestic product ($35 billion) by 2020. In which, when the tourist sector is planning to welcome up to 20 million foreign visitors by 2020. The target of 2018 is received 15-17 million foreign arrivals coming to the

country. However, the Vietnamese target number is still moderate compared to the neighboring countries, e.g, Thailand is targeting 37 million visitors in 2018 (Quy 2018).

Based on the statistics of the Vietnam National Administration of Tourism (see Figure 2), the foreign tourists from Vietnam are also very diversified with residents from all over the world. However, there is a fast increase in the number of foreign tourist arrivals from the traditional markets of Vietnam. In the detail, in 2017, the visitors from China reached 4 million people (an increase of 48.6%), South Korea had 2,4 million visitors (an increasing by 56.4%), and Japan was 789 thousand people (an increasing by 7.8%) or Taiwan has 616 thousand visitors (an increasing by 21.5%). This shows the connection between the development of Vietnam's tourism industry with the world. However, the fast growth of the tourism sector in Vietnam also causes some social problems such as the congestion in passenger transport system, missing in infrastructure as well as the human resources of the tourism sector have not met the service demand of visitors (Savills 2017, Vietnamnet 2018).

Figure 2. Top ten countries have the most number of visitors to Vietnam in 2017
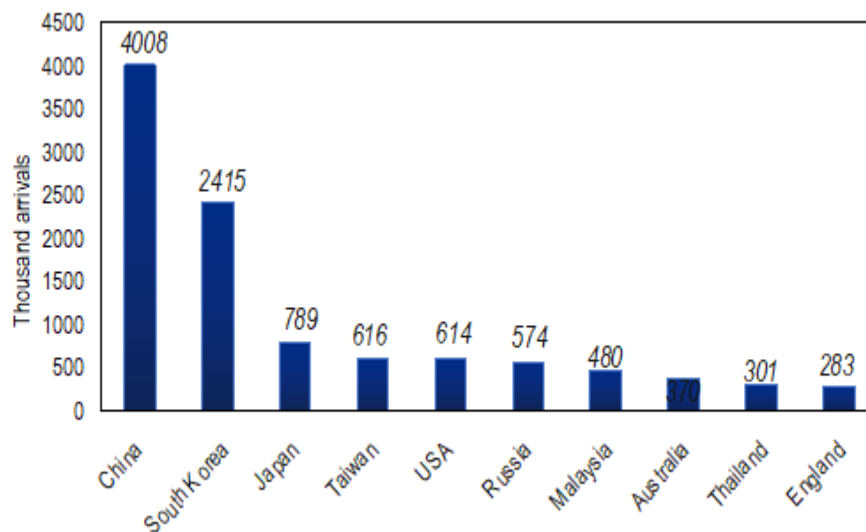
Source: The Vietnam National Administration of Tourism

One of the reasons leading to the passivity of the public administrators in the tourism sector coming from the quality of the forecast is not good. The official forecast data is always very lower than the reality. It is noteworthy that the real number of foreign tourists in 2017 strongly exceeds the number forecasted by the Government in 2020. Specifically, according to the Decision No. 2473 (signed in 2011) of the Government on the approval of the development strategy of Vietnam's tourism sector, the number of foreign tourist arrivals were forecasted to grow at 12% per year for the period of 2011-2020 (much lower than the actual increase of 26% in 2017) as well as reached about 10 million people (also much lower than the real number of foreign tourists calculated as 12.9 million in 2017). The forecast result was not good leading to the lack in the preparing strategy for the tourist service infrastructure.

Following the ranking of the Travel & Tourism Competitiveness Report 2017 (WEF 2017), the score of the tourist service infrastructure factor of Vietnam (113rd/136) was pointed at a very low level compared the average score (67th/136). Besides, we can see the score of the environmental sustainability factor was also very disappointed at the 129th ranking level in 136 countries worldwide. These results clearly show that the quality of forecasting of the Vietnamese administrative departments in the tourism sector is not good which can be demonstrated at the above errors. Thus, the inexactly forecasting is one of the main reasons leading to the investment in infrastructure is not enough as well as the development of the service system does not meet the requirements of tourists. These issues lead to the return of foreign visitors standing at around 33%, more series, another estimated statistic shows that only 6% of first-time visitors to Vietnam ever return - a very low rate compared with other countries (Vnexpress 2017).

1. Literature review

Despite Vietnam has had a fast-economic growth for previous years, however, the literature reviewing shows that there are few studies which focus on the tourism sector in this economy. In an early outside study in the Vietnamese tourist, Jansen-Verbeke (1995) had a report which fastly presented the development potential of tourism in Vietnam. The paper also showed some qualitative forecast on the market potential in Vietnam in the context that the United States lift the 20-year-old trade embargo to Vietnam's economy. At the beginning of the 90s, Vietnam had not got enough resources to ready for receiving a large influx of tourists. Specifically, the Vietnamese tourist sector lacked a suitable infrastructure, accommodation facilities, an

appropriate tourism organization as well as skilled staff. Based on the discussions, the author also suggested some qualitative forecast on the tourist market potential in Vietnam.

Lam (1997) provided an overview of Vietnam's tourism sector as well as analyzed the market potentials and forecasted challenges during this transition period of the Vietnamese economy. The evens including Vietnam joining ASEAN in 1995 as well as the restoration of diplomatic relations with the U.S.A were expected to bring a strong boost to the tourism sector of this economy. The event was forecasted have a strong positive effect on the tourism development in Vietnam. However, the paper noted that Vietnam was not ready as well as enough resources to receive a large number of tourists at this time. The paper also had some recommendations for future tourism developments in the economy.

Suntikul et al. (2008) have a study analyzing the tourist development after the economic revolution 'Doimoi' done in Vietnam. The authors divided the development of the tourism sector into five main periods, since the starting of the innovation policy in Vietnam. The arrivals could have a multiple-choice the accommodation-providers from different kinds of business including State-owned enterprises, foreign direct investment or private businesses (the small and medium-sized enterprises) in this economy. The authors also investigated in terms of the dynamics of interrelations between public, private and foreign operators, and the interaction of the accommodation sector with other factors (*eg.*, political, social and economic factors) in Vietnam during the transition period. Finally, the paper suggested some identifying factors and trends that best characterize the evolution of the Vietnamese tourism sector over the last two decades.

Unlike the idea in other studies, Thirumaran et al. (2013) showed the importance of souvenirs corollaries to tourism development in the case they related to traditional crafts especially in emerging destinations as Vietnam. The authors suggested that the souvenirs in tourism were a useful tool in promoting a tourist destination's image. Finally, the authors also suggested a development schedule for the Vietnamese tourism sector through promoting a tourist destination's image by the souvenir products. Truong (2013) focused on the relationship between tourist policies and poverty alleviation in Vietnam. The author divided the tourism development in this country into three periods, (i) The tourism was supported for political purposes in 1960–1975, (ii) The tourism was recognized as the potential economic resource in 1976-1990, and (iii) the tourism has been agreed as the important tool of the economic growth and poverty alleviation since the beginning of the 90s. The study result implied the important roles of the Government in supporting the tourist development as well as indicated that tourism growth would increase benefits for the poor people in this country.

Hampton et al. (2018) analyzed the impact of tourism on the inclusive growth in Vietnam. The authors noted that inclusive growth was contested yet adopted by the World Bank as an important tool to decrease poverty as well as inequality through fast economic growth. The author applied the inclusive growth concept to analysis the tourism sector in the context this sector had a significant role in many developing countries. The analysis model in the paper was included several factors: supply chains, economic leakage, ownership, employment as well as expenditure. The authors concluded that tourism had rapidly developed with partial economic benefits for local communities but did not appear to fall within the inclusive growth paradigm in the case of Vietnam.

Tung et al. (2018) analyzed the factors affecting the return intention of visitors in Phu Quoc islands (which is the most well known and beautiful one in Vietnam). The data was collected from a survey in the islands. The results show that the eight factors (including Destination image, Natural and Cultural environment, Perceived price, Infrastructure, Accessibility, Local cuisine, Leisure and Entertainment and Attitude of the local people) had the positive effects on the Return intention of visitors at the islands. Finally, the authors provide some suggestions which are useful for managers in the tourist service sector in Vietnam in the future.

However, our reviewing in the literature shows that there is no study result focused on the quantitative forecasting of the foreign tourist arrivals in Vietnam (there are only some qualitative forecasting results). Therefore, in order to improve the forecasting quality of the foreign tourist arrivals to Vietnam in the future, our paper will use the Autoregressive Integrated Moving Average (ARIMA) method to identify a new forecast equation which is more reliable with real data. Besides, our result will contribute to improving the working quality of the Vietnamese policymakers in the tourism sector as well as enhance the performance of tourism businesses in Vietnam.

2. Methodology

2.1. Estimated methods

Our estimation strategy consists of three main steps, in the first step 1, the time-series variables will be tested in order to conclude the unit root situation by the Augmented Dickey-Fuller test (Dickey and Fuller 1979). If the testing result shows that the time-series are stationary, the ARIMA model will be constructed based on the data in the level. On the other hand, if the data is non-stationary at the level, we will test the unit root with the first difference data. Finally, the ARIMA model is applied when the first difference is stationary. In the second step, we proceed to select the optical ARIMA model based on the reference to the Schwarz criterion (SBC) values. Finally, the optimal ARIMA model is used for forecasting foreign visitors to Vietnam in the future.

The Augmented Dickey-Fuller (ADF) test was developed by Dickey and Fuller (1979), which is the most popular method for testing the unit root of a time-series variable. Based on the ADF testing method, we have a time-series (X) is checked

whether it is stationary at the level denoted as I (0) or integrated at the first difference denoted as I (1). The testing equation is constructed as follows:

$$\Delta X_t = \alpha_0 + \alpha_1 t + \alpha_2 X_{t-1} + \alpha_i \sum \Delta X_{t-i} + u_t \tag{1}$$

Where t is represented as a trend time. We have a test if α_2 is less than zero, the null hypothesis will be rejected then this time-series variable is concluded as I (0). On the other hand, if α_2 does not find the negative value statistically significant, the X_t variable cannot be concluded as a stationary variable. After that, the testing process is restarted with the first difference data instead of the level data.

The Autoregressive Integrated Moving Average (ARIMA) method was developed by Box and Jenkins (1976), which is popularly applied in the analysis and forecasting for the time-series variables. Firstly, we have the Z variable that represents a time-series variable over a period. If the value of Z in the time t depends on its values in the previous time, then we have an Autoregression model to identify the value of Z, in which, the function is denoted by AR(p) in the general form:

$$Z_t = \varphi_0 + \sum_{i=1}^{p} \varphi_i Z_{t-i} + u_t \tag{2}$$

In another way, the AR (p) is not the only equation for identifying the values of the Z variable. We can also have another way to calculate the value of Z at the time t through the value of u_t (the error terms) in the previous times, so we have a Moving average (MA) model presented by MA (q) in the form as follows:

$$Z_t = \mu + u_t + \sum_{j=1}^{q} \theta_j u_{t-j} \tag{3}$$

However, in many cases, the Z variable has the common characteristics of both AR(p) and MA(q) procedure. So, this time-series variable can be identified through an Autoregressive Integrated Moving Average model denoted by ARIMA (p, d, q) in the below form.

$$Z_t = \beta_0 + \sum_{i-1}^{p} \beta_i Z_{t-i} + u_t + \sum_{j=1}^{q} \delta_j u_{t-j} \tag{4}$$

Finally, a time-series variable can be generated by a different number of ARIMA equations. Therefore, we will refer to the Schwarz criterion (SBC) values collected from the ARIMA regressions for selecting an optimal ARIMA equation with the estimated data. The optimal ARIMA equation will be used in the forecasting for the foreign tourist arrivals to Vietnam in the future.

2.2. Data description

In order to identify the optimal ARIMA model, our article uses monthly data of the foreign tourist arrivals coming to Vietnam. The study data is sourced from the Vietnam National Administration of Tourism collected from January 2009 to June 2018 with the total sample including 114 observations. The unit of data is a thousand people. The time-series is named the Foreign Tourist Arrivals symbolized by FTA. We have the descriptive statistics as well as the graphs of FTA and DFTA (the first difference values of FTA variable) as follows:

Figure 3. The graphs of the FTA and DFTA variables

Source: The author draws from research data. Noted* the unit of data is a thousand people.

Table 1. The descriptive statistics of variables

Variable	Mean	Median	Max	Min	Skewness	Kurtosis	Jarque Bera	Prob.	Obs.
DFTA	7.301	17.93	231.8	-265.6	-0.403	4.062	8.381	0.015	131
FTA	664.0	614.8	1413.8	227.8	0.919	3.472	16.98	0.000	131

Source: The author calculates from research data. Note: the unit of data is a thousand people.

3. Result and Discussion

Based on our estimation strategy represented in the methodology, firstly, the FTA variable is checked the unit root by the ADF test (Dickey and Fuller 1979). There are three conditions will be used step by step including (1) with a constant, (2) with a trend and intercept, and (3) without constant to analysis the time-series. If the testing result shows that FTA variable is stationary, the ARIMA model will be estimated with the data in the level. Conversely, if the FTA is a non-stationary time-series, then we use the first difference of FTA (denoted by DFTA) to test the unit root phenomenon. If DFTA is a stationary variable, then this time-series will be used to identify the optimal ARIMA equation.

Table 2. The testing result of the unit root

Variable	With intercept	With trend and intercept	Without constant
Foreign Tourist Arrivals (FTA)	-1.325703	-3.952723**	0.716641
ΔForeign Tourist Arrivals (DFTA)	-13.21594***	-13.17824***	-13.14818***

Source: The author calculates from research data. * indicates significance at 0.10 level, ** indicates significance at 0.05 level, *** indicates significance at 0.01 level. 'Δ'denoted the first diffirence of time-series

The testing result represents that the FTA variable is non-stationary with two forms (including with intercept and without intercept). There is only the form with trend and intercept is stationary at the 5% of statistical significance. Then we continuously use the first difference values of FTA (DFTA) to check the unit root. Finally, the DFTA is a stationary time- series at 1% significance level based on the results with all three-testing form. According to the reference from Box and Jenkins

(1976), we will use the DFTA variable in order to identify the optimal ARIMA equation to forecast the foreign tourist arrivals to Vietnam.

Because the first difference data is used to estimate the equation, so the forecasting function will be conducted as the ARIMA (p, 1, q) form. The ARIMA model can be understood including three different forms of function. It can be an AR (Autoregressive), MA (Moving Average), or have both AR and MA terms (Wang 2008). In order to determine the optimal values of p and q in the equation (4), we use the diagram of Autocorrelation (ACF) and Partial correlation (PACF) of the DFTA variable. This diagram is represented as the below table.

Table 3. The diagram of the DFTA variable


```
Sample: 1 114
Included observations: 113

 Autocorrelation   Partial Correlation      AC     PAC    Q-Stat   Prob

                                       1  -0.227  -0.227   5.9744  0.015
                                       2  -0.132  -0.193   8.0138  0.018
                                       3   0.132   0.057  10.071   0.018
                                       4  -0.107  -0.091  11.434   0.022
                                       5  -0.214  -0.257  16.946   0.005
                                       6   0.200   0.052  21.785   0.001
                                       7  -0.185  -0.206  25.992   0.001
                                       8  -0.073  -0.138  26.650   0.001
                                       9   0.110  -0.078  28.163   0.001
                                      10  -0.114  -0.192  29.808   0.001
                                      11  -0.010  -0.094  29.821   0.002
                                      12   0.407   0.280  51.095   0.000
                                      13  -0.027   0.199  51.189   0.000
                                      14  -0.131   0.001  53.445   0.000
                                      15   0.079  -0.029  54.264   0.000
```

Source: The author calculates from research data

Based on the movements of the ACF and PACF values described in the above diagram, we have identified some ARIMA models that may be suitable for forecasting of the foreign tourist arrivals to Vietnam in the future (see Wang 2008). The Schwarz criterion (SBC) values are obtained from the ARIMA regressions will be compared to select the optimal ARIMA equation. The SBC values are shown in the following table.

Table 4. The SBC value of the ARIMA regressions

Equation	Schwarz criterion value	Equation	Schwarz criterion value
ARIMA(2,1,1)	11.81788	ARIMA(7,1,1)	11.90430
ARIMA(2,1,5)	11.86867	ARIMA(7,1,5)	11.78898
ARIMA(2,1,12)*	*11.75224**	ARIMA(7,1,12)	11.85899
ARIMA(5,1,1)	11.86651	ARIMA(10,1,1)	11.98992
ARIMA(5,1,5)	11.85369	ARIMA(10,1,5)	11.77644
ARIMA(5,1,12)	11.92827	ARIMA(10,1,12)	11.92414

Source: The author calculates from research data, * denotes the optimal model

Based on the comparison of the SBC values collected from the regression results of ARIMA equations, we can conclude that the comparison result implies the optimal equation is the ARIMA (2,1,12) because its SBC value is the lowest one in the group of functions. Thus, the ARIMA (2,12,12) model will be chosen as the optimal model for forecasting the number of foreign tourist arrivals to Vietnam in the future.

However, in many cases of quantitative estimation, we are not sure whether our regression result is correctly specified with the econometric assumptions. There is a popular solution to check the problem is to test whether the result is consistent with the estimated assumptions done by some diagnostic tests. Therefore, some diagnostic tests have been done and the testing results indicated that the regressive result of the ARIMA (2,12,12) is free of the heteroskedasticity phenomenon (ARCH test), the serial autocorrelation (LM Breusch-Godfrey test) as well as the normal distributions (Jarque-Bera test). The estimated result of the ARIMA (2,1,12) and the diagnostic tests are reported in the below table.

The exact forecasting about the market demand for a product or a service is the first condition for managers to determine exactly the optimal quantity supply as well as develop a master plan to prepare (or purchase) the corresponding resources to keep well the production process. In the case of the Vietnamese tourism sector, the exact forecasting about the foreign arrivals is also recognized as the important step to prepare some national strategies about the infrastructure, human resource or service quality to fitness the market demand. In this paragraph, the ARIMA (2,1,12) model is applied to forecast the number of foreign tourist arrivals to Vietnam in the third quarter of 2018 (including July, August, and September 2018).

Table 5. The estimated result of the ARIMA (2,1,12)

Dependent Variable: D(FTA)		
Variables	Coefficient	t-statistic
Constant	9.072661*	1.965105
AR(1)	-0.403984***	-3.250063
AR(2)	-0.371603***	-3.328348
MA(1)	0.091056	0.859693
MA(2)	0.257436***	2.848858
MA(3)	-0.051519	-0.623999
MA(4)	-0.021960	-0.272486
MA(5)	-0.311605***	-4.555271
MA(6)	0.011281	0.154010
MA(7)	-0.312405***	-4.533058
MA(8)	-0.176603**	-2.603342
MA(9)	0.023674	0.318138
MA(10)	-0.142095*	-1.886100
MA(11)	0.284996***	3.636276
MA(12)	0.649655***	7.349731
R-squared	0.466907	
Adjusted R-squared	0.389164	
Schwarz criterion	11.75224	
Model diagnostics Serial Correlation test (LM Breusch-Godfrey test) = 0.922519 [0.6305] Heteroskedasticity test (ARCH) =0.566673[0.4516] Normality test (Jarque-Bera test) =1.375097 [0.502807]		

Source: The author calculates from research data. * indicates significance at 0.10 level, ** indicates significance at 0.05 level, *** indicates significance at 0.01 level

Based on the forecasting results, the policymakers and the business administrators will have more information for planning the policies or business schedule. However, we need to continuously collect additional data to improve the accuracy of forecasting. The forecasting result showed that the number of foreign tourists is likely to be extremely volatile in three months in the third quarter of 2018. However, this situation is quite normal compared to the number in the previous years. The forecasting result, as well as the graph of forecasting values, are presented in below.

Table 6. The sample forecasting result for the third quarter of 2018

The forecasting period	DFTA (forecast)	FTA (forecast)
July, 2018	87.396	1270.498
August, 2018	25.266	1295.764
September, 2018	-99.179	1196.585

Source: The author calculates from research data. Note: the unit of data is a thousand people.

Figure 4. The graph of the FTA values
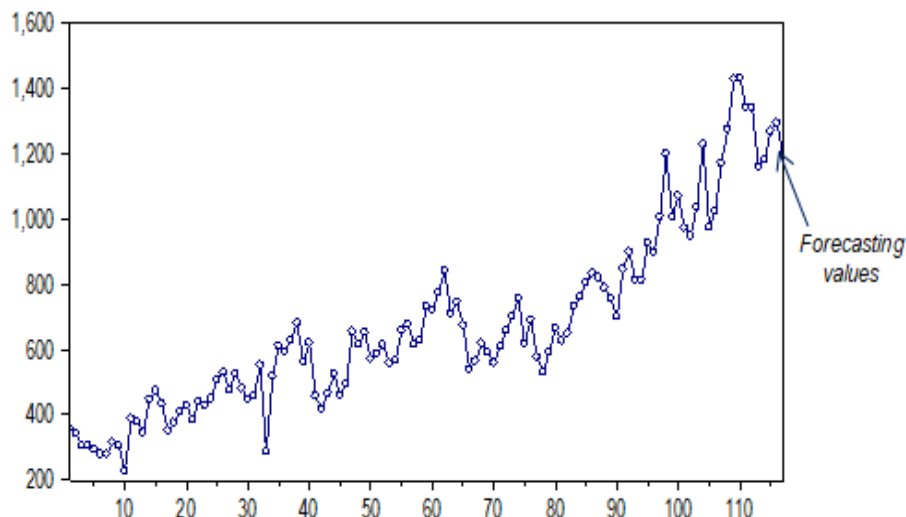
Source: The author calculates from research data. Note: the unit of data is a thousand people.

Conclusion and Policy implication

The exact forecasting about the market demand is the first condition in order to make good policies in macro-level or good plans at micro-level. The tourist sector has sharply increased in Vietnam, however, the inexactly forecasting is one of the main reasons leading to an overload in infrastructure or the service system does not meet the requirements of tourists. To solve this problem, our paper employs the ARIMA method developed by Box and Jenkins (1976) in order to have a better forecasting tool for the number of foreign tourist arrivals to Vietnam in the future. The time-series is the monthly data with the total sample is 114 observations collected from January 2009 to June 2018. The estimated result indicated that the optimal forecasting equation is the ARIMA (2,1,12) model. We have also applied the ARIMA (2,1,12) for forecasting the number of foreign tourist arrivals in the third quarter of 2018 (including July, August, and September). Our forecasting data is very useful for the Vietnamese policymakers as well as the business administrators to make strategies (or plans) for welcoming visitors and thereby increasing the satisfaction of visitors (it can be led to have the return intention to Vietnam).

Although the ARIMA is recognized as a good method for short-term forecasting, it still needs some different results to comparison because the ARIMA equation is maybe less sensitive to the policy shocks as well as the shocks from the external business environment. Besides, in order to increase the efficiency of forecasting work, the Vietnamese policymakers need to continually collect more data and do the forecasts with the latest data. As the result, the forecasting information will increase the credibility of tourism policy planning in Vietnam in the future. On the other hand, the Vietnamese government should invest more resources in order to have a better infrastructure linking the tourist destinations to the highway systems, airports, seaports and railways stations as well as the joining ways to connect with the neighbor countries. The government must be also improved the business environment to ensure the strong participation of private businesses and communities in the national tourism development strategy.
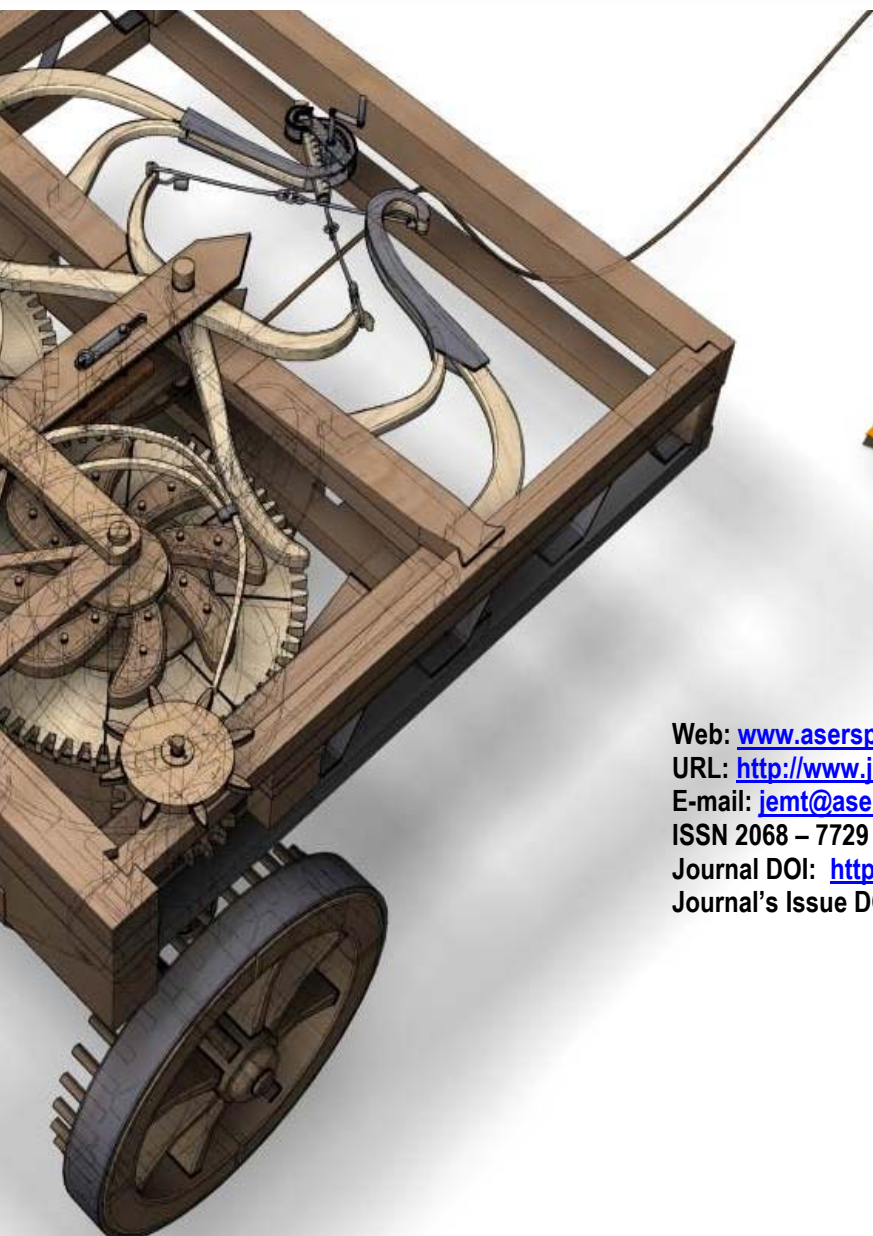
Acknowledgment

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