

Trends and Insights in Inbound Tourism Expenditure: A Multi-Year Current Price Analysis in the Philippines (2019–2023)

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Abstract

This study utilized datasets on inbound tourism expenditure by product at current prices for the period of 2019–2023. The researchers investigate the trends in tourism sector spending through the major categories. The focus of the study is on forecasting based on future spending patterns within the categories of accommodation, food and beverage services, transportation, shopping, travel agencies/other reservation services, and entertainment/recreational services with the use of GRETl software for the ARIMA model on time-series forecasting. Forecasting results of the inbound tourism expenditure shows that accommodation has the highest constantly accrued expenditure, and significant differences exist between food and beverage services and other categories, with the latter registering minimal spending. Accommodation, food and beverage services recorded steady increases in expenditures. On the other hand, shopping, transportation, and recreation activities experienced relatively slow growth from the predicted years. These predictions thus require acute interventions that solve the issue sector-wise and improve the tourism industry's appeal. Future studies should focus on what factors are supporting such trends and introduce alternative models for better forecasting.

Keywords: inbound tourism, tourism expenditure, ARIMA, tourism sector, Philippines, time-series analysis

1. Introduction

To most countries around the world, tourism is an important source of economic development; inbound tourism is a major component of national revenue and employment for the Philippines. Tourism expenditure in recent years reflects not only the sheer volume of international visitors but also shifting consumer preferences and more general economic conditions. Therefore, these expenditures need to be understood and foretold for good policy-making and strategic planning because of such a dynamic market as the Philippines, where tourism activities have been affected not only by global economic trends but also by local development (OECD et al. and Policies 2016, 2016). Other tourism expenditure studies have emphasized the need for

spatial analysis of categories of products, such as accommodation, food and beverage services, transportation, shopping, travel agencies/other reservation services, and entertainment/recreational services. The category-based analysis is deeper in that it brings into perspective spending behavior patterns among tourists and, therefore, makes provision for stakeholders to design particular services and investment strategies along the lines of particular demand patterns in specific sectors. Through tourism demand modeling and forecasting, according to Song, Haiyan, and Li Gang (2008), the dynamics of these aspects can be gained to support strategic resource allocation better (Tourism et al.: A Review of Recent Research, *International Journal of Hospitality Management*, 22, 435–451). Indeed, through recording expenditures on product-specific categories, policymakers and industry operators can better direct resources toward high-demand areas. Since sustainable economic growth has always been a priority, predicting future tourism expenditure has been of more importance. Among all the models provided, AutoRegressive Integrated Moving Average (ARIMA) has been an effective model in forecasting time series. This is because ARIMA can predict future values using past trends and hence is used extensively for tourism expenditure studies. (Hyndman, R. J., & Athanasopoulos, G. (2018). *Forecasting: principles and practice*. OTexts.) This study attempts to forecast the future spending trends within each major category of inbound tourism expenditure using data from 2019 to 2023 at current price levels by implementing ARIMA.

2. Theoretical Framework

2.1 Review of Related Literature

Different writings and research work have also shown that the ARIMA model is an optimization forecasting tool for predicting time-series data, such as tourism. The ARIMA model, well-established using Box-Jenkins methodology, predicts future trends using historical patterns of the data, and it has gained much attention for its universality. This approach captures critical aspects of time-series data, such as trends, seasonality, and noise. It is, therefore, very suitable for the forecasting of expenditure patterns across several categories like accommodation, food and beverage services, transportation, shopping, travel agencies/other reservation services, and entertainment/recreational services (Box et al., 2015). Tourism demand modeling usually integrates ARIMA since it is fairly flexible and accurate in forecasting economic indicators. Studies like that of Song and Li (2008) show that for tourism economics, forecasting performs an important role as predictive models enable stakeholders to make data-driven decisions regarding resource allocation and policy formulation. Using ARIMA, researchers can predict changes in spending behavior by tourists and offer insights on how to adapt and calibrate the service offerings as well as investment strategies (Song & Li, 2008).

Aside from this, the theoretical underpinning of the study is related to the Tourism Economic Contribution Framework, which postulates that expenditure analysis must be involved in understanding the overall economic contribution from tourism. Thus, given this framework, one can de-aggregate inbound tourism expenditure in some categories of products so as to shed more light in a functional or sectoral manner regarding how diversifications of sectors contribute to economic growth and development (Dwyer et al., 2020). This approach focuses on expenditure analysis as pertinent to the betterment of sector-specific planning and, therefore, sustainable growth in tourism-dependent economies.

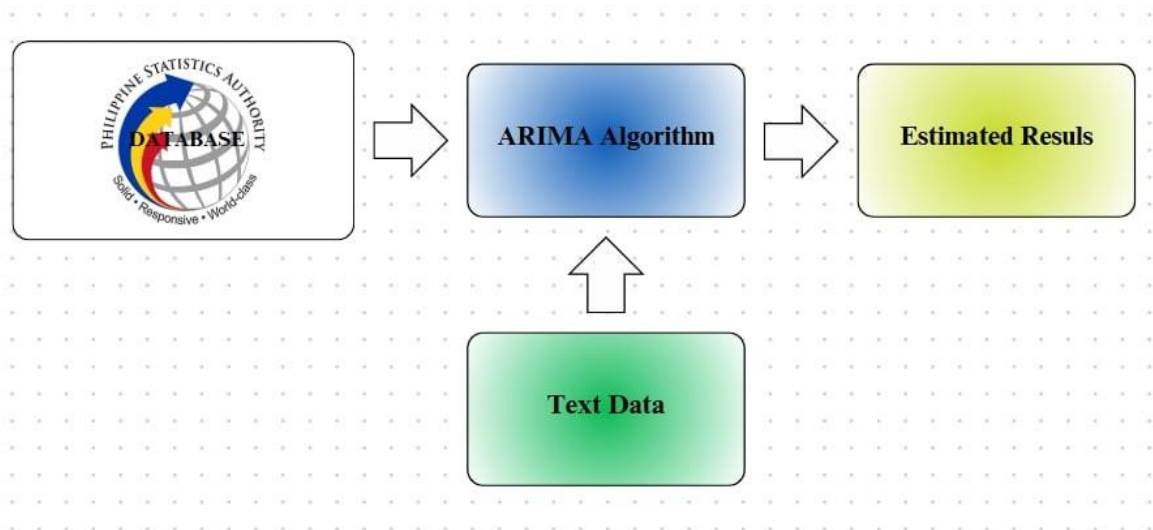
Combining the ARIMA model with the principles of tourism economic analysis, the paper constructs a theoretically rigorous framework for investigating and predicting inbound tourism expenditures. The ARIMA model offers the methodological precision required for time-series predictions, whereas the Tourism Economic Contribution Framework offers the contextual basis required for interpreting the implications of

expenditure patterns in terms of their economic consequences. Together, these theoretical components ensure that the study provides both practical and theoretical contributions to tourism economics.

3. Operational Framework

The study followed a systematic architectural design that included several key steps: data preparation, data selection and transformation, data mining, and data presentation. These steps outline the processes undertaken to analyze and forecast inbound tourism expenditure by product categories. Figure 1 illustrates the architectural design of the study.

Figure 1. Architectural Design of the Study



4. Materials and Methods

Materials

The statistical data used in the study was collected from the Philippine Statistics Authority (PSA) in 2024. The dataset was about Inbound tourism expenditures by product at current prices and levels from 2019-2023. The dataset includes expenditure breakdowns across key product categories such as accommodation, food and beverage services, transportation, shopping, travel agencies/other reservation services, and entertainment/recreational services. This comprehensive dataset serves as our primary source for the analysis.

Methods

The ARIMA model has been extensively applied across different disciplines for time series analysis to design forecasting models (Kayacan et al., 2009), (Orong et al., 2018). Hence, the present study made use of the ARIMA model to forecast expenditure trends based on historical data in inbound tourism categories. Time-series forecasting is basically based on analyzing time trends in past data sets to design appropriate

statistical models that can be extended into the future (Siarni-Namini et al., 2018). The ARIMA(p,d,q) model is mathematically defined as:

$$X_t = \Phi_1 X_{t-1} + \dots + \Phi_p X_{t-p} + a_t - \Theta_1 a_{t-1} - \dots - \Theta_q a_{t-q}$$

Here, Φ (phis) represents the autoregressive parameters, Θ (thetas) represents the moving average parameters, X represents the main series, and a represents the random errors assumed to follow a normal probability distribution.

5. Results and Discussion

Table1. Raw data of inbound tourism expenditure by category

	2019	2020	2021	2022	2023
□.Accommodation services for visitors	191,543.21	37,941.32	7,638.82	63,498.76	143,962.97
□.Food and beverage serving services	135,087.51	27,653.85	6,268.96	94,851.49	95,197.50
□.Transport services	120,726.27	35,730.16	14,258.56	58,286.46	103,209.99
□.Travel agencies and other reservation services	3,621.90	708.10	86.17	5,508.99	13,709.34
□.Entertainment and recreation services	73,234.77	14,504.63	1,707.86	10,475.89	130,826.56
□□Shopping	66,127.70	14,136.78	1,652.50	80,836.42	137,387.45

The raw data shows that most of the tourists spent on accommodation services, peaking at 191,543.21, followed by food and beverage services, which peaked at 135,087.51. However, there is a huge gap between accommodation and food services and other product categories, showing that tourists spend less on some products. This has underscored the central place of accommodation and food services as core areas of the tourism sector, while others require strategies for tourist expenditure.

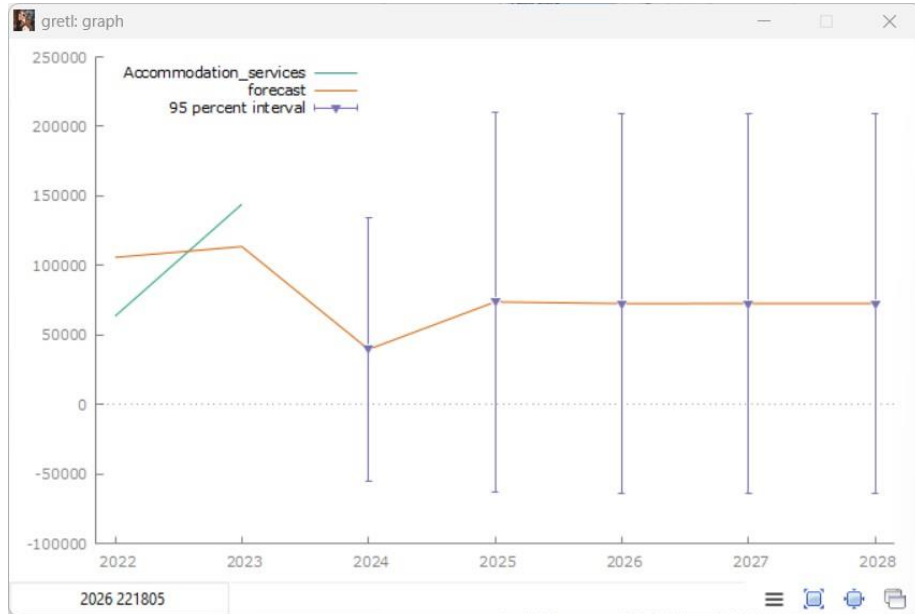


Figure 2. Forecasted inbound tourism expenditure - Accommodation services from (2024-2028)

A five-year prediction of inbound tourism expenditure in the Philippines for Accommodation services from 2024 to 2028 is presented in the figure above, utilizing historical data through ARIMA modeling. The accommodation activities generated a graph that provides a forecast of Accommodation Services from 2022 to 2028. The estimation shows positive growth in 2022-2023, a sharp decline in 2024, recovery in 2025, and stabilizing at around 75,000 from 2026 onward. Wide confidence intervals mainly indicate huge uncertainty, especially in the years 2024 and 2028. Historical data only refers to 2022-2023.

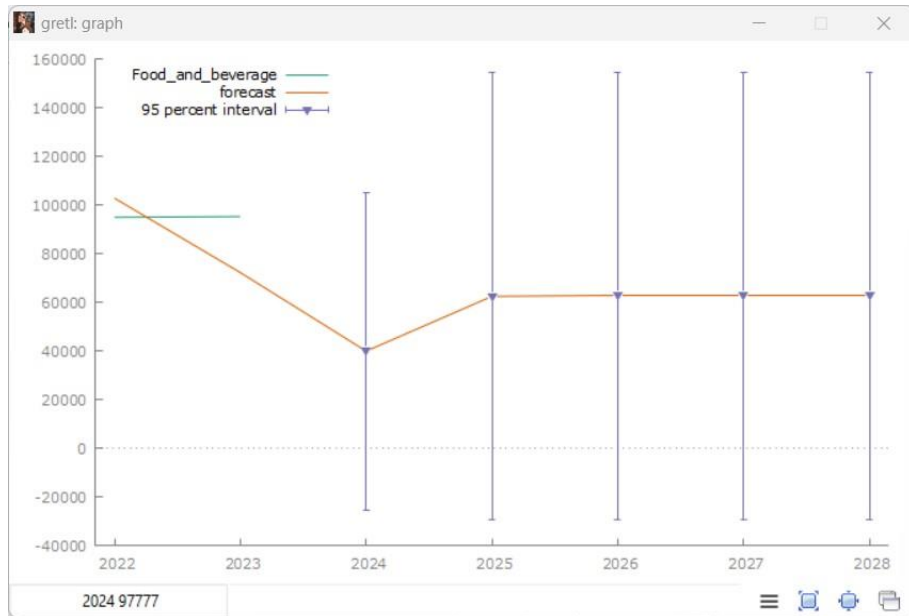


Figure 3. Forecasted inbound tourism expenditure - Food and beverages services from (2024-2028)

A five-year prediction of inbound tourism expenditure in the Philippines for food and beverage services from 2024 to 2028 is presented in the figure above, utilizing historical data through ARIMA modeling. The graph shows a sharp expenditure decline in 2024, after which it stabilized steadily from 2025 to 2028. Although there is stabilization, a large 95% prediction interval illustrates a great deal of uncertainty attached to the projections, and therefore, targeted interventions would be needed to improve the attractiveness of food and beverage services to international tourists. Strategic efforts should focus on improving the quality, variety, and accessibility of such services to encourage increased spending in this area.

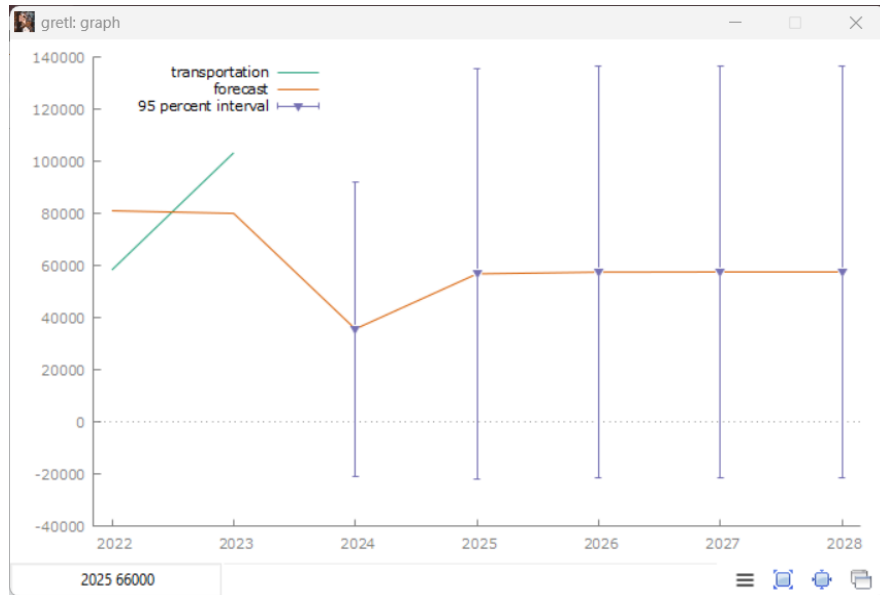


Figure 4. Forecasted inbound tourism expenditure - Transportation services from (2024-2028)

A five-year prediction of inbound tourism expenditure in the Philippines for Transportation services from 2024 to 2028 is presented in the figure above, utilizing historical data through ARIMA modeling. The graph indicates that expenditure in 2024 was low but then gradually recovered and stabilized between 2025 and 2028. The broad 95% prediction interval reflects a great deal of uncertainty in the forecast, and this calls for stringent measures to improve transportation for tourists. Efforts in upgrading infrastructure, connectivity, and service efficiency are crucial in contributing to this sector's growth, thus sustaining economic contributions.

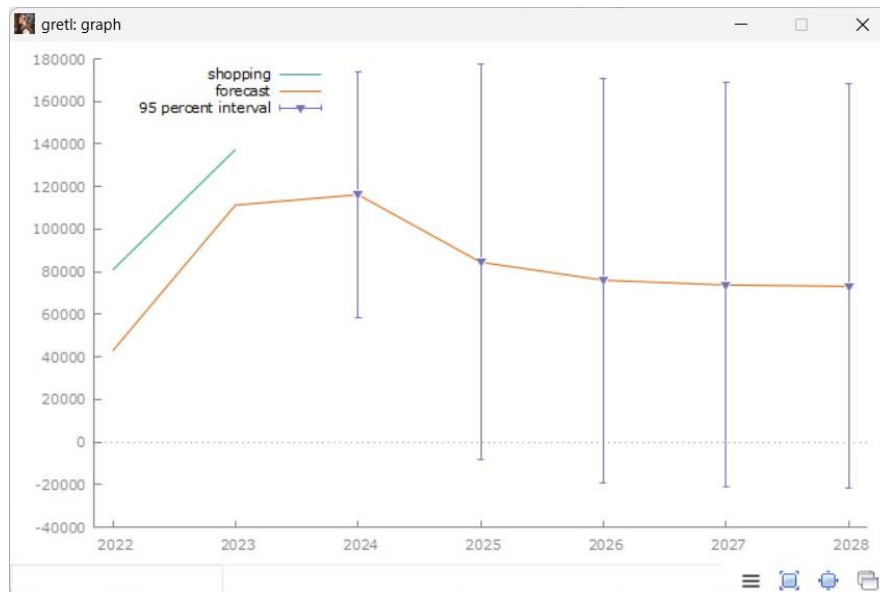


Figure 5. Forecasted inbound tourism expenditure - Shopping services from (2024-2028)

A five-year prediction of inbound tourism expenditure in the Philippines for Shopping Services from 2024 to 2028 is presented in the figure above, utilizing historical data through ARIMA modeling. The shopping activity clearly shows a strong upward trend until 2024, followed by a relatively slow decline or flattening through the years 2028, as represented in the forecast line. There are large confidence intervals, especially for later years, indicating significant uncertainty in the long-term predictions. The graph indicates growth up to 2024, but further movement is potentially stabilized or declined. Therefore, one needs more information to understand what drives these trends in the future.

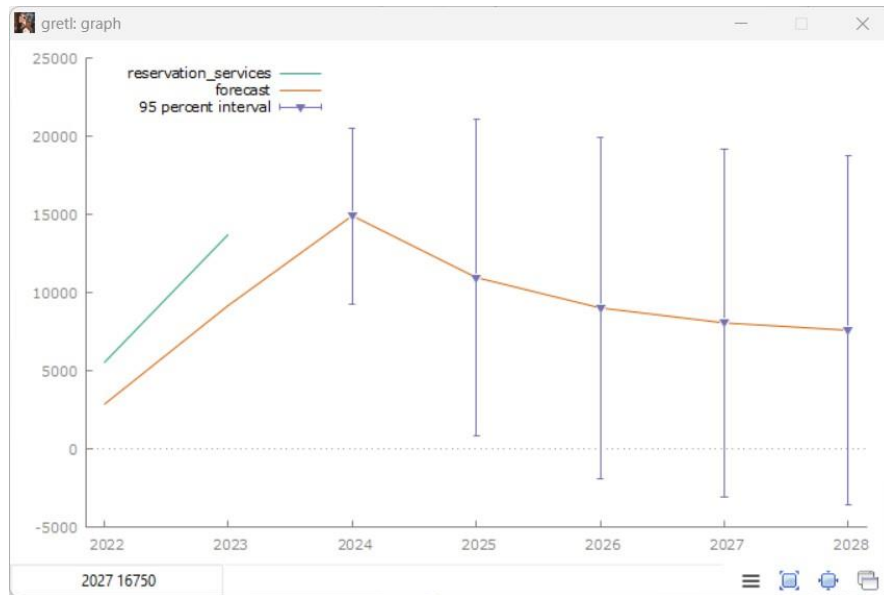


Figure 5. Forecasted inbound tourism expenditure - Reservation services from (2024-2028)

A five-year prediction of inbound tourism expenditure in the Philippines for Reservation Services from 2024 to 2028 is presented in the figure above, utilizing historical data through ARIMA modeling. The reservation activities show an increase at first and then peak at about 15,000 in 2024, followed by a steady decline. Confidence intervals spread out for later years, indicating a growing uncertainty in the predictions. The historical data goes along with the forecast through 2024, but actual data does not exist for years from 2025-2028. This means that a peak growth followed by a possible decline with an increase in uncertainty through later years is seen in the forecast.

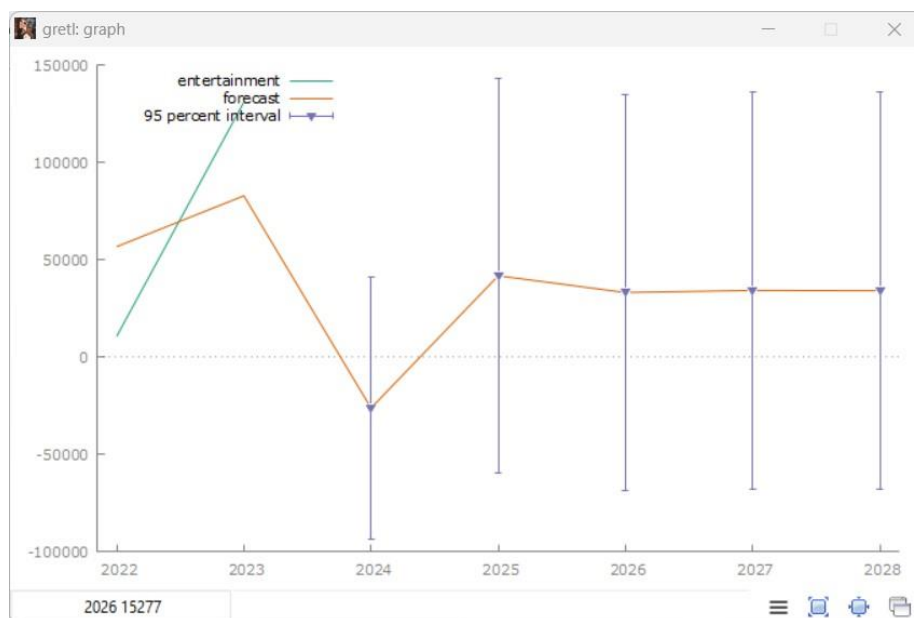


Figure 6. Forecasted inbound tourism expenditure - Entertainment services from (2024-2028)

A five-year prediction of inbound tourism expenditure in the Philippines for Entertainment and Recreational Services from 2024 to 2028 is presented in the figure above, utilizing historical data through ARIMA modeling. The entertainment and recreational activities show that they go up from 2022 to 2023 with initial growth (2022-2023), then sharply decline (2023-2024), before later recovery with stabilization from 2024 to 2028. The prediction intervals are wide, indicating large uncertainty, particularly about the sharp drop and subsequent recovery. Volatility is suggested, and additional analysis may be necessary for an understanding of the factors that cause this kind of trend and the strong variability in the predictions.

6. Conclusions and Recommendations

Forecasted data, specifically on inbound tourism expenditure by product categories, would be advisable in guiding the decision and strategic planning in the tourism sector. In this study, time series analysis effectively identified the spending trends in different product categories, with the ARIMA (p,d,q) model successfully predicting the trend across the available historical data points. Accommodation services have the highest constantly accrued expenditure, and significant differences exist between food and beverage services and other categories, with the latter registering minimal spending.

Accommodation and food and beverage services recorded steady increases in expenditures. On the other hand, shopping, transportation, and recreation activities experienced relatively slow growth. The graphs translate to a need for targeted programs that encourage spending across these categories to meet balanced targets.

From these findings, it is prudent that tourism stakeholders focus on upgrading higher-quality services and developing new marketing strategies targeting underutilized services. Policymakers and businesses should also revise plans developed previously, with self-identified areas for improvement, and conduct campaigns to diversify tourist expenditure patterns in a bid to sustain the growth of tourism industries.

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