

Leveraging Tourist Receipt Data for Strategic Forecasting of Tourist Preferences in Surigao Del Norte

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ABSTRACT: Tourism functions as the dominant economic force on a global scale because it produces essential monetary resources for countries and geographical areas. Precise dependable forecasting methods and determination of visitor preferences became necessary according to tourism industry developments. Tourism operators need to understand consumer behaviours and spending patterns together with their payment size impact to develop successful decision-making policies.

The assessment presents analytical strategies to enhance the accuracy along with dependability of tourist receipt projections. The paper examines multiple data mining approaches to forecast visitor conduct then gauge their purchasing behaviors to establish more accurate sources of tourist revenue. The assessment delves into this evolutionary process since it examines both current analytic limitations which impact tourism analysts through data complexities and data integration obstacles as well as traditional forecasting model restrictions. The paper details the potential advantages of data mining despite known implementation challenges because it demonstrates enhanced decision quality together with optimized resource planning and specific marketing initiatives.

This document assesses tourist spending behavior influence factors through examination of economic situations and cultural changes and seasonality variations using extensive case study studies and current models. Through variable analysis of industry transformations, a detailed forecasting system will make the tourism industry more flexible. Through this section we examine how predictive analytics helps stakeholders build efficient tourism strategies and supply projected tourism trends along with visitor behavior preferences.

The reviewed findings enable the development of a unified forecasting system that manages financial outcomes while adapting to tourist needs adjustments. Tourism stakeholders who use data-driven strategies can produce better decisions through which they distribute their resources effectively and implement market-aligned strategies. This paper presents strategic advice to build tourism agency capabilities which enables them to perform data-driven decision making for sustainable worldwide market expansion.

KEYWORDS: Tourist Receipt Prediction, Tourism Data Platform, Tourism Flow Optimization, and Data Integration

I. INTRODUCTION

The global economy depends heavily on tourism because it creates substantial financial returns that benefit local communities. The development of the industry requires improved prediction techniques for tourist receipts and visitor preference analysis which has growing importance. Large datasets analysis from booking behaviors and demographic information alongside social media trends enables data mining to predict tourist spending more precisely and identify behavior-influencing factors through multiple sources.

These fields solve their challenges using data mining methods as their core solution mechanism. Tourism professionals employ discovered data to make improved decisions through resource optimization while designing individualized tourism solutions. Tourism experts use these insights to make well-informed decisions while optimizing available resources to create services which address tourist needs.

The analysis discusses the role of data mining approaches for enhancing tourism receipt forecasting as well as the predictive analytics methods as well as associated challenges and benefits

in tourism. This paper establishes a basis for building a singular forecasting framework which predicts financial outcomes and shifting visitor patterns while offering stakeholder guidance based on data-driven insights.

II. OBJECTIVES OF THE STUDY

The study aims to achieve the following objectives:

- To assess the opportunities and challenges faced by Tourism Sector
- To propose a cohesive digital platform aimed at improving efficiency and collaboration across multiple industries, the project proposes an all-encompassing solution that incorporates advanced technology.
- To formulate recommendations for the enhancement of tourism businesses and organizations.

III. RELATED LITERATURE

3.1 Importance of Tourism Receipts in Economic Planning
Tourism receipts, referring to the revenue generated from international and domestic visitors, have long been considered

a critical economic indicator. According to the World Tourism Organization (UNWTO, 2022), tracking tourism receipts provides valuable insights for governments and businesses to optimize infrastructure development, market promotion, and resource allocation. Understanding spending patterns also enables policymakers to forecast economic contributions and adjust national tourism strategies accordingly.

3.2 Traditional Methods of Tourism Receipt Prediction

Conventional approaches to predicting tourism receipts have primarily relied on linear regression models, time-series analyses, and trend extrapolation (Song & Li, 2008). Although these methods provided baseline forecasts, they often struggled to adapt to rapid changes in traveler behavior, global crises, or shifting economic conditions. As a result, scholars emphasized the limitations of traditional models in producing accurate and dynamic predictions.

3.3 Emergence of Data-Driven Forecasting Techniques

Recent advancements in data science, machine learning, and artificial intelligence have introduced revolutionary techniques for tourism receipt forecasting. Studies by Law et al. (2019) demonstrated that machine learning models, such as neural networks and ensemble methods, outperform classical models by capturing non-linear relationships and hidden patterns in large tourism datasets. These models also allow real-time updating, making forecasts more responsive to unexpected events such as pandemics or natural disasters.

3.4 Variables Influencing Tourism Receipts

Numerous studies identified critical factors influencing tourism spending, including economic conditions (GDP, exchange rates), political stability, travel motivations, and global events (Gössling & Hall, 2021). Integrating these variables into predictive models enhances forecast accuracy. Understanding the role of destination image, accessibility, and visitor satisfaction is also essential for refining revenue predictions.

IV. METHODOLOGY

4.1 Research Approach

The research investigates tourism receipt prediction models through the study of predictive analytics together with descriptive procedures. The platform's structural design and conceptual foundation will be explained through expert interviews and literature reviews which are qualitative methods. The research obtains secondary data through questionnaire surveys which document industry members' experiences and expectations regarding tourism management practices. Multiple data analysis methods will serve to evaluate the effects of the online tourism prediction platform. A mixed-methods approach serves the purpose of producing beneficial findings that will enhance tourism revenue forecasting management practices.

4.2 Survey Questionnaire

The tourism sector stakeholders will supply information about existing processes while identifying digital platform obstacles and forecasting system expectations through survey-based questions. The survey includes questions about productivity

gains from using such systems alongside data accuracy problems and current forecasting method limitations and previous applications of digital tools and beliefs on forecasting systems and adoption potential together with prioritized advantages. Further questions demand supplementary information along with feedback from survey respondents. This research survey seeks essential data which will shape an operational tourism prediction and management platform.

4.3 Participants of the Study

The basis of system professionals and stakeholders emerges from within tourism sector operations. The tourism sector consists of hospitality workers and tourism service providers as well as travel agencies and tour operators alongside government bodies and multiple related organizations within the industry. Digital platform specialists together with experts in database management and other technology domains typically join the project. Researcher insights about fundamental tourism management practices and beneficial centralized technological solutions emerge because of this wide range of participants. Stakeholder feedback supplies necessary insights and perspectives which guide both development and deployment phases of the proposed tourism forecasting system.

4.4 Sampling Method

The system implements purposive sampling as a method to gather participants who possess both extensive expertise regarding digital technology integration and tourism receipt administration. Researchers need to reach out to the appropriate group by speaking directly to sector workers within tourism. Tourism operators together with service providers alongside local government representatives and data analysts as well as tech-savvy experts in tourism management systems comprise the target sample for research purposes. Research access to stakeholder perceptions and effective management practice assessment is made possible through the planned selection of participants with multiple industry roles and experiences. Through snowball sampling additional participants who fulfill research inclusion requirements can be found by referral. The research approach delivers results that support the creation of a single digital platform which strengthens tourism management forecasting capabilities.

4.5 Data Gathering Procedure

The research uses purposive sampling to choose participants who will provide data for developing digital technologies which enhance tourism service management integration. Multiple interview methods which combine structured and unstructured questions help discover tourism sector challenges and market dynamics simultaneously with survey distribution to measure existing supervision methods and expected features of the forecasting platform. Quantitative survey data analysis produces research themes, yet qualitative interview data derives themes from selected participant discussions. Different techniques help validate collected data and multiple approaches serve for comparison. A detailed report containing analysis together with recommendations for building the unified digital

tourism management platform will emerge from the research. The research team predicts useful findings will appear from this process to assist platform design and implementation.

4.6 Data Analysis

The study "Leveraging Tourist Receipt Data for Strategic Forecasting of Tourist Preferences in Surigao del Norte" applies

two analytic approaches that combine quantitative measures with qualitative research. The quantitative survey data undergoes statistical analysis through frequency distribution combined with weighted mean score to reveal patterns and trends among both tourism management operations and digital platform stakeholder expectations.

Table 1: The Interpretation of Range of the Weighted Mean

Range of the Weighted Mean	Interpretation
4.51 – 5.00	Strongly Agree (for the questions asked)
3.51 – 4.50	Agree (for the questions asked)
2.51 – 3.50	Neutral (for the questions asked)
1.51 – 2.50	Disagree (for the questions asked)
1.50 and below	Strongly Disagree (for the questions asked)

V. RESULTS AND DISCUSSION

In accordance with the methodological section of this research, this chapter is considered as the core of the study analyzing the results to answer to the objectives of the research. The participants' roles and activity during the implementation process are described, in addition to major areas of concern:

using/adopting digital technology, key issues/challenges, and perceived advantages. To increase practical applicability of the achieved findings, it is reasonable to position them within tendencies of the industry, stress possible outcomes, and provide final suggestion concerning further control of.

5.1 Demographics Profile of the Respondents

Table 2: Profile of the Respondents

Organizational Affiliation	frequency	Percentage %
Tourism-Related Establishments	18	45%
Local Government Units (LGUs)	10	25%
National Government Agencies	8	20%
Academe / Research Institution	4	10%
Total	40	100%

This table depicts the profile of the respondents based on their organizational affiliations. According to the results of the survey, it was observed that majority of the respondents belong to organizations that are related to tourism, with a total of 18 respondents or 45% of the entire sample size. This was followed by respondents who belonged to LGUs, which was 10

respondents or 25%. NGA respondents made up 8 respondents or 20% of the total sample size, while Academe/Research Institution was the smallest in number, comprising only 4 respondents or 10%. From this distribution, it can be said that respondents that participated in this survey were representative of tourism stakeholders in Surigao del Norte.

Table 3: Profile of the Respondents in Terms of Location

Location	Frequency	Percentage %
Surigao City	12	30%
General Luna	8	20%
Dapa	7	17.5%
Del Carmen	5	12.5%
San Benito	4	10%
Pilar	4	10%
Total	40	100%

Table 3 indicates the distribution of the respondents based on their respective locations. The city of Surigao had the most respondents with a total of 12 or 30% of the entire sample. Following close behind was General Luna, which had 8

respondents or 20%, then Dapa, which had 7 respondents or 17.5%. Del Carmen had 5 respondents or 12.5%, while San Benito and Pilar each had 4 respondents or 10% of the entire sample size. These distributions show that the respondents

come from important tourist destinations and administrative areas in Surigao del Norte.

Table 4: Profile of the Respondents in Terms of Years of Experience in the Tourism Sector

Years of Experience in the Tourism Sector	frequency	Percentage %
Less than 1 Year	3	7.5%
1 -3 years	8	20%
4 – 6 years	14	35%
7 – 10 years	10	25%
11 years and above	5	12.5%
TOTAL	40	100%

Table 4 displays the frequency distribution of the respondents based on the number of years they had been engaged in the tourism industry. Most of the respondents were found within the 4-6 years' experience category, which comprised of 14 respondents or 35% of the sample size. Second was the number of respondents who have been in the tourism industry for 7-10

years amounting to 10 respondents or 25% of the sample size. There were also respondents who have been in the industry for 1-3 years, and this comprises 8 respondents or 20% of the sample size. Those with 11 years or more were at 12.5%, while respondents who have not spent even a year in the tourism industry constituted 7.5% of the sample.

Table 5: Profile of the Respondents in Terms of Position/Designation

Position/Designation	Frequency	Percentage %
Tourism Officer/Coordinator	12	30%
Tourism Business Owner/Manager	10	25%
Tourism Operations Staff	8	20%
Government Employee (Tourism-Related)	6	15%
Academe/Research Personnel	4	10%
Total	40	100%

The profile of the respondents based on their position or designation is depicted in Table 5. The highest number of respondents came from the category Tourism Officers/Coordinators, with a total of 12 respondents comprising 30% of the total number of respondents. They were followed by the Tourism Business Owners/Managers, who had 10 respondents or 25% of the respondents, and the Tourism

Operations Staff, who had eight respondents or 20%. There were six respondents or 15% that belonged to the government personnel working for tourism services, while four respondents or 10% were from the academe and research areas. This study was able to acquire information coming from people from different positions related to tourism planning, management, operation, and research.

5.2 Challenges and Opportunities of the Tourism Sector in Surigao City

Table 6: Most Frequently Observed Tourist Preferences Based on Tourist Receipt Data

Tourist Preference Category	Frequency	Percentage	Rank
1.a. Accommodation Services (Hotels, Resorts, Homestays)	12	30%	1
1.b. Food and Beverage Establishments	10	25%	2
1.c. Island and Nature-Based Attractions	8	20%	3
1.d. Transportation Services	5	12.5%	4
1.e. Souvenir and Local Product Purchases	3	7.5%	5
1.f. Recreational and Adventure Activities	2	5%	6
Total	40	100 %	

The most common tourist preferences, based on tourist receipt data gathered from tourism providers in Surigao del Norte, were presented in Table 6. Among these preferences, the accommodation services received the highest number of responses (12), equivalent to 30% of the total, making it the top-ranked category among the tourism sectors. Food and beverage

outlets came second with 25% of the total responses, or 10 out of 40. Island/nature attractions ranked third with 20%, while transportation services and purchase of souvenirs/local products had 12.5% and 7.5%, respectively. Recreation/adventure activities had the least percentage of respondents, at only 5%. These findings imply that most tourists prefer to spend their

money on accommodation, food, and attraction services, implying that these three tourism segments exert strong influence on tourist behavior and spending habits in Surigao del Norte.

Table 7: Emerging Tourist Spending Trends Identified from Tourist Receipt Data

Emerging Tourist Spending Trends	Frequency	Percentage	Rank
1.a. Increased Demand for Accommodation Services	12	30%	1
1.b. Growth in Food and Beverage Expenditures	10	25%	2
1.c. Rising Interest in Nature-Based and Ecotourism Activities	8	20%	2
1.d. Increased Spending on Transportation Services	5	12.5%	3
1.e. Higher Demand for Souvenirs and Local Products	3	7.5%	4
1.f. Increased Participation in Adventure and Recreational Activities	2	5%	6
Total	40	100%	

in tourist spending observed in Surigao del Norte are provided in Table 7. Increased demand for accommodation services was identified as the number one trend, with 12 or 30% responses recorded. Food and beverage spending were the second most observed trend, with 10 or 25% responses, followed by nature-based and ecotourism interest, with eight or 20% responses. Transportation spending was also observed in 12.5% of the responses while increased spending on souvenirs and local

products was noted in 7.5% of the responses, and increased engagement in adventure activities was reported by only five percent or the fewest respondents. The results imply that the tourists' spending behavior in Surigao del Norte continues to be inclined toward accommodation, food, dining, and nature-based activities. Therefore, there is a likelihood that these industries would continue to grow.

Table 8: Key Indicators for Strategic Forecasting of Tourist Preferences

Key Forecasting Indicators	Frequency	Percentage	Rank
1.a. Tourist Spending Patterns Reflected in Receipt Data	12	30%	1
1.b. Seasonal Tourist Arrival Trends	10	25%	2
1.c. Demand for Accommodation and Hospitality Services	8	20%	3
1.d. Visitor Preference for Nature-Based and Ecotourism Activities	5	12.5%	4
1.e. Tourist Expenditure on Transportation Services	3	7.5%	5
1.f. Purchases of Local Products and Souvenirs	2	5%	6
Total	40	100%	

Table 8 shows the various indicators highlighted as significant considerations in forecasting the tourists' future preferences in Surigao del Norte. Spending behavior of tourists through receipts was the top factor identified by 12 respondents representing 30% of the survey population. Seasonal trends in arrivals among tourists stood second with 25%, then third was tourists' need for accommodation and hospitality services comprising 20% of respondents. Tourists' preference for nature-based and ecotourism comprised 12.5% of the

respondents while tourists' expenditure on transport services took the fifth position. On the other hand, tourists' spending on local products came last in ranking but was still recognized as a critical indicator of tourist preferences. From the study findings, it can be concluded that the three most significant indicators in predicting tourist preferences in Surigao del Norte include tourists' spending behavior, seasonal trends in visitors, and demand for accommodation services.

Table 9: Challenges in Utilizing Tourist Receipt Data for Strategic Forecasting of Tourist Preferences

Challenges in Utilizing Tourist Receipt Data	Frequency	Percentage	Rank
1.a. Incomplete or Inconsistent Tourist Receipt Records	9	22.5%	1
1.b. Limited Digital Record-Keeping Systems	8	20%	2
1.c. Lack of Data Integration Among Tourism Stakeholders	7	17.5%	3
1.d. Insufficient Data Analysis and Forecasting Capabilities	6	15%	4
1.e. Limited Access to Historical Tourism Data	5	12.5%	5
1.f. Data Privacy and Confidentiality Concerns	5	12.5%	5
Total	40	100%	

The challenges faced by tourism stakeholders in using the tourist receipts information to forecast the preferences of tourists in Surigao del Norte are shown in Table 9 below. The highest number of respondents (9 respondents or 22.5%) mentioned the presence of incomplete tourist receipt information as their main challenge. The next biggest challenge reported by most respondents was the limitation in digital

record-keeping system with 8 respondents or 20%. Data integration among tourism stakeholders came third in the list with 7 respondents or 17.5% reporting it as a challenge. Limited access to past data on tourism was indicated by 6 respondents or 15%. Inadequate skills in forecasting and privacy of data were cited by an equal number of 5 respondents or 12.5% each.

Table 10: Impact of Changing Tourist Preferences on Tourism Businesses

Impact of Changing Tourist Preferences	Frequency	Percentage	Rank
1.a. Increased Demand for Personalized Tourism Experiences	11	27.5%	1
1.b. Growing Preference for Nature-Based and Ecotourism Activities	9	22.5%	2
1.c. Increased Use of Online Booking and Digital Platforms	7	17.5%	3
1.d. Higher Demand for Quality Accommodation and Hospitality Services	6	15%	4
1.e. Increased Interest in Local Culture and Heritage Attractions	4	10%	5
1.f. Changing Spending Patterns on Souvenirs and Local Products	3	7.5%	6
Total	40	100%	

Table 10 shows the influence of the change in tourist preferences towards the tourism industry of Surigao del Norte. From the output generated, the increase in demand for personalized tourism experiences emerged first, which was reported by 11 respondents or 27.5% of the whole sample size. Second to follow was the preference of tourists for nature-based and ecotourism experiences, wherein nine respondents or 22.5% answered yes to the question. Third was the use of the Internet and digital booking, as seven respondents or 17.5%

confirmed the answer. Increase in the demand for good hotels and quality hospitality received 15% of the respondents' answers, while the increase in tourist interest for cultural and historical sites was reported by 10% of the sample size. Lastly, the lowest percentage was obtained from the influence of changes in the expenditure on souvenirs and local products with 7.5% of the total respondents. Based on the results obtained, there is an evident trend for tourists to be interested in personalized and digitally supported tourism experiences.

5.2.1 Conceptual Framework of the Proposed Leveraging Tourist Receipt Data for Strategic Forecasting of Tourist Preferences in Surigao del Norte

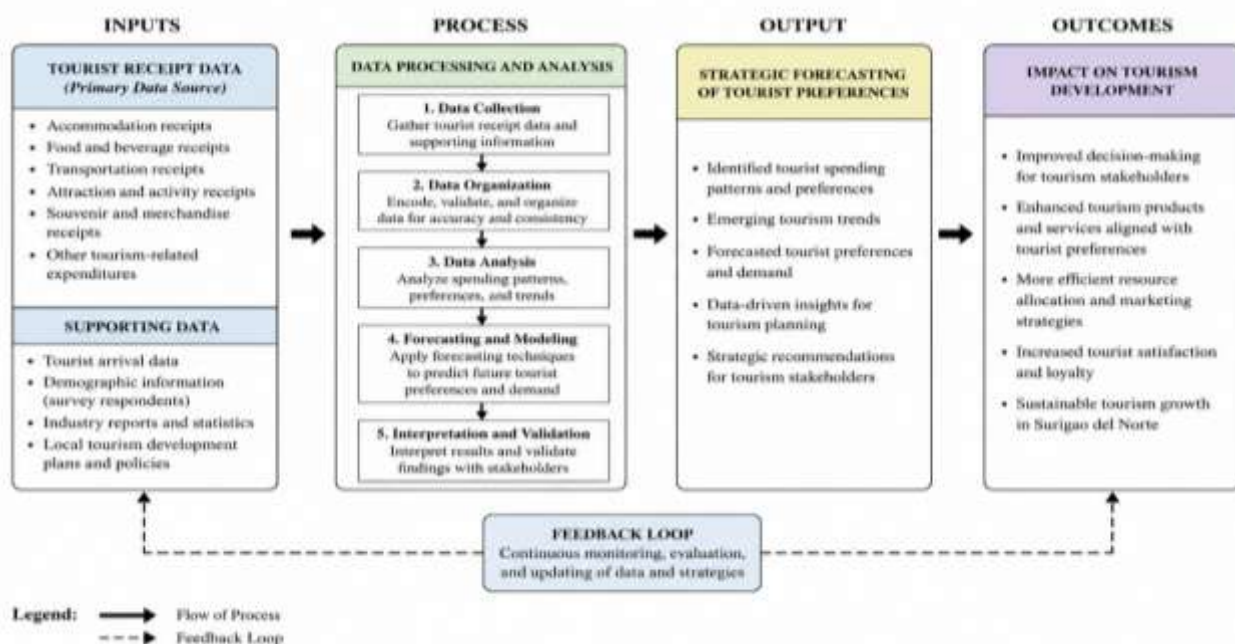


Figure 1: Conceptual Framework

Figure 1 presents the conceptual framework of the study, illustrating how tourist receipt data and supporting tourism

information serve as the primary inputs for analyzing tourist spending patterns and preferences in Surigao del Norte.

Through a systematic process of data collection, organization, analysis, forecasting, and validation, the study generates data-driven insights and strategic forecasts regarding future tourist preferences and demand. These outputs provide tourism stakeholders with valuable information for planning, decision-making, product development, and resource allocation.

Furthermore, the framework emphasizes continuous improvement through a feedback loop that supports the regular monitoring, evaluation, and refinement of tourism data and forecasting strategies, ultimately contributing to enhanced tourism services, increased tourist satisfaction, and sustainable tourism development in Surigao del Norte.

5.2.2 System Development Architecture of the Proposed Leveraging Tourist Receipt Data for Strategic Forecasting of Tourist Preferences in Surigao del Norte

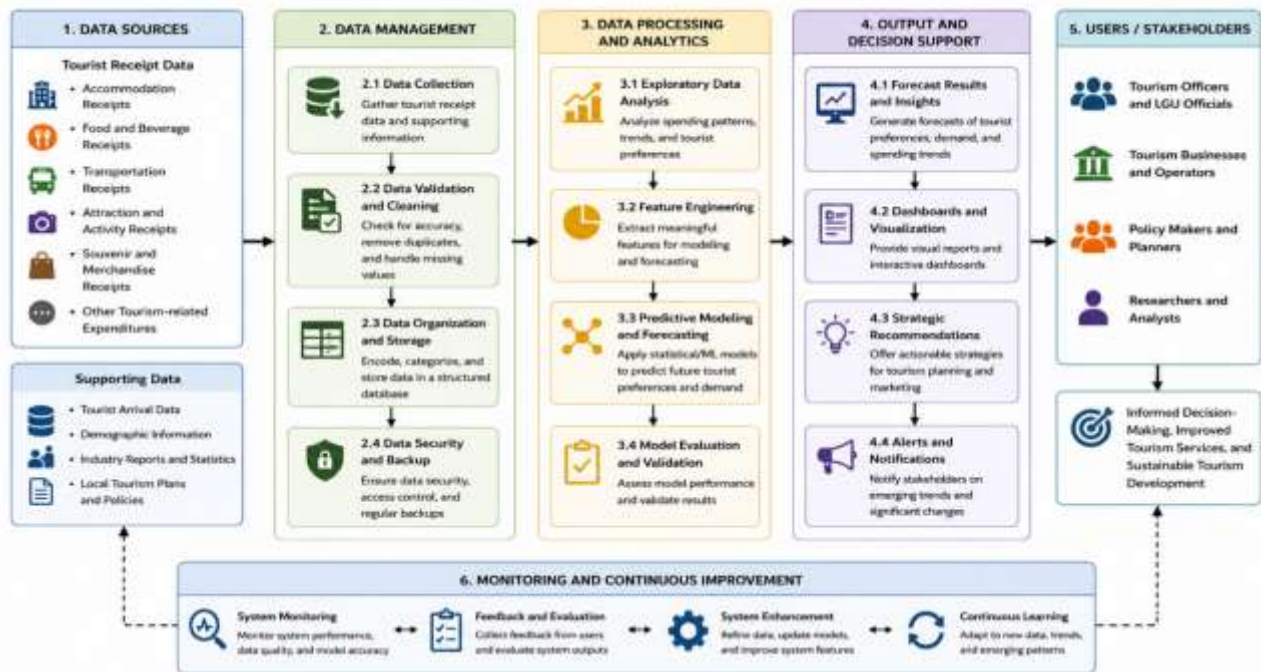


Figure 2: The Development Architecture of the Proposed System

Figure 2 below shows the development architecture of the system design that utilizes tourist receipt data in forecasting tourist preferences in Surigao del Norte. The development architecture starts by collecting the data needed such as the tourist receipts data and other necessary tourism data. The data collected are then subjected to processes such as validation, organization, storage, and protection. After going through these processes, the data are subjected to analysis through exploratory analysis, feature engineering, prediction modeling, and validation to create forecasts based on tourists' preferences. The forecasts will be presented using various formats such as dashboards, reporting, strategic insights, and notifications. Moreover, the architecture will include mechanisms such as monitoring, feedback, evaluation, and improvement for the sustainability of the forecasting process.

5.2.2 Suggestions and Recommendation for Further Improvement of the Tourism Sector

To maximize the benefits from the title “Leveraging Tourist Receipt Data for Strategic Forecasting of Tourist Preferences in Surigao del Norte,” it is strongly advised for tourism stakeholders to collaborate to promote effective cooperation between LGUs, tourism business establishments, researchers, and other organizations involved in tourism. It would be better for tourism stakeholders to adopt standardized methods of

maintaining electronic records for tourist receipts, thereby ensuring accuracy and consistency of data. Moreover, the use of forecasting techniques to gain deeper understanding of tourists' spending behavior and their future preferences should be constantly improved. Capacity building, data-driven decision making, and tourism indicator monitoring are important factors that need to be considered by tourism stakeholders. Lastly, it would be better for tourism stakeholders to consider sustainable tourism development, effective policy implementation, and continual system improvement.

VI. CONCLUSIONS AND RECOMMENDATIONS

From the findings presented, it could be concluded that information about tourist receipts provides an excellent source for understanding and forecasting tourist preferences in Surigao del Norte. Accommodation, food and beverages, and nature tourism activities are among the top preferences in tourist spending behaviors. Such preferences have great potential in influencing the demand and development of tourism in the destination. However, there are several barriers associated with using tourist receipts as a source of data. These include missing receipts, the need for electronic systems for recording, lack of data integration, and restrictions regarding the use of historical data related to tourism. In consideration of the above findings,

it is strongly suggested that tourism stakeholders including Local Government Units, tourism establishments, and agencies involved in tourism data generation, adopt effective mechanisms of collecting and managing data. This includes implementing digital platforms and enhancing information sharing to obtain reliable sources for making decisions in tourism development. At the same time, future research in this area should consider other important aspects like using larger databases, considering more tourist indicators, and applying advanced analysis tools.

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