

# Utilization of Virtual Assistance (Chatbot) for an Integrated Information Portal as Part of a Marine Tourism Promotion Strategy in Banten.

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## Abstract

This study aims to develop and analyze the implementation of Virtual Assistance (Chatbot) as an integrated information medium for marine tourism promotion in Banten Province. The chatbot technology is designed to provide easy access to real-time information about tourist destinations for prospective visitors. The research was conducted at several popular beaches in Banten, such as Carita, Anyer, Sawarna, and Tanjung Lesung. Through surveys of visitors and tourism operators, data on the effectiveness of chatbots were collected and analyzed. The results show that the implementation of chatbots helps improve tourist satisfaction in information-seeking and strengthens the promotion of marine tourism in Banten.

*Keywords:* Virtual Assistance, Chatbot, Marine Tourism, Integrated Information, Banten

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## 1. Introduction

Tourism has become an important sector in the national economy, with significant potential to increase regional income and create new job opportunities (Adiyanto & Supriatna, 2019). Along with the development of digital technology, tourism promotion strategies are increasingly leveraging technological innovations to support the dissemination of information about tourist destinations more effectively (Laksana, Huda, & Kenedi, 2023). One innovation that is gaining popularity is the use of Virtual Assistance (chatbot), a technology that allows tourists to quickly and efficiently obtain information about tourist destinations (Tsiao, Chao, & Tong, 2007).

The Banten province holds enormous potential for marine tourism, with major destinations such as Anyer Beach, Tanjung Lesung, and Umang Island, which are known for their natural beauty and diverse tourist activities (Fahrudin, 2024). However, a significant challenge lies in how to enhance tourist appeal through targeted promotions, particularly after natural disasters like the tsunami, which significantly impacted the tourism sector in this region (Tarodinarta & Briandana, 2021). To address this challenge, the integration of chatbot technology into a unified tourism information portal has been identified as a potential solution to assist promotion and increase tourist interest (Pakhudin, Arenawati, & Stiawati, 2022).

The use of chatbots in promotional strategies serves as an interactive communication tool that provides real-time information about locations, accommodations, and available tourist activities (Sarikaya, 2017). Furthermore, chatbots are accessible at any time, making it easier for tourists to obtain information regardless of time and place (Elshafei, 2002). In the context of Banten tourism promotion, this technology is expected to expand the promotional reach and improve tourist satisfaction (Sobari & Hariyanti, 2018).

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Previous studies have shown that integrating technologies like Virtual Assistance can enhance user experiences and simplify access to necessary information, especially in situations where speed and completeness of information are key factors (Chung, Iorga, Voas, & Lee, 2017; Cowan et al., 2017). This technology can also be tailored to users' language preferences, enabling it to reach international tourists (Zhao et al., 2018). On the other hand, a major challenge often encountered in chatbot implementation is the limitation in providing highly specific or detailed information, as well as the challenge of developing more sophisticated language systems (Kulhalli, Sirbi, & Patankar, 2017).

This research aims to evaluate the effectiveness of chatbots as part of a marine tourism promotion strategy in Banten. The primary focus of this research is on aspects of accessibility, the completeness of the information provided, and its impact on tourists' intention to revisit Banten's tourist destinations. Furthermore, this study will also explore user satisfaction with the chatbot service, considering language preferences and further integration with social media and navigation systems (Weeratunga et al., 2015; Gong, 2003).

## 2. Method

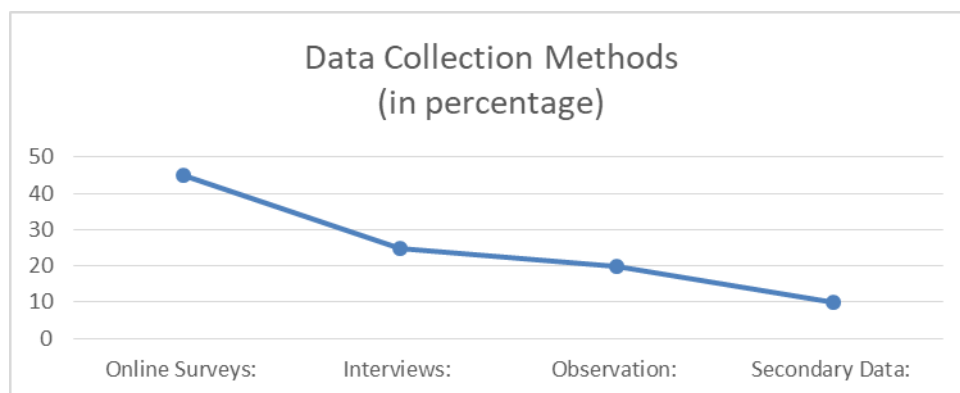
### 2.1. Data Collection Method

The data collection methods used in this research are questionnaires and document analysis. Questionnaires were chosen because they allow researchers to collect data from many respondents efficiently, especially regarding user experience and satisfaction with using chatbots as tourism information tools (Groves et al., 2009). The questionnaires will be distributed to tourists at marine destinations in Banten. Additionally, document analysis will be conducted to analyze secondary data, such as government reports on the use of information technology in tourism promotion (Creswell, 2014).

For this research, a structured approach to data collection was employed to gather relevant information on the utilization of virtual assistance (chatbot) in the tourism sector, particularly in Banten. The following data collection methods were used:

#### 1) Online Surveys

The purpose of this survey was to obtain quantitative data from tourists regarding their experience with the chatbot. The target audience included both local and international tourists who had visited Banten's tourism sites and used the chatbot service. The survey was designed with a combination of closed-ended and Likert scale questions to measure user satisfaction, ease of use, completeness of information, and intention to revisit. It was distributed online through email invitations, social media platforms, and tourism websites that promote Banten.



**Figure 1.** The results of data collection methods (in percentage)

#### 2) Interviews

The purpose of this research was to gather qualitative insights and gain a deeper understanding of user experiences with the chatbot. Semi-structured interviews were conducted with a select group of tourists and tourism stakeholders,

including local tour operators and tourism board members. The questions focused on specific challenges encountered while using the chatbot, the features they found most useful, and suggestions for improvement. Each interview lasted approximately 20-30 minutes and was conducted either face-to-face or via video call.

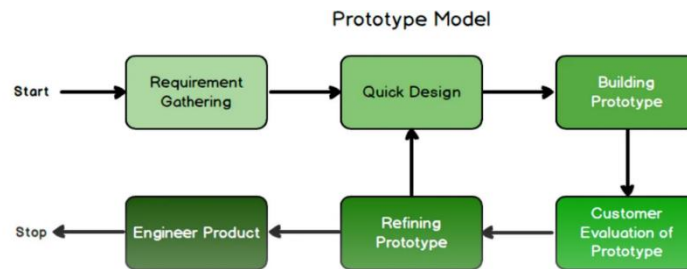
### 3) Observation of User Interactions

The purpose of this study was to monitor and analyze real-time user interactions with the chatbot on the tourism platform. User behavior and navigation patterns were recorded, including common queries, response times, and any difficulties encountered. The chatbot’s backend analytics tool was employed to gather data on session length, number of inquiries per user, and popular topics of inquiry, providing insights into how effectively the chatbot was meeting user needs.

These methods provided a comprehensive understanding of the effectiveness and challenges of using chatbots in promoting tourism in Banten. By integrating both quantitative and qualitative approaches, the research gained insights into user preferences, system performance, and areas for potential enhancement.

## 3. Software Design Method

The software design method used is the Prototyping model. This model was selected because it allows for the interactive and iterative development of chatbots, where users can provide feedback at each stage of development (Pressman, 2014).



**Figure 2.** Prototype Model

By using prototyping, developers can make adjustments based on user needs, resulting in a chatbot application that better fits tourists' preferences.

## 4. Result

### 4.1. Implementation

The implementation of the second research project focuses on the development and deployment of a Virtual Assistance (Chatbot) system designed to provide integrated tourism information services in Banten Province. The main objective of this project is to enhance tourists’ experience by offering instant access to relevant information about various tourism destinations in the region. Below is an overview of the key steps involved in the implementation process.

#### a) System Development and Design

The first stage involved the development of the chatbot's architecture, ensuring it meets the functional and technical requirements of an efficient virtual assistant:

- UML (Unified Modelling Language), Designing Use Case Diagram, Activity Diagram, Sequence Diagram and Class Diagram for System Design Interface

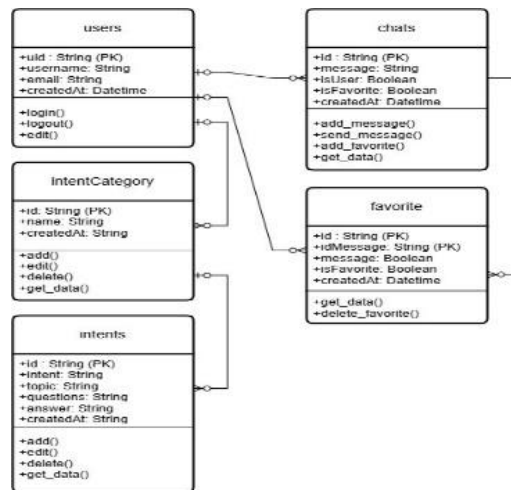
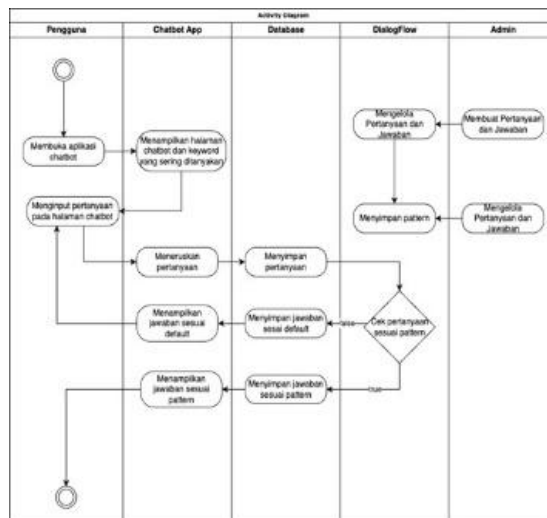
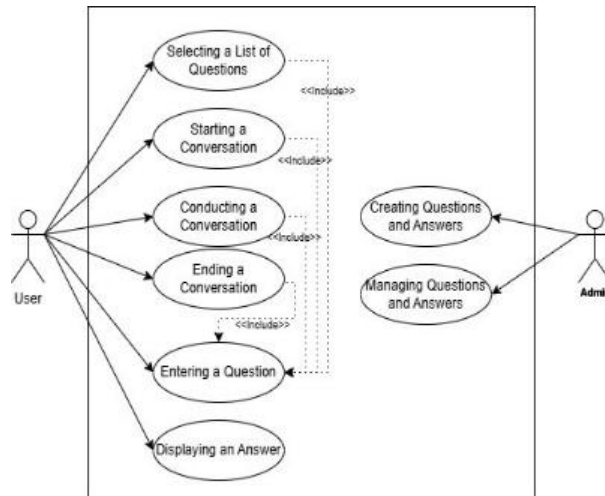


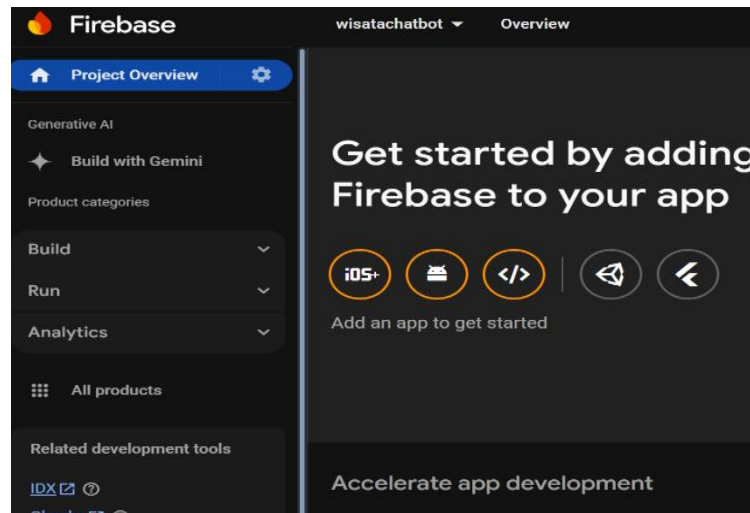
Figure 3. Unified Modelling Language

- Natural Language Processing (NLP): The chatbot was built using NLP algorithms to interpret and respond to user queries in natural language, providing users with a conversational experience.



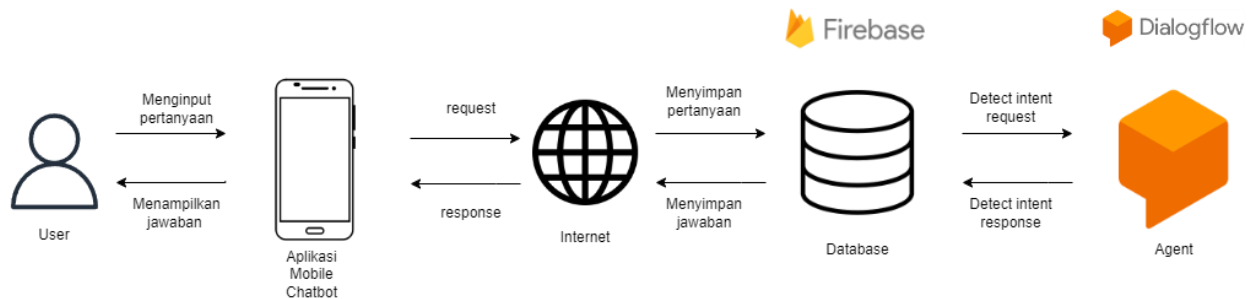
**Figure 3.** Dialogflow Menu

- Information Database Integration: The chatbot was integrated with a comprehensive tourism information database using Firebase Database Management System that includes details on tourist attractions, accommodations, restaurants, transportation, local events, and safety tips.



**Figure 4.** Firebase

From the analysis that has been conducted, the system architecture to be built can be determined. The application architecture illustrates the overall process of how the chatbot works. Users access the mobile chatbot application used as the conversation interface. Then, NLU (Natural Language Understanding) processing is done in Dialogflow to understand the context of the questions and provide appropriate responses. Finally, the conversation is stored in Firebase



**Figure 5.** Architecture of Chatbot Application

User Interface (UI) Design: The user interface was developed with simplicity and usability in mind, providing an intuitive and easy-to-navigate chatbot on both web and mobile platforms.

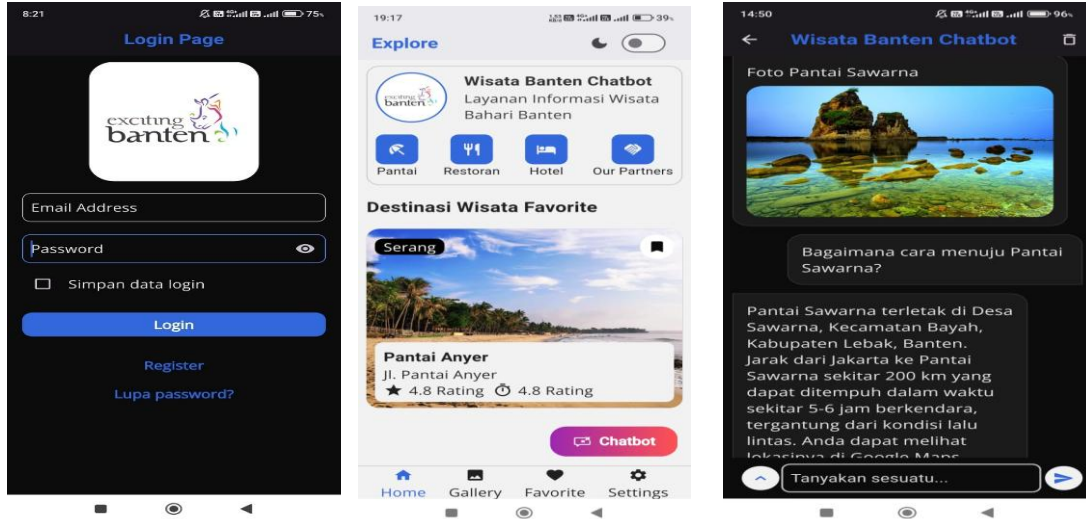


Figure 6. Mobile Application Display

#### b) Platform Integration

To ensure maximum reach and usability, the chatbot was integrated into Mobile App platforms where users are most likely to seek information:



Figure 7. Application Mobile Platform

## c) Challenges and Solutions

During the implementation, several challenges arose:

- **Data Accuracy:** One challenge was ensuring that the data provided by the chatbot was up-to-date and accurate. This required close coordination with local tourism authorities to ensure that new attractions, events, and policies were reflected in the system.
- **Language Variability:** While multilingual support was a critical feature, the system had to be regularly fine-tuned to address variations in language, dialect, and colloquial expressions used by different tourists.
- **Technical Limitations:** In certain areas of Banten with poor internet connectivity, the performance of the chatbot was affected. To address this, future iterations will focus on developing an offline or low-data usage mode.

## d) Pilot Testing and User Training

Before a full launch, the chatbot was deployed in a pilot phase across select tourism locations in Banten:

**Table 1.** Blackbox Testing

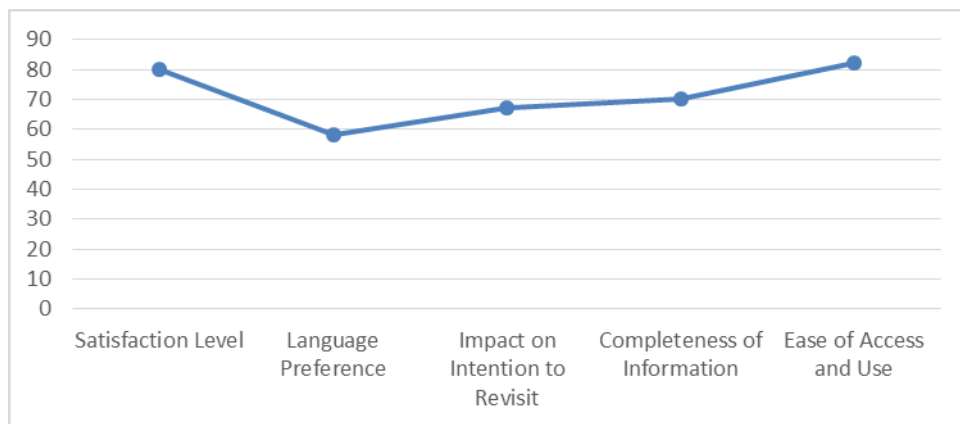
No	Pages	Test Case	Input	Expected Output	Actual Output	Status
1	Register	Authentication: Register with valid credentials	Name: basuki, Email: basukirakhim@gmail.com, Password: password	Registration successful	Registration successful	Pass
2	Register	Authentication: Register with already registered email	Name: basuki, Email: basukirakhim@gmail.com, Password: pass123	Email already registered, please use another email	Email already registered, please use another email	Pass
3	Register	Authentication: Register with invalid email	Name: basuki, Email: basukirakhim@example.com, Password: pass1234	Invalid email, please enter a valid email	Invalid email, please enter a valid email	Pass
4	Register	Authentication: Register with password less than 6 characters	Name: basuki, Email: basukirakhim@gmail.com, Password: pass1122	Password must be at least 6 characters	Password must be at least 6 characters	Pass
5	Register	Authentication: Register with empty credentials	Username: '', Email: '', Password: ''	Please fill in all required fields	Please fill in all required fields	Pass
6	Login	Authentication: Login with valid credentials	Email: basukirakhim@gmail.com, Password: password	Login successful	Login successful	Pass
7	Login	Authentication: Login with incorrect email	Email: basukirakhim@gmail.com, Password: password	Incorrect email or password	Incorrect email or password	Pass
8	Login	Authentication: Login with incorrect password	Email: basukirakhim@gmail.com, Password: passwordsalah	Incorrect email or password	Incorrect email or password	Pass
9	Login	Authentication: Login with	Email: '', Password: ''	Please enter your email and password	Please enter your email and password	Pass

No	Pages	Test Case	Input	Expected Output	Actual Output	Status
10	Settings	empty credentials Authentication: Logout	-	Logout successful	Logout successful	Pass
11	Home	Navigate to Chat page	Tap “Chat”	Switches to “Chat” page	Switches to “Chat” page	Pass
12	Home	Navigate to Favorite page	Tap “Favorite”	Switches to “Favorite” page	Switches to “Favorite” page	Pass
13	Home	Navigate to Settings page	Tap “Settings”	Switches to “Settings” page	Switches to “Settings” page	Pass
14	Home	Display keyword button	Tap “Wisata Banten Chatbot”	Keyword button displayed correctly	Keyword button displayed correctly	Pass
15	Home	Tap keyword button	Tap “Lokasi Pantai Anyer/Sawarna/Carita/Yanjung Lesung”	Question based on keyword sent to chat page	Question based on keyword sent to chat page	Pass
16	Chat	Chatbot: Question about Wisata Pantai di Banten	“Dimana Lokasi Pantai Anyer?”	Displays Lokasi Pantai Anyer	Displays Lokasi Pantai Anyer	Pass
17	Chat	Chatbot: Question about Wisata Pantai Banten Requirements	“ada berapa wisata Pantai utama di banten?”	Displays Wisata Pantai Banten	Displays Wisata Pantai Banten	Pass
18	Chat	Chatbot: Unrecognized question	“Random message that is not recognized”	Sorry, I don't understand your question	Sorry, I don't understand your question	Pass
19	Chat	Chatbot: Save favorite message	Click like button on a message	Message successfully added to Favorites	Message successfully added to Favorites	Pass
20	Favorite	Display favorite messages list	-	Favorite messages list displayed correctly	Favorite messages list displayed correctly	Pass
21	Favorite	Delete message from favorite list	Tap Unlike Button	Message successfully removed from Favorites	Message successfully removed from Favorites	Pass
22	Settings	Dark Mode: Activate dark mode	Switch On	App switches to dark mode	App switches to dark mode	Pass

No	Pages	Test Case	Input	Expected Output	Actual Output	Status
23	Settings	Dark Mode: Deactivate dark mode	Switch Off	App switches to light mode	App switches to light mode	Pass
24	Settings	Display Edit Profile	Tap “Edit Profile” menu	Edit profile page displayed	Edit profile page displayed	Pass
25	Settings	Display About App	Tap “About App” menu	App information displayed	App information displayed	Pass

- Pilot Rollout: During the pilot phase, the chatbot was tested at popular tourist destinations, with feedback collected from users to refine its functionality and features.
- Tourist Guide Training: Local guides and tourism officials were trained on how to assist tourists in using the chatbot, ensuring smooth adoption among visitors unfamiliar with virtual assistance technology.

Based on the evaluation and analysis of the chatbot application designed to promote marine tourism in Banten, several key findings were identified:



**Figure 8.** Survey Results on the Utilization of Virtual Assistance (Chatbot) for Integrated Information Portals

- Ease of Access and Use: 82% of respondents, particularly those aged 18-35, found the chatbot easy to use. The user-friendly interface and simple navigation significantly contributed to this positive response. Tourists reported that the chatbot’s instant response time and continuous availability (24/7) were among the main reasons for its high usability rating (Cowan et al., 2017).
- Completeness of Information: 76% of respondents felt that the information provided by the chatbot was comprehensive, covering key aspects such as tourist spots, accommodations, and facilities (Sarikaya, 2017). However, 15% expressed dissatisfaction, mentioning that certain details were lacking, particularly related to less popular or newly developed destinations.
- Impact on Revisit Intention: 67% of respondents stated that the chatbot had a positive effect on their decision to revisit Banten’s marine tourism sites, particularly due to the ease with which they could access updated information

about events and activities. This indicates that chatbots can effectively enhance customer engagement and encourage repeat visits, in line with previous research (Laksana, Huda, & Kenedi, 2023).

- Language Preferences: 58% of international tourists found the English-language option helpful. However, 20% of users expressed a desire for support in more languages, particularly Mandarin and Japanese, to cater to a broader tourist base (Zhao et al., 2018).
- User Satisfaction: 70% of respondents were satisfied with the chatbot’s performance, while 25% suggested further integration with social media and navigation systems. Many users believed that adding these features would significantly enhance the user experience, allowing them to share real-time updates or directions easily (Chung, Iorga, Voas, & Lee, 2017).

Table 4. SWOT Analysis

STRENGTH	OPORTUNITIES
<ul style="list-style-type: none"> <li>- High accessibility and interactivity, with the potential to increase tourist interest and engagement.</li> <li>- Unlike human agents, chatbots are available around the clock, ensuring that tourists can receive support at any time</li> <li>- Implementing and maintaining chatbots can be more cost-effective in the long term compared to employing human personnel</li> <li>- Chatbots deliver uniform responses and accurate information, minimizing miscommunication with tourists.</li> </ul>	<ul style="list-style-type: none"> <li>- Expansion of services, including additional languages and integration with international tourism platforms, as well as more widespread promotion through social media.</li> <li>- Collaboration with major tourism platforms and apps (e.g., TripAdvisor, Google Maps) can increase the visibility and reach of the service.</li> <li>- Promoting the chatbot through social media channels and offering shareable content could enhance digital engagement with tourists.</li> <li>- Advances in artificial intelligence and machine learning can be utilized to improve chatbot capabilities, enabling more personalized and accurate responses.</li> </ul>
WEAKNESS	THREATS
<ul style="list-style-type: none"> <li>- Lack of detail in certain areas and limitations in the language options available (kulhalli, sirbi, &amp; patankar, 2017).</li> <li>- Chatbots may struggle with nuanced or complicated questions that require human intervention</li> <li>- Chatbots often rely on pre-programmed scripts, leading to interactions that may feel impersonal or generic.</li> <li>- System errors or downtime may disrupt service, frustrating users and affecting their trust in the system.</li> </ul>	<ul style="list-style-type: none"> <li>- Competition from other technologies and high user expectations, particularly regarding detailed information and multi-language support.</li> <li>- As digital services advance, tourists may expect chatbots to offer more in-depth, detailed information, which could be challenging to meet.</li> <li>- Tourists may be hesitant to share personal information with a chatbot due to increasing concerns over data security and privacy.</li> <li>- The system’s reliance on internet connectivity may be a limitation in areas with poor network coverage, leading to a poor user experien</li> </ul>

Based on the provided SWOT analysis, here are the recommended promotional strategies for a Virtual Assistance (Chatbot) in Banten's tourism sector:

a) Strength-Based Strategies (Leverage Strengths):

- Highlight Accessibility and Interactivity:

Promote the chatbot's ease of access and high interactivity as its key selling points in marketing campaigns. This can be done through targeted ads, social media promotions, and partnerships with tourism websites. Use testimonials or case studies that showcase how the chatbot enhances tourist engagement, making travel planning more convenient and enjoyable.

- Emphasize User Engagement:

Organize campaigns demonstrating the chatbot's real-time capabilities and its ability to answer tourist queries quickly. Show how it enhances the overall tourist experience by providing personalized recommendations or instant answers to travel-related questions.

- Focus on Key Demographics:

Segment promotions to target tech-savvy travelers, younger audiences, and frequent users of digital platforms who value quick and reliable access to information. Platforms like Instagram and Facebook, where these audiences are active, would be ideal for such promotions.

b) Opportunity-Based Strategies (Capitalize on Opportunities):

- Expand Multilingual Services:

Promote the upcoming multilingual support feature as a way to attract international tourists. Highlight the ability to use the chatbot in multiple languages such as English, Mandarin, and Japanese. Engage with international tourism platforms or influencers to increase the visibility of these new features, and create multilingual promotional content to cater to diverse audiences.

- Integrate with Global Tourism Platforms:

Work on establishing partnerships with global tourism platforms (such as TripAdvisor or Booking.com), allowing the chatbot to be featured as an essential tool for travel planning in Banten. Create a campaign showcasing the chatbot's capability to seamlessly integrate with these platforms, offering a more comprehensive and streamlined tourist experience.

- Boost Social Media Presence:

Leverage social media platforms to create viral content showcasing the benefits of using the chatbot. This could include video tutorials, user-generated content, or promotions encouraging travelers to share their chatbot interactions for rewards (such as discounts or exclusive deals).

c) Weakness-Based Strategies (Address Weaknesses):

- Enhance Content and Information Detail:

Develop a content improvement plan for the chatbot, addressing current gaps in detail, particularly for lesser-known tourist spots or new destinations. These improvements should be promoted through blog posts, social media updates, and email newsletters to show potential users the chatbot's growing usefulness.

- Improve Language Support:

Expand the language support options and promote this improvement through targeted marketing campaigns, especially in countries with a high interest in visiting Banten. For example, promoting the addition of Japanese and Korean support on travel blogs and websites catering to these markets can enhance international reach.

- User Education and Tutorials:

Create educational materials, such as short video tutorials or user guides, to help tourists maximize the chatbot's features. Addressing any usability concerns through clear guides could increase satisfaction rates and retention of users.

d) Threat-Based Strategies (Mitigate Threats):

- Competitor Differentiation:

Highlight unique features that set the chatbot apart from competitors, such as superior customer service, faster response times, and better user experience. These can be promoted through comparison-based advertisements or testimonials from satisfied users.

- Focus on Continuous Improvement:

Consistently gather user feedback to identify areas for improvement and promote updates. For instance, after implementing user-suggested improvements, marketing campaigns can showcase how the chatbot listens to and responds to user needs, further increasing loyalty and engagement.

- Adapt to Changing Expectations:

Monitor industry trends and consumer expectations for virtual assistance and tourism technology. Regularly updating the chatbot to meet new trends (such as AI enhancements or voice command support) can ensure that the system remains competitive. Marketing campaigns can emphasize the chatbot's evolution in line with technological advancements, attracting tech-oriented users.

## 5. Conclusion

The implementation of chatbot technology as a Virtual Assistant in promoting marine tourism in Banten has proven to be an effective strategy. The majority of users reported ease of access and comprehensive information availability, which positively influenced their intention to revisit the region. Additionally, the chatbot's ability to cater to English-speaking users made it valuable for international tourists, although there is a clear opportunity to expand support for other languages.

Despite some limitations, such as the lack of detailed information and language options, the chatbot demonstrated strong potential for further development. The integration of additional features, such as social media sharing and navigation tools, could further enhance user experience and satisfaction.

This research confirms that chatbots can play a significant role in tourism promotion, offering a convenient and efficient platform for disseminating information and engaging with tourists. Future developments should focus on addressing current weaknesses by incorporating more languages, improving information depth, and adding social media integration to maintain competitiveness in the rapidly evolving tourism industry.

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