A preliminary study on tourist willingness to pay for marine safety improvements in Nusa Penida

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Abstract. This study evaluates the willingness to pay (WTP) among tourists for safety improvements in Nusa Penida, Indonesia, utilizing the contingent valuation method (CVM). The research aimed to quantify the economic value that tourists place on enhanced safety measures and to identify demographic factors influencing their WTP. Data were collected through a structured questionnaire distributed to a diverse group of tourists. The results revealed a clear preference for moderate safety investment, with a significant drop in WTP as the proposed enhancements' costs increased. Chi-square tests conducted to explore the relationship between WTP and demographic variables such as gender, income, education level, age, and marital status. The results showed there was no significant associations between them, suggesting that safety is a universally valued attribute among tourists irrespective of their demographic backgrounds. These findings provide crucial insights for local policymakers and tourism managers, indicating that safety improvements have broad support and can be implemented universally without demographic segmentation. The study highlights the importance of integrating tourist perspectives into safety enhancement strategies, which not only increases the likelihood of their acceptance but also contributes to the sustainable development of the tourist management in Nusa Penida, Indonesia.

1 Introduction

Tourism has emerged as a pivotal sector in the global economy, providing substantial economic benefits to destinations worldwide through increased revenue, employment, and development opportunities [1,2]. Nusa Penida, an island in Indonesia known for its stunning natural landscapes and vibrant underwater biodiversity, has experienced rapid growth in tourist arrivals in recent years [3]. This surge in tourism, while economically beneficial, underscores the necessity for robust safety measures to protect visitors and maintain the

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island's appeal as a top travel destination. Safety in tourism encompasses a broad spectrum of considerations, from physical safety related to infrastructure and transport to health-related issues and personal security [4]. In Nusa Penida, as in many popular tourist locales, ensuring visitor safety is complicated by the ruggedness of the terrain, the challenges associated with water sports and activities, and the need for effective emergency response mechanisms. The perception of safety can significantly influence tourist decisions and satisfaction, affecting repeat visitation rates and the overall reputation of the destination.

Given the critical role of safety in sustaining tourism, it is imperative to understand how much tourists value safety enhancements and their willingness to support such improvements financially. This forms the core of the current study, which employs the contingent valuation method (CVM) to quantify tourists' willingness to pay (WTP) for increased safety measures. The CVM approach allows for direct elicitation of consumer valuation of hypothetical scenarios, providing a straightforward means to gauge economic preferences without market data [5,6]. By asking tourists directly about their WTP for specific safety enhancements, the study seeks to capture the economic value that visitors place on safety, providing a metric that can guide investment decisions. Moreover, the influence of demographic characteristics on economic decision-making in tourism settings is well-documented but often yields mixed results [7–11]. Factors such as age, income, gender, education level, and marital status can shape how safety is perceived and valued [7–11]. For instance, families with young children might prioritize different safety features compared to solo travelers or elderly visitors. Similarly, higher income or education levels might correlate with a greater willingness to invest in personal safety. Understanding these nuances is crucial for effectively tailoring safety interventions to meet the diverse needs and expectations of various tourist segments.

This study, therefore, seeks not only to determine a general WTP for safety improvements in Nusa Penida but also to dissect the demographic underpinnings of these economic valuations. The aim is to provide a nuanced view that can inform more targeted and efficient policy and infrastructure planning. Such tailored approaches are essential for enhancing tourist experiences, fostering positive perceptions of Nusa Penida as a safe and desirable destination, and ultimately ensuring the long-term sustainability of its tourism industry. By integrating the findings of this research into strategic planning, stakeholders can better allocate resources toward those safety improvements that offer the highest return in terms of tourist satisfaction and safety perceptions, thereby reinforcing the economic and social fabric of the destination.

2 Method

In this study, we explore tourists' willingness to financially contribute to enhanced safety measures in Nusa Penida, Indonesia, where safety concerns can significantly affect the tourism experience and the local economy. Understanding how much visitors are willing to pay for improved safety features helps prioritize investments and policies [12]. The research begins by identifying specific safety issues through initial discussion with local stakeholders, including tour operators, safety officials, and tourists themselves (Figure 1). This engagement helps pinpoint which safety improvements are most needed and sets the stage for a tailored research approach. Complementing this, a comprehensive review of existing literature on tourist safety valuation and economic evaluations of safety interventions provides a solid theoretical foundation for the study. This review ensures that

the methodologies employed are consistent with current academic standards while being adapted to the unique characteristics of Nusa Penida.

Following the preparatory stages, the design and distribution of a detailed questionnaire serve as the primary methods for data collection. To ensure the reliability and clarity of the questionnaire, a pretest involving 60 samples is conducted (the minimum sample size for a preliminary study is 50 [7,13]). This preliminary survey, distributed to a small but varied group of tourists, helps refine the questionnaire based on initial feedback, ensuring that the questions are comprehensible and effectively capture the intended data. The final questionnaire, enhanced by insights from the pretest, is designed to capture both the quantitative willingness to pay for safety improvements and qualitative feedback on tourist perceptions and priorities. Distributed through online platforms popular with tourists, local accommodations, and major entry points to the island, the survey reaches a diverse sample of tourists, thereby enhancing the representativeness of the data.

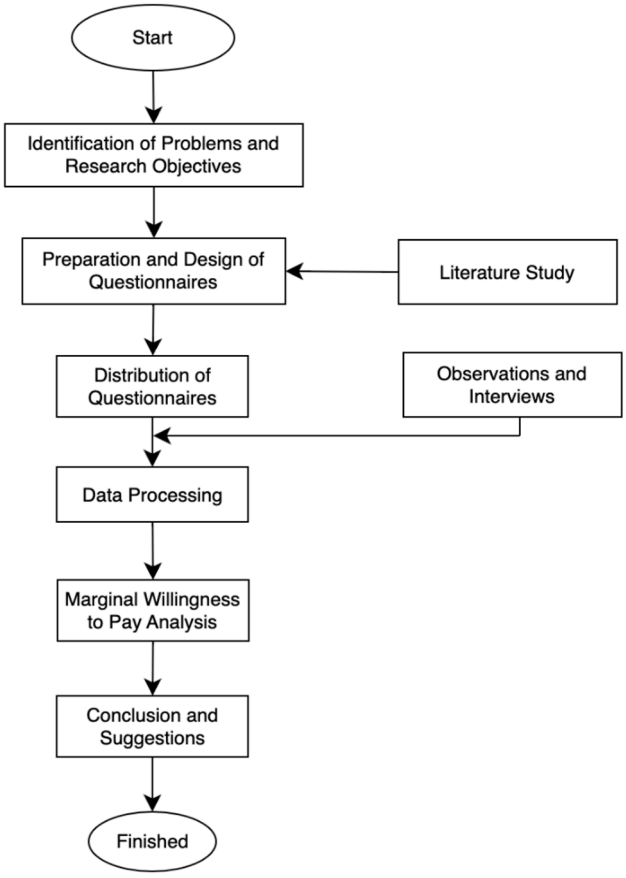

Figure 1. Research methodology

To deepen the understanding of the issues at hand, observations and interviews are conducted at key tourist sites. These observational studies help identify safety concerns that might not be explicitly reported in survey responses and provide contextual depth to the quantitative data collected. Structured interviews with a subset of respondents further enrich

the data, offering nuanced insights into the motivations behind tourists' willingness to pay and their specific safety concerns. The analytical phase of the research involves sophisticated statistical techniques. Regression analysis is employed to examine the relationship between tourists' willingness to pay and independent variables.

Additionally, a Chi-square analysis is used to explore the relationship between tourists' socio-demographic characteristics and their positive responses to willingness-to-pay bids. This analysis helps identify any statistically significant variations in willingness to pay across different groups, allowing for more targeted safety interventions. The data from open-ended willingness-to-pay questions are particularly revealing. Unlike bounded survey responses, open-ended responses allow tourists to indicate, without constraint, the maximum amount they are willing to pay for safety improvements. Analyzing these responses provides a clear picture of the economic value tourists place on safety and helps identify the average and range of willingness to pay across the sample. By combining insights from regression and Chi-square analyses, the study offers a comprehensive view of how tourists value safety in Nusa Penida. The conclusions drawn from the analyses are used to formulate specific, actionable recommendations for local authorities and tourism stakeholders. These recommendations focus on the safety improvements most valued by tourists and suggest how these improvements can be funded and implemented. By leveraging both qualitative and quantitative data, the study provides a detailed economic evaluation of tourist perceptions and the value they place on safety enhancements in Nusa Penida. The findings are expected to guide local policymaking and investment in tourist safety, enhancing both the visitor experience and the sustainability of the tourism sector in the region. This approach ensures that safety investments are aligned with the preferences and expectations of tourists, ultimately contributing to the region's reputation as a safe and attractive destination.

3 Result and discussion

Figure 2 provides a detailed overview of the demographic characteristics of the respondents who participated in the study on tourists' willingness to pay for safety improvements in Nusa Penida. This demographic data is essential for understanding the socio-economic background of the respondents and how it may influence their preferences and willingness to contribute financially toward safety measures. The gender distribution indicates that women comprised a slightly larger portion of the respondents, accounting for 57%, compared to 43% for men. This balanced representation highlights the diversity within the survey sample. The income levels of the respondents are categorized into six groups, with the majority, 56%, falling within the income range of IDR 2,000,001 to IDR 3,000,000. Smaller proportions reported incomes either below IDR 1,000,000 or exceeding IDR 5,000,000. These figures provide important insights into the economic profile of the respondents, which could influence their ability and willingness to pay for enhanced safety measures. The age distribution reveals that the majority of respondents, 63%, belong to the 30-39 age group, followed by 22% in the 18-29 range. The remaining respondents are distributed across older age categories, with minimal representation from individuals aged 50 and above. This predominance of younger to middle-aged individuals suggests that the sample largely represents a working-age population, which may impact their attitudes toward safety investments. In terms of educational attainment, a significant portion of respondents, 52%, hold a bachelor’s degree, while 33% have completed master’s or doctoral-level education. This high level of educational attainment reflects a sample with substantial academic qualifications, which could correlate with greater awareness of safety

issues and a stronger willingness to pay for improvements. Additionally, the marital status of respondents is nearly evenly split, with 52% married and 48% single. This distribution allows for the analysis of how social and familial responsibilities may influence attitudes toward investing in safety.

Figure 3 presents the results of the CVM analysis, illustrating the distribution of WTP intervals reported by tourists in Nusa Penida for safety improvements during their visit. The bar chart displays the number of respondents corresponding to different WTP intervals, measured in Indonesian Rupiah (IDR) per visit. The highlighted intervals in the chart are 0-25,000 IDR, 50,000 IDR, 75,000 IDR, and 600,000 IDR. Notably, the highest number of responses was observed in the 50,000 IDR interval, suggesting that a significant portion of tourists is willing to pay this amount for enhanced safety measures per visit. In contrast, the 600,000 IDR interval shows a markedly lower response, indicating that fewer tourists are inclined to pay at this higher rate. Accompanying the bar chart is a dotted line representing a power-law regression model, described by the equation $y = 16.426x^{-0.405}$ with an R^2 value of 0.0345. This regression line suggests a general trend where the number of respondents willing to pay decreases as the WTP amount increases, which is typical in WTP studies. The relatively low R^2 value indicates that the model explains only a small portion of the variance in the number of responses across different WTP intervals. The analysis also revealed that the average WTP among the 60 respondents is approximately IDR 80,000 per visit to support safety improvements. The lowest stated WTP was IDR 5,000, while the highest reached IDR 600,000. These findings provide valuable insights into tourists' perceived value and financial willingness to support marine safety initiatives in Nusa Penida. They highlight the importance of aligning safety programs with tourists' financial expectations to ensure broader acceptance and engagement.

Figure 2. Sociodemographic of respondent visitors (n=60)

Understanding the factors driving tourists' willingness to pay (WTP) beyond the minimum for marine safety improvements in Nusa Penida is crucial for developing effective strategies. Key drivers include the perceived value for safety, where enhanced measures reduce risks and provide peace of mind, and trust in authorities through transparent fund allocation of robust safety standards. Economic factors, such as higher disposable incomes and favorable cost-benefit evaluations, further motivate higher payments. Psychological influences, including fear of danger and prior experiences with unsafe conditions, reinforce

the willingness to contribute. To enhance contributions, strategies should focus on transparency, awareness campaigns, tiered payment options, collaboration with tour operators, visible safety measures, and aligning safety initiatives with sustainable tourism goals. These approaches can foster greater engagement, ensuring long-term benefits for both tourists and the local community.

Table 1 presents the results of the Chi-square tests conducted to assess the association between various demographic variables and the WTP for safety improvements among tourists in Nusa Penida. The demographic variables examined include gender, income, highest level of education, age, and marital status. These variables were selected based on the hypothesis that different demographic segments may have distinct attitudes and financial capacities affecting their WTP for enhanced safety measures. The Chi-square test, a non-parametric statistic, is used to determine whether there are significant differences between the expected and observed frequencies in one or more categories of a contingency table [14–16]. In this context, the tests explore whether there are statistically significant relationships between each demographic variable and the levels of WTP indicated by the respondents.

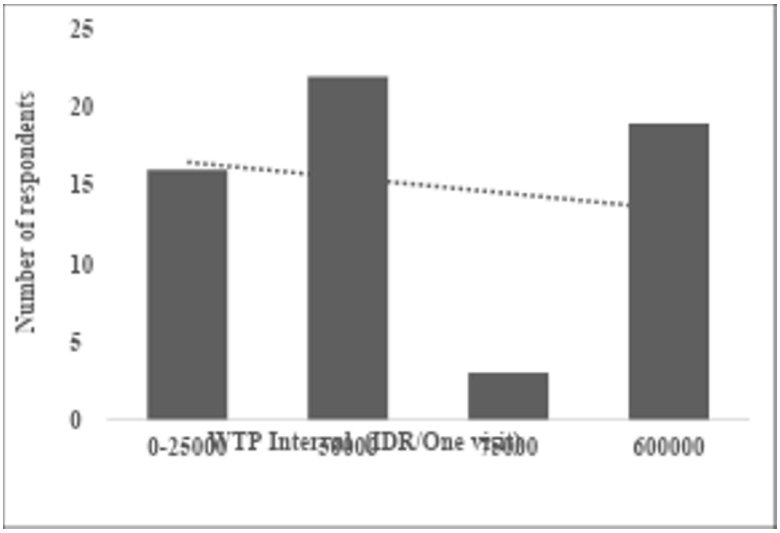

Figure 3. CVM results: bid and number of responses

The degrees of freedom (df) associated with each variable and their corresponding p-values (Asymptotic Significance) are listed. The degrees of freedom for each test are determined by the number of categories in each variable minus one, adjusted for the overall sample size and distribution across the categories of WTP. For instance, gender, which typically has two categories (male and female), is shown with 14 degrees of freedom, suggesting a more complex categorization or combination of categories used in this analysis. The Asymptotic Significance values (2-sided) indicate the probability of observing the given result by chance if there is no actual association in the broader population. For example, the p-value for gender is 0.635, indicating a 63.5% chance that any observed difference in WTP between genders occurred by chance, thus suggesting no statistically significant association between gender and WTP at conventional significance levels. Similarly, other variables like income, highest level of education, age, and marital status show p-values above conventional thresholds for statistical significance (usually 0.05 or

0.01), indicating that no significant differences were found based on these demographic factors in this sample. This suggests that within the context of this study, demographic characteristics may not play a decisive role in influencing tourists' willingness to pay for safety enhancements, or that the sample size or variability within the sample may not have been sufficient to detect such differences.

Table 1. Chi-Square test of WTP for safety

Variable	df.	Asymptotic Significance (2-sides)
Gender	14	0.635
Income	70	0.531
Highest level education	28	0.138
Age	42	0.345
Marital status	14	0.27

The findings from Table 1 reveal no statistically significant associations between various demographic variables and tourists' WTP for safety improvements in Nusa Penida. These results present several important implications for both research and practical applications in tourism management. Firstly, the lack of significant differences across demographic groups such as gender, income, education level, age, and marital status suggests that the perception of safety and the valuation of safety improvements may be relatively homogeneous among tourists visiting Nusa Penida. This uniformity could imply that tourists, regardless of their demographic backgrounds, generally prioritize safety and perceive its value similarly. Such insights are particularly valuable for policymakers and tourism operators, as they suggest that initiatives aimed at improving safety could receive broad support across different tourist segments.

From a policy-making perspective, these results indicate that interventions for enhancing safety could be designed with universal appeal, rather than being tailored to specific demographic niches. This approach could simplify implementation processes and facilitate efficient resource allocation. For instance, resources can be directed toward widespread safety campaigns or structural improvements that benefit all tourists, rather than developing targeted interventions that cater only to specific groups. In terms of marketing and communication strategies, the findings allow tourism marketers to craft messages that promote enhanced safety measures to a broad audience without the need to segment the market based on demographic characteristics. Marketing that emphasizes a universal commitment to safety could appeal to a wider audience [17,18], enhancing the overall image of Nusa Penida as a safe destination and potentially boosting tourist inflows and satisfaction.

However, the absence of significant results also prompts a reconsideration of the survey methods or the statistical power of the study. The high p-values across all tested variables may indicate potential limitations in the sample size or variability within the data. It could be beneficial for future research to include a larger and possibly more diverse sample to explore subtler nuances in how different demographic factors might influence WTP for safety improvements. Additionally, considering other variables or employing different methodological approaches, such as mixed methods that integrate qualitative data [19–21], could provide deeper insights into the motivations behind tourists' willingness to pay and uncover any underlying preferences that a quantitative approach alone might not reveal. Furthermore, the results could encourage a deeper investigation into other factors that might influence WTP, such as previous experiences with safety issues, personal or cultural values related to safety, or even the specific nature of the proposed safety improvements.

Understanding these aspects could aid in crafting more effective safety measures and better engaging tourists with the initiatives being implemented.

4 Conclusion

The study conducted to assess the willingness to pay (WTP) among tourists for safety improvements in Nusa Penida has provided valuable insights into the economic valuation tourists place on safety features. By employing the Contingent Valuation Method (CVM) and supporting statistical analyses, such as Chi-square tests, this research aimed to uncover the financial commitment tourists are willing to make to enhance their safety during their visits. The findings revealed that a significant number of respondents were inclined to pay moderate amounts for safety enhancements, with the majority indicating a WTP of 50,000 IDR. This suggests a recognition of the importance of safety among tourists and a willingness to support improvements financially. However, as the proposed WTP amounts increased, the number of tourists willing to pay higher prices sharply declined, indicating price sensitivity and potential limits to the financial sacrifice's tourists are willing to make for additional safety measures. Moreover, the Chi-square tests provided an additional layer of understanding, showing no statistically significant associations between tourists' demographic characteristics (such as gender, income, education level, age, and marital status) and their WTP. This outcome suggests that safety is a universally valued component of the tourist experience in Nusa Penida, irrespective of the tourists' demographic profiles. It implies that safety improvements can be broadly appealing and do not need to be tailored to specific demographic segments.

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