

# Importance-performance analysis of tourist perceptions on security services and safety facilities in Nusa Penida, Indonesia

*Siska Dwi Wahyuni<sup>1</sup>, Ari Rahman<sup>1\*</sup>, Sapta Suhardono<sup>2</sup>*

<sup>1</sup>Department of Environmental Engineering, Faculty of Infrastructure Planning, Universitas Pertamina, Jakarta 12220, Indonesia

<sup>2</sup>Environmental Sciences Study Program, Faculty of Mathematics and Natural Sciences, Universitas Sebelas Maret, Surakarta 57126, Indonesia

**Abstract.** This study employs an Importance-Performance Analysis (IPA) to evaluate tourist perceptions of safety measures in Nusa Penida, Indonesia. By assessing the importance and performance of various safety-related indicators such as hazard signs, safety standards, accident first aid, information boards, and CCTV, the study aims to identify strengths and areas for improvement in local safety management. Data were collected from a sample of 60 tourists and analyzed using paired sample t-tests to compare the perceived importance and actual performance of each safety measure. The findings reveal that while essential services like hazard signs and safety standards are both highly valued and well-executed, other areas such as information dissemination via information boards are recognized as underperforming. The study highlights the need for strategic adjustments in resource allocation and emphasizes enhancing communication tools to improve overall tourist safety and satisfaction. The results provide actionable insights for tourism operators and local government agencies to refine safety protocols and improve the effectiveness of safety measures, thereby enhancing the destination's appeal and ensuring a safer experience for all visitors.

## 1 Introduction

Tourism is a vital industry that fosters economic growth, promotes cultural exchange, and raises environmental awareness [1,2]. However, the success and sustainability of any tourist destination heavily depend on its ability to ensure the safety and security of its visitors [3,4]. In places like Nusa Penida, an island in Indonesia known for its stunning natural beauty and diverse marine life, the importance of robust safety measures cannot be overstated. As tourist footfall increases, the island faces significant challenges in managing safety concerns that, if not adequately addressed, could deter potential visitors and tarnish the destination's reputation. Nusa Penida's rugged terrain and the adventurous nature of its activities, such as diving, snorkeling, and trekking, further complicate efforts to ensure tourist safety. These

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\* Corresponding author: [ari.rahman@universitaspertamina.ac.id](mailto:ari.rahman@universitaspertamina.ac.id)

activities expose tourists to a range of potential hazards, from marine accidents to physical injuries on difficult treks. Effective safety measures are not just a regulatory requirement; they are a critical component of the destination's tourist offering [5,6]. Safety measures typically include the presence of hazard signs, adherence to safety standards, provision of first aid for accidents, and dissemination of safety information through various means, including information boards and CCTV surveillance.

The implementation of these safety measures serves multiple purposes. Firstly, they provide a physical means of reducing risk by informing tourists of potential dangers and guiding their behavior in hazardous areas [7]. Secondly, they contribute to creating a perception of safety, reassuring tourists that the destination is well-managed and that their well-being is a priority [8]. This perception is crucial, as it directly impacts tourists' satisfaction and their decisions to recommend or revisit a destination. Importance-Performance Analysis (IPA) offers a strategic approach to evaluating these management measures by assessing their importance to tourists against how well they are perceived to be managed [14]. This analysis helps identify not only how tourists prioritize different safety aspects but also highlights any discrepancies between their expectations and experiences. Such insights are invaluable for destination managers and local authorities, as they allow for targeted improvements. By focusing on areas where performance does not meet tourist expectations, managers can better allocate resources to enhance the efficacy and visibility of safety measures. Furthermore, the role of continuous monitoring and feedback in managing tourist safety cannot be underestimated. Regularly assessing tourist feedback and conducting safety audits helps ensure that the safety measures in place evolve with changing tourist demographics and behaviors. It also aids in promptly identifying new safety challenges that may arise as the destination grows in popularity and diversifies its offerings.

In the context of Nusa Penida, understanding the dynamics of tourist perceptions and experiences related to safety is particularly pertinent. As the island seeks to enhance its appeal and extend its reach in the global tourism market, ensuring a safe environment is foundational. Not only does it safeguard the physical well-being of visitors, but it also secures the island's reputation as a premier destination capable of providing memorable and secure experiences. This understanding underscores the strategic initiatives needed to maintain the delicate balance between promoting tourism and ensuring safety, which together drive the sustainable development of the tourism sector in Nusa Penida. While numerous studies have focused on the importance of safety measures in tourism destinations [8,14–19], there is a notable gap in research specifically addressing how tourists in Nusa Penida perceive the performance of these safety measures. Additionally, there is limited understanding of how these perceptions influence overall satisfaction and intentions to return, given Nusa Penida's unique environmental and adventure tourism offerings. The objective of this study is to bridge this gap by conducting an IPA of various safety measures in Nusa Penida. The study aims to identify discrepancies between the importance of safety measures and their performance. This research will provide actionable insights for local tourism authorities to enhance safety management practices based on these perceptions, ultimately improving tourist satisfaction and promoting sustainable tourism development in Nusa Penida.

## 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. The research begins by identifying specific safety issues through initial consultations 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 [14]). 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.

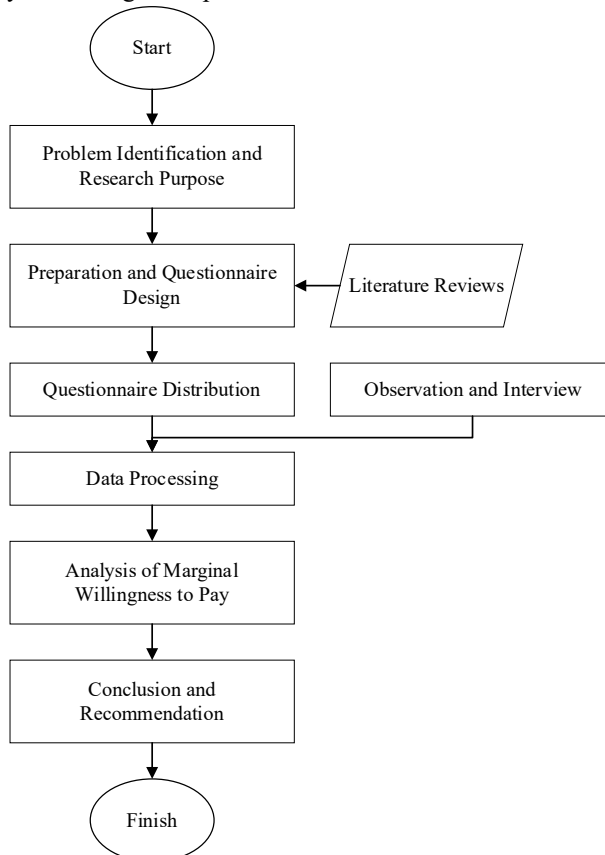


Figure 1. Research methodology

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 ways in which 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**

Table 1 presents a comprehensive analysis of the importance and performance of various safety indicators as perceived by tourists in Nusa Penida. This paired sample t-test analysis is structured to compare tourists' expectations (importance) versus their actual experiences (performance) for each listed safety indicator, including hazard signs, safety standards, accident first aid, information boards, and CCTV. The table displays mean scores, standard deviations, and ranks for both importance and performance, accompanied by t-values and p-values to statistically validate the differences observed between the two dimensions. The methodology involves collecting responses from tourists on how important they perceive each safety measure for a satisfactory visit and how well each measure is executed or maintained in Nusa Penida. The importance and performance of each indicator are then statistically analyzed using a paired sample t-test to determine whether there are significant gaps between what tourists expect and what they experience.

Each indicator is evaluated on a scale, with the mean indicating the average rating given by respondents. The standard deviation shows the variability in responses, providing insight into how opinions on each indicator vary among tourists. The rank orders the indicators based on their mean scores for importance and performance, illustrating priority areas for improvement based on tourist perceptions. The t-values are calculated to measure the magnitude of the difference between the paired importance and performance scores, with associated p-values indicating the probability that these observed differences could occur by chance. A p-value of less than 0.001 in all cases strongly suggests that the differences between importance and performance for each safety measure are statistically significant, highlighting areas where tourist expectations are not being met. This detailed assessment guides local authorities and tourism operators in identifying critical areas needing attention to enhance overall tourist safety and satisfaction. By addressing these gaps, stakeholders can

improve the quality of the tourist experience in Nusa Penida, potentially leading to higher visitor satisfaction and repeat visitation rates.

Table 1. Paired sample t-test of each safety indicators

Indicators	Importance			Performance			t-value	p-value
	Mean	Standard Deviation	Rank	Mean	Standard Deviation	Rank		
Hazard sign	4.700	0.646	2	3.783	1.010	4	6.152	<0.001
Safety standards	4.700	0.530	3	3.533	1.033	3	7.471	<0.001
Accident first aid	4.750	0.474	5	2.750	1.002	5	14.223	<0.001
Information board	4.300	0.696	1	2.900	1.037	2	8.484	<0.001
CCTV	4.767	0.500	4	2.483	1.396	1	11.999	<0.001

Figure 2 presents an IPA grid for safety services in Nusa Penida, which correlates the perceived importance of various safety measures with their actual performance as evaluated by tourists. This grid organizes the safety measures into four distinct quadrants, serving as a visual tool to identify strategic priorities for enhancing safety services based on their importance to tourists and how well they are currently being managed. In Quadrant I, which indicates high importance and high performance, we find hazard signs and safety standards. This quadrant highlights areas where Nusa Penida is excelling, showing that these elements are not only highly valued by tourists but are also effectively managed. Maintaining these high standards is crucial as they are likely to contribute positively to overall visitor satisfaction. Quadrant II is meant to show safety measures that are considered important by tourists but are currently underperforming; however, no safety measures are categorized in this quadrant in the current analysis. This suggests that the most critical elements to tourists are being addressed to some extent, though there might still be room for improvement in managing tourist expectations and delivery service.

Quadrant III includes the information board, categorized as low in both importance and performance. This placement reflects a gap between tourist expectations and actual experience, indicating a critical area for improvement. Enhancing the effectiveness of information boards could significantly improve the visitor experience, as tourists find these boards crucial during their visits. Finally, Quadrant IV contains measures like accident first aid and CCTV, which are high in performance but considered low in importance by tourists. The placement of these measures suggests efficient management; however, they are not prioritized by tourists. This finding points to a potential opportunity to reallocate resources from these well-performing but less critical areas to others that might have a more direct impact on enhancing overall tourist satisfaction and safety perception.

The safety measures in Nusa Penida, particularly hazard signs and safety standards, are crucial components of the tourist experience and are positioned in Quadrant I of the IPA grid. Their placement in this quadrant reflects their high importance to tourists and the fact that their current implementation is meeting or exceeding expectations. These measures represent areas where Nusa Penida excels in safety management, but their sustainability depends on maintaining and continuously improving these high standards. Hazard signs play a vital role in guiding tourists and minimizing risks associated with outdoor activities and environmental hazards [7,19–21]. For sustainability, these signs must be regularly maintained to ensure they remain visible, legible, and relevant to the safety challenges of the area. Changes in environmental conditions, such as coastal erosion or shifting weather patterns, may

necessitate updates to the locations and content of hazard signs. Regular inspections and updates will help avoid issues such as faded, damaged, or misleading signage, which could diminish their effectiveness and erode tourist confidence in safety management.

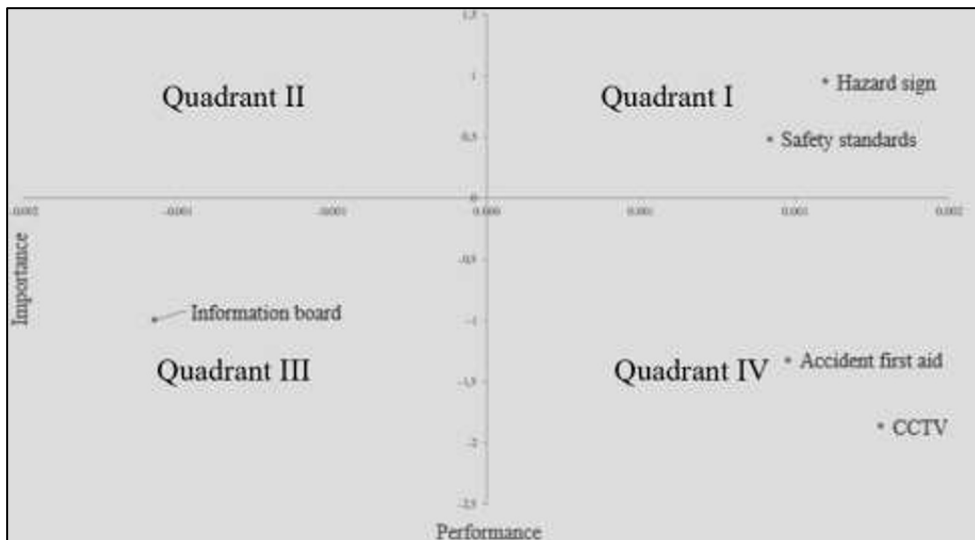


Figure 2. IPA grid for safety service in Nusa Penida

Safety standards, on the other hand, encompass a broader spectrum of protocols and practices that ensure tourist well-being [24]. These include guidelines for emergency response, facility maintenance, and service quality. To sustain the high performance of safety standards, it is essential to continuously align them with evolving best practices and regulatory requirements. For instance, safety protocols might need to account for increasing tourist numbers [19,20], which could place additional strain on existing resources or necessitate adjustments to crowd management procedures.

The Importance-Performance Analysis (IPA) of safety services in Nusa Penida has provided valuable insights into the perceptions of tourists regarding the importance and actual performance of various safety measures. This analysis has identified specific strengths and areas for improvement that can guide local authorities and tourism managers in enhancing visitor safety and satisfaction. In Quadrant I of the IPA grid, hazard signs and safety standards are perceived as both important and well-managed, indicating that the current approaches to these safety measures are effective. This suggests that maintaining these high standards is crucial for continued tourist confidence and satisfaction. The success in these areas highlights Nusa Penida's capability in managing key safety elements that tourists prioritize. Interestingly, no safety measures fall into Quadrant II, which typically identifies critical areas where important measures are underperforming. This absence implies that there are no significant gaps in the most valued safety services, reflecting positively on the overall management of safety in Nusa Penida. However, this does not negate the need for ongoing monitoring and improvement to ensure that all safety measures continue to meet visitor expectations. Quadrant IV includes measures like accident first aid and CCTV, which, despite being well-executed, are not deemed highly important by tourists. The efficient performance of these measures, although they are of lower priority to visitors, suggests that there may be opportunities to reallocate resources from these areas to others that might have a more direct impact on improving tourist experiences. The information board, located in Quadrant III, represents a unique challenge. This quadrant is for measures that are both low in importance and performance. Given the essential role of information boards in

communicating safety information, enhancing the effectiveness of these boards could significantly improve the tourist experience. Improving the visibility, accessibility, and quality of the information provided could transform this underperforming element into a beneficial resource for visitors.

The IPA analysis directly relates to tourist perceptions by comparing what tourists deem important in terms of safety with how well these measures are executed. This comparison reveals discrepancies between expectations and experiences, which can significantly impact overall tourist satisfaction. Understanding these perceptions allows for targeted improvements in safety measures, which can enhance the overall tourist experience. When tourists feel that their safety concerns are adequately addressed, their satisfaction and likelihood of recommending the destination increase. The sustainability of these measures also relies heavily on the capacity of the local workforce and stakeholders who implement and uphold these standards. Training programs that provide regular updates on safety practices and emergency response protocols are crucial [21]. These programs not only enhance the skills of staff but also foster a shared understanding of the importance of safety in preserving Nusa Penida's reputation as a safe and desirable tourist destination. A well-trained workforce can quickly adapt to changes and ensure that safety measures remain effective over time. Community involvement is another critical factor in sustaining the success of these safety measures. Engaging local residents and businesses in safety initiatives can foster a sense of ownership and responsibility for maintaining high standards. Awareness campaigns that highlight the importance of hazard signs and safety protocols can encourage community members to report issues, such as damaged signs or unsafe conditions, and to actively participate in maintaining a safe environment. By involving the local community, safety becomes a shared effort, reducing the burden on tourism operators and authorities. Finally, safety in Nusa Penida must be viewed as part of a broader strategy for sustainable tourism. Effective safety management not only enhances the tourist experience but also contributes to the island's reputation as a safe and attractive destination, encouraging repeat visits and positive word-of-mouth recommendations. This positive cycle can drive economic benefits while reinforcing the importance of investing in safety measures. By sustaining high performance in safety standards and hazard signs, Nusa Penida can ensure that it remains a competitive and responsible player in the global tourism market.

## 4 Conclusion

In conclusion, the Importance-Performance Analysis (IPA) conducted in this study provides critical insights into the perceptions of tourists regarding safety measures in Nusa Penida. By systematically evaluating the importance and performance of various safety indicators, the analysis identifies both strengths and weaknesses in the current safety management practices. The findings reveal that essential safety measures, such as hazard signs and safety standards, are perceived as both important and well-managed, indicating effective implementation. This success is crucial for maintaining tourist confidence and satisfaction, as these elements are fundamental to the overall visitor experience. However, the analysis also uncovers areas needing improvement, particularly in the performance of information boards, which are deemed important but currently underperforming. This gap highlights the necessity for local authorities and tourism operators to enhance communication tools and ensure that safety information is effectively disseminated to tourists. Moreover, the absence of safety measures in the critical underperformance quadrant suggests that the most valued safety services are being adequately addressed, reflecting positively on the overall management of safety in Nusa Penida. Nonetheless, continuous monitoring and improvement are essential to ensure that all safety measures consistently meet tourist expectations.

Ultimately, the IPA analysis serves as a valuable framework for understanding tourist perceptions and guiding strategic improvements in safety management. By aligning safety measures with tourist expectations, Nusa Penida can enhance visitor satisfaction, promote sustainable tourism development, and secure its reputation as a safe and attractive destination.

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