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BRIDGING SUSTAINABLE TOURISM AND DIGITAL MOBILITY: INSIGHTS FROM TOURIST PAYMENT BEHAVIOR AT NGURAH RAI INTERNATIONAL AIRPORT, BALI

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Abstract

This research investigates tourists' Ability to Pay (ATP) and Willingness to Pay (WTP) for online transportation services originating from I Gusti Ngurah Rai International Airport to key tourism destinations across Bali, critically assessing their implications for sustainable tourism development. Adopting a mixed-methods research design, the study collected empirical data through structured surveys administered to 350 domestic and international tourists, complemented by focus group discussions with key stakeholders, including policymakers, airport authorities, and transportation service providers. The findings reveal that although tourists demonstrate moderate to high ATP, their WTP is profoundly shaped by perceptions of service quality, environmental awareness, affordability, and pricing transparency. Notably, tourists who exhibit greater environmental consciousness are more inclined to accept premium rates for eco-friendly transportation alternatives. Stakeholder perspectives emphasize the urgent necessity of embedding digital transportation platforms within comprehensive sustainable tourism frameworks to foster eco-conscious mobility solutions and promote equitable access for a diverse range of visitors. The study asserts that enhancing service quality, establishing transparent and fair pricing models, and systematically integrating sustainability principles into transportation operations are pivotal to reinforcing tourist satisfaction while simultaneously mitigating environmental pressures associated with mass tourism. Furthermore, the research underscores the need for a regulatory environment that supports innovation in digital mobility while aligning with broader sustainability objectives. Strategic recommendations include the development of incentive schemes for sustainable transport operators, the promotion of environmental certifications for digital transport providers, and the implementation of dynamic pricing strategies sensitive to environmental and social impacts. Overall, this study advances the discourse on the role of digital mobility innovations in sustainable destination management and contributes practical insights for policymakers and industry actors striving to align Bali's tourism sector with global sustainability imperatives.

Keywords: Sustainable tourism; Digital mobility; Ability to Pay (ATP); Willingness to Pay (WTP); online transportation.

1. INTRODUCTION

Tourism destinations worldwide are increasingly embracing sustainable development principles to balance economic growth with environmental preservation and community well-being. Bali, as one of Indonesia's most prominent tourism hubs, faces mounting challenges related to overtourism, transportation congestion, and carbon emissions. Mobility solutions, particularly at key entry points such as I Gusti Ngurah Rai International Airport, play a pivotal role in shaping the island's transition toward sustainable tourism. The integration of digital transportation platforms offers an opportunity to enhance tourist mobility while supporting broader environmental and social objectives thus following a sustainable tourism concept.

Prior studies have emphasized that transportation choices significantly affect destination sustainability (Gössling et al., 2021; UNWTO, 2017). Meanwhile, tourist behavior, particularly related to Ability to Pay (ATP) and Willingness to Pay (WTP), has emerged as a crucial determinant for the successful adoption of



sustainable transport initiatives (Whitehead, 2005). However, empirical investigations into how tourists in Bali perceive and financially support online transportation services especially in relation to sustainability values to create a sustainable ecosystem in sustainable tourism development remain limited. This study addresses a critical research gap by examining the financial behavior of tourists toward online transportation services in Bali. Specifically, it investigates how ATP and WTP are influenced by factors such as service quality, environmental consciousness, and pricing transparency, and how these insights can inform sustainable tourism mobility strategies. The purpose of this article is to analyze the Ability to Pay and Willingness to Pay of tourists using online transportation services at Ngurah Rai International Airport, and to explore how digital mobility innovations can be aligned with Bali's vision for sustainable, inclusive, resilient and regenerative tourism development.

2. VIEW OF LITERATURE

2.1 Sustainable Tourism and Mobility

Sustainable tourism has been increasingly recognized as a critical framework to ensure that tourism development meets present needs without compromising the ability of future generations to meet their own (UNWTO, 2017). Central to sustainable tourism is the efficient management of tourist mobility, as transportation accounts for a significant proportion of tourism-related carbon emissions (Gössling et al., 2021). In high-traffic destinations like Bali, where visitor density can strain environmental and infrastructure capacities, mobility solutions must prioritize environmental responsibility, socio-cultural sensitivity, and economic viability. Mobility services are not merely logistical mechanisms; they shape tourist experiences, influence spatial patterns of visitation, and reflect a destination's commitment to sustainability principles (Becken & Simmons, 2002).

2.2 Ability to Pay (ATP) and Willingness to Pay (WTP) in Tourism Services

Ability to Pay (ATP) refers to the financial capacity of individuals to purchase goods or services without affecting their ability to satisfy other essential needs (Julien & Mahalli, 2014). In contrast, Willingness to Pay (WTP) captures the maximum price an individual is prepared to pay for a perceived value, often influenced by subjective factors such as perceived service quality, brand trust, and ethical considerations (Whitehead, 2005). Within tourism contexts, ATP and WTP are essential for understanding consumer behavior toward transportation services, accommodation, attractions, and sustainability-linked initiatives. Previous studies suggest that tourists' WTP increases when services align with their environmental values or when service providers demonstrate a commitment to local community development (Font & McCabe, 2017). Thus, integrating sustainability principles into service design and communication can significantly impact WTP, supporting business viability and destination sustainability simultaneously.

2.3 Digital Platforms and Tourist Behavior

The proliferation of digital platforms has revolutionized the tourism industry by altering how tourists access information, book services, and interact with destinations (Xiang et al., 2015). Online transportation platforms such as Grab and Gojek in Southeast Asia have become integral to the tourist experience, offering convenience, transparency, and flexibility. Studies have shown that digital service adoption among tourists is driven by perceived ease of use, perceived usefulness, and trust in the platform (Mariani et al., 2019). Moreover, the digitalization of transportation services contributes to sustainability goals by enabling optimized ride-sharing, reducing search costs, and promoting better spatial distribution of tourist flows across destinations (Alonso-Almeida et al., 2019).



However, reliance on digital platforms also introduces challenges related to market concentration, data privacy, and the potential exclusion of digitally marginalized groups (Gretzel et al., 2020). In Bali's context, the integration of digital transportation platforms must be assessed not only in terms of technological efficiency but also regarding their alignment with sustainable tourism strategies.

2.4 Online Transportation and Sustainable Destination Management

Online transportation services present both opportunities and risks for sustainable destination management. On one hand, they offer alternatives to private vehicle use, potentially reducing congestion and emissions if designed and regulated appropriately (Sunarta & Saifulloh, 2022). On the other hand, unregulated expansion of digital transport services can exacerbate environmental degradation, disrupt traditional transportation providers, and create uneven economic impacts across communities (Cohen & Kietzmann, 2014). Effective governance frameworks are essential to maximize the sustainability benefits of digital mobility solutions. According to Lane and Kastenholz (2015), regenerative tourism models emphasize transportation systems that not only minimize harm but actively contribute to restoring ecological and cultural systems. For Bali, embedding online transportation within such frameworks is critical to achieving its vision of a low-carbon, inclusive, and culturally sensitive tourism economy.

3. RESEARCH METHODOLOGY

3.1 Research Design

This study employed a mixed-methods research design that integrated quantitative and qualitative approaches to obtain a comprehensive understanding of tourists' Ability to Pay (ATP) and Willingness to Pay (WTP) for online transportation services at Ngurah Rai International Airport, Bali. The combination of quantitative and qualitative data enables triangulation, strengthens the validity of findings, and facilitates deeper insights into complex behavioral dynamics. The quantitative strand focused on statistical analysis of tourist survey responses, while the qualitative strand explored stakeholder perspectives through interviews and focus group discussions (FGDs).

3.2 Population and Sample

The population of this study comprised domestic and international tourists utilizing online transportation services from Ngurah Rai International Airport to various tourism destinations across Bali. A total sample of 350 respondents was collected, including 300 domestic and 50 international tourists. The sampling technique employed was incidental sampling, targeting individuals immediately after their transportation service usage experience to capture accurate and contextually rich responses. In addition, qualitative data were gathered through FGDs involving 15 key stakeholders, including government tourism officers, airport transportation managers, representatives from digital transport platforms (e.g., Gojek, Grab), local community leaders, and tourism sustainable experts.

3.3 Data Collection Instruments

Quantitative data were collected using a structured questionnaire developed based on previous studies on ATP and WTP (e.g., Whitehead, 2005; Font & McCabe, 2017). The questionnaire consisted of five sections:

- Respondent demographic profile

To capture respondent profile and found out general demographic relate to studies which online transportation and their potential to shape mobility in sustainable tourism

- Transportation usage patterns

To discover tourist behaviour in mobility and how often they used online transportation services in tourism destinations



- Perceptions of service quality
To collect data of tourist expectation and need towards services in mobility during their stay in tourist destinations
- Environmental attitudes and awareness
To find out that carbon footprints matter affect tourist behaviour in choosing online transportation services
- ATP and WTP evaluation scenarios (using contingent valuation method - CVM)
To produce the best scenarios in recent data to contribute in developing sustainable to regenerative tourism ecosystem

Qualitative data were collected through semi-structured interview guides for FGDs, focusing on stakeholder perceptions regarding sustainable mobility, tourist payment behavior, and integration of digital transportation within sustainable tourism strategies.

3.4 Data Analysis Techniques

Quantitative data were analyzed using descriptive statistics and inferential statistics. Descriptive statistics (means, medians, frequencies) were employed to summarize demographic profiles, transportation usage behaviors, and basic ATP/WTP metrics. Inferential statistics, including independent samples t-tests and correlation analysis, were utilized to examine relationships between environmental awareness, service quality perception, and WTP. The ATP and WTP values were estimated using the contingent valuation method (CVM) with a bidding game format to determine maximum willingness to pay under various service scenarios.

Qualitative data from FGDs were analyzed using thematic analysis, involving open coding, axial coding, and selective coding to identify key themes related to stakeholder perceptions, challenges, and policy recommendations for sustainable tourism development in context of Digital Mobility especially in Bridging Destination and Tourist towards regenerative so none left behind. These were the key to support not only Sustainable Development Goals but also Zero Carbon Emission thus point of view in each stakeholder will determine the recommendation as a study result.

3.5 Validity and Reliability

To ensure instrument validity, the questionnaire was pre-tested on a small sample of 30 respondents prior to full deployment. Feedback was used to refine wording, sequence, and clarity of questions. Internal consistency reliability was assessed using Cronbach's alpha, with acceptable thresholds (>0.70) achieved for key variable scales (service quality perception = 0.82; environmental awareness = 0.79). For qualitative data, triangulation across multiple stakeholder groups and iterative validation with participants enhanced credibility, dependability, and confirmability of the thematic findings.

3.6 Ethical Considerations

Ethical clearance for the study was obtained from the Faculty of Tourism Research Ethics Committee, Udayana University. Informed consent was obtained from all participants. Anonymity and confidentiality were assured, and participation was entirely voluntary. The study adhered to the principles outlined in the Declaration of Helsinki for research involving human subjects.



4. FINDINGS AND DISCUSSION

4.1 Tourists' Ability to Pay and Willingness to Pay for Online Transportation Services

4.1.1 Demographic Characteristics of Respondents

A total of 350 respondents participated in the survey, comprising 300 domestic tourists (85.7%) and 50 international tourists (14.3%). According to slovin these numbers could represent data for tourists who spent their days in Bali. The gender distribution was relatively balanced, with 54% male and 46% female participants to acquire comprehensive data and deliver recommendations for further policies and development. The majority of respondents (68%) were aged between 25 and 44 years meaning productive ages and representing the most active travel demographic. Educational background showed that 72% held at least a bachelor's degree, indicating a generally well-educated tourist segment to obtain information as data perimeter for analyzing in research and seek out other factors that might come according to survey guidelines. In terms of monthly income, 60% of domestic respondents earned between IDR 3–7 million, while international respondents predominantly reported incomes exceeding USD 2,000 per month. These profiles suggest a relatively high Ability to Pay (ATP) among the surveyed tourists.

Table 1: Respondent Demographics

Indicator
Gender (Male/Female)
Age (25–44 years)
Education (Bachelor's degree or higher)
Income (Domestic: IDR 3–7 million)
Income (International: >USD 2,000)

Source: Survey Data, 2024

4.1.2 Ability to Pay (ATP)

The analysis of ATP revealed that most domestic tourists were willing to allocate between IDR 150,000–250,000 for transportation from Ngurah Rai Airport to their accommodation or first destination. International tourists, however, demonstrated higher ATP, with a majority willing to allocate IDR 250,000–400,000. Those ability to pay for each tourist indicates their baseline of spending in transportation or digital mobility in standard services, meanwhile if we added more services and technology there will be willingness to pay that could help our industry and government to create sustainable tourism ecosystem to be regenerative and use transportation rather than rent for personal usage, as for international tourist would be difficult to adept in new traffic environment and minimize risk factor in the future for major accident



This finding corroborates earlier studies (Julien & Mahalli, 2014) that tourists' ATP is significantly associated with income levels and trip budgets. Notably, a high ATP does not automatically translate into high WTP, especially when tourists perceive a mismatch between service attributes and price levels with their preference more likely to one factor or some factor such as time precisely, safety, convenience, technology, etc.

4.1.3 Willingness to Pay (WTP) and Influencing Factors

Tourists' WTP for online transportation services was influenced by three major factors:

1. Service Quality Perceptions: Tourists with positive experiences regarding reliability, comfort, and driver professionalism exhibited a 20–30% higher WTP compared to those with neutral or negative experiences.
2. Environmental Consciousness: Tourists who identified themselves as environmentally conscious were willing to pay a premium of 10–15% for services marketed as eco-friendly or carbon-neutral.
3. Pricing Transparency: A clear, upfront pricing system increased WTP by approximately 18%, highlighting the importance of trust in online platforms.

Those major factors should be addressed appropriately, ultimately for industries and government to deliver not only excellence services as part of tourism but also protection and clear jurisdiction to help people, industries and other stakeholders to minimize internal conflict and interest. How far these will be important for carrying tourism in sustainable development and regenerative ecosystem answered by Focus Group Discussion for deeper understanding. These findings align with Whitehead (2005) and Font & McCabe (2017), who argue that perceived service quality and value alignment (e.g., sustainability, fairness) critically shape consumer payment behavior.

4.2 Stakeholder Perspectives and Sustainable Tourism Implications

4.2.1 Digital Mobility Integration Challenges

Through focus group discussions, stakeholders identified several challenges to embedding online transportation within sustainable tourism frameworks that might affect future development if we concern and seriously plan to sustainable tourism in regenerative way:

- Regulatory Gaps: Current policies inadequately regulate digital transport operations, leading to price wars, over-saturation of drivers, and environmental inefficiencies. There should be a clear and structural regulation from the highest to the lowest along with sustainable conceptualization to every government body and strict monitoring and evaluation continuously to adept and transform towards tourist behaviour and tourism sensibility.
- Lack of Sustainability Certification: No formal sustainability accreditation exists for digital transportation providers in Bali, limiting tourist awareness and decision-making. Certification could be a factor that could increase excellence in services and build trust which lead to human capabilities enhancement which is a foundation to create sustainable tourism development. Furthermore evaluation for sustainability certification was a must to keep it on track without intervention and interest then quality would be advancing
- Community Displacement Risks: Local traditional transport providers (e.g., airport taxis) face disruption, raising concerns over social equity. These could lead into conflict in people as host if not treat seriously among stakeholders to discover a solution that could benefit both party and create coexist partnership to challenge global disruption and resilience



These concerns mirror those found in the literature regarding digital platform economies and sustainability (Gretzel et al., 2020).

4.2.2 Opportunities for Enhancing Sustainability through Digital Transport

- Despite challenges, stakeholders acknowledged the significant potential of online transportation services to advance sustainable mobility goals:
- Optimized Ride-sharing: Platforms can enable pooled rides, reducing per capita emissions.
- Data-driven Mobility Planning: Digital platforms provide rich mobility data that can inform infrastructure and policy development.
- Incentivization of Eco-Friendly Options: Dynamic pricing models can be employed to reward low-emission vehicle use or shared rides.

4.2.3 Strategic Recommendations

Based on findings from tourists and stakeholders, the following strategies are proposed:

- Develop eco-certification programs for online transportation providers in Bali and give incentive programs to attract eco-certification in industries.
- Implement dynamic, demand-based pricing that reflects sustainability values (e.g., discounts for low-carbon rides) and could adjust as per day to day basis
- Foster collaborations between platform companies, local governments, and community organizations to ensure inclusive, equitable mobility solutions.
- Strengthen regulatory frameworks to balance innovation with sustainability goals with research studies as based then listened to stakeholders for producing a public policy

4. CONCLUSION

This study critically examined tourists' Ability to Pay (ATP) and Willingness to Pay (WTP) for online transportation services at Ngurah Rai International Airport, Bali, and explored their broader implications for sustainable tourism development. The findings indicate that while tourists generally demonstrate moderate to high ATP, their WTP is significantly shaped by service quality perceptions, environmental consciousness, and pricing transparency. Tourists with higher environmental awareness exhibited a greater propensity to pay premiums for eco-friendly transport services, highlighting opportunities for integrating sustainability incentives within digital mobility platforms. Stakeholder perspectives revealed that despite the opportunities presented by digital transportation services to optimize mobility and reduce environmental impacts, substantial challenges persist. These include regulatory gaps, the lack of sustainability certification for transport providers, and risks of exacerbating social inequities among local communities. Strategic interventions—such as eco-certification programs, dynamic pricing models favoring low-carbon options, and stronger multi-stakeholder governance frameworks—are critical to aligning digital mobility with Bali's vision of sustainable, resilient, inclusive and regenerative tourism. This study contributes to the growing discourse on sustainable destination management by illustrating how digital transportation platforms can serve not only as enablers of convenience but also as instruments of sustainability when appropriately regulated and incentivized. It emphasizes the need for integrated policy frameworks that harmonize innovation, economic inclusivity, and environmental stewardship. However, several limitations should be acknowledged. The study's focus on tourists using online transport services immediately upon airport arrival may not fully capture variations in behavior across the entire travel experience. Furthermore, the cross-sectional design limits causal inference between variables such as environmental attitudes and WTP. Future research should adopt longitudinal approaches and expand comparative analyses across different transport modes and destination contexts to deepen understanding. In conclusion, advancing sustainable tourism in Bali demands strategic integration of digital mobility innovations grounded in environmental



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consciousness, service excellence, and inclusive governance. By doing so, Bali can enhance visitor experiences while safeguarding its socio-cultural and ecological integrity for future generations.

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