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Breaking the Gridlock: Can Teman Bus Transform Ubud's Traffic Woes?

Ida Bagus Putu Puja[1], Mahendra Adi Winatha[2], Vithyacharan Retnasamy[3], Putu Ayu Aryasih[4]*
[1]Tourist Travel Business, Politeknik Pariwisata Bali, 80363, Indonesia
[2]Convention Event & Management, Politeknik Pariwisata Bali, 80363, Indonesia
[3]Red Sea Associates Plt, Bukit Bintang, 50450, Malaysia
[4]Tourist Travel Business, Politeknik Pariwisata Bali, 80363, Indonesia

*Corresponding author, email: ibpuja@ppb.ac.id

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ABSTRACT
Traffic congestion in Ubud, Bali, is a significant issue affecting both the quality of tourist experiences and the daily lives of residents. The Teman Bus program, a public transportation initiative, is expected to alleviate congestion by providing a more efficient mass transit alternative. However, the program's implementation faces challenges, particularly regarding the bus sizes that are unsuitable for Ubud's narrow roads, as well as criticism from local residents who feel its contribution to reducing congestion has been minimal. This study aims to evaluate the impact of the Teman Bus program on traffic congestion in Ubud from the perspectives of local residents and tourists. Data were collected through surveys and interviews with Ubud residents and tourists who use the Teman Bus service. The findings indicate that while Teman Bus has the potential to reduce congestion, its effectiveness is limited by the mismatch between bus sizes and road conditions, as well as the lack of awareness and information about the service. Recommendations include the use of smaller buses, improvements to routes and schedules, and enhanced outreach to both local communities and tourists. The study concludes that achieving the goal of reducing congestion requires adjustments to the implementation of the Teman Bus program to better align with the needs of Ubud's local and tourism sectors.

Keywords: Teman Bus; Traffic Congestion; Public Transportation; Ubud; Tourism; Mobility

INTRODUCTION
Ubud, located in Gianyar Regency, Bali, has long been renowned as a cultural, artistic, and tourist hub that captivates both local and international visitors. With its stunning natural attractions, such as lush terraced rice fields, the Monkey Forest, and cultural and spiritual sites, Ubud has become one of Bali's most popular tourist destinations. Additionally, Ubud offers unique travel experiences, including traditional Balinese arts, yoga, and meditation, making it an ideal place for those seeking tranquility. However, alongside the rapid growth of the tourism sector, Ubud faces a serious problem that threatens the comfort of tourists and the quality of life for local residents: increasingly severe traffic congestion.

Traffic congestion in Ubud has escalated in tandem with the growing number of tourists each year. The town center, particularly areas around Monkey Forest Road, Jalan Raya Ubud, and the Ubud Art Market, experiences significant traffic density from private vehicles, online motorcycle taxis, and tourist vehicles. This congestion disrupts traffic flow, worsens air quality, and increases travel times, negatively impacting both visitors and local residents. The once peaceful and serene environment of Ubud is now plagued by noise and air pollution, along with daily challenges for residents caused by worsening traffic conditions. The traffic congestion in Ubud has become an issue that not only undermines the quality of tourist experiences but also affects the well-being of the local community. According to the "Urban Mobility and Climate Change Theory" by McCormick and Gurran (2017), increasing traffic congestion, particularly in tourist destinations, leads to negative externalities like air pollution, which affects both the environment and the well-being of residents.

To address this issue, the Bali local government has launched the Teman Bus program, aimed at providing a more efficient and environmentally friendly public transportation solution. This program is expected to reduce reliance on private vehicles, one of the main

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causes of traffic congestion. Teman Bus offers more affordable mass transportation, potentially decreasing the number of vehicles on Ubud's main roads, thereby alleviating congestion and supporting a more comfortable tourist experience. According to the "Sustainable Transport and Mobility Theory" by Geurs and Van Wee (2018), implementing efficient public transport systems is key to reducing traffic congestion and improving environmental quality in high-traffic areas. However, the implementation of the Teman Bus program in Ubud has not been without challenges and has faced several obstacles that must be addressed to achieve its goals. One of the primary challenges is the size of the buses, which are too large for Ubud's narrow streets, potentially worsening congestion at certain points, particularly in busy intersections. Additionally, limited coordination of routes and schedules reduces the program's effectiveness, as many tourists and local residents are still unaware of the benefits and how to access the Teman Bus service.

Therefore, this study aims to evaluate the extent to which Teman Bus contributes to reducing traffic congestion in Ubud and whether this public transportation solution can support the creation of a more comfortable and sustainable tourist experience. The research will delve deeper into the impact of Teman Bus on the mobility of tourists and local residents, as well as the factors influencing the program's success in addressing Ubud's traffic congestion problems. By doing so, this study will not only provide insights into the effectiveness of Teman Bus as a public transportation solution but also offer recommendations for improving public transportation systems in tourist areas like Ubud. The "Sustainable Urban Mobility Planning (SUMP)" framework (European Commission, 2019) further supports this approach, which emphasizes the integration of public transportation, environmental sustainability, and social equity to address congestion and improve urban mobility in rapidly growing tourist destinations.

METHODOLOGY

This study applies a mixed-methods approach, integrating quantitative and qualitative methods, grounded in Creswell's (2014) framework for mixed-methods research. Data collection involved surveys, interviews, and field observations to ensure a comprehensive evaluation of the Teman Bus program's impact on traffic congestion in Ubud. Surveys were distributed to 100 respondents, including local residents and tourists, to collect quantitative data on satisfaction, awareness, and perceptions. Semi-structured interviews with 20 key stakeholders, such as government officials, community leaders, and bus users, provided qualitative insights into program challenges and opportunities.

Field observations were conducted in key congested areas, such as Monkey Forest Road and Jalan Raya Ubud, aligning with Yin's (2017) case study methodology to gather contextual evidence. Observations included documenting bus operations, road conditions, and traffic flow patterns. This method enriched the study with real-time data to complement survey and interview findings, adhering to the principles of triangulation as emphasized by Patton (1999) for ensuring data validity and reliability.

Quantitative data were analyzed using descriptive and inferential statistics, following the guidelines outlined by Babbie (2020) for social research. Qualitative data were processed through thematic analysis, identifying recurring patterns and insights, as recommended by Braun and Clarke (2006). By triangulating data from multiple sources, the study adheres to rigorous methodological standards, ensuring a robust evaluation of the Teman Bus program's effectiveness in reducing traffic congestion and improving mobility in Ubud.

RESULT AND DISCUSSION

Traffic Congestion in Ubud: Contributing Factors and Impacts

The rapid growth of tourism in Ubud has brought about increasingly complex challenges, with one of the most significant issues being traffic congestion. The surge in the number of private vehicles, including motorcycles and cars, used by both tourists and local residents, is a primary contributor to this problem. Many tourists opt to rent private vehicles or use online motorcycle taxis, which further exacerbates the congestion, particularly along Ubud's main roads, such as Monkey Forest Road and Jalan Raya Ubud. These roads, already narrow and busy, experience particularly heavy traffic during peak hours, resulting in slow-moving traffic and longer travel times. This not only affects the mobility of residents but also significantly impacts the quality of the tourist experience, as it leads to delays and discomfort while navigating the town.

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In response to these challenges, sustainable transportation systems, such as the Teman Bus program, are seen as potential solutions. According to Banister (2018), such systems aim to mitigate negative environmental and social impacts, including reducing greenhouse gas emissions, air pollution, and, crucially, traffic congestion. In Ubud's context, the Teman Bus initiative is expected to alleviate the heavy reliance on private vehicles, thus reducing traffic and pollution. However, the success of this public transportation solution hinges on careful planning and the ability to adapt to Ubud's unique local conditions. For instance, the narrow roads and specific mobility needs of both tourists and locals require that the bus system be designed with consideration for the available infrastructure and the behavior of the population. If implemented effectively, the Teman Bus program could play a pivotal role in improving traffic conditions while promoting sustainable tourism in the area.

Despite the potential benefits, the public's acceptance of the Teman Bus program in Ubud has been lower than expected. Haryanto et al. (2020) emphasize that public perception of public transportation is largely influenced by factors such as comfort, accessibility, and efficiency. If public transportation services meet the mobility needs of the community—providing a convenient, efficient, and comfortable alternative to private vehicles—people are more likely to use them. However, in Ubud, the Teman Bus program has faced challenges in gaining widespread adoption. This is largely due to insufficient socialization, a lack of awareness about the service, and the limitations of the current routes and schedules, which do not yet fully cater to the demands of both tourists and locals. To increase public acceptance, it is crucial to address these issues, ensuring that the Teman Bus service is both convenient and accessible for everyone.

According to Aryasih P.A., e.g. (2024), evaluating the quality of public transport services relies on tourist satisfaction as a crucial metric. The level of satisfaction among public transport users can be gauged by the number of individuals who use public transport. Efficient and effective public transit can enhance the well-being of urban inhabitants, alleviate traffic congestion, facilitate smooth mobility, and simplify access to tourist attractions for visitors. According to Setiawan and Widiastuti (2021), traffic congestion in tourist areas can significantly diminish the overall experience for visitors, which ultimately leads to a decrease in their likelihood of returning to the destination. In Ubud, this issue is particularly evident, as the heavy traffic results in discomfort for tourists and forces them to spend more time stuck in traffic rather than enjoying the cultural and natural attractions the area offers. This not only affects the quality of the visitor experience but also poses a challenge to Ubud's reputation as a peaceful and serene destination. As a solution, the Teman Bus program, an efficient public transportation initiative, is expected to help alleviate congestion by reducing the number of private vehicles on the road. By doing so, it aims to enhance the overall tourist experience, making it more enjoyable and allowing visitors to spend more time exploring the attractions instead of enduring long travel times. In addition, the transportation system in Bali faces significant challenges, particularly in tourist areas like Ubud, where roads are often narrow and congested. Adnyani (2021) highlights the need for a transportation system that takes into account local conditions and the mobility habits of both tourists and local residents. The implementation of public transportation, such as the Teman Bus program, must be adapted to the area's specific needs to avoid exacerbating existing issues. In Ubud, for instance, the narrow streets and the large number of tourists and vehicles create a delicate balance between ensuring accessibility and minimizing congestion. Therefore, the design and operation of the Teman Bus program should carefully consider factors like bus size, routes, and scheduling to ensure that it reduces congestion without causing new challenges, such as traffic jams at narrow intersections caused by large buses.

According to Vuchic, the evaluation of traffic congestion uses the Level of Service (LOS) approach to assess the quality of transportation in supporting the tourism sector. The results of the researcher's observation show that the trip from Monkey Forest Road at 2:00 PM – 4:00 PM local time to the Ubud Market, covering approximately 2.1 kilometers, took 10 minutes, with an actual average speed of 12.3 kilometers per hour. The following are the delays observed during the trip from Monkey Forest Road to the Ubud Market:

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Ideal Travel Time (T_ideal):

$$T_{\text{ideal}} = \frac{D}{V_{\text{ideal}}} = \frac{2.1}{30} = 0.07 \text{ hours} = 4.2 \text{ minutes}$$

Actual Travel Time (T_actual):

$$T_{\text{actual}} = \frac{D}{V_{\text{actual}}} = \frac{2.1}{12.3} = 0.1707 \text{ hours} \approx 10.2 \text{ minutes}$$

Time Delay (T_delay):

$$T_{\text{delay}} = T_{\text{actual}} - T_{\text{ideal}} = 10.2 \text{ minutes} - 4.2 \text{ minutes} = 6 \text{ minutes}$$

LOS Grade	Description	Traffic Conditions	Typical Characteristics
LOS A	Excellent	Free-flowing traffic with minimal delays	High speeds, minimal congestion, no queuing, optimal conditions
LOS B	Good	Slight delays due to increased traffic but still high service levels	Light congestion, vehicles moving at desired speeds
LOS C	Fair	Noticeable delays, but traffic still flows without significant disruptions	Moderate delays, lower speeds, some restrictions on mobility
LOS D	Acceptable	Approaching capacity, significant delays, and slower speeds	Heavy congestion, slow-moving traffic during peak hours
LOS E	Poor	Near full capacity, significant delays and slow speeds	Major delays, long queues, difficulty in moving vehicles
LOS F	Failure	Severe congestion, with traffic moving at very slow speeds or completely stopped	Overcapacity, extreme congestion, long queues, severe delays

Picture 1. Formula Result of LOS

Based on the calculation, the delay time for the trip is 6 minutes, which, on the LOS (Level of Service) scale, falls under the grade F, indicating severe congestion (high density, delay time > 30 seconds).

The traffic congestion in Ubud is a multifaceted issue that stems largely from the area's limited road infrastructure. The central roads, being narrow and often congested, are not equipped to accommodate the high volume of vehicles, particularly during peak tourist seasons. Many of the primary routes in Ubud consist of only two lanes, which becomes problematic when vehicles stop or park along the sides of the road. This blockage significantly impedes the flow of traffic, exacerbating the congestion. Additionally, the geographic constraints and the preservation of traditional architecture limit the feasibility of expanding or constructing new roads. The situation is further worsened by the common practice of tourists parking haphazardly, which narrows the roads even more. This contributes to an overall increase in traffic delays, forcing tourists to spend extended periods in transit instead of enjoying the attractions that Ubud has to offer, which diminishes the overall experience. Not only does this affect visitors, but it also impacts the local community, who are left to contend with air pollution, noise, and the stress of disrupted daily activities due to the constant traffic jams. The narrow, winding roads—especially in the central areas such as Monkey Forest, Ubud Market, and the road to Peliatan complicate matters further. In Ubud, local roads typically have an average width of 3 to 5 meters, while major routes like Ubud Main Road and Monkey Forest Road range from 6 to 8 meters. The introduction of large or medium-sized buses as part of the public transportation system, such as the Teman Bus, can further slowdown traffic if the buses stop at designated bus stops or must navigate narrow turns. Moreover, illegally parked vehicles exacerbate the problem, as buses need more time to pass through these constrained spaces, ultimately worsening the already challenging traffic conditions. Addressing these issues requires a holistic approach that considers the area's unique geographical and cultural characteristics while exploring sustainable solutions for improving traffic flow and enhancing the quality of life for both residents and visitors.

Teman Bus Program: Objectives, Expectations, and Challenges

The Teman Bus initiative is a public transportation program aimed at providing an efficient, eco-friendly, and cost-effective mass transit solution for residents and tourists in various regions, including Ubud. The program seeks to address the chronic issue of traffic congestion by shifting dependence from private vehicles and online motorcycle taxis to buses, thus promoting public transportation as a viable alternative. This initiative underscores local government efforts to establish a more sustainable transportation system, reduce environmental pollution, and enhance travel convenience for both local residents and visitors.

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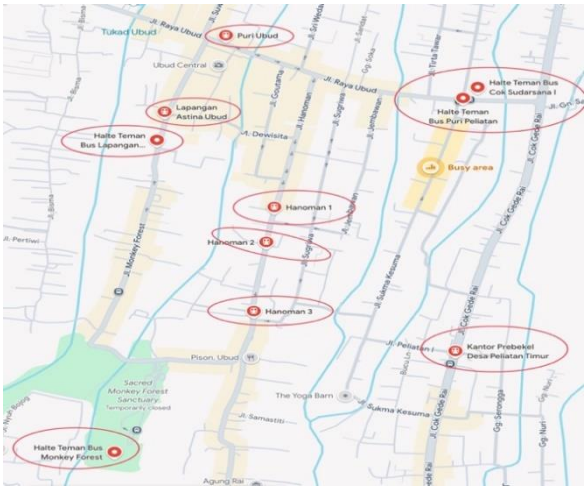
Picture 2. Morning traffic at Jalan Raya Ubud

The rationale behind Teman Bus aligns with established theories in sustainable transportation planning. Banister (2018) posits that urban mobility challenges require a shift toward sustainable transport modes, emphasizing the role of public transportation in reducing environmental impacts and urban congestion. Furthermore, Litman (2021) highlights that effective public transit systems not only alleviate traffic burdens but also contribute to broader societal benefits, such as improved air quality and reduced greenhouse gas emissions.

By introducing the Teman Bus program, the government aims to replace a significant portion of private vehicle usage with buses capable of accommodating a larger number of passengers per trip. This approach is expected to reduce the number of vehicles on Ubud's congested roads, which aligns with the findings of Haryanto et al. (2020). Their research indicates that public acceptance of transportation initiatives hinges on key factors such as comfort, accessibility, efficiency, and affordability. For Teman Bus to succeed, these elements must be prioritized to encourage a behavioural shift among users.

Moreover, implementing the program in Ubud presents unique challenges due to the area's geographic and infrastructural constraints. As Adnyani (2021) notes, the narrow and often winding roads in Ubud, coupled with traditional architectural preservation requirements, limit the feasibility of road expansions. Large buses may exacerbate congestion at intersections or bus stops if not carefully managed. Thus, the program's success depends on designing routes, schedules, and vehicle sizes that are compatible with local conditions.

Beyond its immediate goal of reducing congestion, Teman Bus also addresses broader socioeconomic and environmental issues. Reduced vehicle emissions and noise pollution contribute to a healthier environment, while efficient mobility systems can enhance the overall tourist experience, as highlighted by Setiawan and Widiastuti (2021). By providing a reliable alternative to private transportation, the program supports Ubud's reputation as a serene and accessible tourist destination.



Picture 3. Bus Stop Points of Teman Bus in Ubud

The implementation of the Teman Bus program in Ubud faces considerable challenges, reflecting broader issues often encountered in public transportation initiatives. One critical challenge is the size of the buses used in the program. The narrow roads in Ubud, particularly in the city centre, are not designed to accommodate large buses, leading to traffic congestion at busy intersections and disrupting overall traffic flow. According to Adhvaryu and Chaturvedi (2020), the physical infrastructure of a region must align with the type of transportation system implemented to ensure its effectiveness. In Ubud, the mismatch between the bus size and the road dimensions has limited the program's ability to alleviate traffic congestion, with some areas even experiencing worsened conditions.

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Additionally, the limited routes and frequency of the buses pose significant obstacles. The Teman Bus program currently does not serve all key tourist destinations or residential neighbourhoods, excluding many potential users. Research by Litman (2024) highlights that transport accessibility depends on multiple factors, including system connectivity and affordability. In the context of Ubud, the absence of connectivity to critical activity hubs undermines the program's effectiveness.

The restricted schedules and lack of adequate information on routes and timings further reduce the program's appeal. Litman (2021) argues that the success of public transportation depends heavily on its reliability, accessibility, and user-friendly information systems. Without these elements, public perception of the service remains low, discouraging both tourists and residents from opting for the bus over private or informal modes of transportation. Addressing these gaps is essential for enhancing the program's impact and achieving its goal of sustainable urban mobility.

Public and Tourist Perception of the Teman Bus Program

Public and Tourist Perception of the Teman Bus Program
The success of the Teman Bus program heavily relies on the acceptance of the service by the local community and tourists. Based on conducted research, most residents and tourists still prefer using private vehicles or online ride-hailing services, even though the Teman Bus service is available. This preference is largely due to factors such as comfort, flexibility, and time efficiency, which are perceived to be better with private vehicles or ride-hailing services.

Residents tend to be skeptical about the Teman Bus program, as they feel it does not adequately meet their daily transportation needs. Additionally, the relatively large size of the buses and the limited availability of bus stops fail to meet public expectations for convenient and fast transportation. This sentiment aligns with research by Iseki et al. (2018), which highlights that the accessibility of public transportation services, including the availability of stops and frequency of routes, is a critical factor influencing user satisfaction and adoption.

Tourists visiting Ubud to enjoy its natural and cultural atmosphere prefer private vehicles, as they provide greater freedom in determining travel times and destinations. This is consistent with findings from studies such as those by Litman (2021), which emphasize that convenience and flexibility are key determinants of tourist transportation choices, especially in regions with dispersed attractions or limited public transport options.

It is important to note that while the Teman Bus program has not yet been fully embraced by the community and tourists, there is significant potential to increase their participation if certain aspects of the program are improved. More intensive outreach about the benefits and usage of the Teman Bus, coupled with enhancements in service comfort and reliability, can increase public and tourist participation in utilizing this public transportation system. For instance, Mouwen (2015) suggests that improving the perceived quality of public transport, such as reliability, punctuality, and cleanliness, can significantly boost user satisfaction and attract more riders.

Furthermore, adopting digital tools such as real-time tracking apps and integrated ticketing systems could address concerns about convenience and accessibility, as supported by studies like those of Cats et al. (2016), which show that technological innovations in public transport systems enhance the user experience and increase ridership. By incorporating such improvements, the Teman Bus program can better cater to the diverse needs of its users, ultimately contributing to reduced traffic congestion and a more sustainable transportation ecosystem in Ubud.

Social, Economic, and Environmental Impacts of Traffic Congestion in Ubud

Traffic congestion in Ubud has far-reaching effects, touching every facet of life for residents, businesses, and tourists. To address these challenges, it is essential to examine the social, economic, and environmental consequences in depth and propose actionable solutions grounded in evidence-based practices and literature. Traffic congestion significantly deteriorates the quality of life for Ubud's residents. Noise pollution, coupled with constant exposure to vehicle emissions, has been linked to heightened stress levels and adverse health outcomes, including respiratory and cardiovascular issues (Babisch,

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2008). Residents living near traffic hotspots, such as Monkey Forest Road or Ubud Market, often have trouble in conducting their daily activities due to blocked roads and limited mobility. Furthermore, the congestion hinders community interactions and reduces social cohesion. Ubud's cultural vibrancy, deeply tied to its communal events and local gatherings, suffers when traffic makes participation in these activities inconvenient or inaccessible. A socially inclusive transportation system, therefore, is imperative for preserving Ubud's cultural identity.

The economic implications of traffic congestion are equally alarming. Ubud, a renowned tourism hub, risks losing its appeal if transportation inefficiencies persist. Tourists who face delays or uncomfortable travel conditions are likely to shorten their visits or explore alternative destinations. Goodwin (2004) emphasizes that a seamless travel experience is critical for maintaining a destination's competitive edge in the tourism market. Local businesses reliant on high tourist turnover, such as restaurants, handicraft stores, and wellness centers, also bear the brunt of congestion. Additionally, the delays caused by traffic jams result in productivity losses for residents, many of whom rely on timely transportation for their livelihoods. A report by Litman (2010) underscores that such inefficiencies can translate into significant economic costs for urban areas.

Environmental consequences of congestion are among the most pressing concerns. Traffic stagnation exacerbates carbon dioxide emissions, contributing to climate change and degrading local air quality. Research by the Intergovernmental Panel on Climate Change (IPCC, 2014) indicates that the transportation sector is one of the largest contributors to global greenhouse gas emissions. In Ubud, the narrow roads and high vehicle density magnify these impacts, leading to visible smog and reduced air quality. This not only affects public health but also diminishes the natural beauty that draws tourists to the area. Implementing sustainable transportation systems like electric buses under the Teman Bus program could drastically cut emissions, aligning with global sustainability goals.

One of the critical challenges in Ubud is its infrastructural limitations. The town's road network, characterized by narrow lanes and traditional architecture, struggles to accommodate modern transportation demands. Large buses under programs like Teman Bus often exacerbate congestion on these roads, as highlighted by Pojani and Stead (2015) in their study of urban transport challenges in developing regions. Upgrading Ubud's infrastructure while preserving its cultural and architectural heritage presents a unique dilemma. Expanding roads may not always be feasible, making innovative solutions like introducing dedicated bus lanes or small electric shuttle services more practical alternatives.

A significant hurdle in reducing congestion is changing public and tourist behavior. Most residents and tourists perceive private vehicles and ride-hailing services as more convenient and reliable than public transportation. Beirão and Sarsfield Cabral (2007) note that public perception of service quality, convenience, and accessibility plays a crucial role in transport system adoption. To overcome these barriers, it is essential to enhance the reliability and frequency of public transport services like Teman Bus. Clear communication about routes, schedules, and benefits can help shift public attitudes. Offering incentives, such as discounted fares or priority travel lanes, may further encourage adoption.

Innovative and sustainable solutions are vital to mitigate the impacts of traffic congestion in Ubud. Ewing and Cervero (2010) highlight that investments in public transportation infrastructure yield multiple benefits, including reduced congestion, improved air quality, and enhanced urban livability. For Ubud, integrating small electric buses into the Teman Bus program could address the town's narrow roads while offering a greener alternative. Additionally, developing a comprehensive mobility plan that incorporates pedestrian-friendly pathways, bike-sharing programs, and traffic management systems can complement public transportation initiatives. Such a holistic approach aligns with the Sustainable Development Goals (United Nations, 2015), particularly Goal 11, which advocates for sustainable cities and communities. Addressing Ubud's congestion crisis requires collaborative efforts among local governments, private sectors, and community stakeholders. Public engagement in planning and decision-making processes ensures that the proposed solutions are contextually relevant and widely supported. Creutzig et al. (2015) emphasize that inclusive urban planning is critical for achieving long-term sustainability in transport systems.

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CONCLUSION

The issue of traffic congestion in Ubud represents a complex challenge with significant social, economic, and environmental implications. The town's limited infrastructure, coupled with the overwhelming influx of tourists and increasing vehicle numbers, has created a situation where the local roads are unable to accommodate the growing demand for transportation. The congestion not only diminishes the quality of life for residents but also hampers the tourism industry, a crucial component of Ubud's economy. Furthermore, the environmental impact of this congestion, including increased emissions and pollution, exacerbates the broader global issue of climate change.

Efforts such as the Teman Bus program are a promising step towards addressing these issues. The primary objective of Teman Bus is to reduce traffic congestion by providing a viable alternative to private vehicles and ride-hailing services. However, the program faces several challenges, including the suitability of bus sizes for Ubud's narrow roads, limited routes and frequencies, and resistance from the local community and tourists who prioritize convenience, comfort, and flexibility offered by private transport.

Despite these challenges, there is still a substantial opportunity to improve the program's effectiveness and increase public participation. A key element in addressing these barriers is improving the infrastructure, such as creating dedicated lanes for buses, expanding bus routes to include more tourist spots and residential areas, and ensuring that services are reliable and accessible. Moreover, enhancing public awareness through targeted campaigns about the benefits of public transportation, combined with better service offerings, can lead to greater acceptance of Teman Bus.

In the long term, Ubud must adopt a more integrated and sustainable urban mobility approach, which includes not only enhancing the public transport system but also promoting non-motorized transport options, such as walking and cycling. The environmental benefits of reducing reliance on private vehicles are clear, contributing to the reduction of carbon emissions and improving air quality. Furthermore, by reducing traffic congestion, Ubud could once again strengthen its position as a leading cultural and tourism destination while improving the quality of life for both locals and visitors. Ultimately, the success of Teman Bus in Ubud hinges on collaboration among the local government, private sector, and community members. A comprehensive and forward-thinking urban mobility strategy, which incorporates sustainable transportation solutions, can address the challenges posed by traffic congestion while also supporting Ubud's broader goals of environmental sustainability and socio-economic development. By learning from global best practices and tailoring solutions to the unique needs of Ubud, the town can make significant strides towards becoming a model of sustainable tourism and urban mobility in a rapidly changing world.

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DECLARATIONS

The authors declare no conflict of interest related to this research.

ETHICAL APPROVAL

This research was conducted in accordance with ethical guidelines and received approval from the appropriate ethics committee.

INFORMED CONSENT

Informed consent was obtained from all participants involved in this study.

DATA AVAILABILITY

The data supporting the findings of this study are available upon request from the corresponding author.

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