



Integrated Planning of Park-and-Ride Facilities and BRT-Based Public Transport Services (Case Study of Campus Parking Optimization at Udayana University in Denpasar City)

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ABSTRACT: One aspect that has not been considered in the process of transforming public transportation or angkutan umum (AU) in the Metropolitan Sarbagita area of Bali is integration, specifically physical integration (integration with walking, biking, and park-and-ride). We propose a framework for integrated parking planning at the University of Udayana (UNUD) campus in the city of Denpasar as an informal park-and-ride (PR) integrated with existing AU, specifically the Trans Sarbagita corridor 2 (City-GWK) which passes through the Denpasar and Bukit campuses in the Badung district. Integrated public transportation services are an attractive new form of service that combines fixed route services with responsive on-demand services. The goal of this study is to identify users of the PR at the UNUD campus and investigate their motives, demand, and preferences towards this option. In this paper, a comprehensive background is provided to describe the issues and challenges related to AU operations, directing research into the area of untapped issues by specifically discussing all the steps that must be taken when implementing an integrated approach at the operational and policy level towards sustainable mobility, transportation equity, and door-to-door services.

KEYWORDS: Integrated public transportation, sustainable mobility, door-to-door service, park-and-ride, Trans Sarbagita.

INTRODUCTION

The University of Udayana is the largest university in Bali, ranking 22nd nationally (edu rank, 22) and continuing to grow towards becoming a world-class university. This growth has been anticipated since the 1980s with the massive construction of infrastructure facilities since the 1990s, including the development of buildings, laboratories, and other supporting facilities for smooth learning and teaching, focused on the Bukit Jimbaran campus (BJC), which is approximately 15 km from the Sudirman campus in Denpasar (SCD). Additionally, the development of tourism in the BJC area is rapid, with Garuda Wisnu Kencana (GWK) only about 3 km from the campus area, which is a destination for foreign and domestic tourists visiting Bali.

The impact of tourism development and the number of University of Udayana students, currently with 35,835 undergraduate students, comprising of 19,153 male students and 16,682 female students, has caused traffic in this area to become congested and filled with private vehicles, particularly motorcycles. The distance of only ± 15 km must be traveled in 1 to 2 hours.

Steps that are mode-shifting oriented from the use of one passenger to public transportation and non-motorized modes have been carried out both by UNUD itself by providing buses for employees and lecturers to the public transportation transformation carried out by the Bali provincial government based on bus rapid transit (BRT). However, these efforts have not yet borne fruit, as seen from the low number of passengers. Like most cities in Indonesia that receive bus assistance plus a buy-the-service (BTS) program, the public transportation system has not yet developed as expected. This is particularly related to the essential element that should place "rapid" in the bus rapid transit (BRT) route, but the bus route is physically mixed with transportation that makes it impossible for the bus to avoid congestion, thus making the public transportation take longer than private vehicles. In the short term, a dedicated lane is still not possible because the Sarbagita metropolitan area has formed in such a way, land clearance is difficult and the cost of land clearance is very expensive, especially in the tourist destinations or daerah tujuan wisata (DTW). So, it seems that actions for transportation improvement often make it overwhelming and there is uncertainty about how far public transportation services should be improved to be effective in reducing the use of cars.

The government of Denpasar previously implemented a strategy to combine paratransit services such as city transport (angkot) as an important feeder for the evolution of the BRT project, however, perhaps due to lack of funding this service did not continue. Two post-graduate student groups led by I Gusti Agung Ratih and I Kadek Andre Wisnu Kusuma conducted in-depth interviews with residents of Ubud, Gianyar Bali, to understand how the Trans Metro Sarbagita, a BRT system, changed their mobility patterns, and



how they interact with mass transit services. Because BRT systems are typically planned and implemented within the framework of existing urban and transportation systems, it is the responsibility of the BRT to integrate with those systems, particularly at major hubs. The implementation of an integrated transportation system shows that there are still many missing links and barriers in each attribute.

Traffic congestion and pollution in urban areas and tourist destinations (DTW) caused by private vehicles have become unwanted problems. To address these issues, a series of studies have proposed transportation alternatives such as PR systems and integrated public transportation services that combine fixed route services with responsive on-demand services. (Perpres No.51), [2], [3], [4], [5], [6], [7], dan [8] The studies suggest the importance of integrating various modes of transportation, such as walking, biking, public transportation, and PR systems.

The park-and-ride (PR) system as an alternative transportation option provides a possibility for private vehicle users to utilize the facilities to switch to more sustainable modes of transportation such as public transportation. The main emphasis of this study is on the Trans Sarbagita corridor 2 (Kota-GWK) public transportation mode, but it is also important to consider private transportation modes. These are generally considered as competition with public transportation (this applies especially to private cars) but can also complement each other (e.g., walking to the bus stop, driving to PR/SCD facilities). Where the organization of the BRT network along with other networks allows for maximum integration. Other modes and networks that can be connected to BRT include: intermodal (transfer), public transportation outside of BRT (school buses, taxis, gojek, etc.), cycling (bikeways, public bicycles), walking (pedestrian, building connections, crossings, bridges).

Currently, the only feasible and short-term option is the integration of various modes of transportation. Without an integrated approach, these modes fail to complement each other and instead compete, resulting in poor and inefficient performance of the transportation system [9]. We propose a framework for integrated parking planning at the University of Udayana (UNUD) campus in Denpasar as an informal PR system integrated with existing public transportation, specifically the Trans Sarbagita corridor 2 (Kota-GWK) which passes through the SCJC in the Badung district. The integration should be logical from the perspective of the entire system, with the objectives of 1) increasing accessibility and coverage while avoiding duplication of services, and 2) making the journey as short as possible in terms of both time and distance while minimizing the number of transfers. The purpose of this study is to identify the users of the informal PR by exploring the travel mode preferences of the academic community of UNUD who use the SCD as a kiss-and-ride or park-and-ride facility, including students living near the BJC when public transportation mode (i.e., the Sarbagita bus) as one of the options, and to investigate their motives, demands, and preferences towards this option. One parameter to determine whether a mode shift to more sustainable transportation has been made is by using travel time efficiency. Data collection is done using a stated-preference survey-based questionnaire method. The survey includes a number of attributes such as travel time, waiting time, number of mode changes, time to reach public transportation and time to reach destination, frequency of arrival, and traffic congestion time.

LITERATURE REVIEW

A. Overview of Public transport Integration

The development of transportation networks typically leads to the creation of corridors through spatial concentration of flows along the core axis and integrated public transportation networks combining various modes of transportation to maximize ease and efficiency for passengers in terms of time, cost, comfort, safety, accessibility, and ease. Historically, efforts to improve integration have focused on major metropolitan areas, where demand for public transportation requires the provision of frequent and reliable services. And BRT systems are usually planned and implemented within the framework of existing urban and transportation systems, with responsibility on the BRT to integrate with such systems, especially at key nodes. In rapidly developing cities, where many systems are planned and applied at the same time, these systems need to be coordinated to reduce redundancy and maximize synergy across modes. At these key nodes, and where the systems intersect and make sense to connect the systems and modes, multimodal facilities may be required. However, these facilities often have large sites in the urban context, creating design challenges.

From the customer's perspective, various types of transportation are meaningless. They are mainly interested in ease of use, from transfer (integration) to payment to destination. The widespread use of private cars can partly be explained by no transfer, only one payment (fuel), and one can drive anywhere at any time. For transportation to compete effectively, it must meet the same demand – as comfortable as possible. Integrating across modes helps achieve this.



The comfort of transfers will affect customers' decisions to take a particular mode or trip. This comfort depends on two main things – the wait time for the next service and the physical connection, including level changes, walking distance, and the transfer atmosphere (such as being protected from rain, climate control, etc.). Customers are willing to transfer if the frequency of connecting services is high, and then customers are guaranteed a short wait time, and if the transfer process is easy. Therefore, the design of intermodal facilities is crucial in achieving successful integration.

Park-and-Ride and Kiss-and-Ride Facilities

The development of park-and-ride (PR) facilities provides safe parking for vehicles in garages or parking lots. Kiss-and-ride facilities provide pick-up and drop-off services for customers in proximity to the entrance. In Bali, there are currently no formal PR facilities. However, the Sudirman campus can be considered an informal PR due to its role as a gateway not only to the Sudirman campus, but also to the Bukit campus. Many students and faculty members use supplementary modes of transportation to travel to and from the campus. The kiss-and-ride and park-and-ride facilities are multimodal facilities that accommodate the transfer of students and faculty. The volume of Sarbagita passengers using the Sudirman campus has been increasing, thus redesigning the parking facilities to function as kiss-and-ride and park-and-ride facilities is necessary to enhance service for passengers and their escorts/drivers.

Other examples in Bali, such as the Kuta parking lot, are also park-and-ride facilities [1], (or incentive parking) is a parking facility for a series of travel activities intended to park private vehicles or large vehicles such as buses in a predetermined place, then continue the journey by using public transportation, smaller tour buses.

In 1997, the Central Parking Kuta was established by a decision of the district head. This location is strategic as it is located in the center of the Kuta tourism area, providing easy access to travel destinations in Bali, particularly the beaches of Kuta, Legian, and Seminyak, which are only 10-15 minutes away. The Central Parking Kuta also features a supermarket, affordable accommodation options, and a Food Court Center that offers a variety of Indonesian food with free wifi. It is also a suitable location for a short rest during a long journey. During peak holiday seasons such as Eid al-Fitr and Christmas, this facility is often crowded with buses from outside of Bali. If these buses enter the informal PR facility, severe traffic congestion will occur in the Kuta, Legian, and Jimbaran areas. Therefore, it is expected that bus drivers will comply with parking regulations in this area. A Park and Ride facility typically provides ample connections to public transportation, allowing passengers to reach the city center by leaving their vehicle and then switching to a bus, a rapid transit or commuter rail system, or carpool for the remainder of the journey. They are commonly located on the outskirts of cities or metropolitan areas or in the outer ring of major cities. The term "Park and Ride" is abbreviated as "P+R" on road signs in the United Kingdom.

B. Physical Integration

The physical integration of public transportation aims to make the inter-modal transit system accessible to all users by reducing discontinuities within the system. Physical integration (or spatial) refers to efforts to place various parts of the transportation system together. This typically occurs at stations, but also takes place in other locations within the network. Examples include taxi stands outside of bus terminals, pedestrian connections directly linking stations to adjacent buildings, stations serving various bus and train lines, and bike paths along BRT routes. The first priority for physical integration within BRT networks, essentially a prerequisite for good system design, is with the pedestrian and cyclist environment around stations, terminals, or multi-modal facilities.

Pedestrian Facilities Integration

The provision of pedestrian facilities is a crucial component of sustainable public transportation systems [7]. The key component of BRT planning and design is the provision of safe, comfortable and secure pedestrian access. If it is difficult to walk to a BRT station, customers will be reluctant to use the system at all.

This includes three key stages of pedestrian access [10]: (1) the distance from the surrounding area to the corridor; (2) crossing the corridor to access the station; and (3) circulation within the station. An effective pedestrian access plan addresses each of these stages of the journey. Neglecting any one of these stages can make the system inaccessible to a significant portion of its potential customer base.

In some cases, this involves a shift between walking and public transportation: a strong substitution may exist between the use of buses and walking for trips around 1 to 2 kilometers [11]. The best way to evaluate the quality of the pedestrian environment is by putting oneself in the position of the user. Are the sidewalks leading to the station/stop well-maintained and easily traversable? Are



they wide enough to accommodate existing and projected passenger volumes? Are they safe at night? Are there clear signs indicating the way to the station/stop? Are there logical pedestrian connections between the station/stop and key destinations such as shops, schools/campuses, and workplaces? Can someone in a wheelchair use them comfortably?

Bicycles and Pedicabs Integration

The integration of bicycles and pedicabs as complementary modes to the BRT system serves to expand its reach and accessibility. Whether privately or publicly owned, they serve as a crucial link in the transportation chain. Travelers make mental calculations based on time, available modes, cost, and familiarity with different modes. There is a certain distance that is more time and cost efficient for a cyclist to continue to their destination without the use of public transportation. A comprehensive infrastructure and bicycle parking system allows individuals to make informed decisions.

C. Information Integration

The advancement of technology helps facilitate the integration of information and make travel through the city easier. Having static information about how to connect to other modes at stations helps customers complete their journey. Even just mapping existing services can be revolutionary in terms of helping customers understand how to make and plan trips. Having digital information available to customers, through Google maps using standards data such as GTFS, or through apps such as Bus Buddy or Where Is My Transport, helps customers plan and make better decisions about how to reach their destinations.

The intermodal facilities are the result of a deliberate transportation planning that connects the operational characteristics of one mode with another. This enables customers to transfer between BRT services and access other mode services. It is the 'interwoven' compatibility and matrix of scheduled services, communicated through an integrated system of information, both static (such as schedules and maps), and dynamic (i.e., real-time information about approaching vehicles), and the use of integrated tickets which helps determine the level of transfer and success of intermodal stations. Additionally, the presence of online transportation affects travel behavior [6]

D. Fare Integration

Integration of fare payment across various transportation systems is beneficial for both patrons and the system. For customers, it makes it easier to use the entire transportation system by simplifying the way customers pay for the services or allowing for easy transfer or switching between modes. It also can assist with regional integration, as fare integration can help bridge jurisdictional boundaries.

E. Collaborative Regional Government (PEMDA) and UNUD for AU sustainability

The issues and complexities of public transportation in the metropolitan area of Sarbagita are not only the responsibility of the government or operators but also the community. Recently, a phenomenon has emerged that prioritizes the unpopular face of public transportation among the public. UNUD has been exploring ways to help. In this study, we propose a collaborative scheme involving park-and-ride services (UNUD) that are related to public transportation (PEMDA). It is assumed that commuter users with the goal of working/studying at the Bukit campus will park their vehicles at the Denpasar campus and take the Trans Sarbagita bus to the Bukit campus.

Selection of transportation mode

People travel from their origin address to the destination with several choices of public transportation services to reach their destination; which will require some walking and waiting to complete the journey. Many UNUD students, lecturers, and staff have choices of transportation mode they will use, whether it be taxi/grab, motorcycle, or car. The environmental benefits of UNUD's informal PR and the AU system will be realized if a portion of them is drawn to the AU.

UNUD Campus Parking Management at Denpasar city

Parking is often considered as a major issue for the UNUD academic community. Meanwhile, parking issues at the Denpasar campus are addressed through mediocre parking facility measures compared to building infrastructure facilities. Although the policy for undergraduate program should be conducted at Bukit campus, but there are still many teaching and learning activities conducted in the Denpasar campus such as proposal/thesis examination, seminars, workshops, guest lectures, and other activities, as the space for



these activities is built in the Denpasar campus. As a result, most public transportation users do not get a parking spot or are stuck in a loop of hope in finding a parking lot. In response to these steps, parking in the Denpasar campus area, especially for work (faculty) or classes (students) where changing the destination is not an option, seem to be the most acceptable solution for many of them. Therefore, it requires a study of its users as the first step towards implementing effective informal PR transportation policies for the UNUD community.

UNUD Campus as Informal Park-and-Ride

Informal park-and-ride spaces are often just transit stops where motorists regularly drive their cars and leave them parked on the street or on an adjacent property. UNUD's park and ride operation, although equally informal, is not illegal parking because it is provided for UNUD lecturers, staff and students. However it needs higher regulatory facilities providing a safer environment for users and a more identifiable transit presence. Informal park-and-ride sites can be close to the main service destination or very far from it. The key to their formation is convenient access. There has been no public investment in park-and-ride facilities in Bali. Personal investment is possible, but unlikely.

F. Design Consideration

Design and Implementation outlines the most common design considerations during the planning of a park-and-ride facility. These include: [12] • Types of parking required. • Characteristics of parking facilities. • Urban and landscape design elements. • Passenger amenities. • Electrical systems and utilities. • Safety and security systems. • Wayfinding signage and markers. • Vehicle and access variables. [13] describes in detail all the steps to be taken when implementing the proposed ones leading to the development of an integrated public transport system. By using the VISUM computer-based macro simulation system and its multidimensional – multiparameter comparison with existing solutions. The author's focus on the integration of dimensions: spatial, infrastructure, organizational, economic, and information.

METHODOLOGY

A. Research Flow

The case study in this research is the Optimization of Campus Parking at Udayana University in the City of Denpasar. Therefore, the methodology developed in this section is tailored to this specific case. Figure 1 illustrates the survey method for illustrating the underlying goals and strategies of the informal PR. The overall objectives and strategies of this initiative are identified based on the action plan mentioned above as well as the mobility strategies prior to the integrated assessment initiative. Variables, indicators and parameters are constructed from literature review journals, government documents and the implementation of integrated transportation systems in several countries. To achieve the overall objectives, it is necessary to identify specific actions that are in the planning stage (pre-implementation) that are relevant to the mobility sector. Some of these actions have several sub-actions that are directed at specific streets or areas within the campus and city (only general actions are evaluated, the street-level application of these actions is not explicitly included). General categories for these steps are (A) community relations, (B) motorcycles, (C) public transportation, (D) walking, (E) cycling, and (F) others.

B. Problem Statement

The focus of this research is to optimize the UNUD campus parking as an informal park-and-ride that is integrated with public transportation. Integrating public transportation with private transportation modes has been a challenging task, especially considering that this has not been attempted yet in Bali, in terms of planning and implementation. What has been implemented in the past is the integration of feeder vehicles such as angkot (public minibus).

The integration process highly depends on the specific context of the city, the available transportation alternatives, and the institutional capacity and policy objectives of the intervention implementation. Various efforts have been made by the Bali province

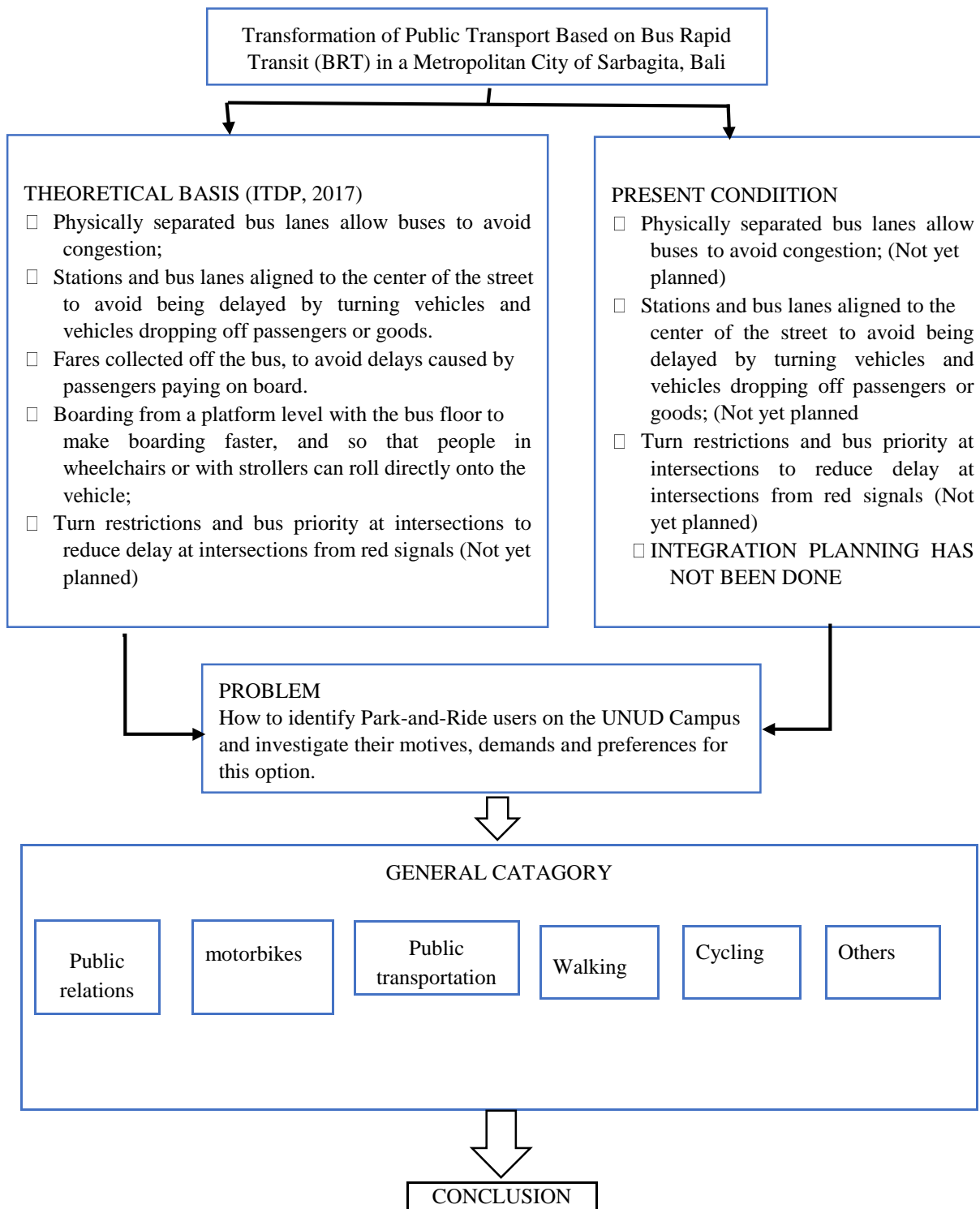


Figure 1. Research Methodology



government, one of which is the provision of free transportation for students and students, which is still in effect and reflected in Regulation Number 112 of 2018 on the fare of TRANS SARBAGITA public transportation in Bali province. As shown in Table 1.

Table 1. Passenger Fares for Trans SARBAGITA Public Transport in Bali Province

No.	Route/lines	Distance (Km)	Once up	
			Public (Rp)	Student
1	Kota – GWK (Garuda Wisnu Kencana) PP	44,50	3.500	0,00
2	Batubulan- Nusa Dua PP	79,00	3.500	0,00

Source: [14]

The problem that challenges the UNUD parking optimization plan for Denpasar City as an informal park-and-ride and forms the basis for the process of integrating pedestrians into bus stops and what infrastructure specifications (parking lots, footpaths) are needed is How to identify Park-and-Ride users on Campus UNUD and investigate their motives, requests and preferences for this option. from a series of parking policies provided by UNUD in developing solutions that are efficient, safe and environmentally friendly to reduce the unwanted impact of private vehicles on the campus area.

C. General category

Service integration policies and practices can fall into two categories, whether they impact directly or indirectly on AU passengers. [12] has identified five main elements that have a direct impact on passengers: 1). Infrastructure, 2). Tariff, 3). Schedule, 4). Information, 5). special events/emergency conditions

Implementing park-and-ride starts with long-term planning—determining how park-and-ride fits into AU's vision of how to attract passengers to its service and its vision of a role in UNUD's societal vision for future land use. Once a potential request has been identified for a park-and-ride facility, planning proceeds with specific project planning for cyclists, pedestrians, air traffic controllers, etc.

RESULTS AND DISCUSSIONS

Although the survey was conducted at several locations in the UNUD parking area in Denpasar, only 29 parking users were successfully identified and interviewed. However, we believe that the small sample size is a consequence of the unregulated PR system. The main purpose of the informal PR users' trip is for work/teaching and studying.

Operational design and formulation with implementation of action plans:

The design of BRT systems must prioritize physical infrastructure and technology to establish a realistic business and operational structure. The operational system of the Trans Sarbagita corridor 1 and 2 is currently managed by the Jakarta Public Transport Company (Perum PPD). There is currently no integration of the ticketing system.

As stated in the methodology chapter, integration is yet to be planned and this study aims to identify the categories that need to be implemented in order to achieve its objectives in future planning. The implementation plan must be evaluated and reviewed continuously. However, the review process must be managed in such a way that it focuses on adjusting the project when new information is confirmed, without reducing the objectives or timeline of the system's implementation.

A. Commuter survey:

Park-and-ride facilities provide facilities for people using public transportation with parking locations, drop-off points, or transfer points. The prototype journey involving a park-and-ride on a Denpasar city campus begins with the user leaving their original location, driving to the park-and-ride facility, parking, getting on public transportation, getting off, and walking to their destination. However, the actual trips of UNUD people who travel involving park-and-ride facilities are very different from this example. Some users are not parked but are unloaded. Some commuters have to move, and others make direct and express trips. The relationship



between parking and public transportation makes PR UNUD Campus a unique form of public transportation. The design and characteristics of park-and-ride facilities on the UNUD campus vary widely. Facilities range from small surface lots to multilevel parking structures and are ideal for transit oriented developments (TOD). The type of public transportation currently is only one small bus with a capacity of only 40 people including standing.

The commuter survey was conducted to assess various attributes related to commuters such as mode choice, travel purpose, opinions on existing parking, distance from bus stop, reasons for not using the UNUD campus parking facilities and suggestions for improving the existing parking management system at UNUD. Based on the interviews conducted, some stated that they did not use UNUD campus parking due to the lack of parking in the Denpasar city campus area. Most of the AU users reach the Sudirman bus stop by walking (65%) without entering the campus area; by kiss-and-ride (25%) without entering the campus area. Only 10% of the commuters use motorcycles and cars that park their vehicles in the Denpasar city campus area, and not all of them use AU but instead carpool with colleagues or friends. This factor reduces the demand for AU and as a result, increases private vehicle travel and congestion. Park-and-ride is a passive travel behavior primarily caused by poor traffic conditions. On the other hand, improving the level of park-and-ride facilities and comfort for boarding the bus will increase the level of park-and-ride utilization.

B. Traveling time

When the new public transportation system was launched, the majority of the academic community at UNUD was enthusiastic about it. However, within a month of its launch, usage began to decline. The main reason for this was the travel time. The reasons for discontinuing the use of public transportation were shorter travel time (78%) and higher comfort. The travel time for users from home to UNUD campus and parking followed by the journey to the bus stop, added with waiting time for the bus to arrive, was often not much different, and often higher, than the normal drive from home to the Bukit campus. Additionally, the bus stops were placed far from the location of the classrooms. The planning for the placement of bus stops followed existing standards, for example, civil engineering students had to walk far from/to the bus stop located in front of the faculty of engineering. Therefore, the majority of the user interactions that include rating transit service, rating location, although fare and parking are free, affect the use of parking facilities. To improve the service of informal PR UNUD, it is suggested to integrate the pedestrian system and parking facilities.

C. Designing and Guessing Park-and-Ride

Once a PR facility is identified, an important aspect is how it will interact with its closest and closest uses. This interaction, in turn, will depend on the facility typology, which describes how the facility is owned, managed, and used. This manual defines the following typologies [15]:

1. Facilities owned by transit agents.
2. Shared use facilities owned by other public bodies.
3. Shared use facilities owned by private or not-for-profit entities.

From this description, PR in SCD includes the second, namely public property, so that it is easier to manage

Building a new park-and-ride facility involves many factors and considerations, such as land availability, capital costs, and maintenance and operation. In addition, AU agents also have the option of entering into a memorandum of understanding with a local public institution, in this case the UNUD, or entering into a less formal agreement, such as a handshake agreement, to secure the use of the parking facility.

CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH

A. Conclusions

Informal park-and-ride (PR) options are used for travel from the UNUD campus in Denpasar city to the Bukit, Jimbaran, and Badung campuses. Although the introduction of the PR system is still new, it is primarily expected to reduce traffic congestion and parking problems at the UNUD campus in both Denpasar city and the Bukit, Jimbaran, and Bali campuses. The explanation and discussion about the implementation of the integrated transportation system show that there are still many missing links and obstacles in each attribute. The partially implemented integrated transportation system will cause commuters to encounter obstacles when traveling from the UNUD campus in Denpasar city to the Bukit, Jimbaran campus and may be the reason why the market share of public transportation in the Sarbagita metropolitan area is decreasing. Moreover, the current public transportation system does not provide



flexibility for users to make daily trips because the options are limited to only corridor 2 that passes through the campus with four vehicles that have constraints and deficiencies because the vehicles are already old. Currently, the fragmented public transportation system has affected inefficient and environmentally unfriendly travel.

Generally, (80%) of users are not willing to park their vehicles in informal UNUD PR due to limited parking. All of this leads to the conclusion that the introduction of the PR system must be preceded by the regulation and control of parking in the UNUD campus area in Denpasar city.

In conclusion, the effectiveness of the informal park-and-ride system at UNUD campus is inadequate. The lack of parking space is a significant factor in the low willingness of users to park on campus, indicating dissatisfaction with the current parking management. The level of awareness of the park-and-ride system among staff, faculty, and students can only be improved by enhancing the service and availability of parking facilities.

Bali is the main destination for tourists coming to Indonesia. Governments and academics have recommended using AU to reduce congestion and support tourism. The mode of mass transportation that has been introduced by the regional government with full support from the central government is the Bus Rapid Transit (BRT) called the Trans Sarbagita south line and Trans Metro Sarbagita for others. UNUD as an academic community does not only discuss or recommend the results of their research but is directly involved in using public transportation and parking their vehicles at SCD and participating in convincing the public to use this mode and maintain it.

B. Suggestions for Further Research

Further research is needed to better understand the transportation choices of students, faculty and staff at UNUD, including the use of ride-hailing services and personal vehicles. To effectively promote the environmental benefits of informal park-and-ride systems and BRT, a comprehensive model should be developed to attract users of cars and motorcycles as the primary goal of the BRT system. This could involve analyzing factors such as travel time, comfort, and accessibility to determine the best strategies for promoting the use of public transportation among different groups of users. Additionally, research should be conducted to better understand the current state of parking management on campus and how it affects the willingness of users to participate in the park-and-ride system.

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Cite this Article: Gede Astawa Diputra, Nyoman Budiarta RakaMandi (2023). Integrated Planning of Park-and-Ride Facilities and BRT-Based Public Transport Services (Case Study of Campus Parking Optimization at Udayana University in Denpasar City). International Journal of Current Science Research and Review, 6(1), 449-458