

Utilisation of the Mitra Darat application to support smart mobility in Indonesia

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Abstract: The government launched the Mitra Darat application (app) as an effort to make public transport journeys easier while increasing the number of public transport users. The effectiveness and user acceptance of this app are important for increasing public transport awareness in Indonesia. This research will analyse how the Mitra Darat app supports smart mobility in Indonesia. In specific terms, this study explores users' perceptions, usage patterns, and engagement by analysing user reviews and application usage trends. User reviews on the Google Play Store were obtained using web scraping. Users' trends were analysed using secondary data on Daily Active Users (DAU) and Monthly Active Users (MAU) obtained from PT Nusantara Global Inovasi, the app developer. The results of the study show that Mitra Darat has opened up the potential for technology-based community mobility management. This app makes it easier for the community to access information on transportation operational services, GPS tracking, vehicle feasibility, and registration for the Mudik Gratis (free homecoming) programme. A detailed analysis of the Mitra Darat application can also inform strategies to improve transportation services in line with the community's needs. To optimise its role in supporting the implementation of smart mobility, Mitra Darat's participation must continue to be improved across both technical aspects and the services provided.

Key Words: smart mobility, public services, public transportation, Mitra Darat application.

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Introduction

As time goes on, the concept that emerges focuses on collaboration between humans and technology to organise cities from design and development to operation, a concept known as smart cities. Besides that, there are also smart city components that come from within the city, namely the community and government as policy makers. The existence of smart cities in Indonesia should improve the lives of Indonesian people and fulfil their

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needs (Damayanti et al., 2024). Implementation of smart city initiatives must take into account the area's size, as each area has different problems and levels of progress (Rachmawati, 2018). Therefore, the implementation of a smart city in an area is usually adjusted to its characteristics (Nuzir & Saifuddin, 2015). The implementation of each smart city dimension within an area is usually tailored to its characteristics. One of the sub-dimensions of the smart city, often implemented in big cities, is smart mobility. It can be one of the dimensions or sub-themes within the smart living dimension, along with other sub-themes such as smart harmony and smart health (Rachmawati, 2019).

In Indonesia, the implementation of smart mobility is closely related to rising population mobility and the increase in motor vehicles (Oktaviastuti & Wijaya, 2017). According to BPS data, the number of motor vehicles in Indonesia increased from 2017 to 2022. Data from 2017 shows that the number of motor vehicles in Indonesia reached 118,922,708 units, while in 2022 it increased to 148,261,817 units. It indicates that the average number of motor vehicles in Indonesia increases by 5,867,822 units per year. Besides, most motor vehicles are private vehicles (BPS, 2024). People tend to feel more comfortable using private vehicles. The increasing number of private vehicle users, without being balanced by improvements in transportation infrastructure quality, has triggered new traffic problems such as congestion, environmental pollution, and increased energy consumption (Azali et al., 2018).

Furthermore, the increase in the number of motor vehicles has become a problem for the economy and health (Oktaviastuti & Wijaya, 2017). Congestion will reduce if public interest in using public transport increases (Kusuma et al., 2024). Public transport use contributes to sustainable development, reducing air pollution from private vehicles and fuel waste (Bhakti, 2024). However, public transport as an alternative to reduce congestion has various obstacles. One of them is the culture of people who prefer private vehicles for comfort (Nur et al., 2024). In addition, unpredictable public transport schedules and a lack of accessible information make it difficult for potential passengers. Access to information is important because public transport connectivity should be readily available so potential passengers can schedule their journeys.

Currently, easy access to information on public transportation has led people to prefer taxis or online motorcycle taxis, which are considered to clearly display travel time estimates and other information (Rasyid et al., 2018). Besides the problem of access to information, low interest in public transportation stems from the greater flexibility of private vehicles. This flexibility encompasses aspects such as time, route, and destination, tailored to the user's trip needs (Pramesti et al., 2024). Private vehicles are considered superior in terms of comfort and safety because trips made in them avoid crowded conditions, unlike those made in public transportation (Bangun & Tamin, 2003). Several aspects influence public interest in choosing a mode of transportation. These include cost, comfort, time, accessibility, and safety. According to Kuntadi's (2025) results, although cost is essential, transportation users prioritise safety.

To increase public transport use, the government must ensure that the public can access it easily (Marsikun et al., 2023). To meet these demands, the Ministry of Transportation provides digital-based public services through the Mitra Darat application. The provision of digital information is also an important aspect in optimising public transport accessibility, alongside the provision of public transport itself (Ode et al., 2024). On the other hand, it must also be effective to ensure that public transport is easily and safely accessible. The effectiveness of the app is crucial, as ease of access to services affects user comfort (Muhamad, 2023). Effective use of the application can certainly improve the quality of public transport services, thereby increasing public interest in using public transport for mobility.

Methodology

Researchers analysed firsthand how the app is used in everyday life. This step also aims to review the application's performance, the completeness and timeliness of the information it provides. The data were collected from the Google Play Store website using a web scraping technique. It is defined as data collection sourced from websites using markup language. Web scraping also means collecting data sourced from the internet (Hermawan & Dzikrillah, 2024). The web scraping process was carried out using Jupyter Notebook, a Python-based data manipulation program. Data retrieval from the Google Play Store requires installing Google Play Scraper, Pandas, and Numpy on the device to be used (Toresa et al., 2024).

The data collected consists of the reviews of the Mitra Darat app on Google Play Store for the period January-December 2024. Several criteria were collected, namely, the score given, the review, and the time the review was issued. The data will be exported in csv format for further processing using Microsoft Excel. The next stage is manual data selection. Data selection aims to avoid irrelevant reviews and ensure that the remaining reviews focus solely on Mitra Darat. Data processing is performed in Microsoft Excel using documents obtained via web scraping. The stages of web scraping data processing include text cleaning, case folding, filtering, stemming, stopword removal, and tokenisation. After that, the data scraping results will be visualised using WordClouds.com. At this stage, it is expected to identify the app's main problems or advantages by analysing the most-discussed topic among application users.

Secondary data in this study refers to the data obtained from the developer, PT Nusantara Global Inovasi. The secondary data collected from the developer includes the number of daily and monthly users of the application, as well as the history of the updates for the period January-December 2024. On the other hand, the researcher also gathered data through a literature review. This stage involves searching for data sources related to the research topic. In this case, the literature study is used to investigate which regions of Indonesia have implemented smart mobility and how it has been implemented, especially in the use of applications.

Results

Daily Active Users (DAU) are users who interact with the application only on certain days or for 24 hours. However, Monthly Active Users (MAU) are calculated based on the number of users over a given period, typically a month (Junaedi et al., 2023). Users who access the application at least once a month are recorded as MAU.

According to Figure 1, the highest DAU of the Mitra Darat application in 2024 were in March and April. The highest average daily user count was also in March, with a peak of 64,943 on 6 March 2024. The number of DAU also increased dramatically in March compared to previous months. In May, the number of DAU dropped sharply from April. Then, slowly increased but tended to decline on certain days, such as Saturdays and Sundays.

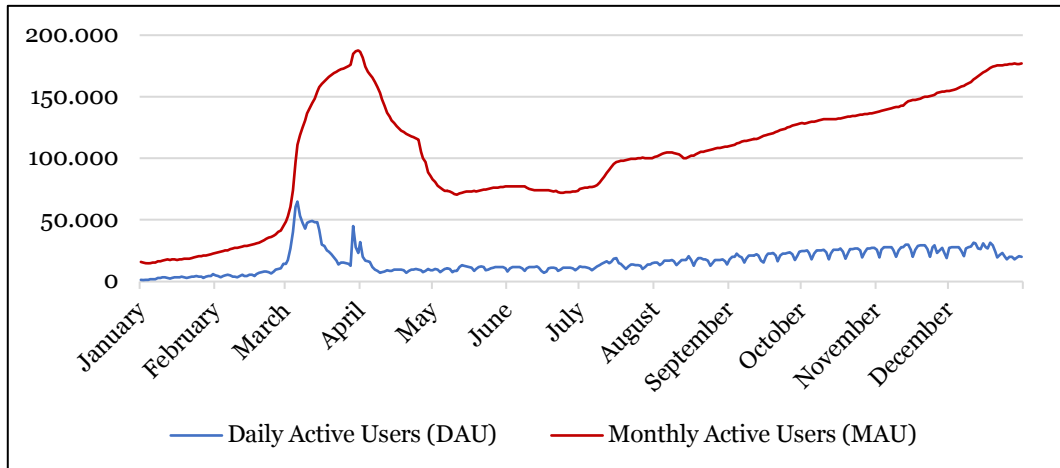


Figure 1. DAU and MAU Growth Rates in 2024
Source: PT Nusantara Global Inovasi (2025)

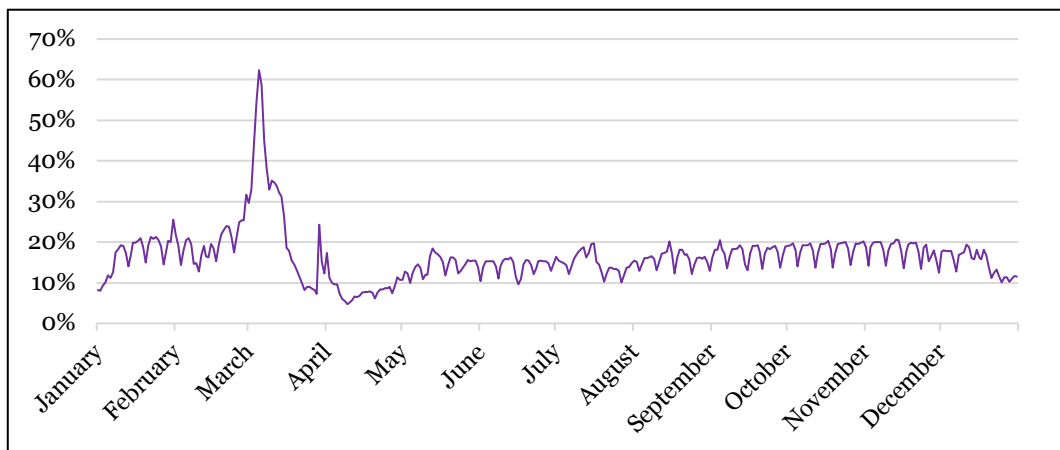


Figure 2. DAU/MAU Ratio Growth Rates in 2024
Source: PT Nusantara Global Inovasi (2025)

The number of MAU also increased around March and April, but declined in May. The highest number of MAU in 2024 was on 30 March 2024 with 186.924 users. From May to mid-July, MAU remained stable. According to the graph, the increase in MAU began in mid-July and continued through December 2024.

On the other hand, the average number of DAU and MAU was at its lowest in January 2024, at the beginning of the year. The average number of DAU in January 2024 was 3,171, while the monthly active user count was 18,187. On the other hand, the comprehensive average number of DAU and MAU in 2024 was 16,730 and 103,378, respectively.

High user interaction with the application in March is shown in Figure 2; the DAU/MAU Ratio reached its highest value at 62,34%. On the other hand, the graph in Figure 3 compares the monthly counts of positive and negative reviews. It is known that the total number of reviews was highest in March and lowest in June. The number of negative reviews rose dramatically in March compared to other months.

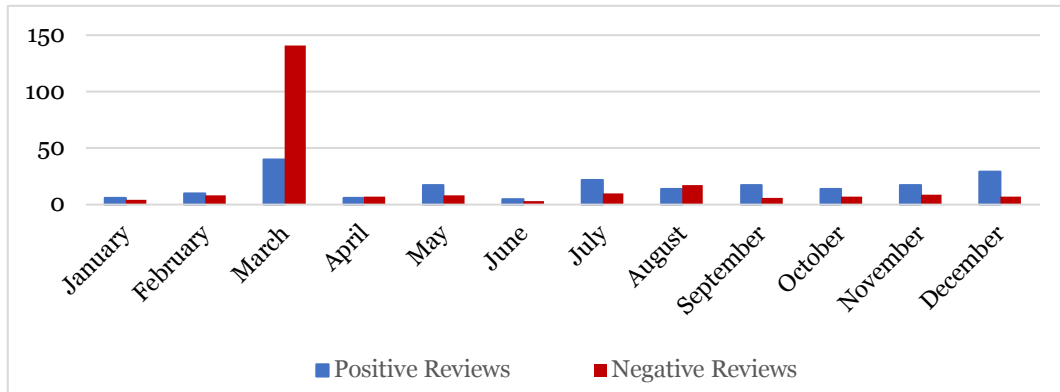


Figure 3. The Number of User Reviews in 2024
 Source: Data Processing using Microsoft Excel (2025)

To understand the factors influencing user satisfaction, a detailed analysis of the application's user reviews is necessary. The scraped review data consists of 197 positive reviews and 227 negative reviews. The review results from web scraping will produce an Excel file containing user names, ratings, the date the review was posted, and a review description. Although ratings usually indicate users' assessments of application performance, the scraping results do not always show this. Reviews with a rating of 5 should be interpreted as indicating good performance, but when viewed in the context of user reviews, not all of them are positive, and vice versa. Therefore, the analysis focuses more on the content of the reviews to assess whether they are negative or positive.



Figure 4. Visualisation Results of Positive Reviews (left) and Negative Reviews (right)
 Source: Data Processing using WordCloud.com (2025)

Figure 4 is a visualisation of the app user reviews using Word Clouds. The visualisation results are classified based on positive and negative reviews. This visualisation shows words with high frequency in user reviews, which also represent aspects that influence user satisfaction with the application. Words with larger sizes represent a higher frequency of occurrence and vice versa. Based on the image, it is known that the 10 words that appear most frequently in positive reviews are “application”, “help”, “bus”, “good”, “can”, “thank you”, “great”, “tracking”, “easy”, and “mitra_darat”. On the other hand, the most frequently appearing words in negative reviews consist of “application”, “mudik_gratis”, “tickets”, “sold out”, “bus”, “navigate to”, “time”, “please”, “enter”, and “error”. Some users feel that

Mitra Darat is helpful and have responded positively. However, there are still some shortcomings in the application that can be optimised. The features available in the application are shown in Table 1.

Table 1. Mitra Darat Application Features

Key Features	Function
Bus Tracking	<ul style="list-style-type: none"> Real-time bus location tracking via GPS, route information, corridors, stops, and fleet numbers Provides fleet arrival notifications in less than 1 minute.
Check Feasible	<ul style="list-style-type: none"> Checks bus eligibility by entering the bus registration number.
Mudik Gratis (Free Homecoming)	<ul style="list-style-type: none"> Facilitates registration for the Mudik Gratis (free homecoming) programme via bus and motorcycle transport, as well as providing information on routes and homecoming facilities (command posts, rest areas, etc.). Provides information on homecoming routes (north, south, goods, toll roads), command posts, repair shops, culinary spots, rest areas, petrol stations, and ATMS.
ATMS	<ul style="list-style-type: none"> Providing a real-time traffic information system showing road capacity and the number of vehicles at intersections.
Additional Features	<ul style="list-style-type: none"> Featuring the latest news from the Ministry of Transportation regarding land transportation. Featuring online maps of the Nusantara BRT, Teman Bus, and BisKita service routes that users can access.

Source: Analysis Results (2025)

Discussions

Application quality assessment is crucial in determining the value of user benefits. User satisfaction, based on their experience with the application, must be explained and analysed as part of a system evaluation (Wulandari et al., 2024). A mobility information provider application must include accurate information on vehicle numbers, travel routes, travel times, locations, and arrival times. The right mobility application also encourages service users to drive more safely while reducing travel time, costs, and pollution (Tae et al., 2024).

The visualisation results in Figure 4 can be used to identify the purposes for using Mitra Darat and the most frequently accessed features. Most users confirm access information on bus schedules, routes and corridors, live GPS tracking, and the Mudik Gratis (free homecoming) programme. The bus tracking feature in the app anticipates that users may experience long wait times or miss buses. This system allows users to review the exact location of the bus and consider it when making decisions (Janarthanam & Santhanakrishnan, 2014). This feature was developed to address limitations in the public transport information system. Prospective service users only know the operational schedule and do not know the exact arrival time of public transport. Bus transportation services themselves do not have actual times for passing through a bus stop. Therefore, the Bus Tracking System (BTS) was developed. This system works by connecting to the bus's actual position, which is then processed by the main server to extract transit information. The work of this system cannot be separated from the Global Positioning System (GPS) (Yudhanta, 2023).

User satisfaction stems from the ability to check bus roadworthiness and access the government's Mudik Gratis programme. These additional features are not specifically aimed at urban bus users, such as BRT and Teman Bus services, but are intended for the general public. Roadworthiness status itself is crucial, as the results of roadworthiness tests represent the technical suitability of vehicles. This status also plays a role in determining whether a vehicle is fit for use. The implementation of roadworthiness tests is also aimed at reducing traffic accidents (Wicaksono & Purnomo, 2023). The Mitra Darat app users feel that the availability of the bus roadworthiness test feature can prevent fraud by irresponsible individuals. In addition, users can be more confident in determining whether the bus they plan to rent has been verified as safe.

Based on how they used it, Mitra Darat app users can be categorised into several criteria. Basic users use the app to find the fleet's location and monitor its operations. These app users may also include active transport users who use public transport as their daily mode of transport. On the other hand, some app users access information even though they do not yet know about fleet operations. This app is not limited to people in certain areas; people from outside the area also find it helpful when planning trips to other areas. The coverage of its users is quite broad, considering that this app integrates various information on services and programmes in Indonesia provided by the Directorate General of Land Transportation.

Users find this application very useful because it helps them access information about public transportation, especially urban buses in Indonesia. The review results also show that satisfied customers feel it helps them plan their trips. Additionally, this application is suitable for people who enjoy travelling by public transportation. Users also feel that the availability of this application allows them to use public transportation more comfortably. Its role in helping service users plan their trips demonstrates that it is part of the Passenger Information System (PIS).

This application is also efficient because users need only one app to access transportation information across different regions. Mitra Darat not only focuses on services provided by the Ministry of Transportation, but also serves as an app that comprehensively integrates other smart mobility support applications at the provincial and city levels in Indonesia. Its ability to provide various services on a single platform aligns with its branding as a super app. Super apps are applications that integrate multiple features. The purpose of releasing a super app is to make it easier for users to access services without having to have several apps (Supardi & Sekti, 2024). Users also find it easy to use and user-friendly. It indicates that Mitra Darat has a simple, easy-to-understand interface. User-friendly implementation of smart mobility contributes to optimising user satisfaction (Alotaibi et al., 2025).

Despite its many advantages, this application still has shortcomings. Based on Figure 3, negative reviews increased dramatically during the Mudik Gratis (free homecoming) programme period. This aligns with the visualisation of negative reviews, which show that user complaints were dominated by issues related to Mudik Gratis. Users found registering through Mitra Darat difficult and kept failing. Then, users found that tickets were sold out before they were opened and quickly filled up. In addition, users found the application difficult to access and experienced inconsistencies in the GPS live-tracking feature. These user reviews indicate that the app is not yet optimal in terms of efficiency and responsiveness. Efficiency in an application is the ability to perform its tasks quickly and easily. An application is effective if users can achieve their goals quickly with minimal effort. On the other hand, responsiveness refers to the app's ability to process the user's requests. These two aspects certainly greatly affect user satisfaction and are interrelated (Fattimah et al., 2024).

Information delays in the Mitra Darat app can also occur for several reasons. The first possibility is the user's signal condition. Network latency can affect the speed at which the app delivers information. Network quality is inseparable from the speed of remote information reception in telecommunications systems. Good network quality is needed so that information, such as data, can be received properly by the receiver (Safitri et al., 2016). In addition, delays in information loading can also be caused by the complexity of data processing in Mitra Darat. High volumes of input data and rapid data access can disrupt app performance, especially during peak hours when service users are at their busiest, or during the Mudik Gratis programme registration period. For example, given the surge in users during the Mudik Gratis registration period, this problem is very likely to occur due to high demand for access to the Mitra Darat app. This phenomenon can cause a server to become overloaded and slow down to the point that it is difficult to access. Server downtime can occur when sudden requests must be served while the server is still busy, leaving it unable to handle user requests. As a result, the server goes down and remains inaccessible for some time (Supramana & Prisma, 2016). Each server has its own capacity to handle users. When user requests surge, adjustments are needed to balance network traffic (Waluyo et al., 2023).

The success of Mitra Darat in supporting smart mobility in Indonesia can also be seen in user engagement levels. Customer engagement is crucial, as high customer participation indicates greater attachment to a service. An increase in the number of applications reflects the application's popularity among the public (Fahimah & Ningsih, 2022). Based on Figure 2, user interaction was very active during the Ministry of Transportation's Mudik Gratis (free homecoming) programme, which ran from March to April 2024. This programme encouraged app users to use the app simultaneously. During the Mudik Gratis period, DAU decreased, while MAU increased. This indicates that the increase in MAU was influenced by temporary promotional effects such as the Mudik Gratis. The programme attracted many new users to access the app at least once a month, but it was not enough to retain users to continue using it. The decline in users could also occur, considering that the Mudik Gratis programme was temporary and had limited quotas. In addition, some users downloaded the app only to participate in the programme, not as regular users. Nevertheless, special programmes such as Mudik Gratis can indirectly serve as a strategy to increase user engagement with Mitra Darat.

A decline in DAU usually occurs on holidays, such as weekends or public holidays. However, the decline in DAU is not drastic. Since July, the daily peak has been approaching a value of around 30,000 users, which indicates adoption by workers or students. This could be because there are sometimes restrictions on bus operations on holidays. On the other hand, the number of DAU on weekdays tends to be stable. People's mobility on weekdays tends to be more active for routine activities such as work, school, or other economic activities. Thus, it can be seen that the number of users can be directly linked to people's movement patterns. On weekdays, the number of users tends to be stable due to the need for transportation to support people's routine activities, whereas on holidays, there is a slight decrease (Fauziah et al., 2025).

Monthly Active Users (MAU) exhibit a fluctuating pattern, with the number starting to decline in April and then increasing consistently from July to December. This condition is a good start toward adopting the application on a wider scale. In this context, although not all users use it every day, more and more are interested in using Mitra Darat to meet their needs. The increase in monthly active users also shows that the app has become part of the management of Indonesia's land transportation system and has the potential to continue growing. This stabilisation indicates that the app is beginning to be used routinely to support daily activities.

In general, this app has greatly helped service users use public transportation, especially government-provided city buses. Mitra Darat allows users to access information on transportation operational services, GPS fleet tracking, vehicle feasibility, and registration for the Mudik Gratis programme. This app is also easy to use, with a simple yet efficient interface that combines various features into a single application. However, it is necessary to optimise its performance based on user reviews so that its development can proceed in line with user needs. An example is adjusting server capacity to ensure it can be accessed easily and accurately, even during peak hours, thereby increasing user satisfaction. In addition, the government and developers can work together to create loyalty policies/programmes that encourage higher user interaction and engagement. This strategy is important for creating a long-term relationship between Mitra Darat and its users. The stage of maintaining customer engagement is crucial once a user is interested in an application (O'Brien & Toms, 2008). On the other hand, the development of smart mobility does not focus solely on transportation and infrastructure, but also on the management of the transportation system itself. Comprehensive transportation system management can increase the intensity of public transportation use among the community (Sukawan & Rachmawati, 2021).

Conclusions

The central and regional governments of Indonesia have pursued the utilisation of ICT in the implementation of smart mobility by releasing various smart mobility support applications. Currently, many apps that provide public transport information at the city and provincial levels have been integrated into the Mitra Darat application. It is an application from the Ministry of Transportation in collaboration with PT Nusantara Global Inovasi (NGI). It was meant to integrate a variety of land transportation services in Indonesia and help users access and plan trips more easily.

The results of this study indicate that Mitra Darat has performed its role effectively as a smart mobility support application in Indonesia. This is reflected in the app's function as a digital platform that facilitates registration for the Mudik Gratis programme. The public also uses this application to access information on transportation operations, GPS fleet tracking, and vehicle feasibility tests. The presence of Mitra Darat can also enhance travel efficiency and comfort, and improve the quality of travel planning to create a better experience when using public transportation.

A detailed analysis of the app can also be part of formulating a strategy to improve transportation services that are appropriate and in line with the community's needs. Through their high levels of user engagement, popularity, reach, and usage patterns, the government may identify the community's mobility patterns using the application. Its use also demonstrates the potential of technology-based community mobility management. However, Mitra Darat's support for smart mobility in Indonesia should continue to improve, both in technology and in the services it offers, to function optimally. The implementation of effective smart mobility is expected to increase public interest in public transport and reduce traffic congestion.

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