

Use Of Mobile-Based Applications in The Services Public Transportation: Route Optimization and Provision of Efficient Services Through Applications (*jalankemana*)

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ABSTRACT

Indonesia has a large and growing population. Rapid population growth has led to increased mobility and the need for transportation to fulfill daily activities. Heavy traffic and congestion that often occurs in various cities in Indonesia are problems that affect the mobility and efficiency of public transportation. The purpose of this paper is to analyze the use of mobile-based applications in public transportation services in optimizing routes and providing efficient services through *jalankemana* applications. The data in the analysis of the use of mobile-based applications in public transportation services in optimizing routes and providing efficient services comes from data taken based on research results. This study used a survey research method, in which data were collected from respondents who were interviewed or filled out a questionnaire. The questionnaire will focus on the urgency related to the need for public transportation in the Yogyakarta area, especially Yogyakarta Muhammadiyah University students. Surveys can be conducted online or through direct interviews with students in Yogyakarta. The results of the study explain *Jalankemana* is a mobile application that provides information and services to assist users in planning trips using public transportation. *Jalankemana* can be a useful application for users who frequently use public transportation to plan their trips more efficiently. This app helps users navigate complex transportation systems, provides up-to-date information, and enables user collaboration to update relevant information.

Keyword: Mobile Application, *jalankemana*, Routes, Public Transportation.

INTRODUCTION

Indonesia has a large and growing population. Rapid population growth has led to increased mobility and the need for transportation to fulfill daily activities, such as working, going to school, shopping, and so on. Population growth and rapid urbanization are increasing the need for efficient public transport that can cope with high mobility within cities.

Heavy traffic and congestion that often occurs in various cities in Indonesia are problems that affect the mobility and efficiency of public transportation. With efficient public transportation, people can get to work, school, shopping centers and other important places easily, even without owning a private vehicle. This facilitates social mobility, expands employment opportunities, and improves quality of life. With reliable public transportation, people can choose to use public transportation rather than private

vehicles. This helps reduce the number of vehicles on the road, reduces traffic congestion and improves travel efficiency. Good public transportation can also help overcome the problem of congestion that often occurs in big cities.

Affordable public transport provides an opportunity for all levels of society to access essential facilities and services. People who do not have private vehicles or are limited in resources can use public transportation as an affordable means of transportation, thereby strengthening social and economic inclusion. A sound and integrated public transport system supports economic growth by facilitating the efficient movement of people and goods. Reliable public transportation allows companies and businesses to operate smoothly, improves market access, and promotes regional economic growth.

Not only that, awareness of environmental issues is

increasing in Indonesia. People are increasingly concerned about the impact of transportation on the environment, such as air pollution and congestion. Therefore, there is a need to develop environmentally friendly public transportation, such as the use of electric vehicles or the development of a rail-based transportation system. Environmentally friendly public transportation is increasingly becoming an urgent need in Indonesia.

LITERATURE REVIEW

2.1. Mobile Application

Mobile applications are software in the form of applications developed using computerized programs to be embedded in mobile devices such as cellphones, tablets and digital watches. Mobile applications are designed to run on mobile devices and can be downloaded through application stores such as the Play Store and App Store. Mobile applications can be created for various purposes, such as to facilitate access to information, simplify business processes, entertainment, and others.

Mobile application development can be done using various types of programming languages, such as Java, Swift, Kotlin, and others. Mobile application development can also be done using a hybrid mobile applications approach, which is an approach that uses a single code that can be implemented on multiple platforms at once. Mobile applications have great benefits for their users, such as facilitating access to information, improving business processes, and facilitating communication between users.

2.2. The Relationship between Human Mobility and the Economy

Human mobility and the economy have a close relationship. The following are some examples of the relationship between human mobility and the economy:

1. Inter-sector and inter-regional mobility of labor can affect economic growth. Socio-economic factors such as the motivation of the population to carry out inter-regional and inter-sectoral mobility or migration in society can influence economic growth

2. Population mobility and socio-economic aspects can affect vehicle ownership in agglomeration areas. Economic growth and tourism in urban agglomeration areas result in increased population mobility and means of transportation. This also has an impact on the trend of vehicle ownership which is increasing every year.

3. Human mobility data can reflect patterns of human movement that indicate human behavior when carrying out their activities, such as walking, driving, working, being in certain public spaces, using public transportation, and others. Data related to human mobility is very important to support restrictions on human movement. Restrictions on human movement can affect economic growth and business activity

4. Mobility of residents and remittances can affect economic growth in an area. The results of the study show that population mobility has a positive and significant effect on Indonesia's economic growth

5. The development of transportation infrastructure can have a positive impact on society such as opening economic opportunities, opening gates to and from other areas, creating jobs, reducing travel distances and travel times, and facilitating the movement of people and goods. Transportation infrastructure development can also support economic growth in an area

6. Economic and social factors can affect the circular mobility of the population. Circular mobility of the population can affect economic activity in an area

In conclusion, human and economic mobility have a close relationship. Human mobility can affect economic growth and business activity in an area. Conversely, economic factors can also affect human mobility in an area. Therefore, it is important to pay attention to the relationship between human and economic mobility in planning infrastructure development and economic policies in an area

2.3. Public Transportation

Public transportation is a passenger transportation service by a group travel system available for use by the general

public, usually managed according to a schedule, operated on a set route, and charged for each trip. Public transportation aims to facilitate people's mobility in carrying out daily activities, such as going to work, school, or tourist attractions. Here are some examples of public transportation:

1. **Bus Rapid Transit (BRT):** BRT is a public transportation system that uses special buses with separate lanes from private vehicle lanes. BRT usually has regular stops and is equipped with an integrated payment system.

2. **Trains:** Trains are one of the most commonly used types of public transportation in Indonesia. The train has a regular schedule and routes that connect with various cities in Indonesia.

3. **Public transportation:** Public transportation is public transportation using vehicles such as minibuses, microbuses, or angkots. Public transport usually has fixed routes and operates within the city.

4. **Ferries:** Ferries are public transportation used to connect the islands of Indonesia. Ferries usually have regular schedules and routes that connect with various ports in Indonesia.

5. **MRT:** MRT is a public transportation system that uses the subway. The MRT usually has separate lanes from private vehicle lanes and is equipped with an integrated payment system.

Public transportation has an important role in facilitating people's mobility and reducing congestion on the roads. In addition, the use of public transportation can also help reduce air pollution and improve environmental quality. Therefore, it is important to support the development of better public transportation in Indonesia.

Public transportation has become a basic need for people in Indonesia. These needs include production, consumption and distribution activities that must be met in a sustainable manner. The availability of transportation services throughout Indonesia is absolutely essential because the strategic function of transportation contributes to stability and continuity of community activities and the

wheels of government. The government continues to strive to provide adequate transportation services and adapt them to the transportation needs of the community. Even so, Indonesia is still late in developing comfortable and integrated public transportation. Improvements to the public transportation system carried out by the Provincial Government of DKI Jakarta have resulted in positive progress, such as placing 46th in the world in 2021. To estimate transportation needs, it is possible to calculate the variables that determine a person's journey, such as distance, time, cost, and mode availability.

METHOD

3.1. Object of research

The object of this research is public transportation in Yogyakarta, especially transportation within the city that reaches the Yogyakarta Muhammadiyah University campus. The strategy used is to make it easier for the community, especially students at Muhammadiyah Yogyakarta University, to access available public transportation by utilizing the *jalanmana application*.

3.2. Research Approach

This research was conducted using a quantitative approach, Arikunto (2006): states that quantitative research is a research approach that uses a lot of numbers, starting from collecting data, interpreting the data obtained, and presenting the results. In a quantitative approach, researchers use systematic and structured methods to collect data in the form of numbers or variables. Data collection can be done through surveys, experiments, observations, or using existing secondary data. The data obtained was then processed and analyzed using statistical techniques to identify patterns, relationships, and significant differences.

The method to be used in this study is survey research, where data is collected from respondents who were interviewed or filled out a questionnaire. The questionnaire

will focus on the urgency related to the need for public transportation in the Yogyakarta area, especially Yogyakarta Muhammadiyah University students. Surveys can be conducted online or through direct interviews with students in Yogyakarta.

3.3. Types of research

This research is a descriptive research, Sukmadinata (2017) states that descriptive research is a type of research that aims to describe or describe existing phenomena in detail and systematically. Descriptive research is a type of research that aims to describe or describe phenomena or characteristics of a population or situation accurately and in detail. This research does not attempt to explain cause-and-effect relationships between variables or test hypotheses, but rather focuses on systematic data collection and descriptive analysis to provide a comprehensive picture of the research subject.

In this study, descriptive analysis of representative sampling techniques for the population studied and applying valid and reliable data collection methods provides ideas in the form of applications that are able to integrate existing public transportation in a city in the form of making roads as a solution for the community to be able to access transportation that is efficient and affordable.



Figure 1. Jalankemana application

3.4. Data Type

This study uses secondary and primary data, where Hidayat (2009) states that secondary data is data collected from studies, surveys, or experiments that have been carried out by other people or for other research. Secondary

data can be obtained from various sources such as government publications, websites, books, journal articles, internal organizational records, and so on. Meanwhile, primary data according to Sugiyono (2016) is data that is directly obtained from the source and given to data collectors or researchers. In this case, primary data was obtained through questionnaires distributed to Yogyakarta Muhammadiyah University students regarding the urgency of public transportation in Yogyakarta, especially the Yogyakarta Muhammadiyah University area.

3.5. Data collection technique

Questionnaire data collection method is one of the methods commonly used in descriptive research. Questionnaires are a series of questions designed to collect information from respondents regarding the research topic. In this method, identification of the problem is carried out, then designing a questionnaire, then starting to collect data by distributing the questionnaire to the target population

3.6. Data Processing Techniques

This research uses data quality checking techniques, namely, it is carried out to check the validity, sustainability, and completeness of the data collected. This involves checking whether all questions are answered, whether the data is valid and consistent, and handling missing or invalid values. Validity tests will be carried out to ensure that the measurement instruments used in the study can measure the variable in question accurately. After the data is processed, the results will be used as the basis for realizing the jalankemana application.

RESULTS AND DISCUSSION

4.1. jalankemana application

JalanKemana is a mobile application that provides information and services to assist users in planning trips using public transportation. This application is planned to be used in various cities in Indonesia, but currently the public transportation needs of Yogyakarta residents,

especially Yogyakarta Muhammadiyah University students.

The image above is the design of the jalankemana application logo. This application uses a blue palette as the main color for the appearance of this application's logo. The image of a person walking represents this application which will guide you to your destination using public transportation. Then this logo is equipped with the words jalanmana? which ends with a question mark as if showing enthusiasm for traveling every day.

JalanKemana can be a useful application for users who frequently use public transportation to plan their trips more efficiently. This app helps users navigate complex transportation systems, provides up-to-date information, and enables user collaboration to update relevant information. On the other hand, the jalankemana application contributes indirectly to protecting the environment because this application exists on the basis of the founder's concern, so that it is easier for people to use public transportation thereby reducing the use of private vehicles which also contribute to pollution in the environment.

4.2. Features Available On the way to where

The features available in the jalankemana application include:

1. Route track feature: users can enter the desired route via maps, like a general direction application.
2. A feature that provides a list of public transportation, this feature will provide a list of any public transportation available on the route that has been entered in the route feature
3. Time adjustment feature, you can plan your trip by entering the departure time in the preferences section.
4. Nominal fare feature, this feature will show the nominal fare available on each public transportation so that users

can adjust which transportation is the most efficient and according to their pockets.

4.3. Where does the Application Mechanism go?

The jalankemana application collects public transportation data from various sources, including transport operators, transport authorities, and user contributions. This data includes stop schedules, routes.



Figure 2. Maps jalankemana application

maps, and other information related to public transportation. Then, the data collected by jalankemana is processed and stored in our database. This process involves data normalization, route mapping, and preparation of

schedules and other related information so that it can be easily accessed by users.



Figure 3. Beranda jalankemana application

Users in this case can carry out trip planning by way of users entering their origin and destination locations, jalankemana applications use complex route planning algorithms to determine the best route using public transportation. This algorithm considers factors such as

schedules, travel time, stops, and required transfers. Once the best route is determined, which way displays information to the user in an intuitive user interface.

Users can view maps with recommended routes, transport arrival schedules, and other relevant information.

JalanKemana provides notifications to users about schedule changes, delays, or interruptions in their trips. This information can be obtained via push notifications in the application or via direct messages within the application. JalanKemana will utilize user contributions to update and improve existing information. Users can provide reports on the actual state of stops, schedules and trip interruptions. This user's contributed data will be verified and entered into the jalankemana system to provide more accurate information to other users.

Integration with third party services, JalanKemana can also be integrated with third party services such as online taxi ordering services. This allows users to see estimated prices and travel time using the service, as well as order a taxi directly from the jalankemana application which will direct directly to the online taxi/online taxi application.

This is the basis used by jalankemana applications to provide public transportation information to users. Through data collection, trip planning, user contributions, and integration with other services, jalankemana helps users plan trips using public transportation more efficiently.

4.3.1. How to display the application

The picture below is the front view when the user opens the JalanKemana application. In the "Enter your destination" column, the user can enter the destination of the trip and the original location will be automatically detected if the user's device turns on the location. At the bottom it is also stated how to use the jalankemana application, in that section because it is still in the

development process, over time it will be replaced with sponsorships, partners, or maybe paid ads. For the time being the usage steps will be put there first. At the bottom it is also stated how to use the jalankemana application, in that section because it is still in the development process, over time it will be replaced with sponsorships, partners, or maybe paid ads. For the time being the usage steps will be put there first.

When the user has entered the route, a display will appear as shown below. At the top the user can manually change the destination and also the location from which the route you want to search for by clicking on the column. After clicking, the user can type the destination or starting location according to the user's travel plans.

Then under the destination column there are time preferences that can be set manually or automatically by the user according to their individual needs. After setting the destination and time, what public transportation can be used on that route will appear along with estimated prices for each public transportation. Users are free to choose which transportation to use and online taxis and online motorcycle taxis will be able to go directly to third-party applications that work with jalankemana so that it makes it very easy for users. Then at the bottom the developer does not forget to give appreciation to the users who have indirectly contributed to reducing environmental damage caused by the pollution of private vehicles in quite a large number in every city.

The use of public transportation is expected to be a solution for climate damage caused by motorized vehicle pollution. Jalankemana is here so that people are no longer confused and complain about how to access public transportation information available in their area.

4.4. The Urgency of Public Transportation in Yogyakarta and Its Impact on the Economy

The Yogyakarta area has very important efficient and inexpensive public transportation, and has a significant impact on the local economy. The following is an explanation of the importance of public transportation in Yogyakarta and its impact on the economy:

1. Increase Population Mobility: If there are good public transportation links in Yogyakarta, it can increase population mobility. With a reliable and inexpensive public transportation system, people can easily access workplaces, schools, shopping centers and tourist attractions. A good public transport system allows people to optimize their productivity and increase their participation in the economy.

2. Reduce Individual Transportation Burden: Inexpensive and efficient public transportation can help people save money. Yogyakarta's public transportation is a cheaper and greener way to travel, as many people in Yogyakarta do not have private cars. The rest of the income can be used for other purposes, such as spending, investing, or saving, by reducing individual transportation costs.

3. Promoting Sustainability and the Environment: One important way to support environmental sustainability in Yogyakarta is by using public transportation. Public transport can reduce air pollution, greenhouse gas emissions, and traffic congestion by reducing the use of private vehicles. This can ultimately have a positive impact on the environment, air, and people's quality of life.

4. Improve Business Accessibility: If there is good public transportation in Yogyakarta, businesses may be more accessible. Markets, business centers and industrial areas can be easily accessed thanks to good and integrated public transportation services. This increases business, investment and employment in Yogyakarta.

5. Tourism Improvement: Reliable and inexpensive public transportation allows tourists to explore various tourist objects and places of interest in Yogyakarta comfortably. Thus, the number of tourists coming will

increase, increase the revenue of the tourism sector, and open up new business opportunities in the fields of hotels, restaurants and other tourism services. On a wider scale, the increase in the tourism industry also helps the local economy.

6. Improved Employment: Cheap and efficient public transport can help people get to work more easily. With cheap public transportation, people have more options when it comes to finding work in various areas of Yogyakarta. This has the potential to increase workforce mobility, create more job opportunities, and reduce geographic differences in the workplace. In the long term, increased accessibility improves human capital, skills and economic growth.

7. Reduction of Traffic and Congestion: It is possible that efficient and integrated public transportation can help reduce traffic and congestion in Yogyakarta. More people can switch from private vehicles to public transport by encouraging more people to use public transport, which will reduce the number of vehicles on the road and the congestion that often occurs.

4.5. SWOT Analysis Where to go application

SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) is a framework used to evaluate internal and external factors that affect an entity, such as a product, company, or project. The following is a SWOT analysis for the jalankemana application:

Strengths (Excess):

- Route Search Feature: jalankemana provides a sophisticated route search feature, enabling users to easily find the best route using public transportation.
- Real-time Information Updates: The app provides real-time information updates about trip schedules, delays and interruptions, providing a more accurate and up-to-date user experience.

- Integration with Third Party Services: jalankemana can be integrated with online taxi ordering services, allowing users to order taxis directly from the application.

Weaknesses:

- Reliance on External Data: which roads rely on data provided by public transport operators and user contributions. If this data is inaccurate or not up-to-date, it may affect the reliability of the information provided by the application.
- Not Available in All Regions: the new jalankemana application is focused on operating optimally in big cities in Indonesia, especially Yogyakarta

Opportunities:

- Partnerships with Transport Authorities: jalankemana can establish partnerships with transport authorities in various regions to gain direct access to official data and increase the reliability of the information provided by the application.
- Additional Feature Development: The app may continue to develop additional features, such as integration with bike sharing services or air pollution mapping, to provide added value to users.

Threats (Threats):

- Competition from Similar Applications: jalankemana faces competition from similar applications that also provide public transportation information services, such as Google Maps, Moovit or Citymapper.
- Changes in Transportation Infrastructure: Changes in the transportation system, such as the opening or closing of lanes, changes to schedules, or the introduction of new technology, can affect the accuracy and reliability of the information provided by the way to where.

This SWOT analysis provides an overview of the strengths, weaknesses, opportunities and threats faced by the jalankemana application. By understanding these factors, the way to take advantage of its strengths and opportunities, while addressing the existing weaknesses and threats to continuously improve service and user satisfaction.

CONCLUSION

5.1. Conclusion

JalanKemana is a mobile application that provides information and services to assist users in planning trips using public transportation. JalanKemana can be a useful application for users who frequently use public transportation to plan their trips more efficiently. This app helps users navigate complex transportation systems, provides up-to-date information, and enables user collaboration to update relevant information. On the other hand, the jalankemana application contributes indirectly to protecting the environment because this application exists on the basis of the founder's concern, so that it is easier for people to use public transportation thereby reducing the use of private vehicles which also contribute to pollution in the environment. The jalankemana application is a solution to the problems faced in order to optimize routes and provide efficient services through:

1. The features available in the jalankemana application are:

- a. Route tracking feature
- b. Features that provide a list of public transportation
- c. Time adjustment feature
- d. Tariff features

2. Mechanism of jalankemana application that collects public transport data from various sources, including transport operators, transport authorities, and user contributions. Then, the data collected by jalankemana is processed and stored in a database so that users can carry out trip planning with complex route

planning algorithms to determine the best route using public transportation. So as to create optimal efficiency and knowledge by users regarding available public transportation.

5.2. Suggestion

The implementation and optimization of jalankemana requires various parties to be involved, it is important for jalankemana to forge more partnerships with third-party services, such as online taxi service providers, bicycle sharing services or related authority applications. This will provide users with ease and flexibility in planning their trips, enabling them to take advantage of the various transportation options available.

Then, as a follow-up to the cooperation that can be carried out by jalankemana, it is hoped that it will continue to expand its area coverage, which will allow users in more cities and regions to access jalankemana services. And can dig deeper into user preferences and habits to provide more personalized and relevant recommendations. For example, by studying a user's travel patterns, Jalanmana can provide suggestions on alternative routes in the event of a travel disruption or take into account user preferences in suggesting suitable transportation options.

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