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Designing System Information DAMRI (Siri) in an Effort to Improve DAMRI Transportation Services User in Bandung

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ABSTRACT

The DAMRI bus or Djawatan Angkoetan Motor Republic Indonesia is one of the mainstays of public transportation for residents in the Bandung area with relatively low costs for the facilities with varied travel routes. The existence of this DAMRI bus is able to help increase the productivity of the community to fulfil needs. However, any of these advantages can be difficult for users of the bus service to obtain due to waiting for a bus for a long time. This is because the number of routes is not as many as other public transportation and there is a lack of information about the bus schedule for each route, so that service users can only guess the arrival time of the bus. This design is carried out by the observation method of collecting data on the experience of DAMRI bus service users through questionnaires, website-based software development methods, and literature reviews. The purpose of this design is to provide convenience to customers in accessing information on DAMRI Bus transportation through their smartphones or computers. The result of this design is a media route schedule information, routes, and costs of each route for users with a minimalist design and easy to understand is also used.

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1. INTRODUCTION

1.1 Background

In this era of globalization, transportation plays a crucial role in connecting cities and even countries. In the highly competitive business environment, particularly in the transportation sector, it has prompted various innovations and new strategies by industry players to maintain and win their business. The primary goal of transportation services is to provide the best possible service to customers in meeting their travel needs, leading people to prefer public transportation over private vehicles (Berechman et al., 2006; Babbie, 1986). Customer satisfaction and comfort have a significant impact on critical aspects such as fostering public loyalty, increasing efficiency and productivity, reducing future living costs, and realizing the country's aspirations in the field of transportation services (Vicente et al., 2020).

Based on the Decree of the Ministry of Transportation of the Republic of Indonesia No. 01/DAMRI/46 dated November 25, 1946, regarding the provision of public transportation services, the Djawatan Angkoetan Motor Republic Indonesia (ER, EYD), commonly known as DAMRI, was established. As it developed into a state-owned enterprise (BUMN), the name DAMRI remained as the company name for the government-owned entity that remains consistent in providing passenger and cargo transportation services.

Information systems are procedural, organized, and systematic applications that are useful in converting raw data into meaningful information to support decision-making and meet information needs (Silitonga and Hasti, 2020).

According to data from the Central Statistics Agency in 2018, there has been an annual increase of 6.88% in private cars and 6.61% in motorcycles. As a result, DAMRI has lost many of its passengers. Therefore, the role of technology is needed to increase DAMRI's users (Dewi et al., 2023). To support the development of DAMRI bus transportation services, technology can be the answer to improving DAMRI's service by utilizing an information system as a data repository and electronically presenting information. This system provides easy access to DAMRI bus transportation information in the Bandung area. It is expected that this system will improve DAMRI's service and increase the number of passengers in the Bandung area.

The DAMRI Bus information system provides convenience to customers in obtaining more comprehensive and efficient information (Sanjaya et al., 2021). Manual data processing poses several challenges, including difficulties in obtaining DAMRI bus route information, knowing the whereabouts of DAMRI buses, and lack of information on arrival and departure times of DAMRI buses (Widayanti et al., 2020). Therefore, the service provided to passengers in terms of information is inefficient and unproductive. Based on these issues, there is a need to develop a system that can facilitate customers in obtaining information. To address the service issues of DAMRI in the Bandung area, a web-based DAMRI Bus Information System needs to be built, allowing customers to easily fulfill their information needs by accessing it through their mobile phones or computers wherever they are.

1.2 Problems

Based on the background, the problem statements are as follows:

1. How to design the DAMRI information system?
2. Can the DAMRI information system help users in accessing DAMRI information?

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1.3 Purpose

The aim of this study is to design an information system that enables customers to easily access information on DAMRI bus transportation through their mobile devices or computers. The main feature of this information system is to determine the nearest bus location and provide estimated arrival time using the Global Positioning System (GPS).

2. RESEARCH METHODS

2.1 Research Place and Time

This research is conducted in Bandung and around areas from April to May, 2020.

2.2 Data Collection Methods

In this research, the data collection methods used were as follows:

a. Observation
   The observation method is a field-based research method where the researcher physically goes to the field to observe the conditions and situations on-site. This observation aims to understand the state of DAMRI transportation and identify the issues faced by DAMRI users. The observation method employed in this research is qualitative observation. Qualitative observation has strengths in terms of specificity, replicability, and generalizability (Trotter II, 2012; Juniardi and Azwansyah, 2014).
b. Questionnaire
   The questionnaire method is a method that involves providing a list of questions to DAMRI users in Bandung. The purpose of the questionnaire method is to gather relevant data according to the actual conditions (Del Greco et al., 1987; Nirmala et al., 2020).
c. Literature Review
   The data collection method is conducted by studying various scientific articles, journal books, and software requirement specifications documents related to or relevant to the research topic. Responses are collected using standardized procedures, making the questionnaire more objective, certainly more so than interviews (Cannell et al., 1981).

2.3 Tools Used in the Development of SIRI

This analysis of requirements is essential for the development of this website. In the design of the SIRI website, several tools are utilized, including WordPress as the content management system, HTML as the primary website layout, CSS for styling and formatting the appearance, and MySQL as the database for data storage. For designing the website interface, the software called Figma is used. As for the hardware specifications used to build this website, they are as follows:

a. Intel i3 6006U Laptop,
b. 2.00 GHz Processor,
c. 4.0 GB Memory,
d. 1 TB Harddisk

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2.4 Data Analysis Technique

Data analysis is the process of collecting and organizing data to be explained and inferred (Thorne, 2000). The data analysis technique employed in this research is inductive analysis, using a fixed comparison method.

To analyze this research, the following steps are followed, as referenced in (Verdinelli and Scagnoli, 2013):

a. Reduction, stage involves selecting relevant information that aligns with the research topic.
b. Data Presentation, involves presenting the collected data in the form of tables, graphs, charts, or descriptions.
c. Drawing Conclusions, final stage of analysys technique involves deriving the essence or main findings from the data.

2.5 Designing Method

In this research, software design, development, and implementation are carried out. To achieve this, a method that follows a systematic, effective, and efficient process is required to ensure good quality in SIRI. Therefore, this research adopts the Waterfall design model. The Waterfall model is a linear development approach that progresses sequentially from the initial planning phase to the final maintenance phase (Nugraha, 2020). Hence, the Waterfall design model aligns with the scope of this research.

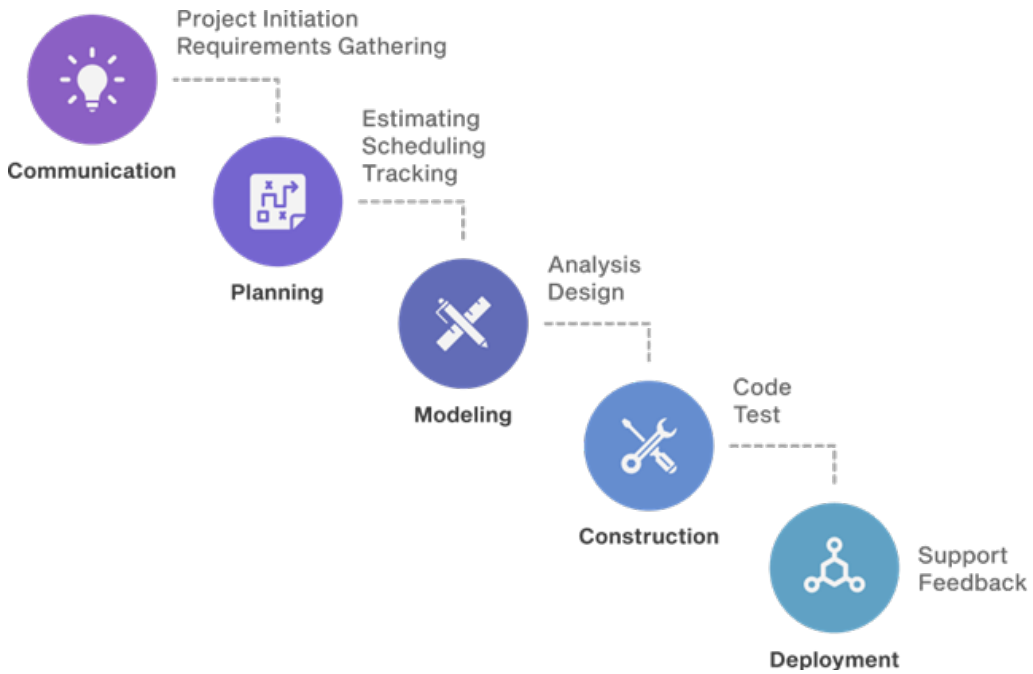

Figure 1. SIRI Waterfall Design Method

3. RESULTS AND DISCUSSION

3.1 Data Analysis Lack of DAMRI Information and Application Functional Needs

Based on the questionnaire results given to 50 respondents who are users of DAMRI transportation services in the Bandung area and its surroundings, it was found that 46% of the respondents experienced difficulty in finding information about DAMRI. The respondents were asked to rate the difficulty level on a scale of 1 (very difficult) to 10 (very easy).

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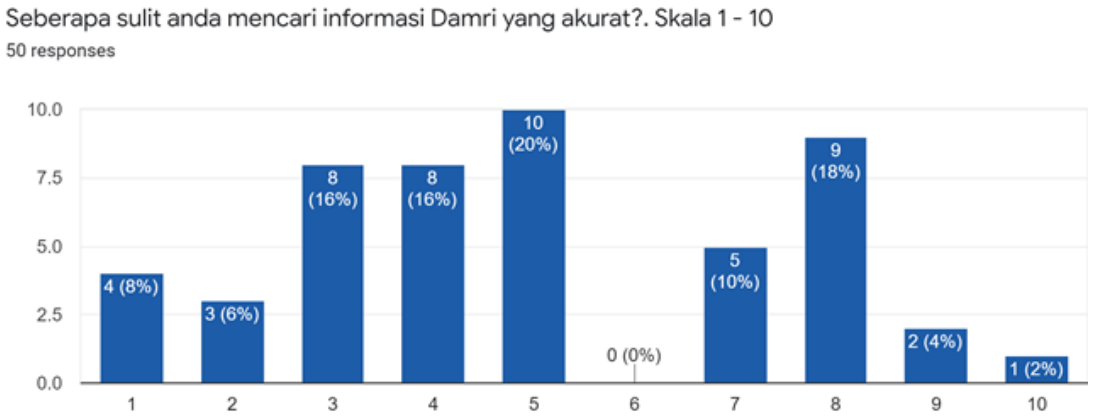

Figure 2. Bar chart of difficulty scale finding accurate information about DAMRI

According to **Figure 3**, users of DAMRI transportation services typically wait for the bus for an average of 15 to 45 minutes.

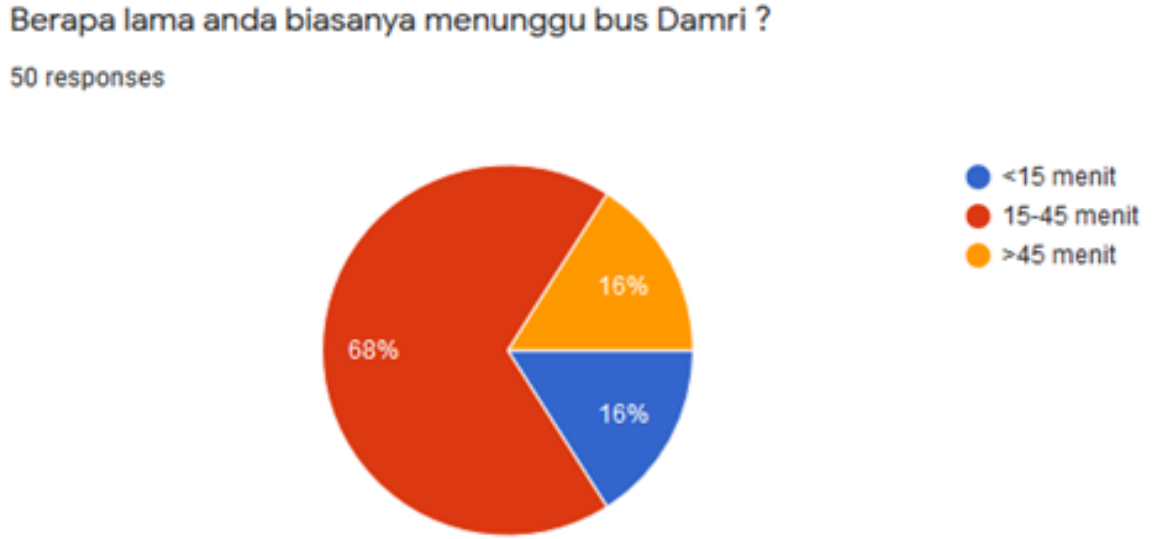

Figure 3. Circle diagram how long users wait for DAMRI buses.

According to **Figure 4**, users feel frustrated with the long waiting time for DAMRI buses, with a scale rating of 1 indicating no frustration and a rating of 10 indicating extreme frustration. The data obtained from the respondents shows that 62% of the respondents feel extremely frustrated due to the long waiting time for DAMRI buses

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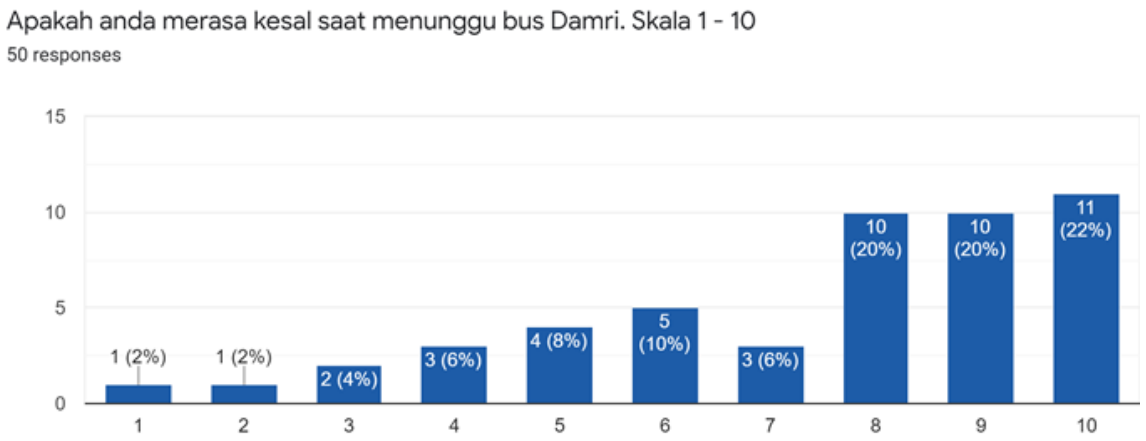

Figure 4. Bar chart of users frustration scale waiting for DAMRI buses

According to **Figure 5**, users feel that they would be helped by a system that provides information about the whereabouts of DAMRI buses. Out of the 50 respondents, 38 of them responded that it would be extremely helpful.

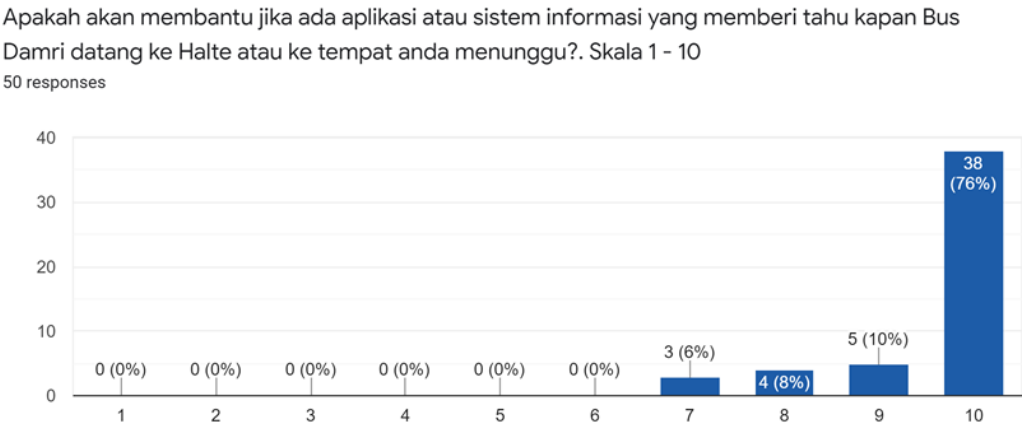

Figure 5. Bar chart scale of how users helped about information on whereabouts of DAMRI buses

Based on the analysis of the questionnaire, the following functional requirements are identified:

a. Schedule and fares for each route.
b. Tracking of DAMRI buses.
c. Departure times and bus availability.

These functional requirements are necessary to maintain customer loyalty. Referring to (Bielen and Deumolin, 2007), when customers are dissatisfied with waiting times, customer satisfaction significantly affects loyalty. In other words, customers must experience a higher level of satisfaction with the service to achieve the same level of loyalty.

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3.2 DAMRI Information System Design

a. Flowchart

Referring to (Hooshyar et al., 2015), a flowchart is a graphical representation used to understand algorithms and programming. It depicts the workflow of a system. Here is a flowchart of the DAMRI information system.

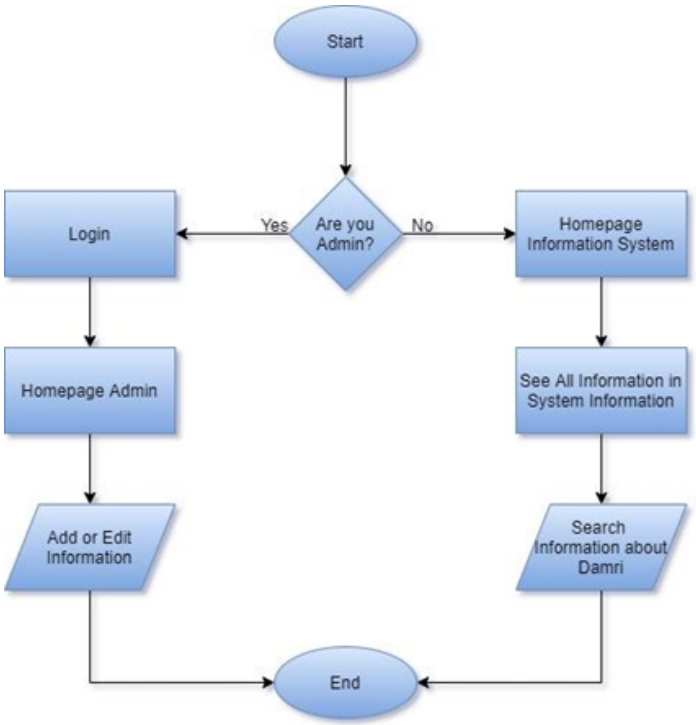

Figure 6. SIRI Flowchart

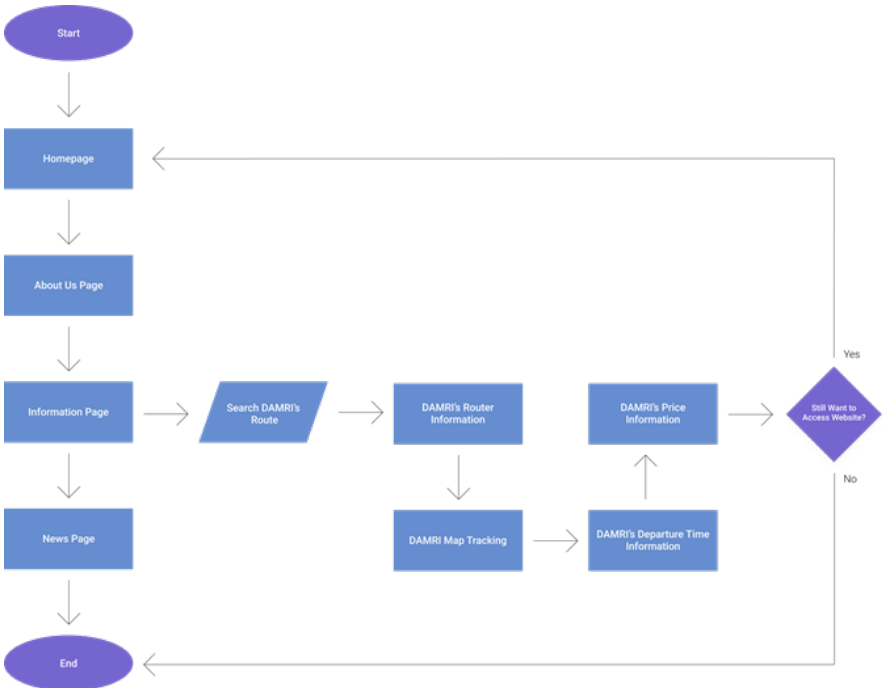

Figure 7. SIRI Flowchart

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b. DFD

According to (Necco et al., 1987), a Data Flow Diagram (DFD) is used to depict an existing system or a new system in terms of data flow and how the data will be stored.

DFD Level 0

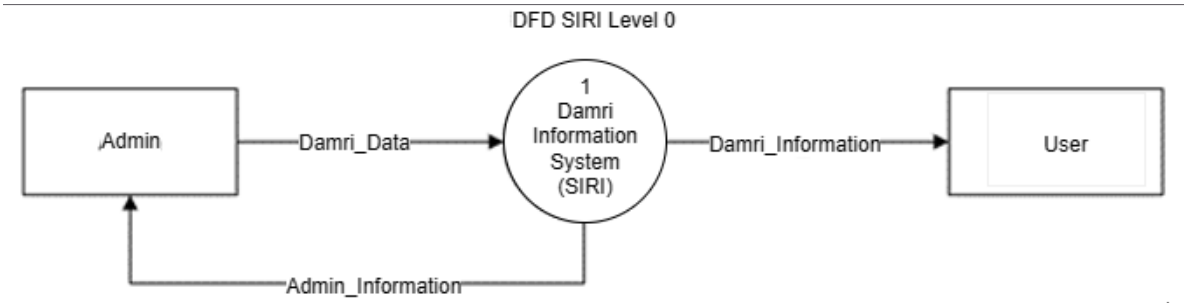

Figure 8. SIRI DFD Level 0

DFD Level 1

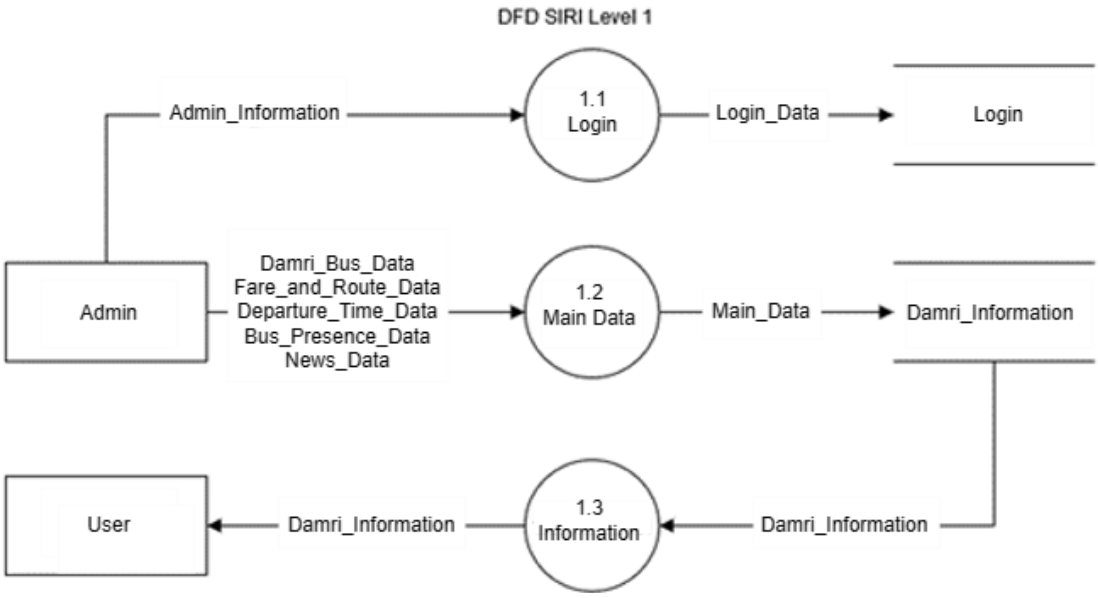

Figure 9. SIRI DFD Level 1

c. Use Case

According to (Gemino and Parker, 2009), a Use Case Diagram is a modeling technique used to represent the behavior of an information system. It illustrates the access rights of users and administrators.

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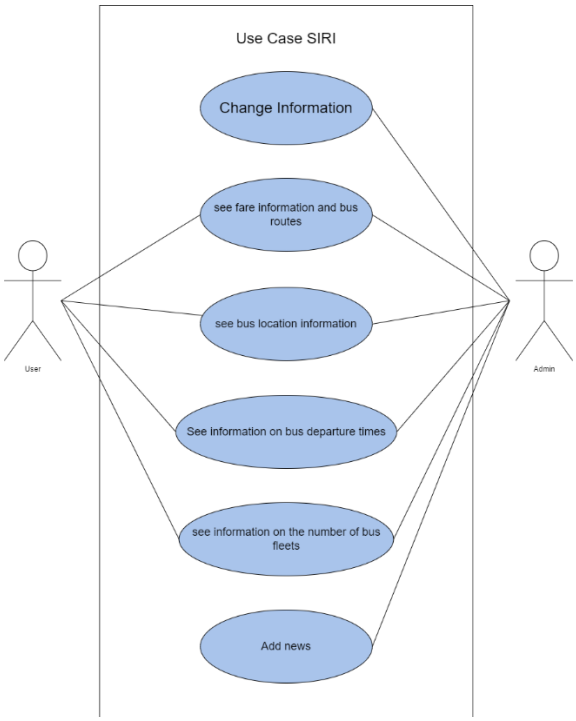

Figure 10. SIRI Use Case

d. Interface Design

- Homepage

  Homepage is the front page of SIRI website.

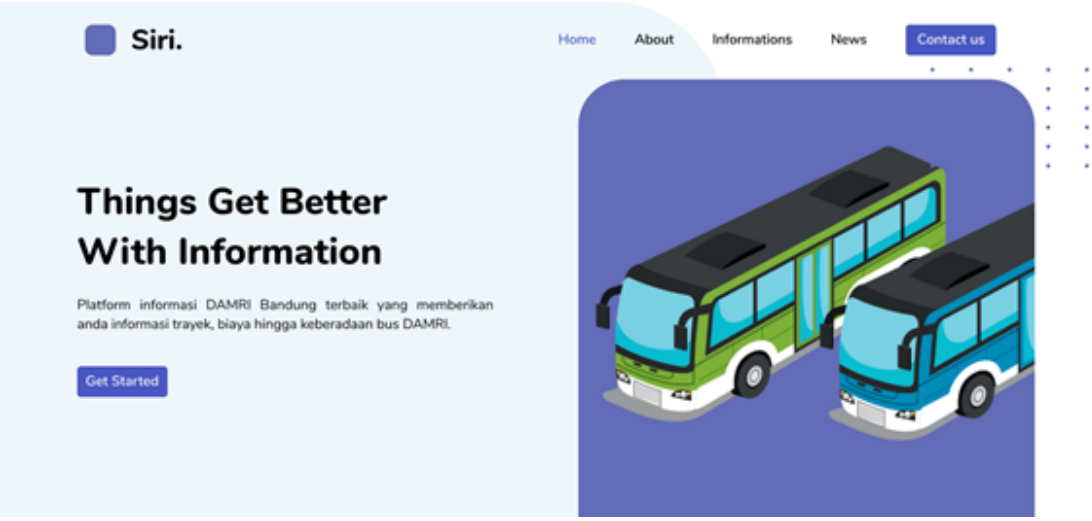

Figure 11. SIRI front page

- About Us Page

  This page contains information about the website, related companies, and services that this website offers.

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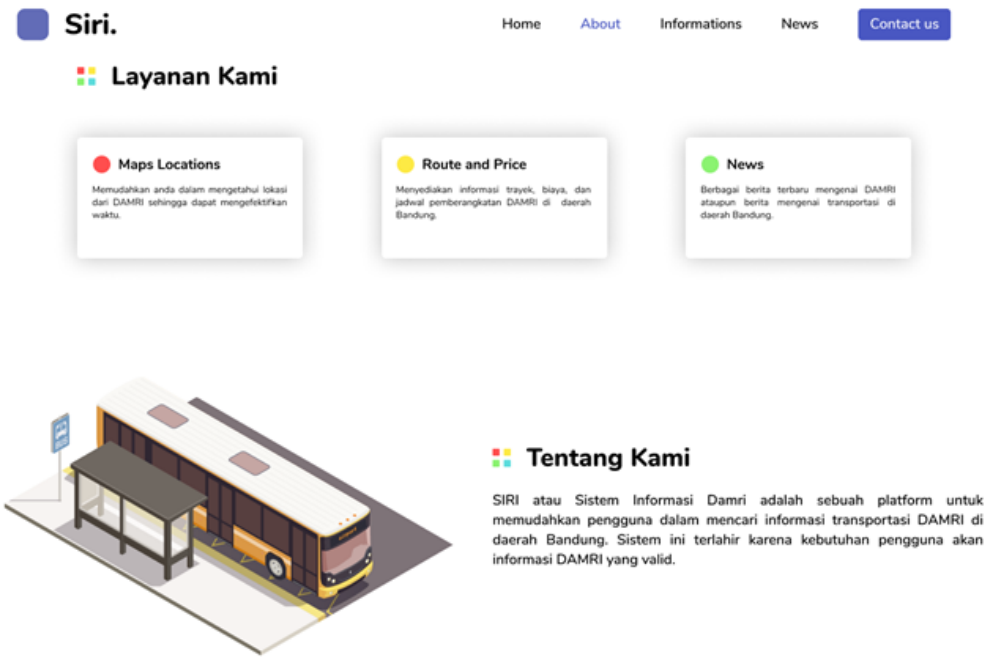

Figure 12. SIRI about us page

- Information Page

This page is the main feature of the SIRI website, which contains information about DAMRI including bus fares and routes, departure times, bus availability, and bus locations.

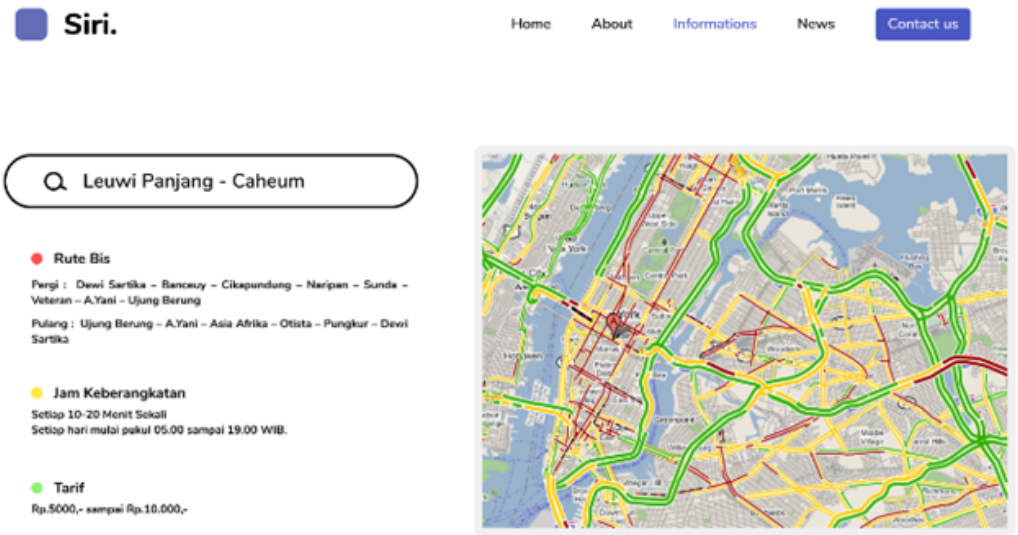

Figure 13. SIRI information page

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- News Page

  This page contains the latest news about DAMRI.

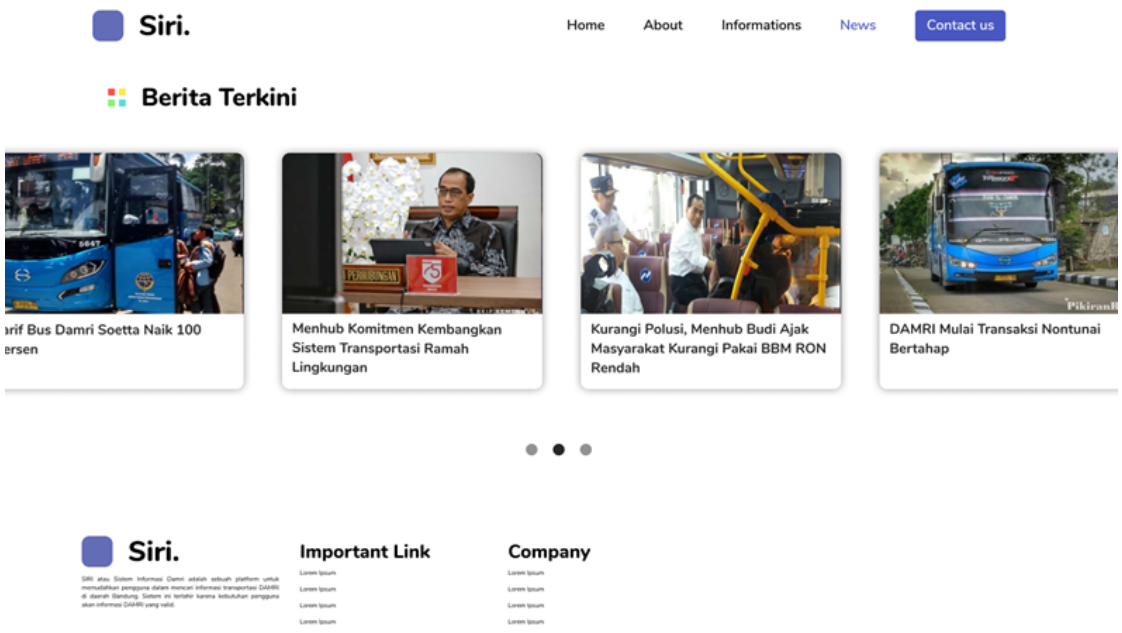

Figure 14. SIRI news page

- Admin Dashboard

  This page is used by the admin to control informations on SIRI website.

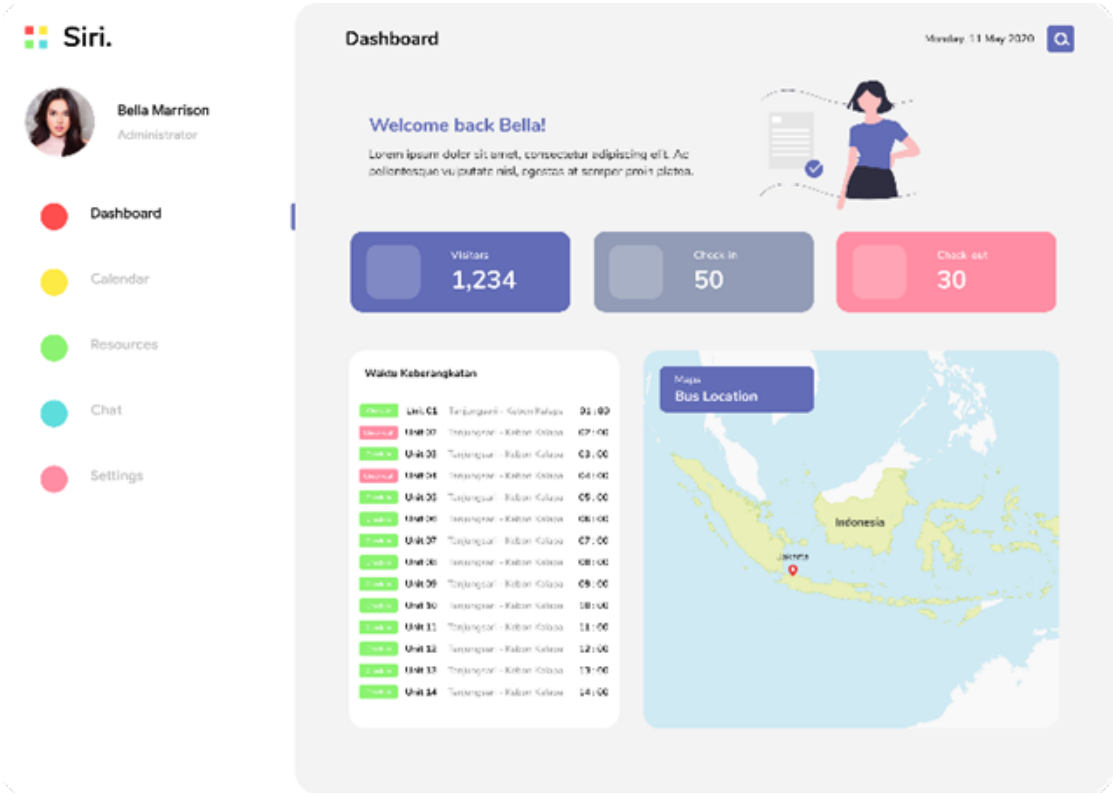

Figure 15. SIRI admin page

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- Responsive Page

  This responsive page represents the mobile view of the SIRI website. In responsive web design, web documents are created to be flexible according to the screen size of the device. When responsive web design is implemented effectively, it can enhance the overall user experience. Responsive web design is the best solution for delivering information to a wider range of users across various devices, resulting in a better user experience (Almeida and Monteiro, 2017).

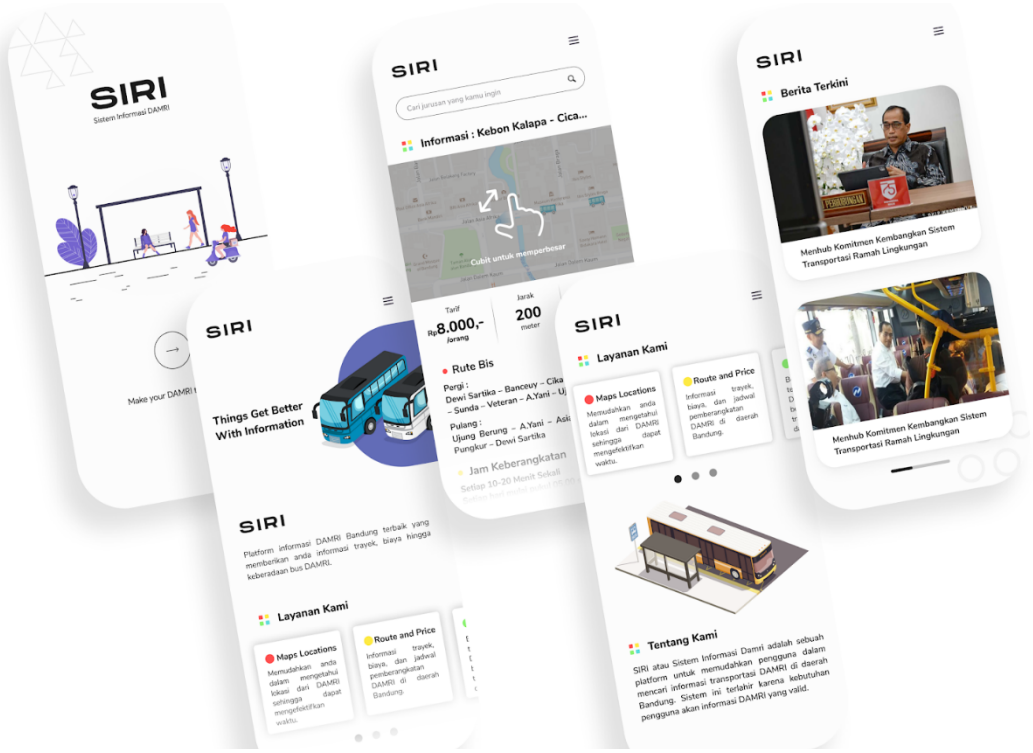

Figure 16. SIRI responsive page

4. CONCLUSION

Based on the research conducted in the design process of the DAMRI Information System (SIRI), several conclusions can be drawn as follows:

The design of the DAMRI information system based on a website in the Bandung area is tailored to the needs of the users. With the integration of online data operations, it simplifies the previously manual work into a more automated process. Customers can easily access information about routes, schedules, and fares through their mobile phones or computers, making the process more efficient. Customers can also easily find the nearest DAMRI bus and estimate the arrival time, facilitating better time management. This concept of an information system can benefit both customers and DAMRI by fulfilling transportation needs and improving business practices.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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6. REFERENCES

Almeida, F., and Monteiro, J. (2017). The role of responsive design in web development. *Webology*, *14*(2), 48-65.

Babbie, E. (1986). Observing ourselves: Essays in social research. *Canadian Journal of Counselling and Psychotherapy*, *23*(1), 140-141.

Berechman, J., Ozmen, D., and Ozbay, K. (2006). Empirical analysis of transportation investment and economic development at state, county and municipality levels. *Transportation*, *33*(6), 537-551.

Bielen, F., and Demoulin, N. (2007). Waiting time influence on the satisfaction-loyalty relationship in services. *Managing Service Quality: An International Journal*, *17*(2), 174-193.

Cannell, C. F., Miller, P. V., and Oksenberg, L. (1981). Research on interviewing techniques. *Sociological methodology*, *12*(1981), 389-437.

Del Greco, L., Walop, W., and McCarthy, R. H. (1987). Questionnaire development: 2. Validity and reliability. *CMAJ: Canadian Medical Association Journal*, *136*(7), 699.

Dewi, A. K., Arifardhani, Y., and Irawan, D. (2023). Antecedents to merger viewed from company erformance in the merger process. *Interdiciplinary Journal and Hummanity (INJURITY)*, *2*(3), 250-259.

Gemino, A., and Parker, D. (2009). Use case diagrams in support of use case modeling: Deriving understanding from the picture. *Journal of Database Management (JDM)*, *20*(1), 1-24.

Hooshyar, D., Ahmad, R. B., Yousefi, M., Yusop, F. D., and Horng, S. J. (2015). A flowchart-based intelligent tutoring system for improving problem-solving skills of novice programmers. *Journal of computer assisted learning*, *31*(4), 345-361.

Juniardi, F., and Azwansyah, H. (2014). Penyusunan sistem informasi geografis infrastruktur transportasi Kabupaten Kapuas Hulu berbasis web. *Jurnal Elkha*, *6*(1), 6-12.

Necco, C. R., Gordon, C. L., and Tsai, N. W. (1987). Systems analysis and design: current practices. *MIS quarterly*, *11*(4), 461-476.

Nirmala, B. P. W., Utami, N. W., and Nirmala, B. M. S. (2020). Sistem informasi marketplace penyewaan kendaraan berbasis website di Nusa Penida, Bali. *Jurnal Ilmiah Ilmu Terapan Universitas Jambi*, *4*(2), 88-98.

Nugraha, Y. (2020). Information system development with comparison of waterfall and prototyping models. *Jurnal RISTEC: Research in Information Systems and Technology*, *1*(1), 126-131

Sanjaya, D., Abdurachman, H., Wicaksono, A. A., and Masya, F. (2021). Sistem informasi pengendalian asset kendaraan di perusahaan transportasi. *Rabit: Jurnal Teknologi dan Sistem Informasi Univrab*, *6*(1), 24-32.

DOI: https://doi.org/10.17509/seict.v4il. 2163
p- ISSN 2774-1656 e- ISSN 2774-1699

Silitonga, O., and Hasti, N. (2020). Sistem informasi rental mobil berbasis website. *Jurnal Teknologika*, *10*(2), 47-50.

Thorne, S. (2000). Data analysis in qualitative research. *Evidence-based nursing*, *3*(3), 68-70.

Trotter II, R. T. (2012). Qualitative research sample design and sample size: Resolving and unresolved issues and inferential imperatives. *Preventive medicine*, *55*(5), 398-400.

Verdinelli, S., and Scagnoli, N. I. (2013). Data display in qualitative research. *International Journal of Qualitative Methods*, *12*(1), 359-381.

Vicente, P., Sampaio, A., and Reis, E. (2020). Factors influencing passenger loyalty towards public transport services: Does public transport providers' commitment to environmental sustainability matter?. *Case Studies on Transport Policy*, *8*(2), 627-638.

Widayanti, R., Maknunah, J., and Soares, L. M. (2020). sistem informasi transportasi angkutan kota berbasis web. *Jurnal Ilmiah Komputasi*, *19*(3), 401-410.

DOI: https://doi.org/10.17509/seict.v4il. 2163
p- ISSN 2774-1656 e- ISSN 2774-1699