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Customer Data Management Information System at PT. Wifi Ceria Using PIECES

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ABSTRACT

***Purpose**: This research was conducted with the aim of exploring, developing, and improving the customer data processing system. This is done to improve efficiency, accuracy, and responsiveness in facing increasingly dynamic market competition.*

***Subjects and Methods:** Currently, PT. Wifi Ceria still faces several problems in the customer data processing process, such as recording new customers, installing WiFi services, managing complaints, processing payments, and preparing company reports. All of these processes still use conventional methods.*

***Results:** In this study, we apply the PIECES concept (Performance, Information, Economy, Control, Efficiency, and Service) in developing a customer data processing system. The main goal is to increase the effectiveness and efficiency in managing and analyzing customer data.*

***Conclusions:** In designing a website using the Unified Modeling Language (UML) method and implementing it with the Html programming language. To test the system, we apply the Black Box Testing method. The result of this study is a web-based information system that makes it easier for PT. Wifi Ceria to provide services to customers.*

INTRODUCTION

The role of technology is very important in facilitating the processing of data and information. Speed, accuracy, and efficiency in managing data and information are key in increasing productivity, controlling costs, and saving time in various types of companies or agencies, including business people (Fachrihusaini, F., Sasono, I., Fuadi, A., Kristiyanti, D., & Juwita, R. N., 2023).

Currently, the number of active customers who have subscribed to the service. With technology, requests for new installations, service moves, service outages, and outage handling, as well as weekly or monthly reports can be made faster and more efficient. The implementation of a

wireless-based network must comply with high service standards, so that it can provide optimal service to customers.

The current procedures often encounter obstacles when customers want to install, or when there is a problem with the network. In such situations, customers can only report problems through the technician number that has been provided. Unfortunately, this results in unstructured problem solving, especially considering the large number of subscribers who subscribe. In addition, the finance department must also collect customer data comprehensively, including financial transaction data and customer bills.

LITERATURE REVIEW

Blackbox testing is a software testing method that tests the functionality (input and output) of each feature in the software without testing for errors/errors in the program code. Testing is carried out only focusing on the execution results (inputs and outputs) through test data and checking its functionality without knowing what is actually happening to the logic of the program code. (Warjiyono, W., Fandhilah, F., Rais, A. N., & Ishaq, A., 2020). Black Box Testing It is a type of software testing in which the tester does not need to know the internal structure or source code of the system being tested. This test focuses on function or behaviour system based on the inputs given and the outputs produced, regardless of how the system works inside.

Customer data is information collected and stored by companies or organizations related to individuals or entities that use their products or services. This data is essential for managing customer relationships, understanding their needs, and providing better and more efficient services. And also, Customer data must be managed with the utmost care to protect privacy and avoid misuse. (Putra, D., Franzely, D., & Sopian, A., 2021).

PIECES is a framework used in the analysis and evaluation of information systems, which helps to identify problems or challenges that exist in the system and design the right solution.

PIECES analysis is very important to be carried out before the system development stage is carried out to find problems that occur in the old system, so that it will make it easier when determining the needs for the new system.

The reliability of a system is the first variable of PIECES which has an important role to see the extent and how reliable an information system is in processing or processing data to produce information and expected goals. (Indrawati, I., Belluano, P. L. L., Harlinda, H., Tuasamu, F. A., & Lantara, D., 2020).

PT. Wifi Ceria is a service of a company for services to manage customer data for wifi installation. This wifi is now widely used in the community due to the need for. Nowadays, Wifi is used by the public for a wide variety of purposes. With the development of technology and the improvement of internet access, people use the internet for various activities that include aspects of personal, social, educational, and business life.

Unified Modeling Language (UML) is a visual modeling language used to describe, design, and document software systems. UML has a very important role in modern software development because it helps the development team to clearly understand how the structure and behavior of the system to be built is and effective.

METHODOLOGY

A research method is an approach used by researchers to collect, analyze, and interpret data with the aim of answering a research question or achieving a specific research objective.

Research methods function as a guide or framework that assists researchers in planning and carrying out research studies in a structured and documented manner. Therefore, the role of research methods is crucial in generating legitimate, trustworthy, and relevant knowledge. The selection of the right method will have a great influence on the quality and success of the research conducted.

Design Method

The system design method is an approach or process used in the planning, development, and implementation of computer systems or information systems. This approach helps to set the steps needed to create an efficient, reliable, and user-specific system.

System Analysis Method

The system analysis method is an approach used to understand, evaluate, and design information systems or other systems. The purpose of system analysis is to identify user needs, analyze existing problems, and formulate appropriate solutions.

To identify problems, an analysis of performance, information, economy, control, efficiency, and service must be carried out. This guide is known as the PIECES (Performance, Information, Economic, Control, Efficiency, Service) analysis. The analysis was carried out on an old information system in the form of hard copies such as brochures if the band was going to hold a performance. From this analysis, several problems are usually obtained and finally the main problem can be found. (Ruli, A. R., 2022, October).

By applying this method, the PIECES method greatly helps organizations in identifying problems, formulating solutions, and improving the overall performance of information systems. By using the PIECES method, organizations can ensure that the information systems they use are effective, efficient, and meet the needs of users.

Figure 1. Pieces Method

The PEICES research method is an acronym used in the context of research methodology to describe important steps or components in the research process. Each letter in PEICES represents a specific step that needs to be followed in order to carry out a systematic and structured research. Here is an explanation of each component in the PEICES research method:

Performance The reliability of a system is the first variable of the PIECES Framework which has an important role in seeing the extent and how reliable an information system is in processing or processing data to produce information and expected goals. (Indrawati, I., Belluano, P. L. L., Harlinda, H., Tuasamu, F. A., & Lantara, D., 2020).

Information (Information and Data) is what is needed or provided by the company, this is one of the main factors that affect the progress of a company. The information and data generated by the information system must have a useful value for decision-making by the company. (Sari, Y. R., & Nurmiati, E., 2021)

Economics (Economic Value) is the one that analyzes how the costs used in the operation of the system as well as the added value of the benefits during the use of the system. (Fitrah, N., & Muawwal, A., (2022).

Control and SecurityIn a system, it is necessary to have a control or supervision so that the system runs properly. This analysis is used to determine the extent of supervision and control carried out so that the system runs properly. (Prayogi, R., Ramanda, K., Budihartanti, C., & Rusman, A., 2021).

EfficiencyThe use of time is not maximized due to the frequent occurrence of repeated data checks so that there are no errors in data processing, thus affecting the report making process. (Nurhayati, S., & Sucahyo, N., 2021).

ServiceThe service dimension evaluates the quality of service provided by the system to customers. This includes the ease of use of the system, the clarity of instructions in payment, as well as the technical support available to users. Service assessment also involves how the system assists Sales in providing better service to customers. (Parera, J. A. K., & Wayangkau, I. H., 2024).

System Testing Methods

System testing methods refer to a series of steps, techniques, and approaches applied to conduct thorough testing of software systems or computer systems. The goal is to check the performance of the system to match the specifications that have been determined and meet the needs of the user. This system testing aims to identify potential failures, errors, or problems that may occur in the system before it is widely used. From a research method conducted by the Customer Data Management Information System at PT. Wifi Ceria using Pieces is:

RESULTS AND DISCUSSION

Planning

Use Case Diagram

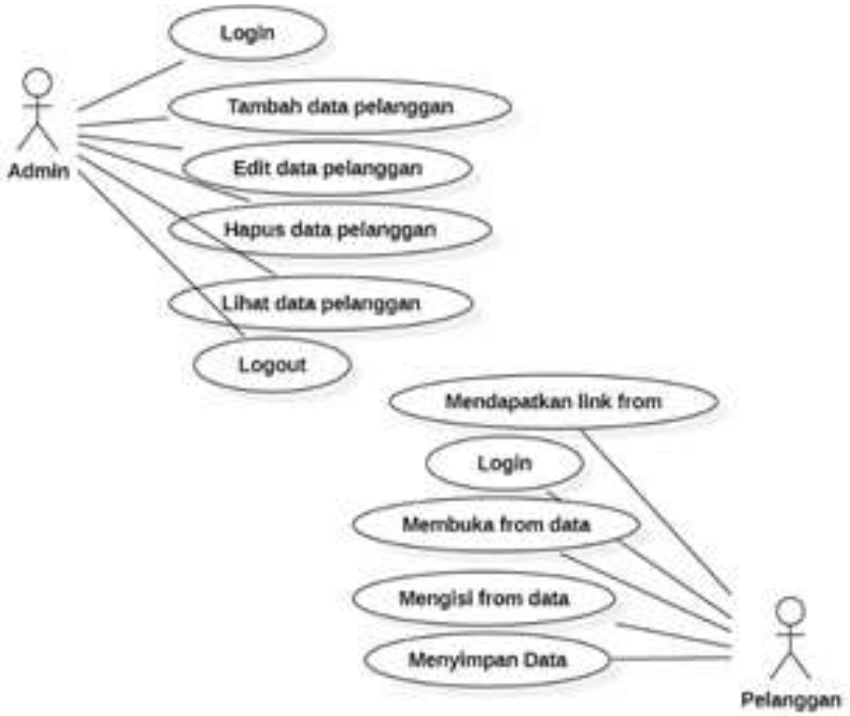

Figure 2. Use Case Diagram

Actor Description

Admin, Actor who is responsible for creating, controlling the system, having full access rights, and executing the implemented system processes.

Customer, Actor who buys or uses WiFi services.

Description of Use Case

Login, this is the process of verifying the user's access rights when accessing the system.

Dashboard, after logging in, the dashboard page will display a summary of information about the processing of customer data.

Customer Registration, this is a registration page that must be filled out by customers, which contains personal data information before making a subscription.

Service Order, this is the stage in choosing the internet package to be used by the customer and then paying the service fee.

Customer Data Input, After the customer makes the payment, the admin will enter the customer data as a new installation, which will be forwarded to the technician.

WiFi Network Installation, after getting the new installation data, the technician will proceed with the installation.

Activity Diagram

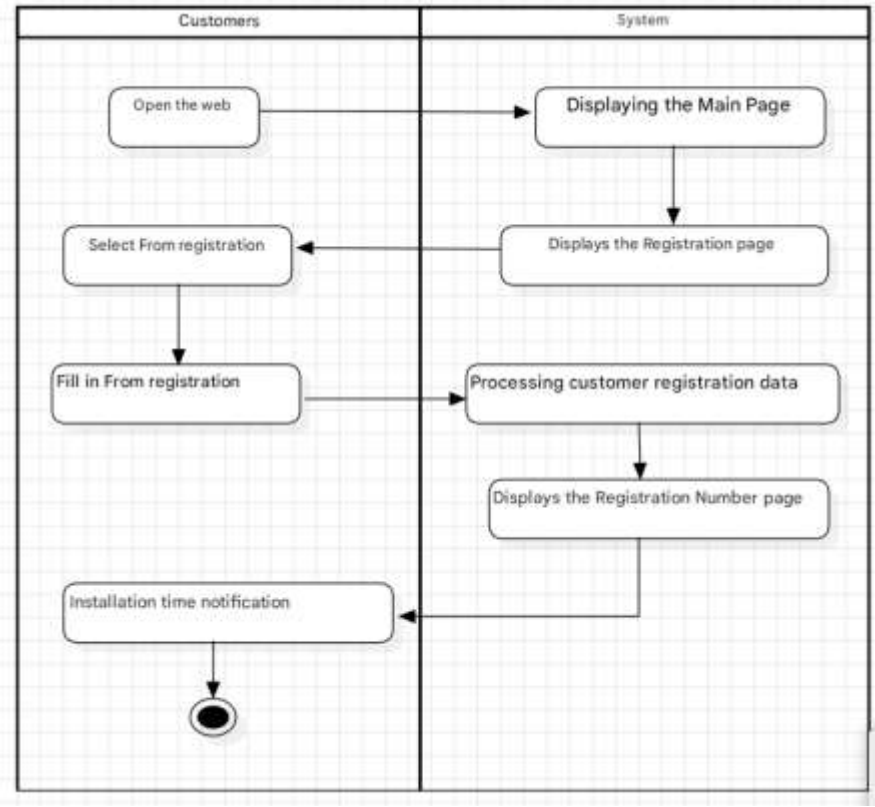

Figure 3. Activity Diagram

In the process flow of the Activity Diagram program on the website development system of the Customer Data Processing System, there are two flowchart symbols that have the role of "start" and "finish". Activity Diagram is a workflow on a business website that spreads the flow that has been designed on a use case diagram. (Ramadona, A., Hartati, M., Nurainun, T., & Permata, E. G., 2020).

Class Diagram

A class diagram describes the structure of a system in terms of defining the classes that will be created to build the system. (Nistrina, K., & Rahmania, A., 2021). Class Diagram in the Android-based Smart Warehouse system serves as a visual representation that describes the structure and relationships between classes or objects in this system. Therefore, class diagrams are an important element in the process of designing an Android-based Smart Warehouse system. These diagrams help in the creation of efficient and structured models, planning, and system development.

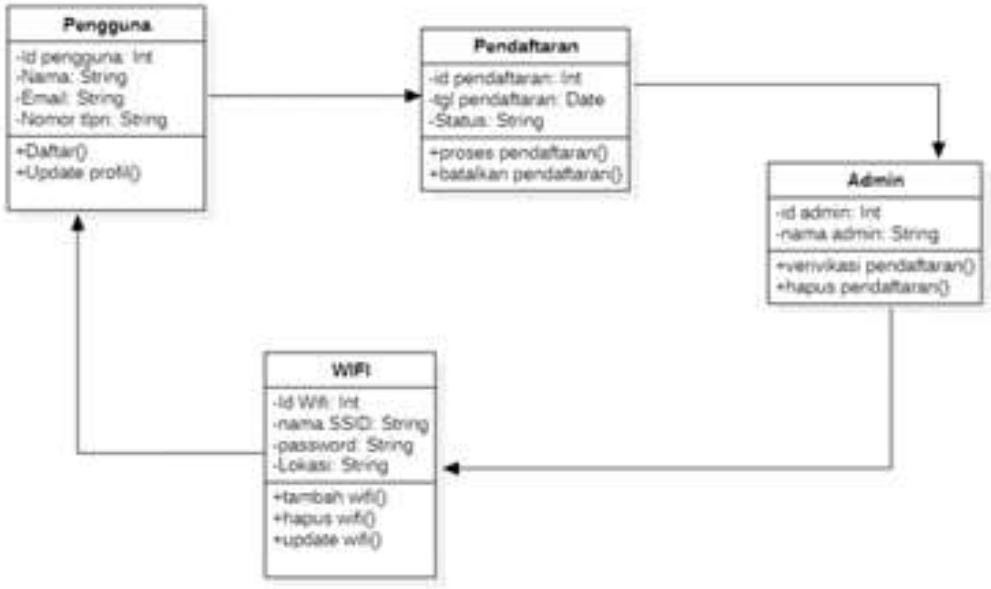

Figure 4. Class Diagram

System Implementation

The design of this Web-Based Customer Data Management Information System uses two users, namely customers and admins. From this research, we can know that the research has been carried out.

Home Page

Figure 5. Porch

In Figure 5, it can be seen that the home page is a front-facing page to enter the login. This page is a landing page that directly gives consumers access to explore various catalog options.

The homepage of PT. Wifi Ceria's customer data management information system is designed to serve as the main control center, making it easy for users—particularly admins and customer service staff—to access information and efficiently carry out daily operations. The website interface adopts user-centered design principles, focusing on ease of navigation, speed of information access, and informative visual presentation of data. This aligns with the principles contained in the PIECES framework (Performance, Information, Economics, Control, Efficiency, and Service).

At the top of the page, a header displays the company logo and the main navigation menus, including Home, Customer Data, Subscriptions, Payments, Reports, and Logout. This menu placement provides clear controls for users to quickly navigate between system modules (Control & Efficiency). The center of the homepage features a hero section, which welcomes users with a large system title and descriptive subheading. Quick action buttons, such as "Add New Customer" and "View Customer Data," also support daily operational efficiency.

Login Page

Figure 6. Login Page

In Figure 6, it can be seen that the login page is a page on a website or application where the user is asked to enter authentication information (usually in the form of a username and password) to access their account. The system then presents concise information in the form of a metrics dashboard comprising four main data cards: the number of active customers, total billings for the month, number of customer complaints today, and average service response time. This data presentation aims to improve the quality of information available quickly and accurately (Information & Performance). From a control perspective, login serves as a security filter that restricts access to the system. Only users with valid credentials can log in and use the customer data module. Furthermore, the system utilizes password encryption (hashing) and brute-force protection as part of its customer data security mechanism. Informationally, the login page also provides relevant information to users, such as notifications if a login error occurs ("Incorrect Username or Password") or if the system is undergoing maintenance. This helps avoid confusion and increases user confidence in the system's reliability. Economically, a good login page prevents unauthorized access and potential data leaks that can lead to significant losses. This initial investment in security reduces future risks. Efficiency is reflected in the fast login process, minimalist yet clear forms, and the system's ability to remember user sessions if enabled (the "Remember Me" feature). Users can be redirected directly to the homepage after logging in without the need for numerous additional clicks.

Ceria wifi package page

Figure 7. Ceria wifi package

In figure 7**,** the Package Page is a page to display the available wifi packages on the Wifi Web page. This page contains detailed information on the prices and types of plans offered by Wifi. Furthermore, a table of recent customers displays concise information such as customer name, subscription status, and payment status. This feature allows staff to monitor recent activity without having to access other modules, directly improving performance and efficiency. With the PIECES approach, the login page in PT. Wifi Ceria's customer data management information system serves not only as a gateway but also as a crucial part of the system's security and convenience management. Its robust functionality, professional appearance, and advanced security integration make it a key foundation for modern and trusted customer data management.

Booking Page

Figure 8. Ceria wifi package booking

In figure 8, the order page method refers to the process or steps used in the creation or management of an order page on a website or application, which allows users to place orders for products or services. On the right side of the page, there's a notification panel and automatic reminders that inform customers who haven't made payments or have been sent reminders. This feature strengthens the customer control and service function (Control & Service).

Payment method page

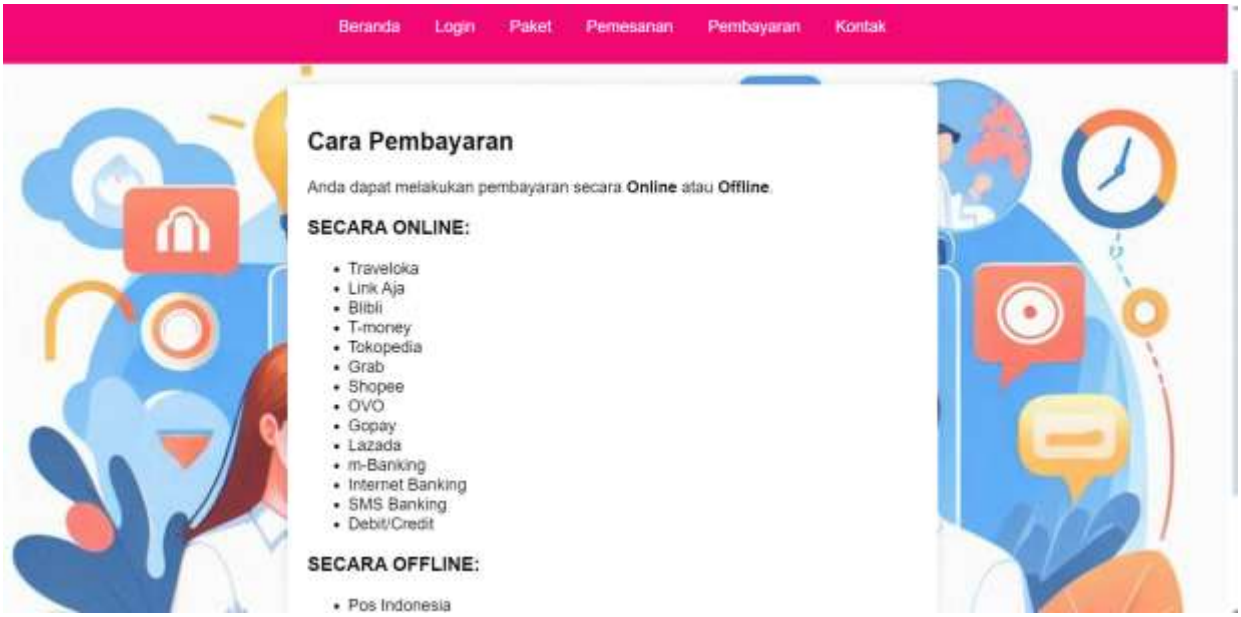

Figure 9. Payment Methods

In Figure 9, The payment method page refers to the section that provides information or options for users to make a payment after selecting the wifi product or service they want to purchase. The homepage also features visual charts, such as the number of customers by region and a chart of payment status (paid/pending). These visualizations strengthen the aspect of efficient and easy-to-understand data-driven decision-making (Economics & Efficiency). The Payment Method Page is a vital part of the customer data management information system at PT. Wifi Ceria. This page not only serves as a means of recording and processing customer transactions, but also directly contributes to the company's operational efficiency, customer satisfaction, and financial control. In its development, this page was designed and analyzed using the PIECES approach (Performance, Information, Economics, Control, Efficiency, Service).

Performance, the payment method page is designed for high responsiveness and fast processing times. When a customer makes a payment or an administrator wants to verify a transaction's status, the system automatically updates the data in the database and displays the current status (paid, pending, or failed). This ensures that every transaction is recorded promptly and without delay.

Economics, by integrating various payment methods, such as bank transfers, e-wallets (OVO, Dana, GoPay), QRIS, and auto-debit, this system helps reduce the potential for payment delays that impact a company's cash flow. Furthermore, reducing administrative costs through payment system automation results in significant cost efficiencies.

Control, the system provides limited access rights for users based on their role. Only admins or finance officers can change or verify payment status. Each transaction is automatically recorded in an activity log, which can be audited at any time. This strengthens oversight and accountability in internal financial processes.

Efficiency, using an integrated system makes the payment process faster and more accurate. Customers simply select a payment method, follow the instructions displayed, and a confirmation will appear automatically after the system receives a notification from the payment gateway. Compared to manual systems, this drastically reduces payment recording and confirmation time.

Service, the payment method page also includes customer service features such as chat support, FAQs regarding payment methods, and a help button in case of technical issues. Additionally, customers receive automatic notifications via email or SMS after a successful transaction, as well as reminders before the payment due date. This shows that the system service is oriented towards user satisfaction.

Page Contact

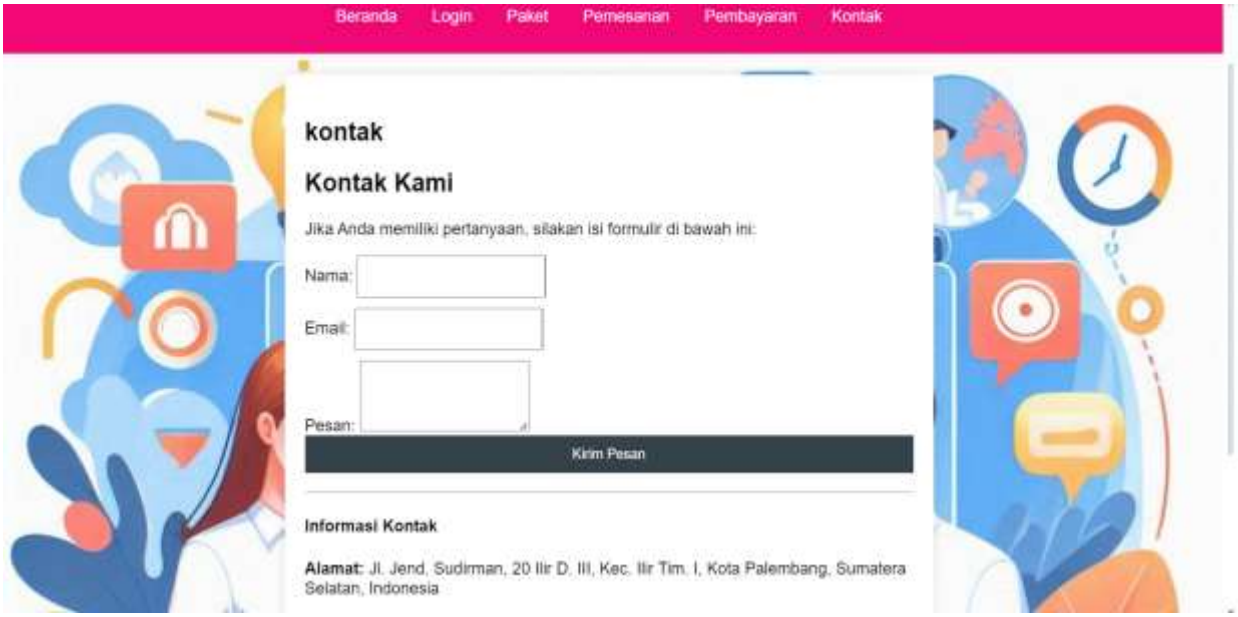

Figure 10. Contact

In figure 10, the Contact Page is a page to display Contacts and updated info against the Wifi Web page. This page contains information on how to contact the call canter available by Wifi. Finally, the page footer contains company contact information, copyright information, and the current system version.

Overall, the system's homepage is designed to improve customer service performance, provide accurate information, enhance internal controls, and create a responsive user experience. The PIECES approach not only served as a reference for the initial analysis but also served as a foundation for designing and implementing a system that adapts to PT Wifi Ceria's operational needs. The Contact Page on PT. Wifi Ceria's Customer Data Management Information System (CDMIS) is designed as a communication tool between customers and the company. This feature is a crucial element in supporting responsive and professional customer service, while also reflecting the company's commitment to transparency and service accountability. With a PIECES approach (Performance, Information, Economics, Control, Efficiency, Service), this contact page serves as more than just static information—it becomes a strategic bridge in customer relationships.

CONCLUSION

From the analysis and discussion that has been carried out, it can be concluded that the application of information technology in customer data management at PT. Ceria Wifi is essential to improve the efficiency and effectiveness of the service. With an integrated information system, the process of installing, moving, and disconnecting services can be carried out more quickly and in a structured manner. In addition, good customer data management will help companies in understanding customer needs and providing better services.

However, there are still some obstacles in the current system, such as unstructured handling of customer problems and inefficient data collection. Therefore, the application of PIECES analysis has become very relevant to identify existing problems and design appropriate solutions.

Integrated System Implementation Develop an information system that facilitates customer service management. Black Box Testing in Thorough testing to ensure that the system functions

according to specifications. HR training is provided to employees to improve the use of the system and handle problems. Customer Data Analysis uses data to understand customer behavior and adjust services. Improved Customer Service in a better support system to handle complaints efficiently. Periodic Monitoring is routinely evaluated to ensure that the system remains relevant and effective. Hereby, PT. Wifi Ceria can improve operational efficiency and customer satisfaction.

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