Design and Implementation of Web Service for Laundry Service Payment at RAZ-Q Laundry Samarinda

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Abstract—The advancement of technology has facilitated access to information and various applications spanning desktop, web, and mobile platforms, becoming an integral part of everyday life. Among these platforms, websites are the most widely used. The web is widely used for business purposes. One of the common businesses is laundry services, which has become essential for individuals with busy schedules, such as workers and students. Busy daily activities make the need for clean clothes a top priority. However, the existence of many laundry service providers creates intense competition and difficulties for new consumers in finding the right service. This research examines a web services-based laundry service designed to help consumers find and book quality laundry services in their vicinity. It also provides process monitoring features and estimated time for clothes pickup. For laundry service owners, these web services offer opportunities to improve their business. This research uses the Waterfall method of software development, including the stages of analysis, design, coding, and testing. Use case diagrams were used to model the interaction between actors in the application. The web interface is designed according to user needs. The result of this research is web services that can help consumers find and order laundry services easily and efficiently. Blackbox testing is conducted to ensure that all designed functions run properly. This application has the potential to help laundry service owners increase their income. Application development is done using Visual Studi Code with PHP Native programming language and MySQL as database management.

Keywords— Web, Services, Small Medium Enterprises, Waterfall, Laundry

I. INTRODUCTION

The development of technology today has had a significant impact on the way we access and utilize information. Not only does it make it easier to access the information we need, but it also provides a wide selection of applications that allow us to live our daily lives more efficiently (Andramawan et al, 2019). Various types of applications, such as desktop applications, web applications, and mobile applications, have become an integral part of our modern lives, providing convenience in various aspects of life, including work, education, communication, and entertainment (Alda, 2019). Technology opens the door to ever-evolving innovations and advancements, allowing us to stay connected, efficient, and informed in an increasingly connected world (Yulius and Lubis, 2019). Apps have helped us in various areas of life, from communication, financial management, transportation, and more. They have changed the way we interact with the world around us (Jantce and Suwita, 2020). In communication, messaging and social media apps allow us to connect with friends and family around the world quickly and easily. In finance, digital banking and payment apps make transactions more practical. Ride-sharing apps have changed the way we travel, while health apps help us monitor our well-being and fitness (Pernando et al, 2023). The ability of apps to simplify everyday tasks and improve efficiency has made them an indispensable part of modern life (Akhsani, 2019).

The Web has become a very important platform in everyday life, combining various functions in one digital ecosystem, including communication, information search, entertainment, e-commerce, and more (Kurniawan, 2019). Web is one of the most popular and widely used media by the general public, especially in Indonesia. One of the distinguishing advantages of the web is its ability to be constantly updated and evolving in terms of content and technology. This means users can access system updates, new features, and the latest content on a regular basis (Harijanto et al, 2021). The web has a dynamic ecosystem, with various sites and web applications being continuously developed by developers, so users always get access to the latest technologies and performance improvements. This makes the web a highly relevant platform and allows users to keep benefiting from their online services in the long run (Cahyadi et al, 2019). While many websites are designed for entertainment, not all web content is limited to entertainment alone. Instead, websites can also be very powerful business tools. Many entrepreneurs and companies have adopted the use of websites to expand and improve their business (Pernando et al, 2023). By using websites, businesses can reach a wider audience and allow customers to interact with their

services or products more conveniently. To overcome this challenge, websites have been developed to simplify and automate the buying and selling process. With the help of these websites, customers can easily browse products, make purchases, and manage their orders online. This not only minimizes errors in recording transactions, but also provides significant efficiency in business processes, allowing business owners to focus on the growth and development of their business (Christian et al, 2019).

Businesses in the field of laundry services have become very familiar to the public. Laundry is a service that assists in washing clothes using automatic washing machines or dryers, as well as using soap, cleaning fluids, and special deodorizers for clothes (Alda, 2019). This service allows customers to easily and efficiently clean and maintain their clothes without having to do it themselves. Laundry has become a very practical solution in coping with daily household tasks, and businesses in this service field have grown rapidly to meet the needs of an increasingly busy society (Simargolang and Nasution, 2019). Laundry services are also known as a very fast turnaround business. The time span between the first service request and the next request is relatively short. When the clothes used are again dirty and require washing, customers will quickly return to using this laundry service (Wahyuni et al, 2021). This shows that laundry services have a sustainable and constant level of demand, as the need to keep clothes clean and well-maintained is always present in everyday life. This makes the laundry business one of the most stable and potential businesses for continuous growth (Rosyi and Reko, 2020). In addition to assisting in washing clothes, laundry services also have an important role in maintaining clothes to keep them clean and durable. The washing process carried out by laundry uses special equipment and cleaning agents that can remove stains, germs, and odors that are difficult to remove manually. In addition, the use of drying machines also helps clothes dry quickly and without damaging the fibers (Voutama, 2022). Thus, laundry helps to extend the life of clothes, maintain their quality, and make them look better. This provides added value for customers who want to take good care of their clothes (Muhammad et al, 2020). One of the main factors that encourage people to use laundry services is the rapid development and changes in modern lifestyles. Increasingly busy daily life, work demands, tasks, and responsibilities make people have little free time. This applies both to office workers who have a busy schedule, as well as to students who are busy with assignments and lectures. In their daily routine, washing and caring for clothes can be a time-consuming and labor-intensive task (Rosyi and Reko, 2020). Therefore, many individuals are looking for practical solutions, and one of them is to use laundry services. This service provides convenience as it removes the burden of washing clothes from their to-do list, allowing them to focus on more important things in their lives. This makes laundry services a highly relevant solution in coping with the busyness and demands of modern life (Rully et al, 2021). Additionally, the current pandemic situation has given people an added push to always keep themselves and the clothes they use clean. This is especially true for individuals who continue to work outside the home or have outdoor activities that make them more vulnerable to exposure to germs and contamination. Clothing hygiene has become a priority. This is especially important because clothing is one of the media that can carry viruses and germs (Alda, 2019). In this context, laundry services become very important, as they can provide assurance that clothes are properly washed and sanitized. This gives people a sense of security and confidence that they can keep their clothes clean, thus not only taking care of themselves, but also protecting the health of those around them. Laundry has therefore become an integral part of efforts to maintain hygiene and health during the pandemic (Mulyadi et al, 2019).

With the rapid development of the times, the laundry business has experienced rapid growth and become one of the types of businesses that can be found easily around us. However, with more and more laundry services available, the competition in this industry is getting tougher (Sonita and Fardianitama, 2019). Especially for small MSMEs that may not yet have a fame among the local community, competing in this market can be a tough challenge. From a consumer perspective, especially those who have recently moved or joined a community, choosing the best laundry service that suits their needs can be a confusing task (Fazli et al, 2021). For example, when they need to do laundry, they have to look for a laundry in the vicinity of where they live, which may require them to physically travel just to find the nearest laundry location. All these challenges indicate that there is a need to provide more efficient and convenient solutions for consumers to search, use, and access laundry services according to their preferences and schedules. In addition, consumers often face uncertainty regarding the estimated completion time of their laundry (Akbar et al, 2019). This can result in an inconvenient and inefficient user experience. Therefore, it is imperative to address these challenges and provide a more practical and efficient solution for consumers in finding laundry services that suit their preferences and needs. In this way, consumers can easily find the nearest laundry, know the estimated finishing time, and access laundry services that fit their schedule, which will ultimately increase customer convenience and satisfaction (Permana, 2021).

Laundry Web Services comes as a significant solution to make it easier for consumers, especially those who have just joined a community, to search and find the best laundry services around their location.

With this service, consumers can quickly find laundries that have proven to have the best reputation and offer services with optimal quality. The advantages of Laundry Web Services do not stop there; the tracking feature provided allows consumers to keep an eye on the status and progress of the clothes being washed, as well as providing an estimated time when the clothes will be washed and ready for pickup (Fariyanto and Ulum, 2021). For laundry service owners, Laudry Web Services also provides great benefits by increasing the

attractiveness of their business. In situations like the pandemic, when customers may be more reluctant to physically interact, this service helps to keep the business running (Apriana and Fauziah, 2021). With a user-friendly and easy-to-understand interface, Laundry Web Services is suitable for a wide range of people. Payment that supports the Cash on Delivery (COD) method makes transactions more practical. The final result of this development is a web service that can be accessed through various devices with an internet connection. This allows consumers and laundry service owners to access and utilize Web Services in an easier and more efficient way. With all the features available, Laudry Web Services brings the laundry experience to be more convenient and affordable.

Final result of this development is a Laundry Web Services that is ready to be accessed through various devices with an internet connection. This service allows consumers and laundry service owners to easily and efficiently access and utilize the various services provided. With this Laundry Web Services, users can optimize their laundry experience and save time that might otherwise be wasted just looking for and waiting for the laundry process to finish. Laundry Web Services ensures that every major function runs properly without any significant bugs or errors. The ordering, payment, and notification processes were as expected. The user interface is intuitive and responsive, allowing for easy interaction with every element of the service.

II. LITERATURE REVIEW

A. Application

According to Abdurahman and Riswaya (2021) Applications are ready-made programs that can be used to carry out commands from the application user with the aim of obtaining more accurate results in accordance with the purpose of making the application, the application has the meaning of problem solving using one of the application data processing techniques which usually races to a desired or expected computation or expected data processing. The definition of applications in general is an applied tool that functions specifically and integrated according to its capabilities, the application is a computer device that is ready for the *user*. It can be concluded that an application is a software program that runs on a certain system that is useful for helping various activities carried out by humans.

B. Information System

The system is a collection of components that have elements of connection between one another. information is data that is processed into a form that is more useful and more meaningful to the recipient.

According to Hendrianto (2021) Information System is a system within an organization that meets the needs of daily transaction data processing, supports operations, is managerial, and strategic activities of an organization and provides certain external parties with the necessary reports.

C. Services

According to Yaqin (2016) Service means helping to prepare or take care of what someone needs. According to Kotler, service is the provision of services to customers according to their needs. It is also said that services can be defined as activities or benefits that can be provided by one party to another which are basically intangible and do not result in ownership of something and their production can or cannot be related to a physical product.

D. Laundry

According to Yaqin (2016) *Laundry* is a *housekeeping* department that is in charge and responsible for processing all washing activities for both hotel operations and hotel guests.

Laundry is a noun that refers to the act of washing clothes, the place where washing is done. *Laundry is* also defined as the activity of washing clothes or other textile materials and also as a place for washing clothes or other textile materials.

E. Internet

According to Hendrianto (2021) Internet stands for *Interconnected Network*. The Internet is a communication system capable of connecting computer networks around the world.

F. PHP

According to Nugroho (2020), PHP (which stands for *PHP Hypertext Preprocessor*) is a web-based programming language. So, PHP is a program language used to create web-based applications (websites, blogs, or web applications). PHP is a program language that can only run on the *server side*, or often called *Side Server Language*. So, a program made with PHP code cannot run unless it is run on a *web server*, without a *web server* that keeps running it will not be able to run. Meanwhile, according to Khoirunnissa, et al (2022) PHP is a powerful scripting language designed to enable developers to create very fast web applications and MySQL features are fast, reliable databases that integrate well with PHP and are suitable for dynamic internet-based applications.

G. Database

Database or database is a collection of data that are interconnected with one another, stored on computer hardware, and used by software to manipulate it. The data needs to be stored in the database for the purpose of providing further information. Creating databases and tables using MySQL. While the design of the database design that describes the relationship between tables and their relationships uses an Entity Relationship Diagram (ERD) (Indrajani, 2020).

H. Unified Modeling Language

Unified Modeling Language (UML) is a standard language that is widely used in the industrial world to define requirements, create analysis and design, and describe architecture in object-oriented programming. UML emerged because of the need for visual modeling to specify, describe, build, and document software systems.

UML is a visual language for modeling and communicating about a system using diagrams and supporting text (Dani Eko, 2021).

III. RESEARCH METHODOLOGY

A. Data Collection

In this research, an approach that involves literature study or literature study is used. The literature study method is carried out by collecting references from several previous studies, which are then compiled comprehensively to get the right conclusion and in accordance with user needs (Permana, 2021).

B. Software Design

Design is a process of describing, planning, and compiling several elements into a complete functional unit and aims to meet the targets and needs of system users and to provide an overview for programmers and other technical experts (Fariyanto and Ulum, 2021).

Figure 1 shows the SDLC (System Development Life Cycle) models that is often applied is the waterfall method, which is sometimes also referred to as the conventional model or classic life cycle (Apriana and Fauziah, 2021). The waterfall method shown in Figure 1, is a sequential software development methodology in which the process continues to flow like a waterfall (Fazli et al, 2021).
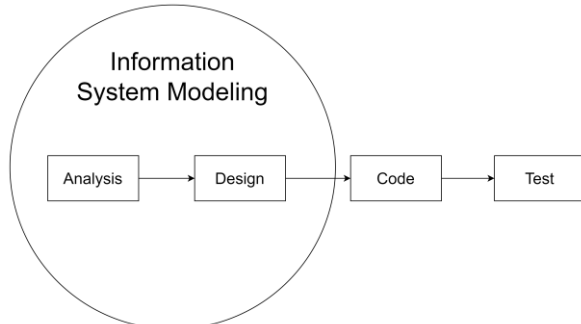

Figure 1. Waterfall Model

The waterfall method uses a systematic and sequential method for software development that goes through the stages of requirements analysis, design, *coding*, and *testing* (Sonita and Fardianitama, 2019). The Waterfall method has several benefits, including being easy to implement, allowing complete, explicit, and correct definition of all system requirements early in the project, software engineering (SE) can ensure smooth software engineering operations, and making system requirements early problems more cost-effective so that less time is lost compared to problems that will arise in the next stage. Since the previous phase or process must be completed before the next one can be performed, the waterfall technique makes it difficult to accommodate modifications after the process has been performed (Akbar et al, 2019). The stages of the waterfall method are as follows:

1. Analysis
This analysis stage aims to examine or analyze any needs required for application design and to understand the principles underlying the program to be created, such as scope, data, and functionality required for application design.
2. Design
In the *design* stage, the design of the analysis development that has been done previously will be made into a design representation that will be used in a software program and application interface design.
3. Code
In the coding stage, code or programs will be written to translate the previously created designs into programming languages, allowing them to create or realize programs with designs that contain all executable and executable code (Robi and Pernando, 2023).
4. Test
To reduce *errors* and ensure that the output produced is as expected, the capabilities of the program and application will be checked during this testing stage (Tabrani and Pudjiarti, 2023).

IV. RESULT AND DISCUSSION

This section contains the results and discussion of the research topic, which can be made in advance of the research methodology. This section also represents explanations in the form of explanations, figures, tables and others. The number of words in this section ranges.

A. Analysis

In this stage, the researcher conducted an in-depth analysis of the problems that emerged in the field and sought essential information to develop solutions. The data collection methods used by the researcher, especially through interviews, play an important role in this process.
1. Problem Identification
The researcher conducted an in-depth analysis of the problems that arise around the neighborhood and community. The results of the analysis show that individuals who are new to a particular community, busy workers, and students with busy routines face difficulties in finding laundry services with the best service. They are looking for practical and efficient solutions to overcome time constraints in finding suitable laundry services.
2. Conducting Interviews
Researchers conducted direct interviews with laundry business owners and related stakeholders. The results of these interviews are a valuable source of information for the design and development of the application that will be developed created. The data obtained from the interviews helped researchers understand the needs and expectations of laundry owners and potential customers in using this application. This became an important foundation in designing solutions that fit the challenges faced in the field.

B. Design

Design is one of the crucial stages before proceeding to the next step in application development. In this design stage, researchers used the *Unified Modeling Language* (UML) to design the system by utilizing several types of diagrams, including use case diagrams, activity diagrams, class diagrams, and sequence diagrams. These diagrams are used to visually describe various aspects of the system. In addition, at the design stage, researchers also designed the user interface (UI/UX) of the Laundry Web Services to ensure good design integration. In addition, database design is also an important part of this process to ensure that the data needed in the web can be stored and accessed efficiently. This design stage is an important foundation in application development before the next steps in implementation and testing.

A use case diagram is a visual tool used to describe the interaction between actors (users) and a system. In the context of the Laundry Web Services, there are three types of actors: consumers, laundry services, and admins. Each actor has different roles and responsibilities in this application.

1. Consumer: The consumer acts as the end user who uses the Laundry Web Services. Their roles include the ability to place orders, view information about laundry services, and modify their account data. They are the primary users who utilize the app to search and use laundry services.

2. Laundry Services: Laundry services are those who provide laundry services and interact with the web services. Their role involves viewing incoming orders, confirming orders from consumers, as well as managing aspects such as product pricing and order status updates. They use the app to receive and process orders from consumers.

3. Admin: Admins are users who have a role in managing and monitoring the Laundry Web Services. Their duties involve viewing the list of laundries that work with the app, monitoring product prices, and accessing order history within the system. They are responsible for managing the backend aspects of the app

Laundry Web Services is an innovative platform that facilitates interactions between consumers, laundry services, and admins in its operations. In this web ecosystem, the roles of each actor are clearly defined to ensure an optimal user experience. Consumers, as service users, have the responsibility to view laundry information, place orders, and manage their account data. Thus, consumers can easily access and use laundry services without any problems. The laundry service plays an important role in the operation of the web service with its tasks that include confirming orders from consumers, managing product prices, and taking care of their account data. With these responsibilities, the laundry service acts as a bridge between consumers and admins, ensuring that orders are processed efficiently, and product prices are in line with set standards. Therefore, synergistic cooperation between consumers and laundry services is key to the success of this application.

The admin, as the manager of the web platform, has managerial and supervisory responsibilities. Admin duties involve laundry management, product price monitoring, and access to order history. With these capabilities, the admin can manage overall operations, keep the system running smoothly, and provide the necessary support for consumers and laundry services. The presence of the admin as a supervisory entity is key to ensuring the sustainability and reliability of the web. With a mature understanding of the roles of each actor, the development of Laundry Web Services can be done more structurally and efficiently. A clear separation of duties between consumers, laundry services, and admins allows each party to focus on their respective responsibilities. This helps to increase productivity and reduce the risk of errors in the day-to-day operations of the laundry app.

Overall, figure 2 shows that well-defined roles for consumers, laundry services, and admins are fundamental to the successful operation of Laundry Web Services. A clear understanding of the responsibilities of each actor paves the way for continuous innovation and improvement in providing efficient and effective laundry services. Thus, the web can continuously evolve and provide the best service to users, creating a pleasant and practical laundry experience.
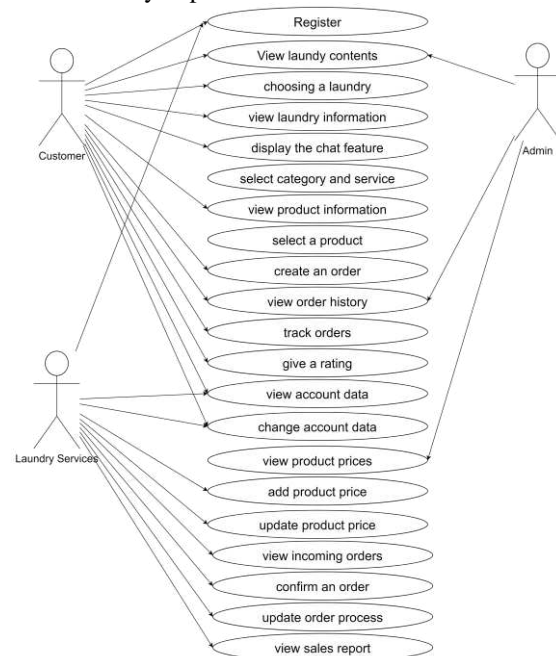

Figure 2. Use Case Diagram

One of the key aspects in this preparation is the design of the user interface (UI) of the application. Figure 2 provides an overview of the draft system design, which serves as a guide in developing the appearance and functionality to be implemented in the Laundry Web Services. This interface design is an important element to provide a good user experience and make it easier for users to interact with the web.

Figure 3, 4, and 5 illustrate the design of the web interface that will be used by consumers. In the first figure, we can see the Login page which will be the

starting point of user interaction with the web. In this Login view, the user will be asked to enter the appropriate login information, such as username and password. After successful login, the user will be able to proceed to the next activity in the application. This Login page is an important step in ensuring that only authorized users can access the Laundry Web Services.

Login Page

Username

Password

Login

Create new account, sign up!

Figure 3. Login Page Interface Design for Customers

Location		History P
Laundry 1	Laundry 2	Laundry 3
Laundry 4	Laundry 5	Laundry 6

Figure 4. Laundry Page Interface Design for Customers

◀ P

Laundry Name

Category
Normal ☐   Express ☐

Service
Complete ☐   Iron ☐   Wash ☐

Next

Figure 5. Laundry Services Interface Design for Customers

The design of the Main Menu page, seen in Figure 3, 4 and 5, has several important functions. This page will display a list of laundries available in the consumer's area, allowing the user to select a service that suits their needs. In addition, there is a profile button that allows users to access and manage their account data. The history button, when pressed, will take the user to a page that displays their order history. On the next page, the draft category and service page, users will be able to select the type of service category, such as "normal" or "express," and select the type of service they want. This page serves to help users determine the price that will be

charged in their transaction. With these various options, users can easily customize their orders according to their preferences and needs.

C. Code

After successfully building the web, users will be faced with an important first step, which is the login page as illustrated in Figure 6, 7, and 8. At this stage, users will be asked to enter their account information to access the laundry service privately. If the user already has an account, they can easily enter the username and password that they have registered for before to enter the application. This convenience allows registered users to immediately respond to their laundry needs without a hitch. However, for first-time users using the laundry web services, the first step is to create an account. This process involves filling out a form with the required personal information, such as name, email address, and password. This step of creating an account aims to create a unique user identity within the system, which will later be used to access the app's services.

Creating an account is a strategic step, given the importance of maintaining user security and privacy. With unique account information, Laundry Web can provide a personalized and secured experience. In addition, the account creation process also allows the app to build a trusted user database. Overall, the login process on web reflects simplicity and security. Users can choose to log in directly if they already have an account or engage in the account creation process if they are using the app for the first time. With these steps, Laundry Web demonstrates attention to user needs and convenience, ensuring that each step is easily accessible and secure.

Welcome to Laudry Web Services
Login

Username

Password 👁

Login

Create new account, **sign up!**

Figure 6. Login Page

Register

Username   Full Name
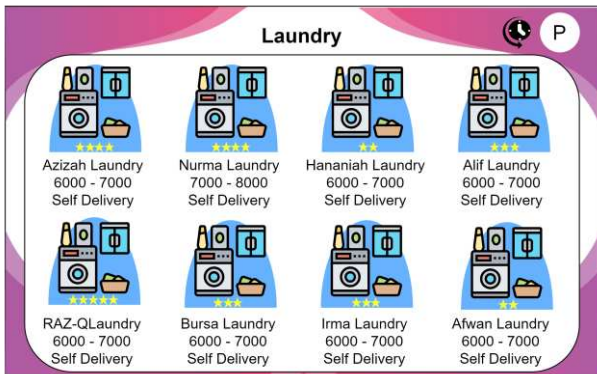
Password

Handphone

Address

Regist

Figure 7. Register Page

Figure 8. Laundry Page

Once the user has selected the desired category and service, they will be directed to the product page. On this page, users can fill in the number of products they wish to wash, as shown in Figure 9. This allows users to specify the number of clothes or items that will be scheduled to be washed by the laundry service.

Figure 9. Laundry Services Page

Figure 10. Order Summary

Figure 11. Location

Once the user has entered the number of products they wish to wash, they will be redirected to the order summary page, as seen in Figure 11. On this page, the user can double-check the total products that have been previously entered and they are also given the option to enter a more detailed delivery address. This aims to ensure that all order details are correct before the next process

D. Testing

In the context of black box testing shown in table 1, the author runs a series of tests to test the various functions and activities that have been implemented in the application he designed. This approach allows the assessment of application performance without requiring internal knowledge of the program structure or logic. Black box testing is focused on the inputs and outputs of the system, thus allowing the author to evaluate the extent to which the application can perform its functions without knowing its internal details. Thus, the author expects that each function or activity in the application can run properly and can provide the desired results, demonstrating the reliability of the application. The importance of black box testing lies in its ability to identify problems or flaws in the functionality of the application that may not be detected through white box testing. By ensuring that the application runs properly without any significant problems, the author can improve the quality and reliability of the application he developed. Therefore, black box testing not only helps to ensure that the application can function as expected by the user, but also reduces the risk against potential damage or failures that could occur during the use of the application by the end user.

Table 1. Blackbox Testing

Activity Name	Activity tested	Testing Results
Consumer login	Consumers fill in their username and password to enter the application	Corresponds to the expected
Consumer register	Consumers fill out form that consists of username, name, password, mobile number, and address	As per with which expected
Display the laundry list	Consumers can see a list of laundries in the vicinity and can choose the laundry that is right for them. desired	Corresponds to the expected
Select category and service types laundry	Consumers can view and select the type of laundry categories and services as desired	As per with which expected
Add product quantity	Consumers can input the number of products they want	Corresponds to the expected
View order details	Consumers can confirm backorder details and enter their Address on the order details page.	Corresponds to the expected
Determine the location of consumers	Consumers can choose their location accordingly with their current location using Google Maps	Corresponds to the expected
View Information laundry	Consumers can view detailed information about laundry that has been selected	As per with which expected
View List order history	Customers can view their order history they have done before	As per with which expected
Provide assessment of laundry	Consumers can provide an assessment of laundry after completing the transaction process	As per with which expected
View and update account data consumers	Consumers can view and update data their account the way they want	As per with which expected
Consumer log out of the application	Consumers can log out to exit the application	Corresponds to the expected
Laundry Login	Laundry can login to the application by filling in the username and password	As per with which expected
Laundry Register	Laundry fills out a form consisting of username, laundry name, password, cell phone number, address, opening and closing hours	Corresponds to the expected
Entering and updates the list Price	Laundry can enter a price list if they have never done so before. Enter price, if laundry has entered a price before they can update the existing price.	Corresponds to the expected
View and update details of incoming orders	Laundry can view order and laundry details update the status of order stages (received, processed, and finalized)	Corresponds to the expected
Admin does log out of the app	Admin can log out to exit from application	As per with which expected

V. CONCLUSION

The Laundry Web Services, designed to be web-based, has the main objective of providing convenience for consumers and laundry businesses in carrying out their transactions. By providing complete information about laundry businesses, including price lists and products offered, web provides easy access for consumers to find laundry services near them. Through this platform, the transaction process becomes more efficient, allowing consumers to quickly choose a laundry service that suits their needs. The Laundry Web Services is not just a platform for transactions, but also plays a role in helping consumers choose the best laundry service. Built using PHP Native programming language, the web provides a user-friendly and intuitive interface. The rating and rating feature of laundry service providers is an important aspect that enhances the user experience. Consumers can evaluate and rate the services they receive, providing valuable feedback for other users in making more informed decisions. This creates a transparent environment and gives consumers confidence in choosing a reliable laundry service. And consumers can utilize ratings and reviews to choose a reputable laundry service provider, ensuring that their needs will be well met. Thus, Laundry Web Services not only makes transactions easier, but also creates a mutually supportive ecosystem between consumers and laundry businesses, creating satisfaction and trust on both sides.

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