Digitalization of Android-Based Services Searching Using the Human-Centered Design Approach

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Abstract – **Using applications is considered an effective solution in providing services to user needs. The current way to order services is to ask relatives or use social media as information channels. For this reason, an integrated service digitalization application is needed in one application to make it easier for users to find and select the services required. Service providers also have the media to promote their services so that they stand on service marketing increases. The methodology in this study is descriptive qualitative with the human-centered design (HCD) approach, which includes inspiration, ideation, and implementation. The data collection process is done by interviewing and focus group discussion. The system development model uses a prototype model. The results showed that the application's design meets the HCD criteria by making feedback from the user a significant guide in building a system regarding features, functionality, and user interface. Stages in system development have been carried out to obtain a comprehensive picture of system development. Application test results using the Blackbox type show that the applications can run according to their respective functionality.**

Keywords: Application, Digitalization, Services, Human Centered Design, Prototype

I. Introduction

Using applications is considered an effective solution in providing services to user needs. In addition to offering information, search, and communication services, applications are also used as effective marketing channels [1]. Based on the results of the APJII survey 2022, it was explained that the device used to access the internet is the most smartphone [2]. Smartphone and internet penetration positively impacts increasing added value in the service sector [3]. Services are economic activities whose output, besides physical products, is also an intangible product that provides added value for service users. Services can also be interpreted as all activities that can be offered from one party to another who are intangible and do not have ownership rights [4] [5]. Output of services in activities rather than

physical objects [6]. Based on this definition, one of the fundamental features of service is an intangible product (intangibility), which means that service products cannot be seen, felt, or held/touched before the user uses the service. To determine the services to be chosen and answer the uncertainty of the quality of the services offered [4], users must get accurate and comprehensive information about the services to be used.

The method used today to find information about service providers is to ask relatives or use social media to search for service providers. The problem with the technique is the need for complete information about service providers, only the assumption of individuals from service providers without any evidence of detailed information or assessment of previous service users who can provide an overview of the quality of the services offered. Besides, looking for assistance this way is less effective, as the information conveyed may need to be based on the user's needs. In addition, it isn't easy to find a comparison as a choice of service providers to be used. This encourages application design that facilitates searching for various services in one application.

Based on the description above, the problem formulation is designing a digitalization of Android-based service search as a service search solution. The problem-solving approach uses the human-centered design approach. This approach focuses on application users in an effort to meet user needs [7] by improving aspects of user effectiveness and efficiency [8]. Based on the literature study, many studies raise the theme of developing service applications that focus on one particular type of service [9][10][11]. The needs of community services are very varied, so it takes an integrated application that can serve the needs of services through one application. In addition, several similar studies have also been carried out, but the approach taken is still conventional; the acquisition of requirements specifications was carried out through standard interviews [12] [13] without any framework approach used. By approaching the Human Centered Design, the results of the application design can build

in-depth empathy of the user so that it can be used sustainably and can set up the user's needs [14][15]

II. METHOD

The method used in this study is a descriptive qualitative research method. This method is used to obtain meaningful information and construct the data obtained [16]. The data collection process is carried out using the interview method and focus group discussion (FGD) involving users in the form of service providers (sellers) and service users (buyers)—system Development Methodology Using the Prototype Model [17]. The approach used in designing a digitalization application for Android-based service search is human-centered design (HCD). HCD is a system design that focuses on the user [14] to obtain ideas and inputs in the development of system design that is needed so as to increase user experience [18] [19]. HCD focuses on three stages, namely inspiration, ideation, and implementation. Inspiration is the stage where we discover the problems encountered and know the desires based on the user input. Ideation is a stage for understanding several user inputs obtained through the inspiration stage to meet the specifications of the system's needs. Implementation is the stages of workflow design of the system/product created as well as the development of the system from the final validation of the user.
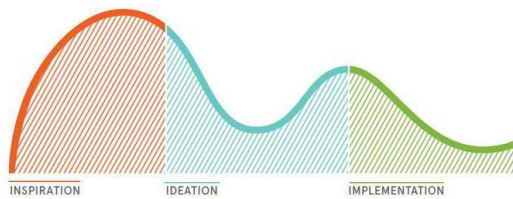

Figure 1. Human-Centered Design

The research stages in this study are stages that are built by combining the HCD approach with the prototype model as a model in system development. At the communication stage, an inspirational approach to the event is a focus group discussion and interview. A quick plan is carried out with an ideation approach. Meanwhile, the stage of modeling short design is carried out with an implementation approach. The research stages can be seen in the following figure:
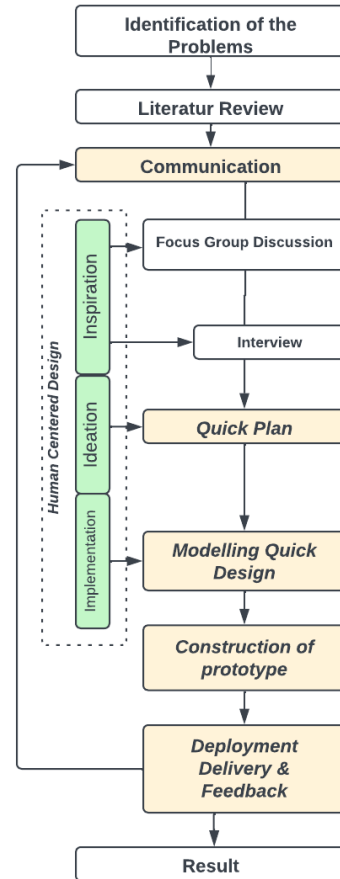

Figure 2. Research stages

A. Identificatioan of the problem

In the initial stage, the researcher identifies the problem by observing the process of ordering various services the community needs. As well as the types of services often used by the community. Researchers also made observations on how to promote service providers (sellers).

B. Literatur Review

The next stage is the researcher searching to find theories related to the research conducted, both in the form of books, journals, articles, and seminar results related to the interface design with the Human-Centered Design (HCD) approach, the developmental methodology of the prototype model system and digital ordering service.

C. Communication

This activity is a better way to understand expectations and desires and obtain input from designs made individually and in user groups [15]. The Focus Group Discussion and Interview Method carries out the communication process. This method is part of the inspiration stage in HCD.

D. Quick Plan

Quick Plan is an initial analysis of the system requirements based on the communication results that have been carried out. This process consists of identifying business processes, system design, and

input and output system specifications. Developing system design with the quick plan method in this study is an ideation stage in HCD.

E. Modelling Quick Design

Modeling Quick Plan is the design of the application workflow created, the actor's specifications, and the process of interacting with the system using UML (Unified Modeling Language). UML is expected to be able to facilitate application development and meet all user needs effectively, completely, and precisely. This stage is part of the implementation stage in HCD.

F. Construction of Prototype

This stage includes creating a prototype, including the unit testing process in the developed system, and the system improvement will be carried out if there is input from the user. This ensures that the user element is the primary input in system development.

G. Deployment Delivery & Feedback

The final stage is to evaluate the system based on feedback given by the user so that the system can be accepted and used based on the user's use and sustainability. If there is still repair input, -re-communication will be carried out to get additional input from the user.

III. RESULTS AND DISCUSSION

The discussion stage of the design of digitalization of searching and ordering services with the Human Centered Design approach and system design with the prototype method will be published about how the concepts, system planning, analysis, and design needed by the system to be built.

A. Communication

Communication is a method carried out at the inspiration stage in HCD. Communication activities are carried out in 2 ways: Focus Group Discussion (FGD) and interviews. Based on the results of FGD and interviews with prospective applications that consist of service users and service providers. Service users need a system that can be used to order services, given the difficulty of obtaining information from providers who have good credibility. Through FGD, researchers get feedback from the user that the services of various services offered published in one application will make it easier for users to meet the services needed. Several types of services service users, such as electronic service, laundry and construction workers services, hair shaving, and screen printing, often order. Service providers also confirm the need for applications like this. They stated that the application can help market the services they manage so that it can be a broader promotional medium that will impact the benefits gained. Researchers also involve users to provide input about the features that will be presented in the application. Service users expect a chat feature to facilitate communication between service users and service providers. They also expect a rating and testimonial feature to give trust about the services offered to users.

They also expect a more attractive display design and color of the application.

B. Quick Plan

Quick Plan is part of the ideation on HCD. At this stage, design identification is carried out, and the input-output specifications on the system use the flowchart based on the results of the communication carried out with the user. The system flowchart of the design of the application digitization application is as follows:
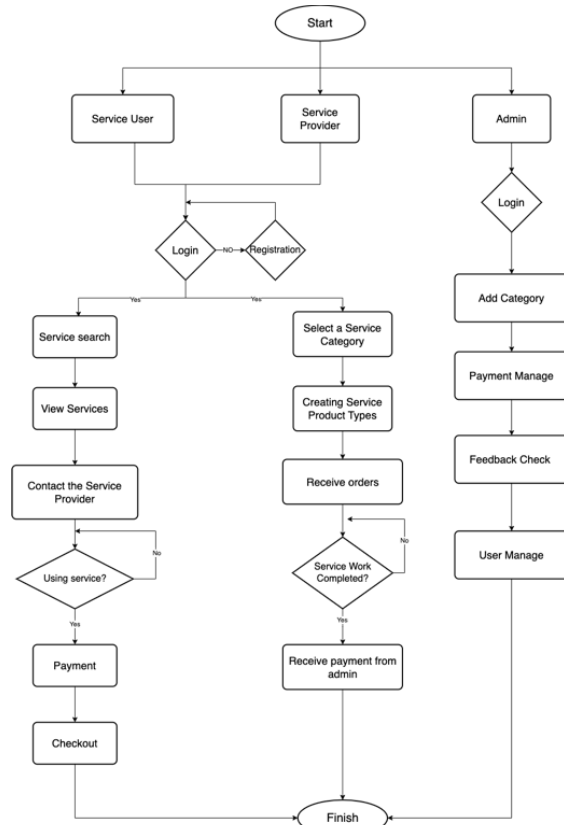

Figure 3. Flowchart system

The picture above explains the sequence of procedures in the system. The initial step by the user is logging in to the system; if the user has yet to be registered, the system will direct the user to the registration page.

1. Service users conduct service searches based on the service category, and then service users can first contact the service provider. If the user wants to use the service, it will continue to the payment and checkout process. If not, service users can return to search for services or exit the application.

2. Service providers register services that will be completed on the registration form, then select the service category they want to market and create a type of service product; if there are orders from the services offered, the service provider will receive orders. Furthermore, if the service work is completed, the next step is to receive payments from the admin.

3. Admin is carrying out the system, starting from adding the following category of management payment and checking feedback.

C. Modelling *Quick Plan*

One stage of implementation is to identify and explain the involvement of actors with the system made using UML. This process includes the creation of a use case diagram for the portrayal of user interaction with the system, an Activity Diagram as a picture of the process that occurs in the system, a sequence diagram, and a class diagram to describe the domain model, which is an abstraction of the database.

1. Use Case Diagram

Figure 4. Use case diagram

The use diagram above illustrates the interaction of actors consisting of service users, service providers, and admins with several activities in the system. All actors conduct login activities to access the system. Service users can search for services, contact the service provider, and make payments. Service providers register for the services offered, choose the service category, choose the type of service product, receive orders, and receive payments. Admin can carry out the process of adding service categories, payment management, and check payment.

2. Activity Diagram
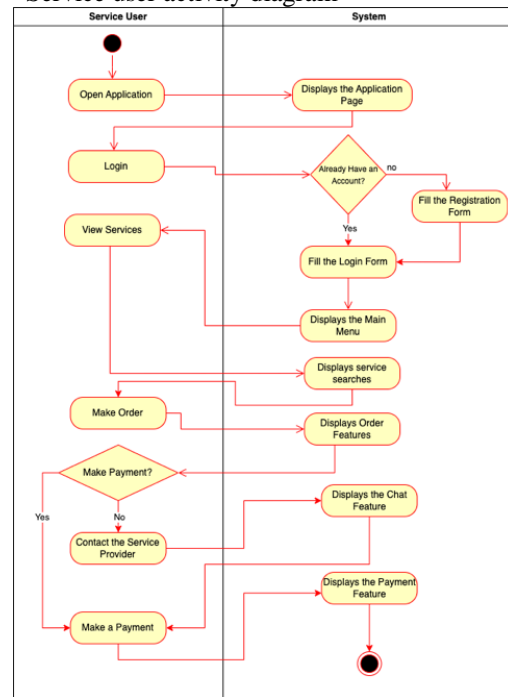a. Service user activity diagram

Figure 5. Service user activity diagram

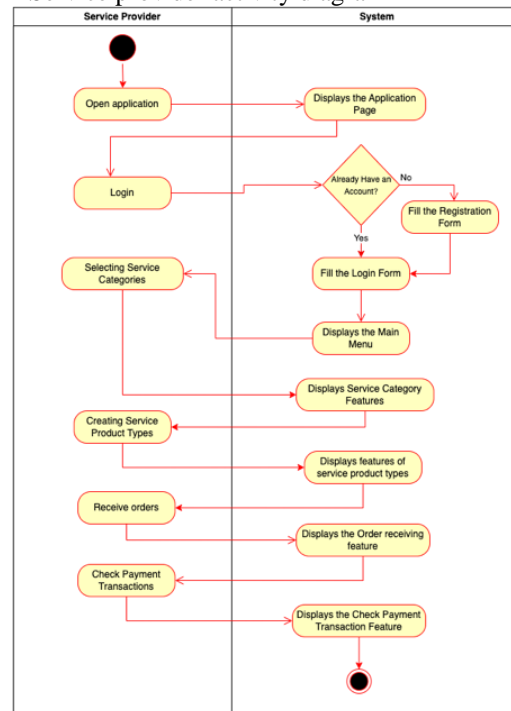b. Service provider activity diagram

Figure 6. Service provider activity diagram
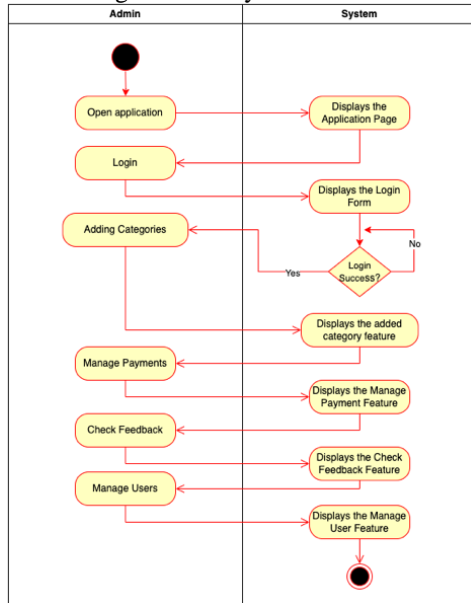
c. Admin diagram activity

Figure 7. Admin diagram activity

Of the three images of the Activity Diagram above, namely in Figure 5, Figure 6, and Figure 7, we can see the interaction between users (service users, service providers, and admin) with the system.
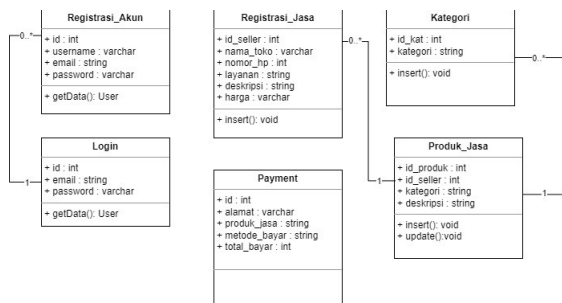
3. Class Diagram

Figure 8. Class Diagram

The picture above shows that the class diagram is made to show the structural relationship of a system [20] as well as several classes in the system, which consists of account registration, service registration, category, login, payment, and service products.

4. Sequence Diagram
In the class diagram, we can see the interaction of objects set in the order of time. Each object has a timeline representing each time's progress, representing the chronological order of interaction [20]—the following sequence diagram for service providers, service users, and admin.
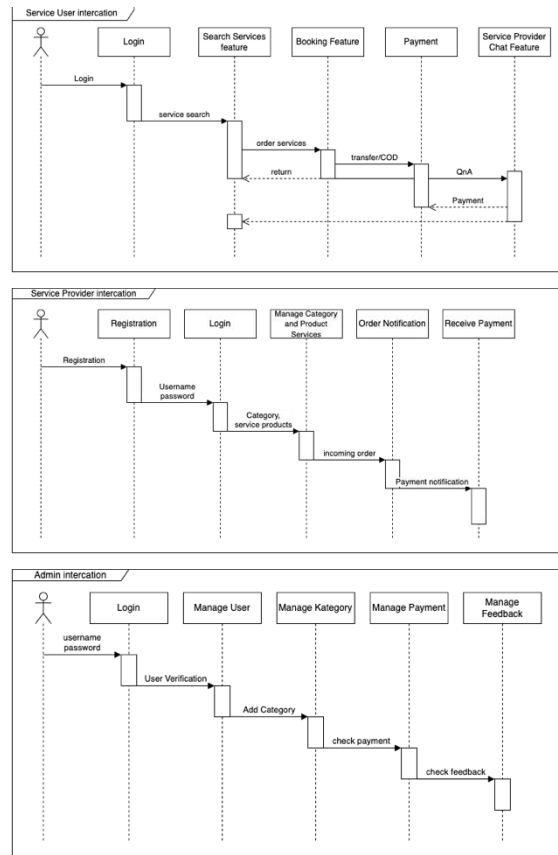

Figure 9. Sequence Diagram

D. Construction of Prototype
Setelah After the stages of data collection, analysis, identification of actors, and identification of interactions with the system, the next stage is the implementation of prototypes using Java programming languages and designing application interface designs. The unit testing process was also carried out at this stage on the system. The test was carried out using the Blackbox method. Based on feedback from the user and in-depth analysis of both features and design, the results of the display design of the digitalization of Android-based services booking using human-centered design.

1. Application User Interface
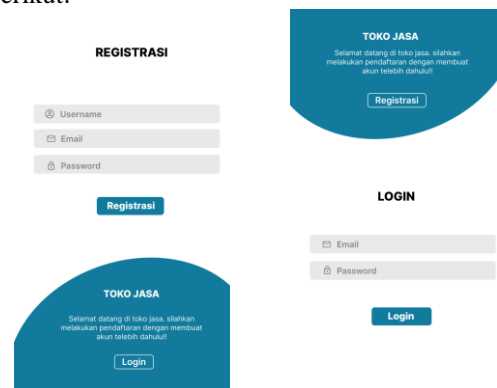Beberapa tampilan sistem dapat dilihat pada gambar berikut.

Figure 10. Registration and Login Interface

The initial display of the system is the login page to access the dashboard as a user or as an admin. If you don't have access rights to log in, the application will direct you to the registration page. After logging in, it will display the user dashboard for service users or service providers. Here's the page display:

Figure 11. Service category interface

The page display above is the display when the user successfully logged in. The main menu display includes the service category offered and the popular list. The interface design and features on the main menu are adjusted to the advice and input from the user. Color and layout selection also involves users in designing application displays. The categories entered are the dominant service categories used by users. The chat feature is also added on each page so service users can communicate with providers or admins. Next, a list of services based on the category selected by the user will appear. Here is an example of a list of service lists based on the selected categories:
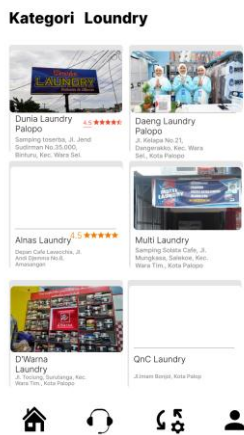

Figure 12. List service interface

In the next stage, after selecting one of the service providers, the type of service will appear in the payment process. Payment can be made when the service is completed or through non-cash payments. The following is the interface:
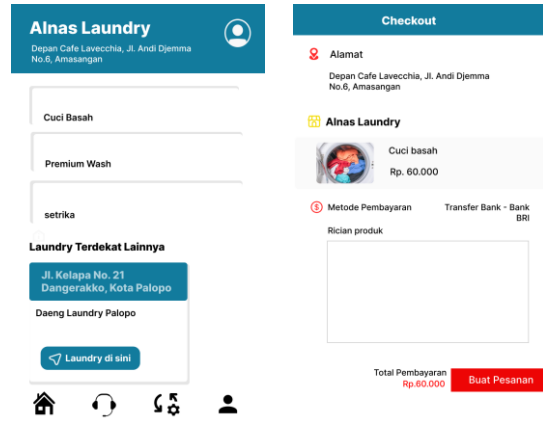

Figure 13. Select service and checkout interface

The following display is the service provider registration form. On this page, the service provider inputs data related to the services offered, including several document requirements needed for the admin to approve.
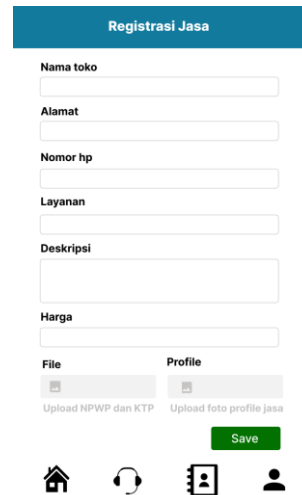

Figure 14. Service Provider registration interface

Next is the display for the admin dashboard menu. On the dashboard menu, the admin does management or governance related to the website. Manage the Services, Payment, and Registration Category from the Service Provider. The following is the interface:

Figure 15. Admin dashboard

2. Application Testing

Application tests are needed to ensure that the application can run well and function according to the planned planning. The selected application testing is a black box type of testing. Blackbox testing is a testing of application functions made whether it functions or not. A black box testing of the digitization application for Android-based service ordering follows.

Table 1. Black box testing

Users	System Functionality	Result	
		Yes	No
Admin	Login and access admin dashboard page	√	
Service User	Login and access User dashboard page	√	
	Selecting the Services category, displaying a list of services, ordering and payment processes	√	
	Service Search	√	
Service Provider	Login and service registration	√	
	Access the service provider dashboard menu	√	

From the table above, the overall system functionality is successfully accessed by the system design. Both functionality for service users and service providers and admin functionality. This shows that the system that is built can be implemented.

E. Deployment Delivery & Feedback

System evaluation is done by coding the feedback given. Based on the results of the system evaluation after being tested on the user, feedback provided by the user (admin, service user, and service provider) as well as lecturers as an element that strengthens the assessment of the evaluation of the function and website design can be described that the appearance of the system design is quite attractive, not dull and easy to use. The color choice is comfortable in the eyes, and the user can quickly respond to the layout of the navigation button. The selection flow of each function is straightforward. In terms of use, the application helps service users find the services they need. As an added value, service users have alternatives to choose other service providers. This application is also considered to help the service promotion activities offered so that the scope of promotion is broader and hopes to provide significant benefits. Overall, the application is feasible to implement and has added value in the eyes of the user.

IV. CONCLUSION

From the discussion explained before, the user digitalizes the search for Android-based services using the human-centered design approach. The design process is both the user interface and features and functionality involving application users consisting of service users and service providers, which are HCD risks. Feedback is the primary reference for researchers when designing applications. The application development process with prototype models goes through several stages. The first stage is to collect data through focus group discussions and interviews. This activity is the initial stage of HCD, namely inspiration. The results of these activities are in the form of formulations regarding services to be offered in applications, initial design design, navigation layout, color, and others. Next is the quick plan, a picture of the output-input specifications described using a flowchart, and an ideation activity on HCD. Next is the Quick Plan modeling, which is part of the implementation. This stage includes identifying and explaining the involvement of actors with a system made using UML. Next is the Contraction of Prototype, which is the activity of translating feedback from users by coding and designing user interfaces. Next, do the application testing and receive feedback from the user after the application trial. This is done to ensure the sustainability of the use of applications.

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