

Restaurant Transaction Application Based on Android System

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Abstract— This study was conducted to see the impact of COVID-19 to transactional activity in restaurant, especially for dine in and take away services. This study aims to help people to transact easily, comfortably, and safely in a restaurant. Other than that, this study aims to help restaurant management activity to be better. This study was developed using lead startup method to give a proper solution. Solution was made in a mobile application for android using Flutter technology. The main features of this application are (1) search for merchant and looking at the available capacity, (2) doing reservation, (3) ordering food for dine in and take away, and (4) doing cashless payment systems in the application also help users to reduce contact with waiters and cashiers.

Index Terms— COVID-19; Dine In; Restaurant, Technology; Take Away; Transaction.

I. INTRODUCTION

Restaurants are familiar to us. Almost everywhere, we can find restaurants, be it in malls, in shop houses, even on the side of the road. According to the Regulation of the Minister of Tourism and Creative Economy No. 11 of 2014 article 1, restaurant is a business providing food and beverage services equipped with equipment and supplies for the process of making, storing, and serving in a fixed place that does not move with the aim of making a profit. Nowadays, restaurants have become part of the lifestyle and culture [9]. Many people go to restaurants to eat, chat, spend their free time, do work, and hang out. This is also supported by data on the growth of the restaurant industry which has continued to move up rapidly in the last decade. according to a survey conducted by Data Industry Research (2021), the restaurant industry has experienced a growth of 50.77% from 2010 to 2019. Based on these data, it can be concluded that the restaurant industry experienced an average growth of 5.64% per year.

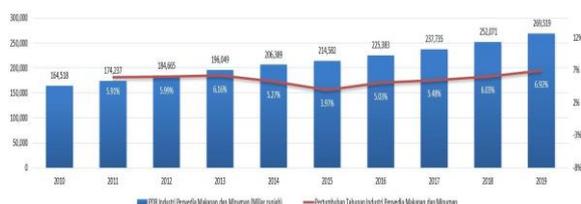


Fig. 1. Graph of the Growth of the Restaurant Industry in 2010 – 2019

However, in this era of increasing restaurant trends, many restaurants are still implementing the traditional system. Many restaurants still carry out various traditional activities, causing the effectiveness and performance of the restaurant to be low [22]. As a result, new problems arise such as loss of concentration of employees, incorrectly delivering orders, double orders occur to the large pile of menus and notes [6]. Not yet finished with the problem, as quoted in Kompas.com, on March 2, 2020, the Indonesian government announced that the COVID-19 virus had entered Indonesia [28]. Because the COVID-19 virus can spread quickly, the Indonesian government has adopted a policy of imposing Large-Scale Social Restrictions (PSBB) to reduce its spread. With the implementation of the PSBB, almost all activities have changed, such as schools being conducted online, working at home or work from home, and various other activities have become restricted, including trade in restaurants. As quoted by CNBC, the Governor of DKI Jakarta, Anies Baswedan, said that during the PSBB, transactions in restaurants were only allowed at 50% of the restaurant's capacity [29]. In addition, the frequency with which people go out of the house has decreased because they are afraid of being infected with COVID-19 [30]. [3] also stated that currently there has been a perception in society that eating and transacting activities in restaurants has a higher percentage of being exposed to COVID-19 than other places. This causes a decrease in the number of transactions in restaurants. According to data submitted by Research Industry Data (2021) in 2020 the restaurant industry production decreased by 6.89%. In addition, according to Sutrisno Iwantono, as deputy chairman of the Indonesian Hotel Association (PHRI), in 2020 there will be 1,033 restaurants that are permanently closed. The general chairman of the Cafe and Restaurant Entrepreneurs Association (Apkrindo), Eddy Sutanto, said that currently restaurant activities depend on controlling the pandemic. Although many transaction activities have shifted to delivery or take away systems, they have not been able to cover the loss of potential income by dine-in or dine-in. Therefore, to encourage transaction

activities in restaurants during the COVID-19 pandemic, it is necessary to implement and improve health protocols [8].

Therefore, This research aims is to help transact activities in restaurants by utilizing technology, both for dine in and take away. This research aims is to create a mobile application where restaurant visitors can immediately see the menu, make orders and reservations, to make digital payments (cashless). In addition, visitors can also see the available restaurant capacity. Through this application, This research aims is to improve the convenience, comfort, and safety of restaurant visitors when transacting at restaurants by reducing physical contact that occurs between visitors and restaurant employees or other visitors. This research aims is to make the mobile application which can make easier the visitors of the restaurant management activities in terms of managing order lists and payments so that there are no errors, such as wrong notes or wrong deliveries. Through this application, order information will be conveyed to the restaurant and when visitors arrive, restaurant employees can provide orders on time so that visitors do not have to wait long. In the process of developing and making applications, restaurant visitors will be referred to as users and the restaurant is referred to as merchants. With this application, this research aims is to increase the convenience, security, and effectiveness for users and merchants so that they can increase transaction activities.

II. THEORETICAL BASIS

A. Theory Relating to Software Engineering

1. Object Oriented Programming

Object oriented system is a system that focuses on capturing the structure and behavior of information systems in the form of small modules containing data and processes, known as objects [7]. Object-Oriented systems have several basic characteristics.

2. Software Development Life Cycle

Software development life cycle (SDLC) is a method for designing, building, and maintaining industrial and information systems (Alshamrani and Bahattab, 2015). Currently there are many SDLC models such as the waterfall model, spiral model, and incremental model. In its application, the SDLC models have a sequence of steps that must be followed and completed by the system maker in order to complete the required product.

3. Unified Modeling Language (UML)

Unified modeling language (UML) is a model language that can display various aspects of a software application system [24]. Currently, UML has become a general modeling language for many purposes [24].

4. Eight Golden Rules

The eight golden rules are fundamental rules in interface design that still very applicable both in desktop devices and mobile devices.

B. Theories Related to the Research Theme

1. Mobile Apps

A mobile application is a type of software application developed to run on mobile devices such as smart phones in the hope that it can be easily carried, held and used by hands.

2. Android

Android first appeared in 2008 and has developed very quickly to date [16]. Android is a comprehensive open-source platform built on top of the Linux system by the Google team. Android is formed from a collection of XML and Java codes. In this case, Android also uses XML to manage its appearance, such as buttons, text fields, and labels.

3. Flutter

Flutter is a portable UI framework from Google for building modern, reactive, and native apps for iOS and Android [20].

4. Node.js

Node.js is a web application with high performance and expandability which is widely used in Internet of Things (IoT) applications, microservices development, frontend development, even in desktop applications [14].

5. Express

Express is a framework built for the use of the Node.js web server by simplifying the use of the API and other features [13].

6. MongoDB

MongoDB is a flexible, scalable, and feature-packed database [12].

7. Restaurant

According to the Regulation of the Minister of Tourism and Creative Economy No. 11 of 2014, a restaurant is a business providing food and beverage services equipped with equipment and supplies for the process of making, storing, and serving in a fixed place that does not move with the aim of making a profit. In its current development, the restaurant which was originally just a place to eat and drink has developed into a hangout and part of a lifestyle [9].

8. COVID-19

COVID-19 (coronavirus disease 2019) is a disease caused by a new type of coronavirus, namely SARS-CoV-2 which was first reported in Wuhan China on December 31, 2019 (Ministry of Health of the Republic of Indonesia, 2020). COVID-19 can spread through the air, goods, or food. Common symptoms include fever, dry cough, and feeling tired. Other symptoms include

aches and pains, congestion, headache, sore throat, diarrhea, loss of sense of taste, skin rash, or discoloration of the fingers or toes. About 80% of infected people recover without the need for special treatment, and another 20% suffer from severe pain and difficulty breathing.

III. METHOD

The method used for making this application is the waterfall model.

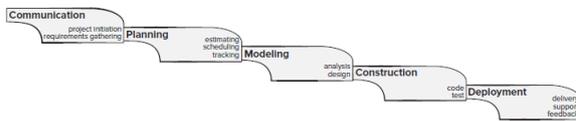


Fig. 2. Stages of the Waterfall Model [31]

Based on Figure 2, the following is an explanation for each stage of the waterfall model:

1. Communication

Communication is the stage to collect information and needs from the market as well as application features and functions. In this project, this research aims to make observations on the market and finds problems. After that, This research aims is also distributed questionnaires to see what the market needed. After that, the results of the questionnaire were analyzed to produce the actual problem and the required solution.

2. Planning

For this step, the research aims is to plan a timeline in making an application, technical task and the requirements that needed to develop an application.

3. Modeling

At this stage, all information and requirements are converted into structural models that are easy to understand and assist in the development process later. The model used is UML which consists of use cases, activity diagrams, sequence diagrams, and class diagrams.

4. Constructions

The construction stage is the stage of making the application. At this stage, the model design in the form of UML is translated into the dart programming language for the client side using the flutter framework and Node.js with the express framework for the server side. At this stage testing is also carried out to see whether the application made is in accordance with what the market needs and whether the application has been able to answer these problems or not.

5. Deployment

At this stage, the Dayly application is tested and evaluated. In addition, improvements were also made to the bugs found.

As for working on this research, it has a timeline as shown in the following table:

TABLE I. DAYLY APPLICATION COMPLETION TIMELINE

Activity	Month				
	March	April	May	June	July
Collecting and exploring the required requirements	█	█			
Design process for the application structure		█	█		
Production process (coding)			█	█	█
Testing					█
Maintenance MVP					█

For now, there are several applications that are mostly used in Indonesia to find restaurants, make reservations, and provide reviews such as Zomato, Qraved, and Eatigo. However, the features provided are still limited to finding restaurants and addresses, merchant ratings, place reservations, and orders for delivery and take away orders. The features available are only for ordering menus and cannot make payments.

TABLE II. DAYLY APPLICATION COMPLETION TIMELINE

Fitur	Application		
	Zomato	Eatigo	Qraved
Search Restaurant	✓	✓	✓
View menu	✓	✓	✓
Give and view restaurant reviews	✓	✓	✓
Make a reservation online	✓	✓	✓
Navigation	✓		✓

Currently, there is no application that can search for restaurants, view restaurant capacity, make reservations, place orders for dine in and take away, to make payments.

A. Analysis of Problems/Needs

To know about the market needs, the questioner has already spread to 100 respondents in randomly and anonym and all questionnaires could be processed. Here are the results of the deployment:

1. What type of food do you choose?

RESPONDENTS PREFERENCE EATING TYPE

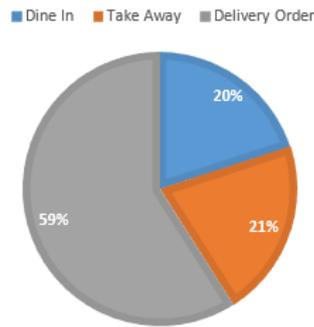


Fig. 3. Graph Respondents Preference Eating Type

Most respondents have a preference for ordering food through delivery orders (59%) and take away (21%). Meanwhile, only 20% of respondents choose to eat dine-in.

2. *For those of you who choose take away or delivery, what is the main reason you choose that option?*

Most respondents prefer delivery or take away for fear of being exposed to COVID-19 (67 respondents). In addition, respondents also prefer to eat at home with delivery or take away services because it is more practical, less comfortable when eating in a crowd during a pandemic, and other reasons such as promos offered by applications or merchants.

After the respondent answers the general questions above, the respondent who chooses the type of eating dine-in will be asked questions to find out the motivation, reasons, and what is important for the respondent when they want to eat dine-in, as follows:

3. *In the midst of a pandemic, how important is the implementation of health protocols in restaurants?*

It can be seen that there are 15% of respondents who think that the implementation of health protocols in restaurants has gone very well, 35% think it is good, 35% think it is quite good, 10% think it is not good enough, and only 5% think it is not good.

4. *Does the level of visitor crowd play an important role in choosing a dine-in place to eat?*

The level of crowds of visitors is one aspect that is very important to be considered by most respondents (70%). In addition, there are 25% who feel important and only 5% who feel the crowd level of a restaurant is less important.

After completing the question session above, which is specifically for respondents who choose dine-in, the following questions are questions that were asked to all respondents, both those who chose to eat dine-in, or take away or delivery. The purpose of this question is to see if respondents are interested in the features that Dayly has to offer and what can encourage respondents to go for dine-in again.

5. *We offer a feature that can tell the capacity and number of diners in the restaurant. How interesting is this feature for you to try?*

There are 58% of respondents are very interested, 24% are interested, and 12% are quite interested in the feature that can see the capacity and number of visitors of a restaurant. Meanwhile, there are 3% of respondents who are not interested, 1% are less interested, 2% are not very interested in this feature.

6. *We offer features to make restaurant reservations and place food orders. How interesting is this feature for you to try?*

There are 63% of respondents who are very interested, 22% are interested, and 11% are slightly interested in the Dayly application with the reservation and food order feature at the targeted merchant. Meanwhile, there are 2% of respondents who are not interested, 1% are not very interested, 1% are less interested in the feature.

7. *We offer a cashless payment feature so there is no need to queue and have direct contact with the cashier. How interesting is this feature for you to try?*

There are 61% of respondents who are very interested, 31% are interested, and 4% are quite interested in features that implement cashless payments. Meanwhile, only 2% of respondents felt disinterested and 2% of respondents were not very interested in the feature.

8. *What do you think needs to be done to encourage you to go dine-in today?*

The tightening of health protocols is the most important thing to be able to encourage respondents to eat dinner again (53.9%). In addition, the decline in COVID-19 cases (10.1%), the existence of qualified supporting applications (9%), surveillance and crowd restrictions (7.9%), and fresh and varied food (4.5%). While some respondents have other opinions such as promos, additional places, and other answers (14.6%).

IV. CONCLUSION

A. Proposed Problem Solving

Based on the analysis that has been carried out, it can be seen that many people are worried and uncomfortable eating dine-in due to the high number of COVID-19 cases. Most people also think that there are supporting applications that can provide certainty regarding health protocols and crowd levels so that they feel easier, more comfortable, and safer when eating dine-in or take-away without having to worry about being exposed to the COVID-19 virus. This research aims to propose to create an application that can ensure the implementation of visitor capacity restrictions. In addition, the application can also help the ordering, reservation, and payment process only by apps so that you don't need to have a lot of contact with other people.

Design Software Description Dayly is an application for ordering food and places, especially when you want to eat dine in and take away so that it becomes easier, more comfortable, and safer from COVID-19. In addition, Dayly also displays the number of capacities and visitors from a merchant so that users can ensure the implementation of health protocols and PSBB. Here are the features in the Dayly app:

- Search for merchants and view visitor capacity.
- View menus.
- Make a reservation for a place to dine in.
- Place orders for dine in and take away.
- Make cashless payments using bank transfer methods (Permata, BCA, BNI, BRI) and e-wallet (GoPay and ShopeePay).
- View merchant reviews

B. Application Functions and Features

This Dayly application has several functions and features that are owned by users and merchants.

1. Users

- Users can search for merchants by merchant name.
- Users can see the capacity of each merchant.
- Users can place orders for dine in or take away.
- Users can make reservations, both for dine in and take away.
- Users can make cashless payments via bank transfer or e-wallet.
- Users can view merchant ratings and provide ratings.

2. Merchants

- Merchants can manage information about their restaurants.
- Merchants can view incoming orders.
- Merchants can add, modify, and delete menus in their restaurants.

In addition to functions and features that can be used by users and merchants, the Dayly application also has certain functions and algorithms to assist the existing process. This function is a password encryption feature using the SHA-256 algorithm with the help of a library from NPM.

C. System Design

The use case reports the interaction between actors in the System safety in take away reservation (Daily Application), as shown in Figure 3.

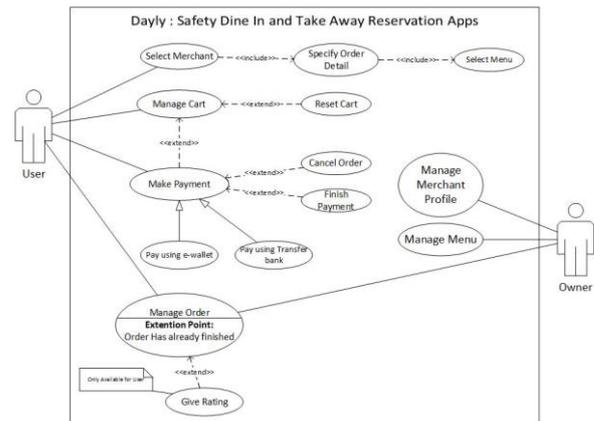


Fig. 4. Use Case Diagram

V. SYSTEM IMPLEMENTATION

In relation to the online learning process, the value Application screen design is a display design that will be applied in the application system as a display interface. The screen design stage is very important in application development because this stage analyzes and presents the UI and UX of an application that will be made. In its application uses Adobe XD to design the Dayly application screen. Here is the layout of the Dayly app:

1. Welcome Screen

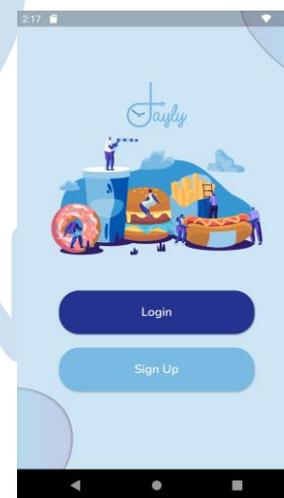


Fig. 5. Welcome Screen Design

The welcome screen is the screen that the user first sees when entering the application if the user has not logged in using the device or has logged out. On this screen, users can see an image of the Dayly logo and food illustrations, a login button and a sign up button.

2. Explore Screen

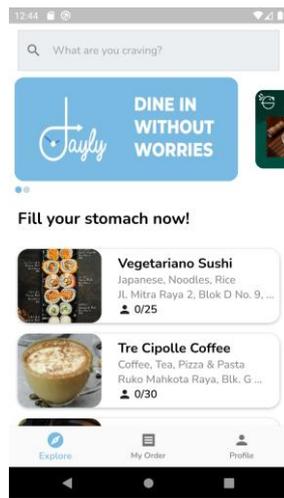


Fig. 6. Explore Screen Design

The explore screen is the screen that the user can see after successfully logging into the application. On this screen, users can see fields to search for merchant names, information banners, and a collection of available merchants.

3. Specify Order Screen

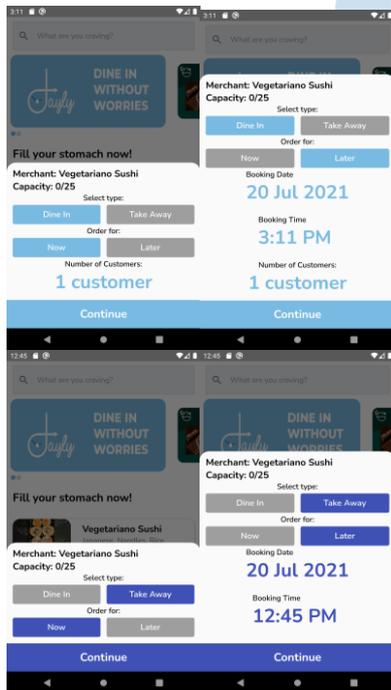


Fig. 7. Specify Order Screen Design

Specify Order screen is a screen where the user can enter information about the order to be made.

4. Merchant Screen

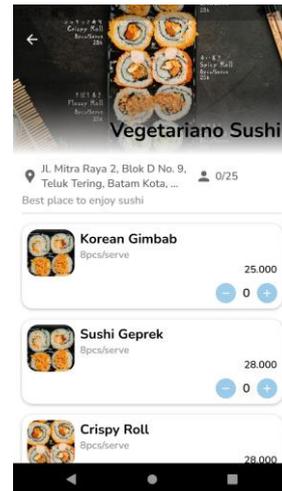


Fig. 8. Merchant Screen Design

Merchant screen is a screen that displays selected merchant data. On this screen, the user can see the available menus and select the menu.

5. Cart Screen



Fig. 9. Cart Screen Design

Cart screen is a screen that displays data from orders to be made and selected menus and their quantities.

6. Payment Screen

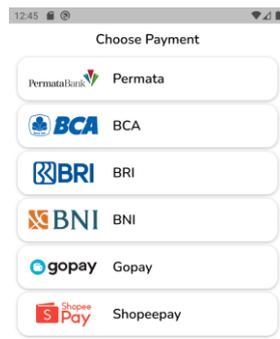


Fig. 10. Payment Screen Design

Payment screen is a screen showing the various payment methods that Dayly provides. The user can choose the payment method by pressing the payment method button.

7. Confirmation Screen

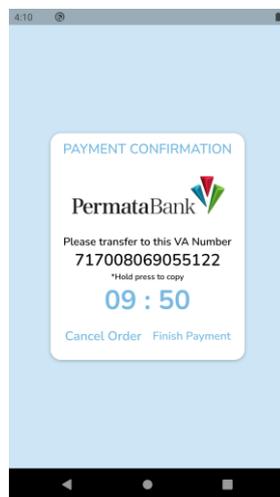


Fig. 11. Confirmation Screen Design

The confirmation screen is a screen that displays information about the selected payment method and the remaining time.

8. My Order Screen

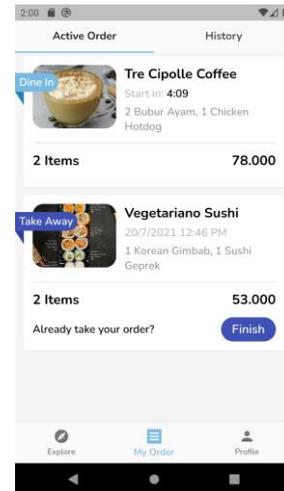


Fig. 12. Active Order Design

Active order is a screen that displays unpaid, pending, and ongoing user orders.

9. History

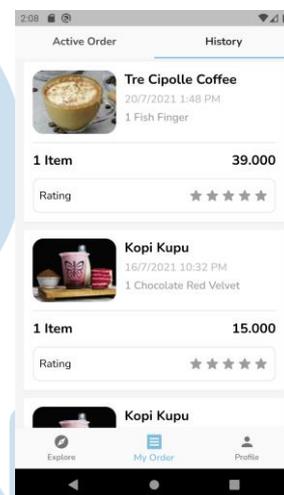


Fig. 13. History Screen Design

History is a screen that displays user orders that have been completed.

10. Give Rating Screen

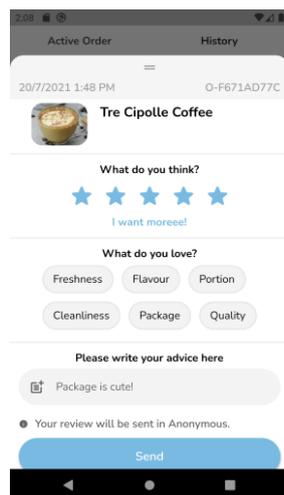


Fig. 14. Give Rating Screen Design

Give rating screen is a screen that users can provide reviews and ratings on merchants.

11. Profile Screen

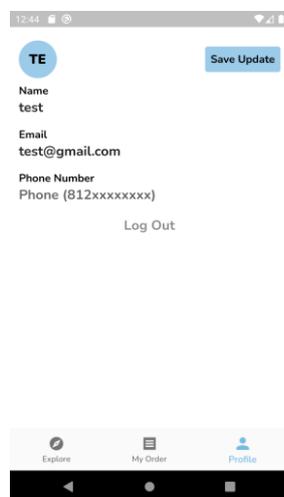


Fig. 15. User Profile Screen Design

Profile screen is a screen that displays information from the currently active user.

VI. CONCLUSION

The current state of the market is feeling worried when you go out to eat, especially when you dine in. This is because they are afraid of contracting COVID-19. Based on the results of usability testing and application evaluation, the Dayly application has answered the issues raised, namely that it can help and make it easier for users to transact at restaurants safely dine-in or take-away by using the feature to see the capacity of restaurants and visitors. In addition, the reservation, ordering, and cashless payment systems in the application also help users to reduce contact with waiters and cashiers. The Dayly application has advantages compared to similar applications, namely it has a feature to see the capacity of a restaurant and its

visitors and has features to make reservations, dine in or take away orders, to cashless payment processes.

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