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Android-based Marketplace Development to Develop Culinary MSMEs in Mataram City

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Abstract **MSMEs (Micro, Small and Medium Enterprises) also contribute to Indonesia's economic growth. In running a business that is engaged in the MSME sector, there are many obstacles faced by most of the perpetrators, one of which is in terms of marketing. Based on research on MSMEs in the province of NTB, the number of MSMEs in Mataram City as of December 31, 2018, was 58,139 businesses. Although the government has made efforts to help MSME actors, there are still many MSMEs that are not yet known by the public so that sellers must promote their products in various places so that their products can be sold, one of which is by utilizing technology such as selling their products through applications. For this reason, in this study, the author builds an Android-based MSME marketplace application in the culinary field in the city of Mataram so that culinary MSME actors in the city of Mataram can promote and sell their products through the application. The process of making the application uses the SDLC (System Development Life Cycle) method with the waterfall model and testing with black box testing. In its design, the application is built using the Kotlin programming language and Firebase services. From testing after the application development process, the results from black box testing show that all test scenarios that have been made have been as expected. Furthermore, testing with MOS (Most Opinion Scrore) was also carried out and the results obtained were the average value of all respondents for a strongly agree score of 45.33%, agree at 34%, 16.67% for moderate, and 4.67% for disagree.**

Key words**: Marketplace; MSME; Culinary; Mataram City; Android**

I. Introduction

MSMEs (Micro, Small, and Medium Enterprises) also contribute to Indonesia's economic growth. MSMEs contribute about 61.07% to Indonesia's total Gross Domestic Product. Based on data from the Ministry of Cooperatives and Small and Medium Enterprises (KemenkopUKM) in March 2021, MSMEs are able to absorb 97% of the total workforce and can collect up to

60.42% of total investment in Indonesia [1]. This is because all community activities can not be separated from various products or services created by MSME actors such as buying daily necessities in stalls and even buying merchandise from relatives or close friends to help their business.

In running a business engaged in the MSME sector, there are many obstacles faced by most of the perpetrators, one of which is in terms of marketing. To market MSME products or services, efforts are needed to expand their marketing network to reach more buyers and increase competitiveness. This also happens to MSMEs in the city of Mataram, especially in the culinary field. Based on data sourced from the NTB Province SME Cooperatives Office, the number of MSMEs in Mataram City as of 2020 is 22,473 businesses with 15,746 micro businesses, 6,194 small businesses, and 533 medium-sized businesses. Although the government has made efforts to help MSME actors, there are still many MSMEs that are not yet known by the public so that sellers must promote their products in various places so that their products can be sold. [2] To overcome these problems, MSME actors can take advantage of technology that makes it easier for the community to carry out many activities. One of the uses of technology in marketing MSME products is by marketing these products through mobile applications that can be accessed anywhere and only by using a smartphone.

The results of a study of MSME actors show that selling through the marketplace has a positive effect on increasing MSME marketing and income. This is because currently many people turn to online shopping because it is easier and more practical. By using the marketplace, MSME actors can reach a wider market share compared to selling in certain areas so that they can reach new consumers and to build new business concepts and use a more effective marketing system. [3]

In addition, in the marketplace, both MSME actors and buyers can take advantage of various features that make it easier for them such as the product catalog feature to display a list of products sold along with photos and detailed information about the product, the auto update stock feature when consumers buy their products, to the chat feature so that consumers can ask further questions with the seller and the seller can also inform more about consumer orders, chat with sellers, tracking features to find out the status of orders, and cart features to store various products you want to buy from various stores.

To build a system, a system development method is needed as a framework in the system development process. In building the Mataram City culinary MSME marketplace application, the system development method applied is the

SDLC (Software Development Life Cycle) with the waterfall model. This method is suitable for high quality software development. SDLC consists of several stages starting from the analysis stage, planning the system or software to be built, the process of making or developing the system including system creation, to testing the system that has been made. The waterfall model is one of the models of the SDLC method whose system development process is carried out using a sequential approach. The waterfall model is applied because to make the Mataram City culinary MSME marketplace application more suitable to be built with a structured and sequential process so that the system will be built as expected.

Based on several advantages possessed by the marketplace that have been described previously, the Mataram City culinary MSME marketplace application will adopt some of these features. The marketplace application that will be built has four user categories, namely sellers, courier buyers, and super admins. So, in this application, sellers can create online stores that display their products, and they can make sales transactions also in the application. Meanwhile, buyers can see the various shops in the application and the products they sell. Courier as an order delivery service, and super admin as the manager of this application. With the existence of a culinary MSME marketplace application focused on Mataram City, it is possible that their business will be increasingly known by the people of Mataram City and its surroundings and will also have an impact on selling their products thereby increasing their income.

II. Literature Review

In this study, the author has read several previous studies relating to the background and limitations of the existing problems as a reference source for completing this research. The following is a summary of previous research related to this Final Project research.

The first research is the research conducted by Idris Yanto Niode, 2009, "MSME Sector in Indonesia: Profile, Problems, and Empowerment Strategies". This research describes the role of MSMEs in the economy which is one of the mainstays for the country's economic resilience, various problems faced by MSMEs, and several development models and strategies for empowering MSMEs that are appropriate to develop these MSMEs. In this study, it is stated that one of the strategies for empowering MSMEs is by way of business actors improving and looking for marketing fields for their businesses. The results of the study from this research are that the government's role in developing MSMEs in the region is very large and MSME actors must be able to take strategic and realistic steps in doing business.[4]

The second research conducted by Agung Arnas Wibowo, 2017, "Designing an Android-Based Application for Handicraft UKM Profile of Bantul Regency". In this study, the problems of MSMEs, especially handicraft MSMEs, were explained, namely the difficulty of the community in finding information and the location of handicraft MSMEs in Bantul district. To overcome these problems, the authors of this study created a craft SME profile application that displays a list of handicraft MSMEs in Bantul district along with profiles, location addresses, and galleries of products sold by MSMEs in the application so that people can find out what handicraft MSMEs are. in Bantul district and find out the exact location of the MSMEs they are looking for. [5]

The third research conducted by Parhuniarti, 2021, "The Strategy for the Development of MSMEs in the Culinary Sector during the COVID-19 Pandemic in the City of Mataram". The problem that was solved in the study was that the culinary MSME actors in the city of Mataram experienced a decline in the number of buyers due to the effects of the COVID-19 pandemic, thereby reducing the income and turnover of the culinary MSMEs. These problems are solved by analyzing the right strategy using the IFE matrix and the EFE matrix. From the results of the analysis, the strategies needed for culinary SMEs during the COVID-19 pandemic are Grow and build (Growth and Development) are incentives (market penetration, market development, and product development) or integration (backward integration, forward integration, and horizontal integration). [6]

The fourth research conducted by Elfina Chairunisa, 2020, "Strategy of Cooperatives and SMEs of NTB Province in the Development of Small and Medium Enterprises (UKM) Sector". In this study, it is explained that as of 2020 there are as many as 22,473 businesses with 15,746 micro businesses, 6,194 small businesses, and 533 medium-sized businesses as well as an analysis of the strategies implemented by the NTB Province Cooperatives and SMEs Office in the development of the SME sector. The results showed that the Department of Cooperatives and SMEs of NTB Province used effective strategies, namely Growth, Development, Protection, and Business Networks and Partnerships. [2]

The fifth research conducted by Teguh Febrianto Setiawan, 2018, "Online Marketing Strategy for Food SMEs (Case Study in Cibinong District)". This research was conducted using a sampling method on several Food SMEs in the Cibinong District. The results of this study are OL marketing (marketing through a computer system) that connects consumers with sellers electronically has increased the income of respondents' food MSMEs by 10-32%.[7]

The sixth research conducted by Kresna Prasmadewa, 2016, "Design and Implementation of Small, Micro and Medium Enterprise Applications Based on Android Mobile". In this study, the author made an application for MSMEs around Tingkir Lor based on Android. The decision was based because based on data from Disperindagkop Salatiga city, 80% of MSME actors do not have computers or laptops, 70% of all MSME actors use smartphones where 96.5% of them use Android-based smartphones. In this application, consumers can search for products sold by various MSMEs, see the location of MSMEs, and send messages to inquire about products or

negotiate prices with sellers. Meanwhile, sellers can register their MSMEs in the application, add and manage the products they sell. [8]

The seventh research conducted by Aji Pamukti, 2021, "Geographical Information Systems for SMEs in Ngaliyan District, Semarang City, Based on Android". In this study, the authors created an MSME information system application that displays MSME information such as the name, address, position of the MSME location on the map, to the route and navigation to get to the MSME location using Google Map, making it easier for consumers if they want to go to the MSME location they want. [9]

The tenth research conducted by Christiana Wulansari, 2016, "e-marketplace for Micro, Small and Medium Enterprises in the city of Bekasi". In this study, researchers designed and built a marketplace application for MSMEs that could be used by buyers and sellers. In this application, sellers can manage the products they sell, manage orders received, see criticism and suggestions from buyers, chat with buyers. Meanwhile, buyers can view various MSME products, make purchases in the application, provide criticism and suggestions for sellers, and chat with sellers to ask for product details or further order status. [10]

The following is a fishbone diagram for the problems that this research will solve.

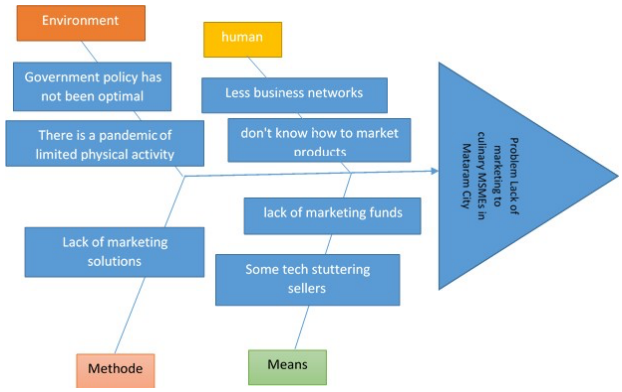

Fig. 1. Fishbone Diagram

III. Research Methods

A. Tools and Materials

The tools and materials needed to support this research are in the form of some hardware, software, and supporting information.

A.1. Tools

The following are used to create a culinary MSME marketplace application in the city of Mataram in this study:

1. Laptop Lenovo V14-IIL
2. Processor Intel Core i5
3. 20 GB RAM
4. Harddisk 179 GB
5. Operating System Windows 10
6. Android Studio Arctic Fox 2020.3.1 Patch 3
7. Firebase

A.2 Research Material

The materials needed to support this research were taken from literature from journals, books, as well as pre-existing research, data on MSMEs in the culinary field in the city of Mataram. The following are culinary MSME data in the city of Mataram sourced from EKRAF (Creative Economy) 2021 Mataram City:

TABLE I. TABLE I. SAMPLE DATA OF CULINARY SMES IN MATARAM CITY

No	Owner	Business Name
1.	Indah Purwanti N.	Bakso Beka
2.	Merry Roesdiana	UD. Alifa
3.	Henny Setiawati	Vey Kitchen
4.	Suci Mahayani	NN Cake & Cookies
5.	Ruspini	Rose Snack
6.	Bq Dian Cahyani	Pawon DJ
7.	Ratu Sa'bani	UD. Tabetta
8.	Mochammad Jamal	Sakana
9.	Ninik Safaroh	Lombok Dessert
10.	Yohani	Totom Cookies
11.	Nurhayani	Cahaya Kue
12.	Fardhiah	Hefa Kitchen
13.	Hayati	Pempek AHA
14.	Leoni Agustina	Sari Buah Segar BE99
15.	Siska Septiana	Poonar Chill House
16.	Lintang Anggraini Kusuma Dewi	Bigboss Martabak Terang Bulan
17.	Andika Indrayanti Sukardi	Indiest Dessert
18.	Endang Susilowati	Muffin Station (PIA LUMBUNG)
19.	Dian Purna Lestari	Sushi Nori
20.	Aminatun Zahro	Yasmin Food

A.3 Research Flow

In conducting research, it is necessary to have a flow that implements a method that will be used as a guide. The method applied in this research is SDLC (System Development Life Cycle) with the waterfall model. The stages in the SDLC applied in this study can be seen in Fig. 2.

Fig. 2. Research flow with SDLC method

Based on Fig. 2, this research consists of 4 major stages, namely the analysis stage, system design, system development, and system testing. In the first stage, namely the analysis stage, a literature study or reference search is carried out in the form of theory and supporting data.

The second stage is the system design stage. At this stage, the process of designing a UML diagram is carried out which explains various features and their detailed flow, database design, and application display design so as to produce a system design that is ready to be implemented.

The third stage is the system development stage where at this stage the programming process is carried out so that from this process the system is ready to be tested before use. The last stage is the system testing stage. At this stage, the system is tested using blackbox testing, which is testing the functionality of the application with several users using different smartphone devices.

A.4 System Planning

The design of the system to create a culinary MSME marketplace application in the city of Mataram consists of several stages, namely making UML diagrams, database creation, and designing the appearance of the application using wireframes.

A.4.1. Use Case Diagram

Fig. 3 is a use case diagram that shows the interaction between users and the culinary MSME marketplace application in the city of Mataram. Based on the use case diagram, users who interact with the application consist of 4 categories, namely buyers, sellers, local motorcycle taxis/drivers, and super admins.

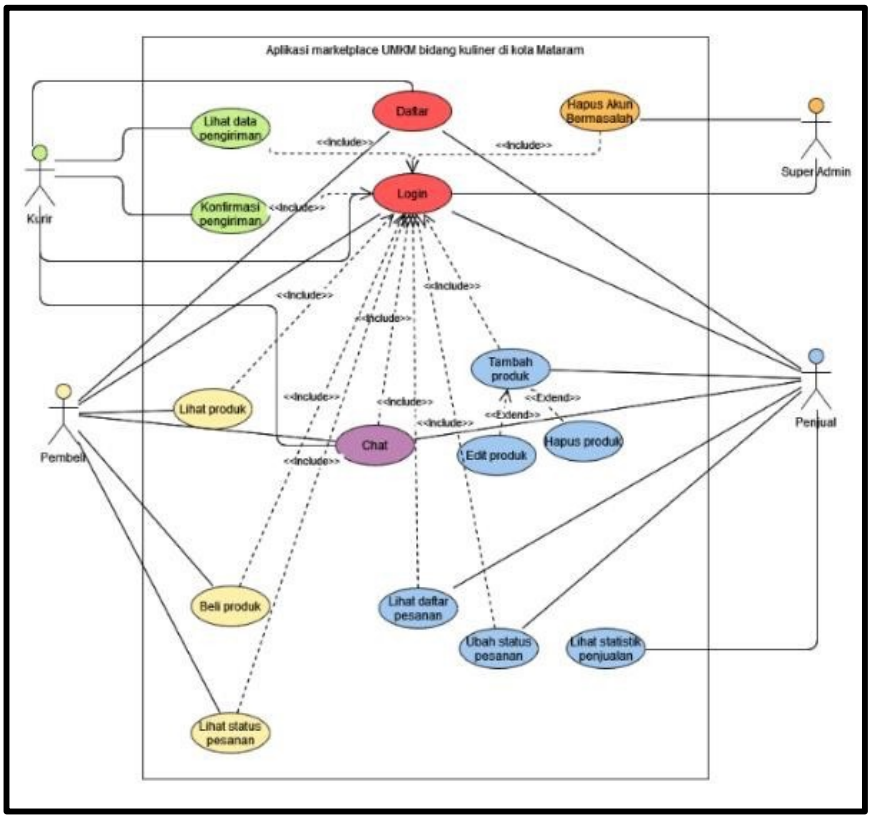

Fig. 3. Application Use Case Diagram

A.4.2 Class Diagram

Based on Fig. 4, there are 7 entities in the Mataram culinary UMKM marketplace application, namely seller, buyer, cart, product, order, driver, and chat entities. The seller entity serves to store user data that acts as a buyer in the application. The data stored is the user ID as a distinguishing identity between users in the application, the user's full name, email, password, phone number, address, city, postal code, last time of access to the application, the date the user created an account for the first time, the name of the bank where the seller has account account for his business, and the seller's account number so that the buyer can make payments by transfer to the seller's account. While the buyer entity functions to store buyer data. The data stored is the user ID as a distinguishing identity between users in the application, the user's full name, email, password, phone number, address, city, postal code, last time accessing the application, and the date the user created an account for the first time.

The product entity serves to store product data sold by the seller in the application. The product data stored is the product ID as a distinguishing identity between existing products, product names, product descriptions, product

prices, product discount prices, product stock sold, URL of product images, and product food categories. Furthermore, the cart entity functions to store a list of products stored by buyers in the cart. The data stored is the buyer's ID, the total price of the products in the buyer's basket, and the total number of products in the buyer's basket. The list of products in the cart is taken from the product entity.

The order entity serves to store purchase data made by the buyer. The data stored is order ID as a differentiator between order data, total purchase price, type of delivery, delivery price, type of payment, time of payment, time of purchase, delivery time, total payment, and purchase status. Chat entity serves to store chat data for each user. The data stored are user ID, message recipient ID, message content, and the date and time the message was sent. Courier entity functions to store data on couriers who will deliver orders to buyers. The data stored is the user ID as a distinguishing identity between users in the application, the user's full name, email, password, phone number, and the last time the application was accessed.

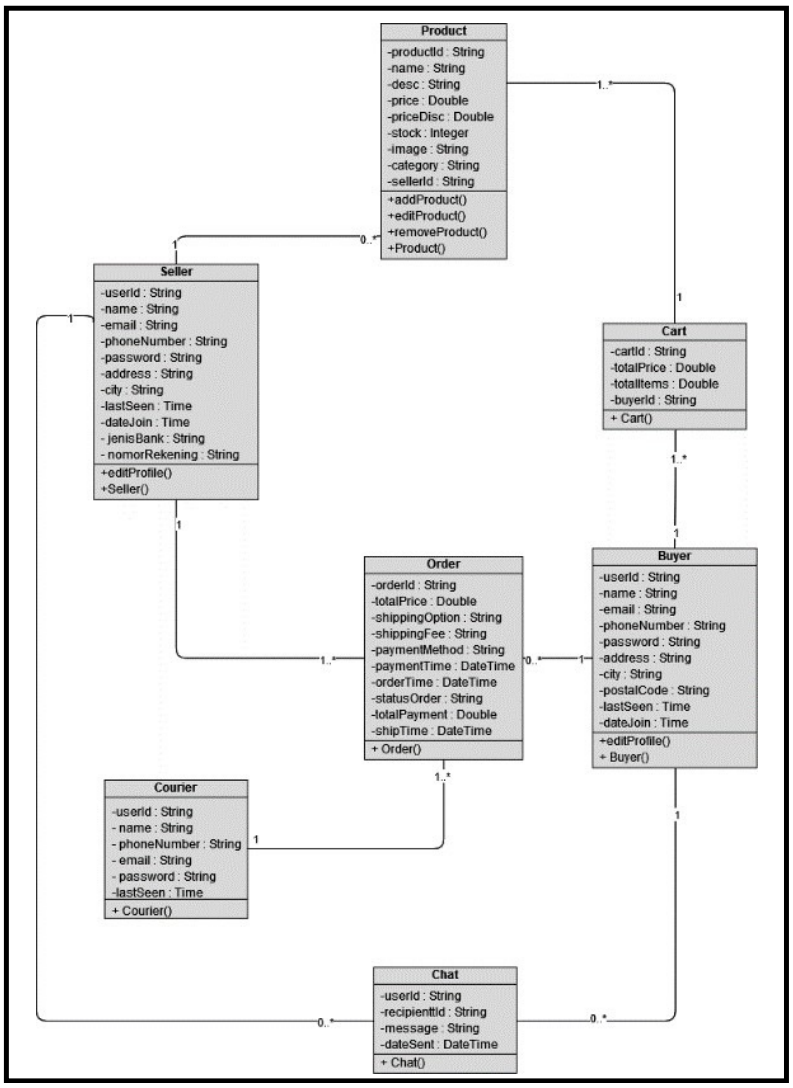

Fig. 4. Application Class Diagram

A.4.3 Database Design with ERD

In Fig. 5, there are 7 entities that will be designed for the culinary MSME marketplace application in the city of Mataram. These entities are seller, buyer, cart, product, order, courier, and chat entities. The seller entity functions to store user data that acts as a buyer in the application. The data stored is the user ID as a distinguishing identity between users in the application, the user's full name, email, password, phone number, address, city, postal code, last time of application access, the date the user created an account for the first time, the name of the bank where the seller has account account for his business, and the seller's account number so that the buyer can make payments by transfer to the seller's account. While the buyer entity functions to store buyer data. The data stored is the user ID as a distinguishing identity between users in the application, the user's full name, email, password, phone number, address, city, postal code, last time accessing the application, and the date the user created an account for the first time.

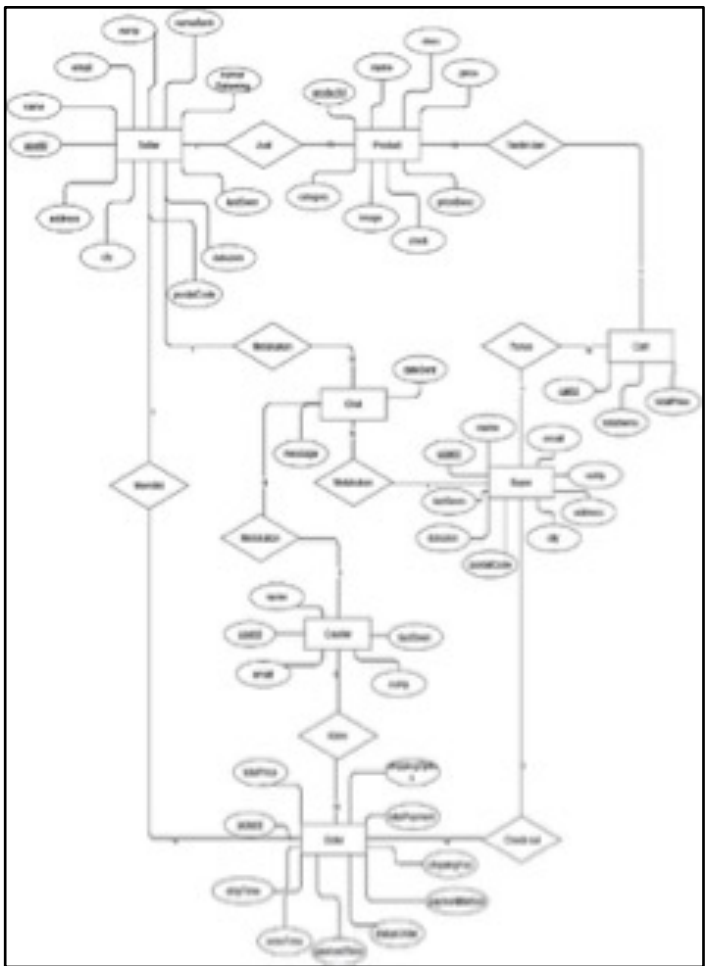

Fig. 5. ERD from application database

A.5 Application Display Design

The design of the application display uses a wireframe that describes the appearance of the culinary MSME marketplace application in the city of Mataram that will be made. The appearance of the application that will be created is as follows.

A.6 System Implementation

After the system design process is carried out, the next stage is the system implementation stage, which is the stage of making a culinary MSME marketplace application in the city of Mataram using Android Studio with the Kotlin programming language and Firebase service. Kotlin is a programming language that was developed from the Java programming language so that code built with Kotlin is more concise and more efficient. To store the application database, the author uses the Firebase Realtime Database service. Meanwhile, to store media files such as product photos sold in the application, the author uses the Firebase Storage service.

IV. Result and Discussion

A. Application Creation and Development

The process of making and developing the application consists of several stages, namely the stages of creating a database, designing application architecture, making a site map, and making an Android-based MSME marketplace application in the city of Mataram.

A.1 Database Creation

The database created for the culinary UMKM marketplace application in the city of Mataram uses a NoSQL-based Firebase Realtime Database where data is stored in the form of a single JSON document. The following is a database structure created for the culinary MSME marketplace application in the city of Mataram on the Firebase Realtime Database.

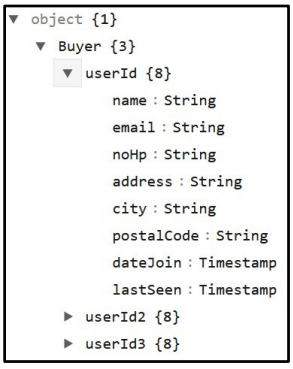

Fig. 6. Buyer mode data structure in database

Fig 6 is the structure of the buyer node data in the database for the culinary UMKM marketplace application in the city of Mataram. In the data there are several users with a differentiator, namely user ID. The user ID node consists of user data that acts as a buyer, namely field name, email, cellphone number, address, city, postalCode, dateJoin, and lastSeen.

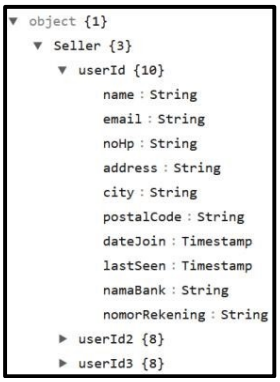

Fig. 7. Seller node data structure in database

Fig 7 is the structure of the seller node data in the database for the culinary MSME marketplace application in the city of Mataram. In the data there are several users with a differentiator, namely user ID. The user ID node consists of user data that acts as a seller, namely field name, email, cellphone no, address, city, postalCode, dateJoin, lastSeen, bank name, and account number.

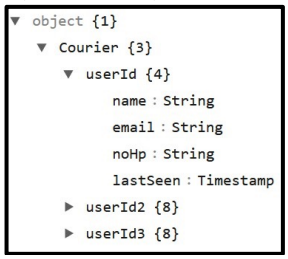

Fig. 8. Courier node data structure in database

Fig 8 is the structure of the courier node data in the database for the culinary UMKM marketplace application in the city of Mataram. In the data there are several users with a differentiator, namely user ID. The user ID node consists of user data that acts as a courier for ordered goods, namely field name, email, cellphone number, and lastSeen.

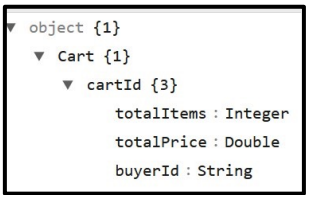

Fig. 9. Node cart data structure in database

Fig 9 is the structure of the data node cart in the database for the culinary UMKM marketplace application in the city of Mataram. The cart node is used to store buyer cart data. On that node, there are several nodes with a differentiator, namely cartId and in the cartId there are fields totalItems, totalPrice, and buyerId.

A.2 Application Architecture After Implementation

Based on Fig. 10, the technology used is Firebase which functions as a backend-as-a-service (Bass) platform, which is a facility that provides several backend services such as database storage, file storage, to managing the authentication system for applications. To be able to operate this application, users need a smartphone device based on Android and connected to the internet in order to retrieve data on the firebase server.

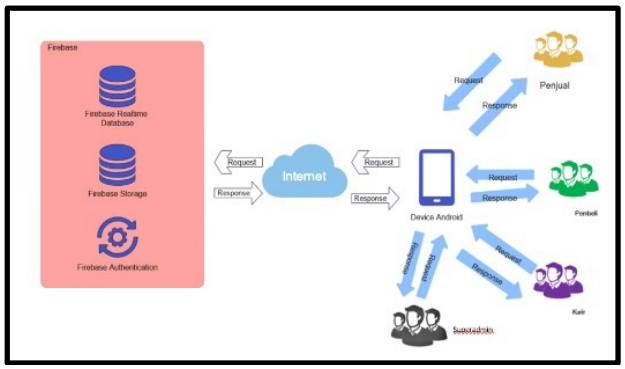

Fig. 10. Application Architecture

A.3 Site Map Creation

A site map is a description of the process of moving from one page to another. Fig 11 to 14 is a site map for the Mataram city culinary MSME marketplace application on the side of buyers, sellers, and couriers, respectively.

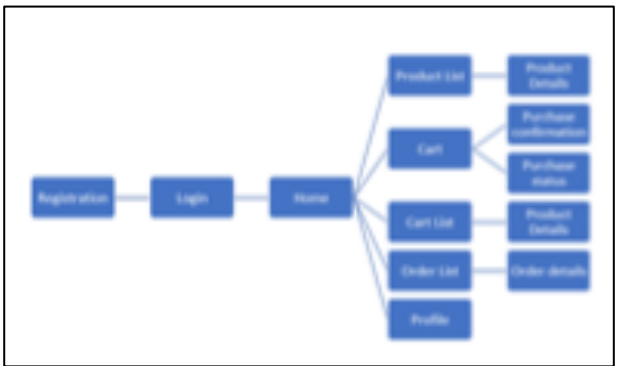

Fig. 11. Site map application from the buyer side

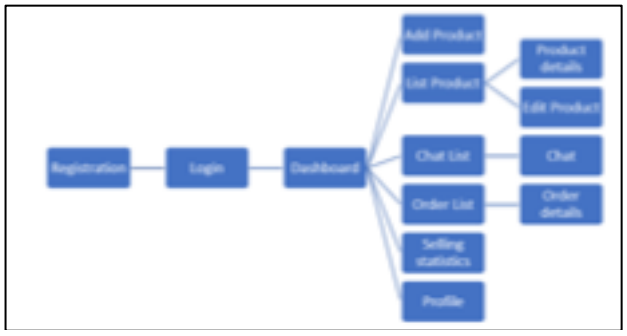

Fig. 12. Application site map from the seller's side

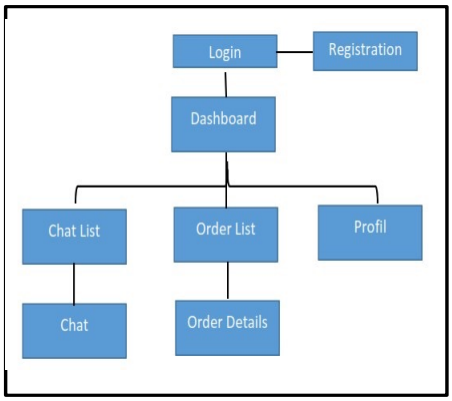

Fig. 13. Application site map from the seller's side

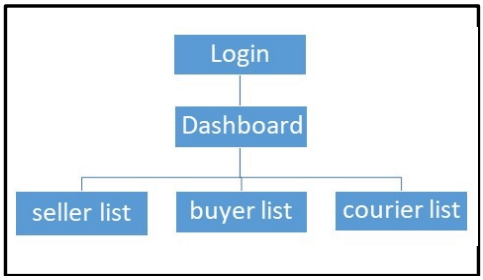

Fig. 14. Application site map from the courier side

A.3 Making the Mataram City Culinary MSME Marketplace Application

Making the UMKM marketplace application in the culinary field of Mataram City is implemented by creating program code using Android Studio and using the Kotlin programming language. This application program project consists of several layouts in the form of XML files, activity classes, view models, and adapters.

A.4 Layout (XML)

Creating layouts for application views (interfaces) using XML. Fig. 15 to 20 are a visualization of creating a layout using XML.

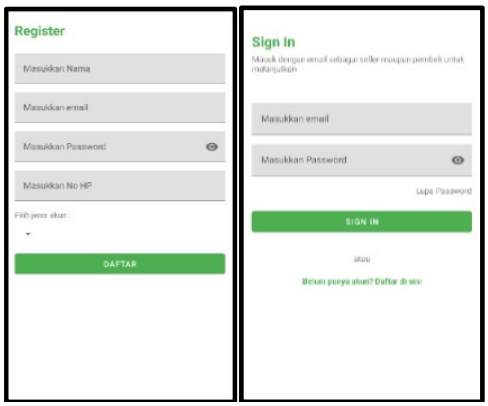

Fig. 15. Registration (left) & Sign (right) in page layout

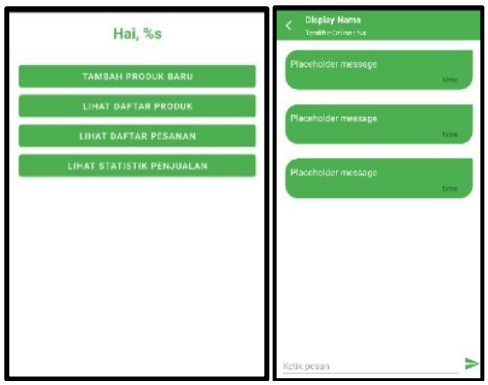

Fig. 16. Seller dashboard (left) & Chat (right) page layout

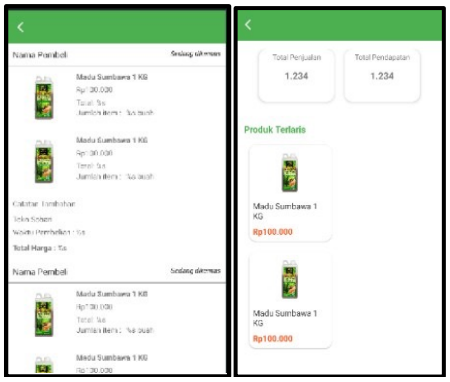

Fig. 17. Seller order list (left) & Seller order statistics (right) page layout

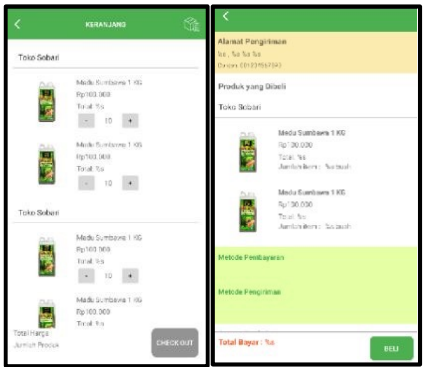

Fig. 18. Buyer cart (left) & Purchase configuration (right) page layout

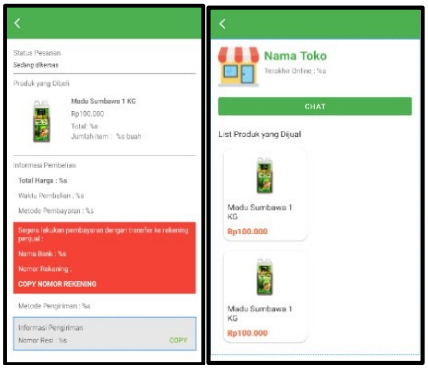

Fig. 19. Buyer order detail (left) & Buyer side profile (right) page layout

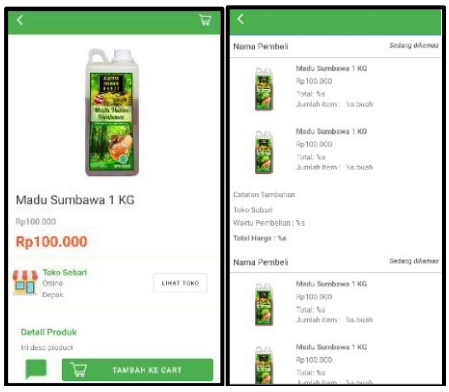

Fig. 20. Product detail from buyer's side (left) & Courier order delivery list (right) page layout

B. Application Testing

The application testing process is carried out using the blackbox testing method and with a questionnaire given to several MSME actors in the culinary field in the city of Mataram.

B.1 Test Results with Blackbox Testing

As explained earlier, blackbox testing is an application test by testing the features contained in the application. The following are the features found in the culinary MSME marketplace application in the city of Mataram.

TABLE II. BLACK BOX TESTING ON THE SELLER

Feature	User	Result
Registration	Seller	Accordance
Login		Accordance
Change Profile		Accordance
Add Product		Accordance
Change Product Data		Accordance
Delete Product		Accordance
Displays a list of products sold by sellers		Accordance
View Product Details		Accordance
See Seller's Order List		Accordance
Change Order Status		Accordance
View Sales Statistics		Accordance
Chat		Accordance

TABLE III. BLACK BOX TESTING ON THE BUYER

Feature	User	Result
Registration	Buyer	Accordance
Login		Accordance
Change Profile		Accordance
Product Recomendations		Accordance
Product Search		Accordance
Displaying Product List by Category		Accordance
View Product Details		Accordance
Adding Items to Cart		Accordance
Displaying Product List on Cart Page		Accordance
Make a Product Purchase		Accordance
Display Order List		Accordance
Display Order Details		Accordance
Chat		Accordance

TABLE IV. BLACK BOX TESTING ON COURIER

Feature	User	Result
Registration	Courier	Accordance
Login		Accordance
Change Profile		Accordance
View Shipping List		Accordance
View Delivery Details		Accordance
Change Order Status		Accordance
Chat		Accordance

B.1 Test Results with Questionnaire

After testing the application with blackbox testing, then testing with the questionnaire method was carried out for several culinary MSME actors in the city of Mataram and some people who acted as buyers. The following is the content of the questions given:

Seller

1. Is the application display easy to understand?
2. Are the features in the application easy to use?
3. Can this application help in marketing and selling products?
4. Is this application in accordance with what is needed by culinary SMEs?
5. Is this application running well?

Buyer

1. Is the application display easy to understand?
2. Are the features in the application easy to use?
3. Can this application help in finding and buying culinary products sold by culinary SMEs in the city of Mataram?
4. Is this application in accordance with what is needed by the buyer?
5. Is this application running well?

Delivery Courier

1. Is the application display easy to understand?
2. Are the features in the application easy to use?
3. Can this application help in sending orders to the destination address?
4. Can this application help in increasing income as a delivery courier?
5. Is this application running well?

From the results of the questionnaire testing obtained, the results of the average calculation of all questions for seller users obtained a value for strongly agreeing 52%, agreeing at 34%, 14% for moderate, 5% for Strongly agree Agree Enough Disagree Don't agree disagreeing, and 0% for disagreeing. The graphical representation of the results of the calculation of the average value of the respondents' answers can be seen in Fig. 21.

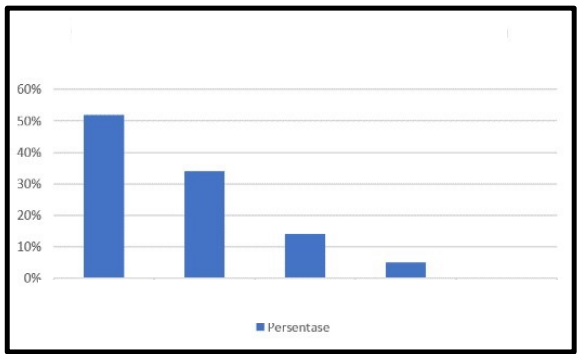

Fig. 21. Graph of the average percentage of respondents on the seller's side

From the results of the questionnaire testing obtained, the results of the average calculation of all questions for the buyer user obtained a value for strongly agreeing at 56%, agreeing at 32% and 12% for moderate. The graphical representation of the results of the calculation of the average value of the respondents' answers can be seen in Fig. 22.

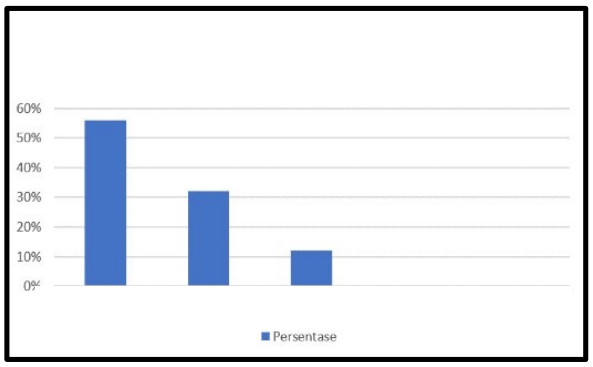

Fig. 22. Graph of the average percentage of Buyer side respondents

From the results of the questionnaire testing obtained, the results of the average calculation of all questions for delivery courier users obtained a value for strongly agreeing at 28%, agreeing at 36%, 24% for moderate, and 14% for disagreeing. The graphical representation of the results of the calculation of the average value of the respondents' answers can be seen in Fig. 23.

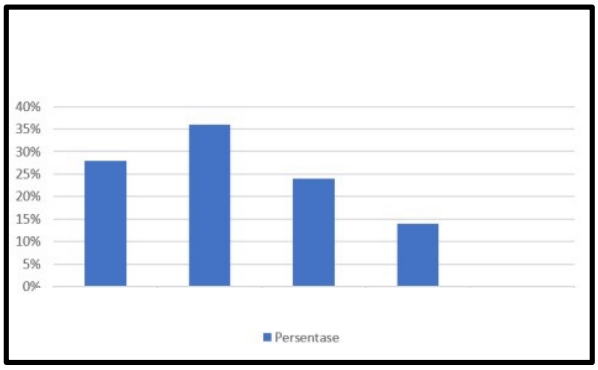

Fig. 23. Graph of the average percentage of respondents on the Delivery Courier side

V. Conclusion and Suggestion

A. Conclution

Based on the description and discussion that has been described previously, the following are:

1. The design of the MSME marketplace application in the culinary field in the city of Mataram in this final project can help MSME actors in the culinary field in the city of Mataram in promoting and selling the products they sell to consumers on the application. Meanwhile, consumers can also make purchases, ask sellers for their product or order information, and track their orders in the application.
2. After testing using the black box testing method, it was found that the application runs quite well on each of its features in all user categories, be it sellers, buyers, and delivery couriers.
3. After testing with a questionnaire to 35 respondents, namely 10 culinary MSME actors in the city of Mataram, 10 buyers, and 5 delivery couriers, the average calculation results from all questions, namely 45.33% of respondents considered that the MSME marketplace application in the culinary field in the city of Mataram runs well, is easy to use and understand, and helps them with buying, selling, and shipping orders

B. Suggestion

The suggestions given for the system that has been built to be even better, are as follows:

1. Adding advertising features so that sellers can promote more vigorously the products they sell to consumers in the MSME marketplace application in the culinary field in the city of Mataram.
2. Adding payment methods using digital wallets such as GoPay, OVO, Dana, and others so as to make it easier for buyers to make payments for their orders.
3. Applications that are built can be continued as research or community service.

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