

Analysis of the Need for a Halal Tracking System in Indonesia: A Case Study of Fast Food Restaurant

Ichsanul Putra Jefi^{1,*}, Putri Monika Pratami², Iwan Sukarno³

{ 102419001@student.universitaspertamina.ac.id¹,
102419013@student.universitaspertamina.ac.id,²
iwansukarno@universitaspertamina.ac.id³}

Program Studi Teknik Logistik, Fakultas Teknologi Industri, Universitas Pertamina
Jl. Teuku Nyak Arif, Simprug, Kebayoran Lama, Jakarta Selatan, 12220, Indonesia

Abstract. Currently, the supply chain sector is developing the halal logistics in supply. As a Muslim-majority country, Indonesia put halal as an important requirement in the use/consumption of goods. However, there is a lack of understanding regarding halal logistics among the public and even companies that produce halal products. To address this, the research conducted with statistical qualitative methode using questionnaires to gauge the public's perception and demand for a system that can trace the halal status of a product from farm to consumer. The study revealed that 77% of respondents of respondents expressed a need for a comprehensive halal tracking system that was able to provide information on the halal of a product from end to end process. In addition, there are 12 functional and 7 non-functional requirements, developed use case diagrams, and system user interfaces that are created as a visualitation from the voice of customers that identified from this research.

Keywords: Halal, Logistics, Tracking system, Fast food, Costumers

1 Introduction

The food business is often a byword in almost many places at this time and in the future, it will be predicted to be one of the prima donnas of world-class business. The increasing trend of the halal food business as a form of Muslim population growth to meet their needs, besides the increasing demand for halal products, is also caused by the large number of non-Muslim residents who are starting to understand the benefits and advantages of halal products themselves. Indonesia, which is predominantly Muslim and has the largest Muslim population in the world, has a huge opportunity as a center for halal food in the world [1].

But fortunately, this great opportunity has not been responded to by the ability of the community and government to maintain halal goods from the production process to the consumers. Recently there was a news that occurred on social media where a netizen shared a video of him ordering a

meal at a well-known restaurant in his area, "why doesn't the chicken have a butcher mark on its neck..." said a customer in this video [9]. In the video, a man can be seen ordering a whole fried chicken meal with rice and fresh vegetables, but when he flips through the chicken he doesn't see the butchery on the neck of the former chicken. The video has been watched by more than 4 million Indonesians and received many comments concerning the handling and processing of food in Indonesia.

From one of this example, it can be seen that Indonesian people are Muslim but in their daily life they still do not apply the concept of Islam itself, especially in end to end process of the food. For Muslims, it is an obligation to consume something halal and also processed it in a halal manner. Moreover, they know that whatever they eat will become flesh and blood in the body, both halal and haram. It is this halal or haram food that in Islam greatly influences the behavior and prayers of a Muslim [1].

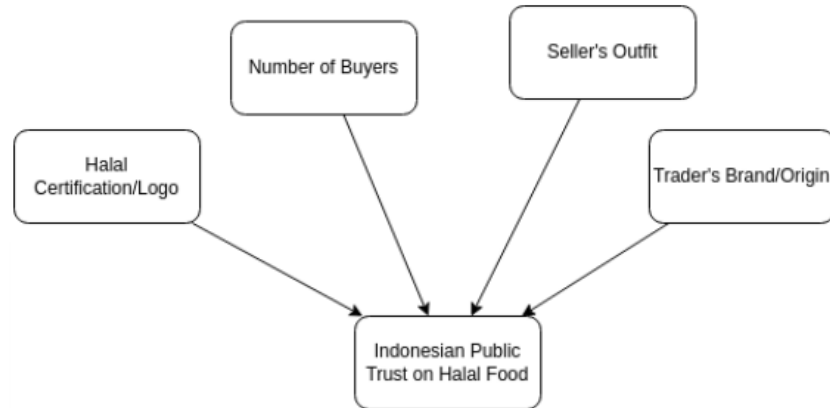


Fig. 1. Factors of Indonesian Public Trust on Halal Food

In general, according to **Figure 1**, this paper will discuss the level of trust of the Indonesian people towards the food that they consume, because in Indonesia itself there are several factors influence it:

- **Number of Buyers**
One of the most prominent habits of Indonesian people is that when a food shop has many buyers, it is automatically in the minds of others who see that the food is halal.
- **Seller's Outfit**
There is no doubt that the Indonesian people believe that when traders who sell food use caps, especially white ones, they will be sure that the food made is halal.
- **Trader's Brand/Origin**
The point is that when their trademark is Nasi Padang or Padang people eat, a lot of people think that the cooked food is halal.
- **Halal Certification/Logo**
The presence of a halal logo on merchandise or merchant shops will eliminate buyer concerns about whether a product is halal or not.

But in reality, those variables above cannot be used as benchmarks for this research, firstly the number of buyers does not guarantee the halal of the product, a real example is the case of fried chicken that is not slaughtered, the sale of fried chicken is quite a lot but in the end, this does not guarantee that is halal. Even though outfit sellers are dressed in Muslim clothes, but some people abuse these clothes, there is a lot of news regarding meatballs from mice or pigs which are used as raw materials for selling them. Next, origins and trademarks, it is a common belief that Nasi Padang is made by Minang people, and of course, they are Muslims, but in fact, recently there is a Nasi Padang restaurant that sells or mixes its products with pork [3].

So it can be concluded that these variables cannot be used as a 100% standard in purchasing halal food. According to these concern, this study aims to determine the community's need for an integrated system to trace the halal of food sold especially in a restaurant from beginning of raw material to the end process until it serve to consumer. This research focusing on fast food restaurants customers as the object research. In addition, this study also aims to find out the detailed system specifications required based on consumers need.

2 Literature Review

2.1 Fast Food

Fast food is food that is prepared quickly, easily served, processed easily and practically [4]. Fast food is food that has lack of nutrition. The content of the material that commonly found in fast food is salt, fat and sugar which are high in calories but low in nutrients such as vitamins, protein and minerals. Eating too much fast food can lead to many diseases and weight gain [4].

The Indonesian fast food industry has great opportunities for the development of Small and medium-sized enterprises (SMEs) and fast food restaurants. A survey titled "Ready Meals Market Size, Share, and Trends Report" conducted by Grand View Research estimates a Compound Annual Growth Rate (CAGR) of 5.5% from 2020 to 2027, with the fast food market growing to reach 159.15 billion in 2019 [5].

Majelis Ulama Indonesia (MUI), an institution that is a forum for deliberations of Muslim scholars, Ulama and intellectuals in Indonesia to guide, foster and protect Muslims throughout Indonesia also continuously ensure the firmness of products produced by Micro, Small & Medium Enterprises (MSMEs) by issuing the Obligatory Halal Certification Policy. However, this policy can burden MSME actors, so it needs to be reconsidered, because will affect the growth rate of MSMEs later. The political process is not easy because it is expensive and need a complicated administration process. Contrastingly a large companies such as fast food restaurant that can implement a halal certification policy need to make sure the raw material until the food ready to serve clean and halal. The halal logo obtained and printed at fast food outlets is useful for convincing Muslim. Whether or not there is an existing halal certification it does not mean it is free from the supervision of the BPOM and God, that has an important role in the protection of certain people's consumption [5].

2.2 Halal Supply Chain

Supply Chain Management (SCM) is a supply chain that consist of stages and activities that are directly or indirectly related to meet customer demands by paying attention to the flow of materials, products, information, and finance [6]. In the supply chain there are various activities, such as storing, procuring goods, shipping, product handling and inventory management and so on. The halal supply chain is a supply chain activity that put halal standards along the end to end process.

Providing halal value in the supply chain as a whole requires halal management based on the standard from each country to implement it. According to Van der Spiegel et al, the first halal product warehousing activity in the world is implemented in the Netherlands, from which the development of halal supply chains has been encouraged in other countries. In ensuring the safety of halal products, a system that can trace and integrate them with halal standards in the food safety system is needed, because during the safety of the product not only come from production or manufacturing process but the from the distribution process halal products can be contaminated by haram or filthy products [7].

2.3 Tracking

Tracking is an activity to track, trace and identify a movement [8]. In this study, the system requirements analyzed are Halal Tracking systems, which are related to tracking the halal movement of a product starting from materials source, proces, storage to distribution. In realizing this system, there have been many technological advances that can be used, including RFID (Radio-frequency identification), Transportation Management System (TMS) and blockchain technology. This technology utilizes the Internet of Things (IoT) to store halal certification data from government agencies and of course can be used to support this halal tracking system [8].

2.4 Functional Requirment

The functional requirements of software depend on the type of software, users, and the type of system itself [10]. Functional requirements are priority requirements needed for services that must be provided by the system, functioning so that the system knows the behavior that must be carried out on certain inputs to meed what the user needs.

2.5 Non-Functional Requirement

The Non-functional requirements of software generally consist of four, namely usability, portability, reliability, and supportability [10]. Usability is related to the ease of use of the system by the user. Portability is related to the ease of accessing the system, especially related to the time and location of access, as well as the devices used to access the system. Reliability is related to system reliability and system security. and the last is supportability, which is related to support in the software used to run the system.

2.6 Use Case Diagram

The use case diagram presents the interaction between the use case and the actor [11]. Where actors can be people, equipment or other systems that interact with the system being built. The use case describes the functionality of the system or the requirements that the system must meet from the perspective of customer. Use Case is modeling for the behavior (behavior) of software applications

to be made [12]. Use Case also describes an interaction between one or more actors and the application to be made.

3 Methodology

This study uses a qualitative approach by utilizing questionnaire data as primary data and literature study as secondary data. The object of this research is fast food restaurant consumers, with the number of respondents is 66 consumers. The research flow chart that contains each steps of the research that will be a guidance to achieve the purpose and results in this research. The research flow chart is shown in **Figure 2**.

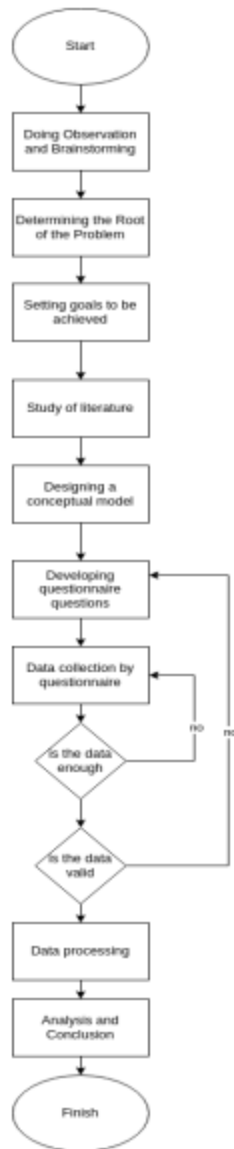


Fig. 2. Research Flowchart

3.1 Field Observation

Before conducting further research, Field Observation conducted every problem that is around, especially related to halal logistics. This will be the root for the research to create the purpose of the research.

3.2 Determining the Root of the Problem

After knowing several problems related to halal logistics in the surrounding, the next step is to determine and analyze the root causes of the existing problems. So the research will be directed.

3.3 Setting Research Objectives

When the root cause of the problem is found, the problem is then set and the research objectives are formed and that will become the goals of the research.

3.4 Study of Literature

To support the conducted research, various literatures ranging from journals, articles and news related to research from the credible information are collected and analyzed.

3.5 Designing a Research Conceptual Framework

At this stage, designs of a conceptual framework are created, which consist of the research flow and the methods that will be used.

3.6 Collecting Data

Data was collected using a questionnaire given to respondents as a sample of research object. The questionnaire was created using a Likert scale and the preparation of questionnaire questions was carried out through discussion and literature study. The questions in the questionnaire have been arranged according to the considerations related to the things to be analyzed in this study, Table 1 is a list of questions in the questionnaire that used in this research.

Table 1. Questionnaire Question Data

List of The Question
<i>Seberapa sering anda makan di restoran Ayam Cepat Saji?</i> <i>Apakah ketika anda makan di sebuah restaurant melihat label halal terlebih dahulu sebelum memasukinya?</i> <i>Apakah menurut Anda makanan yang anda makan setiap hari sudah terjamin kehalalannya?</i> <i>Ketika makan di tempat yang tidak ada label halal, seberapa yakin anda bahwa makanan tersebut halal?</i> <i>Tanggapan Anda ketika melihat Video [9] yang kami bagikan</i> <i>Setelah melihat video yang kami bagikan, apakah anda akan lebih berhati-hati lagi dalam membeli makanan?</i> <i>Apakah Anda merasa Penting adanya Logistik Halal di</i>

Indonesia?

Apakah menurut Anda perlu adanya aplikasi atau sistem yang bisa melacak kehalalan produk anda?

Sistem Tracking Halal Seperti Apa yang anda harapkan?

Detail informasi apa saja yang anda inginkan dalam sistem?

Apa harapan anda terhadap Sistem Tersebut?

3.7 Data Sufficiency Test

After collecting data from the respondents, the first step that must be done is to test whether the data that has been collected is sufficient or not, because when the data is not enough, of course the results from the analysis of the data will not be accurate and the effect the result is not significant, but if the data that is processed is sufficient and by the needs it will increase the results of the processing which has a great influence and significance.

To calculate the adequacy of data that is more than 30, the following equation is used.

$$N' = \left[\frac{\frac{K}{S} \sqrt{N \cdot \sum Xi^2 - (\sum Xi)^2}}{\sum Xi} \right]^2 \quad (1)$$

Information:

N' = Minimum amount of data required

N = Amount of data collected

K = Tingkat kepercayaan dalam pengambilan data (k=2, 1- α = 95%)

S = Level of confidence in data collection (5%)

Xi = Data that has been collected

3.8 Data Validity Test

Next is the validity stage which aims to determine the validity and measure the suitability of the questionnaire that has been designed to the responses given by the respondents. In addition, the purpose of the validity test is to measure that the variables measured are really important for this study. In this study, the validity test used the SPSS software.

3.9 Processing Data

After the data obtained are sufficient and valid, then data processing is carried out. At this stage, the data obtained from the results of the questionnaire are processed using statistical analysis and created into the diagram using Microsoft Excel as a tool.

3.10 Analyzing and Drawing Conclusions

Analysis and conclusions are made based on the objectives and research results that have been obtained to see the result of the research.

4 Results And Discussion

4.1 Analysis of Data Sufficiency Test

In this study it was determined that the degree of accuracy was 5% with a 95% confidence level, so if the value of $k \approx 2$ or in other words from 95% was taken, the data would only have a maximum error value of 5%, while for s the remainder of k ie 5% or 0.05.

$$N' = \left[\frac{\frac{2}{0.05} \sqrt{66 \times 1487 - 96721}}{311} \right]^2$$

$$N' = 23.5$$

$$N' \approx 24$$

It can be seen that the value of $N > N'$ means that the data that has been collected is sufficient, and the data is enough to picturing the respondent. After the data is proven that sufficient, it can proceed to the next stage, which is validity test.

4.2 Data Validity Test Analysis

The **Figure 3** following is a validity test that is assisted by using SPSS software.

		Correlations				
		x1	x2	x3	x4	Total
x1	Pearson Correlation	1	.029	-.042	.054	.586**
	Sig. (2-tailed)		.819	.738	.667	.000
	N	66	66	66	66	66
x2	Pearson Correlation	.029	1	.127	.102	.655**
	Sig. (2-tailed)	.819		.308	.417	.000
	N	66	66	66	66	66
x3	Pearson Correlation	-.042	.127	1	-.344**	.475**
	Sig. (2-tailed)	.738	.308		.005	.000
	N	66	66	66	66	66
x4	Pearson Correlation	.054	.102	-.344**	1	.192
	Sig. (2-tailed)	.667	.417	.005		.123
	N	66	66	66	66	66
Total	Pearson Correlation	.586**	.655**	.475**	.192	1
	Sig. (2-tailed)	.000	.000	.000	.123	
	N	66	66	66	66	66

** . Correlation is significant at the 0.01 level (2-tailed).

Fig. 3. SPSS Correlation Results

Table 2. Data Validation Test Results			
Question	r calculate	r table	Result
X ₁	0.586	0.244	Valid
X ₂	0.655	0.244	Valid
X ₃	0.475	0.244	Valid

Based on the results of data processing using SPSS in Tabel 2, the data is declared valid if $r_{\text{calculate}} > r_{\text{table}}$, from the Table 2 above, it can be concluded that the data collected has been proven valid. So the processing data from the questionnaire can be continue.

4.3 Questionnaire Data Analysis

Data was collected through questionnaires that given to consumers of fast food restaurants. The customer need to answer each question or statement according to Table 1 by choose the number from the linkert scale 1 to 5, a higher number choosen means that more important the statement. Based on the results of the questionnaire obtained some information as **Figure 4** and **Figure 5** follows with X-axis means linkert scale and Y-axis means the number of respondent.

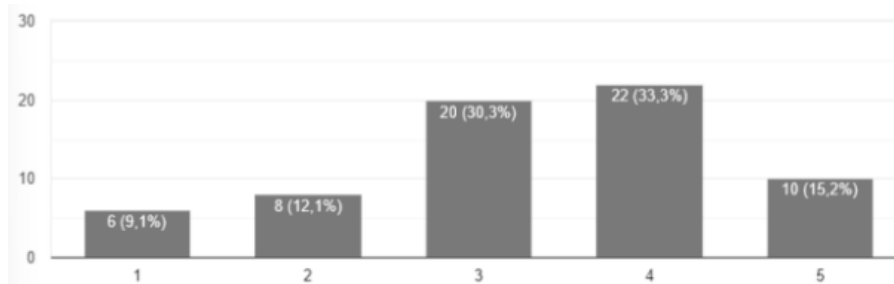


Fig. 4. Information on the Selection of Halal Products and Restaurants

Based on the picture above, the results of the questionnaire show that 30.3% of respondents have visited fast food restaurants, 33.3% choose often and 15.7% very often visit fast food restaurants. Therefore, it can be concluded that respondents who represent consumers tend to often eat at fast food restaurants.

Next, it is related to consumer awareness of the halalness of food and fast food restaurants.

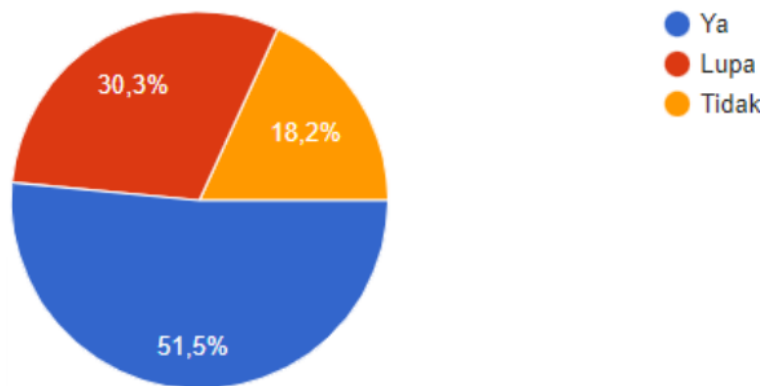


Fig. 5. Information on the Importance of Halal Awareness in Food

From the **Figure 5** above, it shows that only 51.5% of respondents are aware of or pay attention to the halalness of the restaurants they visit. This shows that public awareness or concern for the halal label of the food consumed is still relatively low. Based on this data, the concerns and needs of consumers for halal logistics are analyzed as follows.

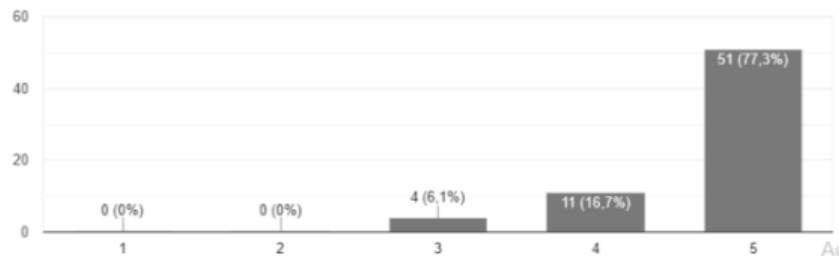


Fig. 6. Information on thhe Importance oof Halal Logistics

Based on the diagram on **Figure 6** above, it was found that 77.3% of respondents stated that besides being halal in terms of food materials, the halal of the fast food logistics system is also important. Therefore, based on the information above, The further survey regarding the needs of the community conducted, especially food consumers in fast food restaurants, to the need for a system that can track the halalness of the product material and logistics of the food they eat. Based on the results of a survey of 66 respondents, 97% of them stated that a halal tracking system is needed.

4.4 System Specification Analysis

After processing and analyzing the questionnaire data, the authors designed the tracking system needs according to the needs and desires of consumers obtained from the results of a follow-up survey to respondents. The specifications that describe system requirements based on user needs are as follows.

4.4.1 System Functional Requirements

The following Table 3 is information related to the functional requirements of the system which is translated based on the voice of consumers from the questionnaires that have been distributed.

Table 3. Functional Requirement Data

	System Functional Requirement
F001	The system has two types of users, namely admin and consumer.
F002	Admin can manage product data and restaurants that already have a halal certificate.
F003	Admin can manage information on procedures for processing halal meat.
F004	Admin can manage information about halal animal management.
F005	Admin can manage product logistics information.
F006	Consumers can scan the halal logo of a product or restaurant.
F007	Consumers can view product halal code and certificate information.
F008	Consumers can view information related to halal meat processing procedures.
F009	Consumers can view information about halal animal management.
F010	Consumers can view tracing information related to the halal logistics of a product.
F011	The Consumers must login before accessing any other functionality.
F012	Consumers must sign-up before logging in.

4.4.2 System Non-Functional Requirements

The non-functional requirements of the system are related to the needs and use of the system. The Table 4 below is information regarding the non-functional requirements of the halal logistics tracking system that created from the voice of customer.

Table 4. Data on Non-Functional Requirements

	System Non-Functional Requirement
FN001	The system is a mobile-based application.
FN002	The system can be run on android and iOS operating systems.
FN003	The system can be accessed by 10,000 users at the same time.
FN004	The system can only be accessed via the internet.
FN005	The system can be accessed 24 hours a day.
FN006	The system uses the flutter framework.
FN007	The system will use Transport Management system.

4.5 System Use Case Diagram

A use case diagram (UCD) is a UML (Unified Modeling Language) diagram that shows the relationship between the user and the system based on their functional requirements. **Figure 7** and **Figure 8** below are the UCD between Admin and the system and between consumers and the system.

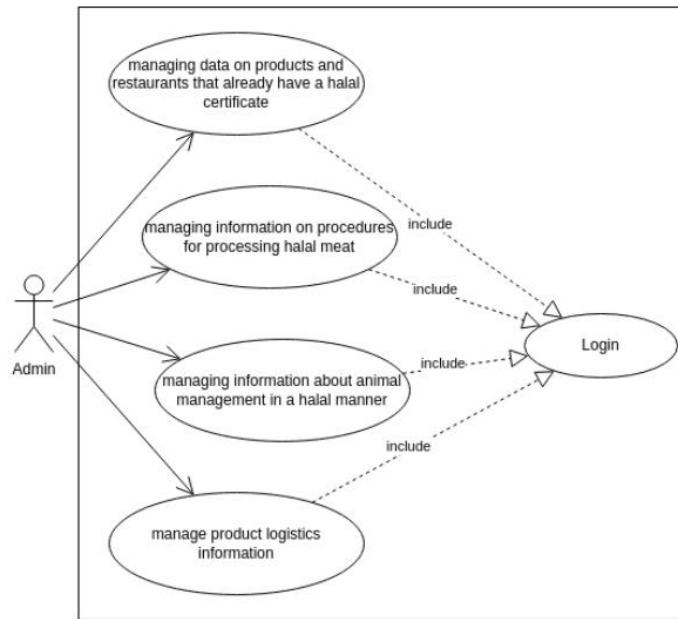


Fig. 7. Use Case Diagram Admin with System

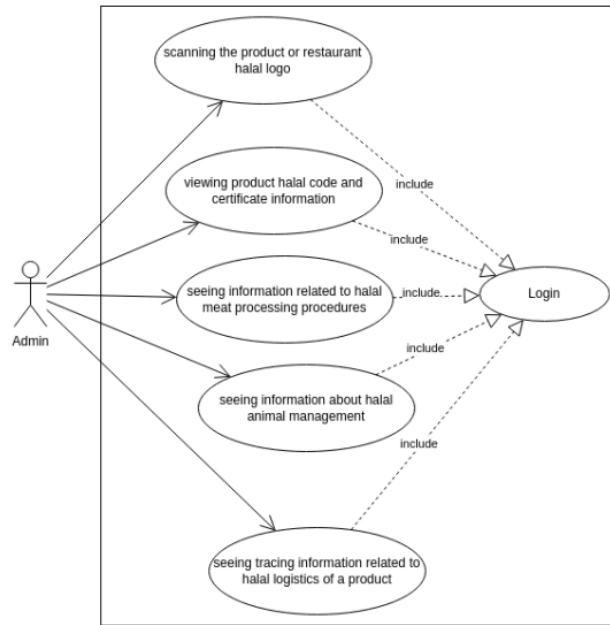


Fig. 8. Use Case Diagram of Consumers with System

4.6 System User Interface Sketch

The following Figure is a design for user interface application for tracking halal materials and logistics system that created based on the voice of customer that.

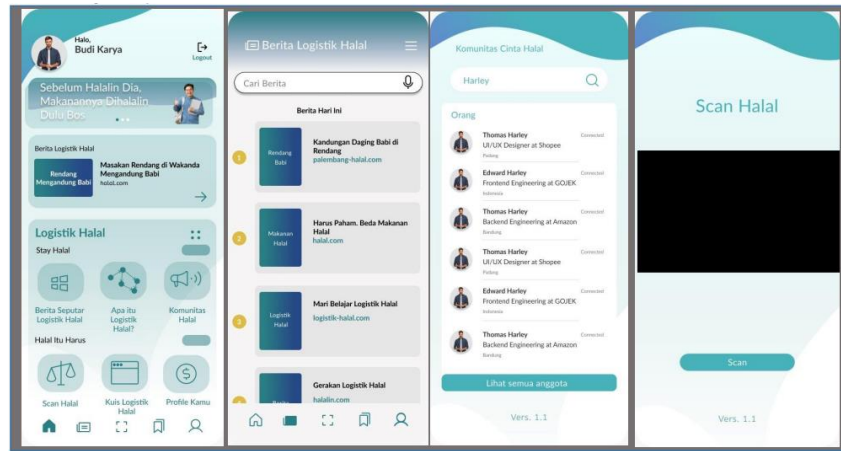


Fig. 9. User interface system

5 Conclusions

Advances in science lead to technological developments and advancements in supply chains. Currently, Indonesia is focusing on developing the halal supply chain in the logistics sector due to its status as a Muslim-majority country. However, there is a lack of understanding regarding halal logistics among the public and even companies that produce halal products. Based on this issue, research is conducted to understand the public's understanding of halal logistics and the need for a system to trace halal logistics. The results from the 66 respondent, only 51% respondent showed that they are paying attention at the halal of product, and from the same respondent more than 70% of respondents said that beside the halal of product, halal from the logistics side of the product, especially food from fast food restaurants is also needed. Based on the results of a follow-up survey, it shows that almost all respondents think that an information system that can track the halalness of a product and restaurant is very necessary. The survey results obtained are also translated into tracking system requirements that will be designed, including functional requirements, non-functional requirements, use case diagrams and user interface. The user interface is capturing the application appearance based on voice of the customer. Therefore, this research is expected to be a reference for further research related to the design of a halal logistics tracking system and the system design can be realized. So that consumer concerns about the non-halal of a product can be minimized by with this halal logistics tracing application.

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