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Original Article

Developing a Web-Based Application for Electronic Equipment Technician Service Order using the Scrum Method

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Abstract *- Residents of Banaran Village, Kauman District, Tulungagung Regency, East Java use electronic equipment on everyday needs. The equipment does not always function properly. When the equipment is damaged, they will try to repair it by calling a technician who can repair it. In the process of finding and ordering technician services, villagers have problems with the lack of information about technicians who can repair damaged electronic equipment, making arrangements for technicians to come to the house is difficult because technicians also have work that must be completed beforehand. In addition, villagers also had problems bringing damaged electronic equipment to the technician's place, the queues were also not well managed, so it took quite a long time to wait for the repair process. With this web-based electronic equipment technician service ordering application, it can help Banaran Villagers in finding and ordering technician services online. This application was built using the PHP programming language, the Scrum development method so that it is flexible to the changes that occur. The development of this application also uses the Google Maps API technology to make it easier to find locations and the Simple Mail Transfer Protocol technology used in sending emails for verification purposes.*

Keywords *- Application, Order, Technician, Web, Scrum.*

I. INTRODUCTION

Currently the development of information technology has grown very rapidly. The most noticeable technological progress today is the development of the internet [1]. Technological developments can change the flow of information, where everyone can receive information easily [10]. Technology that is used properly has benefits in meeting the needs of life and the convenience of all activities carried out by humans, especially in ordering easy and fast online services. The increasing number of online orders in Indonesia today, such as Go-Jek and Grab, which are online ordering service with passenger, food and good shuttle features, are now in great demand by the Indonesian people because they are easy to use, fast, and safe [2].

In the midst of daily life activities, Banaran Village residents use electronic equipment to facilitate their activities. The electronic equipment does not always function properly, when the equipment is damaged they will try to find a technician who can repair the damage. In the process of searching and ordering technician services, the problem that occurs is the lack of information about technicians who can repair damaged equipment. Usually the residents of Banaran Village look for technicians by asking neighbors or looking for information on social media. After finding the technician's information, residents can do two ways to make repairs, namely by calling a technician to their house or coming directly to the technician's place with damaged electronic equipment. By calling technicians to their homes, residents have problems making arrangements with technicians because technicians have work to complete beforehand, but if they go directly to technicians, the queues are not managed properly so customers will have to wait a long time for the repair process.

Based on the background described above, the idea was created to create a web-based application for electronic equipment technician service order. It is hoped that the development of this application can assist users to find and order electronic equipment technician services needed in everyday life.

Various studies on service ordering applications have been carried out. Previous research [3] has produced an Android mobile-based construction service ordering system that uses the Global Positioning System (GPS) so that it is able to provide information on the location of the nearest handyman to the user. Other research [4] has produced a system for providing and ordering construction services based on the Android mobile that provides services including

data collection of handyman information and transactions for ordering services for builders.

Application process development, the author uses the Scrum method. Scrum enables development teams to optimize collaboration, flexibility, creativity, and productivity in product development and delivery [5]. The Scrum team consists of the product owner, the Scrum master, and the development team.

Scrum has been implemented in previous research [6] in making a self service application for Android-based food menus in a cafe. The results of the implementation of the research have been carried out for users and cafe managers and in general the application can facilitate the work of cafe managers. Other studies [7] have also implemented Scrum in the process of developing a recording and data collection system for human resource management. The development of the system is divided into 9 sprints and produces a system that facilitates the employee data collection process that is more effective and efficient, such as data collection on employee personal data, attendance data collection, employee permit and leave data collection, payroll process, employee performance appraisal, and employee sanctions data collection.

Scrum was chosen in the development of a web-based application for electronic equipment technician service order because it is suitable for use in product development with small team sizes and many changes because the sprint stages in the Scrum method can anticipate these changes.

II. STUDY LITERATURE

A. Scrum Methodology

Scrum is a framework used to develop, deliver, and maintain complex products [9]. Scrum to the ability enables of teams to overcome complex adaptive challenges for the development and delivery of high-value products by enhancing collaboration, creativity, and productivity [5].

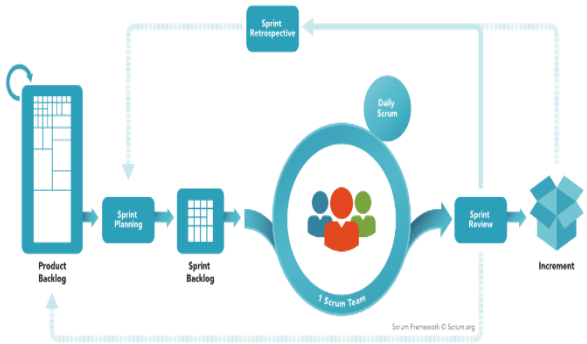


Fig. 1 Scrum process

a) Product Backlog

Product backlog contains a list of requirements that evolve as the product evolves. Product backlog is dynamic and changes constantly to make products viable, competitive and useful.

b) Sprint Planning

In sprint planning activities, all Scrum members collaboratively arrange the work to be done in the sprint.

c) Sprint Backlog

Sprint backlog contains a list of the product backlogs selected to work on in the sprint.

d) Daily Scrum

Daily scrum is an activity with a time limit of 15 minutes every day during the sprint. With the daily scrum, Scrum members can improve the quality of communication, identify barriers to remove, and support quick decision making.

e) Sprint Review

A sprint review is held at the end of the sprint to adjust the product backlog as needed. During the sprint review, Scrum members review what was completed in the sprint. The result of the sprint review is a revised product backlog that will be implemented in the next sprint.

f) Increment

Increment is the result of work from the sprint that has been carried out and in accordance with the definition of completion agreed upon by the Scrum team.

g) Sprint Retrospective

The sprint retrospective is an opportunity for Scrum members to correct and make plans about what could be improved and done in the next sprint. Before the sprint retrospective ends, Scrum members must agree on changes or improvements that will be implemented in the next sprint.

B. Google Maps API

Google Maps API is a feature issued by Google to facilitate users who want to integrate Google Maps into the website being developed [11]. To display Google Maps in web pages, users need the Google Maps API interface application that can be accessed via Javascript. API Key registration is required to access Google Maps [12]. Utilization of the Google Maps API can save time and cost to build reliable digital map applications, so that application development focuses more on processed [13].

C. Simple Mail Transfer Protocol

SMTP stands for Simple Mail Transfer Protocol. SMTP is a service that can be used in the process of sending email. SMTP is used because the email system requires a server as a container, before the email is retrieved by the recipient. SMTP is a simple, text-based protocol that can accept one or more email recipients which will then be verified. The advantage of the SMTP service is that the process of sending

email is simple so that it can be done quickly so that it can be said to be efficient and effective in sending letters [14].

III. ANALYSIS AND DESIGN SYSTEM

The existing business processes are depicted in the following figure:

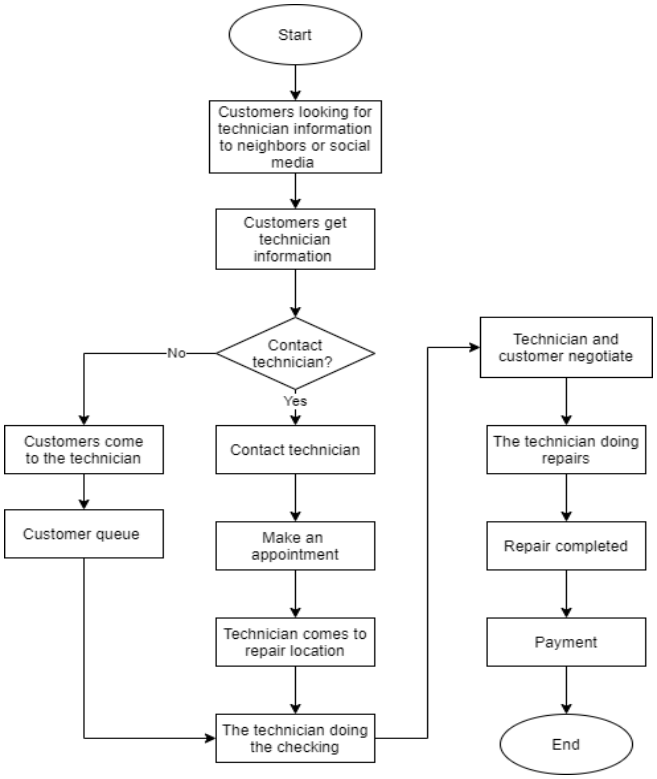


Fig. 2 Existing System Flow Chart

An explanation of the existing business processes starting with customers who have damaged electronic equipment, seeking information about technicians who can repair the damage by asking neighbors or looking for information on social media. After obtaining the technician's information, there are two ways the customer can repair the damaged electronic equipment. The first way is to call a technician to the house, and the second way is coming directly to the technician's place by bringing the damaged electronic equipment. If the customer wants to call a technician to the house, the customer calls the technician and makes an appointment for checking and then the technician will come to the house. If the customer wants to come directly to the technician's place, the customer will bring the damaged equipment to the technician's place. The technician then checks the damaged electronic equipment. After finding the damage, the technician and the customer negotiate the price and additional equipment needed to repair the electronic equipment. After negotiations are complete, the technician repairs the damaged electronic equipment. When the repair process is complete, the customer makes payment to the technician according to the agreed price before.

A. PIECES Analysis

From the existing business processes that have been carried out above, it can be analyzed the problems that arise using PIECES analysis.

Parameter	**Problem**	**Solution**
Performance	Queue management is not well managed, so the queuing process and repair of electronic equipment takes a long time.	With the developed application, customers do not need to queue because the technician will come to the repair location, so the repair process will be faster because the technician will complete his work first before receiving the next order.
Information	Lack of information about technicians who can repair damaged electronic equipment.	The developed application provides detailed service information, so that customers can easily get the service information they need.
Economic	Customers need more time, money, and effort to bring damaged electronic equipment to technician.	With the developed application, customers can easily and quickly find technicians to repair damaged electronic equipment.
Control	The difference in service fee between one technician and another.	With the developed application, the service fee will be the same, according to the type of service provided.
Efficiency	It takes a long time to find technician information.	With the developed application, it can display technician information according to the required expertise.
Services	The presentation of review data is not good so that anyone can input review data.	Reviews must be entered by users who have placed an order.

B. Use Case Diagram

In the following picture is an overview for the use case diagram used in the application. In this application, there are 4 actors, there are superadmin, admin, technician, and customer.

Fig. 3 Use Case Diagram

C. Product Backlog

Priority	Product Backlog Description
1	Users can login and logout
2	Customers can register
3	Superadmin can manage admin master data
4	Superadmin and Admins can manage customer master data
5	Superadmin and Admins can print customer list
6	Superadmin and Admins can manage technician master data
7	Superadmin and Admins can print technician list
8	Superadmin and Admins can manage service category master data
9	Superadmin and Admins can print service category list
10	Superadmin and Admins can manage service type master data
11	Superadmin and Admins can print service type list
12	Customers can place orders
13	Technicians can view order details
14	Technicians can confirm the orders
15	Technicians can add additional services
16	Technicians can complete the order
17	Customers can make payments
18	Customers can print receipts
19	Customers can input ratings and reviews
20	Customers can input complaints
21	Superadmin and Admins can print complaint list
22	Superadmin and Admins can print rating and review list
23	Superadmin and Admisn can print order history
24	Superadmin and Admins can print payment history
25	Customers and Technicians can manage account
26	Superadmin, Admins, and Technicians can view dashboard.

D. Sprint

This application development consists of 3 sprints. In the sprint process, each point of the product backlog will be made more detailed so that the development process can be carried out in more detail.

In sprint 1, the included product backlog focuses on the master data management features. The details can be seen in the table below:

No	Backlog Feature	Task	Estimate		
			Develop	Test	Total
1	Users can login and logout	Create login and logout pages and functions.	1	0.5	1.5
2	Customers can register	Create a registration page and function.	4	2	6
3	Superadmin can manage admin master data	Create a list admins page and function.	3	0.5	3.5
4		Create an add admin page and functions.	4	1	5
5		Create a view admin page and function.	1	0.5	1.5
6		Create a edit admin page and function.	4	1	5
7	Superadmin	Create a	1	0.5	1.5

	and Admins can manage customer master data	view customer page and function.			
8		Create a edit customer page and function.	4	1	5
9	Superadmin and Admins can print customer list	Create a print customer page and function.	3	0.5	3.5
10	Superadmin and Admins can manage technician master data	Create an add technician page and functions.	4	1	5
11		Create a view technician page and function.	1	0.5	1.5
12		Create a edit technician page and function.	4	1	5
13	Superadmin and Admins can print technician list	Create a print technician page and function.	3	0.5	3.5
14	Superadmin and Admins can manage service category master data	Create an add service category page and functions.	4	1	5
15		Create a view service category page and function.	1	0.5	1.5
16		Create a edit service category page and function.	4	1	5
17	Superadmin and Admins can print service category list	Create a print service category page and function.	3	0.5	3.5
18	Superadmin and Admins can manage service type master data	Create an add service type page and functions.	4	1	5
19		Create a view service type page and function.	1	0.5	1.5
20		Create a edit service type page and function.	4	1	5
21	Superadmin and Admins can print service type list	Create a print service type page and function.	3	0.5	3.5
	Total estimated times (hours)		61	16.5	77.5

In sprint 2, the included product backlog focuses on the ordering feature. The details can be seen in the table below:

No	**Backlog Feature**	**Task**	**Estimate**		
			Develop	**Test**	**Total**
1	Customers can place orders	Create page and order function	10	3	13
2	Technicians can view order details	Create page and functions to view order details	2	1	3
3	Technicians can confirm the orders	Create order confirmation function	2	1	3
4	Technicians can add additional services	Create a function to add additional services	5	2	7
5	Technicians can complete the order	Create a function to complete an order	3	2	5
6	Customers can make payments	Create payment page and function	16	8	24
7	Customers can print receipts	Create a receipt print function	3	1	4
	Total estimated times (hours)		41	18	59

In sprint 3, the included product backlog focuses on reporting features. The details can be seen in the table below:

No	Backlog Feature	Task	Estimate		
			Develop	Test	Total
1	Customer can input ratings and reviews	Create rating and review pages and functions	4	2	6
2	Customer can input complaints	Create complaint page and function	4	2	6
3	Superadmin and Admin can print complaint list	Create page and print complaint list function	4	2	6
4	Superadmin and Admin can print rating and review list	Create page and print rating and review list function	4	2	6
5	Superadmin and Admin can print order history	Create page and print order history function	4	2	6
6	Superadmin and Admin can print payment history	Create payment history page and print function	4	2	6
7	Customer and Technician can manage account	Create page and manage account function	3	1	4
8	Superadmin, Admins, and Technicians can view dashboard	Create page and functions for displaying dashboard data	3	0.5	3.5
	Total estimated times (hours)		30	13.5	43.5

IV. IMPLEMENTATION

At the implementation stage, the results of the applications that have been built can be displayed.

Fig. 4 Login form

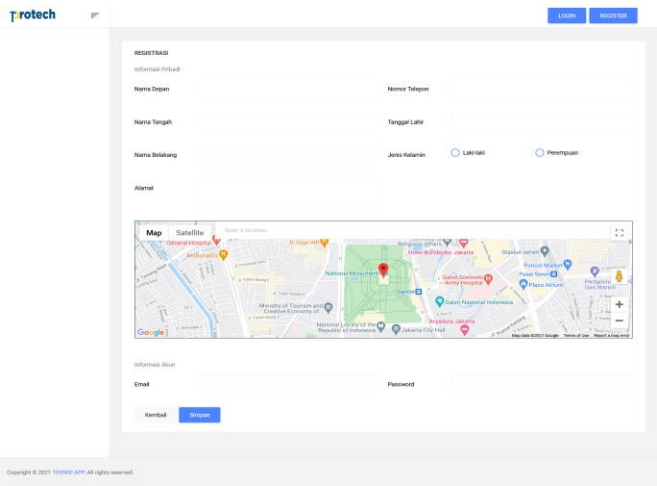


Fig. 5 Register form

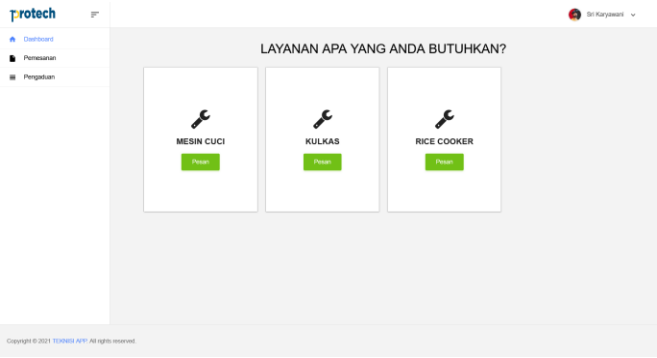


Fig. 6 Choose service category

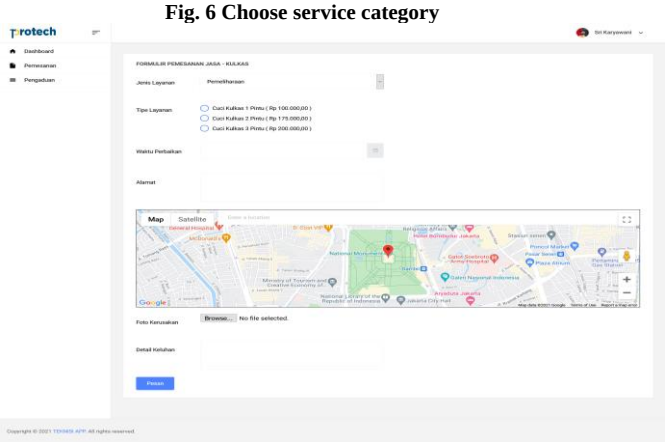


Fig. 7 Order form

Fig. 8 View order detail

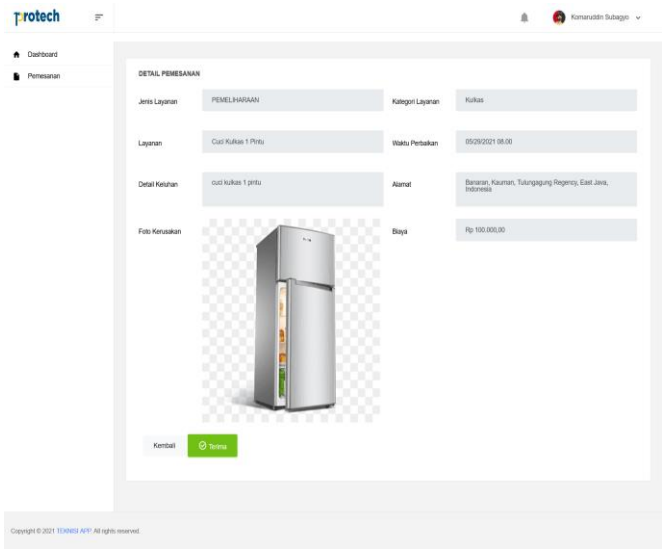


Fig. 9 Order confirmation

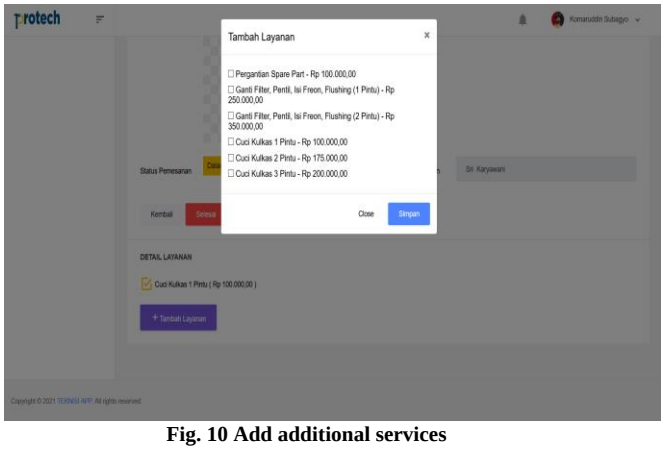


Fig. 10 Add additional services

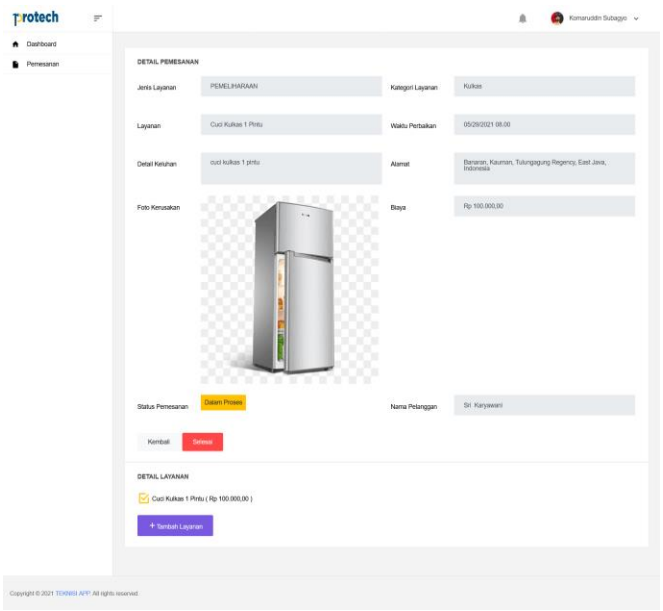


Fig. 11 Complete order

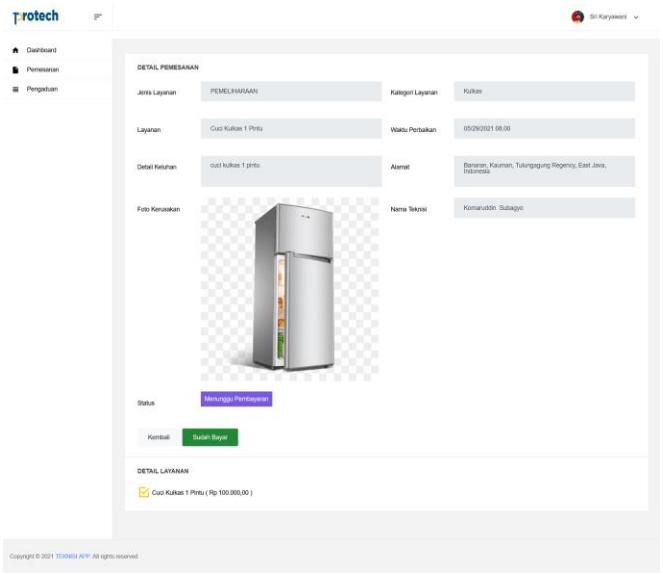


Fig. 12 Payment confirmation

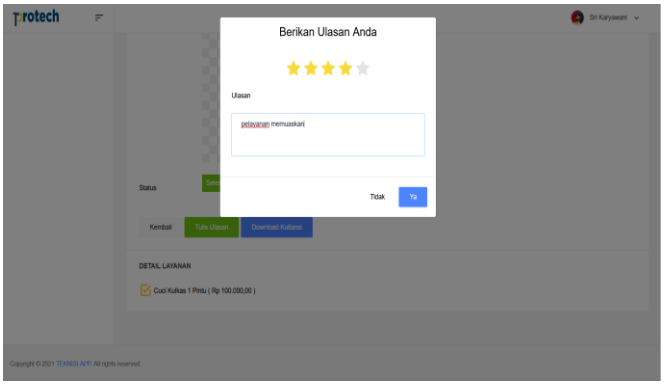
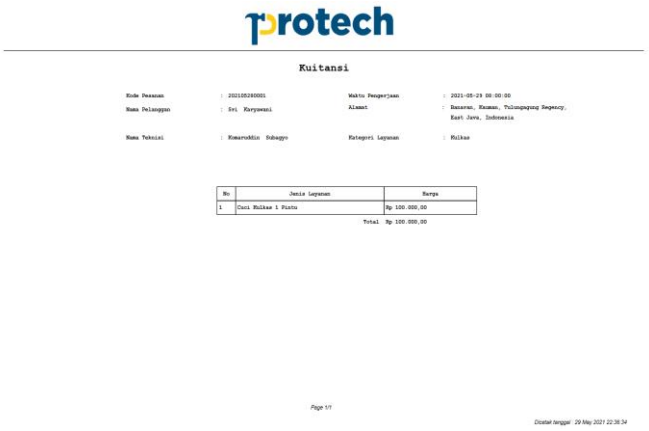


Fig. 13 Rate and review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Kuitansi

Kode Pesanan	: 202105280001	Waktu Pengerjaan	: 2021-05-29 00:00:00
Nama Pelanggan	: Sri Haryawani	Alamat	: Banaran, Kauman, Tulungagung Regency, East Java, Indonesia
Nama Teknisi	: Komarudin Subagyo	Kategori Layanan	: Kulkas

No	Jenis Layanan	Harga
1	Cuci Kulkas 1 Pintu	Rp 100.000,00

Total Rp 100.000,00

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Fig. 14 Download receipt

V. CONCLUSION

Based on the research that has been done, it can be concluded that in the process of developing an application for ordering electronic equipment technician services in Banaran Village using the Scrum method, it is divided into 3 sprints and the result can help residents to get information about technicians who can repair damaged electronic devices, residents can also easily order the services of a technician using a smartphone or laptop that is connected to the internet network.

Suggestions for developing applications for further developers are to develop a chat feature between technicians and customers, as well as develop payment features so that users can use more varied payment methods.

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