ONLINE BUYING AND SELLING APPLICATION OF SACRIFICIAL ANIMALS USING SCRUM METHOD DURING THE COVID-19 PANDEMIC

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ABSTRACT

Since the pandemic entered Indonesia, many people have switched to the online buying and selling transaction process. The Covid-19 pandemic has had a very significant impact on the transaction process which was previously carried out traditionally, especially for the sale and purchase of sacrificial animals. The process of selling sacrificial animals is still done traditionally by ordering directly by phone and coming directly to the cattle pen for the sacrificial animals desired by consumers. To deal with these problems, an alternative solution is needed that can create a information system solution as a medium for selling livestock online. This online sacrificial animals buying and selling application will be developed using the SCRUM method. When conditions change like this during the Covid-19 pandemic, SCRUM is suitable for developing applications. This is because Scrum is an iterative method that is included in the Agile method in how to manage and run an application development project. The features or menus that will be built in this application including Master Data Management, and get Reports on all Transactions periodically, Shipping / Delivery Transactions, notifications for Animal Husbandry Services. However, due to the conditions of the Covid-19 pandemic, there are several features that will be added, namely the Results of Routine Examination of the Condition of Sacrificial Animals for the last 1 month which will continue to be updated by livestock owners, and Description of Physical Condition of Sacrificial Animals which includes Species, Skin Color, Weight (Kg), Height (cm). The results of the Black Box Testing show that all functions have run well with a percentage of successful functional running of 97.3%.

Keywords: *Application, Online Buying and Selling, Sacrificial Animals, Scrum Method.*

1. INTRODUCTION

The Covid-19 pandemic has had a very significant impact on the buying and selling transaction process which was previously carried out traditionally or face to face. Since the pandemic entered Indonesia, many people have switched to the online buying and selling transaction process. The same thing also happened to the sale and purchase of sacrificial animals. The government has paid attention to and regulated the pattern of buying and selling sacrificial animals both traditionally by coming directly to the sacrificial animal cage or market or by online through the application [1][2][3]. However, it would be better if the sale of sacrificial animals is done online to avoid direct contact. The payment process can be done using a non-cash or electronic money transaction system [4][5].

The development of online sacrificial animal trading applications is still not widely practiced in Indonesia. This is because people are not familiar with the online transaction process and there is a sense of distrust between buyers and sellers without seeing directly the condition of the sacrificial animals physically. Several online sacrificial animal trading applications have been generated from several studies including PT. Lembu Besar Sejahtera (LBS), cattle sales in East Nusa Tenggara (NTT), and several farmer partners in East Java, Indonesia. The online marketplace are more likely to serve an industry with underlying technology's potential applications [6] [7].

The process of selling sacrificial animals has the potential to be further developed by implementing information system solutions. Therefore, this study proposes the design of an online sacrificial animals buying and selling application as a way to build an information system solution as a medium for selling livestock online.

This online sacrificial animals buying and selling application will be developed using the SCRUM method. When conditions change like this during the Covid-19 pandemic, SCRUM is suitable for developing applications. This is because Scrum is an iterative method that is included in the Agile method in how to manage and run an application development project [8].

The features or menus that will be built in this application will refer to the results of the user interface design that has been carried out in previous studies, including the Website Admin must regulate User Access Rights, Master Data Management, and get Reports on all Transactions periodically. For sellers, they will be involved in uploading a catalog of sacrificial animals, Sales Transactions with Buyers, Shipping / Delivery Transactions, Sending messages and notifications for Farmer Partners for Animal Husbandry Services, and receiving Periodic Transaction Reports. Customers can make Sales Transactions, check Shipping / Delivery status, and Payment Transactions. For Farmer Partners, we will get a notification that there will be an Animal Care Services and confirmation of approval from the Farmer Partner, whether it can still receive the daycare services or have been fully charged by other customers [9]. However, due to the conditions of the Covid-19 pandemic, there are several features that will be added, namely the Results of Routine Examination of the Condition of Sacrificial Animals for the last 1 month which will continue to be updated by livestock owners, Description of Physical Condition of Sacrificial Animals which includes Species, Skin Color, Weight (Kg), Height (cm), and Making a Schedule for the Visit of Sacrificial Animals between the seller and the buyer on condition, if there is a seller / buyer who comes from outside the city, then he must upload the results of the health examination from the area of origin / local area .

The projects that work best for Scrum are those with aggressive deadlines, a high level of complexity, and a high degree of novelty for their teams. Scrum is considered to be able to produce good quality software according to user desires, can be used in large and small projects, and is easy to adopt changes [10][11][12][13]. Scrum activity stages include product backlog, sprint backlog, daily scrum, sprint review, and sprint restropective. Roles in Scrum include product owner, scrum master, and development team. Scrum has structured and iterative stages, so that if the product in the first sprint does not fulfill the needs, then in the next sprint a system can be developed according to user evaluation [14] [15].

Agile allows for quick shifts. When organizations need to make quick adjustments to priorities, approaches or the content of work, agile is especially well-suited. Use the agile method to "deconstruct" work — break it into small units — to accomplish it one piece at a time. Completing tasks bit by bit provides the opportunity for more in-course corrections [14] [16]. When situations change — as they do regularly through the coronavirus crisis — agile allows for easy shifts because work has been planned in smaller portions and over shorter time horizons.

2. RESEARCH METHOD

We aim to design a safe Scrum process to achieve agility and speed in developing the online buying and selling application of sacrificial animals. Scrum has three important roles: Product Owner, Scrum master, and Development Team. The research methodology is a step or method in examining an object. There are three step used in this research:

A. Data Collection

The data collection method in this study uses the method of observation and literature study.

1. Observation

   In this method, it is done by looking at and studying the problems that exist in the field that are related to the object under study.

2. Literature review

   This method is done by looking for materials that support the definition of the problem through books, journals, and the internet.

B. Requirement Analysis

At this stage the results of data collection are studied and evaluated from various problems that exist starting from the initial process to the final process in the process of buying and selling of sacrificial animals. The results of the collected analysis are also used by researchers to propose a system of proposals and application requirements to be developed.

C. System Development Stage

The system development method used is Scrum. The stages of the scrum method consist of forming a scrum team, creating a product backlog, the sprint phase (sprint planning, sprint backlog, daily scrum, sprint review, and sprint restropective). The SCRUM stages can be seen in Figure 1.

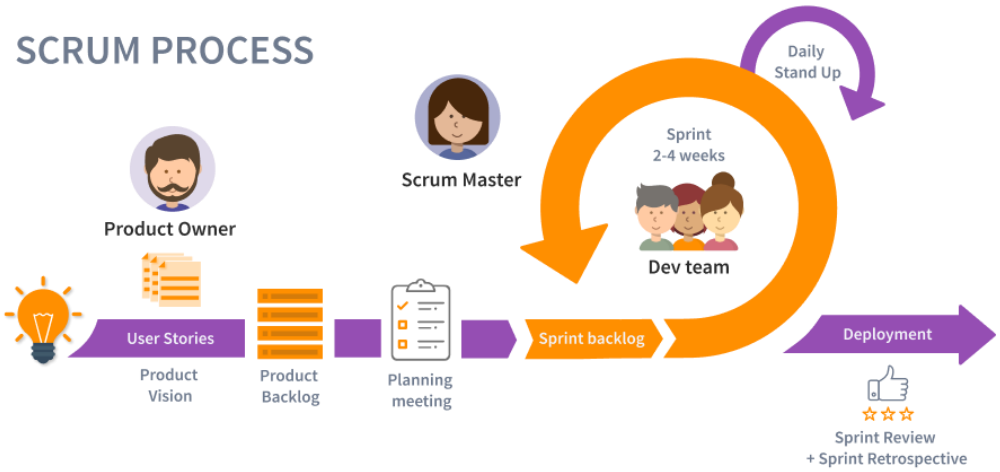

Figure 1. Scrum Methodology Stages

In developing the online buying and selling application of sacrificial animals, the Scrum methodology is used. Scrum is a software development framework (framework) from implementing the Agile Development process for software projects or application development. The Scrum method is very suitable for use as a team so that the software development process can be mutually coordinated and organized between each team member who has different tasks.
a) Product Owner, someone who has vision, authority, and availability of time. The product owner is responsible for continuously communicating the vision and priorities for the development team.
b) Scrum Master, someone who acts as a facilitator for the product owner and the development team consisting of Developers and Testers (Quality Assurance). The Scrum Master is not responsible for managing the team. The function of the Scrum Master is to remove obstacles that prevent the team from achieving its goals. This helps the team stay creative and productive while ensuring visible success to the product owner. The Scrum Master also works to advise product owners on how to maximize teamwork.
c) Scrum Development Team, according to the founder of Scrum "the team is utterly". The development team is responsible for organizing themselves to get the job done.

2.1 User Stories

To analyze the requirements of a system requires a needs analysis based on the business processes carried out by the user. User stories are descriptions of system requirements in natural language that can be easily understood by end users who do not have an IT background. Before carrying out product development activities for the online sacrificial animal trading application, it is necessary to analyze the system requirements that come from prospective end users or users. In the results of interviews from several potential users such as sellers, buyers, animal husbandry services, and web admin as the main manager of the web, the following details of user stories are obtained.

Table 1. User Stories as a Admin Website.

User Story ID	I want to…	Acceptance Criteria
US-A1	Add data master of breeders (sacrificial animals sellers)	• Add or remove data master of breeders • Modify data master of breeders
US-A2	Add data master of customer (sacrificial animals buyers)	• Add or remove data master of customer • Modify data master of customer
US-A3	Add data master of farmer partners (animal husbandry services)	• Add or remove data master of farmer partners • Modify data master of farmer partners
US-A4	Add data master of region	• Add or remove data master of region • Modify data master of region
US-A5	Get Periodic reports on individual or collective / group sales of sacrificial animals	• Check and Print the Periodic reports on individual or collective / group sales of sacrificial animals • Sort order/sales by the time submitted
US-A6	Get periodic reports on animal delivery by direct send or animal care services system	• Check and Print the periodic reports on animal delivery by direct send or animal care services system

User Story ID	I want to…	Acceptance Criteria
		• Sort animal delivery transaction by the time submitted
US-A7	Check and modify User access rights settings	• Modify User access rights settings
US-A8	Get Periodic reports of payment and confirmation, can be done by cash or bank transfer or or electronic money transaction system	• Check and Print the periodic reports on animal delivery by direct send or animal care services system • Sort animal delivery transaction by the time submitted
US-A9	Check the Results of Routine Examination of the Condition of Sacrificial Animals for the last 1 month which uploloaded by sellers	• Check the Results of Routine Examination of the Condition of Sacrificial Animals for the last 1 month. • Notification or warning if the Results of Routine Examination of the Condition of Sacrificial Animals in the Last 1 Month Uploaded by the Seller do not meet the health criteria agreed on in the website regulations

Table 2. User Stories as a Seller.

User Story ID	I want to…	Acceptance Criteria
US-B1	Add catalog of sacrificial animals, include Description of Physical Condition of Sacrificial Animals which includes Species, Skin Color, Weight (Kg), Height (cm), etc	• Add data master of sacrificial animals • Modify data master of sacrificial animals • Update the Information/Description of Physical Condition of Sacrificial Animals
US-B2	Get the list of farmer partners	• See the list of farmer partner according to the request of the buyer
US-B3	Get the list individual or collective / group sales transaction of sacrificial animals	• update purchase transaction data based on sales status: processed, packaged, sent
US-B4	Get the list of animal delivery by direct send or animal care services system	• looking for farmer partners that match the transactions made by the buyer
US-B5	Entry delivery status of sacrificial animals	• Enter and update the status of delivery sacrificial animals
US-B6	Provide confirmation of receipt of payment from buyers who make sacrificial animal purchases	• Enter a confirmation of receipt of payment from buyers who make sacrificial animal purchases
US-B7	Making a Schedule with buyer for the Visit of Sacrificial Animals if condition permit.	• Manage the schedule with buyer for visit sacrificial animal • Providing confirmation to the buyer, the schedule request has been approved or rejected

Table 3. User Stories as a Buyer.

User Story ID	I want to…	Acceptance Criteria
US-B1	View a list of catalog sacrificial animals so I can select some sacrificial animals	• See a thumbnail image for each sacrificial animals • Click to view detail for product • Add to cart from detail page • Search a product • View sacrificial animals by species or category
US-B2	Review my chart so I can make adjustments prior to checkout	• View quantities an items in the cart • See a total cost before tax and shipping • Remove item • Adjust quantity of items • Click to navigate to a product detail page
US-B3	Check out payment and get the product shipped	• Trigger checkout from any page if there are items in cart • Enter a shipping address, billing address, a payment system • Payment verification based on online buying and selling transactions
US-B4	View my history transaction buying and selling	• See the status order • Navigate to details order • Provide information about a tracking number and contact of customer service
US-B5	Confirm product acceptance and review results of products that have been purchased	• Confirm acceptance if the sacrificial animal has been accepted. • Give feedback, comment, and review the sacrificial animal.

Table 4. User Stories as a Animal Husbandry Services.

User Story ID	I want to…	Acceptance Criteria
US-C1	View a list of transaction buying and selling	• Receive notification of requests for sacrificial animal care services within a certain period of time. • See List of Customers dan Breeders.
US-C2	Approval confirmation of animal care services	• receive a confirmation based on a transaction request • read additional details if needed during service

2.2 Product Backlog

In the early stages of development with the Scrum method, a product backlog was made. The product backlog is a list of any orders or activities that may be required in the product and is the single source of requirements for any changes to be made in product development. The product backlog contains a list of all the features, functions, requirements, enhancements, and fixes that are the changes that will be made to the product in a future release. In this study, the product backlog feature was created and compiled by the product owner.

Table 5. Product Backlog.

No.	Product Backlog Features	Time Estimation (hour)	Level of difficulty	Priority	Scrum Sequence
PB-01	Create Use Case Diagram	3	Low	High	1
PB-02	Create Activity Diagram	3	Low	High	1
PB-03	Create Sequence Diagram	4	Low	High	1
PB-04	Create Class Diagram	4	Moderate	High	1
PB-05	Create mockup of Sacrificial Animal Buying and Selling Application	6	Moderate	Moderate	2

No.	Product Backlog Features	Time Estimation (hour)	Level of difficulty	Priority	Scrum Sequence
PB-06	Implementation of Mockup	6	High	High	2
PB-07	Create the Database	6	High	High	3
PB-08	User Access Rights Settings	4	Moderate	High	3
PB-09	Login and Register User	2	Low	Moderate	3
PB-10	Data Master Management	6	High	High	3
PB-11	Create Catalog of Sacrificial Animals	6	High	High	3
PB-12	Create Form Transaction order sacrificial animal	4	Moderate	High	4
PB-13	Confirm of payment can be done by cash or bank transfer or or electronic money transaction system	5	High	High	4
PB-14	Create function of Shipping/Delivery Transaction	5	High	Moderate	4
PB-15	Sending messages and notifications for Farmer Partners for Animal Husbandry Services	4	Moderate	Moderate	4
PB-16	Receiving Periodic Transaction Reports	5	High	High	5
PB-17	Upload the Results of Routine Examination of the Condition of Sacrificial Animals for the last 1 month	4	Low	Moderate	5
PB-18	Making a Schedule for the Visit of Sacrificial Animals between the seller and the buyer	5	Moderate	Moderate	5
	TOTAL (hours)	**82 hours**			
	TOTAL (per days per 6 work hours)	**13,67 days ≈14 days**			

2.3 Sprint Planning

Sprint Planning is made to plan collaborative work that can be done by the Scrum team. In sprint planning, it discusses what to do to improve the results obtained from the sprint. In sprint planning, the resulting output is in the form of a sprint backlog. This sprint backlog contains the target application modules that must be completed in each sprint. The contents of the sprint backlog are part of the product backlog. In this study, sprint planning was carried out with the development team to determine the number of features it worked on during one sprint based on the product backlog to be used as a sprint backlog.

2.4 Daily Scrum

This stage is a practice for monitoring performance and synchronizing work. Every day a standup meeting needs to be held to report what each team member has done. In addition, at the end of the meeting, the completion time of each function is discussed to find out the updated completion time and to find out the remaining work that must be pursued in the remaining running time of the sprint. In this study, daily scrum was carried out with researchers working on features based on the sprint backlog that had been made.

Table 6. Estimating Work Remaining.

Sprint Activity	Februari 2021										Maret 2021			
	15	16	17	18	19	22	23	24	25	26	1	2	3	4
Sprint 1														
Sprint 2														
Sprint 3														
Sprint 4														
Sprint 5														

2.5 Sprint Review

A sprint review is held at the end of the sprint to review the need to change or add to the product backlog. At this meeting the Scrum team and stakeholders involved collaborate to discuss things that have been done during the sprint. This meeting is informal, starting with a presentation from the development team to gather input from both the Scrum team and stakeholders. So that it fosters the enthusiasm for better collaboration. In this study, a sprint review was held by conveying each work that had been done during the sprint. After that, discussions were held to provide solutions to problems faced by the Scrum team.

2.6 Sprint Restropective

This stage is carried out by the entire Scrum team to review the sprint activities that have been completed so that they can improve their performance in the next sprint. The Scrum master provides input to the Scrum team to improve performance so that the next sprint process is more effective. In this study, a sprint retrospective was conducted with the development team discussing and evaluating the errors during the Scrum.

3. RESULTS AND DISCUSSION

The development of the online sacrificial animal buying and selling application was developed using the SCRUM method from sprints that have been carried out from Sprint 1 to Sprint 5, and the time needed to run the entire sprint is 14 days. Following are the results of each sprint based on the planned product backlog, starting from Table 7 to Table 10.

A. Sprint Review 1

In sprint 1, all members are involved in planning application requirements which are described in the form of use case diagrams to class diagrams using UML notation. Based on Table 7, there are 4 product backlog features to work on.

Table 7. Product Backlog Sprint 1.

No.	Product Backlog Features	Priority
PB-01	Create Use Case Diagram	High
PB-02	Create Activity Diagram	High
PB-03	Create Sequence Diagram	High
PB-04	Create Class Diagram	High

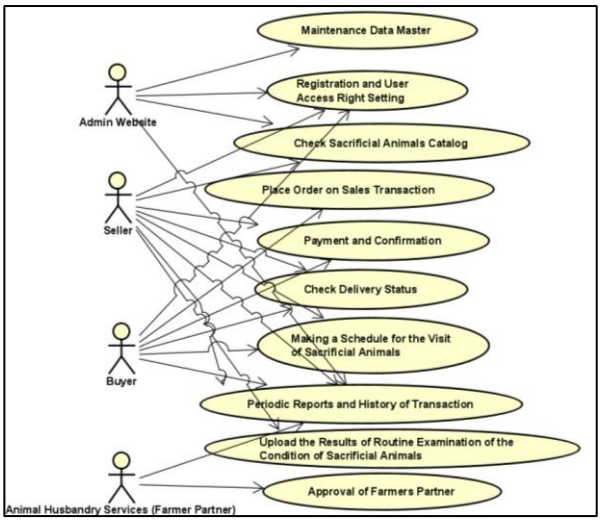

Figure 2. Use Case Diagram of Selling and Buying Application of Sacrificial Animal.

B. Sprint Review 2

Sprint 2 starts to involve Scrum masters, web developers and ui/ux designers to meet the product backlog features to be achieved. For mockup design, this study refers to the results of previous studies [9]. However, there are several features that have been added due to adjusting the needs of buying and selling online in pandemic conditions.

Table 7. Product Backlog Sprint 2.

No.	Product Backlog Features	Priority
PB-05	Create mockup of Sacrificial Animal Buying and Selling Application	Moderate
PB-06	Implementation of Mockup	High

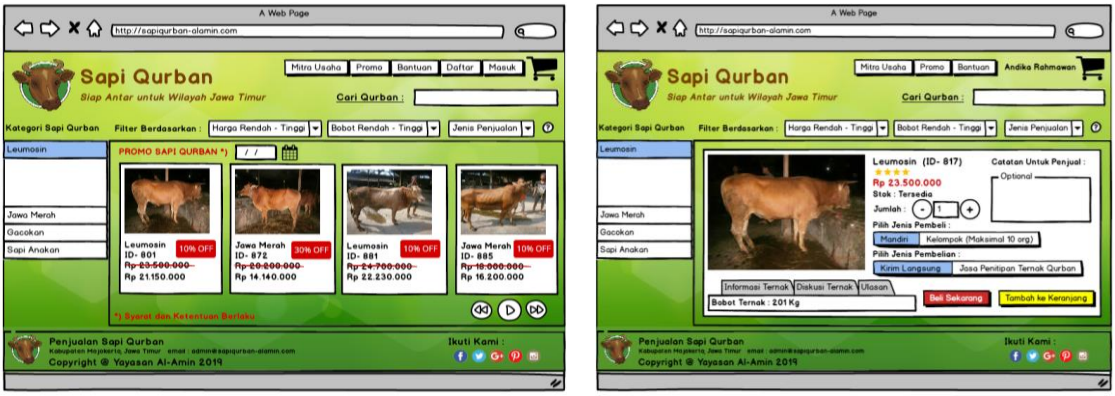

Figure 3. Mockup of Selling and Buying Application of Sacrificial Animal.

C. Sprint Review 3

In the sprint stage 3, the features made have entered the main features of the application. Without this feature, this online buying and selling application will not be perfect when running. This is because the main features are preparing the main master data and access to the database.

Table 8. Product Backlog Sprint 3.

No.	Product Backlog Features	Priority
PB-07	Create the Database	High
PB-08	User Access Rights Settings	Moderate
PB-09	Login and Register User	Low
PB-10	Data Master Management	High
PB-11	Create Catalog of Sacrificial Animals	High

Figure 4. Form Login and Data Master Management.

D. Sprint Review 4

The sprint stage 4 is the development of core features, including sales, payments, and delivery transactions. There are 4 product backlog features that will be achieved.

Table 9. Product Backlog Sprint 4.

No.	Product Backlog Features	Priority
PB-12	Create Form Transaction order sacrificial animal	Moderate
PB-13	Confirm of payment can be done by cash or bank transfer or or electronic money transaction system	High
PB-14	Create function of Shipping/Delivery Transaction	High
PB-15	Sending messages and notifications for Farmer Partners for Animal Husbandry Services	Moderate

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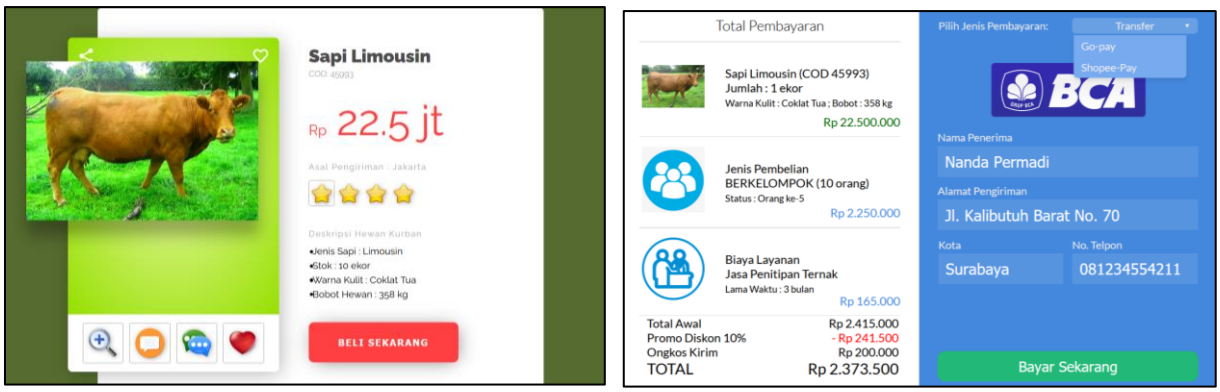

Figure 5. Form Transaction Orders and Payment.

E. Sprint Review 5

In sprint 5, the final stage of application feature development will be generated including Transaction Reports per certain period, scheduling of sacrificial animal visits that occur between sellers and buyers, and uploading the results of routine sacrificial animal checks.

Table 10. Product Backlog Sprint 5.

No.	Product Backlog Features	Priority
PB-16	Receiving Periodic Transaction Reports	High
PB-17	Upload the Results of Routine Examination of the Condition of Sacrificial Animals for the last 1 month	Low
PB-18	Making a Schedule for the Visit of Sacrificial Animals between the seller and the buyer	Moderate

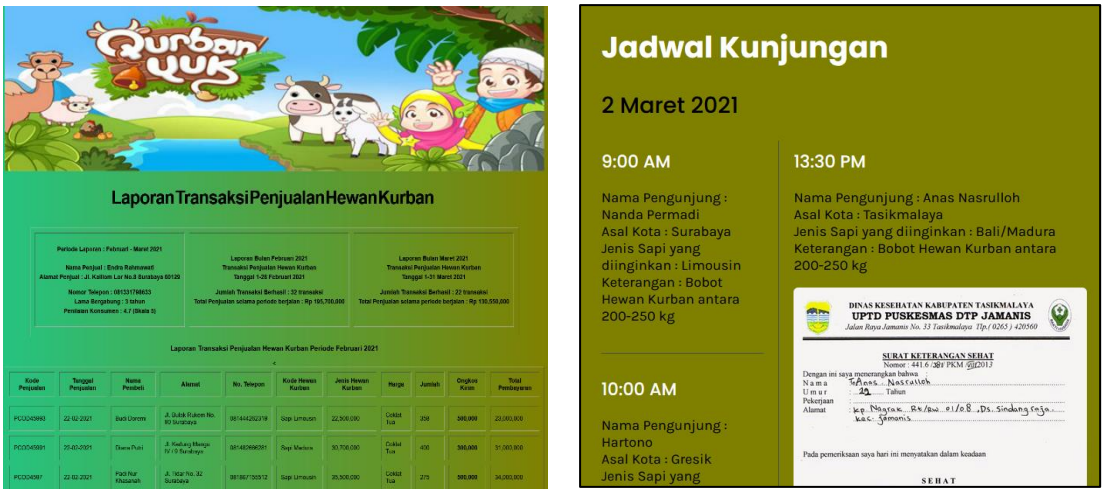

Figure 6. Form Periodic Transaction Reports and Schedule Visit for Sacrificial Animals.

F. Sprint Restropective

The next phase is a sprint restropective. In this phase, a team performance evaluation meeting is held for one sprint with a maximum duration of 3 hours.

G. Testing Application

Application testing uses Black Box Testing, where testing is carried out to test the functionality of the application, whether it is running according to its function or not. In Table 11, you can see the results of testing each functional application that has been carried out. The results of the Black Box Testing show that all functions have run well with a percentage of successful functional running of 97.3%.

Table 11. Back Box Testing Result.

No.Product Backlog	Application Functional	Task Status Product Backlog	Running Functional Results
PB-08	User Access Rights Settings	Completed	100%
PB-09	Login and Register User	Completed	100%
PB-10	Data Master Management	Completed	100%
PB-11	Create Catalog of Sacrificial Animals	Completed	100%
PB-12	Create Form Transaction order sacrificial animal	Completed	100%
PB-13	Confirm of payment can be done by cash or bank transfer or or electronic money transaction system	Completed	90%
PB-14	Create function of Shipping/Delivery Transaction	Completed	100%
PB-15	Sending messages and notifications for Farmer Partners for Animal Husbandry Services	Completed	90%
PB-16	Receiving Periodic Transaction Reports	Completed	100%
PB-17	Upload the Results of Routine Examination of the Condition of Sacrificial Animals for the last 1 month	Completed	100%
PB-18	Making a Schedule for the Visit of Sacrificial Animals between the seller and the buyer	Completed	90%
		Average Percetage	**97,3%**

4. CONCLUSION

The development of the online sacrificial animal buying and selling application was developed using the SCRUM method from sprints that have been carried out from Sprint 1 to Sprint 5, and the time needed to run the entire sprint is 14 days. Sprint 1 takes 3 days, sprint 2 takes 2 days, sprint 3 takes 4 days, sprint 4 takes 3 days and sprint 5 takes 3 days starting from mid-February to early March 2021**.** The results of the Black Box Testing show that all functions have run well with a percentage of successful functional running of 97.3%.

Suggestions given for further research development are seen from the results of the time remaining chart in the development of the sacrificial animal sale and purchase application, namely the development team must know the extent of its ability to carry out a task so that it is not overestimated when estimating the work.

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