Usability Evaluation of Scale-Based System on Penderes Application in Central Agro Lestari Joint Business Group (KUB)

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Abstract. Central Agro Lestari (KUB-CAL) is a joint business group in Purbalingga Regency, Central Java. KUB-CAL has made a real contribution to the organic coconut sugar processing industry. To ensure the quality of raw materials for organic coconut sugar, KUB-CAL, in collaboration with the Productive Innovative Research Team (Rispro) at Jenderal Soedirman University, developed an information system called Penderes Application of KUB Central Agro Lestari. This Penderes Application is used to trace the supply of raw materials to ensure quality. This study aimed to determine the usability of the Penderes Application using a usability scale. 50 participants were taken randomly as the sample of this study. They had used Penderes Application information system. The analytical technique was descriptive analysis with five Likert's scales as the measuremment. Based on the usability scale measurements, the average value was 62.64. This indicated that the usability of the KUB-CAL Penderes Application based on the user's perspective was classified as a medium category. In other words, the application was helpful for users, with a note that further improvements and application development are needed to improve the usability level.

Keywords: Application, Penderes, Mobile, Usability Scale System

1 Introduction

The development of the food processing industry and the creative economy in Indonesia continue to emerge. One sector that supports the food processing industry and creative economy is plantations. Indonesia's potential for plantations, especially coconut producers, is undoubtedly good. It can be seen from the land area in 2018, which was 3,475,547 Ha (Directorate General of Plantations, Ministry of Agriculture) and became the 3rd largest coconut producer in the world with 18.3 million tons of coconut per year (The World Atlas, 2016). On the other hand, according to The Asian and Pacific Coconut Community (APCC), in 2017, the amount of coconut production and its derivative products have not met market demand.

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Organic coconut sugar commodity is a derivative product obtained from *Deres* coconut or coconut tree, which has sap water. One of Indonesia's largest coconut producers, especially in Central Java is Purbalingga Regency. Based on data from the Plantation Service of Central Java Province in 2015, Purbalingga Regency could produce 53,130.8 tons of *Deres* coconut.

The problem with the agro-industrial development of coconut sugar in Indonesia, according to [1] are: a). Unstable price fluctuations caused by low-quality coconut sugar, b). The seasonal factors that cause inconsistent quality of coconut sugar, c). Lack of capital to care for coconut trees, as income from coconut sugar sales is only enough to meet daily needs, d). The company's weak marketing and distribution systems were due to monopoly in marketing and unfair pricing by middle seller coconut sugar. One of the efforts to overcome this problem is to market coconut sugar abroad, but to be able to market coconut sugar abroad requires high-quality standard requirements. Coconut sugar entrepreneurs have problems producing coconut sugar that has the same quality at all times because the quality of coconut sugar is affected by the season. In the rainy season, the quality of coconut sugar decreases. Because of this problem, coconut sugar entrepreneurs use laru from chemicals (sodium metabisulphite) as a solution, but this method is dangerous for consumer health. So, consumers who are increasingly aware of the importance of health (especially in export markets) need information about the source of raw materials used. One way for consumers to know the source of raw materials for coconut sugar is by tracer using a penderes application.

One of the community's efforts in utilizing these potentials and advantages is establishing a Joint Business Group (KUB). One of the KUB, located in Purbalingga and focuses on processing coconut sugar, is KUB Central Agro Lestari (KUB-CAL). KUB-CAL has been established since September 5, 2017 and was officially registered in the Notary Deed No. 54 dated May 15th 2018. The location of the KUB is at Bumisari Village, RT 02 RW 01, Bojongsari District, Purbalingga Regency.

The economic activities of KUB-CAL are not only collecting farmers' products but also marketing their products to various countries and regions. Production sales are made to hotels, restaurants and cafes in the local area. KUB-CAL also becomes a supplier in places such as Bali and Yogyakarta, whose products will later be marketed internationally by exporters. The marketed quality also varies from grade (A) high, medium (B), and low (C).
However, there were still some things that could have been improved in the production process, financial records, marketing, and human resources (HR). Among those problems, especially in the production process, the quality mapping of coconut sugar from the highest to the lowest quality takes a long time due to the poor knowledge of the human resources that produce coconut sugar. As a result, quality control takes a long time.
The Penderes Application is expected to be the solution to solving problems. The application is already in the development process and trial phase by users, especially users from KUB-CAL. After going through the trial phase, the application will be evaluated based on the user's feedback to make it better. Therefore, this study aimed to measure the usability of Penderes Application that users have used.

2 Literature Review

2.1 Potential and Problems of Organic Coconut Sugar

Indonesia is the world's largest coconut sugar-producing country, with an annual production capacity of 120,000 tons [2]. Coconut sugar has great potential to be developed in Indonesia because 1) it has extensive marketing potential to be marketed in both domestic and foreign markets. This is due to the large market demand, and domestic manufacturers' need for coconut sugar for the food and beverage industry sector has yet to be fulfilled. 2) Indonesia has the world's largest coconut plantation area of 3.707 million hectares (31,2% of the total area of 11.909 million hectares) plus Philipina, which has 3,077 thousand hectares (25,8%), India with an area of 1.908 thousand hectares (16.0%), Sri Lanka with 442 thousand hectares (3.7%), Thailand with an area of 372 thousand hectares (3.1%) and other countries 2.398 thousand hectares (20,2%) [2], [3]. 3) MSMEs Coconut sugar can open jobs, increasing public welfare, especially those related to coconut sugar, such as penderes, craftsmen, and traders. The technology used to produce coconut sugar is still low in technology and cost so that it can be developed in various regions. [4] conducted "Studi Kelayakan Industri Gula Kelapa dengan Sistem Pabrikasi", in which it was mentioned that the coconut sugar industry with the manufacturing system deserves to be developed in all aspects.

Although there is an excellent potential for development, there are also problems in producing coconut sugar, some of which are: 1) the problem of quantity, caused by the increasing demand for coconut sugar, but a small amount of production has not been able to meet the quota of coconut sugar quantities demand or have not been able to meet market demand. 2) The quality problem is caused by the low sugar farmers' awareness of quality, so sugar manufacturing still uses less supportive processing technology. 3) The low level of sugar farmers' welfare is due to the inability of sugar entrepreneurs to market their products in either the modern market or the international market [5]. The study of [6] mentioned that there were problems that caused a delay in the performance of SME Sugar coconut, namely: 1) the unstable quality of raw materials used, 2) in the production process, many sugar farmers still use chemicals 3) the processing technology used is still limited 4) pay little attention to cleanliness 5) low-quality human resources 6) financial management problems 7) limited capital 8) waste problems from production processes.

The development of the coconut sugar business can be done by activating four key sectors, including production, human resource capacity (HR), finance, and marketing [2]. It showed that there were still many limitations in small and medium-sized enterprises (SMEs), especially in mastering technology [7]. They still need to gain better knowledge and better abilities, but they want to digitize their business. Currently, digitization is an essential thing for various business sectors to do. This is due to the role of digitalization which can cut and minimize various tasks in a company, for example, updating information on availability in warehousing and selecting the quality of raw materials will be much easier if there are information media that can integrate various kinds of information and company needs. In addition, it can be applied to various other fields such as recording financial data, promoting and selling from the marketing field, and recording the attendance or sharing information from the HR to the staffs. This is in line with the opinion which stated that through the assistance of a financial information system, business performance would increase along with the scale of entrepreneurial business development [8].

There are several supporting factors in advancing SMEs, including the government and stakeholders as key holders in marketing and promotional activities that include improving product quality, company human resources, and technological innovation. The macroeconomic environment is also needed to expand local products [9]. Penderes Application is a breakthrough in improving the performance of KUB Central Agro Lestari in several key sectors, such as marketing, production, human resources, and finance.

2.2 Penderes Application

The Penderes Application is an integrated application that processes data related to *penderes*' activities in digital form, especially activities in the financial sector, such as selling organic coconut raw materials from field farmers to suppliers and suppliers to the Joint Business Group (KUB). This application was developed using the System Development Life Cycle (SDLC) method. The method is divided into several stages: planning, analysis, design, implementation, testing and integration, and application maintenance.

The purpose of developing Penderes Application is to assist penderes farmers, suppliers and KUB in buying organic coconut sugar raw materials. Technically Penderes Application is used for the storage of master data from the Penderes entity, landowners, the type of raw material quality, and for processing transaction data for the sale of organic coconut sugar raw materials. Penderes applications can process data (add, modify, view and delete) farmer/farmer data, owner/land owner data, garden/land data, supplier data, raw material data, material type data, and sales data.

The benefits of developing Penderes application are as follows: a). System admins can record, process and store master data safely and integrally, b). Penderes, suppliers, KUB admins can record, process transaction data effectively, c). Pendereres can monitor sales numbers and sales revenue on a periodic basis, with accurate information, and d). KUB management can use the information generated from Penderes Application to support the e-traceability system of organic coconut sugar products.

The user interface of the KUB Sinar Argo Lestari Penderes Application is illustrated:

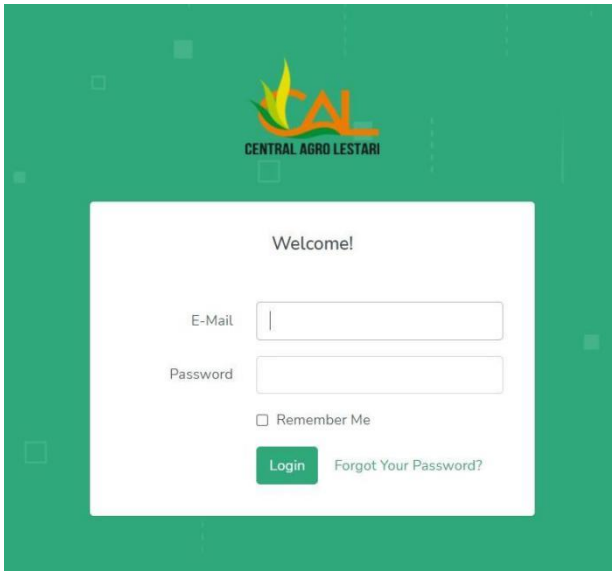

Fig. 1. User interface KUB Sinar Argo Lestari

Home is a web-based deduplication application's home page containing general information.

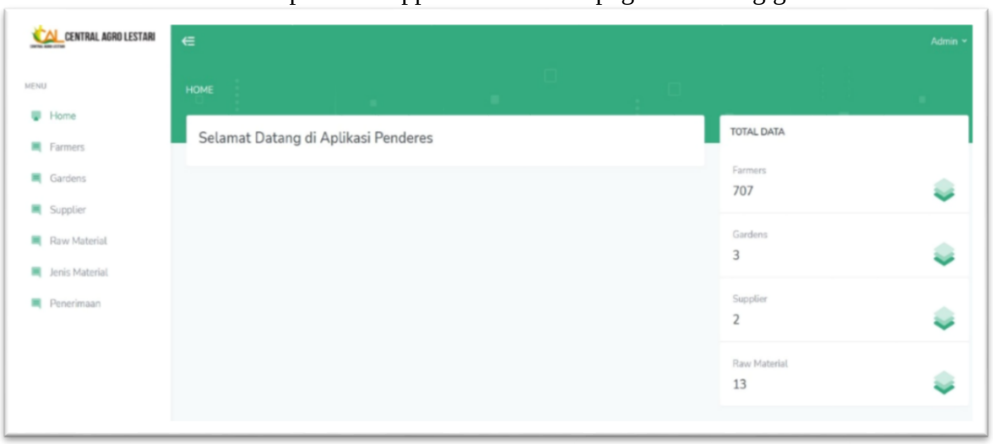

Fig. 2. KUB Sinar Argo Lestari Penderes Application Start Page

On the initial page of the KUB Sinar Argo Lestari Penderes Application, there are the following pages: a). Farmer page is a page for data processing (adding, viewing, modifying, deleting) farmer or farmer data. The entity that exists in the farmer data menu. b) Garden page is a page for data processing functions (adding, viewing, modifying, deleting) of a garden or land data. c) Supplier page is a page for supplier data processing functions (add, view, modify, delete). d) Raw Material page is a page for data processing (add, view, modify, delete) raw material data. e) Material Type page is a page for data processing functions (add, view, modify, delete) of material type data. f) Receipt page is a page for data processing functions (add, view, modify, delete) of the receipt data.

The continuity of application usage depends heavily on the application's usability [10]–[13]. To measure the usefulness of an application, the following indicators are used:Home is a web-based deduplication application's home page containing general information.

2.3 Usability

According to Jakob Nielsen, usability was defined as a measure of the user experience of using a product or software, such as the web, hardware, and equipment operated directly by users [14]. Another definition from Joseph Dumas and Janice Redish said that usability refers to customers' ability to learn and operate a product to fulfill their desires and goals [15]. Meanwhile, according to the Internationalization Organization for Standardization (ISO), usability is the ability of a product to meet users' needs by using factors of efficiency, effectiveness, and satisfaction in its use [16]. Based on the definitions above, usability is the ability of a product to be used by its users, and it can be used by its users with total ease while still providing satisfaction for the achievement of the user's goals.

There were several criteria for measuring the usability of a product, including helpful, satisfying, learnable, and accessible [17].

a. Usefulness

It is a measure of the product in providing satisfaction to its users and a benchmark for people to use it.

b. Efficiency

It measures how quickly users can reach their destination precisely and accurately.

c. Effectiveness

It is a measure of how effective the app assesses the suitability in doing the commands given by the users.

d. Learnability

This is part of the Effectiveness because it is about how users can learn and adapt to the features in the application easily.

e. Satisfaction

It results from the user's compliance with the performance of the user's expectations in running an application.

f. Accessibility

Refers to the access that is needed by the products to achieve a goal.

3 Methodology

This study is a survey study. According to the research objective, which was to measure the usability of the system based on the user's perspective, the researcher used a descriptive method in this study because it has an actual, systematic, and accurate picture of an object through

populations and samples [18]. Data collection using questionnaires. The target population is coconut sugar farmer partners of KUB Central Argo Lestari, while a sample size of 50 coconut sugar farmers is taken randomly. Data collection process, researchers used a usability scale system adopted from [16], [17]. The usability scale system is an evaluation technique done directly by the user. To support the success of the usability scale system, a benchmark was needed as assessment material. Researchers provided statements that will later be assessed by users using a Likert Scale, because the Likert scale was simple and easy to use [19]. The scales are as follows: 1 is for strongly disagree (SDA); 2 is for a statement that does disagree (DA); 3 is for a neutral statement (N); 4 is a statement that agrees (A), and 5 is for a statement that strongly agrees. (SA).

The object of this research was the Penderes App. To know the assessment by the users, the evaluation in this study was based on the users' point of view of the Penderes App. The users were field farmers of KUB Central Agro Lestari, from administrative managers and suppliers to management. The research was conducted at KUB Central Agro Lestari with 50 respondents, and the analytical tools used were descriptive statistical analysis tools.

Information system acceptance criteria can be grouped into several criteria, such as in the following table [20] :

Table 1. Information System Acceptance Criteria

Scala	Equivalent	Scala	Level Acceptance
90 to 100	A	72.5 to 100	Acceptable
80 to < 90	B		
70 to < 80	C	>50 to 72.5	Medium
60 to < 70	D	0 to 50	Unacceptable
< 60	E		

a. Result and Discussion

Based on the results of data collection that have been done on users of the Penderes app, some information can be explained, including the characteristics divided into several indicators such as age, length of *nderes* (collecting the sap water), number of trees, number of family members, education, the status of the tree being used, and how did they know the knowledge of organic coconut sugar technology.

Table 2. Respondents' Characteristics

No	Information	Average	Maximum	Minimum
1.	Age	43	65	27
2.	Length of *nderes*	20	40	6
3.	Length of becoming Organic Coconut Sugar Farmers	5	25	2
4.	Total Tree that being used	26	80	2
5.	Total of Family Members	4	9	2
6.	Education	Total	Percentage	
	a. No Education	2	4%	
	b. Elementary School	45	90%	
	c. Junior High School	3	6%	
	d. Senior High School	0	0%	
	e. Higher Education	0	0%	
7.	Status of the used tree	Total	Percentage	
	a. Private	3	6%	
	b. Rent	38	76%	
	c. Profit Sharing	0	0%	
	d. Combination	9	18%	
8.	How did they know about Organic Coconut Sugar technology	Total	Percentage	
	a. Agricultural Instructor	18	36%	
	b. *Penderes* Farmers Group	27	54%	
	c. Mass Media	0	0%	
	d. Fellow *Penderes* bnjhhFarmersSesama Petani Penderes	3	6%	
	e. Others	2	4%	

Based on the data obtained, the characteristics of the average users were 43 years old, the oldest was 65 years old, and the youngest 27 years old. The second characteristic was how long the users' experience was in dealing with coconut sugar. The average was 20 years, with the longest experience being 40 years and the shortest experience being 6 years. The average experience of being an organic coconut sugar farmer was 5 years, with the longest experience being 25 years and the shortest being 2 years. The average number of trees was 26, with 80 being the most used

trees and 2 in the fewest. On average, the farmers had 5 family members, with 9 as the maximum and 2 as the minimum. The education background, on average, was an elementary school with junior high school as the highest and no education as the lowest. Meanwhile, the status of the trees on average was rental trees. Some trees were a combination of rented and privately owned trees. Lastly, how did they know about the knowledge of organic coconut sugar technology? On average, they learned from the *Penderes* farmer group and an agricultural instructor; some knew the information from other sources. Data from the collection results has been collected, and the following is a recapitulation and calculation results from the data obtained.

Table 3. Descriptive Analysis of Respondent Usefulness of Penderes Application

No	Questions	Minimum Score	Maximum Score	Average	Standart Deviation
1	I am sure, I will use this app more often in the future.	1	5	3.6	0.80
2	This app should not be this complicated(*).	1	5	3.2	0.94
3	I think this app is easy to use.	2	5	3.7	0.74
4	I need others' help to use this app(*).	1	4	3.7	0.90
5	Various functions in this app have been well integrated.	2	5	3.6	0.61
6	I think there are too many inconsistencies in this app(*).	2	5	3.1	0.79
7	I am sure, most people can find it easy to use this app.	2	5	3.68	0.59
8	I think this app is too complicated to use (*).	1	5	3.06	0.96
9	I am confident that I am able to use this app.	2	5	3.78	0.62
10	I need to learn a lot before starting to use this app (*).	1	4	4.02	0.71

*) Reverse

The final average was calculated based on the results of the answers that have been added up in table 4. The calculation was done using the formula Total × 2, then divided by 50 respondents. The final calculation result as shown in Appendix 1.

Based on the results of data calculations, the final total score was 3,132, and the final average was 62.64. Referring to [20], the criteria for the usability scale system, the Penderes App has classified as an acceptable medium (> 50 to 72.5) application and has D (60 to <70) as the equivalent score.

Penderes Application acceptance level is still classified as medium, indicating that it is still considered to have yet to provide a high benefit to the Penderes, this is because the Penderes do not receive direct benefits from this application. The immediate beneficiary is KUB Central Agro Lestari, who directly markets organic coconut sugar to the export market if the marketing performance of KUB Central Agro Lestari will only impact the well-being of KUB Central Agro Lestari partners. On the other hand, the education level is mostly elementary school, so awareness of tracer importance to ensure quality certainty still needs to be improved. Therefore pendereres considers that the tracer application still needs to be more important. The average age of respondents was 43 years old, not including the generation with good digital literacy,

which found it difficult to use penderes application, which influenced their perceptual application to the usefulness of the penderes application, which was considered quite troublesome.

b. Conclusion and Recommendation

Based on the assessment results, *Penderes* as end users of the KUB-CAL Penderes App had 62.64 as the final average score. This score indicated that the usability of the KUB-CAL Penderes App based on the user's perspective was classified in the medium category. In other words, the application is helpful for users with a note that further improvements and application development are needed so that there will be a better level of usability in the future.

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