

Design of Waste Management and Accounting Information System (SITAMPAH 35) Based on Android at BERSERI 35 Waste Bank

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Abstract. One of the achievements of the Sustainable Development Goals (SDG's) is Sustainable Consumption, which means managing waste residue from consumption. Waste management that is less than optimal will result in environmental, pollution, and poor public health. Therefore, strategic efforts are needed to empower sustainable waste management to reduce the volume of waste with awareness of applying the 5M concept, namely reducing, sorting, utilizing, recycling, and saving waste; increasing the role of the waste bank; and focusing on the nature of self-reliance. Berseri 35 carries out weighing and waste management administration activities without using an integrated information system which is manual. Customer members are not yet able to obtain information regarding the amount of savings in real time. In addition, the Waste Bank Management has difficulty reporting the amount of organic and inorganic waste management Environmental Department every month. Nowadays is technology era to facilitate access requires a Technology System and Waste Social Capital. The right technology system requires knowledge transfer and technology transfer as social capital engineering such of waste literacy knowledge. The aims of this program is creating an Integrated Information System application for managing organic and inorganic waste (My Waste For Berseri SITampah 35 to provide waste reports in a timely manner. Waste bank administrators can report the amount of managed waste in a timely and accurately. Strengthening the Waste Bank Institution in order to increase human resource skills for sustainable waste management. This research findings is an application of the accounting information system of for waste management digitally that will

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support financial recording that closure is more effective and efficient namely SITAMPAH 35.

1 Introduction

Everyone, everyday, must produce a certain amount of waste, both organic and inorganic waste. Most of us only care until the "garbage is gone from home" stage, but we do not care much about how the waste ends. Waste is a national problem, a solution to the waste problem, especially in DIY, currently. Yogyakarta Waste Emergency in 2023, the closing Piyungan landfill due to overload. More than 800 tons of waste per day is transported to the Piyungan landfill.

The problem of waste is like an iceberg that is ready to explode at any time and of course has a big impact on humans and the environment. The Ministry of Environment and Forestry reports that domestic waste accounts for 60% of garbage production [2]. This is the major source of waste. The primary responsibility for managing waste that is generated within a household belongs to households or housewives. The domestic waste should be managed from its source or grassroot [3]. This requires awareness. Data shows that 72% of residents do not have the awareness to process waste. Increasing public consumption is not in line with the optimal waste management capacity of either.



Fig. 1. Condition of Management Waste in Indonesia

Waste management that is less than optimal will result in environmental pollution and public health. Therefore, strategic efforts are needed, empowering sustainable waste management to reduce the volume of waste with awareness of implementing the 3R (Reduce, ReUse, Recycle) and 5M concepts, namely Reducing, Sorting, Utilizing, Recycling and Saving waste. Based on the decision of the Ministry of the Environment, Republic of Indonesia Law number 18 of 2008 concerning waste management, Chapter IV, rights and obligations, it is stated as follows: "Everyone has the right to receive guidance so that they can carry out waste management in a good and environmentally manner

Law Number 18 of 2008 concerning Household Waste Management is the basis for its management [1] with the aim of Indonesia Clean from Waste by 2025 is the goal of efforts to manage waste optimal in the form of achieving 30% reduction at the source and 70% management at the landfill.

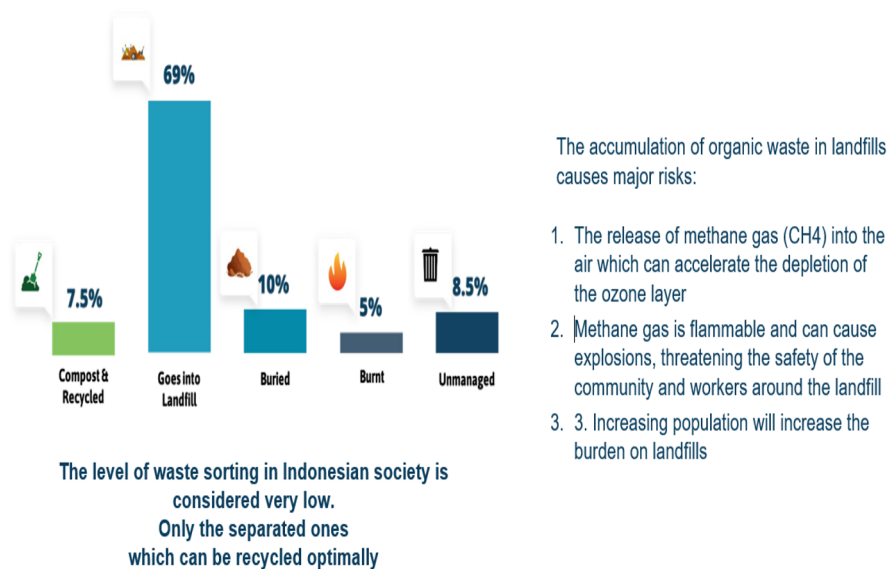


Fig. 2. Level of waste sorting in Indonesia is Low

The question arises, why is understanding waste fundamentally important? There is an answer that waste has different characteristics so treat waste differently too. This is due to changes in people's consumption patterns [23], activity patterns, socio-economic life patterns and technological development [24]. The previous paradigm that waste is a source of disease, has no economic value, and disturbs comfort must now change. Humans must be prepared to change this paradigm to Waste providing business opportunities if it is managed optimally and provides convenience in every activity, for example through utilizing technological developments.

Technological advances are increasingly rapid, making it possible for everyone to access information anywhere and at any time accompanied by the development of internet technology [4]. Technological advances help store, process and provide the required information data. One technology implementation is the use of a web and Android based system [5]. People can access data using Android-based mobile phones

The progress of Information and Communication Technology (ICT) has transformed the way people interact, communicate, and go about their daily lives. In an era where technology increasingly dominates every aspect of life, it is important to comprehend how these changes affect the social dynamics of Indonesian society. Technological developments have changed things significant social life and interactions in Indonesia. This is an unheard-of phenomenon unavoidable and has had several impacts, both positive and negative, which are worthy noticed. One of the most striking positive impacts is easy access to information. Indonesian people now have easier and faster access to various resources. This allows them to stay informed about the latest news, trends, and important developments in various fields [26]

In recent years, *digital transformation* (DT) has emerged as an important phenomenon in strategic IS research as well as for practitioners [27]. At a high level, DT encompasses the profound changes taking place in society and industries through the use of digital technologies [28]. At the organizational level, it has been argued that firms must find ways to innovate with these technologies by devising “strategies that embrace the implications of digital transformation and drive better operational performance” [29].

It can't be denied that every adult already uses a cell phone to communicate or search for global information. so that comfort and convenience are considerations for promoting the

movement for independent waste management. it is hoped that the digital and integrated waste management application can encourage the public to actively optimal waste management. This application can be a source of data regarding the amount of waste managed and be taken into consideration by the government and other related parties in making policies. Based on a survey conducted by the Indonesian Internet Service Providers Association (APJII), internet users in mid-2020 were 196.71 million people, where the majority of internet users used smartphones [30]. With so many smartphone users nowadays, it can be a means to help people manage waste in their daily activities through the applications provided. Smartphones themselves use several types of operating systems, one of which is Android. In 2018, smartphone users with the Android operating system increased by 73% [31]. With so many users of the Android operating system, there is the potential for more application services to be developed for Android to suit market share [32].

Bumijo sub-district has a land area of around 79 hectares which has public facilities covering an area of 10.7 hectares. This sub-district has 3,249 heads of families and a population of 10,393 people with a population density of 13,155.77 per km. This sub-district is divided into 13 community units and 56 neighborhood units. Currently, 14 Waste Banks have been established in the Bumijo sub-district and are managing inorganic waste [20]. This program can strengthen the role of waste banks to realize the government's movement "zero waste organic and an organic".

Activities at the Berseri 35 Waste Bank consists of Waste weighing and waste administration. Waste administration consist of recording customer waste savings, the amount of organic and inorganic waste absorbed. Berseri 35 Waste Bank does not yet use an integrated information system and is still manual. Customer members are not yet able to obtain information regarding the amount of savings in real time. In addition, the Waste Bank Management has difficulty reporting the amount of organic and inorganic waste management to department of enviromental every month.

Data on sales of organic crafts is also not presented accurately. This integrated data is really needed to find out waste management performance in each region. An integrated information system can improve services to customers and facilitate data access for management and stakeholders. This program requires a Waste Technology and Social Capital System. The right technology system requires knowledge transfer and technology transfer and engineering social

Berseri 35 Waste Bank has taken a role and is ready to change in managing waste. Partners already manage organic and inorganic waste. This is done twice a week, sorting waste from the source, namely households, every second and fourth week of every month, waste is weighed and recorded manually. There are still obstacles and problems, namely that customer members are not yet able to obtain information regarding the amount of savings in real time. Apart from that, the Waste Bank Management finds it difficult to report the amount of organic and inorganic waste managed to Enviromental Department every month. Data on sales of organic crafts is also not presented precisely and accurately. This integrated data is really needed to find out the extent of waste management performance in each region. An integrated information system can improve services to customers and facilitate data access for management and stakeholders.

This research objective is to create a Waste Management Technology System as an appropriate technological system requires Knowledge Transfer and Technology Transfer for social capital in the form of knowledge of waste literacy, waste sorting, waste processing and commitment to managing waste as well as community capacity in the form of skills and capabilities are important. Programs to be able to implement technological systems and increase waste social capital to provide social, environmental and economic benefits guarantee the sustainability of good and professional waste management in accordance with

applicable regulations. This is expected to make waste management areas and entities part of the solution, not part of the problem

Based on this background, Berseri 35 need to implement an accounting information system that will help them carry out business operations and improve the quality of their financial reports. This is because financial reports are very important for companies to make policies and see office progress. Based on this, researchers will provide a way to solve this problem by designing a service company accounting information system based on Android

Researchers designed and developed this system using the Codeigniter framework. The creation of this accounting information system uses a programming language, PHP (Hypertext Preprocessor). PHP is a web-based programming language for building web systems [6]. PHP is used to translate a line of program code into machine code so that a computer can read it and so that it can be added to HTML [7]. PHP is a service that operates over a local network [8].

The database server used in this research is MySQL. MySQL is a database that is not paid. RDBMS (Relational Database Management System) allows users to create, manage, and use data in a relational model [9]. RDBMS presents data in the form of interconnected tables [10]. One of the RDBMS software currently being developed is MySQL [11]. MySQL maintains data consistency and avoids data redundancy or storing the same data [12].

2 Methodology

Based on the objectives previously explained, the following is a description and steps of the research that will be carried out. This research process will be carried out using the System Development Life Cycle (SDLC) waterfall method

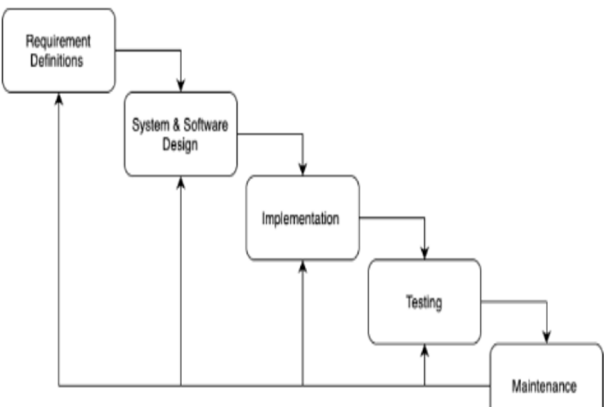


Fig. 3. Stages in the waterfall method

2.1 Application System Design

Partner participation in this program means that partners become targets for this program. activities that support the required production system and marketing management system. partners in implementing the program will provide information about it to take part in training on creating more innovative production and marketing systems related to organic and inorganic waste processing. So, the method for implementing this activity is Participatory Rural Method Participatory which is a collaboration of partner.

The Research and Development (RnD) method was used to produce a new design for a product, as well as to test the effectiveness of existing products. Testing systems were an important component in information system development. The purpose of system testing was to evaluate application capabilities and ensure whether the application had achieved the expected results. The method used in testing this research is the black box testing method. The black box testing method was used to test software without having to pay attention to the details of the software [16]. The database server used in this research is the free-of-charge MySQL database. The Relational Database Management System (RDBMS) allows users to create, manage, and use data in a relational model [33]. RDBMS presents data in the form of interconnected tables [34]. One of the RDBMS software currently being developed is MySQL [35]. MySQL maintains data consistency and avoids data redundancy or storing the same data [36].

Various methods for developing a system such as Rapid Application Development (RAD) and RUP. The comparison of these two methods is the Rapid Application Development (RAD) Model can produce a system quickly, but the cost of modelling and automated code generation is very high and RAD method is relatively new, so it is quite high risk. This study uses RUP to identify and resolve risks related to the process of preparing Financial Reports through more careful request management and review. This method is quite scalable and focuses more on periodic reviews and increase transparency for both parties [37]. The gap with previous research is that the focus is on the system being built, while the research to be carried out focuses on the method, namely using RUP in developing the system.

2.2 Developing Application System

In this stage of developing the Sitampah 35 t system, the RUP (Rational Unified Process) approach was used. RUP was a software engineering process for assigning responsibilities and tasks in organizational development [17].

2.2.1 Inception (analysis stage),

A stage for developers to identify existing and future systems, including system architecture, features and use cases from the results of interviews and observations. This stage is more about modelling the required business processes (business modelling), Defining system requirements. The data collected in this process is in the form of proof of transactions along with the accounts that will be used. The data obtained is then analysed to carry out the process at the next stage. Business modelling is a model created to provide an overview of how business processes run. Based on the data obtained, three actors play a role in the accounting information system: financial staff, financial managers, and company directors. Requirement stage, system needs were described through a use case diagram. This use case diagram graphically depicts users who use the system and interact with the system.

2.2.2. Elaboration phase

The next phase in the RUP method is the elaboration phase, which is a stage for developers to carry out designs based on the results of previous analysis in the inception phase [22] The focus in this phase is analysis and design and implementation. Analysis and design include use case diagrams, activity diagrams, and class diagrams.

2.2.3 Construction phase

In this phase, it is explained how to implement the results of the system design and carry out trials. In this phase the software must be formed. During implementation, must checking the black box [25]. It is explained what hardware and software will be used and meanwhile, in the trial phase, testing is carried out to ensure the quality of the system that has been created.

2.2.4 Transition phase

The final phase in this method is the transition phase where the system that the developer has created is handed over to the user. At this stage, the installation process is also carried out so that users understand it dan operate it comfortably and easily

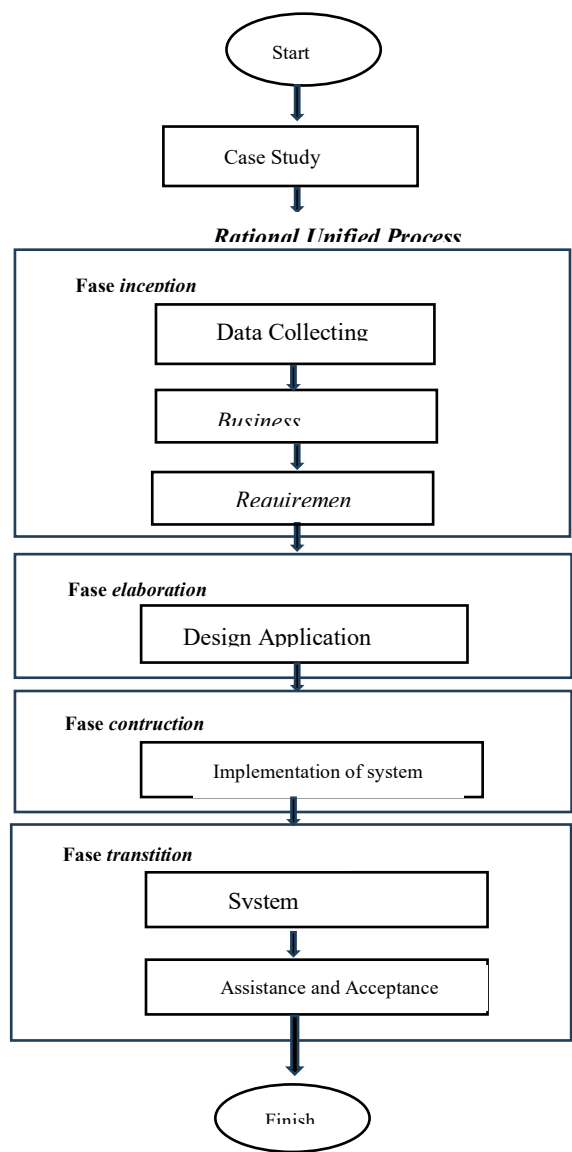


Fig. 4. Stage of Design Application

3 Results and Discussion

Currently, science and technology are developing rapidly in various aspects of human life [13]. Technology is very important for progress in all areas of life, such as economics, social culture, education, health, and so on [14]. Technological advances are increasingly rapid, making it possible for everyone to access information anywhere and at any time, accompanied by the development of internet technology [15]. Current technological advances make people use computers to help store, process, and provide the information data they need. One technology implementation is the use of a web-based system [16]. Information technology has changed the way management systems run organizations from initially using a lot of muscle to work that relies on brain power [17]. The information system cycle that uses information technology starts with input, process, and output. Information technology has been an important part of the accounting process of companies/organizations for a long time [18]. Technological developments supported by advances in software and hardware greatly facilitate the management of output and input data. This makes it possible to achieve efficiency and effectiveness in performance [19].

Digital socialization activities for Waste Processing System Applications were held on Wednesday 22 May 2024 at Balai RT 35 attended by the head of the Jetis district of Yogyakarta City Mrs Rini Rahmawati and the Head of Bumijo Village Mrs Ani Purwanti. Participants who have attended about 40 representatives of member waste bank berseri 35, sub-district facilitators, assisted waste bank partners. The benefit of this application are Costumer can directly and riel time access data for example their savings and get information quickly if there is price changing. And this application is easy to use and based android using Handphone. Digital Application SITAMPAH 35 consist of two menu: For Administrator and For Customer. At the inception stage, system needs were described through a use case diagram. This use case diagram graphically depicts users who use the system and interact with the system. The use case diagram for a service company's accounting information system is depicted in the Figure 5.

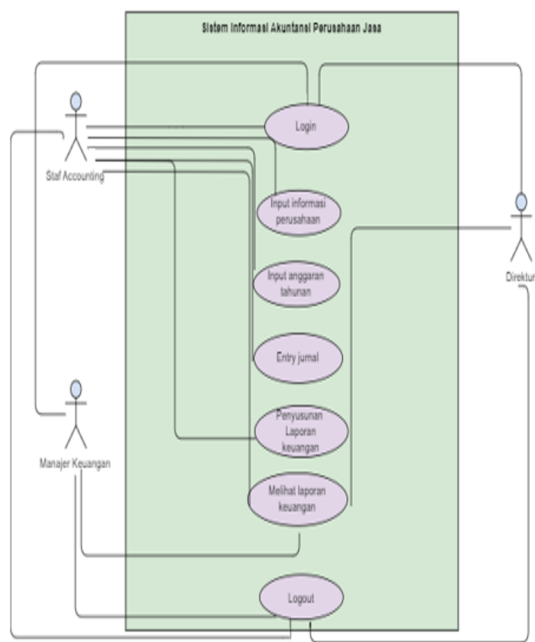


Fig. 5. Use Case Diagram

This elaboration phase is the system architecture design stage based on the requirements that have been obtained. At this stage, a class diagram was designed. Class diagrams are used to describe how to build an information system.

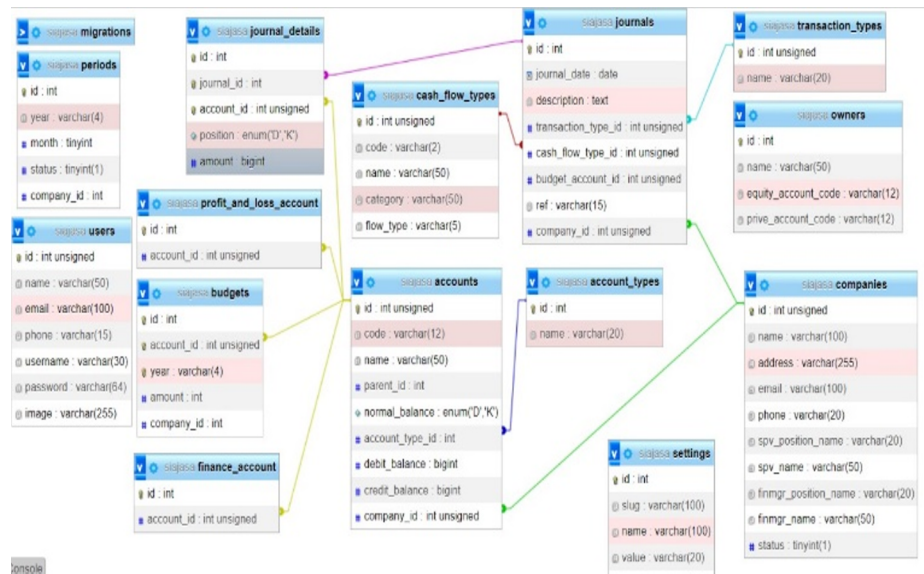


Fig. 6. Class diagrams for Application

3.1 Construction phase

The next stage in the RUP method is the construction phase. At this stage, the system design that had previously been carried out was then implemented. The following is the resulting display. Login Form When the system is started, the initial display looks like the image. The initial display is the login display. Users can fill in the username and password fields given by the admin. The login page is used to enter the application. Enter the registered username and password. If you are not registered, click Register to register. Enter your name, email, password and confirmation, then click Register.

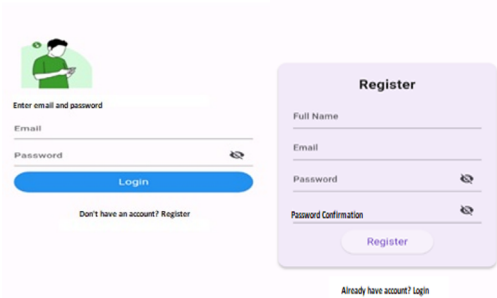


Fig. 7. Register dan Login

3.1.1 Customer Menu

Currently there are 2 menu in the application, namely: News & Information: to see a list of news.Drop Off: to record waste delivery to the Waste Bank. At the top there is information about the balance held by the customer (Costumer savings). The drop off button is used to record and contain waste delivery data to the bank. To add data, click the add button.

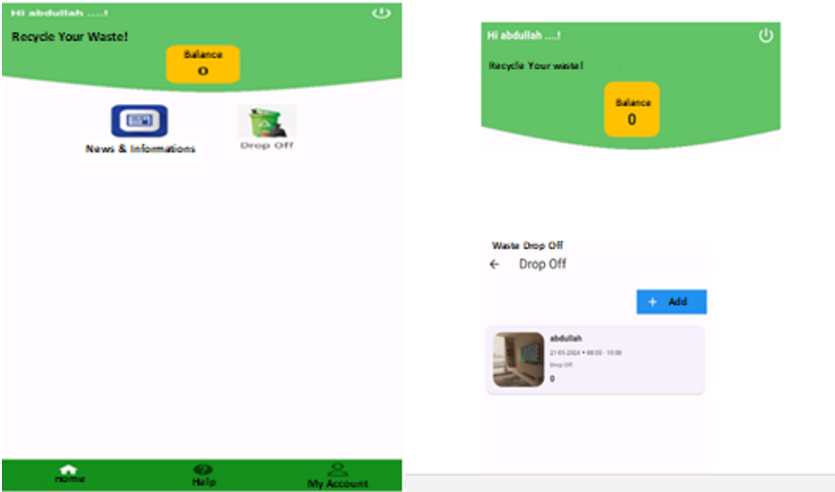


Fig. 8. Customer can access the Balance

Menu drop off, fill in the form completely, then click save. customers can add items from the trash. Types of waste: paper, plastic bottles, cardboard, iron, electronics, glass, aluminum. Select the Sub Type of Waste by clicking on the circle button (in the form of a circle). Once selected, click Save. Next, the officer or administrator will confirm and add the weight.

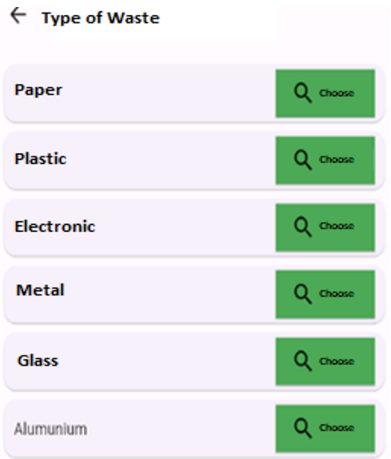


Fig. 9. Administrator Menu Display

3.1.2 Administrator Menu

For administrator, this application can support to record data management Waste , and data organic and inorganic managed or absorbed is reported to the Environmental Board every month quickly and accurately. Report of financial performance for example income of selling Product and calculation of Cost of Goods sold. Select the Trash Type by clicking the Select button on the relevant row. elect the Sub Type of Waste by clicking on the radio button (in the form of a circle). Once selected, click Save. Next, the officer will confirm and add the weight of the trash entered.

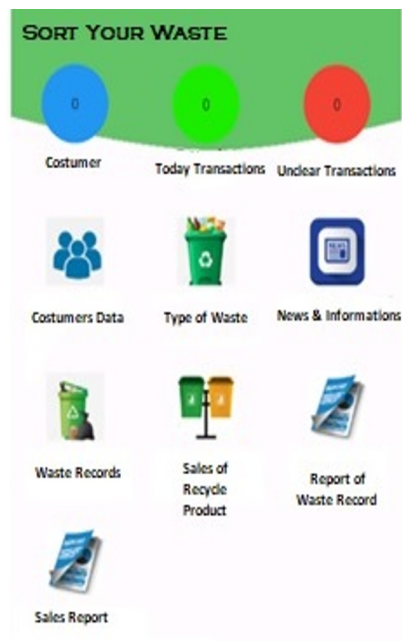


Fig. 10. Admin Application Page Display

The evaluation carried out regarding the implementation of the program is that researcher will carry out gradual control/supervision over the implementation of the program, with the aim that if there are difficulties, the research team will immediately help partners find solutions as well as assistance using Si Tampah 35. Creating Test Scenarios as material in conducting application testing. Application Testing is used to ensure that the application created is in accordance with the needs and has escaped bugs or errors. Before testing the application we need to create "Testcases" or testing scenarios that are used as a reference in testing the application, Details of the menu features are elaborated in the test case, so that the test scenario is important to formulate because it functions to: verify the functionality of each feature completely, Evaluation of participants is carried out by distributing pre-test and post-test questionnaires to measure the extent of partners' understanding regarding to the application .

Service members evaluate and measure the understanding of training participants before and after attending training or counseling. Measurements include: 1) understanding to Install the application-based Android in Handphone as much as 97%, 2) Participants stated that they could using Si Tampah 35 independently as much 96% the other respondent still manually because their age around sixty. 3) The Respondents have improved practicing skill to fill the

form of application easy as 96%. 5) Administrators understand how to publish the financial and non-financial report.

4 Conclusions

This research aims to design an accounting information system for waste management based on Adroid which called as Si Tambah 35, which is expected to assist in recording financial reports and waste management. This development of system using the RnD (Research and Development) research method. This information system was designed using the PHP and MySQL programming languages as data storage media. The development method uses the RUP (Rational Unified Process) method, which consists of 4 main stages, including the inception phase, elaboration phase, construction phase, and transition phase. The method used to test this system is the black box testing method. This Application consist of two master menus are Customer Menu and Administrators Menu. This designed web-based system provides a login page. The menus contained in this system include master data, journal, transaction entry menu, report menu, and settings menu. This application can provide a solution to help the financial recording and non-financial activities, which previously still used manual recording, to make it more effective and efficient.

Acknowledgement

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