Designing and building a business data collection application using the waterfall method

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Abstract: The Department of Industry and Trade of Ende Regency is a local government agency that is directly related to the process of data collection and assistance for small and medium industrial enterprises (SME) in Ende Regency which is still done manually, causing problems in data collection. the process is considered to be very slow so there is still a lot of SMI data that is not recorded clearly and completely. This website-based IKM data collection application aims to assist the Trade and Industry Office of the Ende Regency in the computerized IKM data collection process and checking of business assistance funds so that it can run effectively and efficiently. The software design methodology used in this study is the system development life cycle (SDLC) starting from the analysis, design, implementation, testing, and maintenance stages. In this study, researchers used 2 system testing methods, namely system usability scale testing (SUS), and black box testing. The results of the research on 4 respondents obtained an average SUS score of 86.2 with an acceptable interpretation of the B value category. While the results of black box testing are obtained from the tests that have been carried out, it can be concluded that all functional features can run well.

Keywords: application**,** business, SME, waterfall method

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Introduction

The Department of Trade and Industry (DISPERDAGIND) of Ende district is one of the local government agencies that have a very important role and task in the trade and industry sector of the Ende district government. The vision of the Department of Trade and Industry of Ende Regency is to carry out the task of leading, validating, coordinating, promoting, coordinating, and establishing local government policies in the fields of trade and industry [1]. The task of the Department of Trade and Industry of Ende Regency is to lead the implementation of trade and industrial activities and coordinate the implementation of trade and industrial activities [1]. In the field of trade and industry in Ende district, the existence of small and medium industrial enterprises (IKM) is needed for regioVnal economic growth, the distribution of Small and Medium Industries in Ende Regency is spread over 21 sub-districts, 23 sub-districts, and 255 villages which annually number of industrial business actors. Small and medium enterprises have experienced an increase and the data collection process carried out by the Department of Trade and Industry of Ende Regency is still done manually, causing problems in the data collection process which is considered very slow and there are still many IKM data that are not clearly and completely recorded. Based on these problems, the researchers designed a website-based information system for small and medium industry data collection to assist the Department of Trade and Industry of Ende Regency in the process of collecting data and checking computerized aid funds so that the data collection process can be carried out effectively and efficiently.

Previous research stated that the existence of a small and medium industry information system can help the Boyolali Regency Trade and Industry Office in data collection of small and medium industries online so that the data collection process can be carried out effectively and efficiently [2]. Furthermore, the existence of a geographic information system for small and medium industries can help the Jayapuran government in the process of collecting data and

finding locations for the distribution of small and medium industries faster and easier [3]. Furthermore, other research mentioned the existence of a Web-based IKM Mapping Geographic Information System can help the Mataram City Trade and Industry Office in the process of collecting data and finding IKM business locations [4]. Meanwhile, research also reported that the existence of an IKM data management information system can help the Palu City Trade and Industry Office in the process of collecting data, searching, and filtering IKM data effectively and efficiently [5].

The difference between this research and previous research is that in designing this system, the researcher wants to add a feature for checking business assistance funds where users (users) can check the data of IKM business actors who have received assistance by inputting the ID number of IKM business actors so that system users can check the data. the assistance of each IKM business actor so that there is no doubling of business assistance receipts in the same year. In this system, the researcher also added a search feature for IKM locations based on sub-districts, urban villages, and centers so that system users can easily find IKM locations, and the process of making reports based on location can be quickly and easily printed. The system testing method that the researcher uses in this research the SUS (system usability scale) testing and Blackbox Testing. SUS is a system testing stage that is used to measure the level of user satisfaction with the system that has been used. The SUS questionnaire consists of 10 question items using a 5-point Likert scale [6][7][8]. While black box testing is used by researchers to test whether the system's functionality can run well or not [9][10]. In designing the system in this study, researchers used the PHP programming language using the CodeIgniter framework. PHP is a scripting language that is popular in developing web-based applications. PHP itself is also a scripting language that is fast, flexible, and practical for creating a website [11]. While the Codeigniter framework is a very small PHP scripting language framework, built for developers who need a simple and elegant toolkit to create full-featured website applications [12]. By using the Codeigniter framework, researchers can easily and quickly develop web-based applications.

Methodology
The Research Stages

The method used in building this website-based small and medium industry data collection information system is the System Development Life Cycle (SDLC) method. The SDLC method is a method that provides a software life flow approach sequentially or sequentially starting from the stages of analysis, design, implementation, testing, and maintenance [7][13][14]. The analysis stage is used to collect data requirements, the design stage is used to design applications, the implementation stage is used to create a system using a computer programming language, the testing stage is used to test whether the system still has errors and the maintenance stage is used for if there is an error, then repairs are made to the application goes well The stages in the SDLC method can be seen in Figure 1.
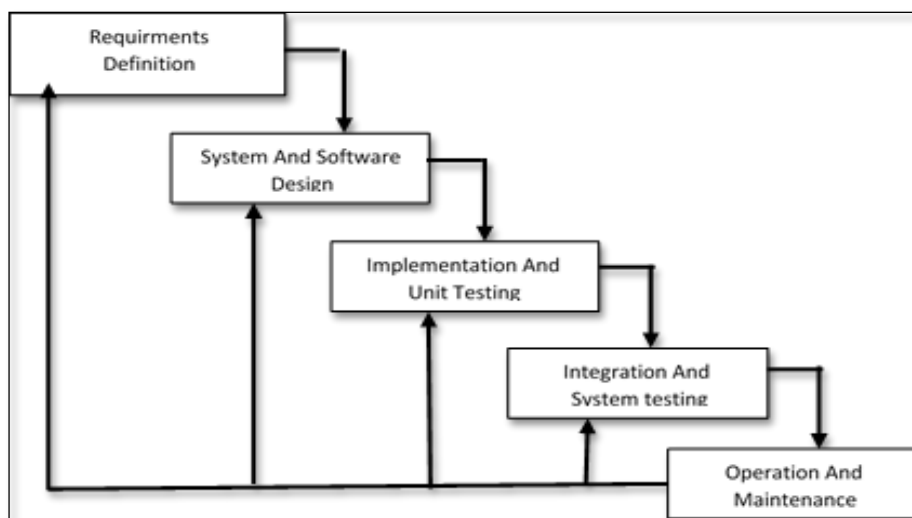

Figure 1. SDLC Model

Analysis

The analysis phase is carried out to obtain the program requirements to be developed including the desired data management needs and the required feature functions. In the analysis phase, the authors conducted interviews with employees of the Department of Trade and Industry (DISPERDAGIND) of Ende Regency. In the interview that the author conducted, it can be concluded that the system features needed to include, managing main data, managing KLBI and industrial permits, managing IKM data, managing assistance, and managing industrial data reports. The system is also expected to contain information on Small and Medium Industries in Ende Regency. Two users in the system will be created or developed. The first user is the admin of DISPERDAGIND who is in charge of monitoring activities on this system. The second user is a user or employee, who is also in charge of filling in the incoming industry data and available assistance.

Design

The design phase that the researchers used in this study included data flow diagrams (DFD) and Entity Relation Diagrams (ERD). A data Flow Diagram is a data process that describes where the data comes from and where the data goes out of the system and is stored [15]. While the Entity Relation Diagram (ERD) is a translator relationship that contains the components of the entity set and the relationship set that is equipped with attributes where to connect the entities, the primary key) key field of each entity is used [15].

Data Flow Diagram Level 0

The design data flow diagram (DFD) level 0 in Figure 2 describes the overall process model of the system, where the user (user) in this case is an employee of the Department of Trade and Industry (DISPERDAGIND) in charge of inputting sub-district data, village data, business data, data KLBI, IKM data, center data, and business assistance data into the system then the IKM data report which is the output of the system is given to the Head of the Department of Trade and Industry (DISPERDAGIND) Ende district.
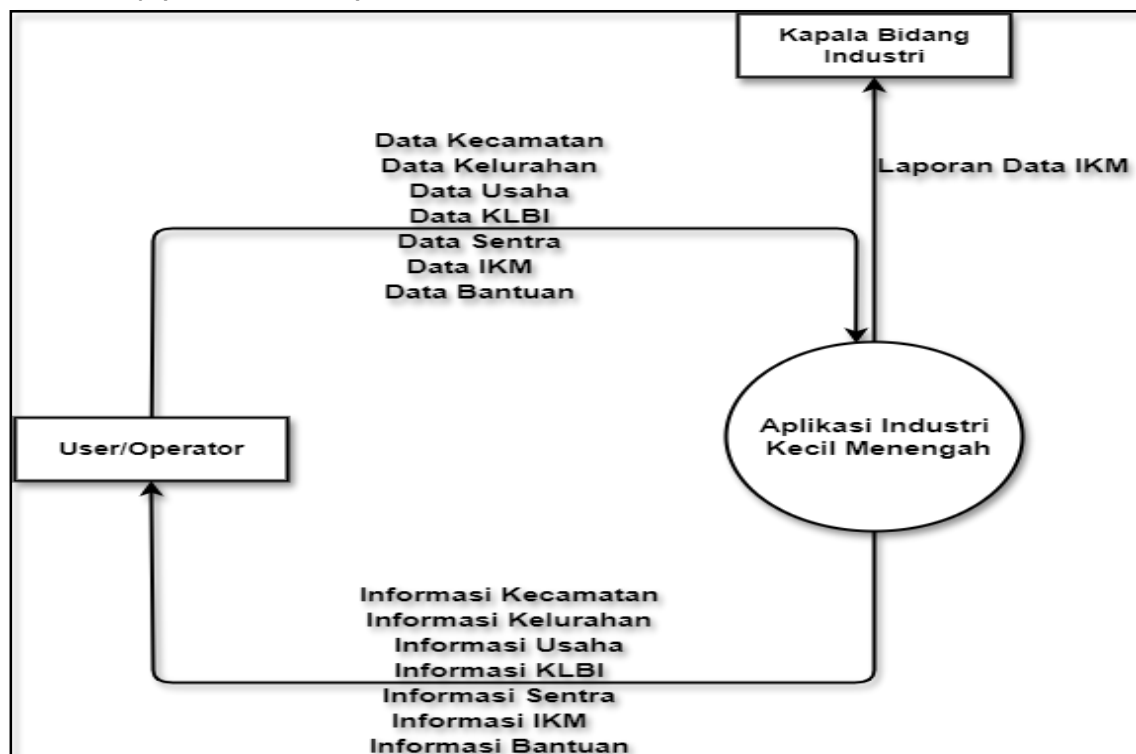

Figure 2. DFD Level 0

Data Flow Diagram Level 1

The level 1 data flow diagram (DFD) design in Figure 3 has 4 processes, namely the user data management process, business data management, sub-district data, center data, and KLBI data, then IKM data management and the last is business assistance data management.
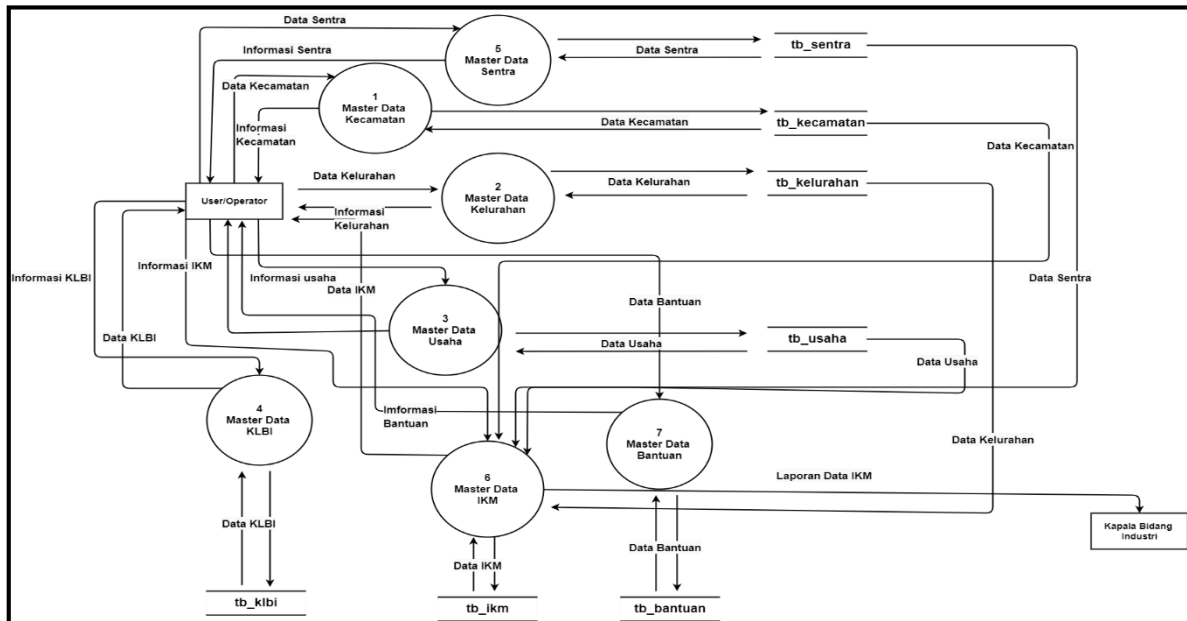

Figure 3. DFD Level 1

Entity Relation Diagram (ERD)

The table relation design in Figure 4 describes the design of the table structure and the relationship between tables used by researchers in this study. There are 7 tables used in this study consisting of sub-district tables, village tables, KLBI tables, centers tables, business tables, IKM tables, and assistance tables.
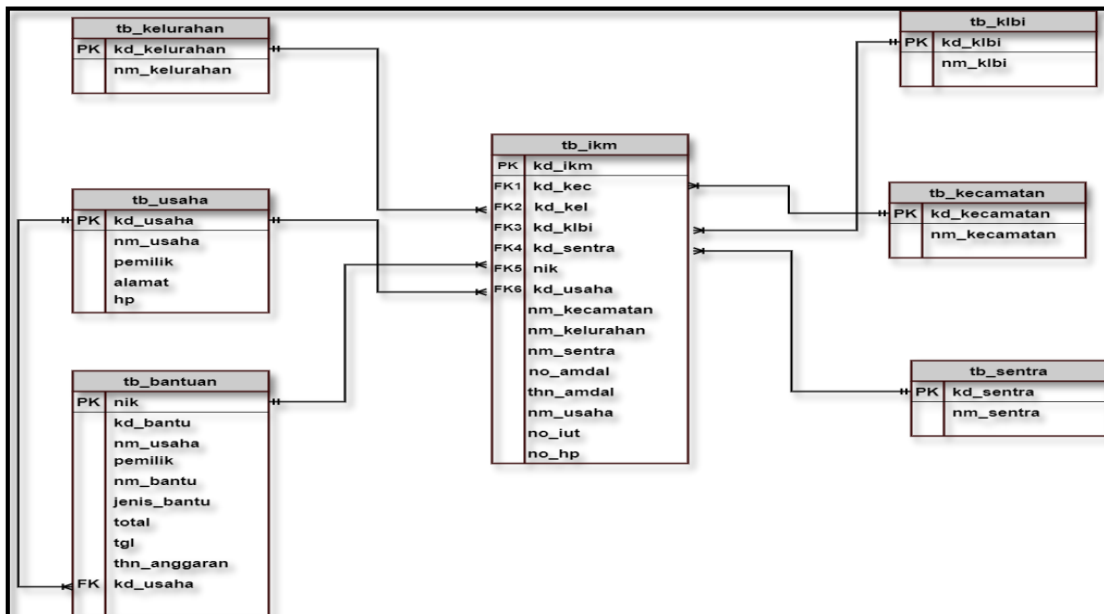

Figure 4. Entity Relation Diagram

Implementation

The results of this study produce an Information System for Small and Medium Industry Business Data Collection in Ende Regency, which has two users, namely Admin, User, or employees who run this information system. Admin has access rights to process existing data, has access rights to change data, delete data, add data and as monitoring data for small and medium industries that have been recorded by the Department of Trade and Industry, users or employees have access rights to register and Filling out data for Small and Medium Industries and data on regulations, permits, and assistance data.

Login Page

The login page is the first page that appears when accessing the system. Figure 5 shows the menu contained on the login page, to access the login page the user must input the nip and password. The login page is used to provide login access rights according to the user level.
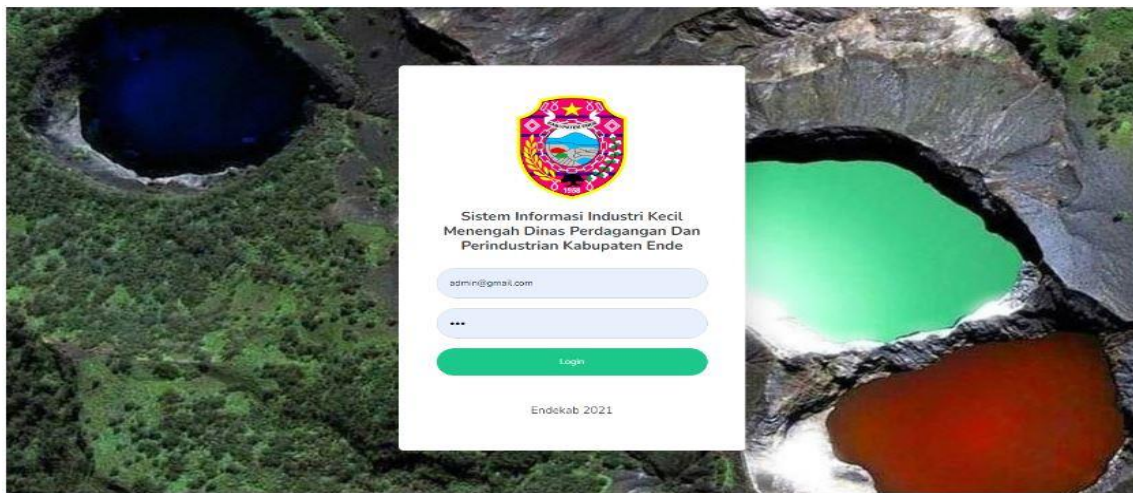

Figure 5. Login Page

Dashboard Page

The admin dashboard page is the main page that can be accessed at the admin level. Figure 6 shows the admin-level dashboard. This page is used to view information on the number of sub-districts, the number of sub-districts, and the number of IKM in the Ende district in real time.
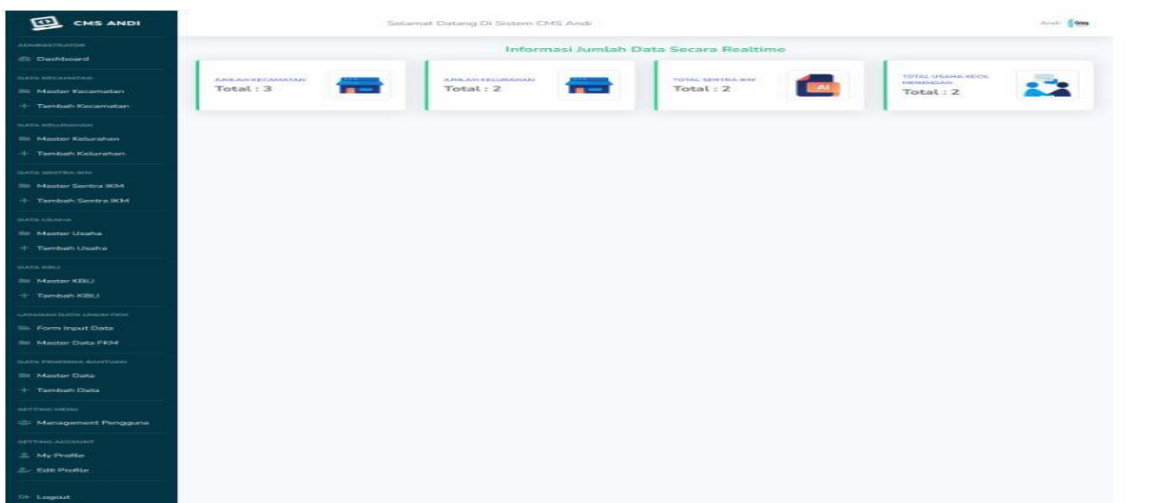

Figure 6. Dashboard Page

IKM Data Input Form Page

The IKM data input form page is a page that can be accessed at the Employee user level. Figure 7 shows the IKM data input form. This page is used for the process of inputting IKM letter data by the Ende Regency DISPERDAGIND employee.
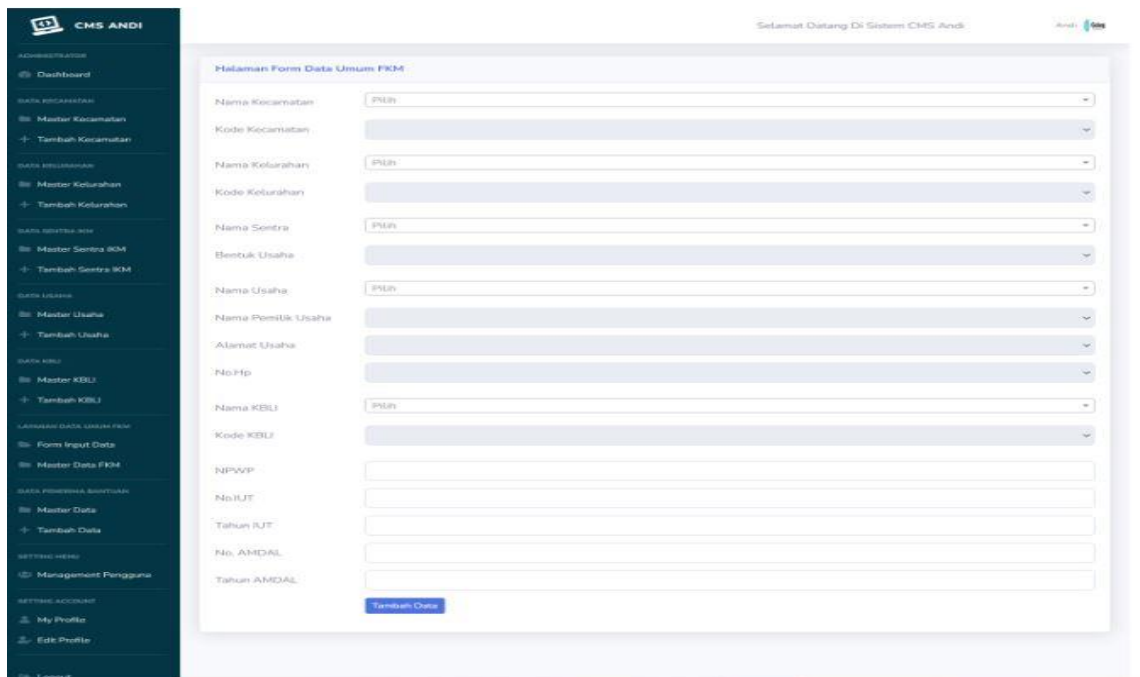

Figure 7. IKM Data Input Form Page

Checking Business Aid Funds Page

The business assistance fund checking data input form page is a page that can be accessed at the Employee user level. Figure 8 shows the business assistance fund checking data input form. This page is used for the process of inputting data for checking business assistance funds carried out by DISPERDAGIND employees of the Ende district.
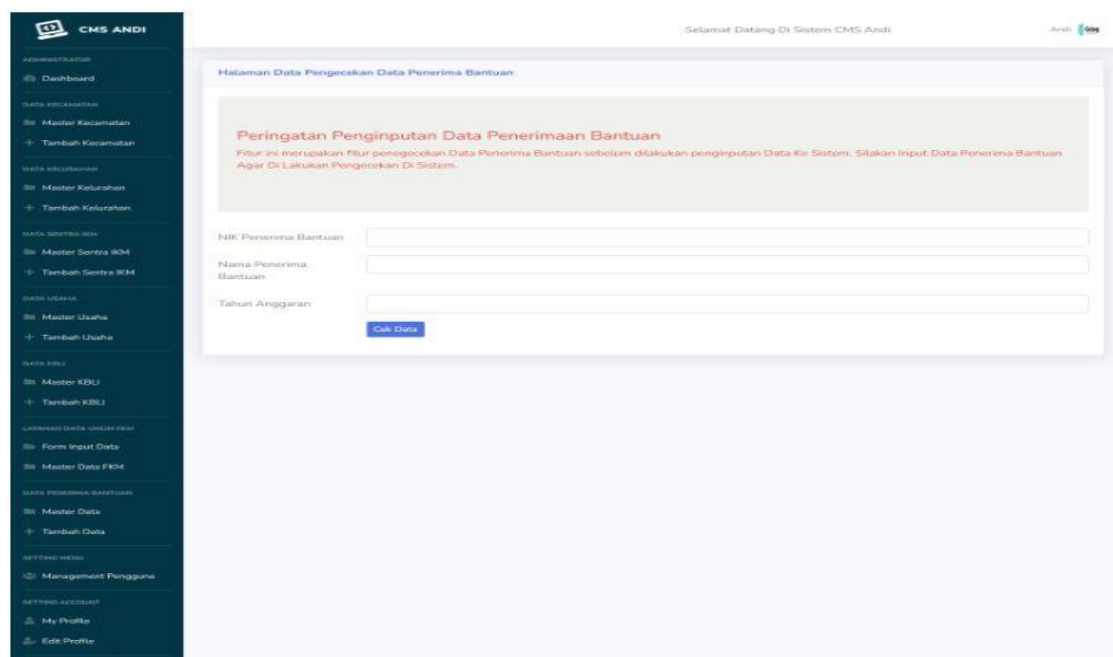

Figure 8. Checking Business Aid Funds Page

Master Data Center Page

The data center master page is a page that can be accessed at the employee user level. Figure 9 shows the center data master page. This page is used to view center data information
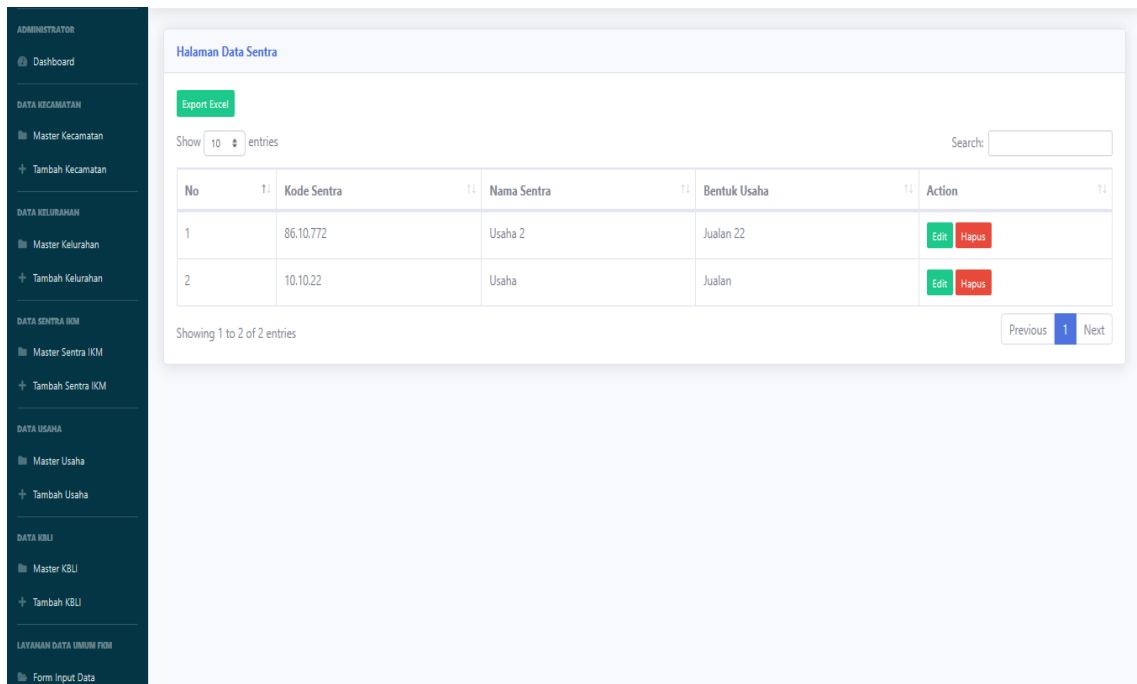

Figure 9. Master Data Center Page

Master Data IKM Page

The IKM master data page is a page that can be accessed at the Employee user level. Figure 10 shows the IKM master data page. This page is used to view information on IKM data.
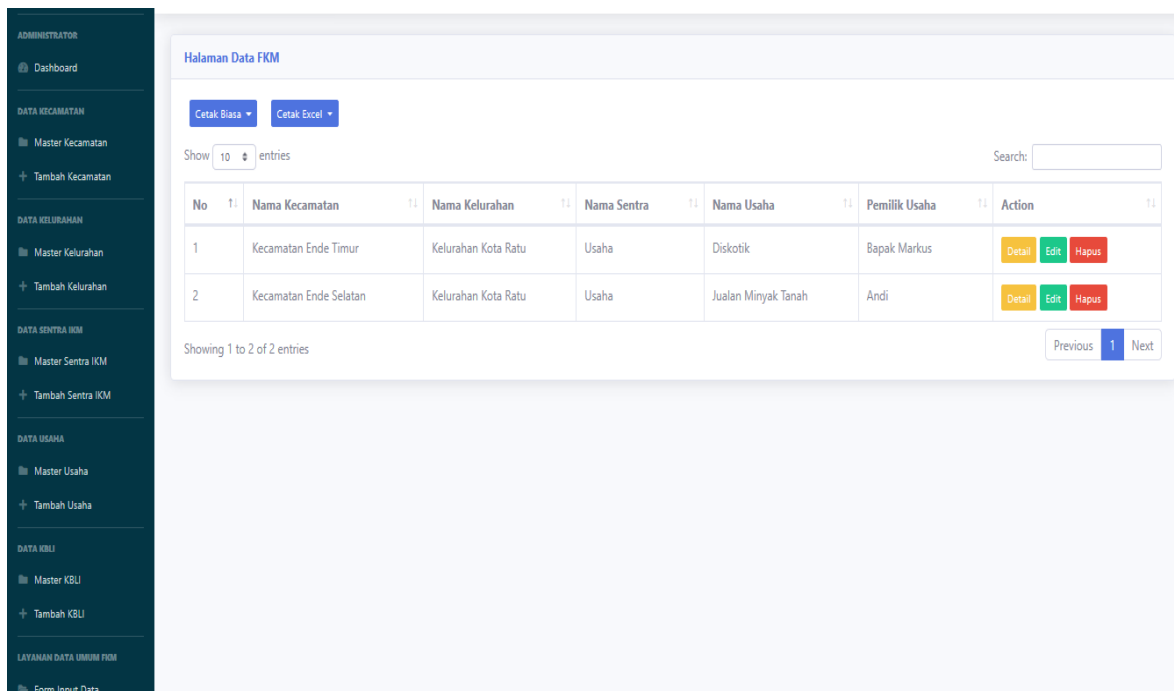

Figure 10. Master Data IKM Page

System Usability Scale Test

Testing the system usability scale questionnaire is a system testing stage that is used to measure the level of user satisfaction with the system that has been used [7]. The results of the usability scale system questionnaire used to measure the level of user satisfaction distributed to 4 respondents who got an average SUS score of 86.2 can be seen in Figure 11.
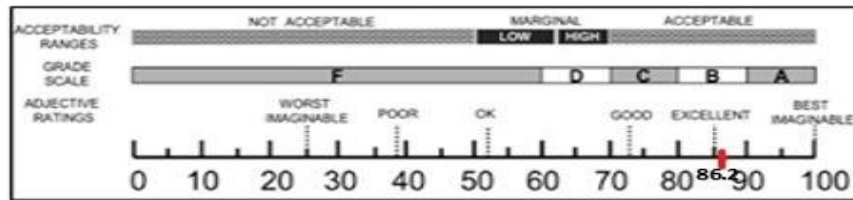

Figure 11. System Usability Scale Score

Based on this test, it was obtained that the score for the grade scale was at grade B, for the adjectives scale the score obtained was categorized as excellent and for the acceptability scale the score obtained was categorized as Acceptable, indicating that the score was classified as acceptable by the user

Blackbox Test

Testing on the system used black box testing which is a software development technique used to evaluate system functionality [16][17][18]. Blackbox testing focuses on the inputs (inputs) for the system and the expected outputs (outputs) for each input (input). This test method is based on software requirements and specifications. By the results of the tests that have been carried out, it can be concluded that all functional features can run well, as explained in Table 1.

Table 1. Blackbox Testing

Test	Function	Input	Output	Status
Login	Login menu to enter the system	Enter the correct user and password	Go to the main page	Valid
Login	Login menu to enter the system	Entering the wrong username and password	Back to the login page	Valid
Data center menu	View data center	Click on the data center	Displays a list of center industrial	Valid
Data center menu	Data center input	Click on add data	Showing the new sentra data entry	Valid
Small and medium industry data Menu	View ikm data	Click on ikm data	Displays a list of small and medium industries	Valid
Small and medium industry data Menu	Input ikm data	Click on add data	Displays a list of small and medium industries	Valid
Menu business assistance data	View business assistance data	Click on business assistance data	Display business assistance data	Valid

Test	Function	Input	Output	Status
Menu business assistance data	Input data business assistance	Click on add data	Displaying business assistance data fields	Valid
Menu business assistance data	Input nik businessmen ikm	Click on add data	Displaying business assistance checking information	Valid

Conclusion

After designing, implementing, and testing a website-based small and medium industry data collection information system, it is concluded that several conclusions are obtained. in Ende Regency. This system provides information related to small and medium industries in Ende Regency. Researchers are trying to make the system as expected from the Department of Trade and Industry of Ende Regency as best as possible. In the future, it is still necessary to develop a system to be better so that the information system for data collection of small and medium industries can have better features and make it easier for users or employees of the trade and industry office of Ende Regency to operate. As for suggestions for further research, it is necessary to test in terms of user experience (UX) and user interface (UI) to increase user satisfaction and comfort in using the system.)

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