Administrative Service Innovation Through Android Application

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ABSTRAK
The purpose of this research is to design and build service information applications at the Tombolopao Subdistrict Office based on android and know the results of the test of the administrative service information application of Tombolopao Subdistrict based on android. This application is made using the Research and Development (R&D) research type and waterfall development model. This research was conducted at the Tombolopao District Office and tested by fifteen people. The results of this study produce products in the form of service information applications that will be used by people who want to know information and perform services at the Tombolopao District Office. This system is tested using the ISO 25010 standard using 4 aspects, namely functional suitability, portability, usability, and performance efficiency. Functional suitability testing makes this application feasible to use. Portability testing is done by observing the output results generated by using android smartphones in various versions, the results obtained are known that this service information application system runs well on several versions of android. Usability testing conducted by users in areas not covered by the network is in the Very Good category. Performance efficiency testing is done using android studio by measuring realtime data for the CPU used which is 100%, 512 Mb memory, when the application is used.

Keywords: Application; Information; Service; Android; Waterfall.

1. Pendahuluan

The making of this application aims to describe the administrative service innovation that will be initiated by the District Government at the Tombolopao sub-district office, namely the service of obtaining an administrative information system (file completeness) through an android application. In today's increasingly advanced digital era, the government must be more sensitive and responsive in utilising existing technology. Likewise, the organiser of public administration documents must always modernise itself, find strategies and approaches to the community more precisely, and continue to try to update theories and instrumentation so that they are not increasingly left behind by the times. In this case, one of the things that can be done is innovation [1].

This application aims to help the community get information on administrative services at the Tombolopao District Office due to the lack of understanding and information obtained by the community regarding the requirements if they want to do a service at the sub-district office. This application helps the community to get or access administrative service information at the Tombolopao District Office, especially villages that have not been reached by the network and can be accessed by the community anywhere.

There are several areas that have not been reached by the network, namely Erelembang Village with a population of 4,317 people which has 7 hamlets and 4 of them have not been reached by the network, namely Erelembang Hamlet, Dusen Matteko, Ma' lenteng Hamlet, and Bontomarannu Hamlet. Furthermore, Bolaromang Village has a population of 1,022 people and has 4 hamlets, and 3 of them have not been covered by the network, namely Lappara'na Hamlet, Langkoa Hamlet, and Bolaromang Hamlet. And finally, Tonasa Village with a population of 5,092 people and has 7 hamlets, 2 of which have not been covered by the network properly, namely Mangottong Hamlet and Langkowa Hamlet. According to the results of the observation, the number of people who have not been reached by the network is 5,000 people. So that people who have not been reached by the network automatically experience difficulties when looking for service information on the website that has been prepared by the sub-district government. Therefore, researchers created an android-based service information application that aims to provide service information to people who are not or have not reached the network. This android-based service information application is made based on problems that occur in the community, including the lack of public understanding of service requirements which also hampers the service process because people go back and forth from home to the office just to complete the service requirements.

Based on the background description of the problems that have been stated, this research is entitled "Administrative Service Innovation Through Android Applications in Tombolopao District". With this innovation in providing administrative
service information, it is hoped that it will be able to increase public knowledge, accelerate services and increase public trust in the performance of the Tombolopao District Government.

2. Materials and Methods

a. Type of research
   The type of research that the author uses in this study is Research and Development (R&D). R&D or research and development is a type of research used to produce certain products and test the effectiveness of these products. Research and Development (R&D) is used to produce products and to improve them in accordance with the references and criteria of the products made to produce new products through various stages and validation or testing [2].

b. Development Model
   The development model used in this research is a software development model using the waterfall method. According to [3] the waterfall model is a sequential development model. The waterfall model is sequential and systematic in building a software programme. The waterfall development model has many advantages, including Easy to understand and can be applied in the software development process.

   ![Waterfall Development Model](image)

   Figure 1. Waterfall Development Model

   The stages of this waterfall development model are:
   1) Requirement
      At this stage, application developers need communication aimed at understanding the software that users expect and the limitations of the software. The system and software requirements are documented and will be reviewed by the user whether they are what is needed and desired.
   2) Design
      At this stage, developers create a system design that can help determine hardware and system requirements that can help determine the overall system architecture. Design is a phase that focuses on the design stage in creating software such as: data structures, software architecture, user interfaces, and coding procedures. There are several types of software modelling, one of the software models used at this stage is the Unified Modelling Language (UML) which is a description of the software program to be created. UML is designed to make it easier for developers to create a software programme.
   3) Implementation
      At this stage, the system is first developed in small programmes called units, which are integrated at a later stage. Each unit that is developed and evaluated for functionality is referred to as testing (unit testing). The evaluation is useful to minimise errors that occur before all parts are combined into a single software unit.
   4) Verification
      At this stage, the system is verified and tested to determine whether the system fully or partially fulfils the system requirements. The testing process focuses on reducing errors that occur when the system is run, system testing consists of testing the function and quality of the software. System function testing is used to check whether the functions performed are running properly. And system quality testing is used to check whether the system made is suitable for use.
   5) Maintenance
      Maintenance is the last stage of the waterfall development method. The finished software programme will be run and maintained. Maintenance includes fixing errors that were not found in the previous steps.

c. Data Collection Technique
   Data collection in research activities is very important because it is related to the availability of data needed to answer problems in research. In this study, the data collection methods used were interview techniques and questionnaires / surveys.
1) Interview
The interview technique is a conversation with a specific purpose. Conversations are conducted by two parties, namely the interviewer who asks questions and the interviewee who provides answers to these questions. This interview was conducted with several farmers in the Bangkala area to collect the data needed to design administrative service information applications.

2) Questionnaire
Questionnaire is a data collection technique using a list of questions used by researchers to determine the feasibility of the software that has been made. There are two types of questionnaires, namely closed and open questionnaires. The questionnaire used in this study is a closed questionnaire, namely a questionnaire that has the answers provided, so that the respondent only must choose and answer directly. This questionnaire is used to determine the feasibility of administrative service information application software in terms of functional suitability and usability. This questionnaire was conducted to obtain data from system validators and users.

d. Research Subjects
What is meant by research subjects is individuals or groups, who will conduct tests on applications that have been built. Research subjects are very important to do because the results of the research obtained will depend heavily on the results of the trials or tests carried out. According to [4], research subjects are divided into two groups, namely human subjects and non-human subjects. The research subjects in this paper are:

1) Two Makassar State University system expert lecturers whose role is to test the functional suitability aspects of the Android-based Administrative Information System Application that has been built.
2) Two content experts from the Tombolopao District Office who play a role in testing the functional suitability aspects of the Android-based Administrative Information System Application that has been built.
3) Fifteen people from the community in the Tombolopao District area who play a role in testing the usability aspects of the applications that have been built. According to [5] the number of respondents to conduct test subjects or usability testing uses a minimum of 10 people.

e. Research Instruments
Research instruments are tools used for data collection or object measurement of a research variable. To get the right data and conclusions in accordance with the actual situation, it is necessary to have an instrument that is valid, consistent, and accurate in providing research data (reliable). The instrument used in this research is a questionnaire. Validator questionnaires to test functional suitability aspects and user questionnaires to test usability aspects.

f. Data Analysis Technique
This data analysis process aims to calculate the variable data tested, namely software quality based on ISO 25010 which has eight aspects, but in this stage the authors use four aspects based on the theory [6], namely:

1) Analysis of Functional Suitability Aspects
Testing on the functional suitability aspect is determined from the results of the calculation of the percentage score for each instrument. On the answer sheet for each question item using the Guttman scale. According to [7] this type of measurement scale will get a firm answer, namely "Yes" or "No", "True" or "False", "Ever" or "Never", "Positive" or "Negative". The table below is a score conversion from the Guttman scale [7].

<table>
<thead>
<tr>
<th>Answer</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ya</td>
<td>1</td>
</tr>
<tr>
<td>Tidak</td>
<td>0</td>
</tr>
</tbody>
</table>

The test results are calculated with the formula of the feature completeness matrix. The feature completeness matrix is a matrix to measure the extent to which features can be implemented correctly. The following is a formula for calculations that can be used to process questionnaire data [8].

\[ X = \frac{I}{P} \quad \text{(1)} \]

Description:
I = Number of successfully implemented features
P = Number of features designed

In the feature completeness matrix, a value close to 1 identifies the number of successfully implemented features [9] software is said to be good in functional suitability according to the following table:
2) Portability Aspect Analysis
Testing on the portability aspect is done by running the Pollyanna administration information application on smartphones with several different android versions, so that the results of data analysis for the portability aspect are obtained from the test results.

3) Usability Aspect Analysis
Analysis of usability aspects was carried out using a questionnaire method. In the questionnaire, the answer to each question item uses a Likert Scale [7].

Table 3. Likert Scale Conversion

<table>
<thead>
<tr>
<th>Answer</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>5</td>
</tr>
<tr>
<td>Agree</td>
<td>4</td>
</tr>
<tr>
<td>Undecided</td>
<td>3</td>
</tr>
<tr>
<td>Disagree</td>
<td>2</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>1</td>
</tr>
</tbody>
</table>

The formula used to calculate the percentage of test results is as follows [10]:

\[
\text{Percentage Score} = \left( \frac{\text{Total Score}}{\text{Maximum Score}} \right) \times 100\% \quad \text{(2)}
\]

After getting the percentage score from the test results, the next step is to compare it with the score interpretation criteria table that has been prepared. In the table, the Usability test success category will be determined based on the range of percentage score values obtained.

After the percentage score results are obtained, they will be compared with the score interpretation criteria table [11] as in the following table:

Table 4. Score Interpretation Criteria

<table>
<thead>
<tr>
<th>Percentage of Achievement (%)</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>81% - 100%</td>
<td>Very good</td>
</tr>
<tr>
<td>61% - 80%</td>
<td>Good</td>
</tr>
<tr>
<td>41% - 60%</td>
<td>Good enough</td>
</tr>
<tr>
<td>21% - 40%</td>
<td>Less good</td>
</tr>
<tr>
<td>0% - 20%</td>
<td>Very unfavourable</td>
</tr>
</tbody>
</table>

4) Performance Efficiency Aspect Analysis
Testing on the performance efficiency aspect uses a testing tool, namely the android profiler on android studio by measuring performance relative to the resources used under certain conditions on the application system.

3. Result
The results obtained from the Android-Based Administrative Service Information Application are to produce an application that functions to help people, especially those who have not reached the network, to access administrative service information without having to come directly to the Tombolopao District Office. The author has tested the application to two lecturers of Makassar State University system expert validators, two service staff content expert validators and fifteen people in the Tombolopao District area, especially those who have not reached the network who will use this android-based administrative service information application, and the following is a description of the results of the android-based administrative service information application that has been built and the results of application testing that has been carried out.

a) Requirement
At this stage, researchers conducted interviews with the community in the Tombolopao District area, especially areas that have not been reached by the network to collect data/information related to the needs and requirements needed in developing the Administrative Service Information Application. The results of this stage are as follows:
1) The community has difficulty in obtaining administrative service information due to difficulties in getting network access so that the community needs an information system that can be accessed without requiring network access.

2) The community needs administrative service information applications with application sizes that do not take up too much storage space on mobile phones.

b) Design

After the requirement/interview stage was completed and the needs were well-documented, the researchers proceeded to the stage of making a temporary design. The design resulted in a storyboard in the form of a flowchart diagram, use case diagram, activity diagram, and interface design.

Figure 1. Flowchart Diagram
c) Implementation

At this stage the researcher begins to build or create an Android-based Administrative Service Information application using Android Studio software using the Java programming language with reference to the designs and concepts that have been made in the previous stage. Researchers also pay attention to every detail of the programmed that is made to ensure that the software produced is in accordance with the specifications and development objectives that have been set. The following are the results of the implementation of the software that has been made:
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In this verification stage, researchers use the ISO 25010 standard to test the feasibility of android-based administrative service information applications using 4 aspects, namely functional suitability, usability, performance efficiency, and portability.

1) Functional Suitability Aspect Testing

In this case the research is carried out based on an instrument in the form of a functional test case containing 11 questions related to the functions in the application that has been built. The functional suitability instrument is validated by a system expert lecturer, every function that can run properly, the system expert lecturer will give a checklist (v) in the "Yes" column, while if the function does not run properly, the system expert lecturer will give a checklist (v) in the "No" column.

Table 5. Functional Suitability Testing Data Analysis

<table>
<thead>
<tr>
<th>Answer</th>
<th>Validator 1</th>
<th>Validator 2</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Maximum Score</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
</tbody>
</table>

After testing the functional suitability in the form of test cases, the score for each assessment can be known, namely:

Yes : (11/11) = 1
No : (0/11) = 0

The data analysis value shows the results of functional suitability testing conducted by two expert system validator lecturers. The data shows that the results of functional suitability testing based on calculations using the feature completeness matrix formula get a score of 0.5 ≤ x ≤ 1 so that the application is in the "Good" category because all features have been successfully implemented. So, it can be concluded that this Android-Based Administrative Service Information Application is "Feasible" to use.

2) Portability Aspect Testing

Portability test results are used to evaluate the extent to which an application or system can run and operate properly in a variety of different environments or platforms. Testing the portability aspect is important because the application will be run on different operating systems, hardware, and environments.

This test will be carried out by observing the results of the output produced using android phones on various versions, the following are the results of the description of testing the portability aspect of the android-based administrative service information application that has been built.

Table 6. Portability Test Results
After testing portability in the form of application installation on several android phones with various versions, it shows that the portability test results have been successfully carried out. So it can be concluded that this Android-Based Administration Service Information Application is "Feasible" for use on android phones with various versions.

3) Usability Aspect Testing

Usability is an important factor in the application design process because an application system is built to meet user needs, so the ease of users in using the application must be prioritised. This questionnaire was distributed to 15 users and got the results as below:

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very good</td>
<td>15</td>
<td>100%</td>
</tr>
<tr>
<td>Good</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Undecided</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Not good</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Very unfavourable</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

In the table above, it is concluded that 15 people or all respondents said strongly agree and get a percentage of 100%, agree, hesitate, disagree, and strongly disagree as many as 0 people or 0%. This shows that the average respondent is satisfied with this android-based administrative service information application, so this application can be said to be "Feasible" to use.

4) Performance Efficiency Aspect Testing
Testing on this aspect of performance efficiency uses a testing tool in the Android Studio SDK, namely the profiler which will be used to measure CPU, memory, network, and energy data used by this android-based administrative service information application system.

![Testing on this aspect of performance efficiency uses a testing tool in the Android Studio SDK, namely the profiler which will be used to measure CPU, memory, network, and energy data used by this android-based administrative service information application system.](image)

Figure 4. Performance Efficiency Aspect Testing

Testing the performance efficiency aspect is done using a profiler by measuring realtime data for CPU, memory, and application network activity. In Figure 5, the CPU used is 100%, the memory used is 512 MB when using this Android-based Administration Service Information Application.

5) Maintenance

In the maintenance stage, the programmed will be run, and maintenance performed. This includes correcting errors that were not found in the previous steps. In this case, researchers will conduct regular performance monitoring to identify problems and bottlenecks that may arise. Perform functionality updates, to provide responses to user feedback and changing needs, consider adding new features or improving existing functionality. And fix bugs reported by users or detected during monitoring to ensure the application continues to run properly.

4. Discussion

The Android-Based Administrative Service Information Application is an application made for several areas of Tombolopao District that have not been reached by the network so that it makes it easier for the public to access administrative service information without having to come directly to the Tombolopao District Office. This application is android-based so that it can be accessed or used anytime and anywhere using android phones on various versions. This application was built using the Java programming language, the application creation process uses the help of the Android Studio SDK (Software Development Kit), this aims to make it easier for researchers to create application systems.

This administrative service information application is made by fulfilling good quality criteria; therefore, guidelines have been applied for making application systems. This is intended so that the process of making applications can be accounted for because it has been carried out based on agreed standard procedures. This application is made using the waterfall development model (Waterfall). The waterfall development model is sequential and systematic in building a software programmed, waterfall generally includes the stages of requirement, design, implementation, verification, and maintenance [3].

The process of making an android-based administrative service information application begins with the application system requirements analysis stage. At this stage, data collection is carried out through interviews, the interview process is carried out with Head of General Services Section there are still several areas in Tombolopao District that are still not covered by the network so that people who have not reached the network automatically experience difficulties when looking for service information on the website that has been prepared by the sub-district government. Therefore, researchers created an android-based service information application that aims to provide service information to people who are not or have not reached the network.

The next stage is the design of a temporary application that is used to produce the model to be built. This android-based Administrative Service Information Application consists of a flowchart diagram design, use case diagram, activity diagram, and interface design. Each design element must be consistent because it will affect other design elements. The next stage is implementation, where researchers begin to build or create an android-based administrative service information application using the help of the Android studio SDK (Software Development Kit) with reference to the designs and concepts that have been made previously. Researchers also pay attention to every detail of the programmed that is made to ensure that the resulting software is in accordance with the specifications and objectives of the predetermined creation. After the software implementation is carried out, an Android-based Administrative Service Information Application is produced.
The application that has been built will then be tested based on the ISO 25010 standard [12]. The testing process focuses on reducing errors that occur when the application is run. This is done to ensure the quality of the application that has been built, testing the application using 4 aspects, namely functional suitability, portability, usability, and performance efficiency. Testing the ISO 25010 software quality standard using 4 aspects of testing on software, the results obtained have met the overall standard of quality testing on the functional suitability aspect conducted by the validator lecturer and obtained that this application is "Feasible" to use. Portability testing is done by observing the output results generated using android smartphones in various versions [12]; the results obtained are known that this administrative service information application system runs well on several versions of android. Usability testing conducted by users/farmers in the bangkala region is in the "Very Good" category. Performance efficiency testing is done using the android studio profiler [13] by measuring realtime data for the CPU used which is 100%, 512 Mb memory, when the application is used.

At the maintenance stage, which is the last stage in the waterfall development model, researchers continue to maintain the quality and reliability of software and are responsive to the needs of farmers, so that this android-based administrative service information application can continue to be used effectively and efficiently. Based on the research results of the Android-based Administrative Service Information Application after validation and testing using the ISO 25010 standard, it can be concluded that all aspects tested have met software quality standards. The results of this test have presented the quality assurance of the product being built so that it can be stated that this application is "Feasible" to use.

5. Conclusion

Based on the results of the research that has been carried out and the discussion that has been put forward, it can be concluded several points of conclusion as follows:

a. Administrative Service Innovation Through Android Applications in Tombolopao Subdistrict is designed using the waterfall development model and the Research and Development (R&D) research method so as to produce an android-based administrative service information application product. This application can be used to access administrative service information where this application is specifically for several areas of Tombolopao Subdistrict that are not yet covered by the network so that the application can be accessed anywhere and the people of Tombolopao Subdistrict who are not yet covered by the network can find out the requirements for an administrative service without having to come directly to the Tombolopao Subdistrict Office.

b. The results of testing the Android-based Administrative Service Information Application based on the ISO 25010 standard using 4 aspects, the results obtained have met the standards with the quality of the functional suitability aspect carried out by the validator lecturer and it is obtained that this application is "Feasible" to use. Portability testing is done by observing the output results generated using android smartphones in various versions, the results obtained are known that this administrative service information application system runs well on several versions of android. Usability testing conducted by users/farmers in the bangkala region is in the "Very Good" category. Performance efficiency testing is done using the android studio profiler by measuring realtime data for the CPU used which is 100%, 512 Mb memory, when the application is used. So, it can be concluded that this Android-Based Administrative Service Information Application is "Feasible" to use.

References