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## DESIGN AND DEVELOPMENT OF INTEGRATION OF PHYSICAL AND JURIDICAL DATA APPLICATION IN COMPLETE SYSTEMATIC LAND REGISTRATION ACTIVITIES (A Study at the Bantul Regency Land Registry Office)

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**Abstract** : Collection of physical data and juridical data should be carried out together and simultaneously to reduce the potential for errors in identifying land divisions. The incomparable amount between the physical task force and the juridical task force causes the achievement of the juridical task force to be slower compared to that of the physical task force. The complete systematic land registration target is increasing year by year and the progress of information technology is a potential solution to overcome the problems of physical data and juridical data integration. This study aims to design applications to speed up physical and juridical data connections, test the feasibility of external factors and the quality of use of ISO-9126. The study method used in the application design integration of physical data and juridical data is the research and development method. It was conducted by testing the results of the user evaluation test questionnaire processing on the external factor of feasibility test ISO-9126 and quality in using ISO 9126 to 26 respondents. The results of this study show that the application design has several stages including (1) planning, (2) design, (3) application construction, and (4) application implementation. Integration of physical and juridical data can be done by uploading juridical data into the application. Then, when the physical task force is in the location of the land division and place a coordinate point in the middle of the land division oriented to satellite imagery, the midpoint of the land division is then combined with the measured land division. The feasibility test of the application design on the external factors ISO-9126 has a sufficient value, so that the application can continue to be developed. Meanwhile, the ISO-9126 quality in use test value is high.

**Keywords**: Land/Agrarian, PTSL, Physical Data, Juridical Data, Integration Data.

### A. Introduction

The size of the government's target for land registration is able to weaken the resilience and concentration of both physical and mental officers in the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency. Hence, in the implementation of a Complete Systematic Land

Registration which is not as smooth as what is expected, there are still obstacles that occur in the field. One of the obstacles faced by officers is the problem of data connection between physical data and juridical data on parcels of land. This becomes a serious problem when physical data on land parcels are not properly connected to juridical

data on land parcels which will lead to new problems such as uncertain legal certainty over land rights, because juridical data do not reflect physical data on land parcels or ownership documents are not met thus reducing the amount specified cluster 1 target. According to data from the Directorate General of Relationship Law in the Workshop of PTSL Acceleration Strategy in 2019 on December 18, 2018 in Jakarta there were 1,515 K1 whose owners were no names or the names of their owners were unknown and the number of K3 no names was 304,705. This becomes an irony when 267,081 there are K3 subjects whose owner is unknown and there are also files that do not know the location of their fields. This is possible because in connecting physical and juridical data so far it still uses conventional methods that take relatively long time, resulting in the acceleration of inefficient land registration. The number of officers that is not comparable between the officers carrying out the measurement and / or mapping activities of a complete systematic plot of land carried out by the physical task force and the implementing officer of the juridical data collection carried out by the juridical task force and the advancement of measurement technology causes the physical data collection to be faster and juridical data is often less slower. The existence of data collection applications such as locus gis, map it and PTSL Go still uses internal memory as a storage medium, so that the exchange of data between users becomes a separate problem. The advancement of information technology, open access to information and the presence of a smartphone GPS can be used as a potential solution to the problem, which allows the exchange of data between the juridical task force and the physical task force in real time. From this background an application design is needed to facilitate the integration of physical data and juridical data on plots of land and at the same time formulate how the workings and user test results are related to applications designed in a complete systematic land registration activity.

This study used the Research and Development method which was deemed suitable based

on the characteristics of the study. Research and development methods were research methods used to produce certain products, and test the effectiveness of these products (Sugiyono 2014, 297). Data collection in this study used interviews aimed at implementing PTSL activities that aim to determine user needs. In addition, questionnaires for testing ISO 9126, study documents and observations are the supporting data. The respondents used by researchers came from state civil servants, government employees with work agreements and the public who had used similar applications and understood physical data and juridical data.

## B. Definition and Concept

### 1. *Juridical Data Collection*

Juridical data according to the technical guidelines for the complete systematic field registration in 2019 is a description of the legal status or status of ownership of land parcels and listed apartment units, rights holders or controlling parties, and other parties' rights and other burdens burden it (Technical Manual for PTSL in Juridical Affairs 2019).

### 2. *Physical Data Collection*

Physical data according to Government Regulation (*peraturan pemerintah*) Number 24 of 1997 article 1 number 6 is a statement regarding the location, boundaries and area of plots of land and apartment units listed, including information on the existence of buildings or parts of buildings on it.

Physical data collection in this study only covers information about the location of land parcels using the midpoint coordinate approach to land parcels.

### 3. *Integration of physical data and juridical data*

Integrating physical data and juridical data is done by spatial join, which is the process of combining tabular data with the join function. This process combines the tabular target feature/layer data to which data

will be added with the join feature which is a feature / table that will be added (Satar 2013). This study carried out the integration process by using the middle plot coordinate approach and with a unique number on each list of land parcel information.

4. *Design and build applications*

The design of this application uses the Prototyping model, which is a software development process that begins with gathering the needs of the system, followed by making prototypes and evaluating users (Wibowo 2016, 104). The approach used in prototyping prospective researchers is throw-away prototyping where the initial specifications of the system are known. Here is a description of the system with throw-away prototyping.

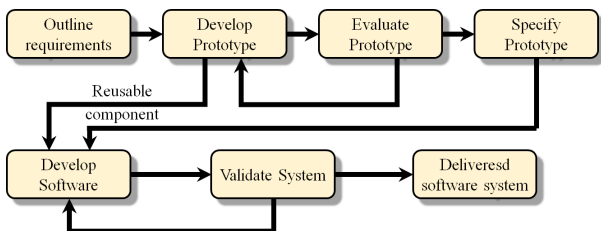


Figure 1. Throw-Away Prototyping System Model.  
Source: Wibowo 2016

The stages of making a prototype model are by determining the user’s needs, making a prototype, testing the system, evaluating and evaluating the prototype.

5. *Unified Modelling Language (UML)*

Unified Modeling Language (UML) is a tool for visualizing and documenting analysis and design results that contain syntax in modeling systems visually (Braun, 2001).

6. *International Organization for Standardization*

ISO is one of the standards for measuring the quality of products produced. The ISO used in this study is the ISO-9126 model on external factors and quality in use. ISO-9126 was first introduced in 1991 as a standardization of the quality of software products. This standardization was created because of the many quality models offered as a soft-

ware quality factor (Evangelos 2000).

7. *Centroid Rank Order (ROC)*

Centroid Rank Order (ROC) weighting is preceded by determining which sub-factors have a more important role than other sub-factors For example criterion 1 is determined based on the most important role in research, criterion 2 is determined based on the role that is more important than criterion 3 and so on until criterion n. To determine the weights, the same rules are given which are the weights of the sub factors that have a more important role than other factors (Kan 2002).

C. *Application Design*

1. *Analysis of User Needs*

Techniques to analyze user needs using the technique finds out whats users want. The desired requirement is an application system that is able to provide the same serial number of fields between the physical task force and the juridical task force without changing much of the system that is already running and can be used as a medium for printing PTSL documents.

2. *UML*

The design using UML includes use case diagrams and class diagrams.

a. *Use case diagram*

Use Case Diagram arranged in the design of the application system are used to describe the interactions between actors who play a role in the integrated data entry application system. Use case diagram can be seen in Figure 2 below:

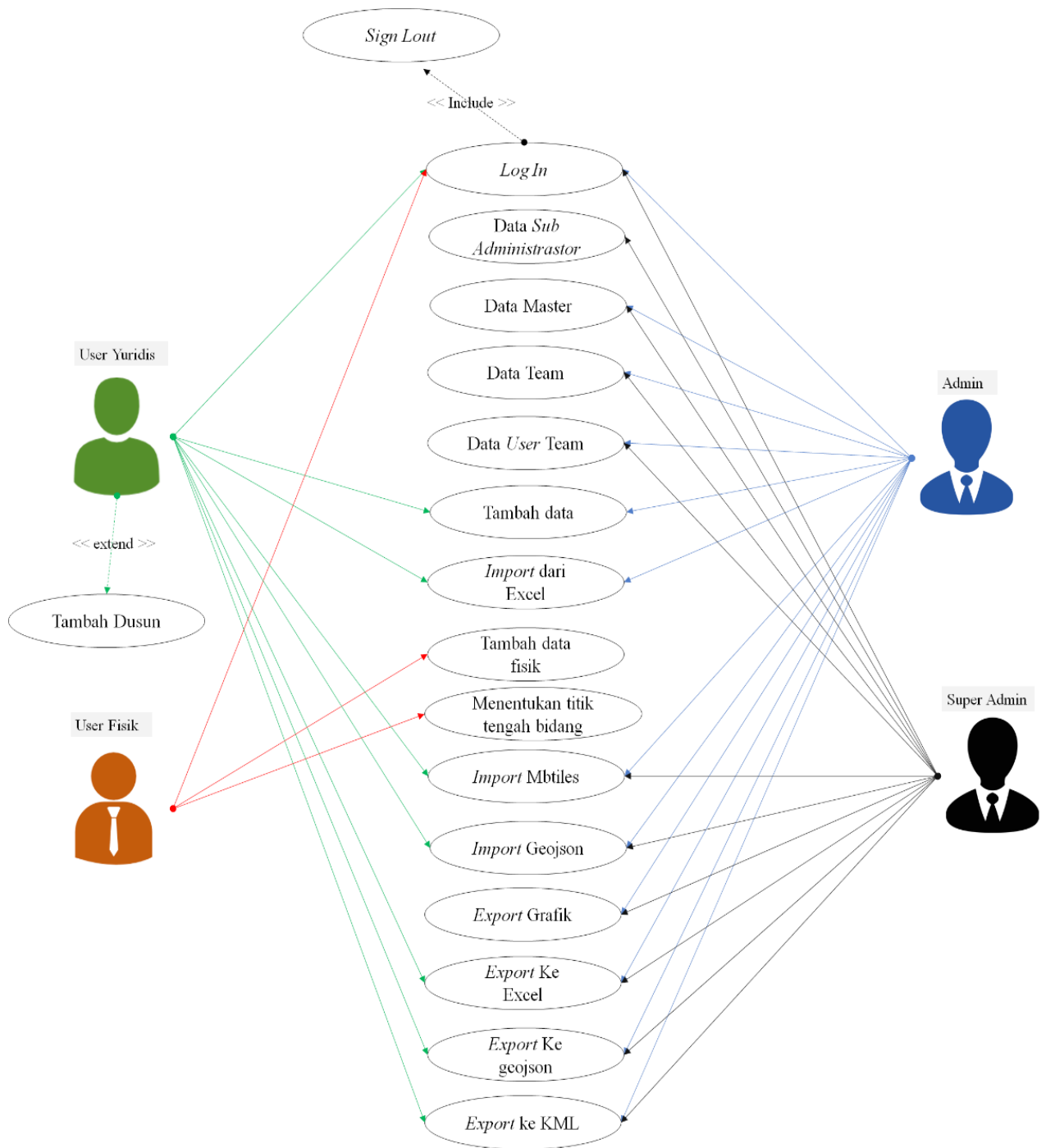


Figure 2. Use Case Diagram of Application System Design. Source: Made by abinowo 2019

b. *Use class diagram*

The purpose of making class diagrams is to describe the structure of system objects, showing the class of objects that make up the system and also the relationships between classes of objects. Class diagrams in this study can be explained as follows:

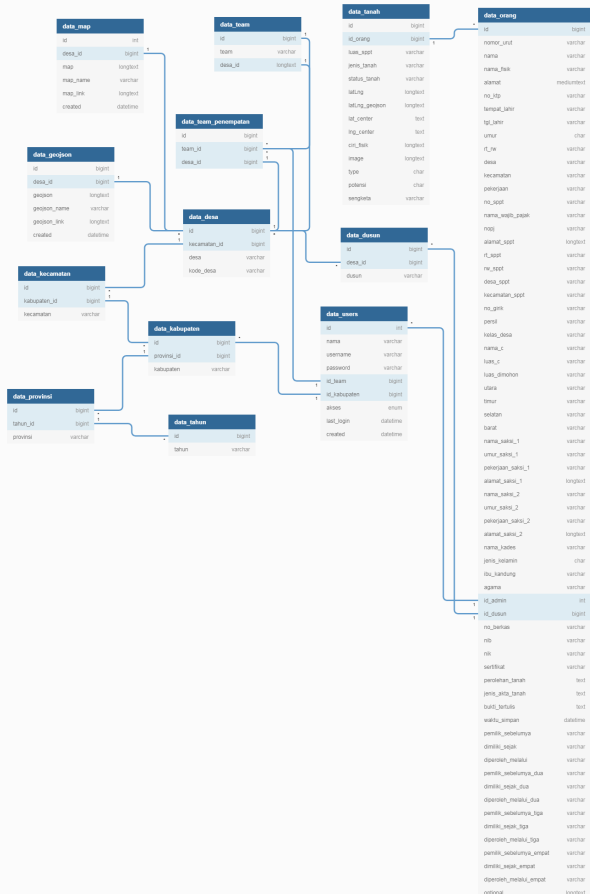


Figure 3. Class Diagram of Application System Design. Source: Made by abinowo

Figure 3 shows the interaction between classes of application systems that are designed. There are 13 database structures that interact with each other.

3. *System Testing*

System testing is done by blackbox testing method. At this stage the researcher only implements coding and testing with functional and system application testing. Testing that to ensure the system that has been designed still has an error or not. This test minimizes the occurrence of major errors,

because each test does not rule out the possibility of errors. Overall blackbox test results show that the application system is functioning properly.

D. *Application Evaluation (ISO 9126)*

This test includes an ISO 9126 external factor feasibility test and quality in use. A total of 26 respondents in this study were divided into 3 occupational categories, namely ASN, PPPK and Community Groups who are members of land data collectors who have used an application system for integrating physical and juridic data.

1. *External Factors ISO 9126*

The feasibility test is taken based on user evaluations that contain responses from respondents to the results of the application system that has been designed. The questionnaire had 5 alternative answers based on a Likert scale, while the variables used were in accordance with ISO 9126 from an external perspective. These variables included functionality, reliability, usability, efficiency, maintainability and portability. The feasibility test can be obtained by calculating the actual score (f) divided by the ideal score (n) then the results are multiplied by 100%. The results are then compared with the value conversion scale stated in 5 categories: very good, good, sufficient, less and very less. Conversion scale is used because it makes it easy for respondents to answer the questionnaire whether they agree or disagree (Malhotra 2012, 308). Jam is easy to use and easily understood by respondents (McDaniel and Gates 2013, 307).

Table 1. Conversion Scale

| Percentage (%) | Interpretation |
|----------------|----------------|
| 90 = x         | Very good      |
| 80 = x < 90    | Good           |
| 70 = x < 80    | Sufficient     |
| 60 = x < 70    | Less           |
| X < 60         | Very less      |

Source: Jogiyanto Conversion Scale, 2008



After calculating each variable, values from several categories are summarized in the following Table 2.

Table 2. Overall Variable Feasibility Test Results

| No | Variable        | Actual Score | Ideal Score | Percentage (%) | Interpretation |
|----|-----------------|--------------|-------------|----------------|----------------|
| 1  | Functionality   | 383          | 520         | 73,65          | Sufficient     |
| 2  | Reliability     | 198          | 260         | 76,15          | Sufficient     |
| 3  | Usability       | 314          | 390         | 80,51          | Good           |
| 4  | Portability     | 205          | 260         | 78,85          | Sufficient     |
| 5  | Efficiency      | 95           | 130         | 73,08          | Sufficient     |
| 6  | Maintainability | 89           | 130         | 68,46          | Less           |

Source: Made by abinowo, 2019

From Table 2, it can be concluded that the interpretation with the value of “enough” includes the factors of functionality, reliability, portability and efficiency. While the variable with the interpretation of “good” is the usability factor and the value of “lacking” is in the maintainability factor. After calculation, the overall application system has an average value of 75.11%. This shows that the application system has a “sufficient” interpretation. So, it can be concluded that the results of the application system meets the minimum standard of ISO 9126 and can be developed.

2. *Quality In Use Factor ISO 9126*

26 respondents gave responses to the results of the application system. Answers from respondents related to the quality in use factor to the question are as follows:

Table 3. Quality In Use Questionnaire Results

| Number Responses | Question Number |     |     |      |      |      |      |      |    |      |      |
|------------------|-----------------|-----|-----|------|------|------|------|------|----|------|------|
|                  | 14              | 15  | 16  | 17   | 18   | 19   | 20   | 21   | 22 | 23   | 24   |
| 1                | 3               | 3   | 8   | 7    | 1    | 5    | 1    | 0    | 1  | 1    | 5    |
| 2                | 5               | 4   | 9   | 10   | 1    | 6    | 1    | 1    | 1  | 0    | 6    |
| 3                | 5               | 4   | 5   | 6    | 1    | 5    | 1    | 1    | 1  | 0    | 2    |
| 4                | 4               | 4   | 9   | 9    | 0    | 9    | 1    | 1    | 1  | 0    | 4    |
| 5                | 4               | 1   | 4   | 4    | 1    | 6    | 1    | 1    | 1  | 0    | 1    |
| 6                | 4               | 4   | 1   | 10   | 1    | 5    | 1    | 1    | 1  | 0    | 10   |
| 7                | 2               | 3   | 8   | 7    | 1    | 10   | 0    | 1    | 1  | 0    | 5    |
| 8                | 4               | 4   | 8   | 8    | 0    | 3    | 1    | 1    | 1  | 0    | 5    |
| 9                | 3               | 3   | 2   | 2    | 0    | 10   | 0    | 1    | 1  | 0    | 4    |
| 10               | 3               | 3   | 2   | 2    | 0    | 10   | 0    | 1    | 1  | 0    | 4    |
| 11               | 5               | 4   | 3   | 3    | 1    | 5    | 1    | 0    | 1  | 0    | 4    |
| 12               | 4               | 4   | 3   | 5    | 1    | 3    | 1    | 0    | 1  | 0    | 7    |
| 13               | 3               | 3   | 3   | 3    | 1    | 7    | 1    | 1    | 1  | 0    | 7    |
| 14               | 4               | 3   | 4   | 4    | 0    | 5    | 1    | 1    | 1  | 0    | 5    |
| 15               | 5               | 1   | 10  | 10   | 1    | 10   | 1    | 1    | 1  | 0    | 3    |
| 16               | 3               | 5   | 2   | 5    | 1    | 2    | 1    | 1    | 1  | 0    | 5    |
| 17               | 3               | 2   | 7   | 7    | 0    | 7    | 1    | 1    | 1  | 0    | 7    |
| 18               | 3               | 3   | 10  | 10   | 1    | 10   | 1    | 1    | 1  | 0    | 10   |
| 19               | 4               | 4   | 10  | 10   | 1    | 10   | 1    | 1    | 1  | 0    | 4    |
| 20               | 5               | 5   | 5   | 5    | 1    | 5    | 1    | 1    | 1  | 0    | 8    |
| 21               | 4               | 3   | 10  | 5    | 1    | 10   | 1    | 0    | 1  | 1    | 7    |
| 22               | 4               | 4   | 4   | 4    | 1    | 8    | 1    | 1    | 1  | 0    | 7    |
| 23               | 4               | 4   | 3   | 3    | 1    | 5    | 1    | 1    | 1  | 0    | 10   |
| 24               | 5               | 5   | 5   | 5    | 1    | 5    | 1    | 1    | 1  | 0    | 5    |
| 25               | 5               | 4   | 3   | 3    | 1    | 7    | 1    | 1    | 1  | 0    | 5    |
| 26               | 5               | 4   | 5   | 6    | 1    | 4    | 1    | 1    | 1  | 0    | 5    |
| Total            | 103             | 91  | 143 | 153  | 20   | 172  | 23   | 22   | 26 | 2    | 145  |
| Average          | 3,96            | 3,5 | 5,5 | 5,88 | 0,77 | 6,62 | 0,88 | 0,85 | 1  | 0,08 | 5,58 |

Source: Quality in use results analyzed by researchers

In question number 14, the answers from 26 respondents were obtained after scoring the values obtained from numbers 1 to 5. Then, the scores were summed up resulting in the total score of 103. The total score of the answer to question 14 was then averaged. Questions number 15 to 24 were done in the same process.

The results are then used as a calculation reference of factors related to quality in use, which includes the factors of effectiveness, productivity, safety, satisfaction in accordance with the characteristics of the application system. The calculation of the value of quality in use used the formula weight calculation, where the ISO - 9126 weight method is divided into 3 categories (high, medium and low). After calculating each variable, values from several categories were summarized in Table 4 below.

Table 4. Summary of Quality in Using Values

| Factor        | Maximum Value | Results | High/Medium/Low |
|---------------|---------------|---------|-----------------|
| Productivity  | 1             | 0,69    | High            |
| Safety        | 1             | 0,98    | High            |
| Effectiveness | 1             | 0,82    | High            |
| Satisfaction  | 1             | 0,78    | High            |

Source: Values analyzed by researchers

a. *Quality In Use Weighting*

The method used to weight the results of application systems that have been designed on quality in use was the Rank Order Centroid (ROC) method. Weighting is preceded by determining which sub-factors have a more important role than other sub-factors. The Productivity sub-factor is considered to have the greatest importance because there are 5 metrics that correspond to the characteristics of the application system. Furthermore, the safety sub-factor with 3 metrics was effective with 2 metrics and finally satisfaction. The maximum value of each sub-factor metric is 1 since, in the ISO-9126 method, the maximum value and the minimum value have been set at 0 < 1. The number of sub-factors used for weighting is 4, so the k value is 4. Calculation of the weight by the method The ROC can be seen in the following table:

Table 5. Quality In Use Weighting

| Characteristics      | Formula  | Results |
|----------------------|--|---------|
| <i>Productivity</i>  | $W1 = \frac{1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4}}{4}$ | 0,52    |
| <i>Safety</i>        | $W2 = \frac{0 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4}}{4}$ | 0,27    |
| <i>Effectiveness</i> | $W3 = \frac{0 + 0 + \frac{1}{3} + \frac{1}{4}}{4}$           | 0,15    |
| <i>Satisfaction</i>  | $W4 = \frac{0 + 0 + 0 + \frac{1}{4}}{4}$                     | 0,06    |

Source: Weighting calculated by researchers

After the weighting has been done, the next step is to determine the value of creativity per sub-factor with the formula for weight summation calculation. Where the value of w is the value obtained from the calculation of metrics based on a questionnaire that has been done previously. The value of m is the weight value of each sub factor.

$$\begin{aligned}
 \text{Quality In Use} &= (0,69 \times 0,52) + (0,92 \times 0,27) + \\
 &(0,75 \times 0,15) + (0,78 \times 0,06) \\
 &= 0,36 + 0,26 + 0,11 + 0,05 \\
 &= 0,78
 \end{aligned}$$

After the final calculation, the final value of

quality in use obtained from the design of the application system to help the integration of physical data and juridical data in PTSL activities has a value of 0.78. Hence, it is included in the high quality category. Judged from the 4 sub factors of quality in use ISO-9126; namely effectiveness, productivity, safety and satisfaction; the results of designing this application system have high quality in use. From the results of the assessment in this study the application is considered to have a high value of effectiveness, productivity, safety and satisfaction, so that it can be used as a reference for the application system to use and develop a complete systematic land registration activity. However, this study is only limited to the assessment in terms of the feasibility of external factors and quality in use, so that the results obtained have not thoroughly described the ability of the application.

**E. Conclusion**

1. The results of the design of the application to help the process of integration of physical data and juridical data are designed with several stages (a) planning by analyzing the needs of users that is still using conventional methods in providing NUB. (b) Designing the application using use case diagrams and class diagrams (c) Construction of application design results using apache2triad, notepad ++, visual studio code used as coding scripts, Google Chrome for testing website applications and emulator android genymotion for testing applications the android. Implemented using blackbox testing methods and task scenarios by respondents.
2. The results of the application design have sufficient value, so it is feasible to be developed further and can be used in a complete systematic land registration activity.
3. It can be seen that the value of quality in detail on each factor and sub factors at ISO 9126 quality in use are included in the high category.

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