Analysis of User Interface Usability of the Online Single Submission Risk-based Assessment (OSS RBA) System at the Ministry of Investment/BKPM

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ABSTRACT

This research paper examines the usability of the user interface of the Online Single Submission Risk-Based Assessment (OSS RBA) system at the Ministry of Investment/BKPM. The primary objective is to evaluate the system's usability using heuristic evaluation methods to identify areas for improvement while ensuring efficiency and user satisfaction. Additionally, a detailed Exploratory Data Analysis (EDA) was conducted to determine the factors that influence usability and user experience. The findings indicate that key factors include learnability, efficiency, memorability, error handling, and satisfaction. Significant insights into the system's usability and the correlations among various usability metrics were obtained through hypothesis testing. To provide a comprehensive evaluation, advanced usability metrics and custom heuristic evaluation models were developed. The main contribution of this study is its balanced approach, combining objective usability assessment with user-centric insights to offer practical recommendations for system enhancement. This approach may prove highly beneficial for future improvements in digital government services and offers essential insights for optimizing user experience, ultimately increasing user engagement and adoption of the OSS RBA system.

Keywords

Heuristic Evaluation, Usability, OSS RBA, Usability

1. INTRODUCTION

Global and domestic economic developments significantly affect investment performance in Indonesia. In the 2015–2019 period, the Indonesian economy experienced a slowdown, with the average growth rate decreasing from 5.8% to 5.04%[1]. However, the contribution of Gross Fixed Capital Formation (PMTB) to Gross Domestic Product (GDP) remained stable, averaging 32.5%[2].The digital transformation of public service complaint management has become increasingly essential in today's era. As governments strive to enhance efficiency and transparency, digital platforms such as SP4N-LAPOR have been introduced to facilitate the handling of public complaints. However, the implementation of digital transformation in public service complaint management presents numerous challenges, requiring an in-depth analysis of the factors influencing its success.

For this reason, it has become increasingly important to evaluate the digital transformation process and identify key challenges that may hinder its effectiveness. Analyzing various aspects of digital complaint management is crucial for improving user experience and ensuring that the platform meets public expectations. Furthermore, digital transformation in Lulu Chaerani Munggaran, Dr., S.Kom., M.M.S.I Information System Management Department, Faculty of Technology and Engineering, Gunadarma University, Jakarta

public service complaint management must not only focus on technological advancements but also consider factors such as organizational readiness, regulatory framework, user engagement, and leadership commitment to achieve sustainable implementation.

In this study, an analysis was conducted on the factors that challenge digital transformation in managing public complaints through SP4N-LAPOR. Various variables were examined, including Digital Capability, Information Network System, Complaint Management, Digital Solutions, Leadership 4.0, Business Ecosystem, Integrated Regulation, Digital Talent, Digital Conversion, and Digital Implementation. These factors all contribute to the overall transformation process. Such an analysis is highly significant because it provides insights into the barriers that may slow down digital transformation and identifies strategies to enhance the system's effectiveness. Factor analysis was utilized to determine the dominant factors influencing digital transformation, with Digital Capability emerging as the most significant factor, having an Eigenvalue of 19.212 and contributing 34.932% to the total variance.

The primary challenge in digital transformation lies in ensuring that technological adoption aligns with the capabilities and readiness of government institutions. If digital transformation is not strategically planned, it may lead to inefficiencies and poor user experience, ultimately reducing public trust in the system. To address these challenges, a comprehensive evaluation was conducted, identifying both the strengths and weaknesses of the current system and proposing potential solutions for improvement.

The main objective of this research is to provide a detailed analysis of the challenges in implementing digital transformation in public service complaint management. This study aims to offer valuable insights that can be utilized in the further development of digital governance, ensuring that public complaint management systems are more efficient, transparent, and user-friendly. In addition, the study seeks to propose strategies for enhancing digital transformation processes, taking into account critical attributes that influence the overall success of the system.

The World Bank's 2020 report on the Ease of Doing Business highlighted Indonesia's ranking stagnation, noting that while the country had previously made significant progress, its position remained unchanged in recent assessments[3]. This stagnation indicates challenges in sustaining reforms and improving the business environment, which are crucial for attracting investment and fostering economic growth. The report emphasized that Indonesia maintained its position at 73 out of 190 countries, reflecting a need for continued efforts to enhance the ease of doing business. Accordingly, it has become increasingly important to evaluate the digital transformation process and identify key challenges that may hinder its effectiveness, analyzing various aspects of digital complaint management is crucial for improving user experience and ensuring that the platform meets public expectations. Furthermore, digital transformation in public service complaint management must not only focus on technological advances but also consider factors such as organizational readiness, regulatory framework, user engagement, and leadership commitment to achieve sustainable implementation.

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2. LITERATURE REVIEW

The Online Single Submission (OSS) system is governed by Government Regulation No. 24 of 2018 on Electronically Integrated Business Licensing Services and Coordinating Minister for Economic Affairs Regulation No. 13 of 2018, which regulates the transfer of business licensing services and the management of the OSS system under the Investment Coordinating Board (BKPM). The Ministry of Investment/BKPM also has a function that is not limited in encouraging the growth of investment value, but also reducing social disparities and creating jobs. In essence, this institution not only plays an active role in encouraging investment realization, but also as a facilitator between the government and business actors [4]. OSS facilitates business registration through the issuance of a Business Identification Number (NIB), business licenses, and operational or commercial permits, all of which are integrated within the Ministry of Investment/BKPM.

To enhance the OSS system, the Indonesian government introduced Government Regulation No. 5 of 2021, which implements a Risk-Based Business Licensing (RBA) approach. This regulation aims to streamline business licensing processes by classifying business activities based on their potential risks, thereby determining licensing requirements and supervision mechanisms accordingly. The RBA framework follows the principle of "trust but verify," where business licensing is granted based on self-assessment, but compliance is continuously monitored through risk-based inspections. The implementation of OSS under RBA seeks to enhance Indonesia's ease of doing business ranking within ASEAN by simplifying administrative procedures and improving regulatory oversight.

Most of the total software development costs are used for maintenance due to user interaction (usability) problems with the system and not technical problems [5].Given the increasing reliance on digital platforms for business licensing, usability plays a critical role in ensuring the efficiency, effectiveness, and accessibility of digital public services such as OSS. Usability determines how well a system meets user expectations in terms of navigation, efficiency, and overall user experience. Nielsen defines usability as a user experience in interacting with an application or website until the user can operate it easily and quickly [6]. According to Nielsen and Molich, Heuristic Evaluation is a widely adopted method for assessing usability. It provides a structured approach to evaluating user interface design by identifying usability violations based on predefined heuristics.

No	Usability Factor	Usability Principles
1	Learnability	Match between system and the real world
		Consistency and standards
		Help and Documentation
2	Efficiency	Flexibility and efficiency of use
3	Memorability	Recognition rather than recall
		Error Prevention
4 Errors		Help users recognize diagnose and recover from errors
	Satisfaction	User control and Freedom
5		Visibility of system status
		Aesthetic and minimalist

Table 1. Usability Mapping with Heuristic Evaluation

The tools used for measurement are as follows: 1.Learnability: The extent to which users can easily understand how to navigate and utilize a website. 2.Efficiency: The speed and ease with which users can access and process information. 3.Memorability: The ability of users to recall how to interact with a website after a period of inactivity. 4.Error Handling: The ability to minimize broken links and incomplete pages, ensuring smooth user experience. 5.Satisfaction: The overall user experience, ensuring users can quickly find the necessary information and navigate the platform without confusion.By applying Heuristic Evaluation, the usability of OSS can be assessed to identify potential design flaws that may hinder user experience. Implementing usability improvements can significantly enhance user adoption, efficiency, and overall satisfaction with the system, thereby supporting the broader objective of improving Indonesia's business environment through digital transformation.

3. DATA AND METHODOLOGY

In this study, the procedures and stepsbegan with the data collection process, which was conducted by distributing online questionnaires to users of the Online Single Submission (OSS) RBA system. The questionnaire was designed based on the Heuristic Evaluation principles to assess the usability aspects of the system, respondents were selected using the purposive sampling method, a technique that selects participants based on specific criteria relevant to the research objectives. Once the data collected, an analysis of respondent characteristics was performed, covering age, gender, education level, and experience using OSS RBA. This analysis aimed to understand the background of users and how their characteristics might influence their perceptions of system usability.

Validity and reliability tests were conducted to ensure that the research instrument maintained a high level of accuracy and consistency. The validity test was performed using Exploratory Factor Analysis (EFA) to determine whether the questionnaire items adequately represented the research variables. The reliability test was conducted using Cronbach's Alpha, where a value of $\alpha > 0.7$ indicated good internal consistency. Once the instrument was confirmed to be valid and reliable[7], descriptive analysis was carried out to provide an overview of users' perceptions regarding the usability of the OSS RBA system. This analysis included frequency distributions, mean values, and standard deviations for each measured variable. The next stage was testing results analysis, which consisted of two types of assessments: Testing based on usability variables – This analysis evaluates five key usability aspects: Learnability, Efficiency, Memorability, Error Handling, and Satisfaction, to determine how users perceive their experience with the OSS RBA system. Testing based on usability sub-characteristics -This assessment examines specific sub-aspects within each usability variable. For instance, within the Error Handling variable, the study evaluates how effective the system minimizes user errors and provides clear troubleshooting guidance. The final step was evaluation, which aimed to interpret the testing results to provide recommendations for improving the OSS RBA system. This evaluation was conducted by comparing established usability standards in Heuristic Evaluation and formulating development strategies to enhance the overall user experience.



4. RESULT AND DISCUSSION

4.1 Respondent Characteristics Analysis Results The sample size in this study was determined using Slovin's formula (as cited in Priyono, 2016), with a target of 200 respondents. The characteristics of the selected sample can be seen in Table 2.

Table 2. Age Distribution of Respondents

Age	F
20-29	70
30-39	92

40-59	38
Total	200

The number of OSS RBA users based on the respondents' age in this study is 200. Among them, 46% (92 respondents) belong to the 30-39 age group, 35% (70 respondents) are in the 20-29 age group, and the remaining 19% (38 respondents) fall within the 40-59 age group.To better illustrate this distribution, a chart was created to visually depict the age composition of the respondents which can be seen in Figure 2.



Figure 2. Age Distribution of Respondents (in %)

In addition, a survey was also conducted on the number of users based on gender, which can be seen in Table 3. **Table 3. Gender Distribution of Respondents**

Gender	F
Man	87
Woman	113
Total	200

Based on the following data, it shows that 56% (113 respondents) are female, while the remaining 44% (87 respondents) are male. To better illustrate this distribution, a chart was created to visually depict the age composition of the respondents which can be en in Figure 3.



Figure 3. Gender Distribution of Respondents (in%)

4.2 Validity and Reliability Test Results

Validity testing can be measured by comparing the calculated r-value (*corrected item-total correlation*) with the table r-value using the degree of freedom (df) = n, where n is the total

sample size, with $\alpha = 0.05$ (5%). The purpose of validity testing is to assess the feasibility of the instrument. An item is considered valid if the calculated r-value > table r-value, where the calculated r-value is derived from the *Corrected Item-Total Correlation*, and the table r-value, based on a sample size of 200 and $\alpha = 0.05$, is 0.128. This validity test was conducted with 200 samples, yielding the following results:

Table 4. Validity Test Results

Item	Validitas Metode Priduct Moment		
	(Corrected Item Total Correlation)		
	r Count	Information	
Item01	0,660	Valid	
Item02	0,691	Valid	
Item03	0,725	Valid	
Item04	0,720	Valid	
Item05	0,660	Valid	
Item06	0,637	Valid	
Item07	0,755	Valid	
Item08	0,767	Valid	
Item09	0.592	Valid	
Item10	0,742	Valid	
Item11	0,670	Valid	
Item12	0,685	Valid	
Item13	0,686	Valid	
Item14	0,690	Valid	
Item15	0,644	Valid	
Item16	0,780	Valid	
Item17	0,723	Valid	
Item18	0,733	Valid	
Item19	0,718	Valid	
Item20	0,761	Valid	
Item21	0,689	Valid	
Item22	0,745	Valid	
Item23	0,759	Valid	
Item24	0,751	Valid	
Item25	0,649	Valid	
Item26	0,733	Valid	
Item27	0,731	Valid	
Item28	0,620	Valid	
Item29	0,690	Valid	
Item30	0,687	Valid	

From the data above, it can be seen that all items have a calculated r value greater than 0.128, which indicates that all items are valid. Furthermore, reliability testing is carried out after the questionnaire data is confirmed to be valid. This is because SPSS will not provide accurate results if the questionnaire items are invalid.In reliability testing, scoring data that has previously been entered into SPSS is used for further analysis.

Table 5. Reliability Test Results

Nilai Cronbach's Alpha	Ketentuan Acceptable	Keterangan
0,968	0,60	Reliabel

The output indicates that the Cronbach's Alpha value for all items is 0.968. Since the result presented in Table 5 is greater than 0.60, it can be concluded that all statement items in the questionnaire are consistent and reliable.

4.3 Test Results Based on Variables

This testing assesses usability based on the variables mentioned in the previous section. A total of 10 variables will be evaluated, and the average responses per respondent will be calculated. Based on the average results from the respondents, the data will be analyzed for each variable accordingly. Overall average of variables = $\frac{Sum \ of \ All \ Averages \ per \ Variable}{Number \ of \ Respondents}$.

Table 6. Usability Test Results based on Variables

Variabel Usability	Score Average	Percentage ofRespondents withScore ≥ 4
Visibility of System	3,97	83,875
Match Between System	3,87	70,5
Use Control and Freedom	3,82	69
Consistency and Standards	3,67	60,5
Error Prevention	4,02	76,25
Recognition Rather than Recall	4,14	84
Flexibility and Efficient of Use	4,15	82,75
Aesthetic and Minimalis Design	3,93	74,4
Help users Recognize Dialogue and Recovers from Errors	4,0	80,5
Help and Documentation	3,97	74,67

The table below presents the usability evaluation results based on the 10 heuristic variables that were assessed. Each variable is evaluated based on the average score given by respondents and the percentage of respondents who rated it ≥ 4 . The results indicate that several variables received an average score below 4, suggesting that these areas require further attention in system development.



Variables

4.4 Test Results Based on Usability Sub-Characteristics

After conducting tests and assessments on the five characteristics of usability based on the heuristic evaluation model for the OSS RBA information system, the total results of the study can be seen in Table 7.

Table 7. Total Results of Usability Characteristics Research

No	SubCharacteristics	Final Index
1	Learnability	78,6 %
2	Efficiency	79,8 %
3	Memorability	82,8 %
4	Error Handling	80,45 %
5	Satisfaction	77,82 %

Based on the usability testing results for the OSS RBA application, the Memorability aspect received the highest score of 82.8%, indicating that users can easily recall how to use the application even after not accessing it for a period of time. The Error Handling aspect followed with a score of 80.45%, showing that the system is fairly effective in managing errors and guiding users toward recovery. The Efficiency aspect scored 79.8%, reflecting that users are able to complete their tasks efficiently when using the application. The Learnability aspect, with a score of 78.6%, suggests that although the application is relatively easy to learn, improvements are still needed, particularly to support new users. The lowest score was found in the Satisfaction aspect, which received 77.82%, indicating that while users are generally satisfied, their experience could still be enhanced for better engagement and comfort. Overall, these values suggest that OSS RBA has a fairly good level of usability, yet several areas still require improvement to optimize the user experience. The next step is to determine whether the OSS RBA application is considered a good application overall in terms of usability using the formula provided below.

Total Usability Score = $\frac{sum \ of \ the \ values \ of \ all \ sub \ characteristics}{Sub \ characteristics \ count}$ Total Usability Score = $\frac{3,93+3,99+4,14+4,02+3,89}{5} = \frac{19,97}{5} = 3,994$

Based on these values, the OSS RBA application has a fairly user-friendly system, but there may be some things that need to be improved.

5. CONCLUSION

The evaluation of the OSS RBA application using the Heuristic Evaluation method was successfully conducted with the involvement of 200 respondents. The testing process began by establishing the usability variables to be evaluated, followed by assigning weightings for each variable. Data were collected through questionnaires and analyzed using SPSS software. The analysis results indicated that several variables, such as Visibility of System, Match Between System, Use Control and Freedom, Consistency and Standards, Aesthetic and Minimalist Design, and Help and Documentation, received below-average scores. This indicates that improvements are necessary to optimize the quality of the application. The analysis of the categories within the five sub-characteristics of usability also showed that learnability had the lowest score, with a final index of 78.6%. This indicates a need for improvement in the learnability aspect to help users understand how to navigate and use the application. User experience must be improved, especially to support new users in adopting the application quickly and efficiently. The hope of this research is that OSS RBA will not only meet usability standards but also provide an optimal user experience. Developers of the OSS RBA application are expected to pay more attention to variables that scored below average, especially in improving the interface and giving clearer guidance to users. Improving the learnability aspect is important to reduce the learning curve for new users and to maximize the efficiency of using the application. This study also encourages the development of OSS RBA toward a more user-friendly design, supporting productivity and increasing overall user satisfaction. Consequently, this application can be accessed and used more easily by all stakeholders, helping support the investment process in Indonesia more effectively and efficiently.

6. ACKNOWLEDGMENTS

Our thanks to the University and professors who helped us to complete this work.

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