

Quality Analysis of Bios Portal Website at Banking Companies Using ISO / IEC 25010:2011 Method

Ana Yulianty¹, Ana Kurniawati²

¹Master of Information Systems Management, Business Information System, Gunadarma University, Indonesia, +62

²Faculty of Technology and Engineering, Gunadarma University, Indonesia, +62

Email Address: ¹anna.yuliantyyy @ gmail.com, ²ana @ staff.gunadarma.ac.id

Abstract— Internet information and communication technology plays a major role in increasing the efficiency and effectiveness of human work in all areas of life. One of the areas of life that applies information and internet communication technology is banking. The role of the banking world is so close to all aspects of life because it is a medium for transactions. The bios portal website is a website-based application developed by a private banking company in Indonesia to increase the efficiency and effectiveness of the work done by employees who previously used a database-based application. To ensure the quality of the bios portal website, it is necessary to carry out an analysis to measure its quality in accordance with the ISO 25010: 2011 model with the methods of literature study, observation, black box testing and questionnaires. The test results obtained in conducting quality analysis using the ISO 25010: 2011 method, namely the bios portal website, obtained a value of 4.87. In addition, there are also recommendations for improvements in the category of performance efficiency and maintainability to improve its quality.

Keywords— ISO 25010, portal bios website, product quality

I. INTRODUCTION

Internet information and communication technology are very important today, considering that its existence can help and support many activities so that work becomes faster and more efficient. With the wider source of knowledge on information technology and internet communication, there will be more applications and competing in designing the best quality technology in various fields of life.

The banking sector is one of the many fields that apply information technology and internet communication to provide maximum service to its customers, one of which is through the development of M-Banking, E-Banking, and various other applications.

A banking company in Jakarta developed a website called portal bios to replace the previous database-based groupware product as an effort to increase the efficiency and effectiveness of the company's internal employees so that its use can be done where whenever and wherever as long as they are still connected to the company's internet network and have been registered as website users who have been divided based on their respective roles. This can prevent the website from being accessed by unauthorized users.

In addition to supporting all business activities it is necessary to ensure the quality of its implementation. Testing and ensuring the quality of the software to be used is something that needs attention, because it requires sufficient knowledge, in finding the source of existing errors.

Software quality must be determined, measured, and evaluated using a widely validated quality measurement method, one of which is the ISO/IEC 25010:2011 model as a refinement of ISO/IEC 9126. ISO/IEC 25010:2011 model has defined eight characteristics, namely functional suitability, performance efficiency, compatibility, usability, portability, security, maintainability, and reliability.

II. STUDY LITERATURE

Literature review is used as a theoretical reference in order to understand matters related to the research to be carried out so as to maximize the research process.

A. ISO 25010:2011

The quality model is a reference for the product quality evaluation system to determine which quality characteristics will be taken into the account when conducting the software product evaluation activities. The product quality model specified in ISO/IEC 25010 consists of eight quality characteristics shown in Fig 1.



(Source : Iso2500.com)

Fig. 1. ISO 25010:2011 Characteristics and Sub Characteristics

1. Functional Suitability

This characteristics describe the extent to which a product or system can provide functions that meet criteria when used under certain conditions. This characteristic is composed of the following sub-characteristics:

- Functional completeness
- Functional correctness
- Functional appropriateness

2. Performance Efficiency

This characteristic describes how far the performance of a product or system is relatively good against a number of resources used in a certain condition. This characteristic is composed of the following sub-characteristics:

- Time Behaviour
- Resource Utilization
- Capacity

3. Compatibility

This characteristic describes how far the product or system can carry out the process of exchanging information with other products, systems, or components in carrying out a function required in sharing the same environment, hardware, or software. This characteristic is composed of the following sub-characteristics:

- Co-existence
- Interoperability

4. Usability

This characteristic describes how far the product or system can be used by users to achieve certain goals in terms of effectiveness, efficiency, and satisfaction in a particular usage context. This characteristic is composed of the following sub-characteristics:

- Appropriateness recognizability
- Learnability
- Operability
- User error protection
- User interface aesthetics
- Accessibility.

5. Reliability

This characteristic describes how far a product or system performs a function under certain conditions within a certain period of time. This characteristic is composed of the following sub-characteristics:

- Maturity
- Availability
- Fault tolerance
- Recoverability

6. Security

This characteristic describes how far the product or system can provide protection for the data and information contained in it so that people, products or other systems can only access according to their respective types and levels of authority. This characteristic is composed of the following sub-characteristics:

- Confidentiality
- Integrity
- Non-repudiation
- Accountability
- Authenticity

7. Maintainability

This characteristic describes how far the level of effectiveness and efficiency of a product or system when modified for repair and to adapt to changing requirements and new environments. This characteristic is composed of the following sub-characteristics:

- Modularity
- Reusability
- Analyzability
- Modifiability
- Testability

8. Portability

This characteristic describes how far a product or system can be moved from one software or hardware to another in different environments. This characteristic is composed of the following sub-characteristics:

- Adaptability

- Installability
- Replaceability

B. Analytical Hierarchy Process (AHP)

The Analytical Hierarchy Process is a model for a decision support developed by Thomas L. Saaty. This model will describe a complex multi-criteria problem into a hierarchical form by providing a value on how important a criterion variable is and determining which criteria has the highest priority so that they can affect the results in certain conditions.

C. User Acceptance Testing

User Acceptance Testing (UAT), is the last test on software performed by users or clients. This test is done to decide whether the software product being developed is acceptable or not in accordance with user requirements. UAT is carried out after functional, system, and regression testing have been completed by the development team. [23]

UAT is an activity that is usually carried out in most software project developments. Document details are sometimes included in proposal documents and procurement contracts when a new system is built by or purchased from the client. Payments from clients to developers are often related to passing certain usability tests. [16]

D. J.R Lewis questionnaire

J.R Lewis questionnaire can also be called the Post Study Usability System Questionnaire (PSSUQ). PSSUQ is a questionnaire that has 19 question items designed with the aim of assessing user satisfaction with the computer system they use. PPSUQ originated from an internal IBM project called SUMS (System Usability MetricS), led by Suzanne Henry in the late 1980s. SUMS's mission is to document and validate procedures or rules for measuring usability, performance, usability issues and user satisfaction.[8]

E. Likert Scale

The Likert scale is a psychometric scale commonly used in questionnaires or questionnaires. This scale was developed by Rensis Likert in 1932 in measuring people's attitudes. The Likert scale provides five answer choices consisting of:

1. Strongly Disagree, with a weight value of 1
2. Disagree, with a weight value of 2
3. Doubt, with a weight value of 3
4. Agree, with a weight value of 4
5. Strongly, with a weight value of 5

III. RESEARCH METHOD

The research methodology used to perform the quality analysis of the bios portal website using ISO 25010:2011 is as follows:

A. Problem Analysis

The application of internet information and communication technology can make work faster and more efficient. However, there are problems that are still in its application, how to guarantee that the software it has developed is guaranteed quality. The bios portal website must really be of good quality, so that users can feel satisfied when

using the bios portal website to help with their work. In this case, the software testing needs to be done on the bios portal website. One of the quality measurement methods that can be used in evaluating and evaluating quality is ISO / IEC 25010: 2011. So far the bios website portal has never been tested using this method, so that quality testing can be carried out to avoid errors.

B. Study Literature

Literature study is carried out to compare similar research from various sources such as international/national journals, final assignments and so on. Literature study is used as a reference in carrying out this research, so that it can add insight, mistakes, and deficiencies from previous research.

C. Determine the weight priorities of the characteristics and sub characteristics using AHP

This study uses the Analytic Hierarchy Process (AHP) method to determine the priority weights of characteristics and sub characteristics on ISO 25010:2011.

D. Blackbox Testing

Black box testing is carried out by focusing on the resulting output of an action that is carried out by observing the input and output of the program. In black box testing, there is usually a test case to write down the various possibilities that can be run in the test. The results obtained from this test case will later be used as a reference for the development team whether there is still need for improvement or not.

E. Data Collection

Data collection was carried out to conduct testing by distributing questionnaires consisting of 19 questions to respondents. Questionnaires were distributed using Google form so that respondents could easily fill it out through any device and anywhere.

IV. RESULT AND DISCUSSION

A. The results of weighting the priority on the characteristics of ISO 25010:2011

Determination of the weight of the characteristics is done by comparing the 6 characteristics that have been previously selected. Then the data is processed using the AHP method. The results of determining priority weight are as follows:

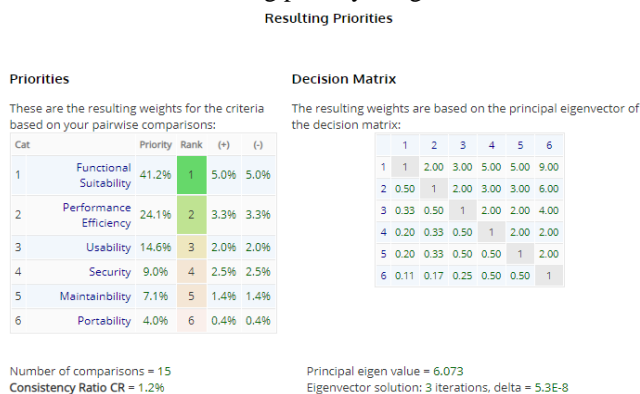


Fig. 2. Resulting Priorities of 6 Characteristics on ISO 25010:2011

B. The results of weighting the priority on the sub characteristics of ISO 25010:2011

The determination of the weight of the sub-characteristics is done by comparing with other sub-characteristics that have been previously selected. Then the data is processed using the AHP method. The results of determining priority weight are as follows:

1. Functional Suitability

The results of determining the priority weight on the sub characteristics are functional completeness on the first priority with value of 60.6%, functional correctness on the second priority with value of 33.3%, and functional appropriateness with value of 6.1% on the last priority.

1. Performance Efficiency

The results of determining the priority weight on the sub characteristics are time behaviour on the first priority with value of 60.6%, resource utilization on the second priority with value of 33.3%, and capacity with value of 6.1% on the last priority.

2. Usability

The results of determining the priority weight on the sub characteristics are appropriateness recognizability on the first priority with value of 37.9%, learnability on the second priority with value of 28.5%, operability with value of 16.9% on the 3th priority, user error protection with value of 8.7% on the 4th priority, user interface aesthetics with value of 4.8% on the 5th priority and accessibility with value of 3.2% on last priority.

3. Security

The results of determining the priority weight on the sub characteristics are confidentiality on the first priority with value of 48.0%, integrity on the second priority with value of 27.8%, non-repudiation with value of 14.5% on the 3th priority, accountability with value of 5.9% on the 4th priority, and authenticity with value of 3.8% on last priority.

4. Maintainability

The results of determining the priority weight on the sub characteristics are modularity on the first priority with value of 54.1%, Analysability on the second priority with value of 28.8%, modifiability with value of 11.8% on the 3th priority, testability with value of 5.3% on the last priority.

5. Portability

The results of determining the priority weight on the sub characteristics are appropriateness recognizability on the first priority with value of 37.9%, learnability on the second priority with value of 28.5%, operability with value of 16.9% on the 3th priority, user error protection with value of 8.7% on the 4th priority, user interface aesthetics with value of 4.8% on the 5th priority and accessibility with value of 3.2% on last priority.

C. Testing Functional Suitability

1. Functional completeness

This test is carried out using the black box testing instrument by testing all existing functions. The results obtained in this test are that all existing functions can function very well so that they get a score of 5 in the very good category.

2. *Functional correctness*

This test is carried out using a black box testing instrument by testing the login, search and export to excel functions on the website to measure whether the website has provided correct results with a level of precision required. The results obtained are that the website can provide correct results according to user expectations according to the assessment criteria so that you get a score of 5 in the very good category.

3. *Functional Appropriateness*

This test is carried out using the black box testing instrument by testing all the functions on the website to measure whether the website meets user expectations in providing facilities to assist in achieving tasks and goals. The results obtained in this test is get a score of 5 in the very good category.

D. *Testing Performance Efficiency*

1. *Time behaviour*

This test is carried out using the black box testing instrument by testing the first time you access the website, logging in, performing searches, opening modules and running the request storage function as a draft to measure whether the website meets the requirements in providing response or processing time when running a function. The results obtained in this test is get a score of 5 in the very good category.

2. *Resource Utilization*

This test is carried using black box testing instruments by testing the use of hardware resources such as memory and ram used by the bios portal website whether they meet the requirements of the resource utilization sub-characteristics. The results obtained in this test is get a score of 4 in the good category because the use of memory storage resources is in the good category, which does not reach 200MB and RAM consumption does not reach 150MB.

3. *Capacity*

This test is carried out using a black box testing instrument by carrying out tests when running certain functions to obtain the maximum limit or maximum memory utilization through the task manager menu. The results obtained in this test is get a score of 4 in the good category because the use of memory storage resources is in the good category, which does not reaching 200MB and RAM consumption not reaching 150MB.

E. *Testing Usability*

In this test, the instrument used was to distribute questionnaires to users of the bios portal website respondents to test the validity and reliability of the questions on the questionnaire. Details of the results of the validity and reliability calculations are as follows:

1. *Validity*

The validity of each item is determined if the value of person correlations > significance, the author uses 3 respondents with a significance value of 5% in the distribution of the r value of the statistical table with a value of 0.997. The results of the validity value measured on each question item in the questionnaire, namely as many as 19 questions, were

declared valid. This is because all question items have a Pearson correlation value > 0.997.

2. *Reliability*

Reliability testing is carried out if the existing questionnaire data has been declared valid. The results obtained from this test are the alpha cronbach value > 0.8 so that the questionnaire is declared reliable with detailed output from SPSS can be seen in Fig. 3 and 4

Case Processing Summary

		N	%
Cases	Valid	3	100.0
	Excluded ^a	0	.0
	Total	3	100.0

a. Listwise deletion based on all variables in the procedure.

Fig. 3. Case Processing Summary

Cronbach's Alpha	N of Items
1.000	19

Fig. 4. Reliability Statistics

After all questionnaire items have been declared valid and reliable, then the questionnaire is distributed back to all respondents. The results obtained in this test is get a score 5 of 5 in the very good category.

F. *Testing Security*

1. *Confidentiality*

This test is carried out using the black box testing method to test whether it is in accordance with the confidentiality criteria, namely whether the website can protect information from people who do not have authority or do not have the right to access the website. The results obtained in this test is get a score of 5 in the very good category.

2. *Integrity*

This test is carried out using the black box testing method to test whether it is in accordance with the integrity criteria, namely whether the website can maintain information from people who do not have authority or do not have the right to change any information without permission. from the author or owner of the information. The results obtained in this test is get a score of 5 in the very good category.

3. *Non-repudiation*

This test is carried out using observations to test whether the bios portal website can keep a user from denying that he has carried out an activity or a transaction recorded on the log activity, for example doing the create action update or delete. The results obtained in this test is get a score of 5 in the very good category.

4. *Accountability*

This test is carried out using observation methods to test whether the bios portal website has a log activity on a computer network. The results obtained in this test is get a score of 5 in the very good category.

5. *Authenticity*

This test is carried out using observation methods to test whether the bios portal website has the ability to verify whether the user who wants to access is a real user or not. The results obtained in this test is get a score of 5 in the very good category

G. *Testing Maintainability*

1. *Modularity*

This test is carried out using the method of observation, namely by logging into the website and testing the website in dividing the function into several modules. The results obtained in this test is get a score of 5 in the very good category.

2. *Analyzability*

This test is carried out by using the black box testing method, namely by bending several negative test cases or wrong orders to test whether the website has been able to analyze errors and find the cause of certain malfunctions. The results obtained in this test is get a score of 5 in the very good category.

3. *Modifiability*

This test is carried using the observation or observation method, by testing whether the bios portal website can be modified or updated according to future needs and also testing whether there are modification features that can be done by the user. The results obtained in this test is get a score of 1 in the very bad category.

4. *Testability*

This test is carried out using the observation or observation method, by testing whether the bios portal website can be tested easily and has passed the user acceptance test (UAT) standard. UAT is a test performed by the end user of the bios portal website. The results obtained in this test is get a score of 5 in the very good category.

H. *Testing Portability*

1. *Adaptability*

This test is carried out using a black box testing instrument by conducting tests on different browsers to prove that the website is able to adapt to different browser environments. The browsers used are Google Chrome, Mozilla Firefox, and Microsoft Edge. The results obtained in this test is get a score of 5 in the very good category cause portal bios website able to run on three different browsers without any problems.

2. *Installability*

This test is carried out using a black box testing instrument by testing the SIT and UAT servers to find out whether the website is easy to install and remove in different environments. The SIT server is an environment that is intended for the development phase which is monitored only by the IT development team, while the UAT server is an environment intended for the UAT phase which is similar to the live phase and is monitored by the monitoring team. The results obtained in this test is get a score of 5 in the very good category cause all existing functions can function properly on both environment.

3. *Replaceability*

This test is carried using or observing by conducting a test in the form of testing the ability of the bios portal website whether it can be replaced by a similar system. After testing, the results obtained were that the bios portal website could be replaced with various similar systems. The results obtained were 5, namely in the very good category.

I. *Total Assessment Results of Characteristics and Sub Characteristics Testing*

After testing and assessing the 6 characteristics and sub-characteristics of ISO 25010: 2011 in this study, the next step is to do a total calculation of the results obtained as a whole. The total calculation of the assessment can be seen in Table I.

TABLE I. Total Assessment

No	Characteristics	Weight	Total Sub Characteristics	Total (Weight x Value)
1	<i>Functional Suitability</i>	0.412	5	2.06
2	<i>Performance Efficiency</i>	0.241	4.606	1.11
3	<i>Usability</i>	0.146	5	0.73
4	<i>Security</i>	0.09	5	0.45
5	<i>Maintainability</i>	0.071	4.528	0.32
6	<i>Portability</i>	0.04	5	0.2
Total				4.87

V. CONCLUSION AND SUGGESTIONS

A. *Conclusion*

Quality testing on the website bios portal using the ISO 25010: 2011 method on email has been successfully carried out. The test is done by calculating the weight calculation for the six parameters using the AHP method, then determining the indicators for each of the sub-criteria. Next is to test each sub-group with the blackbox testing method, observation and questionnaire distribution.

The total test result for the entire testing process is 4.87 out of a total value of 5 with good category.

In addition, there are recommendations for improvements to the characteristics of performance efficiency in order to increase efficiency in the use of resources. Meanwhile, the company maintenance criteria needs to provide a means to open up opportunities for other developers within the internal company to provide criticism and suggestions on the current development of the bios portal website.

B. *Suggestion*

Quality analysis on the bios portal website needs to be carried out again using a variety of other testing tools that are more diverse, using the latest ISO / IEC methods and also carried out on other characteristics, namely reliability and compatibility.

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REFERENCES

- [1] Ali. E, "Rekayasa Perangkat Lunak," Yogyakarta:CV MFA, 2019.
- [2] Crispin. L, and Gregory. J, "Agile testing: A practical guide for testers and agile teams," Pearson Education, 2009.
- [3] Dirwan. "Pengaruh Kualitas Jasa "Jenius BTPN" Terhadap Kepuasan Nasabah Pada PT. Bank Tabungan Pensiun Nasional Makassar,"
- [4] Firdaus. H, Abdillah. G, Renaldi. F, "Sistem Pendukung Keputusan Karyawan Terbaik Menggunakan AHP dan Topsis", Universitas Jenderal Ahmad Yani. Cimahi, 2016.
- [5] Galin. D, "Software Quality Assurance from Theory to Implementation," England, 2004.
- [6] Griffith. A, "SPSS For Dummies®", 2nd ed, Wiley Publishing, Inc., Indianapolis, Indiana:2010.
- [7] Irfan. M, Rusdiana. A, "Sistem Informasi Manajemen," Bandung: Pustaka Setia, 2014.
- [8] Lewis James. R, "IBM Computer Usability Satisfaction Questionnaire: Psychometric Evaluation and Instructions For Use," Technical Report 54.786, 1993.
- [9] Maryuliana. "Sistem Informasi Angket Pengukuran Skala Kebutuhan Materi Pembelajaran Tambahan Sebagai Pendukung Pengambilan Keputusan Di Sekolah Menengah Atas Menggunakan Skala Likert. Teknik Informatika," Universitas Islam Sultan Agung, 2016.
- [10] Nissa. K, Muslimah. H, Mursityo. Y.T, "Evaluasi Usability pada Aplikasi Perbankan Jenius dengan Metode Usability Testing. Universitas Brawijaya," Malang, 2019.
- [11] Nuraini, Y. "Pengujian Kualitas Perangkat Lunak Ujian Berbasis Komputer Squiz Menggunakan Metode ISO 25010:2011," Magister Manajemen Sistem Informasi Universitas Gunadarma, 2019
- [12] R. Likert. R, "A technique for the measurement of attitudes," vol 22, In *Archives of Psychology*, 14, 1932.
- [13] Romindo, Niar. H, Sipayung. R, Julyanthy, Yendianof. D, Faisal. M, Febrianty, Jamaludin, Putu. D, Simarmata. J, Purba. B, "Sistem Informasi Binis," 1st ed, Yayasan Kita Menulis, 2020.
- [14] S. Heru, and Jati. H, "Analisis Kualitas Sistem Informasi Pantauan Pembentukan Karakter Siswa di SMK N 2 Depok Sleman," Universitas Negeri Yogyakarta. Yogyakarta.
- [15] Saaty, L. "Decision making with analytic hierarchy process," Katz Graduate School of Business, University of Pittsburgh. Pittsburgh, 2008.
- [16] Satzinger, J. W., Jackson, R. B., Burd, S. "D. Systems Analysis and Design in a Changing World," 6th ed Boston: Cengage Learning, 2019.
- [17] T. Galuh, "Analisis dan Rekomendasi Sistem SITS Dishub Kota Surabaya menggunakan Framework ISO 25010," Universitas Islam Negeri Suna Ampel, Surabaya, 2019.
- [18] W. Fadli, Rochimah. S, Faticah. C, "Klasifikasi Kualitas Perangkat Lunak Berdasarkan ISO/IEC 25010 Menggunakan AHP dan Fuzzy Mamdani Untuk Situs Web E-Commerce. Kampus ITS," Surabaya, 2019.
- [19] Wahyudi. R, "Uji Validitas Dan Reliabilitas Dengan Pendekatan Konsistensi Internal Kuesioner Pembukaan Program Studi Statistika Fmipa Universitas Bengkulu," FMIPA, Universitas Bengkulu. Bengkulu.