# Quality Assurance of Sayurbox Mobile Application Using Model ISO 25010

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*Abstract*— *Sayurbox is an e-commerce service that sells fresh produce such as fruits, vegetables, halal meat, and other fresh foods. During the epidemic, the Sayurbox program saw an upsurge in users, as people preferred to use E-Commerce services to buy food without having to leave the house. The goal of this research is to use the ISO 25010 model standard to assess the quality level of the Sayurbox application on the Android operating system for end-user experience while using the app. The test is conducted out utilizing eight ISO 25010 characteristics, including Functional Suitability, Performance Efficiency, Compatibility. Usability, Reliability, Security, Maintainability and Portability with its respective sub characteristics. The tool used was a questionnaire with numerous questions emphasizing on the sub-characteristics that are evaluated based on the item. The Analytical Hierarchy Process has been used to weight the characteristics and sub-characteristics, which was then processed using SPSS. To obtain the final results, the data from the questionnaire was analyzed with SPSS to analyze the validity and reliability. The entire Sayurbox program passed the ISO 25010. standard, with the maximum score of 4.886 for the Security characteristic and the lowest score of 2.714 for the Performance Efficiency characteristic. The Reliability test yielded a Cronbach's Alpha of 0.924 (Excellent) and Test Validity showed accurate result for each of the sub characteristics According to the conclusions of the Sayurbox application quality test, Sayurbox satisfied the requirements for the system architecture function to be successful, and the application was successful with minimal errors.*

*Keywords*— *Analytical Hierarchy Process, Cronbach Alpha, ISO 25010, Quality Assurance, Sayurbox.*

## I. INTRODUCTION

People's behavior has altered in numerous ways as a result of the Covid-19 epidemic, including how they satisfy their everyday requirements. The Accommodation and Food and Drink Provision sector had the greatest effect during the start of the Covid-19 epidemic, according to data from the Indonesian Central Statistics [1]. This occurred because, in order to minimize crowds, public spaces have lately been drastically curtailed. People increasingly prefer to satisfy their everyday demands through E-Commerce since it saves them time and removes the need to go to large crowds.

E-commerce is the process of individuals buying and selling items online, as well as companies to companies as a middleman for commercial transactions. E-commerce is a dynamic technology, application, and business process that links businesses, customers, and specific communities, as well as a method of online purchasing and trade or direct selling using internet facilities where there is a website that can provide get & deliver services [2].

Sayurbox is an e-commerce that offers certain products such as fruit, vegetables, meat and other fresh products. Sayurbox has a farm-to-table business concept that provides fresh ingredients and healthy products directly from Indonesian farmers and producers. However, many customers do not know the quality of the Sayurbox before using it, and they already assume that the program can perform jobs in the purchase and payment transaction process properly. Despite the fact that there are numerous variables other than its own functioning element that the user must consider before utilizing the Sayurbox [3].

According to research by Taufiq (2017) which analyzes the quality of the Mobile Web-Based School Activity Information System at SMK Negeri 2 Yogyakarta using the USE Questionnaire by Arnold M. Lund (2001) which has been translated and modified for testing the Sikatans software with a total of 30 statements. with 4 criteria: usefulness, ease of use, ease of learning, and satisfaction using a Likert scale with 7 scales. The results of the calculation of the consistency or reliability of the questionnaire instrument will be tested with Cronbach's Alpha calculations using SPSS with the interpretation of Cronbach's Alpha values, if there are instruments that are declared invalid, the questionnaire will be changed in order to achieve the validity of the Cronbach's Alpha consistency value criteria [4].

Another research conducted by Millati (2019) was to measure the quality of GoJek Using ISO 25010 Model, the researcher describes the exact comparison in testing mobile devices with several methods, including McCall (1977), Boehm (1978), ISO 9126 (2000) and ISO 25010 (2010). The results of this comparison prove that the ISO 25010 model has the most complete characteristics compared to other quality models because there are 26 of 28 factors. In addition, the ISO 25010 model is an update and the result of restructuring the sub-characteristics of the ISO 9126 model. This study also refers to the dissertation conducted by Luis Ricardo entitled A Software Assurance Model for Mobile Application to obtain the characteristics of the weighting of characteristics and sub-characteristics in the ISO model. 25010 [5].

Another study conducted by Angga Setiadi (2018) entitled "Application of the AHP Method in Choosing an E-Commerce Marketplace based on Software Quality and Evaluation ISO/IEC 9126-4 for MSMEs". In this study, data was collected using a questionnaire and data processing was carried out using the Analytical Hierarchy Process (AHP) method using Expert Choice tools. Quality measurement is carried out using ISO/IEC 9126-4 quality in use model and

has 4 metrics for effectiveness, productivity, safety, and satisfaction. This study aims to implement a decision support system using the Analytical Hierarchy Process (AHP) method with data sources originating from more than one respondent and provide recommendations to users regarding E-Commerce with the best quality and it is stated that the model has several improvements contained in ISO 25010 models [6].

This research employs the ISO 25010 technique since it is deemed the most appropriate and up-to-date for ensuring the quality of the Sayurbox. The ISO 25010 model is a technique having broad features and sub-characteristics from Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, through Software Maintainability. As a result, by employing the ISO 25010 model, this study is intended to give information for better analyzing the quality of the Sayurbox.

## II. RESEARCH METHOD

This study begins by establishing the ISO 25010 model's characteristics and sub-characteristics that are suited for the Sayurbox vehicle application, and then uses the AHP technique to determine the relevance of each characteristic and sub-characteristic. The following step is to build question instruments and deliver surveys to Sayurbox users. To evaluate the validity and reliability of the questionnaire, the data was analyzed by using SPSS program. The final stage in the quality test of the Sayurbox Mobile Application is to determine the overall calculation results based on the weighting and processing of the questionnaire data values. Figure 1 depicts this study technique.
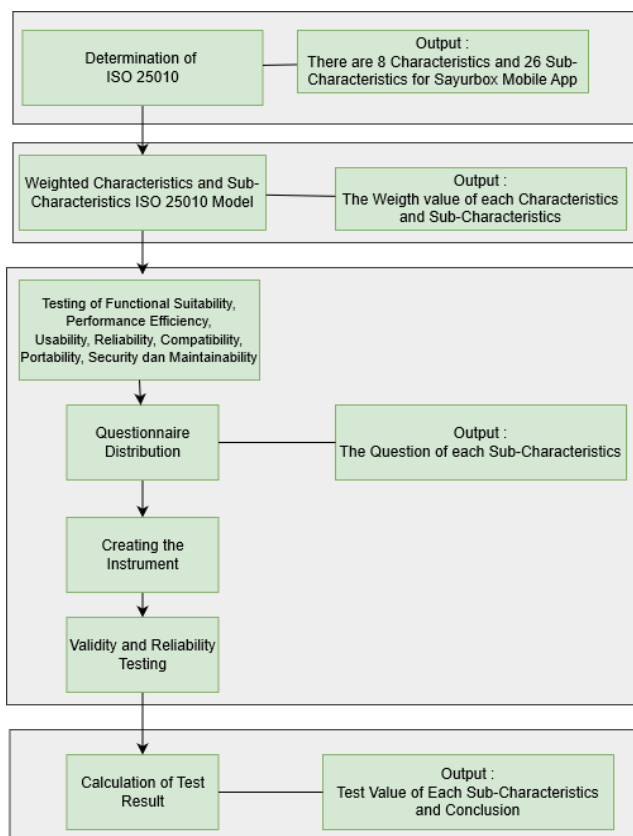


Fig. 1. Research Methods

## 1. Determine ISO 25010 Model

The first step is to determine the ISO 25010 model and match it to the Sayurbox application's requirements. (ISO/IEC, 2011) The ISO 25010 model contains eight characteristics and 31 sub-characteristics. The Application will be tested using eight characteristics and 28 sub-characteristics in this study. Determination to pick the most important features and sub-characteristics for evaluating the quality of mobile apps

Characteristics and sub-characteristics that have been determined for testing the quality of the Sayurbox Application can be seen in Figure 2.



Fig. 2. ISO 25010 Models

## 2. Weighted Characteristic and Sub Characteristic ISO 25010 Model Using AHP

This stage will determine the initial weight of the characteristics and sub-characteristics of the ISO 25010 model using the AHP (Analytical Hierarchy Process) method. Determination of weights is carried out using website-based AHP tools with the url address https://bpmsg.com/ahp/ahp-calc.php [7]. There are 8 characteristics of the ISO 25010 model, namely Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability and Portability. The value of 100 percent is divided into 8 existing characteristics according to the demands of the software to be evaluated for quality, out of the 8 characteristics of the evaluation given a value of 100 percent. The weight of the 28 sub-characteristics is then calculated in the same way as the weight of the characteristics, which is done using the AHP technique.

## 3. Testing of Characteristics and Sub-Characteristics

Testing of 8 characteristics that exist in ISO 25010, namely Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, and Portability will be carried out using a questionnaire. Since this test in this study focuses on the end-perspective, user's questionnaires were used to assess the eight criteria listed in ISO 25010. Each of the eight qualities utilized is represented by a sub-characteristic in the questionnaire. Prior to sending surveys to respondents, measures such as instrument preparation and sample selection were done. [8].

### a. Preparing Questionnaire Instruments

At this stage, the instrument is prepared based on the ISO 25010 standard in the form of a list of required questions/questionnaires. The instrument consists of a test case test in the form of a questionnaire with a Likert scale. With detailed answer choices as follows:

Skala Likert:
1 = Strongly Disagree
2 = Disagree

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3 = Fairly Agree

4 = Agree

5 = Strongly Agree

Below is a list of user questions per dimension based on ISO 25010 for Sayurbox App users [8]

TABLE 1. List Of Questions

| Code | Questions | Sub Characteristic |
|------|-----------|--------------------|
| A1 | Information/data in the Sayurbox Application are complete | Functional Appropriateness |
| A2 | Buttons or menus on the Sayurbox Application can be used | Functional Correctness |
| A3 | Information displayed by the Sayurbox Application as needed | Functional Completeness |
| B1 | The Sayurbox application quickly responds when displaying information. | Time Behavior |
| B2 | At certain times (limited discounts, etc.) the Sayurbox application takes a long response time or even cannot be accessed. | Capacity and Resource Utilization |
| C1 | The Sayurbox application can be used on various versions of the Android operating system properly. | Co- Existence |
| C2 | The Sayurbox application has storage features (shopping history, *cart*, *auto login*) | Interoperability |
| D1 | How to use the Sayurbox application is easy to remember | Appropriateness Recognizability |
| D2 | The use of the Sayurbox application is easy to learn | Learnability |
| D3 | The Sayurbox application is easy to run | Operability |
| D4 | The appearance of the Sayurbox application is easy to understand | User Interface Aesthetics |
| D5 | The Sayurbox application can be used by several users at the same time | Accessibility |
| D6 | A message appears if an error occurs when using the Sayurbox Application | User Error Protection |
| E1 | The Sayurbox application can be accessed at any time. | Maturity |
| E2 | The Sayurbox application can be accessed when needed. | Availability |
| E3 | The Sayurbox application rarely experiences errors while being accessed. | Fault Tolerance |
| E4 | When an error occurs in the Sayurbox Application, the system can return to normal operation in the same phase of access. | Recoverability |
| F1 | The activity of each user of the Sayurbox Application is unknown to other users. | Confidentiality |
| F2 | The Sayurbox application has a security system | Integrity |
| F3 | There is a login menu | Authenticity |
| G1 | The Sayurbox application needs to be updated for better | Modularity and Reusability |
| G2 | There are no frequent errors in the Sayurbox Application | Analyzability |
| G3 | There needs to be a modification so that the Sayurbox Application is easier to understand | Modifiability |
| G4 | Sayurbox application can perform its function properly | Testability |
| H1 | The Sayurbox application can be used on various existing devices. (smartphone, computer, laptop) | Adaptability |
| H2 | The Sayurbox application can be installed and uninstalled easily | Installability |

*b. Determining Sample*

In this study using the non-probability sampling method or random sample selection, a technique that does not provide equal opportunities. The technique used in this study is purposive sampling, which gives certain criteria to the sample

to be taken [9]. The criteria are Women aged 17 years and over who have used the Sayurbox application on Android devices and are domiciled in the Jakarta area. The samples that the researchers took were 100 respondents. Calculation of the number of samples is carried out using the Slovin formula taken from the population of users of the Sayurbox Mobile Application through the Play Store on March 31, 2021, which is 500,000 users, with a margin of error of 10%.

*4. Validity and Reliability Testing*

*a. Validity Testing*

To determine the validity of a questionnaire, validity testing is performed on it. A questionnaire is considered legitimate if the questions contained within it disclose anything that will be measured by the questionnaire. If r count and r table (2-sided test with sig. 0.05), then the instrument or question items have a substantial connection with the overall score (declared valid) [9].

*b. Reliability Testing*

Reliability is a questionnaire tool which is an indicator of a variable. A questionnaire can be declared reliable or reliable when the respondents' answers to these questions have been consistent or stable over time. The aim is to test whether the questionnaire distributed to respondents is really reliable as a measuring tool or not. Because the study instrument was in the form of a questionnaire and a graded scale, reliability assessment was performed using the Cronbach Alpha formula. [10].

From the results obtained using the questionnaire above, it is necessary to calculate the consistency or reliability of the instrument. Calculation of Cronbach's Alpha is calculated using SPSS software with the interpretation of Cronbach's Alpha values presented in Table 2 [11].

TABLE 2. Category of Reliability Value

| Cronbach's Alpha | Internal Consistency |
|------------------|----------------------|
| $\alpha \geq .9$ | Excellent |
| $9 > \alpha \geq .8$ | Good |
| $.8 > \alpha \geq .7$ | Acceptable |
| $7 \alpha \geq .6$ | Questionable |
| $.5 > \alpha$ | Unacceptable |

*5. Calculation of Total Test Results Using ISO 25010*

After conducting an assessment that refers to the ISO 25010 model, the next step to be carried out is to calculate the total test results. Calculations were made based on the initial weight of the characteristics and sub-characteristics with an assessment given by the researcher. The formula for calculating the results of the assessment is as follows:

$$Fa = w_1 c_1 + w_2 c_2 + \cdots + w_n c_n \quad (1)$$

Where:

Fa : Total value of factor a

w1 : Weight for criterion i

c1 : Value for criterion i

### III. RESULT AND DISCUSSION

*1. Characteristic and Sub-Characteristic Weighting Results ISO 25010*

Before conducting an assessment of software quality, a weighting of 8 characteristics and 28 sub-characteristics of software quality assessment will be carried out based on the ISO 25010 standard. Below are the results of the weighting of 8 characteristics and 28 sub-characteristics.

TABLE 3. Characteristic and Sub-Characteristic Weighting Results

| Characteristic | Characteristic Weight | Sub-Characteristic | Sub-Characteristic Weight |
|---|---|---|---|
| Functional Suitability | 16.1% | Functional Completeness | 26.0% |
| | | Functional Correctness | 41.3% |
| | | Functional Appropriateness | 32.7% |
| | | *Total* 100% | |
| Performance Efficiency | 22.8% | Time Behavior | 48.1% |
| | | Resource Utilization | 11.4% |
| | | Capacity | 40.5% |
| | | *Total* 100% | |
| Compatibility | 6.3% | Co-existence | 66.7% |
| | | Interoperability | 33.3% |
| | | *Total* 100% | |
| Usability | 14.6% | Appropriateness Recognisability | 9.1% |
| | | Learnability | 12.0% |
| | | Operability | 29.9% |
| | | User Interface Aesthetics | 17.4% |
| | | Accessibility | 25.3% |
| | | User Error Protection | 6.3% |
| | | *Total* 100% | |
| Reliability | 14.1% | Maturity | 41.9% |
| | | Availability | 29.5% |
| | | Fault Tolerance | 15.8% |
| | | Recoverability | 12.8% |
| | | *Total* 100% | |
| Security | 17.2% | Confidentiality | 11.4% |
| | | Integrity | 48.1% |
| | | Authenticity | 40.5% |
| | | *Total* 100% | |
| Maintainability | 3.9% | Modularity | 9.2% |
| | | Reusability | 8.9% |
| | | Analyzability | 21.9% |
| | | Modifiability | 20.7% |
| | | Testability | 39.3% |
| | | *Total* 100% | |
| Portability | 5.0% | Adaptability | 66,7% |
| | | Installability | 33,3% |
| | | Adaptability | 66,7% |
| | | *Total* 100% | |

### 2. Validity and Reliability Test Results

After weighting the characteristics and sub-characteristics that exist in ISO 25010, the next step is to test the Sayurbox Application by distributing questionnaires to users of the Sayurbox Application. Testing is done by using SPSS tools. The standard value of the correlation coefficient is 0.1966. If the calculated value is > 0.195, then the question is declared valid. Meanwhile, if the result < 0.1966 then the question is declared invalid. Table 4 is the result of the validity test.

TABLE 4. Validity Testing Result

| Question | Code | R count | R table | Details |
|---|---|---|---|---|
| **Functional Suitability** | | | | |
| Item 1 | A1 | 0.693 | 0.1966 | Valid |
| Item 2 | A2 | 0.703 | 0.1966 | Valid |
| Item 3 | A3 | 0.676 | 0.1966 | Valid |
| **Performance Efficiency** | | | | |
| Item 4 | B1 | 0.662 | 0.1966 | Valid |
| Item 5 | B2 | 0.357 | 0.1966 | Valid |
| **Compatibility** | | | | |
| Item 6 | C1 | 0.505 | 0.1966 | Valid |
| Item 7 | C2 | 0.577 | 0.1966 | Valid |
| **Usability** | | | | |
| Item 8 | D1 | 0.735 | 0.1966 | Valid |
| Item 9 | D2 | 0.747 | 0.1966 | Valid |
| Item 10 | D3 | 0.747 | 0.1966 | Valid |
| Item 11 | D4 | 0.542 | 0.1966 | Valid |
| Item 12 | D5 | 0.745 | 0.1966 | Valid |
| Item 13 | D6 | 0.574 | 0.1966 | Valid |
| **Reliability** | | | | |
| Item 14 | E1 | 0.765 | 0.1966 | Valid |
| Item 15 | E2 | 0.632 | 0.1966 | Valid |
| Item 16 | E3 | 0.609 | 0.1966 | Valid |
| Item 17 | E4 | 0.696 | 0.1966 | Valid |
| **Security** | | | | |
| Item 18 | F1 | 0.736 | 0.1966 | Valid |
| Item 19 | F2 | 0.771 | 0.1966 | Valid |
| Item 20 | F3 | 0.786 | 0.1966 | Valid |
| **Maintainability** | | | | |
| Item 21 | G1 | 0.664 | 0.1966 | Valid |
| Item 22 | G2 | 0.594 | 0.1966 | Valid |
| Item 23 | G3 | 0.391 | 0.1966 | Valid |
| Item 24 | G4 | 0.815 | 0.1966 | Valid |
| **Portability** | | | | |
| Item 25 | H1 | 0.664 | 0.1966 | Valid |
| Item 26 | H2 | 0582 | 0.1966 | Valid |

Based on the results of the validity test above, it can be concluded that the reliability test that has been carried out has a very reliable level of reliability.



Fig. 3. Reliability Test Result

In Figure 3 after the reliability test, the Cronbach's Alpha value found is 0.924. To know the value of the reliability test, see Table 5.

TABLE 5. Category of Reliability Value

| Alpha Cronbach Value | Details |
|---|---|
| 0.00 - 0.20 | Unreliable |
| 0.20 – 0.40 | Less Reliable |
| 0.40 – 0.60 | Quite Reliable |
| 0.60 – 0.80 | Reliable |
| 0.80 – 1.00 | Very Reliable |

Based on Table 5 above, it can be concluded that the reliability test that has been carried out has a level of reliability that is Very Reliable

*3. The Calculation Results*

After testing the characteristics and sub-characteristics based on the ISO 25010 model and having obtained the value of each sub-characteristic used, the last step is to calculate the total calculation results from 8 characteristics, namely Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, and Portability. The following is the result of the total calculation of the 8 characteristics used.

TABLE 6. The Calculation Results of Sayurbox Application

| No | Characteristic | Weight | Value | Total |
|---|---|---|---|---|
| 1. | Functional Suitability | 16.1% (0.161) | 4.740 | $0.161 \times 4.740 = 0.7584$ |
| 2. | Performance Efficiency | 22.8% (0.228) | 2.714 | $0.228 \times 2.714 = 0.6188$ |
| 3. | Compatibility | 6.3% (0.063) | 4.000 | $0.063 \times 4 = 0.252$ |
| 4. | Usability | 14.6% (0.146) | 4.488 | $0.146 \times 0.4488 = 0.6552$ |
| 5. | Reliability | 14.1% (0.141) | 4.714 | $0.141 \times 4.714 = 0.6647$ |
| 6. | Security | 17.2% (0.172) | 4.886 | $0.172 \times 4.886 = 0.8400$ |
| 7. | Maintainability | 3.9% (0.039) | 4.181 | $0.039 \times 4.181 = 0.1631$ |
| 8. | Portability | 5.0% (0.050) | 4.333 | $0.050 \times 4.333 = 0.2167$ |
| Total = 0.758 + 0.6188 + 0.252 + 0.6552 + 0.6647 + 0.840 + 0.1631 + 0.2167 = **4.1685** | | | | |

## IV. CONCLUSION

The quality test of the Sayurbox Application using the ISO 25010 model has been declared successful. The stages of the research to test the quality of the Sayurbox Application using the ISO 25010 model include determining the characteristics and sub-characteristics of the ISO 25010 model based on the object of research, determining the weight of characteristics and sub-characteristics using the AHP method, distributing research instruments in the form of a questionnaire, testing the characteristics of the ISO model. 25010, test the validity and reliability, and calculate the total test results. Based on the tests that have been carried out, it is concluded that the Sayurbox Application gets a total score of 4.1685 which can be categorized as Good quality for a Mobile Application according to an End-User Perspective. The results of the Sayurbox Application Quality Test include: on the Functional Suitability characteristic it gets a value of 4.740, on the Performance Efficiency characteristic it gets a value of 2.714, on the Compatibility characteristic it gets a value of 4, on the Usability characteristic it gets a value of 4.488, on the Reliability characteristic it gets a value of 4.714, on the Security characteristic it gets a value 4.886, on the Maintainability characteristic it gets a value of 4.181 and on the Portability characteristic it gets a value of 4.333

Testing on the quality of the Sayurbox Application uses 8 characteristics and 28 sub-characteristics of the ISO 25010 method. The test is carried out using a questionnaire method to 100 respondents who are Sayurbox users who live in Jakarta and use the Android operating system. The results of the tests that have been carried out are the Sayurbox Application gets a value of 4.1685 against 8 characteristics and 28 sub-characteristics used. This value says that the quality of the Sayurbox Application is good.

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