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NEWS PORTAL WEBSITE MEASUREMENT ANALYSIS USING ISO/IEC 25010 AND MCCALL METHODS

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ABSTRACT
Information system is an asset for a company when the information system is managed properly. In the past, newspapers have become one of the main sources for people who want to get the latest news about what is happening around them. But now, the important role of newspapers is gradually being replaced by online-based news portals that can deliver news very quickly. PT Info Pena Indonesia itself utilizes an information technology in carrying out the process of managing and disseminating the news they produce with the help of a web portal called Jitunews. This research is quantitative in nature, namely explaining the use of survey methods by distributing questionnaires to users of the Jitunews news portal site for data about the characteristics of the ISO/IEC 25010 and McCall methods. The results of the research conducted on the backend and frontend pages show that the Jitunews website deserves a "Good" interpretation value. However, the security and functional suitability variables contained on the frontend page have the lowest values of all the variables studied, namely 74.43% and 77.50% with the interpretation of "Enough". This can be input for stakeholders to improve the quality of the website in order to increase user satisfaction with the Jitunews news website portal.
Keywords : *Software Engineering, ISO/IEC 25010, McCall*

1. Introduction

Information system is an asset for a company when the information system is managed properly. Indeed, information systems will provide various competitive advantages and increase the chances of commercial success. Information systems have become one of the important factors that enable a company to be able to compete in business and help improve the efficiency and effectiveness of daily operations by integrating business processes (Robo et al., 2018). An information system has the power to increase productivity, gain competitive advantage, and build a more responsive company (Son & Faisal, 2017).

Not only business people engaged in the retail sector, almost every business today needs a system that can help run the business processes they manage, such as public transportation (Izzatillah, 2019), ordering food, to the process of publishing a news story. and make it easier for a company to market the products they offer.

In the past, newspapers have become one of the main sources for people who want to get the latest news about what is happening around them. But now, the important role of newspapers is gradually being replaced by online-based news portals that can deliver news very quickly (Prihanto, 2018). The internet is one of the main driving factors for the growth of media convergence, which allows the integration of various conventional media and makes it accessible to anyone and anywhere (Brugger, 2009). On the other hand, the development of digital devices makes it easier for people to access various types of content, whether news, entertainment, or other information (Gushevinalti et al., 2020).

PT Info Pena Indonesia is one of the companies engaged in the media. PT Info Pena Indonesia itself utilizes an information technology in carrying out the process of managing and disseminating the news they produce with the help of a website portal page with the name Jitunews. The Jitunews news portal page is built using the CodeIgniter PHP framework, both on the backend and frontend pages.

Regardless of how long the process is in designing and making software, so that the software can be used either for the benefit of a company or the software is used by customers of a business. There needs to be an evaluation mechanism to measure whether the software is in accordance with the eligibility standards so that users, whether it's a company or a customer who

uses the software, can take advantage of the technology properly with very few constraints (Haoues et al., 2017).

Evaluation of an information system is an evaluation carried out using measurements on the quality aspects of an information system with reference to measurement standards recognized by the international community. Of the various existing measurement standards, such as the McCall, Boehm, FURPS, Dromey, ISO/IEC 9126, and ISO/IEC 25010 models, the measurement model that has the most comprehensive measurement aspect is ISO/IEC 25010. ISO/IEC 25010 has eight aspects or characteristics. namely functional suitability, reliability, performance efficiency, operability, security, compatibility, maintainability, and transferability (ISO, 2013).

Many of the big software companies spend huge sums of money but don't produce software that has the features and functionality as promised. A useful product has the functions and features that end-users want, and more importantly, it has reliable assets and is free from errors (Rianto, 2021).

From a series of brief explanations regarding the evaluation of an information system, the author would like to conduct a study entitled "Analysis of Measurement of News Portal Websites Using the ISO/IEC 25010 Dan McCall Method".

2. Literature Review

Software Quality

A In the development of a system requires a quality software. Quality affects software performance. In order for the software to function properly, it is necessary to properly extract user information needs. The product is said to have good quality if the product can provide satisfaction to the majority of users. High quality products can provide certainty and confidence that the product will achieve its quality goals. Quality products can provide certainty and confidence that the product can meet the quality objectives. Software quality testing is a process used to determine the accuracy, integrity and quality of software. Software quality testing is an important part of software quality assurance and is a fundamental consideration in specification, design and coding (Thongtanunam & Hassan, 2021).

ISO/IEC 25010

Research in the area of software quality is as old as software development. Attention to product quality comes with program design that is error-free and efficient when used. Research to improve software quality arises with user demand for software products with improved quality. The use of models is an acceptable way to support quality management of software products. The existing basic model is hierarchically structured, and can be adapted for each type of software product and this model is oriented towards evaluation and improvement.

There are various basic quality models such as McCall, Boehm, FURPS, Dromey, ISO/IEC 9126, and ISO/IEC 25010. The ISO/IEC 9126 model accepts input from previous models and sets standards for assessing software quality. In 2007, ISO/IEC 25010 became a replacement for ISO/IEC 9126. From the comparative studies between models that have been carried out, ISO/IEC 25010 is the model that has the most complete measurement aspect (Hovorushchenko, 2018).

ISO/IEC 25010 is another part of the SquaRE series (ISO/IEC 25000 – ISO/IEC 25099), standards for software product quality-requirements-and evaluation, belonging to the quality model division (ISO/IEC 2501n) (Juninisvianty, 2021). The standards established in this division provide detailed quality models for computer systems and software products, quality in use, and data. Practical guidelines for the use of quality models are also available (ISO/IEC, 2012) mainly ISO/IEC 25010 is used to define quality (Murdiani & Umar, 2020). A metric-based approach is used to assess the quality of a given system and an evolving model of system reliability is used to predict quality. Figure 1 is the international standard of the SquaRE series.

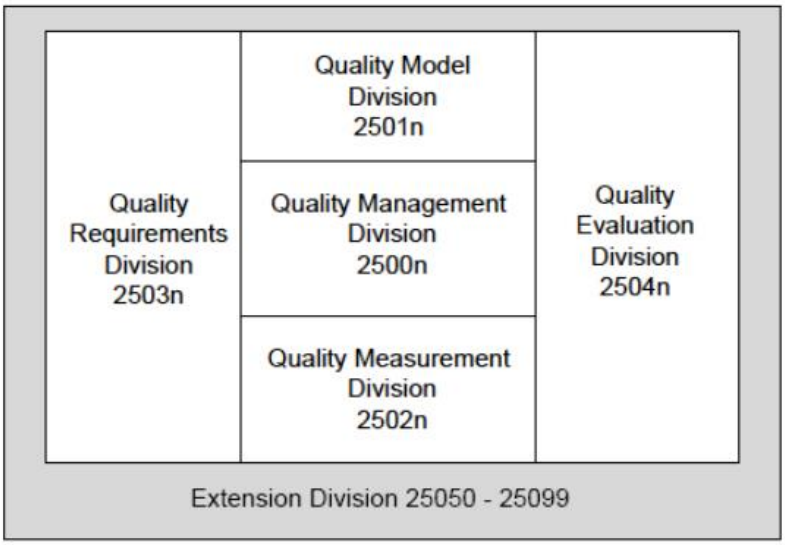

Fig 1. SquaRE series international standard (ISO/IEC, 2012).

There are eight characteristics of the quality model in ISO/IEC 25010, namely functional suitability, reliability, performance efficiency, operability, security, compatibility, maintainability, and transferability (Iqbal & Babar, 2016).

McCall

McCall, Richards and Walter suggested that what affects the quality of the software is a certain factor or criteria (Dwilestari & Nuris, 2020). McCall's method is the oldest test model developed in 1996.

Meanwhile, according to I. Ermis and A. A. Reformasi (Ermis & Reformasi, 2019) who conducted research by analyzing the Tokopedia website with usability analysis using the McCall method which contains 11 factors supporting the success of the quality of a software to satisfy user needs, namely correctness, reliability, efficiency, maintainability, integrity, usability, flexibility, portability, testability, reusability, and interoperability. These factors are divided into 3 main groups, namely: Product Transition, Product Revision and Product Operation. Usability is included in the Product Operation category. A software is not only seen from the product but also seen from the side of the software development stage itself (Juniawan et al., 2020).

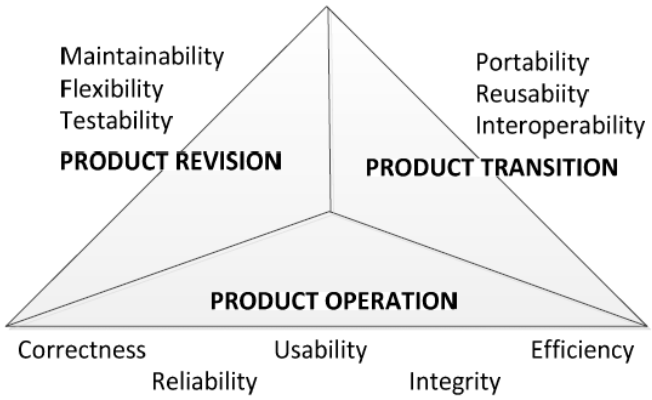

Fig 1. McCall's Model.

Likert Scale

The definition or definition of a Likert Scale is a measurement of attitudes and income using a research scale or in other words measuring perceptions using a scale, a person's opinion or attitude and/or group about an event or social phenomenon, based on the operational definition set by the researcher. With this Likert scale, the questionnaire submitted by the researcher was

given to the respondents to be completed and then they were required to indicate their level of agreement with the questions asked.

Research variables are questions or statements that are used in research and are specifically determined by the researcher. Rensis Likert is the creator of the Likert scale so that his name is used in this scale, who is a social psychologist from the United States (Sugiyono, 2015). This scale is a psychometric scale that is usually used in questionnaires and is most often used in survey research, including descriptive survey research. the variable to be measured is described as an indicator variable. Then the indicator is used as a starting point for compiling instruments in the form of statements.

Table 1 - Measurement scale in Likert scale.

Answer	Score
Strongly Agree	5
Agree	4
Neither Agree nor Disagree	3
Disagree	2
Strongly Disagree	1

3. Research Methods

Research Framework

In terms of the methods used, no one has conducted research on the Jitunews news portal website, but there are several studies using one method such as ISO/IEC 25010 and McCall, but not by combining the two methods(Wattiheluw et al., 2020) (Andria et al., 2016).

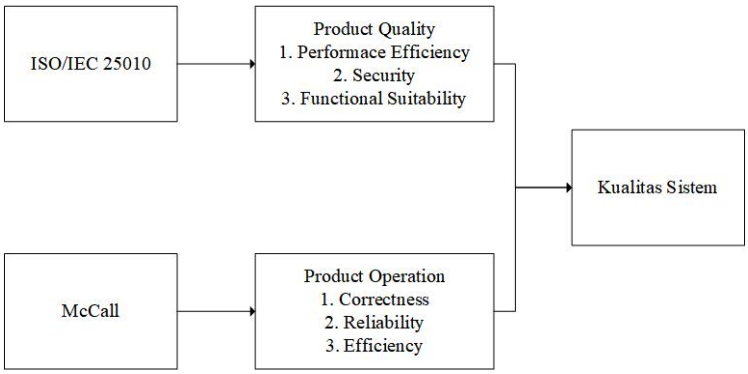

Fig. 2. Research framework.

In the framework of thinking, the variables that will be selected are in accordance with what is needed in this Jitunews website. In ISO 25010 the variables on product quality are:

1. Performance efficiency is the extent to which an application product can run well considering the amount of resources used, including: time behavior, utilization, and capacity
2. Functional suitability is an application product that provides functionality to meet the needs when using the product in certain circumstances, including: functional completeness, Functional Correctness, and Functional Appropriateness
3. Security is a product level application that provides services to protect against access, use, modification, tampering, or anything dangerous, including: confidentiality, NonRepudiation, and authentication

While in the McCall method the variables needed are:

1. Correctness is how the program provides results that match the needs that have been set and requested by the user.
2. Reliability is how the program can be used according to the appropriate function based on the desired level of accuracy.
3. Efficiency is the amount of computer resources and code required by a program to be able to carry out its functions properly and correctly.

Research Design

This research is quantitative, namely research that explains using certain instruments where in this study the instrument used is the survey method to obtain data about the characteristics of the ISO/IEC 25010 and McCall methods. The steps of quantitative research are determining the object of research, identifying problems, determining the matrix to be measured quantitatively, designing testing instruments, conducting tests, analyzing quantitatively and formulating research results.

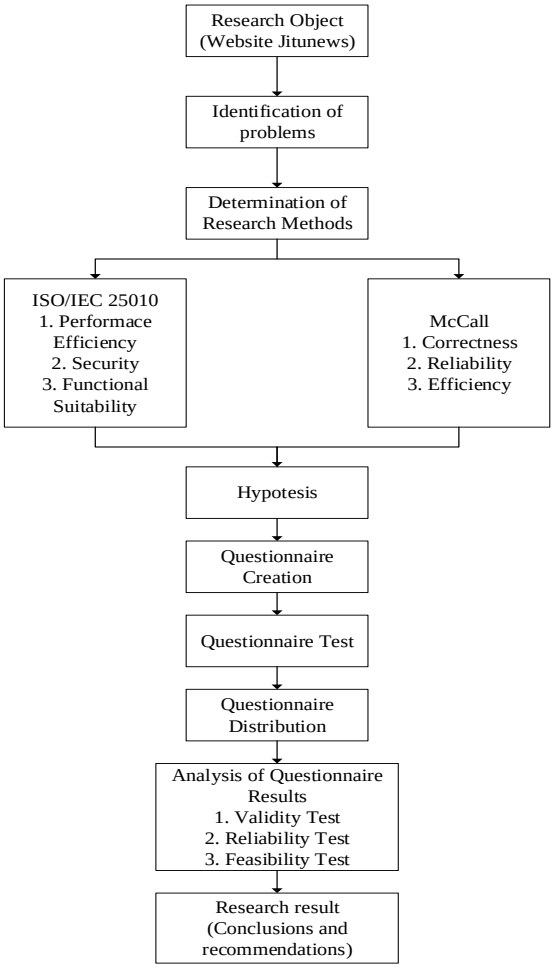

Fig. 3. Research flow.

The explanation of the research stages can be described in the object of research which is determined by determining the problems to be studied in this study where this research which is the object of research is the Jitunews news portal website. Then the problem identification is carried out by determining or defining the problems that exist on the Jitunews website. The hypotheses made with tentative assumptions that will be tested by researchers for the Jitunews website are included in several variables in the ISO/IEC 25010 and McCall methods (Juninisvianty, 2021).

Determination of research methods on the Jitunews website using the ISO/IEC 25010 method and McCall to find out whether the Jitunews website is in accordance with the method by conducting an assessment and testing of the website. After determining the method used and the variables used, the questionnaire was made based on the variables taken from the hypothesis. After that, analysis and testing was carried out on the Jitunews website with the results of the questionnaire that had been answered by the respondents, which was then tested with the SPSS application with the first test being a validity test, then a reliability test was carried out and then a feasibility test was carried out. After testing and there are results, from the results of the research conclusions and suggestions can be drawn from the management and analysis of the website.

Hypothesis

Based on the definitions and explanations above, it can be drawn several studies that will be tested on the Jitunews news portal website using ISO/IEC 25010 and McCall by taking some temporary assumptions (hypotheses) that exist in the 2 methods, where H0 to Hn are hypotheses. the beginning of each variable being tested, so that later the H0-Hn hypothesis can be concluded whether it is accepted or rejected, the hypotheses include:

H0 : Jitunews news portal website on backend and frontend pages according to ISO/IEC 25010 using variable performace efficiency.

H1 : Jitunews news portal website on backend and frontend pages according to ISO/IEC 25010 using variable security.

H2 : Jitunews news portal website on backend and frontend pages according to ISO/IEC 25010 using functional suitability variable.

H3 : Jitunews news portal website on the backend and frontend pages according to McCall using the correctness variable.

H4 : Jitunews news portal website on backend and frontend pages according to McCall using variable reliability.

H5 : Jitunews news portal website on backend and frontend pages according to McCall using variable efficiency.

4. Results and Discussions

Validity Test

Validity test is useful to determine the validity or suitability of the questionnaire used in measuring and obtaining research data from the respondents. Determination of validity is based on the comparison of the calculated r value with r table where if the calculated r value > r table = valid, while for the calculated r value < r table = invalid. To find the value of the r table with N = 243 at 5% significance in the distribution of the statistical table r value, it is obtained 0.138 determination can be seen from the significance value (Sig) where the significance value < 0.05 = valid and conversely the significance value > 0.05 = invalid.

Table 2 - Validation test results for all variables for backend pages.

No	Method	Variable	Component	Results r count	Results r table	Explanation
1	ISO/IEC 25010	*Performance effieciency*	*Time behaviour*	0.934	0.576	Valid
2			*Capacity and resource utilization*	0.858	0.576	Valid
3		*Security*	*Confidentiality*	0.853	0.576	Valid
4			*NonRepudiation*	0.881	0.576	Valid
5			*Autehenticity*	0.610	0.576	Valid
6		*Functional suitability*	*Functional Appropriateness*	0.880	0.576	Valid
7			*Functional Correctness*	0.694	0.576	Valid
8			*Functional Completeness*	0.819	0.576	Valid
9	McCall	*Correctness*	*Correctness*	0.894	0.576	Valid
10			*Consistenscy*	0.809	0.576	Valid
11			*Complateness*	0.600	0.576	Valid
12		*Reliability*	*Reliability*	0.890	0.576	Valid
13			*Accuracy*	0.799	0.576	Valid
14			*Simplicity*	0.890	0.576	Valid
15		*Efficiency*	*Efficiency*	0.788	0.576	Valid

16			*Conciseness*	0.886	0.576	Valid
17			*Execution efficiency*	0.860	0.576	Valid

Table 3 - Validation test results for all variables for frontend pages.

No	Method	Variable	Component	Results r count	Results r table	Explanation
1	ISO/IEC 25010	*Performance effieciency*	*Time behaviour*	0.848	0.138	Valid
2			*Capacity and resource utilization*	0.844	0.138	Valid
3		*Security*	*Confidentiality*	0.866	0.138	Valid
4			*NonRepudiation*	0.875	0.138	Valid
5			*Autehenticity*	0.895	0.138	Valid
6		*Functional suitability*	*Functional Appropriateness*	0.846	0.138	Valid
7			*Functional Correctness*	0.714	0.138	Valid
8			*Functional Completeness*	0.747	0.138	Valid
9	McCall	*Correctness*	*Correctness*	0.807	0.138	Valid
10			*Consistenscy*	0.807	0.138	Valid
11			*Complateness*	0.827	0.138	Valid
12		*Reliability*	*Reliability*	0.832	0.138	Valid
13			*Accuracy*	0.818	0.138	Valid
14			*Simplicity*	0.893	0.138	Valid
15		*Efficiency*	*Efficiency*	0.799	0.138	Valid
16			*Conciseness*	0.882	0.138	Valid
17			*Execution efficiency*	0.851	0.138	Valid

Reliability Test

From the results of calculating Cronbach's alpha using the SPSS application, all variables contained in ISO/IEC 25010 and McCall on the questionnaire contained on the backend and frontend pages above, it can be seen in tables 4 and 5 below:

Table 4 - Reliability test results of all backend page variables.

No	Method	Variable	Component	Crombach's Alpha	Explanation
1	ISO/IEC 25010	*Performance effieciency*	*Time behaviour*	0.773	Reliable
2			*Capacity and resource utilization*		
3		*Security*	*Confidentiality*	0.661	Reliable
4			*NonRepudiation*		
5			*Autehenticity*		
6		*Functional suitability*	*Functional Appropriateness*	0.669	Reliable

7			*Functional Correctness*		
8			*Functional Completeness*		
9	McCall	*Correctness*	*Correctness*	0.667	Reliable
10			*Consistenscy*		
11			*Complateness*		
12		*Reliability*	*Reliability*	0.823	Reliable
13			*Accuracy*		
14			*Simplicity*		
15		*Efficiency*	*Efficiency*	0.796	Reliable
16			*Conciseness*		
17			*Execution efficiency*		

Table 5 - Reliability test results for all frontend page variables.

No	Method	Variable	Component	Crombach's Alpha	Explanation
1	ISO/IEC 25010	*Performance effieciency*	*Time behaviour*	0.602	Reliable
2			*Capacity and resource utilization*		
3		*Security*	*Confidentiality*	0.861	Reliable
4			*NonRepudiation*		
5			*Autehenticity*		
6		*Functional suitability*	*Functional Appropriateness*	0.656	Reliable
7			*Functional Correctness*		
8			*Functional Completeness*		
9	McCall	*Correctness*	*Correctness*	0.743	Reliable
10			*Consistenscy*		
11			*Complateness*		
12		*Reliability*	*Reliability*	0.798	Reliable
13			*Accuracy*		
14			*Simplicity*		
15		*Efficiency*	*Efficiency*	0.794	Reliable
16			*Conciseness*		
17			*Execution efficiency*		

Questionnaire Test Results

To make a decision whether a system can be developed, continued or discontinued can be done with a feasibility test. After testing the validity and reliability on the Jitunews news portal website, the data analysis was carried out quantitatively by using the technique of measuring the percentage of feasibility. The following is the calculation formula that can be used to determine the feasibility test:

$$\text{Eligibility Percentage} = \frac{(\text{Actual Score f})}{(\text{Ideal Score n})} \text{ X } 100\%$$

From the results of the feasibility test calculation on all the variables contained in the ISO/IEC 25010 and McCall methods, the following are the results of the overall feasibility test on the ISO/IEC 25010 and McCall methods from testing the backend page in table 6 and frontend in table 7 below:

Table 6 - Test results of all variables for backend pages.

No	Method	Variable	Actual	Ideal	Eligibility Percentage Results	Explanation
1	ISO/IEC 25010	*Performance effieciency*	113	120	96,16%	Very Good
2		*Security*	157	180	87,22%	Good
3		*Functional suitability*	151	180	83,88%	Good
4	McCall	*Correctness*	162	180	90,00%	Very Good
5		*Reliability*	153	180	85,00%	Good
6		*Efficiency*	158	180	87,77%	Good

Table 7 - The results of the feasibility test of all variables for the frontend page.

No	Method	Variable	Actual	Ideal	Eligibility Percentage Results	Explanation
1	ISO/IEC 25010	*Performance effieciency*	1980	2430	81,48%	Good
2		*Security*	2713	3645	74,43%	Enough

3	McCall	*Functional suitability*	2825	3645	77,50%	Enough
4		*Correctness*	3049	3645	83,64%	Good
5		*Reliability*	2955	3645	81,06%	Good
6		*Efficiency*	2953	3645	81,01%	Good

Overall, the percentage of the feasibility test on the Jitunews news portal website shows that on the backend page, the tests carried out by performing the calculations above, the results of the overall feasibility percentage on the ISO/IEC 25010 method have an average percentage of 89.08% can be stated that the interpretation of "Good". As for the McCall method has an average percentage of 87.59%, it can be stated that the interpretation is "Good". So it can be concluded that the Jitunews news portal website on the backend page has met the ISO/IEC 25010 and McCall standards.

While the percentage of the feasibility test on the frontend page on the Jitunews news portal website, the results show that, the tests carried out by performing the calculations above, the results of the overall feasibility percentage on the ISO/IEC 25010 method have an average percentage of 77.80%, it can be stated that the interpretation "Enough". As for the McCall method has an average percentage of 81.90%, it can be stated that the interpretation is "Good". So it can be concluded that the Jitunews news portal website on the frontend page has met the ISO/IEC 25010 and McCall standards.

1. H0: Jitunews news portal website on backend and frontend pages according to ISO/IEC 25010 using variable performace efficiency?
   Based on the results of the analysis of 12 respondents in the backend page test and 243 respondents in the frontend test by testing the validity that the hypothesis (H0) is accepted by comparing the calculated r value with the r table from Pearson at a significance level of 5% on 2 questions and the test results that the r value count with r table is declared valid where the value of the result of r count is greater than the value of r table, while for the reliability test the value of r count is smaller than r table so that it is declared reliable and a feasibility test where the actual score (f) is divided by the ideal score (n) multiplied 100% then the value generated from the hypothesis (H0) for the backend page is 96.16% with a very good interpretation value and the frontend page is 81.48% with a good interpretation value. So for testing the performance efficiency variable, it is considered according to the ISO/IEC 25010 method.
2. H1: Jitunews news portal website on backend and frontend pages according to ISO/IEC 25010 using variable security?
   Based on the results of the analysis of 12 respondents in the backend page test and 243 respondents in the frontend test by testing the validity that the hypothesis (H1) is accepted by comparing the calculated r value with Pearson's r table at a significance level of 5% on 2 questions and the test results that the r value count with r table is declared valid where the value of the result of r count is greater than the value of r table, while for the reliability test the value of r count is greater than r table so that it is declared reliable and a feasibility test where

the actual score (f) is divided by the ideal score (n) multiplied 100% then the value generated from the hypothesis (H1) for the backend page is 87.22% with a good interpretation value and the frontend page is 74.43% with a sufficient interpretation value. So for testing the security variable is considered in accordance with the ISO/IEC 25010 method.

3. H2: The Jitunews news portal website on the backend and frontend pages complies with ISO/IEC 25010 using functional suitability variables?
   Based on the results of the analysis of 12 respondents in the backend page test and 243 respondents in the frontend test by testing the validity that the hypothesis (H2) is accepted by comparing the calculated r value with the r table from Pearson at a significance level of 5% on 2 questions and the test results that the r value count with r table is declared valid where the value of the result of r count is greater than the value of r table, while for the reliability test the value of r count is greater than r table so that it is declared reliable and a feasibility test where the actual score (f) is divided by the ideal score (n) multiplied 100% then the value generated from the hypothesis (H2) for the backend page is 83.88% with a good interpretation value and the frontend page is 77.50% with a sufficient interpretation value. So for testing the functional suitability variable, it is considered according to the ISO/IEC 25010 method.
4. H3: The Jitunews news portal website on the backend and frontend pages corresponds to McCall using the correctness variable?
   Based on the results of the analysis of 12 respondents in the backend page test and 243 respondents in the frontend test by testing the validity that the hypothesis (H3) is accepted by comparing the calculated r value with the r table from Pearson at a significance level of 5% on 2 questions and the test results that the r value count with r table is declared valid where the value of the result of r count is greater than the value of r table, while for the reliability test the value of r count is greater than r table so that it is declared reliable and a feasibility test where the actual score (f) is divided by the ideal score (n) multiplied 100% then the value generated from the hypothesis (H3) for the backend page is 90.00% with a very good interpretation value and the frontend page is 83.64% with a good interpretation value. So for testing the correctness variable is considered in accordance with the McCall method.
5. H4: Jitunews news portal website on the backend and frontend pages according to McCall using variable reliability?
   Based on the results of the analysis of 12 respondents in the backend page test and 243 respondents in the frontend test by testing the validity that the hypothesis (H4) is accepted by comparing the calculated r value with the r table from Pearson at a significance level of 5% on 2 questions and the test results that the r value count with r table is declared valid where the value of the result of r count is greater than the value of r table, while for the reliability test the value of r count is greater than r table so that it is declared reliable and a feasibility test where the actual score (f) is divided by the ideal score (n) multiplied 100% then the value generated from the hypothesis (H4) for the backend page is 85.00% with an interpret value

5. Conclusion

Based on the results of the analysis and discussion that have been presented, this study obtains conclusions that can be drawn from research on the Jitunews news portal website using the ISO/IEC 25010 and McCall methods, namely the results of measuring the quality of the Jitunews news portal website using the ISO/IEC 25010 method and McCall successfully evaluated By distributing questionnaires to users, both employees on the backend page testing and news readers for research on the frontend page, this study found that the Jitunews news portal website deserves the "Good" interpretation. And from the results of the percentage per variable in the ISO/IEC 25010 method on the backend page, the performance efficiency and correctness variables have the highest percentage with the interpretation of "Very Good".

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