Application of Webqual 4.0 and Importance Performance Analysis Methods in Analyzing The Quality of Information Technology SIPENDEKAR Services

Rina Kartika[*1], Syahrullah[2], Hajra Rasmita[3], Rinianty[4], Wirdayanti[5], Nouval Trezandy Lapatta[6]
[1,2,3,4,5,6] Information System, Engineering Faculty, Tadulako University, Indonesia
E-mail: [*1]**rinakartika222@gmail.com**, [2]syahroellah.ms@gmail.com,
[3]hajra.rasmita@gmail.com, [4]riniantyinformatika@gmail.com, [5]wirda.ida28@gmail.com,
[6]nouval@untad.ac.id

Abstract

Information technology plays a very important role, especially in the field of education, one of which is through the use of websites. The Department of Information Engineering at Tadulako University is one of the universities that utilizes websites, one of which is the information system for administrative services and final assignments (SIPENDEKAR). Sipendekara is designed to facilitate the submission of titles, guidance, and proposal exams, final exams, and thesis exams. But so far, there has been no research that measures the quality of the sipendekar website based on perceptions of usability, information quality, and service interaction quality using the IPA method. This study aims to determine the quality of Sipendekar services using the webqual 4.0 method as the basis for determining the questionnaire. Then the Importance Performance Analysis method to analyze questionnaire data to identify attributes that have met and have not met user expectations. The results showed an average level of conformity of 92.63%. The average gap analysis result is -0.33. The results of the Cartesian quadrant there are 4 attributes in the first quadrant that are prioritized for improvement and there are 9 attributes that achieve a high level of satisfaction and only need to maintain quality.

Keywords *— Importance-Performance Analysis, Service Quality, SIPENDEKAR, Webqual*

1. INTRODUCTION

The use of information technology has grown rapidly and spread widely in daily life. One of the significant positive impacts of this development can be felt in the field of Education [1]. Information technology makes access to information easier and faster, technology can also create a more efficient education management system and allow for personalized education according to needs. The use of information technology in the field of education, especially in universities, is through the adoption of a website-based information system. One of the universities that has used a website as an integral part of its educational infrastructure is the Department of Information Technology at Tadulako University, which has implemented an efficient system, namely the information system for submitting administrative services and final projects (SIPENDEKAR).

Sipendekar is an information system used in the Department of Information Technology, Tadulako University in terms of carrying out administrative processes and final projects. Sipendekar is designed to integrate all administrative processes and final projects centrally and systematically, so that it will minimize errors or fraud that often occur [2]. Sipendekar r allows users to view and monitor the ongoing process as each stage is equipped with captions, providing information about the status and progress of each ongoing process. Sipendekar also significantly simplifies tasks related to correspondence and administration, as well as acting as a liaison between students, lecturers, and education staff.

However, so far, there has been no research conducted specifically to evaluate the service quality of the sipendekar website based on the perception of user satisfaction in terms of usability quality, information quality, and service interaction quality. Evaluation of the quality of website services is very important to evaluate the quality of website services so as to understand how well the website can be accepted by its users [3]. In addition, an evaluation of the quality of website services is necessary because this is a step for website development to match user expectations and satisfaction [4]. As well as to find out what aspects need to be improved and what needs to be maintained.

In addition, with the increase in the number of websites owned by each university, the potential for competition between universities is also increasing. This competition is not only limited to academic aspects and facilities, but also includes the provision of easily accessible and relevant information through existing websites. Website quality is the main factor to ensure that website users are comfortable when accessing and can take advantage of the services that are available [5]. The methods that will be used in this study are the webqual 4.0 and science methods. Both were chosen because they were in accordance with the main problems raised in this study.

The study used methods from webqual and IPA to measure the quality of website services in the previous study entitled "Analysis of Website Service Quality at the Open University of Palembang Using the Webqual 4.0 Method and Importance Performance Analysis (IPA)". Based on the research results from 100 respondents obtained, the results of science at the level of conformity analysis were the highest at 103.63% while the lowest was 97.41%. The average value of the gap analysis is -0.01, which means that the performance on the website has not fully met the expectations of its users. In the analysis of the cartesian quadrant, there are 3 items that are in the first quadrant, namely the main priority of improvement, there are 9 items in the second quadrant, namely maintain performance, in the third quadrant there are 6 items, which are in low priority, and there are 4 items that are in the fourth quadrant, which is excessive [4].

The next research is entitled "Website Quality Analysis of the Langitan Umaha System with Webqual 4.0 and Importance-Performance Analysis". Based on research data from 340 respondents obtained, according to the overall gap analysis, the performance of the Langitan System website has met the expectations and interests of the userwebsite, namely with an average score of 0.13. However, there are some items that do not meet the needs of users. The results of the cartesian diagram have 7 items in the first quadrant, which is the main priority for repairs. 8 items are found in the second quadrant, namely items that have met user

expectations. 5 items in the third quadrant. 7 items in the fourth quadrant which means that the performance is excessive so it is recommended to focus on improvement and development for items in the first quadrant [1].

Based on the previous background, this study aims to evaluate the quality services of the Information Technology website based on user perception, in order to find out how well the website is accepted by users. For the methods that will be used in the webqual 4.0 method and the IPA method.

2. RESEARCH METHOD

The webqual method is a method used to assess and evaluate the quality of service from a website based on the actual assessment of users [6]. The webqual 4.0 method focuses on 3 dimensional qualities, namely usability quality or, information quality or, information quality and service interaction quality [7][8]. To evaluate the quality dimension of the webqual method on the website, it is necessary to measure the analysis of the science method [9]. In the science method that combines measurement between performance perception and level of importance, so that it can help universities in evaluating the quality of their websites through gap analysis, suitability, and quadrant analysis resulting from webqual indicators [1]. In other words, the IPA method to analyze the gap between performance and user importance, which is basically related to the level of satisfaction or user experience [10]. In Figure 1, the following shows the research process carried out by the researcher:

Figure 1. Research Process

2.1 Problem Identification and Literature Study

The problem identification stage is used to find out what problems exist on the sipendekar website. Furthermore, conduct a literature study by looking for several references, such as guidebooks, journals, and related literature in order to get an overview to solve the problems contained in the research.

2.2 Data Collection

At this stage, the information will be distributed in the form of a google form which is distributed online. The distribution of the questionnaire focuses on active students from the Department of Information Technology, Tadulako University who are in the preparation stage to complete their final project and already have a sininja account. The population is 225 students, where in the process of sampling the technique used is simple random sampling, namely each individual in the population gets the same opportunity to be selected as a sample. The calculation to determine the sample was using the slovin formula with an acceptable error (error rate) of 10%. The calculation with the slovin formula resulted in a sample of 70 respondents. Based on the review of the website of the sipendekar, the researcher determined 17 items to be used, in order to assess the level of performance and importance of the website, contained in the table below:

Table 1. Webqual Question Questionnaire

It	Items	Variable
	Usability	
1	*The* syator's website is easy to learn and operate	U1
2	Users find it easy to navigate on the website (easy-to-find features)	U2
3	Users find it easy to find the data they want on the website	U3
4	*The* sipendekar website has an attractive appearance	U4
5	Layout of *the* right website information	U5
6	*The* sipendekar website has clear instructions and is easy to understand	U6
7	*The* sipendekar website has complete facilities (complete features)	U7
	Information Quality	
8	*The* sipendekar website provides reliable data or information	IQ1
9	*The* website provides data or information that is *up to date*	IQ2
10	*The* website is presented in the appropriate format	IQ3
11	*The* sipendekar website provides clear and easy-to-understand data or information	IQ4
12	*The* Sipendekar website provides detailed information/data	IQ5
	Service Interaqtion Quality	
13	*Sikatar websites* have a good reputation	S1
14	When interacting with the website, I feel safe (Downloads from *website* files can avoid viruses)	S2
15	I feel that *the* website guarantees the security of my personal information	S3
16	The services and information on the Sipendekar website run optimally and well	S4
17	*The* sipendekar website facilitates communication with lecturers and admins	S5

2.3 Webqual Testing

2.3.1 Validity Test

Validity testing will utilize SPSS software to determine the coefficient value of items on the research instrument. The coefficient value that has been obtained will be compared to the r value of the table as a reference to determine the validity of each item. Validation testing

serves to determine whether the instrument on the questionnaire is valid and can be used [11]. A data is considered valid if the value of the coefficient > r table [12].

2.3.2 Reliability Test

Reliability testing will use SPSS software with the aim of calculating Cronbach's alpha. Reliability testing is used to ensure the consistency and stability of the data obtained [12]. The criterion for determining reliability is to determine Cronbach's alpha, if Cronbach's alpha > 0.60, it means that the instrument is considered reliable, and vice versa it will be considered unreliable if the value is less than 0.60 [3].

2.4 Data Analysis and Processing

The research will use the science method for the data processing stage after collecting the questionnaire data that has been disseminated. In the science method, there are three stages of calculation, which are as follows:

2.4.1 Gap Analysis

Gap analysis is used to find out the value of the gap in the item, namely between the quality of the perceived website performance and to find out the expected quality of the website [13]. The assessment of this analysis is as follows [14].

- A quality level of ≥ 0 or a positive value means that the quality perceived by the user (actual) has met the expectations of the users (ideal).
- A quality level of ≤ 0 or with a negative value means that the quality level is not appropriate and has not been able to meet what users expect (ideal).

2.4.2 Conformance Analysis

Conformity analysis aims to establish top priorities, which will be the focus in determining which items need to be improved or maintained [15]. If the percentage of the conformity level reaches 100 percent, then the quality provided is in accordance with the expected quality [12]. The formula used [16][17] :

$$Tki = \frac{xi}{yi} x100\% \quad (1)$$

Information:

Tki = respondent's suitability level
XI = Performance Assessment Score
yi = Pedestrian Assessment Score

2.4.3 Analysis of Cartesian Quadrants

This stage is a measurement to determine the position of each item, so that it can know whether the variable is in a position that needs improvement or a position that needs to be maintained [8]. In the diagram of the cartesian divided into four quadrants, it can be seen as follows:

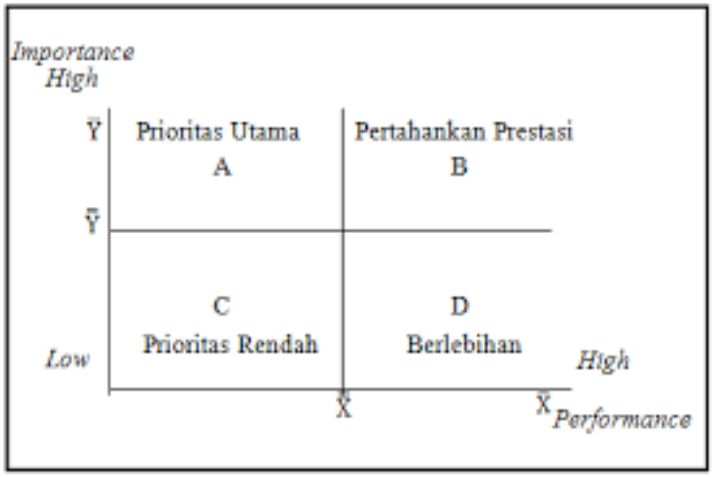

Figure 2. Cartesian Diagram

In the science quadra, there are 4 quadrants with the X axis representing performance items and the Y axis representing importance, then all items that affect the quality of the website are mapped into four quadrants [13]. The following is a description of the four quadrants [1] :

- **Quadrant A, Priorities for Improvement**
  Shows quadrants that have high importance but low performance. until items in quadrant A become the top priority for repairs.
- **Quadrant B, Keep up the good work**
  Showing areas with a high level of user satisfaction and high importance as well, so they must maintain performance because it is a factor to support user satisfaction.
- **Quadrant C, Low Priority**
  Showing areas where there are items with low performance levels and low levels of importance are also considered less important so that they do not need to be prioritized for quality improvement or improvement.
- **Quadrant D, Excessive (Possible Overkill)**
  Showing areas with high performance but relatively low importance, until this quadrant the implementation tends to be excessive. Management can reduce the costs used on items that are in this quadrant and are recommended to be allocated to quadrant A.

2.5 Compilation of Results and Recommendations

The preparation of results and recommendations is the final stage in research that uses the calculation of the science method. After the data is processed and mapped into the science quadrants, the researcher will focus on the items in the A quadrant, which are areas of high importance but low performance. This item is a priority for improvement because it has a significant impact on the satisfaction or success of the goal to be achieved.

3. RESEARCH RESULTS AND DISCUSSION

3.1. Webqual Testing

3.1.1. Validity Test

The validity test in this study is divided into two parts, namely based on the webqual dimension on the performance variable and the webqual dimension on the importance variable. The test was carried out using the SPSS application involving 70 respondents consisting of students. With the number of respondents, the r-value of the table was determined to be 0.235. This value is used as a reference to assess the validity of each question item, so that it can be known whether the research instrument is able to accurately measure the concept in question. The following is a table of webqual validity tests on performance:

Table 2. Webqual Validity Test Results on Performance

No. Item	Indicators	Coefficient value	r table	Validity Results
U1	*Usability Quality*	0.321	0.235	Valid
U2		0.280	0.235	Valid
U3		0.362 reviews	0.235	Valid
U4		0.691 reviews	0.235	Valid
U5		0.802	0.235	Valid
U6		0.509 reviews	0.235	Valid
U7		0.362 reviews	0.235	Valid
IQ1	Information Quality	0.702	0.235	Valid
IQ2		0.372	0.235	Valid
IQ3		0.679	0.235	Valid
IQ4		0.702	0.235	Valid
IQ5		0.745	0.235	Valid
S1	*Service Interaction Quality*	0.675	0.235	Valid
S2		0.691 reviews	0.235	Valid
S3		0.590	0.235	Valid
S4		0.702	0.235	Valid
S5		0.321	0.235	Valid

In table 2, it is known that each instrument item in the webqual validity test for the performance level is declared valid. This is evidenced by the value of the coefficient of each item that is greater than the r value of the table, which is 0.235. Thus, this instrument is considered to be able to accurately measure performance aspects in accordance with research objectives. The following is a table of webqual validity tests on importance:

Table 3. Webqual Validity Test Results on Importance

No. Item	Indicators	Coefficient value	Distribution Value	Validity Results
U1	*Usability Quality*	0.516	0.235	Valid
U2		0.683	0.235	Valid
U3		0.364 reviews	0.235	Valid
U4		0.354 reviews	0.235	Valid
U5		0.637	0.235	Valid
U6		0.572 reviews	0.235	Valid
U7		0.465	0.235	Valid
IQ1	Information Quality	0.654	0.235	Valid
IQ2		0.639 reviews	0.235	Valid
IQ3		0.763 reviews	0.235	Valid
IQ4		0.619	0.235	Valid
IQ5		0.611	0.235	Valid
S1	*Service Interaction Quality*	0.267 reviews	0.235	Valid
S2		0.619	0.235	Valid
S3		0.440	0.235	Valid
S4		0.633 reviews	0.235	Valid
S5		0.528	0.235	Valid

In table 3, it shows that each instrument item in the webqual validity test for the performance level is declared valid. This is evidenced by the value of the correlation coefficient of each item that is greater than the r value of the table, which is 0.235. Thus, this instrument is considered to be able to accurately measure performance aspects in accordance with research objectives.

3.1.2. Reliability Test

Table 4. Reliability Test

Variable	*Cronbach's alpha*	Items
Performance	0.905	17
Importance	0.917	17

In table 4, Cronbach's alpha is presented for the performance and importance variables. Cronbach's alpha value for performance level is 0.905. Meanwhile, the importance level has a Cronbach's alpha value of 0.917. Table 4 shows that Cronbach's alpha has exceeded the significance limit of 0.60, so it can be concluded that the measuring tool used is reliable. This confirms that the instrument is able to measure both variables, namely performance and importance, consistently and reliably for further analysis.

3.2. Analysis of Calculation of Performance Level, Importance, Conformity, and Gap (GAP)

Table 5. Results of *Calculation Analysis of Performance, Importance*, Conformity, and *GAP*

It	Variable	Performance	Importance	Conformance Rate (%)	GAP
1	U1	4.11	4.40	93.41	-0.29
2	U2	3.91	4.36	89.68	-0.45
3	U3	3.46	4.46	77.58	-1.00
4	U4	4.13	4.43	93.23	-0.30
5	U5	3.96	4.23	93.62	-0.27
6	U6	4.24	4.37	97.03	-0.13
7	U7	3.46	4.44	77.93	-0.98
8	IQ1	4.06	4.39	92.49	-0.33
9	IQ2	4.27	4.37	97.72	-0.10
10	IQ3	3.96	4.21	94.07	-0.25
11	IQ4	4.06	4.36	93.12	-0.30
12	IQ5	4.87	4.21	115.68	0.66
13	S1	4.11	4.21	97.63	-0.10
14	S2	4.13	4.36	94.73	-0.23
15	S3	4.27	4.43	96.39	-0.16
16	S4	4.06	4.37	92.91	-0.31
17	S5	3.41	4.40	77.5	-0.99
Average		4.03	4.35	92.63	-0.33

In table II, there is a column "Performance Level" showing how well the variable functions or meets user expectations, with an average value of 4.02 (scale 5). There are SI5 variables that have the lowest performance level values and IQ5 variables that have the highest performance level. The "Importance" column shows how important the variable is to users, with an average value of 4.35. There are several variables with the lowest level of importance, namely IQ3, IQ5, and SI1 and the SI3 variable has the highest level of performance. The results of the conformity level analysis showed an average value of 92.63% or >100%. The average result of the gap (GAP) showed a negative value (<0), which was -0.33. All indicators have negative values, although the difference obtained is small, but it shows that the website has not fully met user expectations, thus affecting the level of user satisfaction.

3.3. Analysis of Cartesian Quadrants

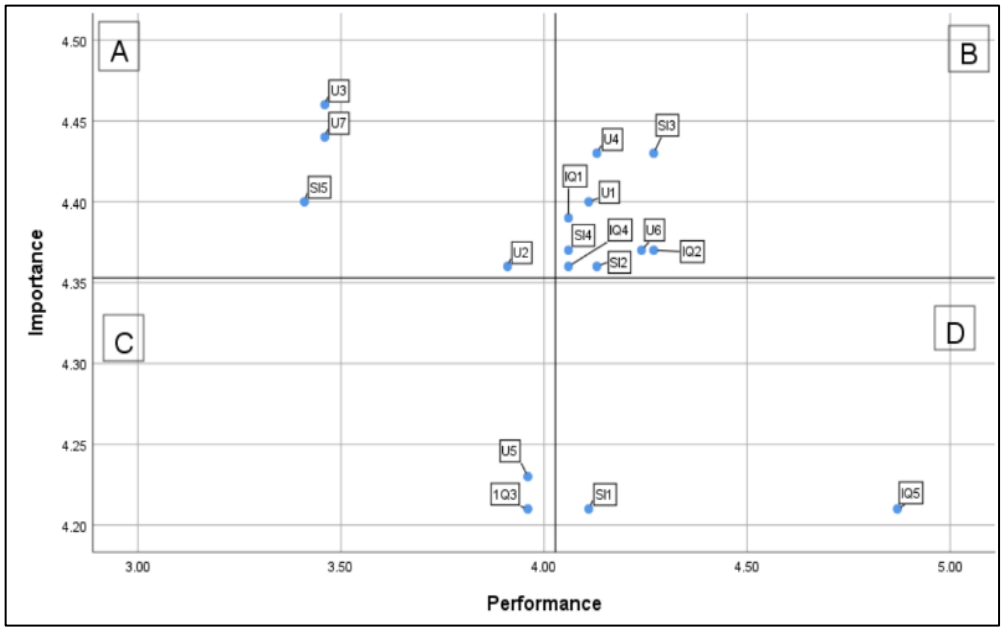

Figure 3. Cartesian Diagram Results

The figure above shows the quadrant analysis of the IPA on the sipendekar. In the diagram, there are 4 items that are in quadrant A which are the main priority to be improved, these items are U2 (Users find it easy to navigate on the website (features that are easy to find)), U3 (Users find it easy to find the data they want on the website of the website), U7 (The website has complete facilities (complete features)), and SI5 (The website of the website makes it easier to communicate with lecturers and the admin). For quadrant B, there are 9 items that have managed to achieve a high level of satisfaction. items in quadrant B must be maintained because they are supporting factors for user satisfaction of the website user, the 9 items are U1 (website website is easy to learn and operate), U4 (website website has an attractive appearance), U6 (website website has clear instructions and is easy to understand), IQ1 (website website provides reliable data or information), IQ2 (website website provides data or information that is up to date), IQ4 (Sipendekar presents clear and easy-to-understand data), SI2 (When interacting with the sipendekar website I feel safe (Downloads from website files can avoid viruses)), SI3 (I feel that the sipendekar website guarantees the security of my personal information), SI4 (The services and information on the sipendekar website run optimally and well). For quadrant C, there are 2 items that have a low level of satisfaction and are considered less important, so they do not have to be prioritized, these items are U5 (Preparation of the layout of the right website information), and IQ3 (The website is presented in an appropriate format). For quadrant D, there are 2 items that have a relatively low level of importance, but the implementation of these items is excessive, namely, IQ5 (In my opinion, the sycatar's website provides detailed information/data), and SI1 (The sipendekar website has a good reputation).

3.4. Repair Recommendations

In the analysis of the caessian quadrant, recommendations for improvement are needed on several items , namely in the A quadrant, because it has a low level of performance and a high level of importance. So, efforts to improve performance must be prioritized to ensure that this item can meet the expectations and needs of users. The improvement recommendations proposed by the researcher to improve the quality of services in quadrant A are:

3.4.1. U2, U3, and U7

Search feature, in the sipendekar application there is no search feature, this feature is very helpful for users to find the information or data they need quickly and efficiently, so that users do not need to search for all the features on the application first. In addition, the search feature can also help users explore new features in the app that they may not have known about. With the search feature, users will feel more satisfied and productive when using the application.

3.4.2. U7

- The Notification feature that has been integrated with email, with the notification feature on the sipendekar application can provide benefits for users who are in the process of managing files. So that users will get an immediate notification when the file being taken care of has been processed, therefore users do not need to constantly monitor the status of the file manually. In addition, with a feature that integrates with email, users will receive notifications directly in the email, so that important information is not missed and file management can be done more efficiently and on time.
- The biodata feature of supervisors and examiners, with this feature is very useful for students, especially in terms of making it easier for students to access complete information related to the lecturer concerned in the process of taking care of final project documents. Through this feature, students can easily get important details such as their full name, Employee Identification Number (NIP), email address, and lecturer's phone number. This information is very helpful in facilitating faster and more accurate communication, making it easier to arrange meetings, and meeting the administrative needs needed during the process of preparing and managing final project documents.
- The guide feature of the sipendekar application, this feature is very helpful for students, especially those who are using the application for the first time, to understand the flow and functions in it. With this guide, students can easily learn how to use the application independently. This feature provides video tutorials or guidebooks that explain step by step to help students understand the submission flow and final project process. This guide is designed to reduce confusion and minimize questions that must be asked to the department staff with repetitive questions, so that the final project administration process becomes smoother and more efficient.

3.4.3. SI5 and U7

Help center feature, The Help Center feature on the sipendekar application helps users find solutions to the problems they are facing, making it easier for students to obtain information and assistance related to the final project process directly in the application. Students can ask questions such as about the use of the application or matters related to the administration of the final project without the need to contact the Administration staff (TU) via WhatsApp. This feature ensures that all the information needed is available quickly and centrally, so that the process of completing the final project becomes more efficient and organized.

4. CONCLUSION

Based on the calculations from the research that has been carried out, the conclusion is that there is a difference between the level of website performance and the expectations desired by its users. This is known from the results of the website assessment based on the dimensions of information quality, usability, and service interaction. The results of the conformity level analysis showed an average value of 92.63% or >100%. The average result of the gap analysis indicated a negative value (<0), which was -0.33. All indicators have negative values, although the difference obtained is small, but this shows that the website has not fully met user expectations, thus affecting the level of user satisfaction. As for the results of the analysis of the cartesian quadrant, it shows four items in the first quadrant, which are priorities to be corrected immediately. This item has low performance but has high expectations. This mismatch between expectations and performance greatly affects the satisfaction of Sipendekar users, so it is very necessary to improve this quadrant. On the other hand, there are nine maintained quality, because they are considered key factors that support the creation of a positive experience for users and play a key supporting role in maintaining the level of user satisfaction with the website. This item needs to maintain its quality, because it is considered a key factor that supports the creation of a positive experience for users and plays a key role in maintaining the level of user satisfaction with the website.

5. SUGGESTED

Based on the results of this study, it can be used as an illustration on the sipendekar website. Sikatar developers can maintain the achievements that have been obtained and items that enter the A quadrant must be prioritized for service quality improvement. For the next researcher, it is recommended to add other methods, so that the analysis does not only depend on the science method, but can be combined with other approaches. This will allow to provide a more accurate picture of the topic being studied. In addition, researchers can then analyze other websites or compare them with other websites to provide deeper insights and recommendations that are more useful for readers and related parties.

6. REFERENCES

[1] A. Pratama, A. S. Larasati, and A. Wulansari, "Quality Analysis of the Langitan Umaha System Website with Webqual 4.0 and Importance Performance Analysis," *J. Inf. Syst. Informatics*, vol. 3, no. 3, pp. 519–533, 2021, doi: 10.51519/journalisi.v3i3.172.

[2] A. A. Kasim and M. Y. Pusadan, "Usability Analysis of Information Systems for Submission of Administrative Services and Final Projects of the Department of Information Technology Heuristic Evaluation Method," vol. 9, no. 2, pp. 228–242, 2024.

[3] O. Mardalena and R. Andryani, "Analysis of Website Service Quality at Universities and Importance Performance Analysis (IPA)," *J. Inf. Syst. Informatics*, vol. 3, no. 4, pp. 615–633, 2021.

[4] R. L. A. Rahmatulloh, "(SCIENCE) IN THE EVALUATION OF THE QUALITY OF THE WEBSITE OF THE SUKAPURA COMMUNITY COMMUNITY COLLECTION (KWS) APPLICATION OF THE WEBQUAL 4 . 0 METHOD AND IMPORTANCE PERFORMANCE ANALYSIS (IPA) IN EVALUATION OF THE QUALITY OF THE SUKAPURA," vol. 12, no. 2, pp. 17–26, 2024.

[5] I. Purwandani and N. O. Syamsiah, "Website Quality Analysis Using the Webqual 4.0 Method Case Study: MyBest E-learning System UBSI," *J. Sist. and Technol. Inf.*, vol. 9, no. 3, p. 300, 2021, doi: 10.26418/justin.v9i3.47129.

[6] N. R. D. Pujiastuti and P. H. Suwardi, "Evaluation of Website Quality of Informatics Study Program Using the Webqual 4.0 Framework with the Importance Performance Analysis (IPA) Calculation Method," *Sainteks*, vol. 20, no. 1, p. 83, 2023, doi: 10.30595/sainteks.v20i1.15288.

[7] L. A. Utami, A. Gani, and S. Suparni, "Application of Webqual 4.0 and Science Methods in Measuring the Quality of the VISLOG PT. Citra Surya Indonesia," *Komputika J. Sist. Comput.*, vol. 9, no. 1, pp. 25–34, 2020, doi: 10.34010/komputika.v9i1.2849.

[8] G. A. Sandag, M. Makapedua, and A. Tompunu, "Website Quality Analysis at PT. DAW Uses Webqual 4.0 Method and Importance Performance Analysis (IPA)," *J. Sist. and Technol. Inf.*, vol. 8, no. 4, p. 339, 2020, doi: 10.26418/justin.v8i4.42592.

[9] G. F. Mandias, S.Kom, M.Cs, Y. Septiawan, and M. J. Bojoh, "Website Quality Analysis Using Webqual 4.0 and IPA Methods on Sla Tompaso Sites," *CogITo Smart J.*, vol. 7, no. 2, pp. 396–406, 2021, doi: 10.31154/cogito.v7i2.331.396-406.

[10] M. D. Firmansyah and C. Christian, "Analysis of User Satisfaction of News Portal Website Quality Using the WebQual 4.0 Method and the Importance Performance Analysis (IPA) Approach Case Study Batampos.co.id," *JASIEK (Apl. Science, Information, Electron. and Computers)*, vol. 5, no. 2, pp. 109–120, 2023, doi: 10.26905/jasiek.v5i2.11572.

[11] S. Aljar Mirantoputra Hoda, A. Khairan, and S. Do Abdullah, "Evaluation of Website Quality Using the Webqual 4.0 Method and Importance Performance Analysis (Ipa) (Case Study) of Website Quality Using the Method Webqual 4.0 and Importance Performance Analysis (Ipa) (Case S)," *J. Jar. and Technol. Inf.)*Vol. Vol. 1, no. No. 1, pp. 6–14, 2022, doi: 00.0000/teak.

[12] M. A. Athallah and K. Kraugusteeliana, "Telkomsel Website Quality Analysis Using Webqual 4.0 Method and Importance Performance Analysis," *CogITo Smart J.*, vol. 8, no. 1, pp. 171–182, 2022, doi: 10.31154/cogito.v8i1.374.171-182.

[13] R. Handika, M. Hasbi, and T. Susyanto, "Quality Analysis of University E-Learning Websites with WebQual 4.0 Method and Importance Performance Analysis," *J. Ilm. SINUS*, vol. 20, no. 2, p. 67, 2022, doi: 10.30646/sinus.v20i2.618.

[14] S. Aziz, M. O. Puspitaningtyas, and Y. N. Dewi, "Website Quality Analysis of PT Takdir Jaya Abadi Using Webqual 4.0 Method and Importance Performance Analysis," *J. Tek. Inform. and Sist. Inf.*, vol. 10, no. 2, pp. 329–339, 2023, [Online]. Available: http://jurnal.mdp.ac.id

[15] B. P. P. I Gede, S. Made, and G. Nyoman, "Analysis Quality of Employment Information Systems Using Webqual 4.0 and Importance Performance Analysis Method," *J. Nas. Educators. Tech. Inform.*, vol. 13, no. 1, pp. 33–48, 2024, doi: 10.23887/janapati.v13i1.70713.

[16] L. A. E. Simamora and M. A. I. Pakereng, "Analysis of Lazada E-Commerce User Satisfaction in Indonesia Using the Importance Performance Analysis (IPA) Method," *JIPI (Jurnal Ilm. Researcher. and Informed Learning.*, vol. 9, no. 2, pp. 693–700, 2024, doi: 10.29100/jipi.v9i2.4696.

[17] T. M. Tamtelahitu, "Analysis of the Quality of the Maluku Province Covid-19 Info Website Using the E-Govqual Method and Importance Performance Analysis," *JIPI (Jurnal Ilm. Researcher. and Informed Learning.*, vol. 7, no. 2, pp. 574–582, 2022, doi: 10.29100/jipi.v7i2.2262.