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Quality Evaluation of Ticketing Management System Using ISO/IEC25010:2023 Standards and AHP Method

Puji Ariningsih[1], Alva Hendi Muhammad[2]
[1,2]School of Posgraduate, Magister of Informatics, Universitas Amikom Yogyakarta, Ring Road Utara Condongcatur Depok Sleman, Yogyakarta 55281, Indonesia

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ABSTRACT

Purpose: Information Technology plays a crucial role in supporting education service systems. When system-related issues arise, a Ticket Management System (TMS) becomes essential to address various software and hardware problems. Evaluating the performance and quality of TMS applications is necessary to ensure their effectiveness. This study aims to evaluate the performance and quality of a Ticket Management System (TMS) application developed by University of Amikom Yogyakarta using ISO/IEC 25010:2023, while also determining the priority of three key ISO/IEC 25010:2023 characteristics through the Analytic Hierarchy Process (AHP) method. This dual approach ensures both comprehensive quality assessment and focused analysis of critical system characteristics.
Methods/Study design/approach: The Analytic Hierarchy Process method is employed to prioritize three key ISO/IEC 25010 characteristics by engaging TMS application users. Following the ranking, the study conducts quality measurements using questionnaires and black box testing. The questionnaire results are assessed using a Likert scale to determine scores for the TMS application based on the sub-characteristics of the three selected ISO/IEC 25010:2023 characteristics and the AHP-derived rankings.
Result/Findings: The findings indicate that the TMS application achieved a quality score of 4.354. This shows that the TMS application is in the good category.
Novelty/Originality/Value: The study highlights the need for performance efficiency improvements, specifically in the Time Behavior sub-characteristic, to enhance the overall quality of the TMS application.

Corresponding Author:

Puji Ariningsih
Email: 23.55.1414@students.amikom.ac.id

1. INTRODUCTION

Information Technology (IT) plays a crucial role in various aspects of work and activities in organizations. The role of IT is very influential in changing the way of communication and changing the way humans access information, both in the scope of work and daily life [1]. IT support services extend beyond computer networks, operating systems, internet connections, and security to encompass the resolution of software and hardware issues [2]. These issues, whether related to software or hardware errors, can often be addressed remotely or within the organization’s infrastructure [3]. For organizations, having an effective customer service system is essential as it serves as the face of the organization and plays a significant role in maintaining its reputation. Such systems must efficiently handle complaints, requests, and facilitate clear communication between the organization and its users.

A Ticket Management System (TMS) serves as a key tool in this process, enabling the systematic management of issues and ensuring timely resolution. TMS is a system that simplifies the process of handling customer requests. A reliable customer service system is essential for any company or organization, as it serves as the face of the organization and plays a key role in maintaining its reputation. Such a system must effectively manage complaints, address requests, and function as a clear communication channel between the organization and its customers. Most companies have TMS, the purpose of which is to help users/customers to create tickets by describing their problems or requests [4]. The contribution of TMS is to integrate companies and clients in an efficient and structured way [5]. It is indisputable that TMS is an important part of IT support in various industries. Not only for technical teams, but it has penetrated the realm of management. TMS is the main contact point for users/customers seeking help with their queries or problems. It includes a request module that serves as a channel to manage requests. Customer requests will be handled by TMS admins based on Frequently Asked Questions (FAQ). However, if there is no solution then the request is forwarded to the technician to be resolved [3].

The application of TMS is not only in the industrial world, but also in the world of education. Several studies have developed TMS for education. [6], developed TMS at Klabat University for fault reporting and monitoring repair work. With TMS, the IT Department can be helped in monitoring incoming tasks and jobs. However, this research does not review the developed quality analysis of TMS. [7], analyzed, and implemented TMS Helpdesk at Singaperbangsa University of Karawang. This system was developed to facilitate the academic community in reporting ICT problems and providing information to them about the progress of the problems reported. From this research, TMS helpdesk was produced by utilizing OS Ticket in the UPT-TIK work unit at Singaperbangsa University of Karawang. However, the research has not analyzed the quality of the system developed. [8], utilizing machine learning models to classify help desk tickets with the right service to minimize processing time, save human resources, and increase user satisfaction. This research helps define business processes, with well-defined activities and measure KPIs to assess the performance of IT staff and processes. However, this research has not analyzed the quality of the help desk ticket system.

Analysis related to the quality of the TMS is important to ensure the quality of the TMS implementation. Testing and ensuring the quality of the software to be used is something that needs to be considered, because it requires sufficient knowledge in finding the source of existing errors [9]. There are several types of quality measurement models that are used as software assessment standards. One model that can be used to measure software quality is ISO/IEC 25010 [10]. Some studies that apply the ISO/IEC 25010 standard document include: Research by [9] measures software quality using the ISO / IEC 25010: 2011 method for website portal bios in Bank companies. In his research, the Analytic Hierarchy Process (AHP) method is used to give the weight value of each characteristic in the ISO / IEC 25010: 2011 standard document. There are 6 characteristics used from 8 characteristics in ISO / IEC 25010 / 2011. From the results of measuring the software's quality, a value of 4.87 was obtained in the good category. Research [11], measuring the quality of Halodoc software using ISO 25010: 2011 using 8 characteristics and 29 sub-characteristics. In determining the weight of the assessment in the test using the Analytical Hierarchy Process (AHP). The testing strategy was carried out by Black-Box testing, push testing, and distributing surveys to 100 respondents for Convenience testing. From the total test results for the Halodoc application, it gets a score of 4.515 out of a maximum score of 5.

Several previous studies have emphasized that software quality must be determined, measured, and evaluated using validated measurement methods. One widely adopted approach involves the ISO/IEC 25010 quality model. Over time, this standard has evolved, with the most recent update transitioning from ISO/IEC 25010:2011 to ISO/IEC 25010:2023. This research develops a framework to analyse the quality of the Ticket Management System (TMS) in higher education using the ISO/IEC 25010:2023 standard. ISO/IEC 25010, first published in 2011 by the Canadian Standards Association, provides guidelines for software evaluation. It is an enhancement of the earlier ISO/IEC 9126 model and belongs to the broader ISO/IEC 250n series.

The ISO/IEC models related to software quality have undergone revisions, with the latest versions being ISO/IEC 25010:2023, which focuses on product quality, and ISO/IEC 25002:2004, which includes quality characteristics for software evaluation. ISO/IEC provides two system quality measurement models: the Quality in Use model and the Software Product Quality model. The ISO/IEC 25010:2023 is an updated version of ISO/IEC 25010:2011.

Even though the ISO/IEC 25010:2023 model consists of nine quality characteristics: Functional Suitability, Performance Efficiency, Compatibility, Interaction Capability, Reliability, Security, Maintainability, Flexibility, and Safety. This study focuses on three key characteristics:

1. Functional Suitability
2. Performance Efficiency
3. Reliability

These characteristics were selected based on their relevance to the current state of the system. The quality analysis framework for the TMS software will be implemented and simulated at University of Amikom Yogyakarta (Amikom). Amikom has an IT Directorate responsible for developing a web-based Ticket Management System (TMS) called Amikom Care that can be accessed at www.care.amikom.ac.id. The users of this system include work units/directorates, lecturers, students, education personnel, prospective students, and the public. Users can report issues by creating tickets within TMS Amikom Care. Once a ticket is submitted, it is initially handled by Customer Service (CS) within the respective work unit. If the issue cannot be resolved at this level, the ticket is escalated to the Team Member (TM) and further, if necessary, to the Head of Department (HOD). Although TMS Amikom Care is currently operational, no formal quality analysis of the software has been conducted to date. This study has two primary objectives : the first is to evaluate the performance and quality of the TMS application at Amikom using the ISO/IEC 25010:2023 standard. And the second is to determine and prioritize three key characteristics of the ISO/IEC 25010:2023 standard that are most relevant for TMS evaluation using the AHP method. These objectives are designed to provide both a comprehensive quality assessment and a focused analysis of critical system characteristics that impact user satisfaction and system effectiveness.

2. Literature Review

The literature review provides a foundational theoretical framework to guide and optimize the research process. It enables researchers to identify, understand, and adopt established concepts relevant to the study. In this research, the ISO/IEC 25010 standard serves as the primary model for evaluating software quality. This model is widely recognized for its comprehensive approach to assessing software product characteristics and ensuring that critical quality parameters are met during evaluation.

The ISO/IEC 25010 standard, first introduced in 2011 and revised in 2023, provides a detailed framework for evaluating software and system quality. It defines a product quality model that categorizes essential quality characteristics and their sub-characteristics, which are integral to measuring a system's ability to meet functional, performance, and user-specific requirements. Each characteristic reflects a key dimension of software quality, encompassing aspects like functionality, performance, reliability, and adaptability. These dimensions ensure that software not only meets technical requirements but also delivers value to its users and stakeholders under specified conditions. As shown in Figure 1, the product quality model listed in ISO/IEC 25010 consists of eight quality characteristics.

Figure 1 Characteristics and Sub Characteristics of ISO 25010:2023
(Source: https://iso25000.com/)

The nine quality characteristics outlined in ISO/IEC 25010:2023 are Functional Suitability, Performance Efficiency, Compatibility, Interaction Capability, Reliability, Security, Maintainability, Flexibility, and Safety. These characteristics collectively form a robust framework for understanding software quality. The following sections elaborate on each characteristic and its sub-components to clarify their role in the evaluation process [12].

1) Functional Suitability represents the system's ability to deliver functions that meet specific user requirements under defined conditions. This characteristic emphasizes functional completeness, ensuring all necessary features are provided; functional correctness, which guarantees accurate outcomes; and functional appropriateness, ensuring the functionality meets its intended purpose efficiently.
2) Performance Efficiency addresses the system's ability to deliver performance relative to resource consumption under given conditions. Sub-characteristics include time behavior (response time and

latency), resource utilization (efficient use of system resources), and capacity (system's ability to handle varying workloads).

3) Compatibility examines the system's ability to operate and exchange information with other systems or products. It includes co-existence, ensuring harmonious operation within shared environments, and interoperability, which focuses on effective communication and data exchange between systems.
4) Interaction Capability focuses on the usability and user experience of the system. It assesses how effectively the product interacts with users through its interface. Sub-characteristics include learnability (ease of understanding), operability (ease of operation), user error protection (prevention of misuse), and user engagement (satisfaction and inclusivity). This dimension ensures that the system is accessible, intuitive, and user-centered.
5) Reliability measures the product's ability to operate consistently under specified conditions without failure. Key sub-characteristics include fault tolerance (system resilience during failures), availability (operational uptime), and recoverability (ability to restore after a failure).
6) Security evaluates the extent to which the system safeguards data and resources against unauthorized access and threats. It encompasses confidentiality (data privacy), integrity (data accuracy), non-repudiation (proof of actions), authenticity (verification of identities), and accountability (traceability of actions). This characteristic is essential for protecting sensitive organizational and user information.
7) Maintainability highlights the product's capacity for efficient modification, ensuring adaptability to new requirements and environments. Sub-characteristics such as modularity (segmented design), reusability (component reuse), modifiability (ease of changes), and testability (ease of testing) facilitate ongoing development and maintenance.
8) Flexibility assesses the system's ability to adapt to changes in requirements, contexts, or environments. It includes adaptability (adjustments to new conditions), scalability (handling increased demands), and installability (ease of deployment).
9) Safety ensures the product's ability to prevent risks that may harm human life, property, or the environment. This includes hazard warnings, risk identification, and fail-safe mechanisms that minimize the potential for accidents or failures.

By incorporating these nine characteristics and their sub-components, ISO/IEC 25010:2023 provides a structured approach to software quality evaluation.

3. METHOD

3.1 Metode Analytical Hierarchy Process (AHP)

Analytical Hierarchy Process is a decision support model developed by Thomas L. Saaty. This model will decompose a complex multicriteria problem into a hierarchical form by giving a value of how important a criterion variable is and determining which criteria have the highest priority so that they can affect the results under certain conditions. Therefore, we need to know the problem, decision needs and objectives, decision criteria, sub-criteria, stakeholders and affected groups and alternative actions to be taken [13]. A sample of AHP Hierarchical tree is shown in Figure 2.

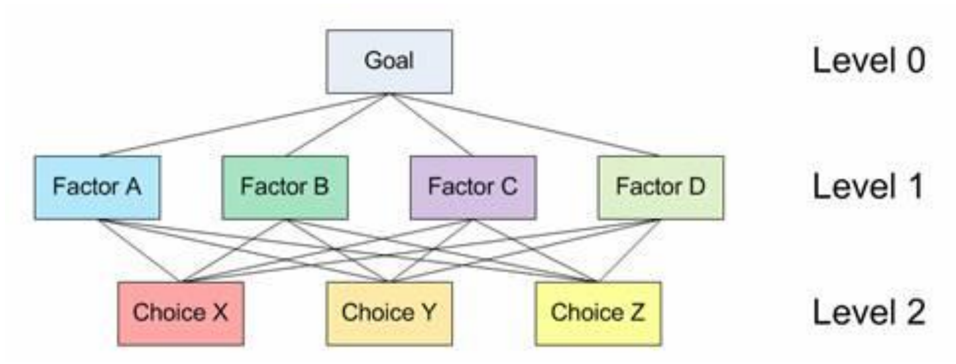

Figure 2. Sample AHP Hierarchical Tree

3.2 Likert Scale (AHP)

This scale is a psychometric scale that is often used in questionnaires. This scale was developed by Rensis Likert in 1932 to measure people's attitudes. The Likert scale provides five answers consisting of:

1: strongly disagree
2: disagree
3: undecided
4: agree
5: strongly agree

For this reason, researchers implemented a Likert scale in this study with the following description (Table 1):

Tabel 1. Likert Scale Score Calculation

Skor	Likert Scale	Meaning
5	Excellent	Features work very well, responds very quickly without errors
4	Good	Features work well, responds quickly without errors
3	Fair	Features work well, but there are still things that need to be improved
2	Poor	Features are available but do not work and there are many errors massages
1	Very Poor	Features does not work at all

4. RESULTS AND DISCUSSIONS

4.1 AHP Hierarchy Decision Making on ISO/IEC 25010:2023

The decision hierarchy for the selected characteristics of the ISO/IEC 25010:2023 standard was established using the Analytic Hierarchy Process (AHP) via an online system. The hierarchy is structured into multiple levels: Level 0 represents the overarching goal of the evaluation, Level 1 comprises the three selected characteristics to be prioritized, and Level 2 includes their corresponding sub-characteristics, which are assessed through pairwise comparisons. In the AHP framework, each sub-characteristic at Level 2 is compared in pairs to determine relative importance. The comparisons use a priority scale ranging from 1 to 9, where 1 indicates equal importance, and 9 signifies extreme importance of one sub-characteristic over another. These pairwise comparisons are processed to generate priority weightings, which reflect the relative significance of the sub-characteristics and characteristics.

The priority weightings derived from the pairwise comparisons at Level 2 are aggregated to determine the overall ranking of the characteristics at Level 1. This process ensures a systematic evaluation, providing a clear understanding of the significance of each characteristic within the context of the ISO/IEC 25010:2023 standard. The AHP decision hierarchy results, as illustrated in Figure 3, visually represent the relationship between the goal, the three prioritized characteristics, and their sub-characteristics. The calculated weightings obtained through this process serve as the basis for subsequent quality measurements and analysis of the TMS application.

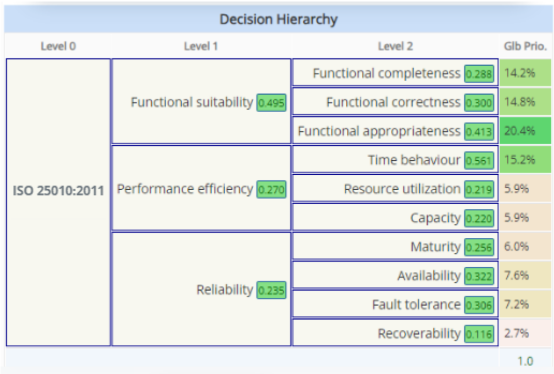

Figure 3. Decision hierarchy result with AHP online system

The decision hierarchy of ISO/IEC 25010:2023 characteristics is determined by inputting 3 previously determined characteristics into the AHP online system. Level 0 is the Goal; level 1 is the 3 characteristics that will be ranked, and level 2 is the sub-characteristics that will be pairwise. The AHP decision hierarchy of ISO/IEC 25010:2023 standard is shown in Figure 3.

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4.2 Analysis of AHP Hierarchy Decision Making Results

The pairwise comparisons provided by stakeholders for the sub-characteristics of the ISO/IEC 25010:2023 standard yielded the global priority weights for each sub-characteristic. These weights were used to determine the overall priority of the Level 1 characteristics in the decision hierarchy. The results are summarized as follows:

1. Functional Suitability
   Among the Functional Suitability sub-characteristics, Functional Appropriateness emerged as the highest priority, receiving a weight of 20.4%. This indicates its critical role in ensuring that the TMS application meets user needs and supports task completion effectively. Following this, Functional Correctness was ranked second with a weight of 14.8%, reflecting its importance in delivering accurate results. Lastly, Functional Completeness received the lowest weight of 6.1%, highlighting a relatively lower priority for including all required functions compared to appropriateness and correctness.
2. Performance Efficiency
   For Performance Efficiency, Time Behaviour was prioritized as the most significant sub-characteristic, with a weight of 15.2%. This reflects the critical need for the system to respond quickly and efficiently under defined conditions. In contrast, Capacity and Resource Utilization were equally weighted at 5.9%, indicating their shared but lower significance compared to Time Behaviour.
3. Reliability
   Within the Reliability characteristic, Availability emerged as the top priority with a weight of 7.6%, underscoring the importance of system uptime and consistent availability. Fault Tolerance followed closely with a weight of 7.2%, reflecting its role in maintaining system operation during failure scenarios. Maturity ranked third with a weight of 6%, while Recoverability was identified as the lowest priority among the Reliability sub-characteristics.

4.3 Overall Priority Ranking of Characteristics

Using the global priority weights calculated through the AHP online system, the three main characteristics were ranked as follows:

1. Functional Suitability – ranked first with a weight of 49.5%, highlighting its critical role in meeting user expectations and functional needs.
2. Performance Efficiency – ranked second with a weight of 27%, reflecting the importance of system performance in terms of response time and resource usage.
3. Reliability – ranked third with a weight of 23.5%, indicating its significance in ensuring the system operates consistently and dependably.

The priority ranking analysis results are illustrated in Figure 4, which visually represents the distribution of weights across the three characteristics.


Consolidated Priorities

Consistency Ratio CR: 0.1%

	Cat	Priority	Rank
1	Functional suitability	49.5%	1
2	Performance efficiency	27.0%	2
3	Reliability	23.5%	3

Consolidated Decision Matrix

Aggregation of individual judgments for 5 Participant(s)

	1	2	3
1	1	1.78	2.17
2	0.56	1	1.12
3	0.46	0.89	1

Figure 4. The results of priority ranking analysis with AHP

Following the prioritization process, researchers conducted further testing of the sub-characteristics using questionnaires and black box testing. These methods were applied to measure the actual performance of the TMS application based on user feedback and functional validation, providing a comprehensive assessment aligned with the ISO/IEC 25010:2023 standard.

4.4 Result Sub-Characteristics Questionnaires and Black Box Testing

We measured the sub-characteristics of the ISO/IEC 25010:2023 standard through systematic black box testing. Each sub-characteristic was evaluated by testing specific functionality of the TMS application.

1. Functional Completeness. Functional Completeness was assessed through black box testing, where all existing functions of the TMS application were systematically tested. The evaluation aimed to determine whether all necessary functions were present and operational. The test revealed that several functions did

not operate as intended, resulting in a score of 4, which is categorized as good. Despite this positive result, the findings indicate areas where functionality requires improvement.

2. Functional Correctness. Functional Correctness was measured using the black box testing method, focusing on critical features such as the login, search, export to Excel, and notification functions. The objective was to verify whether the application provides accurate outputs with the required level of precision. While the test results demonstrated that the TMS application largely met user expectations, some functions still require refinement. Consequently, this sub-characteristic also received a score of 4, placing it in the good category.
3. Functional Appropriateness. Functional Appropriateness was similarly evaluated through black box testing by analyzing all website functions to determine whether the system adequately supports users in achieving their tasks and goals. The evaluation confirmed that the website meets user expectations by providing the necessary facilities and tools. As a result, the TMS application scored 4 for this sub-characteristic, placing it within the good category.

Overall, these assessments highlight that while the TMS application performs well in terms of functional suitability, there remain areas for improvement in specific functionalities. The black box testing revealed that some functions did not operate as intended, suggesting the need for targeted enhancements to optimize system performance. Based on the evaluation results, several key areas for improvement have been identified:

- Performance Optimization
  The Time Behavior sub-characteristic scored 3.700, indicating a need for response time optimization Recommended actions:
  - Implement server-side caching to reduce database query times
  - Optimize database indexes for frequently accessed data
  - Consider implementing asynchronous processing for ticket updates

- Functional Enhancement Priorities
  While Functional Suitability scored well (4.369), specific improvements are recommended:
  - Enhance the ticket categorization system to improve routing efficiency
  - Implement automated ticket status updates
  - Develop a knowledge base integration for common issues

- Reliability Improvements
  Despite strong overall reliability (4.619), the following enhancements are suggested:
  - Develop a comprehensive disaster recovery plan
  - Enhance the backup system for improved recoverability

- User Experience Considerations
  Based on user feedback, the following improvements are recommended:
  - Enhance the notification system
  - Improve the mobile responsiveness of the interface

These recommendations are prioritized based on their potential impact on system quality and user satisfaction. Implementation should be phased, with immediate focus on performance optimization due to its direct impact on user experience.

4.5 Total Assessment of Characteristics and Sub-Characteristics

After testing and evaluating the three characteristics and their respective sub-characteristics of the ISO/IEC 25010:2023 standard, the total score was calculated to determine the overall quality of the TMS application. The calculations were based on the characteristic weights obtained through the AHP method and the assessment results for each sub-characteristic, as detailed in Table 2.

Tabel 2. TMS App score calculation result

Characteristic	**Characteristic Weight**	**Sub-characteristic**	Assessment Result Sub-characteristic	**Total Subcategories**	**Total Result**
Functional Suitability	0.495	Functional completeness	4.552	4.369	2.162
		Functional correctness	4.123		
		Functional appropriateness	4.431		
Performance Efficiency	0.27	Time behavior	3.700	4.094	1.106
		Resource utilization	4.250		
		Capacity	4.333		
Reliability	0.235	Faultlessness	4.527	4.619	1.086
		Availability	5.000		
		Fault tolerance	4.750		
		Recoverability	4.200		
TOTAL	**1**	**TOTAL**			**4.354**

The evaluation results demonstrate that Functional Suitability played the most significant role in determining the overall quality score of the TMS application, with a weight of 0.495. The sub-characteristics — Functional Completeness, Functional Correctness, and Functional Appropriateness — achieved an average score of 4.369, resulting in a weighted contribution of 2.162. This highlights the importance of ensuring that the system provides accurate, complete, and appropriate functionality to meet user requirements effectively. Performance Efficiency, with a weight of 0.27, ranked second in priority. The sub-characteristics assessed included Time Behaviour, Resource Utilization, and Capacity, achieving an average score of 4.094 and contributing 1.106 to the total score. Among these, Time Behaviour recorded the lowest individual performance, signalling the need for optimization to improve response time and overall system efficiency.

The Reliability characteristic, weighted at 0.235, performed well overall, with sub-characteristics such as Faultlessness, Availability, Fault Tolerance, and Recoverability achieving the highest average score of 4.619. Availability stood out with a perfect score of 5.000, underscoring the system's strong capability to remain operational and accessible without interruptions.

The final evaluation yielded a total score of 4.354, placing the TMS application in the “Good” category. This result reflects the system’s overall effectiveness in meeting the critical quality requirements of functionality, performance, and reliability, as outlined by the ISO/IEC 25010:2023 standard. Overall, while Functional Suitability emerged as the most influential factor due to its high weight and consistent performance across sub-characteristics, Performance Efficiency revealed room for improvement, particularly in Time Behaviour. The Reliability characteristic demonstrated strong results, especially in Availability, further enhancing the overall quality. These findings provide valuable insights into the strengths and areas for improvement in the TMS application, emphasizing the need for targeted enhancements to optimize system performance.

5. CONCLUSION

In this study, the prioritization of three selected characteristics from the ISO/IEC 25010:2023 standard was conducted using the Analytic Hierarchy Process method. The evaluation of each sub-characteristic was carried out through a combination of questionnaires and black box testing. The measurement results were analyzed using a Likert scale to assign scores to each sub-characteristic. The scores for individual sub-characteristics were averaged and weighted based on the characteristic prioritization derived from the AHP method. This process ensured a systematic and data-driven evaluation of the software quality. The results revealed that the Ticket Management System application, evaluated in the case study at University of Amikom

Yogyakarta, achieved a score of 4.354. This score indicates that the TMS application falls within the “good” category, reflecting a positive overall quality while highlighting areas for potential improvement.

REFERENCES

[1] R. S. Mission, “Multi-channel support and ticketing interface for online support management system platforms,” *Int. J. Appl. Sci. Eng.*, vol. 18, no. 4(Special Issue), pp. 1–9, 2021, doi: 10.6703/IJASE.202106_18(4).006.

[2] M. Al-Emran and H. Al Chalabi, “‘Developing an IT Help Desk Troubleshooter Expert System for diagnosing and solving IT Problems,’” BCS Learning & Development, Feb. 2015. doi: 10.14236/ewic/bcsme2014.16.

[3] F. Gohil and M. Vikash Kumar, “Ticketing System the Creative Commons Attribution License (CC BY 4.0).” [Online]. Available: http://creativecommons.org/licenses/by/4.0

[4] S. Fuchs, C. Drieschner, and H. Wittges, “Improving Support Ticket Systems Using Machine Learning: A Literature Review,” in *Proceedings of the Annual Hawaii International Conference on System Sciences*, IEEE Computer Society, 2022, pp. 1893–1902. doi: 10.24251/hicss.2022.238.

[5] K. D. Aglibar and N. Rodelas, “Impact of Critical and Auto Ticket: Analysis for Management and Workers Productivity in using a Ticketing System,” *Int. J. Comput. Sci. Res.*, vol. 6, pp. 988–1004, Jan. 2022, doi: 10.25147/ijcsr.2017.001.1.84.

[6] S. I. Adam, J. H. Moedjahedy, and O. Lengkong, “Pengembangan IT Helpdesk Ticketing Sistem Berbasis Web di Universitas Klabat Development of Web-based IT Helpdesk Ticketing System at Universitas Klabat,” *Cogito Smart J.* |, vol. 6, no. 2, 2020.

[7] D. Yunadi, N. Sulistiyowati, and A. A. Ridho, “Analisis Dan Implementasi Sistem Ticketing Helpdesk Pada Universitas Singaperbangsa Karawang,” 2020.

[8] F. Al-Hawari and H. Barham, “A machine learning based help desk system for IT service management,” *J. King Saud Univ. - Comput. Inf. Sci.*, vol. 33, no. 6, pp. 702–718, Jul. 2021, doi: 10.1016/J.JKSUCI.2019.04.001.

[9] A. Yulianty and A. Kurniawati, “Quality Analysis of Bios Portal Website at Banking Companies Using ISO / IEC 25010:2011 Method,” *Int. Res. J. Adv. Eng. Sci.*, vol. 6, no. 2, pp. 11–16, 2021.

[10] M. Mulyawan, I. N. S. Kumara, A. Swamardika, and K. Saputra, “Kualitas Sistem Informasi Berdasarkan ISO/IEC 25010: Literature Review,” *Maj. Ilm. Teknol. Elektro*, vol. 20, p. 15, Mar. 2021, doi: 10.24843/MITE.2021.v20i01.P02.

[11] A. Arga Pratama and A. B. Mutiara, “Software Quality Analysis for Halodoc Application using ISO 25010:2011,” 2021. [Online]. Available: www.ijacsa.thesai.org

[12] ISO/IEC25010, “Systems and software engineering-Systems and software Quality Requirements and Evaluation (SQuaRE)-Product quality model,” *Switzerland*, vol. 2023, 2023.

[13] T. L. Saaty, “Decision making with the Analytic Hierarchy Process,” *Sci. Iran.*, vol. 9, no. 3, pp. 215–229, 2002, doi: 10.1504/ijssci.2008.017590.

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