

The Effect of Hajj Pilgrim Data Management and the Effectiveness of Hajj Data Services on the Quality of the Integrated Hajj Computerization System

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Abstract: To realize the quality of public services for Hajj, one of the efforts made is to implement information technology. This study aims to analyze the influence of hajj pilgrim data management and service effectiveness on the quality of SISKOHAT. Quantitative approach and associative research design, this study involved 380 respondents who were selected through the *Proportionate Stratified Random Sampling* technique. Data was collected through questionnaires as a primary data instrument. The results of the analysis showed that the management of pilgrim data had a significant influence on the quality of SISKOHAT, with a tcount value of 13,934 and a p-value of 0.000, which indicates that the better the management of pilgrim data, the higher the quality of SISKOHAT received by pilgrims. In addition, the effectiveness of the service was shown to have a significant effect on the quality of SISKOHAT with a p-value of 0.000., while the F Test showed that data management and service effectiveness simultaneously contributed significantly to the quality of SISKOHAT, with an R² of 0.407 (40.7%). The findings show that good data management and service effectiveness can improve the quality of SISKOHAT for all pilgrims.

Keywords: Hajj Pilgrim Data Management, Service Effectiveness, and SISKOHAT Quality.

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I. INTRODUCTION

Public services are a form of state obligation in meeting the needs of the community, because it has become the main concern in good *governance*. The mandate of Law Number 13 of 2008 concerning the Implementation of Hajj, especially in Article 6, is the legal basis that affirms the state's obligation to provide optimal service to pilgrims. In this context, the provision of quality services not only reflects efforts to fulfill state responsibilities, but is also a key indicator in creating the quality of service for pilgrims. The quality of service, in the end, will be a benchmark for service quality and a representation of the success of the system of organizing the hajj equally.

To realize the quality of public services for Hajj, one of the efforts made is to implement information technology, which functions as a means to accelerate, facilitate, and increase transparency and accountability (Laudon & Traver,

2020) One form of implementation is the Integrated Hajj Computerization System (Siskohat) which was developed several decades ago. The development of Siskohat over the decades and its problems shows that even though this system has undergone modernization, there are still obstacles such as not being integrated with Dukcapil data, so that validation of pilgrim data often requires manual verification. In addition, the capabilities of human resources differ at each level of Siskohat, which affects the speed and accuracy of data management in the field. In fact, the Siskohat application is a convenience for pilgrims, both in the registration process, paying fees, and managing departures and returns. Therefore, the application of hajj information technology in Siskohat is not only intended as a tool for managing hajj pilgrim data, but also as a solution to improve the quality of service in the following years. However, it is also important to ensure that its implementation is implemented effectively so that the benefits can be maximized (Fuadi, 2021.).

Table 1 Development of SISKOHAT

No	Generation Name	Description	Problem	Constraints	Factor factor
1	Generation 1 (Early Deployment)	The system was first introduced to manage pilgrim data manually and using very simple software. Data is still paper-based.	The data management process is very limited, prone to data loss, and slow in searching and verifying information.	Use of paper-based data, limitations of hardware and software, error-prone manual management	Reliance on paper, low technology used, limited technical personnel and IT infrastructure at that time
2	Generation 2 (Computerized System)	The use of computer-based systems began. Pilgrim data began to be entered into a more structured database.	Data management is still not well integrated between related agencies, information is difficult to access in real-time.	Lack of integration between systems, lack of network infrastructure that supports real-time access	Reliance on old software, need for technology updates and more sophisticated systems
3	Generation 3 (Integrated Siskokat)	The development of the system towards a more modern Integrated System. Online systems and the use of larger databases are introduced.	Difficulties in data integration between agencies, Dukcapil data has not been fully integrated.	Inhibited data flow between agencies, data mismatch between information sources	Differences in data standards between institutions, technologies that do not yet fully support automatic data integration
4	Generation 4 (Siskohat 4.0 – Integration with Digital Services)	Integrates with a wide range of digital systems and cloud-based applications. Users can access pilgrim information in real-time.	The differences in human resource capabilities at each level of Siskohat and the challenges in integration with Dukcapil data that are not optimal.	human resources who are not equally prepared in the use of technology, dependence on old systems that are not yet fully renewable	Lack of HR training, system limitations in managing data simultaneously and without errors
5	Generation 5 (Siskohat 5.0 – AI and Big Data-Based Systems)	The application of artificial intelligence (AI) and Big Data-based analytics to manage and analyze hajj pilgrim data efficiently and predictably.	System development requires human resource adjustments, as well as handling more complex security-related issues and data management.	Difficulties in the implementation of new technologies, increasing need for skilled human resources to manage AI and Big Data data	The rapid development of AI and Big Data technology, the lack of infrastructure and human resources ready to face it

Data Sources Processed, 2025

Abidin (2023) research studies show that if the services received are lower than expected, the quality of the prepared quality is also poor. To overcome various problems of lack of service quality from the management of hajj pilgrim data which has become an icon of public services, SISKOHAT (integrated hajj computerization system) is needed. SISKOHAT has not effectively functioned as an integrated system that manages the entire administrative process of pilgrims, starting from registration, data verification, to reporting. The SISKOHAT system has not been as expected to provide convenience for prospective pilgrims and ensure accurate and efficient data management. In addition, SISKOHAT has not been effective in having the ability to manage large numbers of pilgrims centrally and *in real-time*, so that the administrative process can run more effectively and minimize the potential for data errors.

Quality, according to Kotler, is all the characteristics that affect its ability to achieve stated or remaining needs, while according to Gronroos, service is an activity that is

invisible or intangible that occurs as a result of interaction between consumers and employees or other things that are intended to solve consumer problems. Thus, the quality of hajj services in an integrated manner can be interpreted as a measure of how good the level of service provided by hajj organizers is in accordance with public expectations, in other words the main factor that affects the quality of hajj service is the management of hajj pilgrim data with the effectiveness of siskohat.

Research studies Munawaroh et al., (2015) that the SISKOHAT Quality includes the registration and storage of the database of pilgrims and hajj officers, the processing of passport and visa documents, the issuance of Hajj Travel Administration Documents (DAPIH), BPIH payments by BPS BPIH online, the implementation of the BPIH accounting system, the preparation of the pre-manifest of the group, the monitoring of flights, the monitoring of the health of the hajj, and the monitoring of hajj operations in the country and in Saudi Arabia. In addition, the results of the

research by Munawaroh et al. (2015) discussing the effectiveness of services in the implementation of the hajj, as well as its supporting and inhibiting factors. Using a descriptive qualitative method, it was concluded that SISKOHAT is very effective in improving the performance of hajj services. Research by Herni Yuliani, Ahmad Sarbini, and Herman shows that SISKOHAT increases the transparency of information data for prospective pilgrims. Meanwhile, Novitasari (2017) shows the level of Service Effectiveness in the registration service of pilgrims. Thus, the quality of hajj services is influenced by the management of hajj pilgrim data.

The research study above tends to focus more on proving the narrative of the quality of Hajj services by using qualitative methods, the researcher feels limited not only to that method so that the researcher's interest is novelty by using quantitative methods, the purpose of novelty to analyze the benchmark of the quality of Hajj services is influenced by the management of hajj pilgrim data with Service Effectiveness as an intervening variable.

Referring to the theory of service by Hessel (2008) that service can basically be defined as the activity of a person, group or organization either directly or indirectly to meet needs. Hessel divides services into two types, both of which are the dimensions of services required by humans (data management) and administrative services (service effectiveness) provided by other people as members of the organization, be it mass organizations or the state. On the contrary, contrary to Noor's opinion, the Human Resources (HR) Ability at SISKOHAT is still minimal and requires quality improvement factors.

In fact, regarding the availability of SISKOHAT Quality, it has not been effective where technical problems have been found that cannot be overcome by human resources

themselves, meaning that they must contact the central or provincial authorities for help so as not to hinder the work (Fuadi, 2024). Service effectiveness still faces a gap with a number of challenges. Where the expected expectations for the effectiveness of the implementation of SISKOHAT are not sufficiently in line with the expectations of the Directorate General of Hajj and Umrah (PHU) of the Ministry of Religion in 2020-2024. The problem of data management whose database is still different, there is information on pilgrims that has not been updated and the lack of data management so that it is still not fully integrated, in addition, data management is not in accordance with the expectations of the use of information technology which should be one of the direct factors in improving the quality of hajj services. However, SISKOHAT can support the implementation of effective hajj in the next period.

The SISKOHAT study in recent years has shown a significant increase in data management in the queue for pilgrim registration in Indonesia. This reflects the high enthusiasm of the community to perform the hajj, which results in a fairly long waiting time (*waiting list*) in various provinces. Until the last data accessed on January 10, 2025, the number of *waiting lists* for pilgrims was recorded at 5.3 million people. This waiting time varies throughout Indonesia, depending on the number of registrants and the quota allocated each year.

In addition to data on the number of registrants by province, it is also important to understand the profile of pilgrims as part of efforts to increase service effectiveness. These profiles cover various aspects, such as the distribution of gender, education level, and the work background of the pilgrims. This data provides an overview of the diversity of characteristics of pilgrims in Indonesia, which can be the basis for designing policies and services that are more suited to their needs.

Table 2 Recapitulation of Hajj Pilgrim Waiting List Profile

Yes	Category	Number of Pilgrims
1	Gender	
	Woman	2,915,080 people
	Man	2,435,004 people
2	Education Level	
	Elementary Education (SD)	1,286,804 people
	High School	1,403,442 people
	S1	1,430,200 people
3	Work Background	
	Housewives	1,319,970 people
	Private Workers	1,353,226 people
	Civil Servants (PNS)	829,651 people

The results of initial observation found that the waiting list profile data of Hajj registrants showed significant diversity in terms of gender, education level, and work background. Based on observation data, female pilgrims reached 2,915,080 people, exceeding the number of male pilgrims which amounted to 2,435,004 people. Furthermore, pilgrims with a basic education background (SD) still dominate with a total of 1,286,804 people, followed by

1,403,442 high school graduates, and S1 graduates with almost an equal number of 1,430,200 people. Meanwhile, pilgrims with a background as housewives occupy the highest position with a total of 1,319,970 people, followed by private workers as many as 1,353,226 people, and civil servants (PNS) as many as 829,651 people. From all the observation data above, the implementation of Hajj needs to be managed effectively, both in terms of gender, education level, and work

background. This is important so that the hajj service system, including in the context of the use of SISKOHAT, can answer the needs effectively, then the focus of the research question is How does the management of hajj pilgrim data affect the quality of SISKOHAT?, How does the effectiveness of service affect the quality of SISKOHAT?, and How does the simultaneous management of pilgrim data and service effectiveness affect the quality of SISKOHAT?

II. GRAND THEORY

➤ *Evaluation Theory*

Evaluation is a very important process in assessing the effectiveness of a program or policy. According to Fitzpatrick (1998), evaluation is a process that includes identifying, clarifying, and applying valid criteria to assess the value or benefit of the object being evaluated based on predetermined criteria. Roza (2021) stated that evaluation is an observation activity on certain objects that aims to collect, analyze, and present data systematically. The results of this evaluation are used to assess and compare existing evaluation indicators, which then become the basis for decision-making related to the object. Evaluation is also an important instrument in knowing the extent to which the set goals have been achieved, as well as to identify gaps between the existing reality and the standards that have been set. With this approach, evaluation can provide an objective picture of the success or failure of a program, as well as be the basis for future improvements.

➤ *Program Evaluation Theory*

Program evaluation theory focuses on a systematic process to assess whether a program has been implemented effectively and in accordance with the goals that have been set. According to Arikunto & Jabar (2009), a program is a series of activities that are carefully planned to implement certain policies. Wirawan (2022) added that the program can be implemented without a certain time limit, as long as the desired goals can be achieved. Program evaluation itself is a process that is carried out to collect, analyze, and utilize information to answer questions about the effectiveness and sustainability of a program. Program evaluations are divided into several types, namely process evaluation (which assesses how the program is run), benefit evaluation (which assesses the outcomes achieved), and impact evaluation (which measures the long-term effects of the program). Paulson (2021) states that program evaluations use certain standards to produce the right decisions. Therefore, program evaluations are essential to provide useful feedback in objective data-driven decision-making.

➤ *SISKOHAT Quality Theory*

Quality is a broad concept that encompasses various dimensions in quality management. In the context of

SISKOHAT, quality can be defined as the extent to which a service system can meet the expectations and needs of users, which is an important dimension in integrated quality management (TQM). Juran (1993) defines quality as the suitability of product use, which aims to meet customer needs and provide satisfaction. Crosby (1979) emphasizes more on compliance with established standards, while Deming (1982) focuses on the suitability of products to market needs. In SISKOHAT, quality is measured through five main dimensions: tangible, reliability, responsiveness, assurance, and empathy. These dimensions are essential for creating a satisfying user experience, given the importance of sustainability and accountability in public service systems. Based on research by Seng et al. (2017) and Chen et al. (2018), the quality of SISKOHAT must continue to be improved in terms of system reliability and responsiveness to the demands of pilgrims. Thus, the application of the TQM principle in the context of SISKOHAT shows that quality does not only depend on the product or service, but also on how the system adapts to the dynamic needs and expectations of users.

III. METHODS

This study uses a quantitative approach, based on the philosophy of positivism, to test the relationship or influence between variables. In this approach, data is collected using a pre-prepared instrument, such as a questionnaire, and analyzed quantitatively to test the hypothesis that has been formulated. This method is called scientific because it applies objective, empirical, rational, measurable, and systematic principles, and relies on numerical data analyzed using statistical tools. This type of research is associative with a form of causal relationship, which describes the cause-and-effect influence between independent variables and bound variables.

The population in this study consists of all users involved with SISKOHAT who meet certain criteria. To determine the number of samples, the Slovin formula was used, which produced a sample of about 380 respondents from a population of 7,562. Sampling was carried out using the Proportionate Stratified Random Sampling technique, where the population is divided into strata and samples are taken randomly based on the proportion of the number of members in each strata. This technique ensures that the samples taken are proportionally representative of the entire population, so that the results of the study are more representative. Data collection was carried out using a questionnaire with a Likert scale to measure the level of respondents' approval of the statements submitted.

IV. RESULTS: RESPONDENT PROFILE

Table 3 Statistic Respondent

Statistics					
		Jeniskelamin	Age	Employment	Status
N	Valid	380	380	380	380
	Missing	0	0	0	0

Statistics				
Mean	1.23	1.30	1.27	2.01
Median	1.00	1.00	1.00	1.00
Mode	1	1	1	1
Hours of deviation	.419	.542	.497	1.481
Sum	466	493	484	765

Data Sources Processed, 2025

Based on Table 3, descriptive data from 380 valid respondents with no missing data showed interesting results. The gender variable had a mean score of 1.23 (close to 1), a median score of 1.00, a mode score of 1, and a low standard deviation (0.419), indicating that the majority of respondents were women. A similar pattern was also seen in the age variable with a mean score of 1.30 and working period with a mean score of 1.27, where the three measures of data concentration tended to be at a value of 1. This shows the strong dominance of the first category, namely women for gender, young age for age, and relatively short working periods.

However, there was a significant difference in the status variable which showed a mean of 2.01, which was higher than the median and mode (1.00), with a large standard deviation (1.481). This indicates an asymmetrical distribution and the possibility of outliers. These findings suggest that while there is strong homogeneity in gender, age, and length of service, there is a disparity in status, which indicates greater variation among respondents.

According to Sugiyono (2019), a highly homogeneous distribution, as seen in sex, age, and length of service, can affect the external validity of research if it is not critically acknowledged. Hair et al. (2019) also explain that the difference between the mean and median on the status variable indicates the skewness of the data, which requires further examination to identify outliers. Overall, these results reflect the strengths and limitations of the sampling design, and provide an opportunity for comparative analysis of status to identify the different patterns in the study.

V. TEST RESULTS

➤ Hajj Data Management Validity Test (X1)

The validity test for Hajj data management measures the effectiveness of the system used with the Pearson correlation between each item and the total score. The test results showed a significant correlation at the level of 0.01 (2-tailed) for almost all items. Items such as X1.1 and X1.14 have a strong correlation with total scores, indicating that these measurement instruments are very valid in measuring the effectiveness of hajj data management systems. This high correlation shows that the instruments used are reliable and consistent in measuring the desired dimensions, and can be used in similar studies in the future to measure the effectiveness of the hajj service system.

➤ Service Effectiveness Validity Test in SISKOHAT (X2)

The validity test of SISKOHAT service effectiveness also showed significant results with the Pearson correlation between items and the total score at the level of 0.01 (2-

tailed). Each item, including X2.1 and X2.15, showed a strong relationship with the total score, which signifies that this instrument is effective in measuring the effectiveness of system services. The high correlation between the items in the scale shows that the instruments used have excellent validity and can be used for further research on the effectiveness of services in SISKOHAT, as well as supporting the development of future hajj service systems.

➤ SISKOHAT Quality Validity Test (Y)

The SISKOHAT quality validity test uses Pearson correlation which shows a significant relationship between each item and the total score. Items such as Y14 and Y15 have very high correlation coefficients, indicating that these instruments are valid in measuring the quality of SISKOHAT. This high correlation suggests that the items in the instrument have a significant contribution in describing the quality construct being measured. Therefore, this instrument is reliable to assess the satisfaction of pilgrims and provides a solid basis for further analysis regarding the quality of SISKOHAT.

➤ Reliability Test of Hajj Pilgrim Data Management (X)

The reliability test shows that the instrument used to measure the effectiveness of the Hajj data management system is very reliable. Cronbach's Alpha values that vary between 0.929 to 0.945 indicate excellent internal consistency. In addition, a high Corrected Item-Total Correlation value indicates a positive relationship between the item and the total score. These results confirm that this instrument can be relied upon to measure the effectiveness of the hajj data management system consistently and stably.

➤ Service Effectiveness Reliability Test in SISKOHAT (X2)

The results of the reliability test for the effectiveness of SISKOHAT services show that the instruments used have excellent reliability. Cronbach's Alpha values between 0.750 and 0.755 indicate high internal consistency, while the Corrected Item-Total Correlation value for each item indicates a significant relationship with the total score. This test proves that this instrument is reliable to measure satisfaction with services in SISKOHAT and can be applied in similar studies in the future.

➤ SISKOHAT Quality Reliability Test (Y)

The reliability test to measure the quality of SISKOHAT shows excellent internal consistency with Cronbach's Alpha values between 0.748 to 0.752. The Corrected Item-Total correlation for each item shows a strong and significant relationship with the total score, confirming that this instrument is reliable in measuring the quality of SISKOHAT. These results show that the instruments used are reliable to measure the satisfaction of pilgrims and provide

consistent and stable data for further analysis related to the quality of SISKOHAT.

➤ Hypothesis Test Results

Results of the t-test on the effect of Hajj Pilgrim Data Management on SISKOHAT Services. The t-test results show that the management of hajj pilgrim data (variable X1) has a significant influence on the Quality of SISKOHAT (variable Y). The regression coefficient for data management is 0.609 with $t = 13.934$ and $p\text{-value} = 0.000$, which means that better data management will improve the quality of SISKOHAT services. The positive coefficient indicates that every single unit increase in data management will improve the quality of service. With a high t-value and a very small p-value, it can be concluded that the management of hajj pilgrim data is a key factor in improving the quality of SISKOHAT services.

The results of the Service Effectiveness Test on SISKOHAT Quality to test the effect of service effectiveness on SISKOHAT Quality showed significant results. With a regression coefficient of 0.551, $t = 13.574$, and $p\text{-value} = 0.000$, it can be concluded that every one unit increase in service effectiveness (X2 variable) will increase the quality of SISKOHAT by 0.551 units. The high t-value and very small p-value confirm that the effectiveness of the service has a significant influence on the quality of SISKOHAT. This shows that improving the quality of services can directly contribute to the improvement of the quality of SISKOHAT.

Results of Test F The Simultaneous Influence of Hajj Pilgrim Data Management and Service Effectiveness on SISKOHATH Quality The results of the F test show that the regression model that combines the management of pilgrim data and service effectiveness has a significant influence on the Quality of SISKOHAT. A very high F-value (129.516) and a $p\text{-value} = 0.000$ indicate that this regression model successfully explains significant variations in SISKOHAT Quality. Thus, both the management of pilgrim data and the effectiveness of services simultaneously contribute significantly to the improvement of service quality, and this model can be used for further predictions in this study.

VI. DISCUSSION

➤ Results of the t-test on the effect of Hajj Pilgrim Data Management on SISKOHATH Quality.

The t-test results show that the management of hajj pilgrim data (numberx1) has a significant influence on the Quality of SISKOHAT (number). With $t = 13.934$ and $p\text{-value} = 0.000$, it can be concluded that good data management directly improves the quality of SISKOHAT services. Each one-unit improvement in data management can lead to an increase of 0.609 units in service quality. The study supports the theory that efficient data management improves administrative processes, reduces errors, and improves user satisfaction. These findings also reinforce that good data management contributes greatly to the positive experience of pilgrims in the services they receive, as shown in research by Kandampully et al. (2017) and Venkatesh et al. (2003).

➤ Results of the Service Effectiveness Test on SISKOHATH Quality

The results of the t-test for the effect of service effectiveness on the quality of SISKOHAT show that any increase in service effectiveness (amountx2) has a significant effect on the quality of services received by pilgrims. With $t = 13.574$ and $p\text{-value} = 0.000$, the regression coefficient $B = 0.551$ indicates that an increase in service effectiveness by one unit can improve the quality of service by 0.551 units. This emphasizes the importance of increasing effectiveness in services to increase the satisfaction of pilgrims and the overall quality of SISKOHAT. Studies by Kandampully et al. (2017) and García et al. (2020) also show that the effectiveness of services is directly related to user satisfaction, which is reflected in the quality of services provided to pilgrims.

➤ Results of Hajj Data Management and Service Effectiveness Test Simultaneously on SISKOHATH Quality.

The results of the F test show that the regression model that combines the management of hajj pilgrim data (amountx1) and service effectiveness (amountx2) has a significant effect on the Quality of SISKOHAT (amount). The value of $F = 129.516$ and $p\text{-value} = 0.000$ indicates that both variables simultaneously make a strong contribution in explaining the variation in SISKOHAT Quality. Although an R^2 value of 0.408 indicates a moderate relationship, these results still show that good data management and service effectiveness have a significant impact on service quality. This study supports the findings by Hair et al. (2019) and Venkatesh et al. (2003), who stated that although the R^2 value is not very high, the model remains effective in explaining the variability of dependent variables and can be used for further analysis.

VII. CONCLUSION

➤ Hajj Pilgrim Data Management on SISKOHATH Quality the Research Results Show that the Management of Hajj Pilgrim Data has a Significant Influence on SISKOHATH Quality.

The reliability test showed an excellent level of data, and the results of the hypothesis test received H1, which indicated that the management of pilgrim data contributed positively to the quality of services received by pilgrims. The results of the t-test showed a tcal value of 13,934 and a $p\text{-value}$ of 0.000, which shows that the better the data management, the higher the quality of SISKOHAT. Efficient and appropriate data management can reduce data distribution errors and increase responsiveness to the needs of pilgrims, which in turn improves the overall quality of hajj services.

➤ Service Effectiveness on SISKOHATH Quality this Study also found that Service Effectiveness has a Significant Influence on SISKOHATH Quality.

The t-test showed a tcal value of 13,574 and a $p\text{-value}$ of 0.000, which indicates that the increase in service effectiveness will contribute significantly to the improvement of the quality of services received by pilgrims. The regression results show that any improvement in service effectiveness

will result in an immediate improvement in the quality of the pilgrims' experience, increase their satisfaction, and ensure the smooth running of the entire hajj process. These findings confirm the importance of good management of service effectiveness to improve the quality of hajj services.

➤ *Simultaneous Management of Hajj Pilgrim Data and Service Effectiveness on the Quality of SISKOHAT*

Uji F shows that the simultaneous management of pilgrim data and service effectiveness has a significant influence on the Quality of SISKOHAT, with a Fcal value of 129,516 and a p-value of 0,000. An R² value of 0.407 indicates that about 40.7% of the variation in SISKOHAT Quality can be explained by these two variables. These findings confirm that the two factors, data management and service effectiveness, work together to influence the quality of services received by pilgrims. In conclusion, efficient data management and effective services have a key role in improving the overall quality of SISKOHAT.

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