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# The Effect of the Use of Digital-Based Information Systems on User Satisfaction and the Effectiveness of Administrative Data Management at Madrasah Tsanawiyah

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## Abstract

This study aims to analyze the effect of using digital-based information systems in Madrasahs on user satisfaction and the effectiveness of administrative data management in Madrasah Tsanawiyah Negeri Padang Pariaman Regency. The research approach is quantitative with survey method. Data were collected through questionnaires and analyzed using statistical tests with Smart PLS Version 3. The results showed that the use of digital-based information systems significantly increased user satisfaction, with Original Sample 0.727, T Statistics 0.733, and P Values 0.034. However, this system does not have a significant effect on the effectiveness of administrative data management, with Original Sample 0.595, T Statistics 0.600, and P Values 0.062. This finding indicates that digital-based information systems are more effective in increasing user satisfaction than the effectiveness of administrative data management. Therefore, system implementation needs to be improved to optimize its benefits on both aspects.

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## INTRODUCTION

The implementation of services in the government is generally carried out through direct contact between service providers and the community. These services are often synonymous with long queues, even causing cases of maladministration that can cause losses to the ministry and the community. This service problem demands a transformation of the government bureaucracy, where paper-based administration is starting to be abandoned, and electronic government (e-Government)

is becoming increasingly important for government decision-making. In this situation, good and effective service is essential to ensure the welfare and prosperity of the community (Bao, 2023).

The use of digital technology is an inseparable part of educational practices (Sufyarma, et al, 2023) in various fields. An effective management information system has an important role in improving efficiency and reducing errors, so as to improve the quality of administrative services (Sulaiman & Wibowo, 2016). Based on the Management Information System Theory, the implementation of an integrated system can support data management more accurately, quickly, and efficiently, especially in the context of educational services. The development of information systems to support the management of education data and education personnel has become one of the strategic steps in improving administration in educational institutions. This system is designed to regulate various aspects of services, including the management of teacher professional allowances (TPG), with the aim of improving data accuracy and speeding up administrative processes. In addition, the use of technology in learning has great development prospects in the future, especially with the development of information and communication technology (Merika, 2024).

The history of the development of digital-based information systems in the field of education began in 2013 with the introduction of an application by the Ministry of Education and Culture which was then adapted and further developed by the Ministry of Religion in 2015. This development shows the government's commitment to utilizing technology to support the improvement of the quality of education through better and integrated services (Rosyidah, U., Kusri, 2018).

According to the Information System Success Model theory by DeLone and McLean (Jeyaraj, 2020), the success of an information system can be measured through the dimensions of information quality, system quality, system utilization, individual impact, and organizational impact. Therefore, the accountability of the parties involved in the service needs to be maintained and improved, so that the community can get the greatest benefit from the service. The measurement of the quality of government services is carried out through a thorough evaluation of services by comparing performance with public expectations. Based on the factors of personal needs and satisfaction that motivate individuals in carrying out their activities (Rusdinal, et al. 2021), this measurement allows authorities to determine the satisfaction of government service users, especially in the education sector. (Said, 2020) can improve quality.

This research was carried out based on modifications of previous research conducted by (Lestari, 2021) and (Risnawati, 2021). The study assesses the influence of the use of management information systems on the effectiveness of administrative data management in madrasahs. The first study showed that the use of the information system had a positive effect on the effectiveness of administrative data management in MTs, while the second study evaluated the implementation of the information system in MAN by focusing on factors such as leadership style and teacher performance. Modifications that can be made in these two studies are to expand the scope of the research location to MTsN in Padang Pariaman Regency and add user satisfaction variables to gain deeper insight into the impact of the information system on administrative management and user satisfaction.

In supporting the implementation of information system-based administrative programs in education, implementation efficiency is very important to assess the success of the program.

Efficiency includes goal achievement, outcome benefits, operational efficiency levels, supporting components, and user satisfaction (Cintya, 2018). Therefore, this study aims to analyze the influence of the use of digital-based management information systems on user satisfaction and the effectiveness of administrative data management in Madrasah Tsanawiyah Negeri Padang Pariaman Regency.

## METHODS

This study uses a quantitative method to analyze the data collected. Data was collected through the distribution of questionnaires or questionnaires filled out in a self-administered questionnaire, namely respondents answered directly the questionnaire that had been prepared by the researcher. The object of the research is educators and education staff in MTsN throughout Padang Pariaman Regency. The data collection instrument was in the form of a questionnaire using the Likert scale with five answer choices. The Variable of Management Information System (SIM) Usage was measured using 5 statement items, Customer Satisfaction using 4 statement items, and Data Management Effectiveness using 5 statement items. The collected data is analyzed using SEM PLS. Descriptive analysis was carried out to determine the Respondent Achievement Level (TCR). The Measurement Model Assessment (MMA) procedure is applied to test validity, reliability, and discrimination. In addition, R Square and Q Square tests were carried out to evaluate the research model. Hypothesis testing is carried out through the Structural Model Assessment (SMA) procedure in accordance with the theory put forward by (Bagozzi, R. P., & Yi, 1988). The operational definition of the variables used in this study is shown in Table 1.

Table 1. Operational Variable Matrix

Variable	Indicators	Instruments	Source
Information Systems Management	Quality of Information	Information provided by the system accurate and error-free.	(Jeyaraj, 2020)
	System Quality	I feel my data is protected securely.	(Pipit dkk, 2020)
	System Usage	The system is easily accessible from Various devices.	(Susanto, 2020)
	Individual Impact	System upgrade My work efficiency.	
	Brainware	I can use the system without the help of others.	
Customer Satisfaction	Suitability of Needs	Features available accordingly with goals and needs Madrasah administration	(Nurul et al., 2022)
	System Performance	The system operates quickly and responsive when in use.	(Ersi & Samuel, 2014)
	Ease of Use	I can easily Explore the various features in the system	(Carey, 1992)
	Quality of Service	Overall, I'm satisfied with quality service given	
Effectiveness Data Management	Clarity of Purpose and Policy Use	System usage contribute to transparency and Accountability	(Aswati et al., 2015)

Variable	Indicators	Instruments	Source
		in Education.	(Pane et al., 2020)
	Operational Effectiveness and Functional Programs	I see that there is Improvements in the process Educational Administration After implementation	
	Facilities and Supporting Infrastructure	Internet connection in Madrasas support access The Lancer	
	Planning and Implementation Strategy	IT team provides solutions fast in case of technical problems on the system	
	Program Effectiveness	Data managed through more accurate system and according to the needs Madrasah Administration.	

## RESULT AND DISCUSSION

### Measurement Model Assessment

Measurement Model Assessment (MMA) is used to assess the relationship between statement items and constructs/variables through convergent validity and discriminant validity (Hair, J. F,dkk, 2014)

### Convergent Validity

Convergent validity measures the extent to which a variable's measurement items are interrelated (Hair, J. F., dkk, 2014) Item assessment criteria are valid if outer loading > 0,7 (Febryaningrum et al., 2024) Data reliabel, if Cronbach's alpha > 0,7, Composite reliability > 0,7, Average Variance Extracted (AVE) > 0,5 (Jovianggi & Soelasih, 2020) Validity and reliability testing is carried out with the Smart-PLS Algorithm as shown in the Table 2.

Table 2. Results of Outer Loadings Analysis (Phase 1)

	Customer Satisfaction Effectiveness	SIM
CS1	0,831	
CS2	0,761	
CS3	0,795	
CS4	0,818	
EPD1		0,832
EPD2		0,803
EPD3		0,701
EPD4		0,686
EPD5		0,786
SM1		0,779
SM2		0,805
SM3		0,768
SM4		-0,096
SM5		0,788

Based on table 2, there are invalid statement items: in the effectiveness variable (EPD), the EPD4 item with the outer loading is 0.686 (< 0.7), and in the management information system (SIM)

variable, the SM4 item with the outer loading is -0.096 (< 0.7). These invalid items are eliminated, then re-analyzed with the results in the Table 3.

Table 3. Results of Outer Loadings Analysis (Stage 2)

	<b>Customer Satisfaction</b>	<b>Effectiveness</b>	<b>SIM</b>
CS1	0,835		
CS2	0,761		
CS3	0,792		
CS4	0,817		
EPD1		0,862	
EPD2		0,818	
EPD3		0,688	
EPD5		0,827	
SM1			0,782
SM2			0,808
SM3			0,769
SM5			0,781

Based on table 3, it can be seen that there is still 1 statement item used to measure the effectiveness variable declared invalid, namely the EPD3 item because it has an outer loadings value of 0.688 or less than 0.7. The invalid items are removed or eliminated and then re-analyzed with the following results:

Table 4. Results of Outer Loadings Analysis (Stage 3)

	<b>Customer Satisfaction</b>	<b>Effectiveness</b>	<b>SIM</b>
CS1	0,854		
CS2	0,737		
CS3	0,793		
CS4	0,815		
EPD1		0,888	
EPD2		0,880	
EPD5		0,836	
SM1			0,773
SM2			0,816
SM3			0,759
SM5			0,791

Based on table 4, all items in the Customer Satisfaction (CS) variable have outer loadings > 0.7 and are declared valid. In the effectiveness variable (EPD), 3 valid items with outer loadings > 0.7, and the management information system variable (SM) had 4 valid items with outer loadings > 0,7 (Febryaningrum et al., 2024). Furthermore, the results of Cronbach's alpha, composite reliability, and average extracted variance (AVE) analysis are presented in the Table 5.

Table 5. Cronbach's Alpha Analysis, Composite Reliability, and AVE

	<b>Cronbach's Alpha</b>	<b>Composite Reliability</b>	<b>Average Variance Extracted (AVE)</b>
Customer Satisfaction	0,814	0,877	0,641
Effectiveness	0,836	0,902	0,754
SIM	0,792	0,865	0,616

Based on Table 5 all variables have a Cronbach's alpha > 0.7, indicating good consistency. A composite reliability value of > 0.7 indicates the reliability of the construction, and AVE > 0,5 (Jovianggi & Soelasih, 2020) indicates the validity of the measurement. These findings confirm that the research instrument meets the standards of consistency, reliability, and validity.

#### Discriminant Validity

Discriminant validity indicates the uniqueness of a construct compared to other constructs. This means that the value of an item is greater in its latent variable compared to other latent variables. The methods used include Fornell-Larcker criterion, Cross loadings, and Heterotrait-Monotrait (HTMT). The results of the discriminant validity analysis are presented in Table 6. and Table 7.

Table 6. Results of Discriminant Validity Analysis with Method Fornell-Lacker Criterion

	<b>Cronbach's Alpha</b>	<b>Composite Reliability</b>	<b>Average Variance Extracted (AVE)</b>
Customer Satisfaction	<b>0,801</b>		
Effectiveness	0,715	<b>0,868</b>	
SIM	0,727	0,595	<b>0,785</b>

Based on the table, the correlation of the customer satisfaction (CS) variable with itself was 0.801, higher than the correlation with effectiveness (0.715) and other variables (0.727) showed a stronger relationship with itself. Likewise, the correlation of the effectiveness variable with itself is 0.868, also greater than its correlation with other variables. The value of the thickened diagonal correlation is greater than other values, both vertically and horizontally.

Table 7. Results of Discriminant Validity Analysis with Method Cross Loadings

	<b>Customer Satisfaction</b>	<b>Effectiveness</b>	<b>SIM</b>
CS1	<b>0,854</b>	0,606	0,699
CS2	<b>0,737</b>	0,552	0,470
CS3	<b>0,793</b>	0,579	0,570
CS4	<b>0,815</b>	0,556	0,558
EPD1	0,654	<b>0,888</b>	0,529
EPD2	0,586	<b>0,880</b>	0,546
EPD5	0,627	<b>0,836</b>	0,472
SM1	0,543	0,472	<b>0,773</b>
SM2	0,613	0,514	<b>0,816</b>
SM3	0,513	0,439	<b>0,759</b>
SM5	0,608	0,441	<b>0,791</b>

The table shows that items CS1, CS2, CS3, and CS4 have the highest loadings in the customer satisfaction column, so it can be trusted to measure these variables. Similarly, items EPD1, EPD2, and EPD5 have the highest loads in the effectiveness column, so they can be trusted to measure the effectiveness variable. Items SM1, SM2, SM3, and SM5 also have the highest loadings in the associated columns, so they can be trusted to measure these variables.

#### Descriptive Analysis

In the variable of Management Information System, the use of the system in this study was initially measured with 5 statement items, but based on the results of the outer loading test, only 4 items were valid. That is, only 4 statements that are consistently and significantly connected to the dimension or construct being measured. One other statement was considered not to have contributed

sufficiently or inconsistent with the dimensions measured, so it was declared invalid for use in this study.

Table 8 Description of Usage Variables SIM

Code	Items	Average	TCR (%)	Information
SM1	The information provided by the system is accurate and error-free.	4,01	80,2	Hight
SM2	I feel like my data is securely protected	4,03	80,6	Hight
SM3	The system is easily accessible from a variety of devices.	3,77	75,5	Keep
SM5	I can use the system without the help of others.	4,09	81,9	Hight
Average SIM		4,00	80%	Hight

Table 8 shows that the average score of the Usage variable is 4.00 with a TCR of 80%, which is in the high category. The highest score is found in SM5 statement items with an average of 4.09 and a TCR of 81.9%, indicating that the level of user independence in use is in the very good category. Meanwhile, the lowest score is in the SM3 statement item with an average of 3.77 and a TCR of 75.5%, which shows that the accessibility of various devices is still in the category of quite good but needs to be improved to meet user expectations more optimally.

Customer Satisfaction in this study was measured using 4 statement items designed to describe the level of user satisfaction with the system studied. Each item is organized based on relevant indicators to evaluate the user's experience, comfort, and perceived benefits.

Table 9 Variable Description Customer Satisfaction

Code	Items	Average	TCR (%)	Information
CS1	The features available are in accordance with the goals and needs of Madrasah administration	4,00	80	Hight
CS2	The system operates quickly and responsively when in use.	4,00	80	Hight
CS3	I was able to easily explore the different features	3,93	79.0	Keep
CS4	Overall, I am satisfied with the quality of service provided by the system	4,12	83,0	Hight
Average SIM		4,00	80%	Hight

Table 9 shows the average score of the Customer Satisfaction variable of 4.00 with a TCR of 80%, including the high category. The highest score was found in CS4 items (4.12, TCR 83%), indicating that user independence was in the very good category. The lowest score on CS3 items (3.93, TCR 79%) indicates that the ease of exploring features is in the good category, although it still needs improvement.

In this study, Data Management Effectiveness (EPD) was initially measured with 5 statement items, but based on the outer loading test, only 3 items were valid. The results of the analysis show

that the 3 items are consistently and significantly connected to the dimension of the effectiveness of data management measured, so it is considered more relevant in this study.

Table 10 Description of Data Management Effectiveness Variables

Code	Items	Average	TCR (%)	Information
EPD1	The use of systems contributes to transparency and accountability in education.	4,00	80	Hight
EPD2	I see an improvement in the education administration process after the implementation of the	3,93	79,0	Keep
EPD5	Data managed through the system is more accurate and in accordance with the needs of madrasah administration.	3,93	79.0	Keep
	Average SIM	4,00	80%	Hight
	Average SIM	4,00	80%	Hight

Table 10 shows the average score of the Data Management Effectiveness (EPD) variable of 4.00 with a TCR of 80%, which is in the good category. This shows that the system used supports effective data management, although there are still opportunities for improvement. The highest score is in the EPD1 item (4.00, TCR 80%), which shows a significant contribution in improving transparency and accountability in education data management. The lowest scores were found in EPD2 and EPD5 items (3.93, TCR 79%), which were in the medium category, indicating that there are still aspects that need to be improved, especially in the administrative process and data accuracy.

R square and Q square analysis  
 R square ( $R^2$ ) measures the influence of exogenous variables on endogenous variables, while Q square ( $Q^2$ ) shows the ability of exogenous variables to predict endogenous variables (predictive relevance). The model is considered to have relevant predictive if  $Q^2 > 0$ . The results of  $R^2$  and  $Q^2$  analysis are presented in Table 8.

Table 11. R Square and Q Square Analysis Results

	R Square	Information	Q Square	Information
Customer Satisfaction	0,529	Keep	0,326	Weak
Effectiveness	0,354	Weak	0,260	Weak

Based on the table of 11 customer satisfaction variables have an  $R^2$  of 0.529, which shows that 52% of these variables are influenced by the use of information systems, classified as medium (Hair et al. 2014). The effectiveness variable has an  $R^2$  of 0.354, meaning that the influence of the use of information systems on the effectiveness of data management is 35%, classified as a weak category (Hair et al., 2014). In addition, customer satisfaction has a  $Q^2$  of 0.326, and effectiveness has a  $Q^2$  of 0.260, both of which indicate that the ability to predict the use of information systems is in the weak category.

Structural Model Assessment

Picture 1. Structural Model Assessment

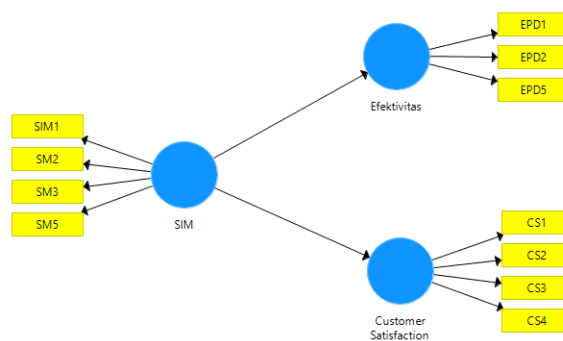


Table 12. Results of Structural Model Assessment Analysis

	Original Sample (O)	T Statistics ( O/STDEV )	P Values	Information
Use of SIMPATIKA -> Customer Satisfaction	0,727	0,733	0,034	H1 Accepted
Use of SIMPATIKA -> Effectiveness	0,595	0,600	0,062	H2 Rejected

Based on Figure 1 and Table 8, it can be concluded that the influence of system use on customer satisfaction has an original sample of 0.727, T-statistic 0.733 (<1.96), and P-value 0.034 (<0.05). This means that the use of the system has a significant effect on customer satisfaction (H1 received). The effect of system use on effectiveness had an original sample of 0.59, T-statistic 0.600 (<1.96), and P-value 0.062 (>0.05). This means that the use of the system does not have a significant effect on the effectiveness of data management (H2 is rejected). Overall, the use of the system had a significant positive impact on customer satisfaction (H1 was accepted), but not on the effectiveness of data management (H2 was rejected). These results show that the system's contribution to user satisfaction is greater than the effectiveness of administrative management in MTsN Padang Pariaman Regency.

**DISCUSSION**

The results of the descriptive analysis show that the implementation of educators and education personnel in MTsN throughout Padang Pariaman Regency is relatively high, with an average usage score of 4.00 and a TCR of 80%. The user satisfaction rate is also high, with an average score of 4.00 and a TCR of 80%. The first hypothesis test (H1) shows that the use has a significant influence on user satisfaction, with the original sample value of 0.727, T-statistic 0.733 (below 1.96), and P-value 0.034 (below 0.05). Thus, the first hypothesis was accepted, proving that use has a significant influence on user satisfaction.

This result confirms the importance of the system in improving the user experience, especially educators and education staff, with a real contribution to transparency, ease of access, and accountability in the management of education administration data in the MTsN environment throughout Padang Pariaman Regency. Empirically, this study is in line with the findings (Khatimah et al., 2022) which shows that service quality affects user satisfaction by 58.8%, indicating that the improvement of service quality is directly proportional to the increase in user

satisfaction. Other research (Fadila et al., 2020) also shows that effective SOPs can improve service, which ultimately increases user satisfaction. From the explanation above, it can be concluded that the level of user satisfaction in educators and education staff in MTsN throughout Padang Pariaman Regency is relatively high.

The results of the descriptive analysis show that the implementation of educators and education personnel in MTsN throughout Padang Pariaman Regency is relatively high, with an average usage score of 4.00 and a TCR of 80%. Similarly, the effectiveness of data management is also relatively high, as evidenced by an average score of 4.00 and a TCR of 80%. However, the second hypothesis test (H2) showed that the use did not have a significant effect on the effectiveness of data management, with the original sample value of 0.595, T-statistic 0.600 (below 1.96), and P-value 0.062 (above 0.05). Therefore, the second hypothesis is rejected. The results of this study show that the use does not have a significant influence on the effectiveness of data management. Previous research (Lestari, 2021) shows that the use has a significant influence on the effectiveness of madrasah administration data management. Similarly, the findings of (Rahmawati, 2020) shows that there is a significant influence on the effectiveness of education administration management. The insignificance of the results in this study is suspected to be caused by various factors, including context, user characteristics, operational support, and measurement methods. The respondents in this study consisted of educators and education staff with various levels of digital literacy.

Furthermore, the use of the system had a positive effect on user satisfaction, with the original sample 0.727, T-statistic 0.733 (below 1.96), and P-value 0.034 (below 0.05). Thus, the first hypothesis (H1) is accepted. However, the use of the system did not have a significant effect on the effectiveness of administrative data management, with the original sample 0.595, T-statistic 0.600 (below 1.96), and P-value 0.062 (above 0.05). Therefore, the second hypothesis (H2) is rejected. These findings provide an overview of the extent to which information systems can meet user needs and support administrative processes in the educational environment, especially in MTsN Padang Pariaman Regency.

## **CONCLUSION**

This study empirically proves the influence of the use of SIMPATIKA on customer satisfaction and the effectiveness of administrative data management, with a total of 150 respondents, which are divided into 127 educators and 23 education personnel in MTsN in Padang Pariaman Regency. Based on the results of the research and discussion that has been presented previously, it is concluded that the use of SIMPATIKA has a positive effect on customer satisfaction in MTsN in Padang Pariaman Regency but the use of SIMPATIKA has no effect on the effectiveness of administrative data management in MTsN in Padang Pariaman Regency.

## **CONFLICTS OF INTEREST**

Regarding this study, the author declares that there is no conflict of interest.

## **AUTHOR CONTRIBUTIONS**

Each author contributes in some way to the completion of this research activity. The main author provides basic ideas and provides research materials and the second, third, fourth

authors design research methods and furthermore, all authors share responsibility for data collection, data tabulation and analysis, review process, and article writing.

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