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ANALYZING SINAGA ATTENDANCE AT SMA JATILAWANG USING TAM FRAMEWORK

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Abstract: The rapid digital transformation in education demands more efficient, technology-driven administrative systems, including civil servant (ASN) management. To address this, the Central Java Provincial Government introduced the Personnel Service Information System (SINAGA) to enhance the effectiveness of administrative processes. This study examines the factors affecting the acceptance of SINAGA among ASN at SMA Negeri 1 Jatilawang by applying the Technology Acceptance Model (TAM), extended with Information Quality (IQ) and Perceived Complexity (PC) as external variables. An explanatory quantitative design was employed, involving 60 respondents and analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS). The results indicate that acceptance is primarily influenced by information quality and users' positive attitudes, whereas technical complexity has minimal impact. Clear, reliable, and accessible information strengthens perceived usefulness and ease of use, encouraging continued engagement with the application. The study contributes to the theoretical development of TAM within public education and provides practical insights for developers and policymakers to improve SINAGA's effectiveness through enhanced information quality, simplified interfaces, and responsive technical support tailored to ASN needs.

Keywords: complexity; digital attendance; information qualit; sinaga; technology acceptance model (TAM)

Abstrak: Transformasi digital dalam administrasi kepegawaian mendorong instansi Pendidikan untuk mengadopsi sistem absensi berbasis aplikasi. Penelitian ini bertujuan untuk menganalisis penerimaan penggunaan aplikasi SINAGA (Sistem Informasi Layanan Kepegawaian) di SMA Negeri 1 Jatilawang dengan menggunakan *Technology Acceptance Model* (TAM) yang telah dimodifikasi. Model ini dikembangkan dengan menambahkan dua variabel eksternal yaitu kualitas informasi dan kompleksitas sistem. Penelitian ini menggunakan pendekatan kuantitatif dengan metode struktural Equation Modeling-Partial Squares (SEM-PLS). Responden berjumlah 60 orang ASN. Hasil penelitian menunjukkan bahwa penerimaan aplikasi terutama dipengaruhi oleh kualitas informasi yang disajikan dan sikap positif pengguna terhadap sistem, sedangkan kompleksitas teknis tidak menjadi faktor utama. Informasi yang akurat, relevan, dan mudah diakses meningkatkan persepsi manfaat serta kemudahan penggunaan. Temuan ini memperkuat penerapan model TAM di sektor publik dan memberikan kontribusi teoretis serta praktis dalam pengembangan sistem kepegawaian digital yang lebih adaptif, berorientasi pengguna, dan mampu mendukung efektivitas administrasi pendidikan.

Kata kunci: absensi digital; kualitas dan kompleksitas informasi; model penerimaan teknologi (TAM); sinaga

INTRODUCTION

The development of information technology has accelerated change in

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various sectors, including education. Education is a field that continues to change in line with technological advances, particularly in improving the efficiency and accuracy of data management[1]. The government's approach to digitizing the bureaucracy by establishing an integrated information system is a step towards better and more transparent governance [2]. As part of its public digitalization efforts, the Central Java Provincial Government, through the Regional Civil Service Agency (BKD), has developed the Civil Service Information System (SINAGA) to accelerate civil service for the State Civil Apparatus (ASN). This application provides key features such as employee profile information, performance achievements, leave requests, attendance, and a notification system [3].

SMA Negeri 1 Jatilawang is one of the schools that has implemented the SINAGA application for personnel administration. Field findings, however, show varying levels of user acceptance. Some civil servants reported technical problems such as server disruptions during peak hours, inaccurate facial recognition, and access difficulties while others acknowledged that the application simplified administrative tasks. This situation shows that the successful implementation of SINAGA depends not only on the quality of the technology, but also on the ability of users to accept and adapt to the system[4].

The main problem that has arisen is the suboptimal level of acceptance of the SINAGA application by civil servants, which is influenced by user characteristics, especially among older age groups with lower technological adaptation abilities, as well as various technical obstacles that interfere with user comfort. Although this application is mandatory, differences in perceived experiences indicate the need for in-depth analysis to assess the effectiveness of digital civil service policies.

In examining technology acceptance, the Technology Acceptance Model (TAM), developed by Davis in 1989, has been widely used to explain information system adoption behavior [6]. This model centers on two primary constructs: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), which progressively influence Attitude Toward Using (ATU), behavioral intention to use (BIU), and actual use (AU)[5]. Some studies show that PU and PEOU have a positive effect on BIU in the context of education and employment systems [6], [7], [8]. Although variations between studies indicate that these relationships may differ depending on the institutional context and user characteristics.

In the context of the SINAGA application, the TAM model is expanded by including IQ and PC. This addition is in line with the characteristics of SINAGA, which depends on the accuracy of information and relatively complex digital procedures. Outdated information can reduce the perception of usefulness, while complicated procedures can reduce the perception of ease of use, especially for users with limited technological experience.

Based on these reasons, this study analyzes the level of acceptance of the SINAGA application among civil servants at SMA Negeri 1 Jatilawang using an expanded TAM model, which integrates IQ and PC as external variables. These findings are expected to provide deeper insights into the factors that influence technology acceptance in educational institutions and provide empirical recommendations for developing a more effective, adaptive, and inclusive digital personnel system.

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METHOD

This study uses an explanatory quantitative design to analyze the causal relationship between variables in the Technology Acceptance Model (TAM). Davis' original 1989 TAM model was expanded with two external factors, Information Quality (IQ) and Perceived Complexity (PC), to explain the acceptance of the SINAGA digital attendance system by civil servants.

This approach was chosen because it allows for objective measurement through inferential statistical analysis based on Partial Least Squares-Structural Equation Modeling (PLS-SEM) using SmartPLS 4.1.1.4 [9].

Hypothesis Referring to the Technology Acceptance Model (TAM) introduced by Davis in 1989, this study adopts the main variables in the model, namely Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Attitude Toward Use (ATU), Behavioral Intention to Use (BIU), and Actual Use (AU). In addition, this study adds two external variables, namely information quality (IQ) and complexity (PC), which are assumed to have an influence on the main variables in TAM.

Model evaluation consists of an external model to evaluate the reliability and validity of indicators, and an internal model to analyze the relationship between variables. During external model assessment, convergent validity is tested through loading (λ) and Average Variance Extracted (AVE). It is calculated using the following formula:

$$AVE = \frac{\{\sum \lambda_i^2\}}{\{n\}} \qquad \{1\}$$

An indicator is considered valid if it has a loading value > 0.70 and AVE ≥ 0.50. Construct reliability is evaluated using Composite Reliability (CR) and Cronbach's Alpha (CA). Composite reliability is calculated using the following formula:

$$CR = \frac{\{(\sum\lambda_i)^2\}}{(\sum\lambda_i)^2 + \sum(1-\lambda_i^2)} \qquad \{2\}$$

$$\alpha = \frac{\{k\}}{\{k-1\}}\left(1 - \frac{\sum\sigma_i^2}{\sigma_T^2}\right) \qquad \{3\}$$

Both reliability measures are considered adequate if CR and CA > 0.70. Discriminant validity is evaluated using the Heterotrait-Monotrait Ratio (HTMT), with the formula:

$$\text{HTMT} = \frac{Rata-rata\ korelasi\ heterotroit}{Rata-rata\ korelasi\ monotroit} \qquad \{4\}$$

An HTMT value of less than 0.90 indicates that discriminant validity is fulfilled.

After the outer model meets the criteria, testing continues on the inner model to assess the relationship between variables based on the coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2). The R^2 value is calculated using the formula:

$$R^2 = 1 - \frac{\{\sum(Y - \{Y\})^2\}}{\{\sum(Y - \{Y\})^2\}} \qquad \{5\}$$

$$f^2 = \frac{\left\{R^2_{\{included\}} - R^2_{\{excluded\}}\right\}}{\left\{1 - R^2_{\{included\}}\right\}} \qquad \{6\}$$

$$Q^2 = 1 - \frac{\{\sum PRESS\}}{\{\sum SS\}} \qquad \{7\}$$

Hypothesis testing was performed using the bootstrapping technique with 5,000 resampling and PLSpredict to assess predictive validity. This methodological approach follows the latest PLS-SEM standards to ensure valid, reliable results that contribute to the development of research on technology acceptance in the public education sector[10], [11].

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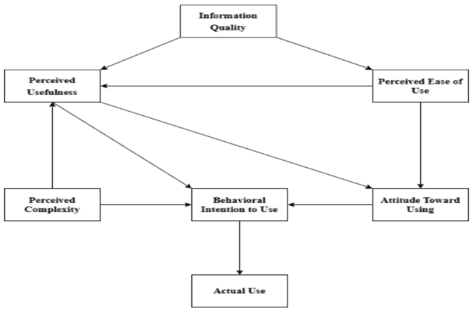

Figure 1. Hipotesis

Based on this conceptual framework, the research hypotheses are formulated as follows:
H1: Information Quality (IQ) is expected to positively and significantly influence the Perceived Usefulness (PU) of the SINAGA application.
H2: Information Quality (IQ) is hypothesized to positively and significantly affect the Perceived Ease of Use (PEOU) of the SINAGA application.
H3: Perceived Ease of Use (PEOU) is predicted to have a positive and significant impact on Perceived Usefulness (PU).
H4: Perceived Ease of Use (PEOU) is expected to positively and significantly affect the Attitude Toward Use (ATU) of the SINAGA application.
H5: Perceived Usefulness (PU) is hypothesized to positively and significantly influence the Attitude Toward Use (ATU).
H6: Perceived Usefulness (PU) is predicted to have a positive and significant effect on Behavioral Intention to Use (BIU).
H7: Attitude Toward Use (ATU) is expected to positively and significantly influence Behavioral Intention to Use (BIU).
H8: Behavioral Intention to Use (BIU) is hypothesized to positively and significantly affect the Actual Use (AU) of the SINAGA application.
H9: Perceived Complexity (PC) is expected to negatively and significantly affect Perceived Usefulness (PU).
H10: Perceived Complexity (PC) is hypothesized to negatively and significantly influence Behavioral Intention to Use (BIU) of the SINAGA application.All research hypotheses were then tested through data analysis using the SEM- PLS method, so that the extent of the influence between variables could be determined in accordance with the conceptual framework that had been developed.

RESULT AND DISCUSSION

This study involved 60 civil servants at Jatilawang 1 Public High School, with a balanced gender compo sition and most respondents aged 31–50 years as active users of the SINAGA application. They routinely use the system for digital attendance, personnel data management, and online admini strative services, making it suitable for assessing technology acceptance using the TAM Model. The analysis continued by testing external and internal models to evaluate the variables that influence attitudes, intentions, and actual use of SINAGA.

Table 1. Outer Loading

	Outer Loading	Keputusan
ATU1	0.830	Valid
ATU2	0.871	Valid
ATU3	0.910	Valid
ATU4	0.920	Valid
ATU5	0.888	Valid
AU1	0.941	Valid
AU2	0.948	Valid
AU3	0.949	Valid
AU4	0.847	Valid
BIU1	0.934	Valid
BIU2	0.869	Valid
BIU3	0.940	Valid

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BIU4	0.901	Valid
BIU5	0.836	Valid
PC1	0.823	Valid
PC2	0.870	Valid
PC3	0.708	Valid
PC4	0.790	Valid
PC5	0.830	Valid
PEOU1	0.763	Valid
PEOU2	0.863	Valid
PEOU3	0.898	Valid
PEOU4	0.831	Valid
PU1	0.823	Valid
PU3	0.830	Valid
PU4	0.895	Valid
PU5	0.898	Valid
QI1	0.804	Valid

Table 2. Result (Cronbach's Alpha, CR, AVE)

	CA	CR	AVE
ATU	0.930	0.947	0.782
AU	0.941	0.958	0.851
BIU	0.939	0.953	0.804
PC	0.864	0.902	0.650
PEOU	0.860	0.905	0.706
PU	0.885	0.920	0.743
QI	0.907	0.935	0.783

The evaluation of the measurement model showed that all instruments met the validity and reliability requirements. The outer loading values in Table 1 are in the range of 0.708–0.949, so all indicators have met the convergent validity standard >0.70 according to Hair et al. [10].

The AVE values in Table 2 (0.650–0.851) also confirm that each construct is able to explain the variance of its indicators. In addition, the Cronbach's Alpha values (0.860–0.941) and Composite Reliability (0.902–0.958) confirm that the instrument has strong internal consistency.

Meanwhile, the discriminant validity test in Table 4 shows an HTMT value <0.90 and fulfillment of the Fornell–Larcker criteria, so that all constructs have good discrimination. In addition, the negative relationship between PC and PEOU and ATU is in accordance with theory, where higher perceived complexity reduces ease of use and attitude toward the application.

Table 3. Discriminant test (HTMT)

	ATU	AU	BIU	PC	PEOU	PU	QI
ATU							
AU	0.820						
BIU	0.882	0.771					
PC	0.623	0.623	0.582				
PEOU	0.858	0.788	0.775	0.739			
PU	0.753	0.808	0.713	0.601	0.800		
QI	0.666	0.803	0.658	0.534	0.825	0.890	

Table 4. Discriminant (Fornell-Lacker critation)

	ATU	AU	BIU	PC	PEOU	PU	QI
ATU	0.884						
AU	0.772	0.922					
BIU	0.830	0.733	0.897				
PC	-0.569	-0.568	-0.531	0.806			
PEOU	0.770	0.713	0.697	-0.637	0.840		
PU	0.694	0.740	0.651	-0.534	0.707	0.862	

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Table 5. Result (R^2)

	(R^2)	(R^2) adjusted	Interpretion
ATU	0.638	0.625	Predictive good
AU	0.537	0.529	Predictive good
BIU	0.702	0.686	Predictive good
PEOU	0.527	0.519	Predictive good
PU	0.686	0.669	Predictive very good

After the measurement model was declared valid and reliable, the structural model was evaluated for its predictive accuracy. As shown in Table 5 shows that all variables have R^2 values in the good to very good category, with the highest values in PU, followed by BIU and ATU. This confirms that the model is able to explain system usage behavior effectively.

Table 6. Result effect size (f^2)

	Nilai f^2	Interpretation
ATU-BIU	0.773	Large effect
BIU-AU	1.160	Large effect
PC-BIU	0.008	Small effect
PC-PU	0.028	Small effect
PEOU-ATU	0.431	Large effect
PEOU-PU	0.041	Efek kecil
PU-ATU	0.123	Moderet effect
PU-BIU	0.027	Small effect
QI-PEOU	1.115	Large effect
QI-PU	0.554	Large effect

Next, to determine the magnitude of the influence between variables, an effect size test (f^2) was conducted. The test results in Table 6 show several relationships with large effects, such as BIU–AU, ATU–BIU, and QI–PEOU and QI–PU, while others are at a moderate to small level. This indicates that information quality and user attitudes are the main factors that drive intention and system usage.

Table 7. resulst Q^2predict

	Q^2predict	Interpretation
ATU	0.375	Predictive good
AU	0.467	Predictive good
BIU	0.354	Predictive good
PEOU	0.510	Predictive good
PU	0.629	Predictive very good

The consistency of these results is reinforced by the predictive relevance test (Q^2predict). Table 7 shows that all constructs have positive values ranging from good to very good. This confirms that the model is capable of explaining the relationships between variables and reliably predicting new data. Overall, the structural model shows strong explanatory power and stable predictive performance, making it suitable for further analysis and hypothesis testing.

Table 8. Hypothesis testing results

	β	T statistics	P values	Description
ATU -> BIU	0.705	7.088	0.000	accepted
BIU -> AU	0.733	12.655	0.000	accepted
PC -> BIU	-0.061	0.470	0.638	rejected
PC -> PU	-0.122	1.039	0.299	rejected
PEOU -> ATU	0.559	4.657	0.000	accepted
PEOU -> PU	0.189	1.330	0.184	rejected
PU -> ATU	0.299	2.315	0.021	accepted
PU -> BIU	0.129	1.199	0.231	rejected
QI -> PEOU	0.726	12.170	0.000	Accepted
QI -> PU	0.607	4.928	0.000	accepted

The next phase involved hypothesis testing to analyze relationships among variables in the Technology Acceptance Model (TAM). As shown in Table 9, bootstrapping results indicate that most relationships are significant and align with theoretical expectations. The results of the analysis show that IQ has a significant effect on PEOU ($\beta = 0.746$; $p < 0.001$) and PU ($\beta = 0.642$; $p < 0.001$), so that accurate information increases the perception of the ease and benefits of the application, in line with Prasetyo et al [9]. PEOU ($\beta = 0.559$; $p < 0.001$) and PU ($\beta = 0.299$; $p = 0.021$) were found to influence ATU, which in turn influenced B ($\beta = 0.705$; $p < 0.001$) and AU ($\beta = 0.733$; $p < 0.001$). These results reinforce the TAM theory that attitude and intention are the main determinants of actual use [12]. Conversely, PC did not significantly affect BIU or PU, indicating that system complexity is not a barrier as long as the benefits are felt[13]. Similarly, the relationship between PEOU and PU was not significant, indicating that benefits are more influenced by information quality than technical ease [14]. Overall, this study confirms that the successful adoption of the SINAGA application is primarily determined by information quality, ease of use, benefits, and users' positive attitudes toward the system.

CONCLUSION

The study shows that people at State Senior High School 1 Jatilawang mostly accept the SINAGA attendance app because of the quality of the information given and their positive feelings about the system. Technical difficulty doesn't really affect how much they like or use it. When the information is correct, related to their needs, and easy to understand, it makes them think the app is useful and simple to use. This helps them feel good about using it and want to keep using it for everyday school tasks. These results mean that making digital attendance systems work well in schools isn't just about the technology it also depends on how good the information is and how easy it is for users to interact with the system.

This study builds on the Technology Acceptance Model (TAM) by including Information Quality and Complexity, giving a more complete view of how technology is accepted in education. In real-world terms, the findings help developers improve SINAGA by making information clearer, designing a better user interface, and offering quicker technical support. For future work, it's important to look at more schools and include other factors like support from the organization, how reliable the system is, and how satisfied users are, to get a fuller picture of how accepted these digital attendance systems are and how they can be kept running smoothly over time.

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