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User Attitude as a Mediating Variable in Technology Acceptance: Evidence from a Government Statistics Application

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Abstract

This study examines user acceptance of the Mboistats application developed by the Malang Statistics Bureau by applying the Technology Acceptance Model (TAM). Specifically, it analyzes the effects of perceived ease of use and perceived usefulness on actual system usage, with user attitude serving as a mediating variable. Data were collected through an online questionnaire distributed to 100 users and analyzed using path analysis. The results indicate that perceived ease of use and perceived usefulness have significant direct effects on user attitude and actual usage. However, user attitude does not mediate the relationship between perceived ease of use or perceived usefulness and actual usage. These findings suggest that when a digital application offers clear and measurable benefits, users tend to adopt the system directly without relying on attitudinal evaluation. This study contributes to the technology acceptance literature by providing empirical evidence from a government statistics application and highlights the importance of enhancing usability and perceived benefits to promote adoption of public sector digital services.

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1. Introduction

Rapid developments in digital technology have fundamentally transformed the way information is accessed, processed, and distributed across social, economic, and governmental sectors. The widespread adoption of mobile devices and internet-based applications has accelerated the transition from conventional information systems to digital platforms that enable faster, more efficient, and more flexible data utilization. In Indonesia, the increasing penetration of internet usage and smartphone ownership has encouraged public institutions to adopt digital solutions to improve service delivery and data accessibility.

As a government institution responsible for producing and disseminating official statistical data, the Malang Statistics Bureau plays a strategic role in supporting evidence-based decision-making for policymakers, businesses, and the general public. To enhance data accessibility and efficiency, the Bureau developed the Mboistats application, an Android-based platform that provides regularly updated statistical information at the city, provincial, and national levels. Through this application,

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users can access survey and census data without the constraints of time and location, reducing dependence on conventional data retrieval methods.

Despite the potential benefits offered by digital applications, successful implementation largely depends on user acceptance. One of the most widely applied frameworks for analyzing technology adoption is the Technology Acceptance Model (TAM), introduced by Davis (1989). TAM posits that perceived ease of use and perceived usefulness are key determinants influencing users' attitudes toward technology, which subsequently affect actual system usage. Previous studies have consistently demonstrated that users are more likely to adopt a system when it is perceived as easy to use and beneficial to their performance (Davis, 1989; Igbaria et al., 1995).

However, empirical findings regarding the mediating role of user attitude in the relationship between perceived ease of use, perceived usefulness, and actual usage remain inconclusive. Some studies suggest that attitude plays a critical mediating role in technology acceptance, while others indicate that users may adopt a system directly based on its functional benefits without strong attitudinal considerations (Jogiyanto, 2017; Park & Park, 2009). This inconsistency highlights the need for further investigation, particularly within the context of government-developed digital applications, which often differ from private-sector systems in terms of user motivation and usage characteristics.

Given the limited empirical evidence focusing on government statistical applications in Indonesia, this study aims to examine user acceptance of the Mboistats application by applying the Technology Acceptance Model. Specifically, this research analyzes the effects of perceived ease of use and perceived usefulness on actual system usage, with user attitude considered as a mediating variable. By doing so, the study seeks to contribute to the technology acceptance literature and provide practical insights for improving the effectiveness of public sector digital services.

2. Literature Review

Management Information System

A system is generally defined as a set of interconnected components that interact with one another to achieve specific objectives. These components operate collectively within an organized framework to support organizational activities. Lestari and Amri (2020) describe a system as a combination of two or more interrelated components that function together to produce a unified outcome. Systems may exist in abstract forms, such as conceptual frameworks, or as tangible structures composed of interacting elements.

A Management Information System (MIS) plays a critical role in supporting managerial functions, including planning, controlling, evaluating, and decision-making processes within an organization. According to Laudon and Laudon (2014), an MIS consists of integrated components designed to collect, process, store, and disseminate information that supports organizational operations and management. The effectiveness of an information system depends on its quality, reliability, and ability to deliver timely and accurate information, which ultimately influences organizational performance.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is one of the most widely used theoretical frameworks for analyzing user acceptance of information technology. Developed by Davis (1989), TAM explains how users come to accept and use a technology by focusing on two primary beliefs: perceived ease of use and perceived usefulness. These beliefs influence users' attitudes toward technology, which subsequently affect behavioral intention and actual system usage.

TAM emphasizes the role of individual perceptions in shaping technology adoption behavior. According to Aldino (2013), the model explains how external factors influence internal beliefs, attitudes, and behavioral responses toward information systems. Empirical studies have consistently shown that

TAM provides a robust explanatory framework for understanding technology adoption across various organizational and technological contexts (Igbaria et al., 1995).

Perceived Ease of Use

Perceived ease of use refers to the degree to which an individual believes that using a particular system would be free of effort (Davis, 1989). This perception encompasses both the initial learning process and continued usage of the system. A system that is perceived as easy to learn, easy to control, and flexible in operation is more likely to be accepted by users.

Joan and Sitinjak (2019) identify several indicators of perceived ease of use, including ease of learning, clarity and understanding, controllability, flexibility, the ability to become skillful, and overall ease of system use. When users perceive minimal effort in interacting with a system, they tend to develop positive evaluations that encourage system adoption.

Perceived Usefulness

Perceived usefulness is defined as the extent to which an individual believes that using a system will enhance job performance (Davis, 1989). Wibowo (2008) further explains that perceived usefulness reflects users' subjective assessments of the benefits obtained from system usage, such as increased productivity, effectiveness, and efficiency.

Indicators of perceived usefulness commonly include the ability of a system to speed up work processes, improve performance, increase productivity, enhance effectiveness, and make tasks easier to accomplish. When users perceive tangible benefits from a system, they are more inclined to accept and utilize the technology in their daily activities.

Attitude Toward Use

Attitude toward use represents an individual's overall evaluative response to using a technology. It reflects users' positive or negative feelings, beliefs, and behavioral tendencies toward a system. Davis (1989) and Yang (2005) emphasize that perceived usefulness significantly influences users' attitudes toward technology adoption.

Jogiyanto (2017) explains that user attitude is shaped by cognitive, affective, and behavioral components, which together determine the willingness to engage with a system. A favorable attitude increases the likelihood that users will adopt and continue using a technology.

Actual Usage

Actual system usage refers to the observable behavior of users when interacting with a technology. According to Rahmawati (2018), actual usage is a form of psychomotor response that reflects real system utilization, typically measured by the frequency and intensity of use.

In the context of TAM, actual usage is the final outcome of the technology acceptance process. When users perceive a system as easy to use and beneficial, and develop positive attitudes toward it, they are more likely to engage in sustained system usage (Hanggono et al., 2015).

Conceptual Framework

Based on the Technology Acceptance Model, this study conceptualizes perceived ease of use and perceived usefulness as exogenous variables influencing actual system usage, with attitude toward use acting as a mediating variable. This framework aligns with prior TAM-based studies and reflects the theoretical relationships among the variables examined in this research.

3. Methodology

Research Design

This study employs a quantitative research design with a causal approach to examine the relationships among variables within the Technology Acceptance Model (TAM). The causal approach is used to identify and analyze the influence of exogenous variables on endogenous variables, as well as the role of mediating variables within the proposed research framework. According to Sugiyono (2017), causal research aims to determine cause-and-effect relationships among variables through empirical testing.

The variables examined in this study consist of exogenous variables, a mediating variable, and an endogenous variable. Perceived ease of use and perceived usefulness are treated as exogenous variables, attitude toward use functions as a mediating variable, and actual usage is specified as the endogenous variable. The research was conducted on users of the Mboistats application within work units under the Central Statistics Agency of Malang City, East Java, Indonesia.

Population and Sample

The population of this study comprises all users of the Mboistats application. However, because the exact number of application users is unknown, the sample size was determined using the Lemeshow formula, which is commonly applied when population size cannot be precisely identified (Sugiyono, 2015).

The Lemeshow formula is expressed as follows:

$$n = \frac{Z^2\, p(1-p)}{d^2}$$

where:
n = sample size
Z = Z-score at the selected confidence level
p = population proportion
d = sampling error

Since the population proportion is unknown, the maximum value of $p\ (1 - p)$ occurs when $p = 0.5$. Substituting this value into the formula yields:

$$n = \frac{Z^2}{4d^2}$$

Using a 95% confidence level (Z = 1.96) and a sampling error of 10% (d = 0.1), the sample size is calculated as follows:

$$n = \frac{(1.96)^2}{4(0.1)^2} = 96.04$$

The calculated sample size was rounded up to 100 respondents. A simple random sampling technique was applied to select respondents, ensuring that each user had an equal opportunity to participate in the study.

Data Collection Technique

Primary data were collected using a structured questionnaire distributed online through the Google Forms platform. The questionnaire consisted of closed-ended statements designed to measure respondents' perceptions and attitudes toward the Mboistats application. All items were measured

using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), as recommended by Sugiyono (2017).

Variables and Operational Definitions

The operationalization of variables in this study follows the constructs of the Technology Acceptance Model. The variables, indicators, and measurement scales are presented in Table 1, which is structured identically to the original document.

Table 1. Variables and Operational Definitions

Variable	Indicators	Measurement
Perceived Ease of Use (X_1)	Ease of learning, ease of control, clarity and understanding, flexibility, ease of access	Likert scale (1–5)
Perceived Usefulness (X_2)	Productivity, effectiveness, performance improvement, overall usefulness	Likert scale (1–5)
Attitude Toward Use (Y_1)	Cognitive, affective, behavioral components	Likert scale (1–5)
Actual Usage (Y_2)	Intensity of use, frequency of use	Likert scale (1–5)

Data Analysis Technique

Data analysis was conducted using descriptive statistical analysis and path analysis. Descriptive analysis was used to describe respondent characteristics and summarize responses for each variable. Path analysis was applied to examine direct and indirect relationships among perceived ease of use, perceived usefulness, attitude toward use, and actual usage.

Validity testing was performed using correlation coefficients, while reliability was assessed using Cronbach's Alpha, with values exceeding the acceptable threshold of 0.70 indicating reliable instruments. The coefficient of determination (R^2) was calculated to assess the explanatory power of the model, representing the proportion of variance in the endogenous variable explained by the exogenous variables.

The significance of direct and indirect effects was evaluated by examining path coefficients, consistent with the analytical approach applied in previous TAM-based studies (Davis, 1989; Igbaria et al., 1995).

4. Results

Respondent Characteristics

A total of 100 valid responses were collected and analyzed in this study. Respondents were classified based on gender, age, education level, and employment status. Male respondents accounted for 52% of the sample, while female respondents represented 48%. In terms of age distribution, respondents aged over 30 years dominated the sample (55%), followed by those aged 20–30 years (37%), and respondents under 20 years (8%). Regarding educational background, most respondents held a bachelor's degree (60%), followed by postgraduate degrees (23%) and high school education (17%). The majority of respondents were employed (71%), while 28% were students and 1% fell into other categories.

Validity and Reliability Test Results

Instrument validity was assessed using correlation coefficients, while reliability was evaluated using Cronbach's Alpha (CA) at Table 2. All measurement items demonstrated satisfactory validity, with correlation values exceeding the minimum acceptable threshold. Reliability analysis showed that all constructs had Cronbach's Alpha values above 0.70, indicating acceptable internal consistency.

Table 2. Statistical Test Results of Research Variables

Research Variable	Instrument	r-value	CA	Mean
Perceived Ease of Use	PE1 – Easy to learn	0.912	0.894	4.585
	PE2 – Easy to control	0.872		4.550
	PE3 – Easy to understand	0.962		4.610
	PE4 – Easy to customize	0.832		4.490
	PE5 – Easy to access	0.817		4.590
Perceived Usefulness	PU1 – Productivity	0.933	0.915	4.570
	PU2 – Effectiveness	0.851		4.540
	PU3 – Performance improvement	0.957		4.625
	PU4 – Overall usefulness	0.925		4.540
Attitude Toward Use	AT1 – Cognitive	0.847	0.879	4.625
	AT2 – Affective	0.878		4.500
	AT3 – Behavioral	0.932		4.500
Actual Usage	AU1 – Intensity	0.950	0.889	4.482
	AU2 – Frequency	0.883		4.395

Source: Authors' calculations

The descriptive results indicate that respondents generally exhibited high perceptions across all constructs. Within perceived ease of use, "easy to understand" recorded the highest mean value. For perceived usefulness, "performance improvement" emerged as the dominant indicator. Behavioral components showed the highest contribution within the attitude construct, while usage intensity dominated the actual usage variable.

Coefficient of Determination

The coefficient of determination (R^2) was calculated to assess the explanatory power of the research model. The results show an R^2 value of 0.624, indicating that 62.4% of the variance in actual usage can be explained by perceived ease of use, perceived usefulness, and attitude toward use. The remaining 37.6% is influenced by other factors not included in the model.

Path Analysis Results

Path analysis was conducted to examine the direct and indirect relationships among variables. The results of the path analysis are presented in Table 3.

Table 3. Direct and Indirect Effects of Research Variables

Relationship	Direct Effect	Indirect Effect	Result
Perceived ease of use → Attitude toward use	0.332	–	Significant
Perceived usefulness → Attitude toward use	0.344	–	Significant
Perceived ease of use → Actual usage	0.378	–	Significant
Perceived usefulness → Actual usage	0.292	–	Significant
Attitude toward use → Actual usage	0.219	–	Significant
Perceived ease of use → Actual usage (via attitude)	–	0.073	Not significant
Perceived usefulness → Actual usage (via attitude)	–	0.100	Not significant

Source: Authors' calculations

The results indicate that perceived ease of use and perceived usefulness have significant direct effects on attitude toward use. Both variables also have significant direct effects on actual usage. In addition, attitude toward use significantly influences actual usage. However, the indirect effects of perceived ease of use and perceived usefulness on actual usage through attitude toward use are not statistically significant, indicating that attitude does not function as a mediating variable in these relationships.

5. Discussion

This study investigates user acceptance of the Mboistats application by examining the relationships among perceived ease of use, perceived usefulness, attitude toward use, and actual usage within the Technology Acceptance Model (TAM) framework. The findings provide several important insights into technology adoption in the context of government-developed digital applications.

First, the results indicate that perceived ease of use has a significant positive effect on user attitude toward using the Mboistats application. This finding supports the core assumption of TAM proposed by Davis (1989), which suggests that systems perceived as easy to use are more likely to generate favorable user attitudes. When users experience minimal effort in learning and operating the application, they tend to evaluate the system more positively. This result is consistent with previous studies that highlight ease of use as a critical determinant of user attitudes in information system adoption (Igbaria et al., 1995; Joan & Sitinjak, 2019).

Second, perceived usefulness is found to have a significant positive effect on user attitude. This finding aligns with prior empirical evidence demonstrating that users develop positive attitudes toward systems that enhance job performance and productivity (Davis, 1989; Wibowo, 2008). In the context of the Mboistats application, users appear to value the system's ability to provide timely and relevant statistical data that support decision-making processes. These perceived functional benefits strengthen users' favorable evaluations of the application.

Third, both perceived ease of use and perceived usefulness exert significant direct effects on actual usage. This result reinforces the argument that users are more inclined to adopt and continue using a system when it is both easy to operate and beneficial to their tasks. The direct influence of perceived usefulness on actual usage is particularly noteworthy, suggesting that users prioritize tangible performance outcomes over psychological considerations when interacting with government digital services. This finding is consistent with TAM-based studies that emphasize the central role of perceived usefulness in driving system usage behavior (Davis, 1989; Aldino, 2013).

In addition, attitude toward use is found to have a significant direct effect on actual usage. This result indicates that users with positive evaluations of the system are more likely to engage in sustained usage. Attitude reflects users' cognitive, affective, and behavioral evaluations, which collectively shape their willingness to interact with the application (Jogiyanto, 2017). Thus, attitude remains an important explanatory variable in understanding technology usage behavior.

However, a key finding of this study is that attitude toward use does not mediate the relationship between perceived ease of use and actual usage, nor between perceived usefulness and actual usage. This result differs from some prior studies that identify attitude as a significant mediating variable in the TAM framework (Park & Park, 2009). One possible explanation for this discrepancy lies in the specific context of the study. As a government-developed application, Mboistats may be used primarily for its functional value rather than based on users' attitudinal evaluations. When system benefits are clear, concrete, and directly linked to users' tasks, individuals may bypass attitudinal processing and adopt the system directly based on perceived utility.

Furthermore, external factors such as institutional expectations, professional requirements, or task-related needs may play a more prominent role in shaping usage behavior in public sector applications. Under such conditions, perceived usefulness and ease of use function as sufficient drivers of actual usage, reducing the mediating role of attitude. This finding suggests that the traditional TAM structure may operate differently in government or public service contexts compared to private-sector applications.

Policy Implications and Recommendations

The findings of this study offer several important policy implications for public institutions and government agencies implementing digital applications. First, policymakers should prioritize enhancing the functional benefits of government digital systems. Clear, measurable, and task-relevant features are critical in encouraging direct adoption and sustained usage among users.

Second, system design should emphasize simplicity and usability. Improving ease of learning, clarity of interface, and accessibility can strengthen both user attitudes and actual usage. Investment in user-centered design is therefore essential for maximizing the effectiveness of public digital services.

Third, training and communication strategies should focus on demonstrating the practical value of digital applications rather than solely promoting positive attitudes. Providing users with concrete examples of how applications improve efficiency and performance may be more effective in driving adoption than attitudinal campaigns alone.

Finally, government institutions should continuously evaluate user feedback to ensure that digital applications align with users' functional needs. By focusing on perceived usefulness and ease of use, policymakers can improve technology acceptance and enhance the overall impact of digital transformation initiatives in the public sector.

6. Conclusion

This study examines user acceptance of the Mboistats application developed by the Malang Statistics Bureau by applying the Technology Acceptance Model. The findings confirm that perceived ease of use and perceived usefulness play significant roles in shaping user behavior toward the application. Both variables are found to have direct and significant effects on user attitude and actual system usage, indicating that usability and functional benefits are critical determinants of technology adoption in government digital applications.

The results also demonstrate that user attitude has a significant direct influence on actual usage. This suggests that positive cognitive, affective, and behavioral evaluations contribute to sustained interaction with the system. However, the mediating role of attitude between perceived ease of use and actual usage, as well as between perceived usefulness and actual usage, is not supported. This finding indicates that users tend to adopt the application directly based on its perceived functionality and ease, without relying heavily on attitudinal evaluation.

These results contribute to the technology acceptance literature by providing empirical evidence that the traditional mediating role of attitude within the TAM framework may be less prominent in public sector digital applications. In such contexts, clear and measurable system benefits appear to be sufficient drivers of actual usage.

Despite its contributions, this study has limitations. The sample size is limited to users of a single government application, and the model focuses only on core TAM variables. Future research is encouraged to incorporate additional variables, such as institutional factors or user characteristics, and to apply more advanced analytical techniques to further enhance understanding of technology adoption in public sector environments.

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