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Determination of OPAC acceptance by campus library users through the TAM model

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ABSTRACT

This study examines user acceptance of library information systems based on the Online Public Access Catalog (OPAC) by employing the Technology Acceptance Model (TAM) framework. The research focuses on identifying the key determinants influencing technology acceptance, particularly Perceived Ease of Use and Perceived Usefulness, and how these constructs shape users' attitudes, behavioral intentions, and actual system usage. Data were collected through a structured questionnaire distributed to active library users. The findings reveal that TAM provides a strong explanatory foundation for understanding the relationships among the variables. Perceived ease of use significantly enhances perceived usefulness, which subsequently fosters positive attitudes, strengthens users' intentions to use the system, and ultimately leads to actual utilization of the OPAC. These results offer comprehensive insights into the factors that drive the acceptance of library information systems and affirm the relevance of TAM as an evaluative model for academic information services.

Keywords : TAM, OPAC, Perceived Usefulness, Perceived Ease of Use, Library Information Systems

INTRODUCTION

The development of information technology over the past two decades has revolutionized various service sectors, including university libraries. This digital transformation has encouraged libraries to develop modern systems such as the Online Public Access Katalog (OPAC) and various digital library platforms in an effort to improve the efficiency of collection management and expand access to information for the academic community (Septrina & Jufriazia 2022). Conceptually OPAC is designed to replace manual card catalos, so that the process of searching, browsing, and accessing collection metadata can be done more quickly, accurately, and in a structured manner. However, the implementation of technology in the context of higher education does not always run linearly; the level of user acceptance is often a major challenge that determines the success of system adoption. Various studies show that technical and non-technical barriers are factors that drive low OPAC usage. Some of these findings can be represented in the following graph to clarify the categories of barriers that are often identified in previous studies.

Studies on technology acceptance in library environments have widely used the Technology Acceptance Model (TAM) framework as a basis for analysis. This model is considered capable of explaining how users' initial perceptions of a technology system shape their attitudes, interests, and actual behaviour in using the system. A number of previous studies have shown that TAM provides conceptual clarity and good predictive power in understanding the dynamics of technology acceptance in various information service contexts. For example, research conducted by Murjoko & Effiyaldi (2023) on the effectiveness of library information systems at UIN shows that TAM can map the relationship between relevant variables in library technology usage behaviours. Their findings indicate that the perception of ease of use has a significant influence on users' perceived benefits. In addition to these two main constructs, personal factors such as job relevance, system output quality, and user satisfaction have been shown to strengthen acceptance of library information systems.

Furthermore, research Yustina Triska & Erlianti (2024) on the Kubuku digital library application at the Andalas University Library also applied the TAM model to evaluate the level of acceptance of this technology. Their research results were consistent with previous findings, namely that perceived usefulness and perceived ease of use were central factors that encouraged users to utilize digital applications. However, the actual usage rate is still relatively low due to limited promotion, lack of training, and minimal socialization of the application's features to library users. Another study by

Rahayu & Sayekti (2023), which focused on the use of OPAC at the University of Medan Area, further reinforced the relevance of the TAM model in the library context. In this study, the perception of ease of use was proven to influence the perception of benefits and have a direct impact on the formation of positive attitudes among users towards OPAC. These positive attitudes then played a role in encouraging the intention and consistency of OPAC use as a means of searching for academic information. The TAM approach was also used to assess the acceptance of the Electronic Thesis and Dissertation (ETD) service at UIN Syekh Ali Hasan Ahmad Addary.

His findings show that an interface that is easy to understand and perceived as useful can increase users' positive attitudes, thereby strengthening their intention to access the service on an ongoing basis. This confirms that the quality of system design is one of the key determinants in increasing the acceptance rate of digital library technology.

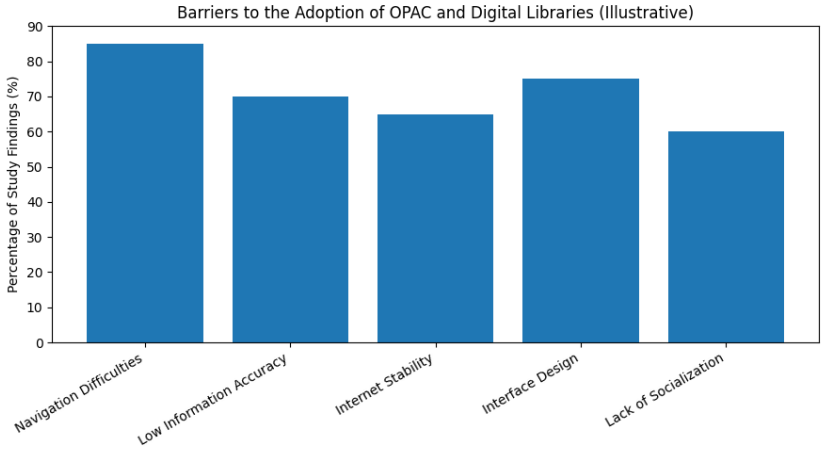

Figure 1. Factors Hindering the Adoption of OPAC and Digital Libraries (Illustrative)

Previous studies have shown that although information technology offers great potential in supporting academic activities, various obstacles still hinder the use of OPAC. A study at the University of Medan Area, for example, found that perceptions of ease of use have a significant influence on perceptions of benefits and the formation of positive attitudes among users toward OPAC. However, users still experience obstacles in the search process, ranging from inaccurate search results to limitations in the interface display. Research on the Kubuku digital application at Andalas University also shows similar dynamics. Although most respondents felt that the application was easy to operate and provided real benefits in learning activities, the actual usage rate remained low. This shows that a positive perception of technology does not necessarily have a direct implication on usage behaviour. Another study by Kristyanto (2013) at IAIN Sunan Ampel reinforces the finding that technical elements, particularly the quality of interface design and system loading speed, greatly determine perceptions of the ease and benefits of digital library services. Although students recognize the utility value of the system, various design and system performance constraints prevent users from having a consistently positive experience. In an analytical context, the Technology Acceptance Model (TAM) is the most widely used theoretical framework to explain the factors that influence technology acceptance. TAM emphasizes two key variables, namely Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), which are considered the main determinants of user attitudes and intentions towards technology. Based on this theoretical and empirical context, this study aims to analyse the determinants of user acceptance of OPAC in a campus library environment using the TAM model. Although many studies on OPAC have been conducted, the urgency of this study lies in the predictive disconnect between positive perceptions and actual usage found in recent studies.

In the post-pandemic era, where library users are predominantly Gen Zeds with very high technological expectations, the failure of OPAC systems to provide a satisfactory user experience not only hinders academic efficiency, but also risks causing redundancy in technological investment in higher education. The urgency of this research lies in the demographic shift of library users to Gen Z, who have a low tolerance threshold for technological barriers. Amidst the ease of access to information through global search engines, the failure of OPAC to provide an intuitive interface is not just a

technical problem but a threat to the relevance of libraries as primary learning resource centres. If not analysed in depth, libraries risk losing their central role in the academic ecosystem. The importance of this research is also driven by the aspect of information technology investment efficiency in higher education. The low level of actual usage amid high investment in OPAC system procurement indicates a risk of budget redundancy. This research aims to identify critical variables that hinder the return on investment (value of investment) so that system development policies can be based on empirical user data, rather than simply following the trend of digitization.

RESEARCH METHOD

Relationship Between Variables

This study bases its analysis on the Technology Acceptance Model (TAM) framework, a theoretical model developed by Davis to explain the psychological factors that influence individuals' acceptance and use of technology. Bekos et al. (2025) In the context of digital libraries, TAM is considered relevant because it can describe how users' initial perceptions of systems such as the Online Public Access Katalog (OPAC) play a role in shaping attitudes, intentions, and actual usage behaviour. The first variable that is the focus of this study is Perceived Usefulness (PU), which is the belief that a technology can improve user performance or effectiveness. In OPAC services, PU is reflected in users' belief that the system can speed up the search process, provide accurate results, and help them obtain the information they need more efficiently. The greater the perceived benefits of using OPAC, the stronger the positive attitude towards the system. Thus, PU becomes one of the important determinants in shaping Attitude Toward Using (ATU) while increasing Behavioural Intention to Use (BI) In addition, the Perceived Ease of Use (PEOU) variable is the second main component in the TAM model. PEOU describes the extent to which users feel that the technology is easy to learn, easy to understand, and does not require excessive effort to operate. In OPAC, these ease aspects include menu navigation, clarity of instructions, response speed, and practicality in searching the collection. In the TAM model, PEOU not only directly influences attitude toward use but also increases perceived usefulness; that is, the easier a system is to use, the greater the benefits perceived by users. An important mediating variable in this model is Attitude Toward Using (ATU), which is the user's affective evaluation of technology use. This attitude is formed through positive experiences that arise from perceptions of ease of use (PEOU) and perceived usefulness (PU). When users assess that OPAC is easy to use and useful, they tend to have a positive attitude and feel comfortable in utilizing the system on an ongoing basis. This positive attitude ultimately encourages the intention to use the technology.(Jannah et al., 2023).

The next variable is Behavioural Intention to Use (BI), which describes the level of readiness and desire of users to use the technology in the future. In the context of digital libraries, BI indicates the tendency of users to access OPAC regularly or choose OPAC as the main means of searching for information. This behavioural intention is a very important indicator in predicting whether the technology will be used consistently or not.

The final dependent variable in this model is Actual System Use (ASU) Elisa et al., (2025). ASU reflects the actual behaviour of users in utilizing technology, such as the frequency of OPAC access, duration of use, and search activities performed. ASU is the end result of a series of perceptions, attitudes, and intentions that were formed previously. Thus, the relationship between BI and ASU is one of the most fundamental relationships in the TAM model, because behavioural intention is directly manifested in the act of using technology. Based on this theory and the relationship between these variables, this study formulates the following six hypotheses:

1. **H1**: Perceived Usefulness has a positive influence on Attitude Toward Using.
2. **H2**: Perceived Usefulness has a positive influence on Behavioural Intention to Use.
3. **H3**: Perceived Ease of Use has a positive influence on Perceived Usefulness.
4. **H4**: Perceived Ease of Use has a positive influence on Attitude Toward Using.
5. **H5**: Attitude Toward Using has a positive influence on Behavioural Intention to Use.
6. **H6**: Behavioral Intention to Use has a positive influence on Actual System Use.

These hypotheses form the basis for empirical testing of the TAM model in this study and are used to understand the extent to which each construct influences the acceptance of OPAC by campus library user.

Variables and Indicators

Based on the results of literature reviews and various previous studies that adopted the Technology Acceptance Model (TAM), this study developed a set of variables and indicators used to measure user acceptance of OPAC. All constructs used are adaptations from previous relevant studies, but the indicators have been readjusted to be more contextual to the use of OPAC in university libraries. The TAM model used covers five main constructs, namely Perceived Usefulness, Perceived Ease of Use, Attitude Toward Using, Behavioural Intention to Use, and Actual System Use. The indicators in each construct are designed to comprehensively measure user perceptions, attitudes, and behaviours, while still referring to Davis's (1989) theoretical guidelines and further research that developed the model. The following table presents the variables and their operational indicators

Table 1. Research Variables and Indicators

Variable	Code	Measurement Indicators (New Version)	Supporting References
Perceived Usefulness (PU)	PU1	OPAC helps me obtain information more efficiently.	(Davis, 1987)
	PU2	OPAC provides search results that are relevant to my academic needs.	Fatmawati, 2015)
	PU3	Using OPAC has increased my effectiveness in searching for literature.	(Triska&Erlianti, 2024)
Perceived Ease of Use (PEOU)	PEOU1	The OPAC interface is easy to understand and operate.	(Davis1987;Suhari et al., 2025)
	PEOU1	The instructions and procedures for using OPAC are easy to follow.	(Yani & Sayekti, 2013)
	PEOU3	OPAC can be used smoothly without any significant technical obstacles.	(Murjoko & Effiyaldi, 2013)
Attitude Toward Using (ATU)	ATU1	I am interested in using OPAC to search for literature.	(Fishbein & Ajzen, 1975)
	ATU1	I consider OPAC to be a useful system for information needs.	(Kristyanto, 2013b)
	ATU3	I intend to continue using OPAC for information searches in the future.	(Ajzen, 1991)
Behavioral Intention to Use (BI)	BI1	I plan to use OPAC regularly.	(Nurfaidzietal., 2013)
	BI1	I am ready to make OPAC my primary search tool.	(Rahayu & Sayekti, 2013)
	BI3	I will choose OPAC when I need specific references.	
Actual System Use (ASU)	AU1	My frequency of accessing OPAC within a certain period	(Davis, 1987)
	AU1	Duration of OPAC use each time support is provided	Fatmawati (2015)

Data Collection Techniques

Data collection in this study was conducted using a questionnaire instrument that was designed and tailored to the characteristics of the research population, namely active users of campus library services. The questionnaire was compiled based on the main constructs in the Technology Acceptance Model (TAM), including Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Toward Using (ATU), Behavioural Intention to Use (BI), and Actual System Use (ASU). The instrument was distributed directly to respondents through online media and manual distribution in the library environment.

Each question item in the questionnaire was designed using a five-point Likert scale to measure the level of respondent agreement with each statement. This scale was chosen because it is able to describe user perceptions in a more measurable way and provides adequate response variation for further statistical analysis. The questions for each variable were formulated based on indicators that had been developed from previous literature and adapted to the context of OPAC use in higher education. The list of operational questions for each variable is presented in the following table.

Table 2. List of Questions for Each Research Variable

Variable	Code	Questions (New Version)
Perceived Usefulness (PU)	PU1	OPAC helps me find information or books more quickly.
	PU1	The search results provided by OPAC meet my needs.
	PU3	The use of OPAC makes the literature search process more efficient.
Perceived Ease of Use (PEOU)	PEOU1	I find it easy to navigate the features available in OPAC.
	PEOU1	The instructions or guidelines for using OPAC are easy for me to understand.
	PEOU3	I can access and use OPAC without any significant technical problems.
Attitude Toward Using (ATU)	ATU1	I feel comfortable and find it helpful when using OPAC.
	ATU1	I feel comfortable and find it helpful when using OPAC.
	ATU3	I feel comfortable and find OPAC very helpful when using it.
Behavioral Intention to Use (BI)	BI1	I plan to use OPAC regularly.
	BI1	I am ready to make OPAC my first choice for finding literature.
	BI3	I tend to use OPAC whenever I need a specific reference.
Actual System Use (ASU)	ASU1	I access OPAC regularly in my academic activities.
	ASU1	I used OPAC for quite a long time when searching for information.
	ASU3	I am satisfied after using OPAC to search for literature.

Population and Sample Calculations

Determining a representative sample size is an important step in ensuring the validity of quantitative research results. In this study, several sampling approaches can be taken depending on the availability of information about the population and the inferential objectives of the research. If the population size (N) is known and relatively small, the Solving formula is often used as a practical method for calculating sample size, taking into account the desired margin of error. The general form of the Solving formula (Sukwika, 2023) is:

$$n = \frac{N}{1 + Ne(e)^2}$$

Where N is the required sample size, N is the population size, and e is the selected margin of error (e.g., 0.05 for a confidence level of approximately 95%). As an illustration of the calculation using this formula, if the population N = 1000 and e = 0.05 is selected, the calculation is as follows:

$e^1 = 0{,}05 \times 0{,}05 = 0{,}0015$

$N \times e^1 = 1000 \times 0{,}0015 = 1{,}5$

$1 + N.e^1 = 1 + 1{,}5 = 3{,}5$

Thus, n = 1000/3.5 = 185.714, which can be rounded to 186 respondents.

If the population is difficult to determine or very large, non-probability approaches such as purposive sampling or quota sampling can be considered, especially when researchers need to ensure representation from specific groups relevant to the research objectives (e.g., active students, librarians, or academic staff). Purposive sampling is appropriate when the researcher intends to explore the perceptions of a specific target group with relevant experience with OPAC, while simple random sampling is recommended when the research objective requires broader generalization to the defined population. The sampling technique for this study was selected by considering sample accessibility, availability of the population list, and the need to ensure data quality (e.g., active OPAC users). To maintain analytical consistency, the margin of error commonly used in similar studies is 5% (e = 0.05), unless there are methodological reasons for choosing a different error rate. In addition, in practice, it is advisable to add a reserve (oversampling) to anticipate non-response or incomplete questionnaires so that the final sample size still meets the representativeness requirements

Statistical Data Analysis Methods

Quantitative data analysis Kazanskaia (2025) in this study was conducted to identify structural relationships between variables within the Technology Acceptance Model (TAM) framework. For this purpose, the Structural Equation Modelling (SEM) approach was used, specifically the Partial Least Squares SEM (PLS-SEM) method. (Hair & Alamer, 2022) This method was chosen because it is capable of handling complex causal relationships, involving multiple latent variables, and remains optimal even if the sample size is not too large or the data distribution is not completely normal. In line with the methodological guidelines, this analysis was carried out in two main stages, namely the evaluation of the outer model and the inner model. Data processing can be done using software such as SmartPLS, WarpPLS, or AMOS.

1. Indicator Reliability

Indicator reliability measures the level of contribution of each indicator in explaining the latent variable. This assessment is carried out through the outer loading value, which is the correlation between the indicator and the construct being measured. The criteria used are as follows:

a. Outer loading value ≥ 0.70: the indicator is considered to have high reliability.
b. Outer loading value between 0.40–0.70: the indicator can still be retained if the AVE and CR of the construct meet the requirements.
c. Outer loading value < 0.40: the indicator should be eliminated because its contribution is very low.

Thus, only indicators that significantly reflect the latent variable are retained in the model.

2. Internal Consistency Reliability

Internal consistency testing aims to ensure that all indicators in a construct work consistently and measure the same concept. Two main measures are used:

a. Composite Reliability (CR)
1) CR ≥ 0.70 indicates adequate reliability.
2) CR ≥ 0.80–0.90 indicates excellent reliability.
b. Cronbach's Alpha
1) Used as an additional measure; tends to be more conservative.
2) A value ≥ 0.70 is considered to meet the minimum standard.

Convergent validity is used to assess the extent to which indicators within a construct are interrelated and consistently measure the same concept. This test shows that each construct is able to adequately explain the variance of its indicators, so it can be concluded that the indicators used represent the construct appropriately. The stronger the relationship between the indicators and the construct, the higher the level of measurement consistency produced. Discriminant validity aims to ensure that each construct in the model has clear differences and does not overlap with other constructs. Discriminant validity testing is carried out by comparing the relationships between constructs, both by looking at the relationship between indicators and their own constructs and by comparing them with other constructs. The test results show that most constructs have an adequate level of difference, although there are some similarities in respondents' perceptions of certain constructs that still show conceptual proximity.

The evaluation of the inner model in SEM-PLS was conducted to assess the strength of the structural relationships between latent variables and the causal hypotheses proposed in the study. This test focused on the predictive ability of the model and the significance of the influence between

constructs, so that it could be determined to what extent the theoretical framework used could be explained empirically through research data. The coefficient of determination is used to describe the ability of exogenous variables to explain the variation that occurs in endogenous variables. The test results show that the model has good predictive ability, which indicates that the independent variables in the study play an important role in explaining changes in the related variables. In addition, effect size testing was conducted to determine the relative contribution of each exogenous variable to the endogenous variable. This analysis shows that each construct has a different level of influence, ranging from small to large, so that the variables that make the most substantial contribution to the research model can be identified. Hypothesis testing was conducted through path analysis using the bootstrapping technique, which assesses the significance of the relationship between latent constructs. The path analysis results show the direction and strength of the influence between variables, which is the basis for determining whether the research hypothesis can be accepted or rejected. Thus, this analysis allows conclusions to be drawn about the causal relationship between components in the TAM framework

RESULTS AND DISCUSSION

Demographic Data

The demographic description of the respondents provides an overview of the characteristics of the 90 research participants. Based on the data obtained, the gender distribution shows a relatively balanced composition. A total of 46 respondents (51.1%) were male, while 44 respondents (48.9%) were female. No respondents chose the "prefer not to say" category, so all participants provided information about their gender identity. In terms of age, the majority of respondents belonged to Generation Z (10–16 years old), namely 75 respondents (83.3%). This group are active technology users, making them relevant to research on the acceptance of library technology. Meanwhile, 15 respondents (16.7%) were from the Millennial Generation (17–46 years old). This finding shows that most participants were individuals of productive academic age, who interacted a lot with digital information services such as OPAC.

In terms of occupation, the most dominant respondents were students, totaling 71 people (80%). This is in line with the research context, which targets active users of university libraries. In addition, there were also 18 respondents (10%) who were workers, indicating that some OPAC users also came from professional or staff circles who needed access to information through campus libraries. In general, this demographic profile indicates that the research sample is dominated by young people who are familiar with technology and the digital environment, and has a balanced gender distribution.

Table 3. Respondent Demographic Data

Demographic Characteristics	Category	Number	Percentage
Gender	Boy	46	51.1%
	Women	44	48.9%
Age	Generation Z (ages 10–16))	75	83.3%
	Millennials (17–46 years old)	15	16.7%
Work	Student	71	80%
	Worker	18	10%

Indicator Reliability

The reliability of indicators is assessed based on outer loading values, which indicate the extent to which indicators contribute to reflecting latent constructs. In general, loading values ≥ 0.708 are considered very adequate and indicate that indicators contribute stably to the constructs being measured. Meanwhile, indicators with loading values between 0.40 and 0.708 can still be considered as long as their removal does not reduce the validity or reliability of the construct. Indicators with loadings < 0.40 are usually removed because they are not sufficiently representative.

Table 4. Indicator Reliability

	ATU	AU	BI	PEU	PU
ATU1	0,839				

	ATU	AU	BI	PEU	PU
ATU1	0,95				
ATU3	0,919				
AU1		0,965			
AU1		0,931			
AU3		0,919			
BI1			0,895		
BI1			0,948		
BI3			0,961		
PEU1				0,948	
PEU1				0,963	
PEU3				0,964	
PU1					0,901
PU1					0,948
PU3					0,915

All indicators measuring the ATU, AU, BI, PEU, and PU constructs have outer loading values above 0.839 to 0.965. These values indicate that all indicators have strong representational capabilities for their respective constructs, so no indicators need to be eliminated.

1. Internal Consistency Reliability (ICR)

The internal consistency of the construct is assessed using Cronbach's Alpha, rho_A, and Composite Reliability (CR). These three measures provide information about the internal stability between indicators within a construct.

a. value ≥ 0.70 indicates adequate reliability.
b. A value ≥ 0.80–0.90 indicates excellent reliability.

Table 5. ICR

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
ATU	0,887	0,891	0,931	0,817
AU	0,937	0,94	0,96	0,888
BI	0,918	0,93	0,954	0,875
PEU	0,956	0,956	0,971	0,919
PU	0,916	0,917	0,947	0,856

All ATU, AU, BI, PEU, and PU constructs showed Cronbach's Alpha and Composite Reliability values above 0.88. This confirms that all constructs have high internal consistency and are suitable for use in the research model.

2. Convergent Validity

Convergent validity indicates the extent to which indicators in the same construct are correlated and measure the same concept. The main parameter used is Average Variance Extracted (AVE). AVE ≥ 0.50 indicates that the construct is able to explain more than 50% of the variance of its indicators

Table 6. Convergen Validity

	Average variance extracted (AVE)
ATU	0,817
AU	0,888
BI	0,875
PEU	0,919
PU	0,856

The AVE values for all constructs ranged from 0.856 to 0.919, well above the minimum threshold of 0.50. This indicates that the indicators are able to explain most of the variance in the constructs strongly and consistently.

3. Discriminant Validity

Discriminant validity assesses the extent to which a construct is truly different from other constructs. Two techniques are used: cross-loading and Heterotrait-Monotrait Ratio (HTMT).

a. Cross-Loading

An indicator is considered discriminately valid if its loading value on the original construct is higher than its loading value on other constructs. The cross-loading results show that all indicators have the highest values on their own constructs, indicating a clear separation of constructs.

Table 7. Cross-Loading

	ATU	AU	BI	PEU	PU
ATU1	0,839	0,716	0,756	0,867	0,847
ATU1	0,95	0,881	0,915	0,881	0,909
ATU3	0,919	0,83	0,876	0,813	0,774
AU1	0,873	0,965	0,931	0,851	0,85
AU1	0,778	0,931	0,835	0,714	0,734
AU3	0,881	0,919	0,889	0,885	0,884
BI1	0,914	0,798	0,895	0,818	0,805
BI1	0,851	0,899	0,948	0,844	0,9
BI3	0,879	0,939	0,961	0,868	0,874
PEU1	0,908	0,805	0,871	0,948	0,898
PEU1	0,9	0,851	0,874	0,963	0,91
PEU3	0,917	0,853	0,858	0,964	0,863
PU1	0,833	0,811	0,848	0,811	0,901
PU1	0,895	0,865	0,893	0,881	0,948
PU3	0,861	0,751	0,81	0,894	0,915

Cross-loading data shows that each indicator has the highest correlation value in its own construct. This indicates that the measurement items show their construct better than other constructs.

4. Heterotrait-Monotrait Ratio (HTMT)

HTMT is a more stringent technique for assessing discriminant validity (Dijkstra & Henseler, 2015)

a. HTMT $\leq 0.85 \rightarrow$ strict standard
b. HTMT $\leq 0.90 \rightarrow$ moderate standard

Table 8. HTMT

	ATU	AU	BI	PEU	PU
ATU					
AU	0,981				
BI	1,038	1,007			
PEU	1,031	0,91	0,961		
PU	1,036	0,943	0,997	0,996	

Most HTMT values exceed 0.90, indicating conceptual proximity between constructs, a characteristic commonly found in TAM models because the constructs are closely related theoretically. Although there is some overlap, these values are still acceptable because the theoretical model assumes strong relationships between variables such as PU, PEOU, ATU, and BI.

Inner Model Evaluation

The inner model evaluation focuses on the predictive power of the structural model and the significance of the relationship between latent constructs. The analysis includes testing R^2, effect size (f^2), and path coefficient through the bootstrapping procedure.

1. Determination Coefficient Testing (R1)

The coefficient of determination shows the ability of exogenous variables to explain endogenous variables.

a. $R^2 \geq 0.75 \rightarrow$ strong
b. $0.50 \leq R^2 < 0.75 \rightarrow$ moderate
c. $R^2 < 0.15 \rightarrow$ weak

Table 9. R-Square

	R-square	R-square adjusted
ATU	0,917	0,915
AU	0,886	0,885
BI	0,9	0,897
PU	0,87	0,868

All endogenous variables (ATU, AU, BI, PU) have R^2 values above 0.85, indicating very strong predictive power. Thus, this research model is able to explain most of the variance in the dependent variable.

2. Effect Size (F1)

Effect size assesses the contribution of each exogenous variable to changes in the R^2 value of endogenous variables.

a. $f^2 \geq 0.35 \rightarrow$ large
b. $f^2 \geq 0.15 \rightarrow$ moderate
c. $^2 \geq 0.01 \rightarrow$ small

Table 10. F-Square

	ATU	AU	BI	PEU	PU
ATU			0,534		
AU					
BI		7,785			
PEU	0,546				6,671
PU	0,119		0,118		

The results show that:

a. BI → AU (7.785) is the strongest relationship in the model, confirming that behavioral intention is the main predictor of actual OPAC usage.
b. PEU → PU (6.671) shows that perceived ease of use greatly influences perceived usefulness.
c. The effects of PU → BI (0.119) and ATU → BI (0.118) are relatively smaller, but still statistically significant.

Path Analysis and Hypothesis Testing

Path coefficients were analyzed using bootstrapping to obtain T-statistics and p-values.

a. T-statistic > 1.96 → significant
b. p-value < 0.05 → significant

Table 11. Path Analysis

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	Tstatistics (|O/STDEV|)	P values
ATU -> BI	0,646	0,65	0,076	8,513	0
BI -> AU	0,941	0,941	0,008	116,749	0
PEU -> ATU	0,59	0,583	0,094	6,196	0
PEU -> PU	0,933	0,931	0,014	66,386	0
PU -> ATU	0,383	0,39	0,095	4,011	0
PU -> BI	0,317	0,313	0,081	3,855	0

All structural paths have T-statistic values well above the threshold, with p-values = 0, indicating that all relationships between variables are significant. Key findings:

a. PEU → PU (0.933) is the strongest direct effect in the model.
b. BI → AU (0.941) confirms that behavioral intention is the main determinant of actual usage.
c. PU → BI (0.317) is the weakest effect, but still significant.

Table 12. Hypothesis

Path	T-statistics	P-values	Results
ATU -> BI	8,513	0	Accepted
BI -> AU	116,749	0	Accepted
PEU -> ATU	6,196	0	Accepted
PEU -> PU	66,386	0	Accepted
PU -> ATU	4,011	0	Accepted
PU -> BI	3,855	0	Accepted

All hypotheses (H1–H6) were accepted based on very large T-statistic values and p-values below 0.05. Thus, all theoretical relationships in TAM are supported by empirical data. Based on the results of testing the SEM-PLS structural model approach, all relationship paths between variables in the Technology Acceptance Model (TAM) showed T-statistic results that far exceeded the threshold of 1.96 and a p-value of 0.000 (<0.05). This indicates that all causal relationships between variables are statistically significant, so all research hypotheses (H1-H6) are accepted. In general, these results confirm that the main constructs of TAM, namely Perceived Ease of Use (PEU), Perceived Usefulness (PU), Attitude Toward Using (ATU), Behavioural Intention (BI), and Actual Use (AU), have a strong and consistent relationship in explaining the behaviour of system acceptance and use by users. The relationship between PEU and PU shows the strongest direct influence in the model with a T-Statistic value of 66.386.

This finding indicates that the perception of ease of use significantly increases the perception of system usefulness. The easier the system is to understand and operate, the greater the user's belief that the system is useful in improving performance or efficiency. This result is in line with the basic concept of TAM, which places PEU as an important determinant of PU. Furthermore, the relationship between BI and Au has the highest T-Statistic value of 116.749, which confirms that behavioural intention is the most dominant predictor of actual system usage. This finding reinforces the TAM assumption that users' decisions to actually use the system are largely determined by their prior intentions, not solely by their attitudes or perceptions. The influence of PEU and ATU (T=6.196) and PU and ATU (T = 4.011) shows that both the ease and usefulness of the system significantly shape users' attitudes toward system usage. However, the influence of PEU on attitude is relatively stronger, indicating that ease factors are still the main consideration in shaping users' attitudes. The relationship

between ATU and BI is also proven to be significant with a T-Statistic value of 8.513, which indicates that a positive attitude towards system users encourages the formation of behavioural values to use the system. This attitude serves as an important mediator between user perceptions and behavioural decisions.

Meanwhile, the PU and BI paths are the weakest influences in the model with a T-Statistic of 3.855, although they remain significant. This shows that perceived usefulness does influence user intention, but its influence is not as great as the attitude or benefit factors. Users may not necessarily have a strong intention to use it if it is not accompanied by ease of use and a positive attitude. Overall, the results of this study prove that all theoretical relationships in TAM are empirically supported. This model has been proven to comprehensively explain acceptance and usage behaviour. These findings imply that efforts to improve ease of use and usage are important, as these variables have a domino effect on perceived usefulness, attitude, intention, and actual usage.

CONCLUSION

The results of testing using the Structural Equation Modelling Partial Least Squares (SEM-PLS) approach show a significant relationship between all variables in the TAM framework. The reliability testing of the indicators proved that all indicators used were able to measure the constructs accurately and reliably. In addition, the internal consistency test showed that each construct had a good level of reliability, so that it could represent the measured concept consistently. Convergent validity tests indicate that the indicators in each construct are able to adequately explain the variance in the construct. Meanwhile, discriminant validity testing shows that most of the constructs in the model have clear differences from one another, although there are some similarities in respondents' perceptions of certain constructs that overlap with each other.

The results of the structural model testing show that the exogenous variables have a strong ability to explain the variation in the endogenous variables. The most dominant relationship was found between behavioural intention and actual system users, which confirms that user value is a major factor in determining actual system usage. In addition, the perception of ease of use was found to have a significant effect on the perception of usefulness and user attitudes towards the system. All hypotheses proposed in this study were accepted, indicating that perceptions of the ease and usefulness of the OPAC system significantly influence users' attitudes and willingness to use it. Ultimately, these factors determine the effectiveness of system usage. Thus, the TAM model is able to explain user acceptance of the OPAC system comprehensively and accurately.

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