# An Exploratory Study of the Factors Influencing Consumer Behavior in Adopting Free Wi-Fi Services in Yogyakarta: An Approach Based on the Technology Acceptance Model (TAM)

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*Abstract: This study aims to analyse the factors influencing consumer behavior in adopting free Wi-Fi services in the city of Yogyakarta. The adoption of technology, particularly free Wi-Fi, is a crucial issue in the context of smart cities and enhancing public access to information. This research employs the Technology Acceptance Model (TAM) to explore the impact of perceived usefulness (PU) and perceived ease of use (PEOU) on intention to use, as well as how security concerns and social influence moderate these relationships. The research methodology utilizes Structural Equation Modelling (SEM) with Partial Least Squares (PLS) technique. Data was collected through a survey involving 100 respondents who are users of free Wi-Fi services at various strategic locations in Yogyakarta. The results indicate that perceived usefulness (PU) and perceived ease of use (PEOU) have a significant positive impact on users' intention to adopt free Wi-Fi, while security concerns are found to be a significant inhibitory factor. Additionally, social influence plays a role in enhancing the intention to use free Wi-Fi, although with a smaller effect. This study contributes to the understanding of consumer behavior in adopting free Wi-Fi technology and can serve as a reference for public policy development related to Wi-Fi infrastructure in major cities, particularly in Indonesia.*

## INTRODUCTION

In the current digital era, the demand for fast, stable, and affordable internet access has become increasingly critical. The internet has evolved into an essential component of daily life, serving not only entertainment purposes but also facilitating education, work, business, and public services. According to the 2024 report by the Indonesian Internet Service Providers Association (APJII), internet penetration in Indonesia has reached 79.5%, with the majority of users falling within the productive age range (16–35 years). This statistic reflects the high level of reliance on internet connectivity for various activities.

Recognizing this pressing need, the Yogyakarta City Government has initiated a public free Wi-Fi program across several strategic locations such as city parks, bus stops, tourist areas, educational institutions, and other public spaces. The goal of this initiative is to expand access to information, enhance public productivity, and support the

development of a smart city ecosystem. According to data from the Yogyakarta Communications and Informatics Office in 2023, over 150 free Wi-Fi access points have been established throughout the city.

However, despite the availability of free Wi-Fi services, the level of utilization and adoption among the public remains inconsistent. An internal survey conducted by the Yogyakarta City Government in 2023 indicated that approximately 65% of users access free Wi-Fi for educational and entertainment purposes, while 35% refrain from utilizing the service due to concerns related to data security, inconsistent connection speeds, and cumbersome login procedures. Additionally, demographic factors such as age, education level, and digital literacy are hypothesized to influence the adoption behavior of free Wi-Fi in public spaces.

To better understand these dynamics, a comprehensive consumer behavior analysis is necessary to identify the factors that influence the intention and decision to use free Wi-Fi. The Technology Acceptance Model (TAM), first proposed by Davis (1989), offers a theoretical framework for explaining the adoption of new technologies. According to TAM, two primary factors perceived usefulness (PU) and perceived ease of use (PEOU) are crucial in determining technology acceptance.

In the context of free Wi-Fi, perceived usefulness (PU) refers to the extent to which an individual believes that using the technology will enhance their performance or provide benefits for their activities. This could include the perceived advantages of accessing the internet for educational, work, or entertainment purposes without incurring additional costs. On the other hand, perceived ease of use (PEOU) relates to the degree to which a user believes that using the technology is easy and does not require significant effort. In the case of free Wi-Fi, PEOU is linked to factors such as ease of access, connection speed, and a user-friendly login process.

Several previous studies have shown that these two factors significantly impact attitudes toward usage and behavioral intentions to adopt new technologies. For example, Venkatesh and Davis (2000) found that both PU and PEOU are key predictors of users' intention to adopt new technologies. Furthermore, Moore and Benbasat (1991) suggested that social influence and facilitating conditions also play a significant role in technology adoption decisions, including the use of free Wi-Fi in public spaces.

In addition to these theoretical contributions, empirical studies have provided deeper insights into the factors influencing free Wi-Fi adoption: Choi and Kim (2015) in their study on free Wi-Fi adoption in South Korea found that both perceived usefulness and perceived ease of use had a significant impact on users' intentions to access free Wi-Fi. They also highlighted that concerns about data security were a significant barrier to free Wi-Fi adoption. Kwon and Wen (2010), in their research conducted in China, concluded that social influence, particularly recommendations from friends or colleagues, significantly affected the decision to use free Wi-Fi. They also emphasized the importance of ease of access and service quality in driving adoption rates. Hsu et al. (2016) identified that perceived ease of use had the most substantial effect on users' attitudes and intentions to use free Wi-Fi, while concerns such as security and cost were of lesser significance.

While numerous studies have explored the adoption of free Wi-Fi technology, most of them focus on developed countries or regions with advanced technological infrastructures. For instance, Choi and Kim (2015) and Kwon and Wen (2010) conducted their research in countries like South Korea and China, which have high levels of internet penetration and advanced technological infrastructures. Moreover, many of these studies

primarily concentrate on factors such as data security and social influence in the context of free Wi-Fi use, without delving deeply into factors such as ease of access and perceived usefulness, which are more relevant in developing countries like Indonesia.

This study seeks to address this gap by examining the acceptance of free Wi-Fi services in Yogyakarta, a city with distinct characteristics and challenges, particularly in terms of digital literacy, data security, and service quality. This research will contribute new insights into the role of social factors, such as the influence of peers or family, on the intention to use free Wi-Fi in public spaces, and will also explore demographic factors in relation to perceived ease of use and perceived usefulness.

Therefore, this study is expected to make a valuable contribution to the literature on the adoption of free Wi-Fi technology, particularly in the context of developing cities, and to provide recommendations for the development of more inclusive and adaptive public Wi-Fi services that better meet the needs of the Indonesian population.

## LITERATURE REVIEW
### Consumer Behavior in Technology Adoption

Consumer behavior in technology adoption refers to the series of decisions, attitudes, and actions taken by individuals when accepting or rejecting the use of new technologies (Kotler & Keller, 2016). In the context of free public Wi-Fi services, this behavior can be observed through how frequently the service is used, the duration of use, and the specific purposes for which it is accessed. Indicators include the frequency of using free Wi-Fi, which reflects how regularly consumers engage with the service (Zhou, 2008); the duration of use, which indicates the level of dependency or comfort users experience (Park et al., 2014); and the types of activities conducted while connected, such as studying, working, entertainment, or social interaction, which demonstrate the relevance of the service to users' daily needs (Hsu et al., 2016). Moreover, satisfaction with the experience encompassing connection speed, stability, and ease of access also plays a crucial role in encouraging continued usage (Kim et al., 2011; Choi & Kim, 2015). Both internal factors (such as perceived usefulness and ease of use) and external influences (such as peer pressure and availability of supporting facilities) significantly shape consumer decisions regarding technology adoption (Schiffman & Kanuk, 2010).

### Technology Acceptance Model –(TAM)
### Perceived Usefulness (PU)

Perceived Usefulness (PU) is a core construct in the Technology Acceptance Model (TAM), defined by Davis (1989) as the degree to which an individual believes that using a particular technology will enhance their performance. In the context of free public Wi-Fi services, PU reflects users' perceptions of how beneficial the service is in supporting both productive and recreational activities. Indicators of PU include the belief that free Wi-Fi can increase productivity such as assisting in completing school assignments or work-related tasks efficiently and its ability to reduce internet costs by eliminating the need for personal data usage. Furthermore, free Wi-Fi allows users to access information quickly and easily, which aids in learning and informed decision-making. It also supports digital entertainment activities such as video streaming, music, and online gaming, all of which contribute to a positive user experience (Choi & Kim, 2015; Venkatesh & Davis, 2000). Therefore, the higher the perceived usefulness of free Wi-Fi, the greater the likelihood that users will adopt and continue using the service in their daily lives.

## Perceived Ease of Use (PEOU)

Perceived Ease of Use (PEOU) in the Technology Acceptance Model (TAM) refers to the degree to which an individual believes that using a particular technology will be free of effort (Davis, 1989). In the context of free public Wi-Fi services, PEOU is strongly influenced by several usability-related factors. These include the ease of locating available Wi-Fi hotspots, especially in public areas such as parks, transportation hubs, or educational facilities. A simple and fast login or registration process also significantly contributes to a positive user experience, as complex or time-consuming procedures can deter usage. Furthermore, stable connectivity without requiring additional technical configuration enhances the perceived simplicity of the service. The availability of clear information or technical assistance when users encounter issues is also vital, as it provides reassurance and confidence in using the service. These indicators collectively reflect the user's perception of the effort involved in using free Wi-Fi and play a crucial role in determining their intention to adopt and continue using the service (Hsu et al., 2016).

## Attitude Toward Usage

Attitude Toward Usage refers to an individual's overall evaluation either favorable or unfavorable of using a particular technology (Ajzen & Fishbein, 1980). In the context of free public Wi-Fi services, this attitude is reflected in how comfortable users feel when accessing Wi-Fi in public spaces, their perception that using free Wi-Fi is a beneficial and smart choice, and their willingness to recommend the service to others. A positive attitude often arises when users perceive the service as reliable, helpful, and easily accessible, contributing to a sense of satisfaction and trust. This attitude is influenced by both cognitive assessments (e.g., usefulness and ease of use) and affective responses (e.g., enjoyment or frustration). According to Venkatesh and Davis (2000), a strong positive attitude toward the technology significantly enhances users' behavioral intention to adopt and continue using it.

## Behavioral Intention to Use

Behavioral intention to use refers to the likelihood or intention of an individual to continue using a technology in the future, based on their previous experiences and attitudes toward it (Davis, 1989). In the context of free Wi-Fi services, behavioral intention is a key predictor of continued usage and adoption. This intention is influenced by factors such as satisfaction with the current experience, perceived usefulness, and ease of use. Indicators of behavioral intention to use include the plan to continue using free Wi-Fi in the future, the willingness to try Wi-Fi services in other public locations, and the preference for relying on free Wi-Fi rather than using personal data packages, especially when the quality and availability are perceived as high. Studies have shown that when users find Wi-Fi services to be beneficial and easy to use, they are more likely to intend to use them frequently in the future (Venkatesh & Davis, 2000).

## Study Model and Hypothesis

This study model refers to the Technology Acceptance Model (TAM) developed by Davis (1989). TAM explains that individual acceptance of a technology is influenced by two main factors, namely Perceived Ease of Use (PEOU) and Perceived Usefulness (PU). PEOU is the extent to which a person believes that using a system will be free from effort, while PU is the extent to which a person believes that using a system will improve their performance. These two factors influence Attitude Toward Usage (ATU), which then

influences Behavioral Intention to Use (BIU), which is a person's intention to use the technology (Davis, 1989; Venkatesh & Davis, 2000).
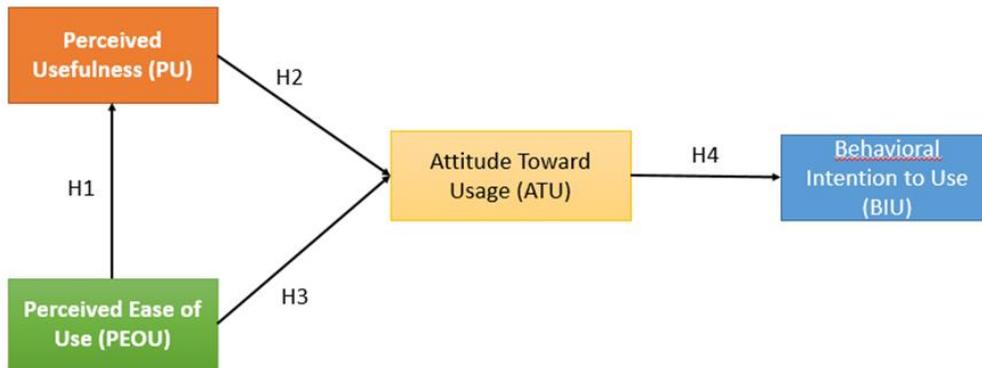


**Picture 1.** Study Model and Hypothesis

Based on this model, the hypothesis proposed in this study is as follows:

H1: Perceived Ease of Use (PEOU) has a positive effect on Perceived Usefulness (PU)
H2: Perceived Usefulness (PU) has a positive effect on Attitude Toward Usage (ATU).
H3: Perceived Ease of Use (PEOU) has a positive effect on Attitude Toward Usage (ATU)
H4: Attitude Toward Usage (ATU) has a positive effect on Behavioral Intention to Use (BIU)

## METHODS
### Research Design
This study uses an exploratory quantitative approach based on surveys to identify the factors that influence consumer behavior in adopting free Wi-Fi services in Yogyakarta. The research model refers to the development of the Technology Acceptance Model (TAM), with the addition of external variables related to social and environmental factors surrounding users. The study aims to explore how these variables affect consumers' perceptions and decisions to use free Wi-Fi services. The research was conducted in several public spaces in Yogyakarta that provide free Wi-Fi services, including city parks, tourist areas, cafes, shopping centers, and other public facilities with free Wi-Fi hotspots. The study was carried out from May to July 2025, considering that during these months, the number of visitors to public spaces in Yogyakarta is typically high, including both local residents and tourists.

### Population and Sample
The population in this study consists of users of free Wi-Fi services in Yogyakarta. The sampling technique employed is purposive sampling, with the following criteria: participants must be at least 16 years old and have used free Wi-Fi services at least once in the past three months. The sample size is determined using the formula from Hair et al. (2010), which recommends having at least 5 to 10 times the number of indicators for the study. With 30 indicators in the survey, a minimum of 150 respondents is required to ensure that the data collected is statistically significant and representative of the

population. This sampling method ensures that the respondents have relevant experience with the subject matter and can provide valuable insights into the adoption behavior of free Wi-Fi services.

**Data Collection and Data Analysis Techniques**

Primary data in this study is collected through both online and offline questionnaires. The instrument used employs a 5-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), to capture respondents' perceptions and behaviors regarding the adoption of free Wi-Fi services in public spaces. The questionnaire is designed to gather information on perceived usefulness, perceived ease of use, attitude toward usage, and behavioral intention to use, with appropriate modifications to ensure clarity and relevance to the context of the study. The questionnaire is distributed through various platforms and directly at public spaces in Yogyakarta, where the service is available.The collected data is analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the aid of SmartPLS 4.0 software. The analysis process includes several steps: First, the evaluation of the outer model for validity and reliability, focusing on convergent validity, discriminant validity, and composite reliability. Next, the inner model is assessed by examining path coefficients, R-squared values, and effect size ($f^2$) to evaluate the relationships between variables. Finally, significance testing is performed using bootstrapping to determine the t-statistics and p-values, which indicate the strength and significance of the hypothesized relationships. This robust method ensures that the structural relationships in the model are appropriately tested and validated.

**RESULTS AND DISCUSSION**

**Descriptive statistics.**

The descriptive statistics presented in Table 1 illustrate the profile of the respondents involved in this study. The sample comprises individuals from diverse demographic backgrounds, including variations in age, gender, education level, and social status. This diversity reflects a broad representation of the Lebanese population, thereby enhancing the external validity of the study's findings. The heterogeneous composition of the sample is expected to provide a more comprehensive understanding of the phenomena under investigation.

**Table 1.** Description of Respondent Characters

| Character | Description | Amount | Percentage (%) |
|---|---|---|---|
| Gender | Male | 58 | 58% |
| | Female | 42 | 42% |
| Age | < 20 years | 13 | 13% |
| | 20–30 years | 77 | 77% |
| | 31–40 years | 1 | 1% |
| | > 40 years | 9 | 9% |
| Monthly Allowance | < Rp1 million | 37 | 37% |
| | Rp1–3 million | 43 | 43% |
| | Rp3–5 million | 13 | 13% |
| | > Rp5 million | 7 | 7% |
| Internet Cost/Month | < Rp75 thousand | 33 | 33% |

| Character | Description | Amount | Percentage (%) |
|---|---|---|---|
| | Rp75–145 thousand | 53 | 53% |
| | Rp150–260 thousand | 11 | 11% |
| | > Rp260 thousand | 3 | 3% |
| Occupation | Student | 45 | 45% |
| | Private Employee | 27 | 27% |
| | Entrepreneur | 8 | 8% |
| | Civil Servant | 6 | 6% |
| | Housewife | 4 | 4% |
| | Laborer | 3 | 3% |
| | Farmer | 2 | 2% |
| | Freelance Laborer | 1 | 1% |
| | Housing Security | 1 | 1% |
| | Technical Worker | 1 | 1% |
| | Freelancer | 1 | 1% |
| | Packing Staff | 1 | 1% |

The respondent profile is predominantly male (58%) and within the productive age group of 20–30 years (77%), indicating a young and potentially tech-savvy demographic. Most receive a monthly allowance of Rp1–3 million (43%) and spend Rp75–145 thousand per month on internet access (53%), reflecting moderate economic capacity and digital accessibility. In terms of occupation, the majority are students (45%), followed by private employees (27%), showing that the sample is largely composed of individuals engaged in education and the private sector. This demographic composition is relevant for studies focusing on digital behavior, consumer trends, or education-related topics

**Measurement Model Testing (Outer Model)**

Measurement model testing (outer model) aims to evaluate the validity and reliability of the research instrument used to measure the latent construct in the model. This testing is carried out using the main data as a whole

**Validitas Konvergen**

Convergent validity is a component of construct validity within measurement models, indicating the extent to which indicators of a specific construct are correlated and consistently reflect the construct they are intended to measure. Convergent validity is considered adequate when the outer loading of each indicator is ≥ 0.7. However, loadings between 0.6 and 0.7 may still be acceptable if the Average Variance Extracted (AVE) and Composite Reliability (CR) values meet the recommended thresholds. An AVE value of ≥ 0.5 indicates that the construct explains more than 50% of the variance in its indicators, which confirms acceptable convergent validity (Hair et al., 2022; Fornell & Larcker, 1981).

**Table 2.** Results of Loading Factor and Average Variance Extracted Convergent Validity Test

| Variabel | Item Pengukuran | Indikator | Factor Loading (FL) | Average variance extracted (AVE) | Description |
|---|---|---|---|---|---|
| Perceived Usefulness (PU) | X1.6 | Support is easy to access when I face issues with Yogyakarta's free Wi-Fi. | 0.887 | 0.836 | Valid |
| | X1.7 | Using Yogyakarta's free Wi-Fi is easy for me | 0.922 | | Valid |
| | X1.8 | Yogyakarta's free Wi-Fi improves my digital quality of life | 0.933 | | Valid |
| Perceived Ease of Use (PEOU) | X2.1 | I feel comfortable using Yogyakarta's free public Wi-Fi. | 0.713 | 0.621 | Valid |
| | X2.2 | Using Yogyakarta's free Wi-Fi is a smart choice. | 0.766 | | Valid |
| | X2.5 | I would recommend Yogyakarta's free Wi-Fi to others. | 0.877 | | Valid |
| Attitude Toward Usage (ATU) | Y1.1 | I feel comfortable using Yogyakarta's free public Wi-Fi. | 0.773 | 0.661 | Valid |
| | Y1.2 | Using Yogyakarta's free Wi-Fi is a smart choice. | 0.840 | | Valid |
| | Y1.3 | I believe Yogyakarta's free Wi-Fi provides positive benefits for me. | 0.748 | | Valid |
| | Y1.4 | I am satisfied with my experience using Yogyakarta's free Wi-Fi. | 0.849 | | Valid |
| | Y1.5 | I would recommend Yogyakarta's free Wi-Fi service to others. | 0.858 | | Valid |
| | Y1.6 | I have a positive perception of using Yogyakarta's free Wi-Fi in public spaces. | 0.822 | | Valid |
| | Y1.7 | Using Yogyakarta's free Wi-Fi makes me feel more productive and connected. | 0.793 | | Valid |
| Behavioral Intention to Use (BIU) | Z.1.1 | I intend to continue using Yogyakarta's free public Wi-Fi in the future. | 0.899 | 0.716 | Valid |
| | Z1.2 | If available, I prefer using Yogyakarta's free Wi-Fi over personal data plans | 0.877 | | Valid |
| | Z1.3 | I am willing to try Yogyakarta's free Wi-Fi at other public locations. | 0.818 | | Valid |
| | Z1.4 | I prefer Yogyakarta's free Wi-Fi due to its quality and convenience. | 0.818 | | Valid |
| | Z1.5 | I will regularly use Yogyakarta's free Wi-Fi if accessible at my activity locations. | 0.817 | | Valid |

Based on the measurement model testing results, all indicators within each construct show factor loading values above 0.7 and Average Variance Extracted (AVE) values greater than 0.5, indicating that each indicator significantly explains its respective latent variable and meets the criteria for convergent validity. This aligns with the recommendations of Hair et al. (2022) and Fornell & Larcker (1981), who state that convergent validity is achieved when factor loading values are ≥ 0.7 and AVE is ≥ 0.5. Therefore, the research instrument can be considered valid in measuring the intended constructs.

**Discriminant Validity**

Discriminant validity ensures that each construct in a model is truly distinct from others. It can be assessed through: (1) Cross Loadings, where indicators must load higher on their associated construct than on others; (2) Fornell-Larcker Criterion, which requires that the square root of AVE for each construct is greater than its correlations with other constructs (Fornell & Larcker, 1981); and (3) Latent Variable Correlation, where correlations between constructs should be below 0.85 to avoid redundancy (Henseler et al., 2015). Together, these methods confirm the uniqueness and conceptual separation of constructs in SEM.

**Table 3.** Model Heteroltrait Monotrait Ratio (HTMT) Of Discriminant Validity Test

| | Attitude Toward Usage | Behavioral Intention to Use | Perceived Ease of Use (PEOU) | Perceived Usefulness (PU) |
|---|---|---|---|---|
| Attitude Toward Usage | | | | |
| Behavioral Intention to Use | 0.875 | | | |
| Perceived Ease of Use (PEOU) | 0.917 | 0.785 | | |
| Perceived Usefulness (PU) | 0.684 | 0.803 | 0.620 | |

Based on the correlation matrix between latent constructs in the Technology Acceptance Model (TAM), all variables exhibit strong and positive interrelationships. The correlation between Attitude Toward Usage and Behavioral Intention to Use **is** 0.875, indicating a very strong relationship, which suggests that a more positive user attitude toward the system significantly enhances their intention to use it. Furthermore, Perceived Ease of Use (PEOU) shows a high correlation with both Attitude Toward Usage **(**0.917**)** and Behavioral Intention to Use **(**0.785**),** indicating that users' perception of ease of use greatly influences both their attitude and behavioral intention.

Additionally, Perceived Usefulness (PU) demonstrates strong positive correlations with Attitude Toward Usage **(**0.684**),** Behavioral Intention to Use **(**0.803**)**, and PEOU **(**0.620**),** confirming that the perceived usefulness of the system contributes not only to users' attitudes and intentions but is also closely associated with how easy they perceive the system to be. Overall, these correlations support the theoretical framework of TAM, where perceived ease of use and perceived usefulness are key antecedents of attitude, which in turn affects behavioral intention. The consistently high correlation values also reflect data reliability and the strength of construct relationships in explaining users' technology adoption behavior.

**Cross Loadings**

Cross loading analysis requires that each indicator loads more strongly on its associated latent variable than on any other latent variables. If an item's loading on its own construct is higher than its loadings on other constructs, this suggests good discriminant validity (Hair et al., 2022).

**Table 4.** Cross Loading Results of Discriminant Validity Test

| Instrument | Attitude Toward Usage | Behavioral Intention to Use | Perceived Ease of Use (PEOU) | Perceived Usefulness (PU) | Description |
|---|---|---|---|---|---|
| Y1.1 | **0.773** | 0.541 | 0.654 | 0.435 | Valid |
| Y1.2 | **0.840** | 0.667 | 0.650 | 0.402 | Valid |
| Y1.3 | **0.748** | 0.574 | 0.538 | 0.438 | Valid |
| Y1.4 | **0.849** | 0.754 | 0.746 | 0.627 | Valid |
| Y1.5 | **0.858** | 0.631 | 0.683 | 0.506 | Valid |
| Y1.6 | **0.822** | 0.629 | 0.524 | 0.562 | Valid |

| Instrument | Attitude Toward Usage | Behavioral Intention to Use | Perceived Ease of Use (PEOU) | Perceived Usefulness (PU) | Description |
|---|---|---|---|---|---|
| Y1.7 | **0.793** | 0.719 | 0.447 | 0.568 | Valid |
| Z1.1 | 0.721 | **0.899** | 0.698 | 0.667 | Valid |
| Z1.2 | 0.700 | **0.877** | 0.646 | 0.593 | Valid |
| Z1.3 | 0.680 | **0.818** | 0.523 | 0.633 | Valid |
| Z1.4 | 0.630 | **0.818** | 0.460 | 0.525 | Valid |
| Z1.5 | 0.641 | **0.817** | 0.418 | 0.643 | Valid |
| X2.1 | 0.493 | 0.432 | **0.713** | 0.369 | Valid |
| X2.2 | 0.524 | 0.328 | **0.766** | 0.205 | Valid |
| X2.5 | 0.725 | 0.722 | **0.877** | 0.584 | Valid |
| X1.6 | 0.541 | 0.665 | 0.494 | **0.887** | Valid |
| X1.7 | 0.608 | 0.673 | 0.446 | **0.922** | Valid |
| X1.8 | 0.565 | 0.647 | 0.471 | **0.933** | Valid |

The results of the discriminant validity test using cross loading indicate that each indicator has the highest loading value on its intended latent construct compared to other constructs, thereby fulfilling the criteria for discriminant validity (Hair et al., 2022). For instance, item Y1.4 shows the highest loading on the construct *Attitude Toward Usage* (0.849), which is significantly higher than its loadings on other constructs. This pattern is consistent across all items, demonstrating that each construct in the structural model is conceptually distinct and that no indicators cross-load significantly on unintended constructs. These findings confirm the reliability of the measurement model in accurately representing the latent variables.

**Fornell-Larcker**

The Fornell-Larcker criterion is used to assess discriminant validity in SEM-PLS by comparing the square root of AVE with the correlations between constructs. Discriminant validity is considered established when the square root of a construct's AVE is greater than its correlation with any other construct (Fornell & Larcker, 1981; Hair et al., 2022). This method is conservative but effective, especially when supported by cross-loading and HTMT evaluations.

**Table 4.** Fornell-Larcker Results of Discriminant Validity Test

| | Attitude Toward Usage | Behavioural Intention to Use | Perceived Ease of Use (PEOU) | Perceived Usefulness (PU) |
|---|---|---|---|---|
| **Behavioural Intention to Use** | 0.798 | 0.846 | | |
| **Perceived Ease of Use (PEOU)** | 0.754 | 0.667 | 0.787 | |

|  | Attitude Toward Usage | Behavioural Intention to Use | Perceived Ease of Use (PEOU) | Perceived Usefulness (PU) |
|---|---|---|---|---|
| Perceived Usefulness (PU) | 0.625 | 0.724 | 0.528 | 0.914 |

Each latent construct demonstrates discriminant validity if the square root of its AVE (diagonal values) is greater than its correlations with other constructs (off-diagonal values). In this study, the square root of AVE for each construct—Attitude Toward Usage (0.798), Behavioural Intention to Use (0.846), Perceived Ease of Use (PEOU) (0.787), and Perceived Usefulness (PU) (0.914)—is higher than their correlations with other constructs. This confirms that each construct shares more variance with its indicators than with other latent variables, thereby supporting the discriminant validity of the measurement model, consistent with the Fornell-Larcker criterion (Fornell & Larcker, 1981).

**Latent variable correlation**

Latent Variable Correlation is a measure of the relationship between latent constructs in the PLS-SEM model. This correlation is important for assessing the strength and direction of the relationship between variables and verifying the validity of the discriminator. If the square root of AVE of a construct is higher than its correlation with another construct, then its discriminant validity is considered good (Fornell & Larcker, 1981). This correlation is also useful for detecting potential multicollinearity between constructs in the model.

**Table 5.** Latent Variable Correlation, AVE and AVE Root Results

| Variabels | Attitude Toward Usage | Behavioral Intention to Use | Perceived Ease of Use (PEOU) | Perceived Usefulness (PU) | Average variance extracted (AVE) | √Average variance extracted (AVE) | Description |
|---|---|---|---|---|---|---|---|
| Attitude Toward Usage | 1.000 | 0.798 | 0.751 | 0.626 | 0.661 | 0.813 | Valid |
| Behavioral Intention to Use | 0.798 | 1.000 | 0.654 | 0.724 | 0.716 | 0.846 | Valid |
| Perceived Ease of Use (PEOU) | 0.751 | 0.654 | 1.000 | 0.513 | 0.621 | 0.788 | Valid |
| Perceived Usefulness (PU) | 0.626 | 0.724 | 0.513 | 1.000 | 0.836 | 0.914 | Valid |

Based on the latent variable correlation table and Fornell-Larcker analysis, it can be concluded that all constructs in the model exhibit good discriminant validity. This is evidenced by the square root of the AVE (√AVE) for each construct being higher than its correlations with other constructs. For example, the √AVE for *Attitude Toward Usage* is 0.813, which is greater than its correlations with *Behavioral Intention to Use* (0.798), *Perceived Ease of Use* (0.751), and *Perceived Usefulness* (0.626). This pattern is consistent across all

constructs, indicating that each construct measures a distinct concept, thus confirming that discriminant validity is met according to the Fornell-Larcker criterion.

**Reliability Testing**

Reliability testing in PLS-SEM aims to assess the internal consistency of latent construct indicators. Reliability is considered acceptable when Cronbach's Alpha and Composite Reliability values are ≥ 0.7, and the AVE is ≥ 0.5. These measures indicate that the indicators consistently and validly represent the intended constructs within the research model.

**Table 6.** Reliability Testing

| Variabel | Cronbach's alpha | Composite reliability (rho_a) | Description |
|---|---|---|---|
| Attitude Toward Usage (ATU) | 0.914 | 0.919 | Reliabel |
| Behavioural Intention to Use (BIU) | 0.901 | 0.903 | Reliabel |
| Perceived Ease of Use (PEOU) | 0.696 | 0.737 | Reliabel |
| Perceived Usefulness (PU) | 0.902 | 0.905 | Reliabel |

Based on the reliability test results, all variables in the model are considered reliable. The values of Cronbach's Alpha and Composite Reliability for *Attitude Toward Usage* (0.914 and 0.919), *Behavioral Intention to Use* (0.901 and 0.903), and *Perceived Usefulness* (0.902 and 0.905) exceed the threshold of 0.7, indicating strong internal consistency. Although the Cronbach's Alpha for *Perceived Ease of Use* (0.696) is slightly below 0.7, its Composite Reliability (0.737) still meets the acceptable standard, thus it is also deemed reliable. Therefore, all four constructs demonstrate sufficient reliability for further analysis.

**Validasi Model Fit**

**Table 7.** Model Fit Evaluation

| Parameter | Rule of Thumb | Estimated Model | Explanation |
|---|---|---|---|
| **SRMR** (Standardized Root Mean Square Residual) | SRMR value < 0.10 indicates a good fit | 0.1 | Fit |
| **d-ULS** (Unweighted Least Squares Discrepancy) | Value ≥ 0.05 indicates acceptable fit | 1.712 | Fit |
| **d-G** (Geodesic Discrepancy) | Value ≥ 0.05 indicates acceptable fit | 0.797 | Fit |
| **Chi Square** | $\chi^2$ statistic ≥ $\chi^2$ table value (df = 20, α = 0.05, $\chi^2$ table = 27.587) | 409.359 ≥ 27.587 | Fit |
| **NFI** (Normed Fit Index) | NFI value close to 1 indicates good fit | 0.734 | Fit |
| **GoF** (Goodness of Fit Index) = √(Average AVE × Average R²) | 0.10 = Small GoF 0.25 = Moderate GoF 0.36 = Large GoF | 0.608 | Fit |

Based on the evaluation, the structural model demonstrates an acceptable level of fit with the data. The SRMR value of 0.1 is at the threshold of acceptability (< 0.10), indicating the model is considered fit. The d-ULS (1.712) and d-G (0.797) values exceed the minimum recommended threshold of 0.05, supporting the adequacy of the model's structure.

The Chi-Square statistic (409.359) is significantly higher than the critical value (27.587 at a certain degree of freedom), indicating a strong statistical model fit. The NFI value of 0.734, which approaches 1, further confirms the model's acceptability.

Additionally, the GoF (Goodness of Fit) index is 0.608, which exceeds the threshold for a large effect size (> 0.36). This suggests that the model has a high explanatory power for the observed data.

**Inner Model Testing**

The Inner Model testing (also known as the structural model evaluation) is a key step in SEM-PLS analysis used to assess the relationships between latent constructs as hypothesized in the research framework. This test involves evaluating the R-square ($R^2$) values to determine the model's predictive power, examining the path coefficients to assess the direction and strength of relationships, and conducting significance testing (t-statistics/p-values) through bootstrapping. A model is considered strong if it demonstrates moderate to high $R^2$ values and statistically significant path coefficients (Hair et al., 2022).

**Table 8.** Reliability Testing

| Dependent Variable | R-square | R-square adjusted |
|---|---|---|
| Attitude Toward Usage | 0.641 | 0.633 |
| Behavioral Intention to Use | 0.637 | 0.633 |
| Perceived Usefulness (PU) | 0.279 | 0.271 |

The analysis results indicate that the model has a relatively strong predictive power for the variables of attitude and behavioral intention to use Yogyakarta's free public Wi-Fi. This is evidenced by the R-square values of 0.641 for *Attitude Toward Usage* and 0.637 for *Behavioral Intention to Use*, meaning that 64.1% and 63.7% of the variance in these variables are explained by the model, respectively. Meanwhile, the R-square value for *Perceived Usefulness* is 0.279, suggesting that only 27.9% of the variance in perceived usefulness is accounted for by the model, indicating a moderate explanatory level. These findings imply that while the model performs well in predicting user attitudes and intentions, additional variables may be needed to enhance its explanatory power for perceived usefulness. The following is a picture of 2 PLS SEM Algorithm outputs to see the $R^2$ of the research model
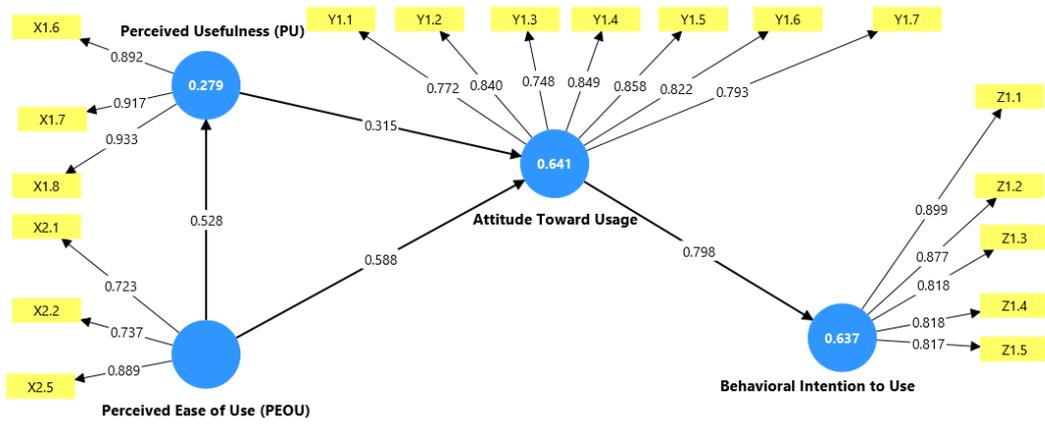
**Picture 2.** Output Model PLS SEM Alogoritm

**Significance (Hypothesis Testing)**

Significance testing in PLS-SEM aims to evaluate the relationships between latent variables using the bootstrapping technique. This process involves resampling to calculate path coefficients and standard errors, which are reported through t-statistics and p-values. A relationship is considered statistically significant if the p-value is less than 0.05. Significant path coefficients indicate empirical support for the proposed hypotheses, both for direct and indirect effects.

**Table 9.** Path Coefficient Bootstrapping (Direct Effect)

| Path Coefficient | Original sample (O) | Sample mean (M) | Standard deviation (STDEV) | T statistics (\|O/STDEV\|) | P values | Description |
|---|---|---|---|---|---|---|
| Attitude Toward Usage -> Behavioral Intention to Use | 0.798 | 0.798 | 0.047 | 16.843 | 0.000 | Proven |
| Perceived Ease of Use (PEOU) -> Attitude Toward Usage | 0.588 | 0.585 | 0.086 | 6.840 | 0.000 | Proven |
| Perceived Ease of Use (PEOU) -> Perceived Usefulness (PU) | 0.528 | 0.540 | 0.105 | 5.028 | 0.000 | Proven |

| Path Coefficient | Original sample (O) | Sample mean (M) | Standard deviation (STDEV) | T statistics (\|O/STDEV\|) | P values | Description |
|---|---|---|---|---|---|---|
| Perceived Usefulness (PU) -> Attitude Toward Usage | 0.315 | 0.318 | 0.111 | 2.844 | 0.004 | Proven |

Based on the results of significance testing using the bootstrapping technique in PLS-SEM analysis, all relationships between variables in the model are statistically significant. This is indicated by t-statistics values exceeding the critical value of 1.96 and p-values less than 0.05. The relationship between Attitude Toward Usage and Behavioral Intention to Use shows a strong and significant effect, with a path coefficient of 0.798, a t-value of 16.843, and a p-value of 0.000. Similarly, the relationship between Perceived Ease of Use and both Attitude Toward Usage (path coefficient = 0.588; t = 6.840) and Perceived Usefulness (path coefficient = 0.528; t = 5.028) is also statistically significant. Furthermore, the influence of Perceived Usefulness on Attitude Toward Usage is significant, with a path coefficient of 0.315, a t-value of 2.844, and a p-value of 0.004. These findings provide empirical support for all proposed hypotheses in the model. The results confirm that perceived ease of use and perceived usefulness play a crucial role in shaping users' attitudes, which ultimately influence their behavioral intention to use a system or technology.

**Table 10.** Path Coefficient Bootstrapping (Indirect Effect)

| | Original sample (O) | Sample mean (M) | Standard deviation (STDEV) | T statistics (\|O/STDEV\|) | P values |
|---|---|---|---|---|---|
| **Perceived Ease of Use (PEOU) -> Attitude Toward Usage -> Behavioral Intention to Use** | 0.469 | 0.466 | 0.070 | 6.676 | 0.000 |
| **Perceived Usefulness (PU) -> Attitude Toward Usage -> Behavioral Intention to Use** | 0.251 | 0.255 | 0.094 | 2.671 | 0.008 |
| **Perceived Ease of Use (PEOU) -> Perceived Usefulness (PU) -> Attitude** | 0.133 | 0.141 | 0.066 | 1.999 | 0.046 |

| | | | | | |
|---|---|---|---|---|---|
| **Toward Usage -> Behavioral Intention to Use Perceived Ease of Use (PEOU) -> Perceived Usefulness (PU) -> Attitude Toward Usage** | 0.166 | 0.175 | 0.079 | 2.116 | 0.034 |

## Effect Size (f²)

Effect size (f²) in PLS-SEM measures the individual contribution of an exogenous variable to the R² value of an endogenous variable. It indicates how much a predictor variable impacts the dependent construct when included in the model. According to Cohen (1988), f² values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively. A higher f² suggests a stronger influence of the variable on the model outcome.

**Table 11.** Effect Size (f²) Results

| Variable | Attitude Toward Usage | Behavioral Intention to Use | Perceived Ease of Use (Peou) | Perceived Usefulness (Pu) |
|---|---|---|---|---|
| Attitude Toward Usage | | 1.756 | | |
| Behavioral Intention to Use | | | | |
| Perceived Ease of Use (PEOU) | 0.695 | | | 0.386 |
| Perceived Usefulness (PU) | 0.199 | | | |

Effect size (f²) in PLS-SEM measures the relative contribution of an exogenous construct to the variance explained in an endogenous construct. According to Cohen's (1988) guidelines, f² values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively. In this context, Perceived Ease of Use (PEOU) has a large effect on Attitude Toward Usage (f² = 0.695), indicating that ease of use plays a dominant role in shaping users' attitudes toward the system. PEOU also has a medium to large effect on Perceived Usefulness (PU) (f² = 0.386), suggesting that a system perceived as easy to use is also likely to be perceived as more useful. Additionally, Perceived Usefulness (PU) has a medium effect on Attitude Toward Usage (f² = 0.199), which implies that while its influence is not as strong as PEOU, perceived usefulness still significantly contributes to the formation of user attitudes. Overall, these findings support the theoretical structure of the Technology Acceptance Model (TAM), highlighting the critical roles of both ease of use and usefulness in influencing user attitudes and behavioral intentions toward technology adoption.

**CONCLUSION AND SUGGESTION**

Based on the results of descriptive analysis, measurement model testing, and structural model evaluation, all proposed hypotheses in the Technology Acceptance Model (TAM) are supported empirically. The findings show that Perceived Ease of Use (PEOU) significantly influences both Perceived Usefulness (PU) and Attitude Toward Usage, with large effect sizes, indicating that users' perceptions of system simplicity play a dominant role in shaping both its perceived benefits and their attitudes. Additionally, Perceived Usefulness (PU) positively affects Attitude Toward Usage, though with a moderate effect, emphasizing its importance in reinforcing user attitudes. Moreover, Attitude Toward Usage has a strong and significant effect on Behavioral Intention to Use, which confirms its central role as a mediating construct in user adoption behavior.

Furthermore, all indirect effects (mediation) are statistically significant, confirming that PEOU and PU influence Behavioral Intention not only directly but also through the mediating role of Attitude Toward Usage. The model demonstrates good fit (SRMR = 0.1; GoF = 0.608), strong reliability, and sufficient discriminant validity across all constructs. Therefore, the structural model successfully explains users' behavioral intentions to adopt digital systems, such as public Wi-Fi, with key implications for technology design and service policies aiming to enhance user experience and adoption.

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