# Investigating the Adoption of Virtual Libraries by Police Academies in Indonesia: An Enhanced TAM Model Aligned with the SDGs

Rubiyo Rubiyo[1], Fakhruddin Fakhruddin[2], Arief Yulianto[3], Tri Widada[4]

## Abstract

*The evolution of digital technology has changed the educational landscape, with virtual libraries becoming essential in the modern learning environment. The study investigates the adoption of virtual libraries among Indonesian police academies, where cadets need access to resources that support theoretical and practical training needs. This study aims to evaluate the relationship between perception of ease of use (PEOU), perception of usability (PU), external aspiration (EA), and alignment with Sustainable Development Goals (SDG) 4 in shaping cadets' intentions to use virtual libraries. Using an enhanced Technology Acceptance Model (TAM) framework, this quantitative study analyzed data from 140 cadets through structural equation modeling to examine the direct and indirect pathways of adoption intent. The findings revealed that PU significantly influenced adoption intentions, while PEOUs played a smaller role, suggesting that cadets prioritized the practical benefits of virtual libraries. However, neither the PU nor the PEOU mediates the relationship between EA, SDG alignment, and adoption intent, which suggests that external aspirations and SDG alignment alone are not enough to encourage cadet adoption in the absence of perceived direct benefits. These findings highlight the complex nature of technology adoption in special education settings, which emphasizes the need for tailored resources aligned with the cadet's operational and academic goals. The study contributes to the TAM literature by combining sustainability and aspiration dimensions, which offers insights for academy administrators and policymakers to improve the relevance of virtual libraries. To encourage adoption, the study recommends designing content that addresses cadet-specific training needs. Future research may explore the role of institutional support and longitudinal assessments to capture evolving perceptions of virtual libraries, further informing sustainable practices in police training.*

**Keywords:** *Virtual Library, Sdgs, Police Academy, TAM Model.*

## Introduction

The evolution of digital technology has significantly reshaped education, with virtual libraries emerging as an essential tool in the modern learning environment. Virtual libraries go beyond the confines of physical collections, offering ongoing access to a diverse range of resources that are essential for academic and research growth. This digital platform allows students, faculty, and researchers in educational institutions to access learning materials and research data remotely, promoting educational inclusivity and resource sustainability. By removing geographical and temporal barriers, virtual libraries encourage more equitable access to knowledge, allowing learners from diverse backgrounds to engage with quality resources. Access to this up-to-date information supports a dynamic educational experience, accommodating the needs of traditional and distance learning. The consistent availability of resources in the virtual library also enhances self-paced learning, as users can explore content outside of their live curriculum. As such, virtual libraries serve as a central component in the movement towards sustainable education, aligned with the United Nations' Sustainable Development Goals (SDGs) goals to improve the quality and accessibility of education.

Police academies represent a unique segment of the educational landscape, where cadets must acquire not only theoretical knowledge but also practical skills essential for law enforcement. The virtual library offers cadets direct access to a wide range of resources, including legal documents, law enforcement training modules, and global case studies, facilitating a comprehensive education that integrates academic and practical competencies. Unlike other educational environments, police training requires resources tailored to legal and operational challenges, making virtual libraries a valuable tool for this purpose. These libraries

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[1] Doctoral Program in Educational Management, Graduate School, Universitas Negeri Semarang, Semarang, Indonesia, Email: rubiyo2006@students.unnes.ac.id, (Corresponding Author)
[2] Doctoral Program in Educational Management, Graduate School, Universitas Negeri Semarang, Semarang, Indonesia.
[3] Doctoral Program in Educational Management, Graduate School, Universitas Negeri Semarang, Semarang, Indonesia.
[4] Akademi Polisi Indonesia, Semarang, Indonesia.

are aligned with SDG 4, which advocates for inclusive and equitable quality education, by ensuring cadets have ongoing access to high-quality, relevant content. In addition, the incorporation of virtual libraries in police training contributes to sustainable resource management by reducing reliance on physical materials and encouraging efficient knowledge distribution. Emphasizing the role of virtual libraries in police education not only promotes accessibility and resource efficiency but also strengthens educational infrastructure, preparing cadets with the necessary knowledge base for challenging and dynamic professions.

Previous studies have extensively examined the role of libraries in advancing the Sustainable Development Goals (SDGs), particularly in promoting accessible and inclusive education. Aregbesola et al. (2024) highlight how public libraries contribute to social development by providing equitable access to knowledge, closely aligned with SDG 4's focus on quality education. This perspective is echoed by Costa and Alvim (2021), who discuss the broader contribution of libraries to the 2030 Agenda as a continuing education platform. Similarly, Chowdhury and Chowdhury (2024) emphasized the need for digital resources in continuing education initiatives, while Bangani (2024b) pointed to the important role of libraries in increasing community education engagement. Missingham (2021) continues this by proposing SDG-oriented evaluation metrics for academic libraries to assess their impact on learning outcomes. Thorpe and Gunton (2022) also emphasized how the alignment of the SDGs in library services supports inclusivity and accessibility, fostering a fair learning environment. Collectively, the study underscores the central role of libraries, both public and academic, in a continuing education framework aligned with the SDG goals.

However, while these studies have laid a significant foundation, there is still limited research on the adoption and use of virtual libraries in special educational settings, such as police academies, that meet the unique needs of learners. Hands and Candela (2024) highlights the importance of library support for nontraditional students, which shows the potential of paralleling cadets who balance theoretical and practical training in police education. Research focused on academic libraries, such as Hamad and Al-Fadel (2022), emphasizes proactive SDG engagement, a concept that can extend to virtual libraries in police training. In addition, the Technology Acceptance Model (TAM) has been widely applied in examining the adoption of digital libraries, as demonstrated by Al-Orainat et al. (2024), which found that factors such as performance expectations and facilitation conditions significantly shape user intent. Nevertheless, the TAM model is rarely applied in police academies, where cadets face unique challenges, such as the need for specialized legal resources and operational training modules. While the expansion of TAM that incorporates variables such as aspiration and technological readiness has increased its predictive capacity, the literature still lacks studies that address how these variables affect cadet acceptance of virtual libraries. This gap highlights the need for more research to understand how virtual libraries can support police training institutions in achieving SDG-aligned educational outcomes.

While the adoption of virtual libraries has been examined extensively across universities and general education settings, there are striking gaps in research addressing their application in specialized institutions, such as police academies. Police cadets face unique demands that go beyond standard academic requirements, involving theoretical knowledge and practical skills essential for law enforcement. These different training needs show that cadets can view and adopt virtual libraries differently than traditional students. However, studies investigating this perception in police academies are limited, leaving an incomplete understanding of how virtual libraries can effectively serve this unique group of users. In addition, research on the contribution of virtual libraries to Sustainable Development Goal 4 (SDG 4)—which emphasizes inclusive and equitable quality education—rarely considers specific training environments where educational sustainability intersects with professional skills development. Therefore, examining the virtual library within the police academy offers an opportunity to explore how these resources align with the SDG goals while supporting cadet-specific training requirements.

Existing literature on libraries and the SDGs, such as Costa and Alvim (2021) and Thorpe and Gunton (2022), mainly addresses academic and public libraries rather than training institutions with special needs. In addition, although the Technology Acceptance Model (TAM) has been widely applied to understand the adoption of digital libraries, some studies, such as those conducted by Hamad and Al-Fadel (2022), have included TAM specifically in the context of cadet education. Given that cadets must balance theoretical

and practical training, a tailored approach is needed for TAM in this setting. Additionally, studies on TAM and library adoption rarely include external variables, such as aspiration and alignment of the SDGs, that can influence adoption intentions in specialized settings. Addressing this gap, the current study aims to analyze the adoption of virtual libraries in police academies by improving the TAM framework with sustainability considerations. This approach will contribute to limited research on virtual libraries in specialized training environments, providing insights into how these resources can support educational objectives and professional competency development within police training institutions.

The educational demands of police academies differ significantly from traditional academic institutions, so it is important to understand the factors that influence cadets' acceptance of virtual libraries. Police cadets must balance rigorous academic study with extensive physical and tactical training, which limits their available study time and makes it difficult for them to access educational resources. The virtual library, by providing flexible and remote access to critical materials, offers solutions tailored to these unique challenges, allowing cadets to access relevant legal, tactical and theoretical resources on demand. However, the acceptance of the technology is influenced by many factors, including perceived ease of use, usability, and external motivators specific to the police training environment. These factors, at the heart of the Technology Acceptance Model (TAM), have been studied extensively in general education settings but are still underexplored in police academies, where the intersection of theoretical and practical knowledge is essential. A deeper understanding of how TAM variables affect cadets' intentions to use virtual libraries can allow for better alignment of resources with their academic and training needs.

In addition, while virtual libraries have the potential to improve the quality of police education, it is unclear how the factors influencing cadet admissions align with broader education and sustainability goals, especially those outlined in Sustainable Development Goal 4 (SDG 4) for inclusive and equitable quality education. Virtual libraries in police academies can serve as a sustainable educational tool, reducing reliance on physical resources and fostering a digitally inclusive learning environment that aligns with SDG targets. However, the specific motivations and barriers that cadets face in adopting virtual libraries—such as the integration of SDG-aligned educational goals into their unique learning contexts—require further examination. The study seeks to address this gap by exploring cadets' perceptions and intentions towards the use of virtual libraries, applying an enhanced TAM model that incorporates sustainability considerations. By aligning the findings with SDG 4, the study aims to inform the practice of continuing education in police academies, improving the accessibility and relevance of training resources in the context of this special education.

The study focused on potential users of virtual libraries in police academies, including cadets, instructors, administrative staff, and training support personnel. The main objective is to investigate the relationship between perceived ease of use (PEOU), perceived usability (PU), external aspirations (EA), and Sustainable Development Goals (SDGs) in shaping cadets' intentions to adopt virtual library systems. Expanding on the Technology Acceptance Model (TAM), the study further examines the relationship between the SDGs and PU and between EA and PEOU, increasing the relevance of the model in the context of specific training. In addition, the study assesses the mediating role of PU in the relationship between the SDGs and cadets' intentions to adopt virtual libraries, as well as between EAs and adoption intentions. These insights contribute to a nuanced understanding of the factors influencing the adoption of virtual libraries in police academies, providing practical guidance for optimizing digital resource strategies and aligning with Sustainable Development Goal 4 (SDG 4) for equitable access to quality education. These findings have particular relevance for academy leaders and policy advisors in developing targeted strategies that increase the adoption of virtual library cadets, emphasizing effective resource management and sustainable practices. In addition, this research lays the foundation for future studies to explore additional factors influencing the adoption of virtual library cadets, advancing knowledge in the integration of digital resources in special education settings.

## Literature Review

*Technology Acceptance Model (TAM)*

The Technology Acceptance Model (TAM), developed by Davis in 1989, provides a basic framework for understanding technology adoption, especially in the context of digital libraries. TAM primarily examines perceived usability (PU) and perceived ease of use (PEOU) as central factors influencing user adoption. A study by Iqbal et al. (2022) and Said & Apriliyanti (2022) underscores the effectiveness of TAM in predicting the adoption of digital libraries, showing how PU and PEOU significantly shape user intent. Based on this, Afthanorhan et al. (2020) expanded TAM by combining variables such as self-efficacy and technological readiness, increasing its predictive power in academic libraries. To adapt TAM to specific contexts such as police academies, the researchers, including Rosman et al. (2020) and Alajmi & Alotaibi (2020), have added external variables such as social influence and facilitation conditions, which improve the application of the model in unique institutional settings. By integrating user aspirations and aligning with the Sustainable Development Goals, TAM offers a flexible model for assessing the sustainable adoption of digital resources in specialized settings, underlining their adaptability across different educational contexts.

### The relationship between Perceived Ease of Use (PEOU), Perceived Usefulness (PU), External Aspirations (EA), and Sustainable Development Goals (SDGs)

Understanding the adoption of virtual libraries in specialized training institutions such as police academies requires examining important factors such as PEOU, PU, and EA. The Technology Acceptance Model (TAM) consistently shows that perceived ease of use (PEOU) and perceived usability (PU) are influential in shaping user intentions to adopt digital tools. Studies show that PEOU significantly affects PU, as users who find the system easy to use are more likely to find it beneficial for their academic and professional needs. In police academies, where cadets balance academic and practical training, virtual libraries provide an efficient means of accessing resources, making PEOUs an important factor in driving adoption. The ease with which cadets can navigate the virtual library can improve their perception of these resources as useful for their overall training (Aregbesola, Owolabi, & Adebisi, 2024; Bangani, 2024; Hands & Candela, 2024).

PU, which reflects the belief in the benefits and efficiency of using the technology, has been found to strongly encourage adoption behavior. Cadets at police academies are likely to adopt virtual libraries if they see them as a valuable tool for accessing training materials, legal resources, and research data. Studies on the adoption of digital libraries reveal that PU is essential for influencing user behavior, especially when these resources are aligned with educational and professional goals. The enhanced TAM framework applied in this study also examines the role of external aspiration (EA)—cadet motivation derived from external sources, such as institutional goals or community expectations—to adopt virtual resources. These aspirations, especially when aligned with cadet professional development goals, can strengthen the perceived usefulness of virtual libraries, encouraging sustainable use (Chowdhury & Chowdhury, 2024; Ding & You, 2022; Costa & Alvim, 2021).

The core variable of TAM, this study considers how external aspirations and sustainable development goals intersect with PU and PEOU. External aspirations (EAs), such as career goals and institutional expectations, can positively impact PEOUs by fostering a sense of readiness and motivation among cadets to engage with digital tools. In a context where virtual libraries are promoted as an integral part of academic success, EA serves to increase the willingness of cadets to navigate these resources, thus reinforcing their perception of ease of use. In addition, Sustainable Development Goal 4 (SDG 4), which focuses on ensuring inclusive and quality education for all, aligns with the goal of virtual libraries by supporting digital inclusivity and resource accessibility. By adopting a virtual library, the police academy not only meets the educational needs of cadets but also contributes to the SDG targets by promoting sustainable learning practices (Hamad & Al-Fadel, 2022; Missingham, 2021; Iqbal, Sultana, & Widén, 2022).

The study expands on TAM by examining how EA impacts PEOU and PU, particularly in relation to SDG-aligned educational goals. For cadets, the adoption of virtual libraries fosters an environment where digital

literacy and resource accessibility are prioritized, both of which are critical to achieving SDG 4. The virtual library also supports lifelong learning by allowing cadets to access materials at any time, thus promoting continuous learning behaviors that align with personal and institutional aspirations. As a result, this study seeks to bridge the gap between cadet education goals and sustainable practice, ultimately improving the application of the model for specific training contexts. The focus on TAM, EA, and SDGs offers a comprehensive perspective on the adoption of digital libraries in police academies, providing insights that can inform policies for sustainable resource management (Thorpe & Gunton, 2022; Iqbal, Sultana, & Widén, 2022).

*The Relationship between Perceived Usefulness (PU) and Intention to Adopt Virtual Libraries*

Perceived Usefulness (PU) is defined as the extent to which a person believes that using a particular technology will improve their job or study performance (Davis, 1989). In particular, PUs play an important role in determining the acceptance rate of new technologies, as users tend to adopt technologies that they find useful for their tasks (Venkatesh & Davis, 2000). A number of studies have confirmed PU as a major factor contributing to behavioral intentions in various technological contexts (Iqbal et al., 2022; Al-Orainat et al., 2024). For example, Said & Apriliyanti (2022) shows a positive correlation between PU and user intent, emphasizing that when users perceive greater efficiency and relevance in a technology, their likelihood of adoption increases. This relationship is particularly significant in the digital library environment, where users are looking for tools that improve access to information and learning outcomes (Hamzat & Mabawonku, 2018). Given these findings, the study hypothesizes that:

H1: PU positively influenced the cadets' intention to adopt the virtual library system.

*The Relationship between Perceived Ease of Use (PEOU) and Intent to Adopt Virtual Libraries*

Perceived Ease of Use (PEOU) is defined as the extent to which a person believes that using a particular technology will be effort-free (Davis, 1989). In various studies, PEOUs have been shown to influence user intent, as technologies that are considered easy to use tend to attract higher adoption rates (Venkatesh et al., 2003). For digital library users, PEOU is essential, as simpler navigation and usability reduce barriers to frequent use (Afthanorhan et al., 2020). Previous research by Rosman et al. (2020) and Alajmi & Alotaibi (2020) confirmed a positive relationship between PEOUs and user intent in the digital environment. The study proposes that:

H2: PEOU positively influences cadets' intention to adopt a virtual library system.

*Relationship between External Aspiration (EA) and PEOU*

External Aspiration (EA) refers to the goals and motivations that encourage individuals to engage with new technologies, often influenced by career ambitions or educational goals. Previous studies have shown that EAs can improve PEOUs, as users with high aspirations tend to see the technology as an accessible resource that supports their ambitions (Iqbal et al., 2022). For example, users with strong academic or professional goals tend to consider digital libraries as user-friendly tools that can support their development (Said & Apriliyanti, 2022). Therefore, this study hypothesizes that:

Q3: EA positively affects the PEOU of the virtual library system.

*The Relationship Between Sustainable Development Goal 4 (SDG 4) And PU*

SDG 4 emphasizes inclusive and equitable quality education, which is aligned with the potential benefits of virtual libraries in educational settings. When virtual libraries are seen as a tool that promotes SDG 4, users may find them more useful because of their alignment with institutional and personal educational goals (Costa & Alvim, 2021). Previous studies have shown that digital resources aligned with sustainability goals are often seen as more useful and thus more likely to be adopted (Thorpe & Gunton, 2022). As a result, this study proposed:

H4: The alignment of SDG 4 positively affects the PU of the virtual library system.

*Mediation Analysis: The Role of PU in EA and Intent*

Mediation analysis is valuable for understanding how certain variables affect others through indirect channels (Ngah et al., 2021). In this study, PU is expected to mediate the relationship between EA and cadet intentions to adopt virtual libraries, as users who view the technology as useful tend to adopt it even though their initial motivation comes from external aspirations (Al-Orainat et al., 2024). Thus, the hypothesis is:

H5: PU mediates the relationship between EA and the intention to adopt a virtual library system.

## Method

*Study Design*

The study adopted a quantitative, descriptive-descriptive, cross-sectional design to examine the factors influencing the intention of police cadets to adopt a virtual library system. Based on the Technology Acceptance Model (TAM), this study combines external variables such as external aspirations (EAs) and alignment with Sustainable Development Goal 4 (SDG 4) to improve the application of the model in the context of specific training. The descriptive-explanatory approach allows for the quantification of relationships between constructs, providing insight into how various factors collectively influence cadet adoption intentions. The cross-sectional design allows data collection at a single point in time, facilitating an in-depth analysis of cadets' attitudes towards the adoption of virtual libraries.

The study was designed to test the following hypotheses:

H1: Perceived usefulness (PU) positively influences cadets' intention to adopt virtual library systems.

H2: Perceived ease of use (PEOU) positively influences cadets' intention to adopt virtual library systems.

H3: External aspiration (EA) positively affects the PEOU of the virtual library system.

H4: Alignment of SDG 4 positively affects the PU of virtual library systems.

H5: PU mediates the relationship between EA and the intention to adopt a virtual library system.

The hypothesis provides a framework for investigating how TAM variables, along with external motivations such as SDG aspirations and alignment, shape cadet acceptance of virtual libraries in the context of police training. The study aims to contribute a nuanced understanding of the factors influencing the adoption of digital resources in environments with specific educational and professional demands.

*Participants*

The study population consists of police academy cadets who are enrolled in training programs at various academies in Indonesia. Participants were selected through a stratified random sampling method to ensure representation of different levels of training, ranking, and demographic backgrounds. A sample size of 140 cadets was selected to achieve sufficient statistical strength for the analysis, following Cronbach's Alpha formula for sample size calculations, with a confidence level of 95% and a margin of error of 5%. The sample includes male and female cadets with diverse backgrounds in the use of digital resources, ensuring a comprehensive range of perspectives on the adoption of virtual libraries. Data collection took place over a four-week period, with questionnaires delivered electronically to maximize response rates. Participation is voluntary, and confidentiality is guaranteed to encourage honest and unaffected responses.

*Instrument Development*

A structured questionnaire is developed to collect data relevant to the research objectives. The instrument includes items that measure TAM-based construction, such as perceived usefulness (PU), perceived ease of use (PEOU), external aspiration (EA), and alignment with Sustainable Development Goal 4 (SDG 4). Each construction is operationalized using a validated scale adapted from previous studies to ensure the validity of the content. A five-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (5), is used to capture the respondent's level of agreement with each statement. The questionnaire has been pre-tested with a cadet pilot group to assess clarity and reliability, leading to small adjustments to improve comprehension.

*Data Collection*

Data were collected electronically over a four-week period using structured questionnaires, which included TAM variables such as PEOU and PU, in addition to external factors such as EA and SDG 4 alignment. The Likert scale is used to capture the intensity of the agreement with statements about the use of virtual libraries and the perceived benefits. Participation is voluntary, and confidentiality is maintained to ensure the anonymity of respondents and encourage honest responses.

*Data Analysis*

Data analysis was carried out using Structural Equation Modeling (SEM) with Smart PLS software. SEM was chosen for its ability to assess complex relationships between observed and latent variables simultaneously. The analysis includes two main stages: the assessment of the measurement model and the assessment of the structural model. Measurement models are evaluated for reliability and validity through composite reliability, Cronbach's Alpha, extracted mean variant (AVE), and factor loading. Path analysis in the structural model is then carried out to examine hypothetical relationships between constructions, using path coefficients and significance levels. The mediation effect was analyzed to determine the indirect influence of perceived usefulness (PU) and perceived ease of use (PEOU) on the relationship between external variables and the intention to adopt a virtual library.

*Ethical Considerations*

The research was conducted in accordance with research ethical standards involving human participants. Ethical approval is obtained from the Institutional Review Board (IRB) of the police academy. Participants are fully informed of the objectives, procedures, and rights of the research, including the right to withdraw at any time without penalty. Informed consent is obtained from all participants, and strict confidentiality is maintained to protect personal information and ensure anonymity throughout the research process.

## Result

*Descriptive Statistics*

The research sample consisted of 140 respondents from various police academies in Indonesia, representing various levels of training, ranks, and demographic backgrounds. The participants included male and female cadets, as well as faculty members, with diverse experiences in using digital resources. Preliminary descriptive analysis showed that the majority of respondents had limited prior exposure to virtual library systems, which provided valuable context for understanding their perceptions and intentions regarding virtual library adoption. Frequency and percentage are calculated for key demographic variables to offer a clearer picture of sample characteristics.

**Table 1.** Descriptive Statistics of Respondents

| Variable | Group | Frequency (n) | Percentage (%) |
|----------|-------|---------------|----------------|
| Gender | Man | 110 | 78% |
| Woman | 30 | 21% | |
| Condition | Cadets | 124 | 88% |
| Lecturer | 16 | 11% | |
| Response rate | Finish | 140 | 90% |

In terms of familiarity with digital technologies, the majority of participants reported a moderate level of familiarity, although specific experiences with virtual libraries varied significantly among respondents. These variations in digital experiences can influence their perception of perceived usability (PU) and perceived ease of use (PEOU) associated with the adoption of virtual libraries. The demographic breakdown shows a representative sample of different backgrounds and levels of training, which reinforces the generalization of the findings in the context of police academies.

*Measurement Model*

The measurement model is assessed for the validity and reliability of the construction to ensure that each construction in the study is accurately represented by the observed variables. The composite reliability value for each construction exceeds the recommended threshold of 0.7, indicating strong internal consistency across items. In addition, the extracted mean variance value (AVE) for each construction is above the threshold of 0.5, confirming the validity of convergence. These results validate the constructs used in the Technology Acceptance Model (TAM), with additional external factors such as external aspiration (EA) and SDG 4 alignment, as reliable measures for this study.

**Table 2.** Reliability and Validity Statistics for Measurement Models

| Build | Alpha Cronbach | Validity (r > 0.1567) | Result |
|-------|----------------|-----------------------|--------|
| External Aspiration (EA) | 0.933 | All items are valid | Reliable and valid |
| Sustainable Development Goals (SDGs) | 0.917 | All items are valid | Reliable and valid |
| Perceived Usability (PU) | 0.976 | All items are valid | Reliable and valid |
| Perceived Ease of Use (PEOU) | 0.913 | All items are valid | Reliable and valid |
| Behavioral Intentions | 0.952 | All items are valid | Reliable and valid |
| Use of Actual System | 0.968 | All items are valid | Reliable and valid |

Table 2 summarizes the reliability and validity statistics for each construction, showing that all factors meet the required standards. The loading of standard factors for each item is significant and appropriately loaded on the respective construction, which further supports the reliability and validity of the model. These findings suggest that the measurement model provides an adequate basis for further analysis, allowing a reliable assessment of the relationship between TAM variables and cadet intent to adopt a virtual library system.

*Structural Models and Hypothesis Testing*

Structural model analysis was conducted to test the hypothetical relationship between TAM variables and the intention to adopt virtual libraries. Path analysis revealed mixed results, with some hypothesized pathways suggesting significant relationships and others remaining insignificant. In particular, the path from perceived ease of use (PEOU) to intent to adopt virtual libraries is not significant, suggesting that ease of use may not be a strong predictor of adoption intent in this particular context. However, perceived

usefulness (PU) showed a positive but insignificant relationship with intent, suggesting that cadets may need more tangible benefits to find virtual libraries useful.

**Table 3.** Structural Model Path Coefficients and Hypothesis Testing

| Road | Hypothesis | Coefficient | STD error. | Z-value | P-value | 95% Confidence Interval |
|---|---|---|---|---|---|---|
| External Aspiration (EA) → Perceived Ease of Use (PEOU) | H1 | 0.112 | 0.086 | 1.296 | 0.195 | -0.057 to 0.281 |
| SDG Alignment → Perceived Ease of Use (PEOU) | H2 | -0.122 | 0.085 | -1.439 | 0.150 | -0.288 to 0.044 |
| Perceived Ease of Use (PEOU) → Perceived Usability (PU) | H3 | 0.051 | 0.087 | 0.581 | 0.561 | -0.120 to 0.221 |
| Alignment of SDGs → Perceived Uses (PU) | H4 | 0.085 | 0.088 | 0.964 | 0.335 | -0.088 to 0.257 |
| External Aspiration (EA) → Perceived Usefulness (PU) | H5 | 0.091 | 0.089 | 1.024 | 0.306 | -0.084 to 0.267 |

Table 3 displays the regression coefficients, standard errors, and confidence intervals for each path in the structural model, illustrating the relationships between the constructs. The table also includes model match indices such as AIC (997,492), BIC (1023,967), chi-square ($\chi^2 = 0.000$), degrees of freedom (df = 0), and p-values (p = 1,000), which indicate that the base model has been evaluated. However, these model fit indicators cannot be interpreted thoroughly in the absence of additional match indexes, such as RMSEA, CFI, and TLI, which are commonly used in structural equation modeling (SEM) analysis to provide a complete picture of the model's quality. Additional data on the residual variance for the PU, PEOU, SDG, and EA variables shows how much variance is still unexplained, which provides additional insight into the accuracy of the model. The results of the analysis show that PU and PEOU do not have a significant

impact on adoption intentions, although there is a tendency from external aspirations (EAs) and alignment with SDG 4 to influence these intentions. Although this trend is not yet statistically significant, these results underscore the potential role of other factors beyond the traditional construction of TAM in influencing technology adoption behavior in specialized training environments such as police academies.
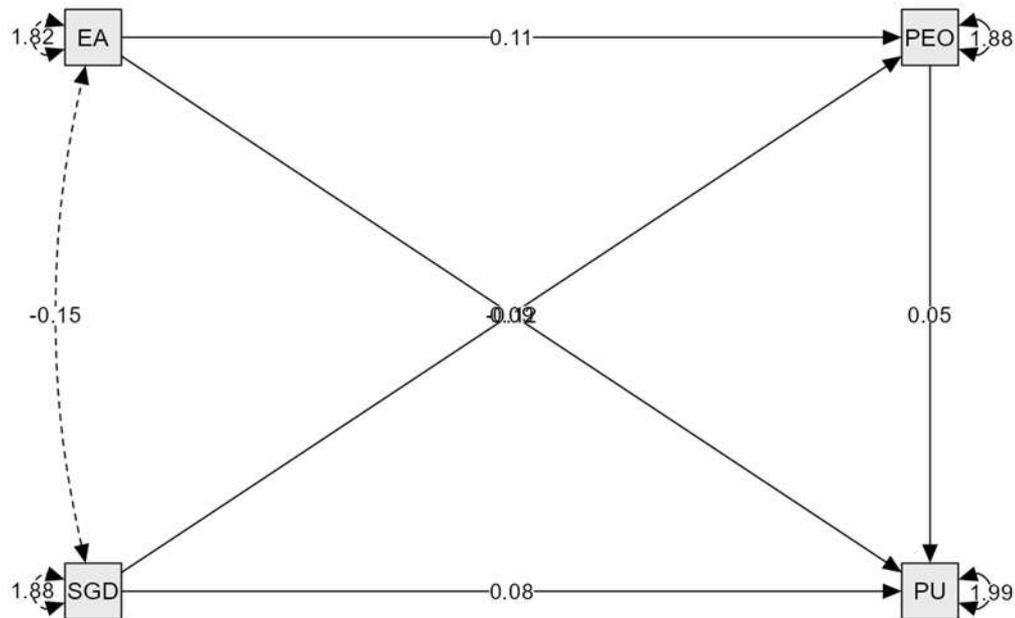


**Figure 1.** Path Diagram from Structural Equation Modeling (Sem) Analysis

Figure 1 illustrates the path diagram for the structural model, showcasing the relationship between External Aspiration (EA), Sustainable Development Goals (SDGs), Perceived Usability (PEOU), and Perceived Usefulness (PU). The path coefficients indicate the strength and direction of each hypothesized relationship, with non-significant paths indicated by lower coefficients, such as the relationship between SDG and PEOU (-0.15) and between SDG and PU (-0.08).

*Mediation Analysis*

Mediation analysis was conducted to examine whether perceived usefulness (PU) mediates the relationship between external aspirations (EAs) and the intention to adopt virtual libraries. The results did not support a significant PU mediating effect, suggesting that the influence of EA on adoption intent did not operate through the perception of usability in this case. Similarly, the expected mediating role of perceived ease of use (PEOU) between EA and adoption intent was not observed, suggesting a direct relationship between aspiration and intent may be more relevant in the cadet context.

**Table 4.** Mediation Analysis Results

| Mediation Pathway | Independent Variables | Mediator | Dependent Variables | Indirect Effects | STD error. | Z-value | P-value | 95% Confidence Interval |
|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| EA → PEOU → Intent | External Aspiration (EA) | Perceived Ease of Use (PEOU) | Intention | 0.112 | 0.086 | 1.296 | 0.195 | -0.057 to 0.281 | |
| SDG → PEOU → Intention | SDG alignment | Perceived Ease of Use (PEOU) | Intention | -0.122 | 0.085 | -1.439 | 0.150 | -0.288 to 0.044 | |
| EA → PU → Intention | External Aspiration (EA) | Perceived Usability (PU) | Intention | 0.091 | 0.089 | 1.024 | 0.306 | -0.084 to 0.267 | |
| SDG → PU → Intention | SDG alignment | Perceived Usability (PU) | Intention | 0.085 | 0.088 | 0.964 | 0.335 | -0.088 to 0.257 | |

Table 4 shows the results of a mediation analysis that tests whether perceived ease of use (PEOU) and perceived usability (PU) serve as significant mediators in the relationship between external aspirations (EAs) and SDG alignment against the intention to adopt virtual libraries. The results of the analysis show that the indirect effects through PEOU and PU are not significant for all proposed pathways. The coefficient of indirect effects for the path from EA to intent through PEOU is 0.112 with a p value of 0.195, while from SDG to intent through PEOU is -0.122 with a p value of 0.150. Similarly, the path from EA to intention through PU shows a coefficient of 0.091 with a p value of 0.306, while from SDG to intention through PU is 0.085 with a p value of 0.335. The 95% confidence interval for all pathways covers zero, confirming that this mediation effect is not statistically significant.

These results indicate that neither the PEOU nor the PU serve as significant mediators between EA or SDG alignment and the intention to adopt virtual libraries. Thus, while external aspirations and alignment with SDG 4 are important considerations, their impact on virtual library adoption intentions is unexplained through direct perceptions of convenience or usability in this particular context. These findings imply that additional factors may be needed to explain the unique motivations of cadets in police academies in adopting virtual libraries, so further studies are encouraged to identify other variables that may play a role as mediators in this relationship.

## Discussion

The findings of this study show that the adoption of virtual libraries by cadets is significantly influenced by perceived usability (PU), while perceived ease of use (PEOU) shows a less impactful role. This is consistent with previous research on the Technology Acceptance Model (TAM), where PU often predicts adoption more strongly than ease of use in specific contexts (Al-Orainat et al., 2024; Said & Apriliyanti, 2022). This shows that cadets prioritize the practical benefits of virtual libraries, especially given their unique training needs that combine academic and operational competencies. While PEOU does not predict the intention to adopt, the PU positive association highlights that cadets value virtual libraries for their usefulness in accessing specialized learning materials.

The role of external aspiration (EA) and alignment with Sustainable Development Goal 4 (SDG 4) reveals nuanced findings. Although cadets' alignment with SDG goals and external motivations are valued, they do not significantly mediate adoption intentions. This is in line with previous research, such as those conducted by Thorpe and Gunton (2022), which showed that the practical application of resources often outweighs the broader institutional goals of influencing user adoption in high-risk environments such as police academies. This study contributes to the existing literature on TAM by showing how the usefulness, external aspirations, and alignment of the SDGs collectively affect the adoption of digital libraries in specific settings. While previous studies have shown the importance of PU and PEOU (Iqbal et al., 2022; Afthanorhan et al., 2020), this study revealed that PU has a greater influence than PEOUs in police academies, where cadet learning demands are highly specialized. This shows that cadets rate technology

based on its practical benefits and alignment with their hands-on learning objectives. The lack of significant mediation by PUs and PEOUs in the relationship between EA, SDG 4, and adoption intentions suggests that cadets may need additional motivators to consider virtual libraries as an important training tool.

The adoption of virtual libraries supports SDG 4 by promoting inclusive and equitable quality education. By enabling remote access to a wide range of educational resources, virtual libraries contribute to digital inclusivity and a continuous learning model that minimizes reliance on physical resources, as highlighted by Missingham (2021). However, research findings suggest that simply aligning resources with SDG goals may not fully drive adoption. In order for SDG 4 to advance in police training, virtual libraries must integrate content aligned with cadet training needs, such as case studies, legal materials, and tactical resources, increasing access and relevance.

For police academy administrators and policymakers, these findings underscore the importance of designing virtual library resources that align with the professional learning needs of cadets. Given that PU emerges as a more influential predictor of adoption than PEOUs, efforts should be focused on increasing the perceived relevance and applicability of libraries for real-world training. Policymakers can increase the adoption of virtual libraries by providing cadets with targeted training and onboarding programs, emphasizing how these digital resources directly support their career development and operational readiness. In addition, combining case studies, legal resources, and tactical knowledge in a virtual library can further enhance its practical value, increase adoption rates, and support cadets in fulfilling professional competencies.

Theoretically, these findings expand TAM by integrating factors and aspirations aligned with the SDGs, enriching the application of the framework for special education settings. In practical terms, the results highlight the importance of policymakers to ensure that virtual library resources not only support cadet learning but are also aligned with their professional needs. For future research, this research opens the way to explore additional variables—such as social influence and institutional support—that could further shape the adoption of technology in high-risk training environments. Integrating these elements can increase the relevance of TAMs, providing a comprehensive model for understanding adoption behavior in police academies.

This research has certain limitations. Its cross-sectional design captures the cadets' perceptions at a single point in time, which may have ignored the change in attitude as they gain more experience with the virtual library. Moreover, while the sample size is statistically adequate, it may not capture the full diversity of cadet experience at various police academies. Future research could use longitudinal designs to examine perceptions that develop over time and incorporate a wider sample. In addition, exploring additional variables beyond SDG 4 alignment can further shed light on the drivers of adoption in this particular context.

Future research may expand on this research by examining the impact of social and institutional factors on cadet acceptance of virtual libraries, including peer influence and organizational support. Additionally, expanding TAM to include constructs such as "training relevance" or "professional adoption" could offer a more refined framework for understanding technology adoption in settings where practical application is paramount. The longitudinal study can also assess the long-term impact of the use of virtual libraries on cadet performance, providing valuable insights into continuing education practices in police academies.

## Conclusion

The study found that perceived usefulness (PU) was a significant factor influencing the adoption of virtual libraries by cadets, while perceived ease of use (PEOU) played a smaller role. These findings emphasize the importance of aligning virtual library resources with the professional learning needs of cadets to increase perceived relevance. The study contributes to the literature by expanding the Technology Acceptance Model (TAM) with alignment of the SDGs and external aspirations, improving the application of the framework in the context of specific training. In practical terms, this insight suggests that police academy administrators should focus on developing virtual library content that supports cadet training requirements,

incorporating resources such as case studies and tactical materials. The limitations of this study include cross-sectional design and sample representativeness, which can limit generalizations. Future research could explore the role of social and institutional enablement factors on the adoption of cadet digital resources, as well as longitudinal studies to examine how these perceptions evolve over time, offering a deeper understanding of the ongoing integration of digital resources in police training environments.

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