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Village-Owned Enterprise E-Government Adoption: A UMEGA Analysis in Tangerang

Aryo Wicaksono[1*], Heri Faturrahman[2]
Faculty of Administrative Science, Universitas Indonesia[1,2]
aryo.wicaksono41@ui.ac.id[1*], heri.fathurahman09@ui.ac.id[2]

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Abstract

Purpose: This study examines the determinants of behavioral intention among non-adopter BUM Desa managers in utilizing the bumdes.kemendesa.go.id portal for legal entity registration in Tangerang Regency, Indonesia, using the Unified Model of Electronic Government Adoption (UMEGA).

Research Methodology: A quantitative cross-sectional survey was conducted on 112 non-adopter BUM Desa managers during May–June 2026. Data were collected via a structured online questionnaire measuring seven UMEGA constructs with 28 indicators on a six-point Likert scale. Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0 was employed for analysis.

Results: Four of seven hypotheses were supported. Effort Expectancy ($\beta = 0.263$, $p = 0.013$) and Social Influence ($\beta = 0.260$, $p = 0.046$) positively influenced Attitude. Facilitating Conditions significantly affected both Effort Expectancy ($\beta = 0.365$, $p = 0.007$) and Behavioral Intention ($\beta = 0.304$, $p = 0.044$). Performance Expectancy, Perceived Risk, and the Attitude-to-Behavioral Intention path were not significant.

Conclusions: In mandatory G2B e-government contexts, adoption intention is driven by perceived simplicity, social pressure, and facilitating resources rather than by functional expectations or attitudinal mediation. The non-significant attitude-intention path is attributed to the mandatory nature of the service, which renders UMEGA's central mediation pathway less operative and calls for contextual recalibration.

Limitations: The cross-sectional design, single-regency scope, and modest R^2 values limit causal inference and generalizability.

Contributions: This study extends UMEGA to a mandatory G2B village-level context and recommends that policymakers prioritize operational support and village-head endorsement over attitudinal campaigns.

Keywords: *Behavioral Intention, E-Government, Legal Entity Registration, UMEGA, Village Owned Enterprise*

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1. Introduction

Village-owned enterprises (Badan Usaha Milik Desa/BUM Desa) have emerged as a central instrument in Indonesia national development strategy, serving a dual mission of social welfare provision and local economic empowerment (Khairani, Ramlan, & Pulungan, 2021; Srirejeki, 2018).

The enactment of Law Number 11 of 2020, subsequently amended by Law Number 6 of 2023, and Government Regulation Number 11 of 2021 marked a paradigmatic shift by transforming BUM Desa from informal community enterprises into fully recognized legal entities. This institutional strengthening is expected to enhance BUM Desa capacity in accessing formal capital, establishing professional partnerships, and operating under comprehensive legal protection (Kasmawati, Hamzah, & Sunaryo, 2024). To operationalize this transformation, the Ministry of Village and Disadvantaged Regions launched the *bumdes.kemendesa.go.id* portal, an e-government instrument designed to streamline the bureaucratic complexity of legal entity registration, administrative governance, and amendment of articles of association through digital means.

Despite the promising administrative convenience offered by this digital platform, national adoption remains suboptimal. As of September 2025, only approximately 56% of the total 63,263 BUM Desa across Indonesia have utilized the digital service to obtain legal entity status, leaving nearly 44% operating in a vulnerable legal condition. This phenomenon becomes more intriguing when examined at the sub-national level, particularly in Tangerang Regency a peri-urban district adjacent to the national capital with a relatively mature digital ecosystem. Tangerang Regency records an Indonesian Digital Society Index (IMDI) score of 50.33, surpassing the national average of 45.38, and boasts 100% internet connectivity at village head offices. Paradoxically, its BUM Desa legal entity registration rate stands at merely 48.86%, positioned the lowest among comparable regencies in the Jakarta metropolitan fringe, trailing behind Bekasi (72.09%) and Bogor (79.95%). This disparity suggests that the impediment to technology adoption is no longer rooted in technical infrastructure deficits but rather in non-technical and psychological barriers residing within the prospective users themselves.

The misalignment between digital readiness and actual service utilization underscores the necessity of employing a theoretical framework that can comprehensively explain user behavioral intention toward e-government adoption. While conventional technology acceptance models such as TAM and UTAUT have been extensively applied in organizational and private-sector contexts, their explanatory power often diminishes when transferred to public-sector digital services, where issues of trust, perceived risk, and institutional accountability assume greater salience. The Unified Model of Electronic Government Adoption (UMEGA), developed by Dwivedi et al. (2017) addresses this limitation by integrating Attitude and Perceived Risk into a unified structure, demonstrating an explanatory power (R^2) of up to 80%. UMEGA posits that Performance Expectancy, Effort Expectancy, Social Influence, and Perceived Risk directly shape user attitude toward e-government services, while Facilitating Conditions exert a dual influence on both Effort Expectancy and Behavioral Intention.

Nevertheless, existing UMEGA literature reveals substantial heterogeneity in findings across geographical and institutional contexts, indicating that adoption determinants are highly contextual rather than universally generalizable. Moreover, prior empirical studies have predominantly examined UMEGA in Government-to-Citizen (G2C) settings such as tax registration, population administration, and public complaint systems where service usage is often mandatory. The application of UMEGA in a Government to Business (G2B) context at the village level, particularly for legal entity registration of community-owned enterprises, remains empirically underexplored.

An important conceptual clarification is warranted regarding the service modality examined in this study. Although UMEGA was originally validated in a voluntary adoption context, the bumdes.kemendesa.go.id portal for BUM Desa legal entity registration operates under a de facto mandatory framework: Government Regulation Number 11 of 2021 stipulates that all BUM Desa must obtain legal entity status, and the digital portal constitutes the sole prescribed mechanism for fulfilling this obligation, with no offline alternative available. Consequently, the non-adopters in this study are not individuals who have freely chosen to forgo the service, but rather organizations that have yet to fulfill a regulatory requirement due to capacity constraints, institutional barriers, or limited awareness of the registration process. This distinction has significant implications for the

interpretation of Behavioral Intention, which in this context reflects compliance readiness and institutional capacity rather than purely voluntary volitional choice. The study explicitly acknowledges this tension and examines the extent to which UMEGA's constructs, particularly the attitude-intention pathway, remain operative in a context where non-adoption reflects constrained capacity rather than discretionary behavior.

This study addresses that gap by contextualizing the UMEGA model in Tangerang Regency, focusing specifically on non-adopters, village apparatus or BUM Desa managers who have not yet completed legal entity registration through the portal. By doing so, this research aims to provide empirical evidence on the psychological and situational determinants that govern behavioral intention in a rural-urban hybrid institutional setting, thereby enriching the theoretical foundation of digital governance literature while offering actionable insights for policymakers to design targeted interventions that accelerate BUM Desa legal formalization.

2. Literature Review and Hypotheses Development

2.1 The Unified Model of Electronic Government Adoption (UMEGA)

Technology adoption research has traditionally relied on information systems frameworks such as the Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), and Unified Theory of Acceptance and Use of Technology (UTAUT). However, Dwivedi et al. (2017) argued that direct transplantation of these models into e-government contexts overlooks domain-specific nuances, particularly trust, perceived risk, security, transparency, and privacy. In response, they formulated the Unified Model of Electronic Government Adoption (UMEGA), which integrates 29 constructs from nine predecessor theories into seven core variables. These include five independent constructs Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), and Perceived Risk (PR) with Attitude (ATT) positioned as the central mediator and Behavioral Intention (BI) as the ultimate dependent variable (Dwivedi et al., 2017).

The inclusion of Attitude as a mediator is conceptually critical. Unlike organizational technology adoption where usage is often mandatory, e-government engagement at the individual level is typically voluntary, making affective evaluation a prerequisite rather than a bypassable step (Dwivedi et al., 2017). Similarly, the explicit incorporation of Perceived Risk addresses the transactional nature of digital government services, where concerns about data breaches, identity theft, and procedural ambiguity constitute barriers that conventional models fail to capture (Dwivedi et al., 2017). Empirical validation of UMEGA in the Indian context, using the Online Permanent Account Number Card Registration System (OPCRS) with 377 non-adopter respondents, demonstrated an explanatory power of 80% for Behavioral Intention, surpassing UTAUT 34% and confirming the model's superior predictive capacity in public-sector digital service contexts.

2.2 Empirical Trajectory and Contextual Variability of UMEGA

Since its inception, UMEGA has been replicated and extended across diverse geographical and institutional settings, yet the literature reveals significant heterogeneity in findings. Prawati, Karina, and Balqis (2022) applied UMEGA to the National Samsat Online Application (SAMOLNAS) in Jakarta and found that Effort Expectancy, Social Influence, and Perceived Risk significantly shaped user attitude, whereas Performance Expectancy did not. Conversely, Mursitama et al. (2023), examining the e-SPT tax application for corporate taxpayers, reported that Social Influence and Perceived Risk were significant determinants of attitude, but Performance Expectancy and Effort Expectancy were not. Prawati, Karina, Addy Putri, and Rachmi (2024) later studied e-Filing among individual taxpayers in Jabodetabek and found that Performance Expectancy, Effort Expectancy, and Social Influence positively influenced attitude, while Perceived Risk and Facilitating Conditions showed no direct effect on attitude.

In developing-country contexts, the pattern remains inconsistent. Mensah, Zeng, and Luo (2020) extended UMEGA in Ghana by adding trust and service quality constructs, discovering that Performance Expectancy, Effort Expectancy, and Social Influence were all insignificant toward attitude, while Facilitating Conditions directly influenced both Effort Expectancy and Behavioral

Intention.Muhammad and Kaya (2023), studying e-government adoption in Nigeria, found Performance Expectancy, Effort Expectancy, and Perceived Risk significant, but Social Influence insignificant. Avazov and Lee (2022) validated an extended UMEGA in Uzbekistan and confirmed that Performance Expectancy and Effort Expectancy shaped attitude, whereas Social Influence and Perceived Risk did not. Nugroho, Imania, and Rahmawati (2022), examining mobile civic services in Surakarta, Indonesia, reported that Effort Expectancy, Facilitating Conditions, and Perceived Risk influenced attitude, while Performance Expectancy and Social Influence did not. Al-Kautsar Maktub, Handayani, and Sunarso (2025), studying the JAKI mobile government application in Jakarta, confirmed that Performance Expectancy, Social Influence, and Perceived Risk shaped attitude, while removing Effort Expectancy from observation entirely.

This fragmented empirical landscape suggests that UMEGA relationships are not universal but are systematically moderated by contextual conditions. Benosa, Omorog, and Ramos (2023), employing a mixed-methods approach in rural Philippine municipalities, found that all UMEGA variables influenced adoption, though divergent patterns emerged between citizens and government apparatus. Verkijika and De Wet (2018), validating UMEGA in South Africa with added computer self-efficacy, found all relationships significant except Effort Expectancy toward Attitude. Burhanuddin, Badruddin, and Yapid (2019), in Thailand, reinforced that attitude and trust serve as key mediators between belief structures and usage intention.

Saleh, Haizan Nor, Islam, Jusoh, and Abdullah (2023), in a systematic review and meta-analysis of nine UMEGA empirical studies, quantitatively confirmed that although the model demonstrates a significant combined effect, substantial inter-study heterogeneity exists. Geographical context, respondent characteristics, and e-government service type were identified as moderators of inter-construct relationship strength. This meta-analytic evidence underscores the necessity of contextualized replication rather than blind generalization.

2.3 Village-Owned Enterprises and the Digital Governance Imperative

The institutionalization of Badan Usaha Milik Desa (BUM Desa) represents Indonesia strategic effort to activate rural economic autonomy. Established under Law Number 6 of 2014 and subsequently strengthened by Law Number 11 of 2020 and Government Regulation Number 11 of 2021, BUM Desa functions as a village-characterized business entity with dual social and economic orientations (Kasmawati, Hamzah, & Sunaryo, 2024). The elevation of BUM Desa into a fully recognized legal entity grants it independent legal subjectivity, separate asset ownership, and the capacity to engage in formal business transactions, access institutional financing, and establish professional partnerships (Andika, Yamani, & Budi Ambarini, 2023; Muhammad Ikhsan, Sukarno, Khairul, & Rauzi, 2023).

Despite this regulatory momentum, empirical evidence indicates persistent institutional fragility. Kusmulyono, Dhewanto, and Hariadi (2023) identified that less than 600 out of 45,549 BUM Desa nationwide demonstrate satisfactory performance, with the majority facing governance deficiencies, managerial incapacity, and weak community participation. Kania, Anggadwita, and Alamanda (2021) further documented that BUM Desa in Garut, while functioning as entrepreneurship incubators, struggle with human resource limitations, political intervention, and complex regulatory requirements. Trinanda and Khoirunurrofik (2024), analyzing 74,949 villages, confirmed that villages with BUM Desa exhibit higher Village Development Index (IDM) scores, yet the modality of business operation determines the magnitude of developmental contribution.

The digital transformation of BUM Desa governance is operationalized through the *bumdes.kemendesa.go.id* portal, an e-government mechanism designed to streamline legal entity registration and administrative compliance. However, Sihotang, Hidayanto, Purwandari, et al. (2023), in a systematic literature review of 35 articles on micro-level e-government adoption in developing countries, concluded that village-level adoption is determined less by technical infrastructure and more by organizational readiness and human resource capability. Sihotang, Hidayanto, and Kurnia (2023), applying stakeholder theory to village information systems in Gunungkidul, emphasized that sustainable adoption depends on orchestrated alignment among government agencies, community

groups, and BUM Desa actors. Malodia, Dhir, Mishra, and Bhatti (2021) noted that over 60% of e-government projects in developing countries fail to achieve intended outcomes, with 35% failing completely, indicating that digital presence does not guarantee utilization. Beyond service delivery, e-government adoption carries broader economic implications. Elbahnasawy (2021) demonstrated that higher levels of e-government penetration are associated with reduced informal economic activity, as digital administrative systems improve transparency, reduce bureaucratic friction, and expand the reach of formal regulatory institutions, which are outcomes that are directly relevant to the goal of formalizing BUM Desa through digital legal entity registration.

2.4 Research Gap

Three interrelated gaps motivate this study. First, while UMEGA has been extensively validated in Government to Citizen (G2C) contexts such as tax registration, population administration, and vehicle licensing, its application in Government to Business (G2B) interactions at the village level remains empirically scarce. BUM Desa occupies a legal position as a hybrid institution operating under public law yet engaging in civil-economic transactions, rendering G2C frameworks conceptually inadequate (Alfiansyah, 2021; Sukarja, Siregar, & Lubis, 2021). Second, existing UMEGA studies predominantly examine adopters or mixed populations, leaving the psychology of non-adopters those who have never initiated legal registration despite regulatory pressure and infrastructure availability under-theorized. Third, the peri-urban village context of Tangerang Regency, characterized by above-average digital ecosystem maturity yet below-average e-government utilization, presents a paradox that challenges infrastructure-centric explanations and demands a behavioral lens. Furthermore, studies in developing-country contexts have consistently shown that trust and institutional factors play a moderating role in e-government adoption that UMEGA's baseline structure does not fully capture (Lessa & Tsegaye, 2022), reinforcing the need for contextually grounded replication in the Indonesian village governance setting.

2.5 Hypothesis Development

2.5.1 Performance Expectancy and Attitude

Performance Expectancy refers to the degree to which users believe that utilizing a technology will enhance their task performance (Dwivedi, Rana, Janssen, Lal, Williams, & Clement, 2017). In the context of BUM Desa legal registration, this construct captures managerial beliefs about procedural acceleration, administrative effectiveness, and post-registration access to formal capital and partnerships. While Dwivedi et al. (2017), Prawati et al. (2024), and Al-Kautsar Maktub et al. (2025) confirmed this relationship, Mensah et al. (2020), Mursitama et al. (2023) and Nugroho et al. (2022) found it insignificant. Nevertheless, in a G2B context where legal entity status directly determines business operability and credit eligibility, the functional utility of the registration portal is expected to be salient. Therefore, the following is hypothesized.

> *H_1:* Performance Expectancy has a positive and significant relationship with Attitude toward using the bumdes.kemendesa.go.id portal.

2.5.2 Effort Expectancy and Attitude

Effort Expectancy denotes the perceived simplicity of system interaction (Dwivedi, Rana, Janssen, Lal, Williams, & Clement, 2017). For village managers with limited digital literacy, the navigational clarity of the registration portal, readability of instructions, and simplicity of document upload procedures are critical. Dwivedi et al. (2017), Muhammad and Kaya (2023), and Prawati et al. (2024) supported this relationship, whereas Mensah et al. (2020) and Mursitama et al. (2023) found no significant effect. Given that BUM Desa managers in peri-urban settings may lack specialized IT support, perceived ease of use is posited to shape evaluative affect.

> *H_2:* Effort Expectancy has a positive and significant relationship with Attitude toward using the bumdes.kemendesa.go.id portal.

2.5.3 Social Influence and Attitude

Social Influence reflects the perceived pressure from significant others to adopt a system (Dwivedi, Rana, Janssen, Lal, Williams, & Clement, 2017). In rural and peri-urban governance, village heads,

peer BUM Desa managers, and district government officials serve as normative referents. Benosa et al. (2023) and Mursitama et al. (2023) identified Social Influence as a strong driver, whereas Mensah et al. (2020), Avazov and Lee (2022), and Muhammad and Kaya (2023) reported insignificance. In the Indonesian village context, where decision-making is often communal and inter-village benchmarking is prevalent, social pressure is expected to exert a positive influence.

> *H_3:* Social Influence has a positive and significant relationship with Attitude toward using the bumdes.kemendesa.go.id portal.

2.5.4 Facilitating Conditions

Facilitating Conditions represent the belief that organizational and technical infrastructure exists to support system use (Dwivedi, Rana, Janssen, Lal, Williams, & Clement, 2017). UMEGA uniquely positions this construct as exerting a dual influence, directly upon Behavioral Intention and indirectly through Effort Expectancy. Dwivedi et al. (2017), Mensah et al. (2020), and Mursitama et al. (2023) confirmed both pathways, while Prawati et al. (2022) and Prawati et al. (2024) found the direct path to Behavioral Intention insignificant. In Tangerang Regency, where 100% of village offices have internet connectivity yet adoption remains low, the availability of technical guidance, operational manuals, and companion assistance from district officials is hypothesized to simultaneously reduce perceived difficulty and strengthen usage intention.

> *H_4:* Facilitating Conditions has a positive and significant relationship with Behavioral Intention toward using the bumdes.kemendesa.go.id portal.

> *H_5:* Facilitating Conditions has a positive and significant relationship with Effort Expectancy toward using the bumdes.kemendesa.go.id portal.

2.5.5 Perceived Risk and Attitude

Perceived Risk captures user concerns about data security, privacy breaches, and procedural uncertainty inherent in transactional e-government (Dwivedi, Rana, Janssen, Lal, Williams, & Clement, 2017). Dwivedi et al. (2017), Muhammad and Kaya (2023), and Mursitama et al. (2023) confirmed its negative effect on attitude, whereas Avazov and Lee (2022) and Al-Kautsar Maktub et al. (2025) found it insignificant. For village apparatus or BUM Desa managers, the registration process involves submitting sensitive institutional and village-head data, where input errors or system vulnerabilities could jeopardize legal entity status. This vulnerability is expected to generate negative affective evaluation. Research on e-government trust and risk perception has shown that concerns about institutional credibility and data vulnerability are particularly salient in mandatory digital transactions where users have no alternative channel (Warkentin, Sharma, Gefen, Rose, & Pavlou, 2018).

> *H_6:* Perceived Risk has a negative and significant relationship with Attitude toward using the bumdes.kemendesa.go.id portal.

2.5.6 Attitude and Behavioral Intention

Attitude, defined as the individual's positive or negative evaluative affect toward a behavior, serves as the central mediator in UMEGA (Dwivedi, Rana, Janssen, Lal, Williams, & Clement, 2017). The original validation demonstrated that Attitude and Facilitating Conditions collectively explained 80% of variance in Behavioral Intention. Although the bumdes.kemendesa.go.id registration is de facto mandatory, UMEGA's theoretical structure still positions attitude as the primary psychological bridge between cognitive-perceptual determinants and conative intention. This study therefore tests whether that mediating pathway remains operative when adoption reflects a regulatory obligation rather than a purely voluntary choice; the strength of the attitude intention relationship is consequently treated as an open empirical question in this mandatory G2B context.

> *H_7:* Attitude has a positive and significant relationship with Behavioral Intention to use the bumdes.kemendesa.go.id portal.

3. Research Methodology

3.1 Research Design and Approach

This study adopts a positivist paradigm and a deductive explanatory approach to examine the causal relationships among the determinants of e-government adoption among BUM Desa managers. The positivist stance was chosen because the research objective requires an objective, value-free, and empirically measurable investigation of behavioral intention in a public-sector digital service context (Neuman, 2017). Following the logic of deduction, the study begins with the Unified Model of Electronic Government Adoption (UMEGA) as the overarching theoretical framework, translates its propositions into seven testable hypotheses, and subsequently validates these hypotheses through standardized quantitative instruments and statistical analysis (Creswell & Creswell, 2023).

In terms of purpose, the study is classified as applied research because it addresses a practical problem: the low rate of legal entity registration through the bumdes.kemendesa.go.id portal in Tangerang Regency despite universal digital infrastructure availability. Temporally, the design is cross-sectional. Data were collected at a single point in time during May – June 2026. Although the legal status of BUM Desa is dynamically changing, the measurement of Behavioral Intention was deliberately anchored to the pre-adoption phase, the period before a BUM Desa completes its legal entity registration to ensure construct consistency and prevent distortion from post-registration status changes.

3.2 Population and Sampling

The population of this study comprises all BUM Desa in Tangerang Regency that had not yet completed legal entity registration through the bumdes.kemendesa.go.id portal, totaling 112 entities as of September 2025. It is acknowledged that a period of approximately eight months elapsed between the establishment of this sampling frame (September 2025) and the data collection window (May–June 2026). To address potential frame obsolescence, the researcher cross-checked the registration status of all 112 target BUM Desa through the official portal immediately prior to questionnaire distribution. BUM Desa that had completed registration during the interim period were excluded and replaced, ensuring that the final 112 respondents exclusively comprised confirmed non-adopters at the time of data collection. This validation procedure preserves the construct consistency of the pre-adoption measurement framework.

The unit of analysis is the BUM Desa itself, with one respondent representing one BUM Desa unit. The respondents include village heads, village apparatus, and BUM Desa managers who are functionally involved in the administrative process of legal registration. Village heads were included because they serve as gatekeepers and supervisors of BUM Desa operations, while village apparatus and operational managers were targeted because they typically receive delegated authority to handle the technical and administrative details of registration (Rakhman et al., 2021).

Given the finite and fully accessible population, this study employed total sampling (census), distributing questionnaires to all 112 BUM Desa units. This technique was chosen to maximize representativeness and eliminate selection bias. The adequacy of the 112-respondent sample was verified through three convergent benchmarks: (1) the 10-times rule (Hair et al., 2014) yields a minimum of 50 with five predictors; (2) the sample falls within the 100–150 range acceptable for SEM (Javed et al., 2020); and (3) prior PLS-SEM studies have produced stable estimates with comparable samples (Alfaro-Ramos & Ferreras-Méndez, 2022; Jha & Ray, 2021; Karimi et al., 2022).

3.3 Instrument and Measurement

Data were collected through a structured, closed-ended questionnaire administered via an online digital platform. The instrument was adapted from the validated UMEGA instrument developed by Dwivedi et al. (2017) and contextualized to the BUM Desa legal registration portal. The questionnaire measures seven latent constructs namely Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), Perceived Risk (PR), Attitude (ATT), and Behavioral Intention (BI). These constructs were operationalized into 28 reflective indicators, with PE measured by seven items, SI by six items, and EE, FC, PR, ATT, and BI each measured by three

items. All items were rated on a six-point Likert scale ranging from 1 (Strongly Disagree) to 6 (Strongly Agree). The six-point scale was deliberately chosen to eliminate the neutral midpoint and thereby reduce central tendency bias, forcing respondents to commit to either a positive or negative evaluative stance (Neuman, 2017).

3.4 Data Collection Procedure

Prior to the full-scale survey, a pilot test was conducted with a separate preliminary group of 30 respondents drawn from non-adopter BUM Desa managers in an adjacent regency (Kabupaten Serang) to avoid contaminating the main study sample. This approach ensured independence between the pilot and main study phases, preventing circular validation. Data from this pre-test were analyzed using IBM SPSS 31 to assess internal consistency through Cronbach's Alpha and to examine construct validity via factor analysis, confirming that the adapted items were contextually appropriate and statistically sound for the target respondents. Upon confirmation of satisfactory psychometric thresholds during the pilot phase, the refined questionnaire was administered electronically to all 112 confirmed non-adopter BUM Desa units during the May–June 2026 data collection window. Upon collection, raw data underwent systematic cleaning to identify missing values and outliers, ensuring that only complete and valid responses entered the subsequent statistical pipeline.

3.5 Data Analysis

The analytical procedure was executed in two sequential stages. First, the psychometric quality of the instrument was examined using IBM SPSS Statistics version 31. Validity was assessed through factor analysis, with the Kaiser-Meyer-Olkin (KMO) measure, Anti-Image Correlation matrices, and factor loadings serving as the primary diagnostic criteria. Reliability was evaluated through Cronbach Alpha coefficients to ensure internal consistency among the items within each construct. Only constructs that satisfied both validity and reliability thresholds were retained for structural modeling.

Second, hypothesis testing was performed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4.0 software. PLS-SEM was selected for five methodological reasons that align with the characteristics of this study. First, it allows the simultaneous estimation of complex structural models with multiple direct and indirect relationships among latent variables (Hair, Risher, Sarstedt, & Ringle, 2019). Second, PLS-SEM does not impose strict multivariate normality assumptions, making it robust against the non-normal distributions commonly encountered in Likert-scale survey data (Hair et al., 2019). Third, it is designed to perform effectively with small-to-medium sample sizes, which matches the 112-respondent dataset (Hair et al., 2019). Fourth, it accommodates both reflective and formative measurement models, as well as varying numbers of indicators per construct, which is relevant given that this study employs seven indicators for PE and three for several other constructs. Fifth, PLS-SEM provides predictive relevance metrics (Q^2) alongside explanatory power (R^2), offering a comprehensive evaluation of model performance.

Following Hair et al. (2019), the PLS-SEM analysis was conducted through two sub-models. The outer model (measurement model) was evaluated to ensure that the reflective indicators possessed adequate convergent validity, discriminant validity, and reliability before proceeding to structural testing. Convergent validity was assessed through two criteria: outer loadings, which must exceed the threshold of 0.70 to indicate that each indicator shares a substantial proportion of variance with its intended construct, and Average Variance Extracted (AVE), which must be equal to or greater than 0.50 to confirm that the construct explains more than half of the variance of its indicators. Discriminant validity was examined using the Heterotrait-Monotrait ratio (HTMT), with a conservative threshold of 0.85 or a more lenient threshold of 0.90, ensuring that the correlation between distinct constructs is meaningfully lower than the correlation among indicators within the same construct. Consistent with current PLS-SEM practice, the HTMT ratio was adopted as the primary criterion for assessing discriminant validity, as it is more sensitive in detecting discriminant-validity problems than the traditional Fornell-Larcker criterion in variance-based SEM (Hair et al., 2019). Reliability was evaluated through Composite Reliability (CR), which must be equal to or greater than 0.70, and Cronbach Alpha, which must also meet the 0.70 threshold, indicating that the indicators consistently measure the same underlying construct. In cases where an indicator exhibited

an outer loading below the 0.70 threshold, it was eliminated iteratively to improve measurement quality, provided that the construct retained a minimum of three valid indicators to preserve content coverage and model identification.

The inner model (structural model) was assessed to test the research hypotheses and evaluate the overall quality of the model after the outer model was declared valid and reliable. The evaluation of the inner model followed four criteria. First, path coefficients (β) were examined to determine the strength and direction of the hypothesized relationships between constructs, with statistical significance tested through bootstrapping using 5,000 subsamples at the $\alpha = 0.05$ significance level under a one-tailed test assumption. Second, the coefficient of determination (R^2) was reported to measure the proportion of variance in the dependent constructs explained by their independent predictors, with values of 0.25 interpreted as weak, 0.50 as moderate, and 0.75 as substantial explanatory power. Third, effect size (f^2) was calculated to assess the relative contribution of each independent construct to the R^2 of the dependent construct, with thresholds of 0.02 indicating a small effect, 0.15 a medium effect, and 0.35 a large effect. Fourth, predictive relevance (Q^2) was computed through the blindfolding procedure to evaluate the model's out-of-sample predictive capability, where a Q^2 value greater than 0 confirms that the model possesses predictive relevance. A hypothesis was accepted if the path coefficient was statistically significant (p-value < 0.05) and the direction of the relationship aligned with the theoretical prediction. The entire analytical process was conducted using SmartPLS 4.0 with the PLS algorithm and bootstrapping procedures.

To address the potential threat of Common Method Bias (CMB) arising from the single-source, single-method, self-report survey design, a full collinearity assessment was conducted following the procedure recommended by Kock (2015). Under this approach, all constructs are simultaneously treated as both predictors and criteria, and the resulting Variance Inflation Factor (VIF) values are examined against a threshold of 3.3. Values below this threshold indicate the absence of pathological collinearity attributable to common method variance. The results of this assessment are reported in Section 4.4 alongside the structural model evaluation.

4. Results and Discussions

4.1 Pre Test Validity and Reliability Test

Prior to the full-scale survey, a pilot test was conducted to validate the psychometric properties of the adapted UMEGA instrument among a preliminary group of respondents. Data from this pre-test were analyzed using IBM SPSS 31 to assess internal consistency through Cronbach's Alpha and to examine construct validity via factor analysis, ensuring that the adapted items were contextually appropriate and statistically sound for targeted respondents. Upon confirmation of satisfactory psychometric thresholds during the pilot phase, the refined questionnaire was subsequently administered to the full sample of 112 non-adopter BUM Desa managers in Tangerang Regency during May–June 2026.

Table 1. Validity test (pre-test questionnaire)

Variable	Indicators	KMO	Barlett Test Sig.	Anti-Image Correlation	Factor Loading	Decision
Performance Expectancy (PE)	PE1	0,897	0,000	0,829	0,963	Valid
Performance Expectancy (PE)	PE2	0,897	0,000	0,894	0,958	Valid
Performance Expectancy (PE)	PE3	0,897	0,000	0,911	0,962	Valid
Performance Expectancy (PE)	PE4	0,897	0,000	0,948	0,914	Valid
Performance Expectancy (PE)	PE5	0,897	0,000	0.870	0,968	Valid
Performance Expectancy (PE)	PE6	0,897	0,000	0.916	0,983	Valid

Variable	Indicators	KMO	Barlett Test Sig.	Anti-Image Correlation	Factor Loading	Decision
Performance Expectancy (PE)	PE7	0,897	0,000	0.926	0,978	Valid
Effort Expectancy (EE)	EE1	0.779	0,000	0.745	0.981	Valid
Effort Expectancy (EE)	EE2	0.779	0,000	0,860	0,971	Valid
Effort Expectancy (EE)	EE3	0.779	0,000	0,745	0,981	Valid
Social Influence (SI)	SI1	0,848	0,000	0.958	0.848	Valid
Social Influence (SI)	SI2	0,848	0,000	0.832	0.938	Valid
Social Influence (SI)	SI3	0,848	0,000	0.972	0.910	Valid
Social Influence (SI)	SI4	0,848	0,000	0.807	0.924	Valid
Social Influence (SI)	SI5	0,848	0,000	0.785	0.940	Valid
Social Influence (SI)	SI6	0,848	0,000	0.800	0.944	Valid
Facilitating Conditions (FC)	FC1	0.720	0,000	0.770	0.947	Valid
Facilitating Conditions (FC)	FC2	0.720	0,000	0.768	0.947	Valid
Facilitating Conditions (FC)	FC3	0.720	0,000	0.646	0.978	Valid
Perceived Risk (PR)	PR1	0.645	0,000	0.804	0.863	Valid
Perceived Risk (PR)	PR2	0.645	0,000	0.618	0.946	Valid
Perceived Risk (PR)	PR3	0.645	0,000	0.586	0.972	Valid
Attitude (ATT)	ATT1	0,771	0,000	0,902	0.977	Valid
Attitude (ATT)	ATT2	0,771	0,000	0,717	0.989	Valid
Attitude (ATT)	ATT3	0,771	0,000	0,787	0.988	Valid
Behavioral Intention (BI)	BI1	0,777	0,000	0.726	0.990	Valid
Behavioral Intention (BI)	BI2	0,777	0,000	0.889	0.981	Valid
Behavioral Intention (BI)	BI3	0,777	0,000	0.738	0.989	Valid

Table 1 confirmed that all 28 indicators met the validity thresholds in which the Kaiser-Meyer-Olkin (KMO) values ranged from 0.645 to 0.897 (above 0.50), Bartlett Test of Sphericity was significant at $p < 0.001$, Anti-Image Correlation values exceeded 0.50, and factor loadings ranged from 0.848 to 0.990 (above 0.50).

Table 2. Reliability test (pre-test questionnaire)

Variable	Indicators	Cronbach Alpha	Corrected Item-Total Correlation	Decision
Performance Expectancy (PE)	PE1	0,986	0.949	Reliable
Performance Expectancy (PE)	PE2	0,986	0,943	Reliable
Performance Expectancy (PE)	PE3	0,986	0,948	Reliable
Performance Expectancy (PE)	PE4	0,986	0,885	Reliable
Performance Expectancy (PE)	PE5	0,986	0,956	Reliable
Performance Expectancy (PE)	PE6	0,986	0,976	Reliable
Performance Expectancy (PE)	PE7	0,986	0,970	Reliable
Effort Expectancy (EE)	EE1	0,976	0,956	Reliable
Effort Expectancy (EE)	EE2	0,976	0.934	Reliable
Effort Expectancy (EE)	EE3	0,976	0,956	Reliable
Social Influence (SI)	SI1	0.963	0.788	Reliable
Social Influence (SI)	SI2	0.963	0,909	Reliable
Social Influence (SI)	SI3	0.963	0,869	Reliable
Social Influence (SI)	SI4	0.963	0,889	Reliable
Social Influence (SI)	SI5	0.963	0,910	Reliable
Social Influence (SI)	SI6	0.963	0,916	Reliable
Facilitating Conditions (FC)	FC1	0,952	0,883	Reliable
Facilitating Conditions (FC)	FC2	0,952	0,880	Reliable
Facilitating Conditions (FC)	FC3	0,952	0,948	Reliable
Perceived Risk (PR)	PR1	0,916	0,725	Reliable
Perceived Risk (PR)	PR2	0,916	0,861	Reliable
Perceived Risk (PR)	PR3	0,916	0,920	Reliable
Attitude (ATT)	ATT1	0,984	0,949	Reliable
Attitude (ATT)	ATT2	0,984	0,974	Reliable
Attitude (ATT)	ATT3	0,984	0,973	Reliable
Behavioral Intention (BI)	BI1	0,986	0,977	Reliable
Behavioral Intention (BI)	BI2	0,986	0,959	Reliable
Behavioral Intention (BI)	BI3	0,986	0,976	Reliable

In addition to validity test, Table 2 shows that reliability testing further indicated that all seven constructs achieved Cronbach Alpha values between 0.916 and 0.986, far exceeding the 0.60 threshold, while Corrected Item-Total Correlations ranged from 0.725 to 0.976 (above 0.30). With no indicators eliminated, the instrument was declared valid and reliable for deployment in the main study.

4.2 Descriptive Statistics

The main survey was administered to the full population of 112 non-adopter BUM Desa units in Tangerang Regency, spanning 27 sub-districts.

Table 3. Respondents demography

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	101	90
Gender	Female	11	10
Age (years)	< 25	3	2,7
Age (years)	25–35	13	11,6
Age (years)	36–45	38	33,9
Age (years)	46–55	36	32,1
Age (years)	> 55	22	19,6
Education	Senior High School	75	67
Education	Diploma	5	4
Education	Bachelor	31	28
Education	Postgraduate	1	1
Position	Village Apparatus (non-head)	43	38,4
Position	Chairperson/Director of BUM Desa	35	31,3
Position	Head of Business Unit/Operations	12	10,7
Position	Village Head	12	10,7
Position	Secretary of BUM Desa	7	6,3
Position	Treasurer of BUM Desa	3	2,7
Tenure	< 1 year	44	39,3
Tenure	1–3 years	21	18,8
Tenure	4–6 years	15	13,4
Tenure	> 6 years	32	28,6

Table 3 reflected the structural reality of rural governance in Indonesia: 90% were male, the majority (66.1%) were between 36 and 55 years of age, 67% held senior high school education, and the largest occupational group consisted of village apparatus outside the village head (38.4%), followed by BUM Desa chairpersons or directors (31.3%). Notably, 39.3% of respondents had served in their position for less than one year, suggesting a high turnover rate among BUM Desa managers.

Table 4. Descriptive Statistics

Konstruk	Min	Max	Mean	Standard Dev
Performance Expectancy	1,00	6,00	4,6288	0,96614
Effort Expectancy	1,00	6,00	4,5833	0,97363
Social Influence	1,00	6,00	4,7024	0,80053
Facilitating Conditions	1,00	6,00	4,7768	0,82429
Perceived Risk	1,00	6,00	3,2381	1,40813
Attitude	1,00	6,00	4,8929	0,78169
Behavioral Intention	1,00	6,00	4,5149	0,86748

Descriptive statistics as shown on Table 4 revealed that Attitude recorded the highest mean score (4.89), followed by Facilitating Conditions (4.78) and Social Influence (4.70), whereas Perceived Risk yielded the lowest mean (3.24) with the highest standard deviation (1.41), indicating substantial heterogeneity in risk perception across the sample.

4.3 Measurement Model Assessment

The reflective measurement model was evaluated through convergent validity, discriminant validity, and construct reliability.

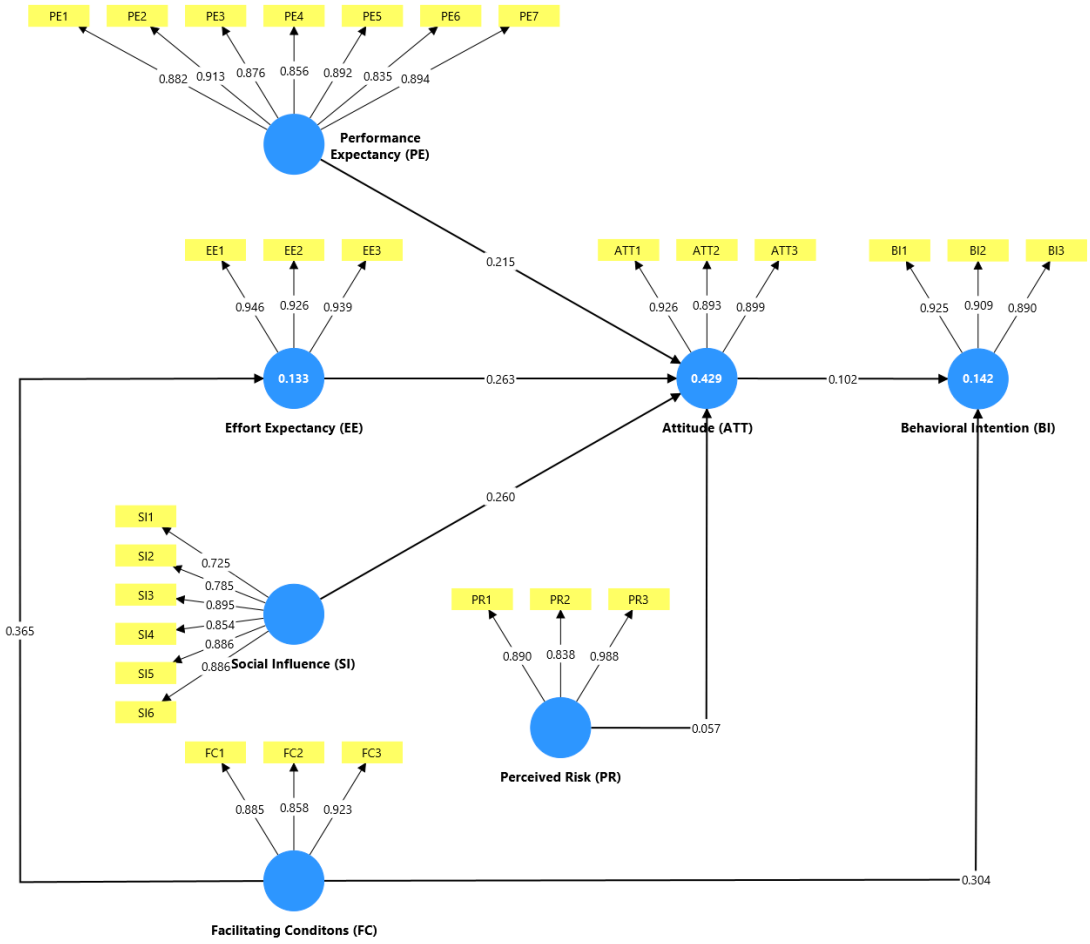

Figure 1. SEM-PLS Measurement Model Results

The SEM-PLS measurement model results, including all outer loadings and inter-construct path relationships, are presented in Figure 1. The visual representation confirms the reflective measurement structure of all seven constructs, with each indicator loading substantially onto its intended latent variable, consistent with the convergent validity evidence reported in Table 5.

Table 5. Measurement model test

Construct	Indicator	Outer Loading	AVE	Composite Reliability	Cronbach Alpha
Performance Expectancy	PE1	0,882	0,772	0,959	0,951
Performance Expectancy	PE2	0,913	0,772	0,959	0,951
Performance Expectancy	PE3	0,876	0,772	0,959	0,951
Performance Expectancy	PE4	0,856	0,772	0,959	0,951
Performance Expectancy	PE5	0,892	0,772	0,959	0,951
Performance Expectancy	PE6	0,835	0,772	0,959	0,951

Construct	Indicator	Outer Loading	AVE	Composite Reliability	Cronbach Alpha
Performance Expectancy	PE7	0,894	0,772	0,959	0,951
Effort Expectancy	EE1	0,946	0,878	0,956	0,931
Effort Expectancy	EE2	0,925	0,878	0,956	0,931
Effort Expectancy	EE3	0,939	0,878	0,956	0,931
Social Influence	SI1	0,725	0,707	0,935	0,916
Social Influence	SI2	0,785	0,707	0,935	0,916
Social Influence	SI3	0,895	0,707	0,935	0,916
Social Influence	SI4	0,854	0,707	0,935	0,916
Social Influence	SI5	0,886	0,707	0,935	0,916
Social Influence	SI6	0,886	0,707	0,935	0,916
Facilitating Conditions	FC1	0,885	0,790	0,919	0,868
Facilitating Conditions	FC2	0,858	0,790	0,919	0,868
Facilitating Conditions	FC3	0,923	0,790	0,919	0,868
Perceived Risk	PR1	0,890	0,824	0,933	0,951
Perceived Risk	PR2	0,838	0,824	0,933	0,951
Perceived Risk	PR3	0,988	0,824	0,933	0,951
Attitude	ATT1	0,926	0,821	0,932	0,921
Attitude	ATT2	0,893	0,821	0,932	0,921
Attitude	ATT3	0,899	0,821	0,932	0,921
Behavioral Intention	BI1	0,925	0,825	0,934	0,894
Behavioral Intention	BI2	0,909	0,825	0,934	0,894
Behavioral Intention	BI3	0,890	0,825	0,934	0,894

Table 5 shows that convergent validity was confirmed as all outer loadings exceeded 0.70 (ranging from 0.725 to 0.988), and the Average Variance Extracted (AVE) for all seven constructs surpassed the 0.50 threshold, with values ranging from 0.707 (Social Influence) to 0.878 (Effort Expectancy). Moreover, construct reliability was equally robust, with Composite Reliability values ranging from 0.919 to 0.959 and Cronbach Alpha values between 0.868 and 0.951, indicating strong internal consistency.

Table 6. HTMT test

	ATT	BI	EE	FC	PR	PE	SI
ATT	-	-	-	-	-	-	-
BI	0,323	-	-	-	-	-	-
EE	0,633	0,201	-	-	-	-	-
FC	0,713	0,398	0,402	-	-	-	-
PR	0,072	0,493	0,156	0,143	-	-	-
PE	0,590	0,310	0,662	0,526	0,104	-	-
SI	0,643	0,553	0,766	0,558	0,234	0,649	-

Discriminant validity was established through HTMT tests (see Table 6). The Heterotrait Monotrait Ratio (HTMT) for all construct pairs was below the conservative threshold of 0.85, with the highest value recorded between Social Influence and Effort Expectancy at 0.766.

4.4 Structural Model Assessment

Before hypothesis testing, collinearity was assessed through the Variance Inflation Factor (VIF).

Table 7. Variance inflation factor (VIF) collinearity assessment

Structural Path	VIF
PE → ATT	1,876
EE → ATT	2,747
SI → ATT	2,518
PR → ATT	1,187
FC → EE	1
FC → BI	1,637
ATT → BI	1,637

Table 7 shows that all values ranged from 1.000 to 2.747, well below the threshold of 3.0, confirming the absence of multicollinearity among predictors. To complement the collinearity diagnostics, a full collinearity VIF test following Kock (2015) was conducted to assess the risk of Common Method Bias (CMB). In this procedure, all seven constructs were simultaneously designated as both predictors and dependent variables, and the resulting VIF values were examined against the pathological threshold of 3.3. All full collinearity VIF values ranged from 1.187 to 2.747 (see Table 7), remaining well below the 3.3 threshold. This result provides evidence that Common Method Bias does not constitute a significant threat to the validity of the findings, and that the observed inter-construct relationships reflect substantive theoretical relationships rather than measurement artifacts.

Table 8. Coefficient of determination (R^2) and predictive relevance (Q^2)

Endogenous Construct	R^2	Q^2 Predict	Interpretation
Attitude	0,429	0,275	Weak / Moderate predictive relevance
Behavioral Intention	0,142	0,102	Weak / Small predictive relevance
Effort Expectancy	0,133	0,086	Weak / Small predictive relevance

The structural model's explanatory power was modest (see Table 8). The coefficient of determination (R^2) was 0.429 for Attitude, 0.142 for Behavioral Intention, and 0.133 for Effort Expectancy. While these values fall into the weak category according to Hair et al. (2019), they remain acceptable given the exploratory nature of the study and the complexity of behavioral modeling at the village level. Predictive relevance was confirmed through the Q^2 Predict values, which were 0.275 for Attitude, 0.102 for Behavioral Intention, and 0.086 for Effort Expectancy, all exceeding zero and thus indicating that the model possesses out-of-sample predictive capability.

4.5 Hypothesis Testing and Discussion

Hypotheses were tested using bootstrapping with 5,000 subsamples under a one-tailed test procedure, with a uniform significance threshold of $p < 0.05$ (t-statistic > 1.65) applied to all hypotheses (Hair et al., 2022; Kock, 2015). Of the seven hypotheses, four were supported at the 5% significance level, while three were rejected, as shown in Table 9.

Table 9. Structural model results (Bootstrapping)

Hypothesis	Path	β	t-value	p-value	Decision
H_1	PE → ATT	0,215	1,487	0,069	Not supported (α = 0.05)
H_2	EE → ATT	0,263	2,212	0,013	Supported
H_3	SI → ATT	0,260	1,682	0,046	Supported
H_4	FC → BI	0,304	1,708	0,044	Supported
H_5	FC → EE	0,365	2,471	0,007	Supported
H_6	PR → ATT	0,057	0,488	0,313	Not supported
H_7	ATT → BI	0,102	0,605	0,272	Not supported

Table 9 shows that four hypotheses were supported and three were not. Effort Expectancy (EE) significantly influenced Attitude (ATT) (β = 0.263; p = 0.013), Social Influence (SI) significantly affected ATT (β = 0.260; p = 0.046), Facilitating Conditions (FC) significantly influenced Behavioral Intention (BI) (β = 0.304; p = 0.044), and FC also significantly affected EE (β = 0.365; p = 0.007). In contrast, Performance Expectancy (PE) did not significantly influence ATT (β = 0.215; p = 0.069), Perceived Risk (PR) had no significant effect on ATT (β = 0.057; p = 0.313), and ATT did not significantly influence BI (β = 0.102; p = 0.272). These findings indicate that ease of use, social influence, and supporting conditions are more important determinants of technology adoption intention than perceived performance benefits, perceived risk, or attitude.

The effect sizes for each structural path are presented in Table 10. As shown in Table 10, Facilitating Conditions exerted the largest effect on Effort Expectancy (f^2 = 0.153, approaching medium), while the Attitude-to-Behavioral Intention path recorded a negligible effect (f^2 = 0.007), further corroborating its non-significance in this mandatory service context. The remaining significant paths exhibited small yet practically meaningful effect sizes (f^2 = 0.044–0.066), consistent with social science behavioral modeling at the village level.

Table 10. Effect size (f^2)

Path	f^2	Interpretation
PE → ATT	0,043	Small
EE → ATT	0,044	Small
SI → ATT	0,047	Small
PR → ATT	0,005	Negligible
FC → EE	0,153	Medium
FC → BI	0,066	Small
ATT → BI	0,007	Negligible

Table 10 presents the effect size (f^2) of each relationship in the structural model. Facilitating Conditions (FC) had the strongest effect on Effort Expectancy (EE) (f^2 = 0.153), indicating a medium effect size. The effects of Performance Expectancy (PE), Effort Expectancy (EE), and Social Influence (SI) on Attitude (ATT), as well as FC on Behavioral Intention (BI), were classified as small, with f^2 values ranging from 0.043 to 0.066. Meanwhile, the effects of Perceived Risk (PR) on ATT (f^2 = 0.005) and ATT on BI (f^2 = 0.007) were negligible, suggesting that these relationships contributed very little to the explanatory power of the model. Overall, FC emerged as the most influential predictor in the model, particularly in enhancing users' perceptions of ease of use.

4.5.1 Performance Expectancy and Attitude (H_1)

The path from Performance Expectancy to Attitude yielded a coefficient of 0.215 (t = 1.487, p = 0.069), which is not significant at the 5% level. H_1 is therefore rejected. This finding aligns with UMEGA replications by Prawati et al. (2022), Nugroho et al. (2022), Mursitama et al. (2023), and Mensah et al. (2020), all of whom reported a non-significant performance-expectancy-to-attitude relationship.

The absence of a significant effect suggests that BUM Desa managers do not yet perceive functional benefits such as procedural acceleration or post-registration capital access as salient evaluative criteria. This may reflect limited understanding of the strategic implications of legal entity status. The small effect size (f^2 = 0.043) further indicates that Performance Expectancy contributes minimally to Attitude variance in this context. The non-significance also raises the question of whether important antecedent variables, such as awareness of downstream legal entity benefits, prior e-government experience, or digital literacy, are absent from the model and may partially explain this finding.

4.5.2 Effort Expectancy and Attitude (H_2)

Effort Expectancy exerted a significant positive effect on Attitude (β = 0.263, t = 2.212, p = 0.013), supporting H_2. This result is consistent with Dwivedi et al. (2017), Prawati et al. (2022), Nugroho et

al. (2022), and Muhammad and Kaya (2023), reinforcing the argument that perceived simplicity is a foundational determinant of user affect in technologically constrained environments. For village managers with limited digital literacy, the navigational clarity of the portal and the readability of registration instructions directly shape whether they form a positive or negative evaluative stance toward the system.

4.5.3 Social Influence and Attitude (H_3)
Social Influence significantly influenced Attitude (β = 0.260, t = 1.682, p = 0.046), supporting H_3. This corroborates Dwivedi et al. (2017) and underscores the salience of normative pressure in rural governance. As Sihotang, Hidayanto, and Kurnia (2023) observed through stakeholder theory in Indonesian village information systems, technology adoption at the village level is embedded in a web of hierarchical and communal expectations. Recommendations from village heads, peer managers who have successfully registered, and district government officials serve as powerful social cues that legitimize use of the digital portal.

4.5.4 Facilitating Conditions and Behavioral Intention (H4)
Facilitating Conditions demonstrated a significant direct effect on Behavioral Intention (β = 0.304, t = 1.708, p = 0.044), supporting H_4. This aligns with Dwivedi et al. (2017) and indicates that technical infrastructure, operational guidance, and companion support directly propel usage intention, independent of attitudinal mediation. Although 100% of village offices have internet connectivity, the significant effect of Facilitating Conditions confirms that perceived adequacy of support resources, rather than the mere presence of infrastructure, determines adoption intention. This gap between connectivity and utilization echoes Malodia et al. (2021), who noted that over 60% of e-government projects in developing countries fail to achieve intended outcomes despite digital presence.

4.5.5 Facilitating Conditions and Effort Expectancy (H_5)
The path from Facilitating Conditions to Effort Expectancy was significant (β = 0.365, t = 2.471, p = 0.007), supporting H_5, and represents the strongest relationship in the model (f^2 = 0.153, approaching medium effect). The result confirms that resource availability and technical support reduce the perceived cognitive burden of operating the portal, amplifying the sense of ease among village managers. This finding is consistent with Dwivedi et al. (2017) and Mensah et al. (2020).

4.5.6 Perceived Risk and Attitude (H_6)
Perceived Risk did not significantly influence Attitude (β = 0.057, t = 0.488, p = 0.313), leading to rejection of H_6. The path coefficient was also positive rather than the hypothesized negative direction. This contrasts with Dwivedi et al. (2017) but converges with Avazov and Lee (2022) in Uzbekistan. The negligible effect size (f^2 = 0.005) confirms that Perceived Risk plays a minimal role in this context, possibly reflecting high institutional trust in the Ministry of Village Affairs or low digital risk awareness among peri-urban village administrators.

4.5.7 Attitude and Behavioral Intention (H_7)
The central mediating path from Attitude to Behavioral Intention was not significant (β = 0.102, t = 0.605, p = 0.272), leading to rejection of H_7. This represents a striking departure from the UMEGA literature, where Attitude has consistently been the dominant predictor of intention. For instance, Dwivedi et al. (2017) reported a path coefficient of 0.736 with R^2 of 80%.

Two interrelated explanations are advanced. First, as established in Section 1, the registration service is de facto mandatory with no offline alternative. Technology enactment theory (Danziger, 2004) posits that in such contexts, behavioral intention is driven less by personal affect and more by external regulatory pressure and the absence of procedural choice. As Sihotang, Hidayanto, and Kurnia (2023) documented, adoption at the village level is often orchestrated through top-down stakeholder alignment rather than bottom-up individual attitude formation. Second, the very low R^2 for Behavioral Intention (0.142) and the negligible effect size (f^2 = 0.007) suggest that important explanatory constructs, such as trust in government, digital literacy, government capacity, and managerial self-efficacy, identified as significant in prior UMEGA extensions (Al-Kautsar Maktub et al., 2025; Mensah et al., 2020), are absent from the model. Future research should consider re-specifying the

dependent variable as actual use or compliance readiness rather than volitional Behavioral Intention, and formally test UMEGA's boundary conditions across voluntary and mandatory e-government service contexts.

5. Conclusions

5.1 Conclusion

This study set out to examine the determinants of behavioral intention among non-adopter BUM Desa managers in utilizing the bumdes.kemendesa.go.id portal for legal entity registration in Tangerang Regency, Indonesia, through the lens of the Unified Model of Electronic Government Adoption (UMEGA). The empirical analysis, conducted on 112 non-adopter respondents across 27 sub-districts using PLS-SEM, yielded several theoretically and practically consequential findings.

First, the study confirms that Effort Expectancy and Social Influence are significant positive predictors of attitude toward the e-government portal. The finding that perceived simplicity of system interaction shapes managerial affect ($\beta = 0.263$, $p = 0.013$) underscores the criticality of interface simplicity and procedural clarity in technologically constrained village environments. Similarly, the significant effect of social pressure ($\beta = 0.260$, $p = 0.046$) reaffirms that technology adoption in rural governance is not an isolated individual decision but a socially embedded process, where recommendations from village heads, peer managers, and district officials function as powerful legitimizing cues.

Second, Facilitating Conditions emerged as the most influential construct in the model, exerting significant dual effects on both Effort Expectancy ($\beta = 0.365$, $p = 0.007$) and Behavioral Intention ($\beta = 0.304$, $p = 0.044$). This finding highlights that the availability of technical infrastructure, operational guidance, and companion support is the primary lever for accelerating adoption, even when attitudinal mediation is weak. Paradoxically, although 100% of village offices have internet connectivity, the significant effect of Facilitating Conditions on both Effort Expectancy and Behavioral Intention indicates that perceived adequacy of technical support, guidance, and operational resources, not mere infrastructure presence, determines adoption intention.

Third, and most strikingly, three hypothesized relationships were rejected. Performance Expectancy did not significantly influence attitude ($\beta = 0.215$, $p = 0.069$), suggesting that BUM Desa managers do not yet perceive functional benefits such as procedural acceleration or post-registration capital access as salient evaluative criteria. Perceived Risk also failed to shape attitude ($\beta = 0.057$, $p = 0.313$), indicating that concerns about data security or procedural errors are not prominent enough to dampen managerial stance, possibly due to high institutional trust in the Ministry of Village Affairs or low digital risk awareness. Most anomalously, Attitude did not translate into Behavioral Intention ($\beta = 0.102$, $p = 0.272$), a radical departure from the original UMEGA validation where attitude explained 80% of intention variance.

This anomaly can be attributed to the mandatory nature of the legal registration service. Unlike the voluntary tax registration context in which UMEGA was originally validated, the absence of an offline alternative for BUM Desa legal entity registration means that behavioral intention is driven less by personal affect and more by external regulatory pressure, organizational mandate, and the absence of procedural choice. Consequently, the study argues that UMEGA requires contextual recalibration when applied to mandatory G2B e-government services at the village level in developing countries. In such contexts, the attitude-intention nexus may be circumvented by institutional coercion and stakeholder orchestration, rendering the model's central mediation pathway less operative.

Collectively, the model explains 42.9% of variance in Attitude, 14.2% in Behavioral Intention, and 13.3% in Effort Expectancy. The modest R^2 values, particularly for Behavioral Intention and Effort Expectancy, warrant critical reflection beyond the exploratory-study justification. These values likely reflect the omission of theoretically relevant predictors such as trust in government, digital literacy, managerial self-efficacy, and government institutional capacity, which have demonstrated explanatory power in prior UMEGA extensions. Additionally, the mandatory nature of the service may have

structurally suppressed variance in Behavioral Intention because non-adopters face a binary compliance obligation rather than a genuine volitional choice. Despite these constraints, predictive relevance was confirmed through positive Q^2 Predict values (0.275 for Attitude, 0.102 for Behavioral Intention, and 0.086 for Effort Expectancy), and Facilitating Conditions exerted a near-medium effect on Effort Expectancy ($f^2 = 0.153$, Table 10), thereby providing substantive practical direction for policy intervention.

5.2 Research Limitations

Several limitations warrant acknowledgment. First, the cross-sectional design captures behavioral intention at a single point in time (May–June 2026), precluding causal inferences about the temporal dynamics of adoption. Second, the exclusive focus on non-adopters, while theoretically justified for pre-adoption measurement, limits the generalizability of findings to adopters who may exhibit different psychological profiles. Third, the sample size of 112, although adequate for PLS-SEM according to the 10-times rule and comparable studies, remains relatively small for detecting weak effects. Fourth, the study is confined to a single peri-urban regency in Indonesia, raising questions about the transferability of findings to rural or urban contexts with different digital ecosystems. Fifth, the mandatory nature of the service complicates the interpretation of the non-significant attitude-intention relationship, as behavioral intention may be shaped by perceived obligation rather than voluntary volition.

Sixth, the model does not include potentially relevant moderating or mediating variables such as digital literacy, trust in government, managerial experience, and village-level institutional capacity, which may help explain the relatively low R^2 for Behavioral Intention (0.142). Future research should extend the baseline UMEGA framework with these domain-specific constructs to improve explanatory power. Seventh, as a single-source, single-method, cross-sectional study, there is an inherent risk of Common Method Bias. Although the full collinearity VIF test indicates no pathological CMB in this study, future research should apply procedural remedies such as temporal separation of measurement and the inclusion of marker variables to strengthen causal inference.

5.3 Suggestions and Directions for Future Research

Based on the findings and limitations, three avenues for future research are proposed. First, future studies should employ a longitudinal design to track the same cohort of BUM Desa managers as they transition from non-adopters to adopters, thereby capturing the temporal evolution of performance expectancy, risk perception, and attitude formation after actual system exposure. Second, the non-significant attitude-intention pathway in this study invites a comparative replication across voluntary versus mandatory e-government services. Such a comparative framework could formally test whether service modality (voluntary vs. compulsory) moderates the mediating role of attitude in UMEGA, thereby contributing to a boundary theory of the model. Third, future research should extend UMEGA with institutional and trust-based constructs such as government capacity, trust in government, and computer self-efficacy, which have proven significant in prior UMEGA extensions and may capture variance currently unexplained by the original seven constructs.

Practically, the findings suggest that policymakers should prioritize facilitating conditions over attitudinal campaigns. Specifically, the Ministry of Village Affairs and Tangerang Regency Government should invest in dedicated technical assistants at the sub-district level, simplified procedural manuals in local language, and direct computer-device provisioning to village offices. Additionally, leveraging social influence through village-head endorsement and inter-village peer learning networks may prove more effective than emphasizing abstract performance benefits, given that functional utility is not yet a salient decision criterion for this population.

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Author Contributions

AW and HF contributed to this study. AW was responsible for conceptualization, methodology design, data collection, formal analysis, and writing the original draft. HF provided supervision, conceptual guidance, critical review and editing of the manuscript, and final approval of the version to be published. Both authors have read and agreed to the published version of the manuscript.

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