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A Modified TAM-ECT Model for Evaluating User Satisfaction and Behavioral Intention in Community-Based Internet Services

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Abstract

This study develops and validates a modified Technology Acceptance Model–Expectation Confirmation Theory (TAM-ECT) framework to evaluate user satisfaction and behavioral intention in the context of community-based internet services (RT/RW Net). Unlike prior TAM-ECT studies predominantly conducted in commercial ISP or e-service environments, this research explicitly focuses on decentralized, community-managed internet services characterized by informal governance structures, low switching barriers, and non-contractual user relationships. Addressing the lack of research on decentralized internet service models, this study integrates external factors service quality, cost-effectiveness, system quality, and customer support and moderating factors, namely digital literacy and switching cost. A quantitative survey approach was employed, collecting valid responses from 803 active users between January and March 2025. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) and Importance-Performance Map Analysis (IPMA). The results demonstrate that perceived ease of use strongly influences perceived usefulness and behavioral intention, while perceived usefulness significantly impacts both user satisfaction and behavioral intention. Notably, and contrary to the core assumption of Expectation Confirmation Theory, user satisfaction does not significantly predict behavioral intention, indicating a context-specific deviation in community-based digital services where pragmatic usability considerations outweigh affective satisfaction. External factors such as customer support and system quality significantly affect user perceptions, highlighting the importance of technical performance and user experience in decentralized service settings. Digital literacy positively moderates the relationship between perceived ease of use and behavioral intention. The IPMA findings reveal that ease of use, service usefulness, and customer support are the most critical areas for improvement. Theoretically, this study extends TAM-ECT by demonstrating that continuance intention in community-based internet services is driven more by usability and functional value than by satisfaction-driven confirmation mechanisms commonly observed in commercial platforms. This study offers practical insights for optimizing technical quality, service functionality, and user digital competencies to foster sustainable adoption in community-managed internet infrastructures.

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INTRODUCTION

Access to reliable internet services has become a fundamental necessity in the digital era, influencing education, business, healthcare, and social interactions (Rahimi et al., 2021; Acheampong et al., 2020). However, underserved and rural communities continue to face significant challenges in securing stable and affordable internet access. To address this disparity, community-based internet services such as RT/RW Net have emerged as decentralized solutions to bridge the digital divide (Cheng, 2020). Unlike commercial ISPs, RT/RW Net initiatives are managed by local communities, offering tailored internet solutions. Despite their promise, user satisfaction and continuous adoption remain uncertain due to a variety of influencing factors (Mahadin, 2019; Alshammari, 2024; Kalia et al., 2021).

Technology Acceptance Model (TAM) and Expectation-Confirmation Theory (ECT), are two widely recognized frameworks in explaining user acceptance and continuance behavior (Ahmad et al., 2019; Al-Mamary et al., 2024). TAM emphasizes perceived usefulness (PU) and perceived ease of use (PEOU) as key predictors of technology acceptance, while ECT highlights the importance of expectation confirmation in forming user satisfaction and behavioral intention. However, these frameworks predominantly focus on structured environments and do not fully capture the unique operational features of community-based internet services. Service quality, system reliability, cost-effectiveness, and customer support are critical elements influencing user perceptions and long-term satisfaction in decentralized networks like RT/RW Net (Ahmad et al., 2019; Alkhurshan, 2020; Keshta, 2021). Prior research confirms that service quality factors such as network speed, reliability, and stability substantially affect user experience and satisfaction with internet services (Mayasari et al., 2023; Salem, 2023; Wang et al., 2020). Furthermore, cost-effectiveness remains a crucial determinant of customer retention, especially in non-commercialized service models (Mahadin, 2019; Al-Rahmi et al., 2021).

While concerns over data security are important in digital service environments (Alraja et al., 2019; Keshta, 2021), this study focuses specifically on evaluating service quality, system quality, customer support, and cost-effectiveness as antecedents to user perceptions in the RT/RW Net context. Additionally, digital literacy and switching costs are identified as critical moderating factors influencing user satisfaction and continuance intention (Ngah, 2024; Ali et al., 2024; Kalia et al., 2021). Despite the proliferation of research on commercial ISPs and e-service platforms, empirical studies focused on RT/RW Net remain limited (Alam et al., 2022; Jia et al., 2020). Given the localized management and infrastructure-specific challenges faced by community-based networks, there is a need to adapt traditional technology adoption models by incorporating social, economic, and technological nuances such as digital literacy and user retention barriers (Hendeniya, 2022; Mayasari et al., 2023).

Despite the extensive application of TAM and ECT in studies of commercial internet service providers, e-services, and subscription-based digital platforms, these models largely assume formalized service structures characterized by contractual relationships, relatively high switching barriers, and profit-oriented service logics. In contrast, community-based internet services such as RT/RW Net operate under fundamentally different conditions, including informal governance, collective management, low switching costs, and voluntary user commitment. These structural differences raise important theoretical questions regarding the applicability of satisfaction-driven continuance assumptions embedded in classical ECT when applied to decentralized and non-commercial service ecosystems. Consequently, findings derived from commercial ISP or platform-based TAM-ECT studies cannot be directly generalized to community-managed internet services without contextual adaptation.

Furthermore, although prior studies have incorporated constructs such as trust, perceived risk, and security concerns into extended TAM-ECT models, their explanatory power has been shown to vary considerably across contexts. In community-based internet services, where interpersonal interaction, localized technical support, and shared social norms often substitute for formal institutional guarantees, usability, functional value, and technical support may play a more dominant role than abstract perceptions of risk or trust. This study therefore deliberately prioritizes service quality, system quality, customer support, and cost-effectiveness as proximal antecedents of user perceptions, while positioning digital literacy and switching cost as contextual moderators that capture users' capacity and freedom to continue or discontinue service usage. By explicitly addressing these contextual and theoretical limitations in prior TAM-ECT research, this study advances the literature by repositioning continuance intention in community-based internet services as a pragmatic, usability-driven decision rather than a purely satisfaction-based outcome. This perspective not only clarifies the theoretical boundary conditions

of TAM and ECT but also provides a more context-sensitive foundation for evaluating sustainable adoption in decentralized digital infrastructure initiatives.

To address these gaps, this study proposes a modified TAM-ECT model that integrates service quality, system quality, customer support, cost-effectiveness, perceived usefulness, perceived ease of use, user satisfaction, behavioral intention, digital literacy, and switching costs. This integrated framework enables a more comprehensive understanding of user satisfaction and behavioral intention in community-managed internet services (Alshammari, 2024; Brown et al., 2012). Moreover, Importance-Performance Map Analysis (IPMA) will be employed to identify the critical factors that significantly impact user retention, thus offering actionable insights for service providers (Hariguna et al., 2023; Liao et al., 2022). Therefore, this study aims to examine the influence of service quality, cost-effectiveness, system reliability, and customer support on users' perceived usefulness and perceived ease of use. It further investigates how these perceptions shape user satisfaction and behavioral intention, while assessing the moderating roles of digital literacy and switching costs. The findings are expected to provide empirical contributions toward optimizing community-based internet services and fostering sustainable digital inclusion efforts (Ngah, 2024; Kautish et al., 2021; Osabutey, 2020; Turk et al., 2019)

RESEARCH METHODS

A. Research Design

This study employed a quantitative approach using a survey method to collect data from users of community-based internet services (RT/RW Net). This approach aligns with the recommendation by Hair et al. (2019) for structural model-based research. The research model was developed by integrating the Technology Acceptance Model (TAM) and the Expectation-Confirmation Theory (ECT), which were modified by adding external factors, namely service quality, cost-effectiveness, system quality, and customer support, as well as moderating factors such as digital literacy and switching cost (Ngah, 2024; Brown et al., 2012).

B. Conceptual Framework

The conceptual framework of this study adapts the core constructs of TAM (perceived usefulness and perceived ease of use) and ECT (confirmation, satisfaction, and behavioral intention) (Al-Mamary et al., 2024). The model was extended by including the influence of service quality, cost-effectiveness, system quality, and customer support on perceived usefulness and perceived ease of use (Mahadin, 2019; Alshammari, 2024), as well as the moderating effects of digital literacy and switching cost on the relationship between satisfaction and behavioral intention (Ngah, 2024; Ali et al., 2024).

C. Research Hypotheses

This study developed nineteen hypotheses based on the integration of the modified TAM and ECT models. The hypothesized relationships are as follows:

H1–H14: The effects of external factors on perceived usefulness and perceived ease of use, and their subsequent impact on user satisfaction and behavioral intention.

H15–H16: The effects of switching cost and digital literacy on behavioral intention.

H17–H19: The moderating effects of switching cost and digital literacy on the relationships between user satisfaction and behavioral intention, and between perceived ease of use and behavioral intention.

Service quality is hypothesized to have a positive influence on perceived usefulness (H1) and perceived ease of use (H2). Service quality attributes, including network speed, stability, and reliability, are believed to enhance users' perceptions of the usefulness and ease of use of the service (Ahmad et al., 2020; Mahadin, 2019; Rjoub, 2020). Cost-effectiveness is also assumed to positively influence perceived usefulness (H3) and perceived ease of use (H4). Lower cost structures are expected to enhance perceived value and comfort in using the service, particularly in community-based services with limited resources (Mahadin, 2019; Al-Rahmi et al., 2021). Customer support is hypothesized to have a positive impact on perceived usefulness (H5) and perceived ease of use (H6). Responsive technical support and customer assistance facilitate users' sense of convenience and trust in both the usefulness and usability of the service (Odeh, 2021). System quality is predicted to positively affect perceived usefulness (H7) and perceived ease of use (H8).

A reliable, fast, and seamless system is expected to enhance perceptions of service benefit and facilitate easier interaction (Mayasari et al., 2023; Wang et al., 2020). Perceived ease of use is hypothesized to positively influence perceived usefulness (H9). According to TAM, the easier a system is to use, the more likely users will perceive it as beneficial. Perceived usefulness is expected to positively influence user satisfaction (H10) and behavioral intention (H11).

Perceptions of the benefits derived from using the system significantly enhance user satisfaction and strengthen the intention to continue usage (Ahmad et al., 2020; Alam et al., 2022). Perceived ease of use is also hypothesized to positively influence user satisfaction (H12) and behavioral intention (H13). Ease of use increases the likelihood of user satisfaction and continued service usage intention (Cheng, 2020). User satisfaction is expected to positively influence behavioral intention (H14). User satisfaction is a key factor in increasing user loyalty and the sustainable use of services (Alshammari, 2024).

Switching cost is hypothesized to positively affect behavioral intention (H15). Higher switching costs create barriers that encourage users to remain loyal to the current service provider (Ali et al., 2024; Koo et al., 2020). Digital literacy is also hypothesized to positively affect behavioral intention (H16). Higher levels of digital literacy enhance user confidence and willingness to continue using digital services (Ngah, 2024). Furthermore, this study examines the moderating effect of switching cost on the relationship between user satisfaction and behavioral intention (H17). Higher switching costs are expected to strengthen the relationship as users are more likely to stay with services that meet their expectations (Ali et al., 2024). Digital literacy is hypothesized to moderate the relationships between perceived usefulness and behavioral intention (H18), and between perceived ease of use and behavioral intention (H19). Users with higher digital literacy are better able to leverage the benefits and ease of services, thereby enhancing their continuance intention (Liao et al., 2022).

D. Data Collection and Sampling

Data were collected through online and offline surveys distributed to active RT/RW Net service users across various community areas in Indonesia. Purposive sampling was used based on the following criteria: (1) active users for a minimum of three months, (2) aged 17 years or older, and (3) willing to participate as respondents (Hair et al., 2019; Hair Jr et al., 2021) The data collection was conducted from January to March 2025, resulting in a total of 803 valid respondents.

Although purposive sampling was employed to ensure that respondents possessed sufficient experience with RT/RW Net services, this approach may introduce limitations related to sample representativeness. However, purposive sampling is considered appropriate for theory-testing and prediction-oriented studies, particularly when the research objective requires respondents with specific usage characteristics (Hair et al., 2019). In the context of community-based internet services, user populations are heterogeneous and not always supported by formal user registries, making probability sampling impractical. To mitigate potential sampling bias, this study applied strict inclusion criteria, including minimum usage duration and active service engagement, thereby ensuring that respondents were capable of providing informed evaluations of system usability and service performance. Nevertheless, the findings should be interpreted with caution when generalizing beyond similar community-managed internet service contexts.

E. Data Analysis Method

The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the SmartPLS 4.0 software (Hair et al., 2019; Liao et al., 2022). The analysis steps included: Evaluation of the measurement model (outer model) by testing convergent validity (outer loadings, AVE), reliability (composite reliability, Cronbach's alpha), and discriminant validity (Fornell-Larcker Criterion and HTMT) (Hair et al., 2019). Evaluation of the structural model (inner model) by testing the significance of the relationships among variables (path coefficients, T-statistics, p-values), coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and multicollinearity (VIF) (Hair et al., 2019). Importance-Performance Map Analysis (IPMA) was conducted to identify the factors with the greatest influence on user satisfaction and behavioral intention, as well as areas needing performance improvement (Hariguna et al., 2023).

The measurement instruments used in this study were adapted from previously validated scales in TAM, ECT, and service quality literature to ensure content validity. All items were reworded to reflect the specific context of community-based internet services (RT/RW Net). Prior to full-scale data collection, the questionnaire was reviewed by domain experts and subjected to a pilot test to assess clarity, relevance, and contextual appropriateness. Minor wording adjustments were made based on feedback to improve item comprehensibility. This adaptation process ensured that the constructs retained their theoretical meaning while remaining sensitive to the operational characteristics of decentralized and community-managed service environments.

Given that data were collected using a self-reported, cross-sectional survey design, the potential risk of common method bias (CMB)

was assessed. Procedurally, respondents were assured of anonymity and confidentiality to reduce evaluation apprehension and social desirability bias. Statistically, common method bias was examined using the full collinearity variance inflation factor (VIF) approach. The results indicated that all full collinearity VIF values were below the conservative threshold of 3.3, suggesting that common method bias was not a significant concern in this study. These findings support the robustness of the observed relationships among constructs.

RESULT AND DISCUSSION

A. Measurement Model Evaluation

This study conducted a thorough evaluation of the measurement model to assess the reliability and validity of the constructs before proceeding to the structural model analysis. The evaluation followed the guidelines suggested by Hair et al. (2019), including convergent validity, reliability, and discriminant validity. Convergent validity was assessed by examining the outer loadings, composite reliability (CR), average variance extracted (AVE), and Cronbach's alpha. As shown in Table 1, all outer loadings exceeded the recommended threshold of 0.70, indicating adequate indicator reliability. The composite reliability values ranged between 0.894 and 0.957, and Cronbach's alpha values were all greater than 0.80, demonstrating strong internal consistency (Hair et al., 2019). The AVE values for all constructs also exceeded the minimum threshold of 0.50, confirming the convergent validity of the constructs (Hair et al., 2019). These results indicate that the measurement items adequately capture the intended latent constructs.

Table 1. Measurement Model Evaluation

Latent Variables	Indicators	Indicators Code	Outer Loadings	Cronbach's alpha	rho_a	rho_c	AVE
Service Quality	Network speed	SQ_1	0.868	0.823	0.826	0.894	0.738
	Connection stability	SQ_2	0.838				
	Latency	SQ_3	0.871				
Cost-Effectiveness	Affordability	CE_1	0.899	0.891	0.894	0.932	0.820
	Value for money	CE_2	0.913				
	Cost transparency	CE_3	0.905				
Customer Support	Response speed	CS_1	0.951	0.902	0.905	0.953	0.910
	Technical support quality	CS_2	0.958				
System Quality	System responsiveness	SYQ_1	0.900	0.896	0.899	0.935	0.828
	Error-free performance	SYQ_2	0.905				
	Adaptability	SYQ_3	0.924				
Perceived Usefulness	Perceived efficiency	PU_1	0.936	0.933	0.935	0.957	0.882
	Enhancement in daily tasks	PU_2	0.932				
	Service usefulness	PU_3	0.948				
Perceived Ease of Use	Ease of setup	PEOU_1	0.873	0.901	0.905	0.938	0.835
	User-friendliness	PEOU_2	0.934				
	Learning curve	PEOU_3	0.933				
User Satisfaction	General satisfaction	US_1	0.888	0.892	0.895	0.933	0.822
	Fulfillment of expectations	US_2	0.910				
	Willingness to continue using	US_3	0.922				
Behavioral Intention	Intention to continue use	BI_1	0.935	0.891	0.896	0.932	0.821
	Likelihood of recommending	BI_2	0.875				
	Preference over alternatives	BI_3	0.906				
Switching Cost	Switching difficulty	SC_1	0.951	0.884	0.889	0.945	0.896
	Cost implications of switching	SC_2	0.942				
Digital Literacy	Tech skills	DL_1	0.924	0.889	0.891	0.931	0.818
	Online behavior adaptability	DL_2	0.907				
	Familiarity with digital tools	DL_3	0.882				

Discriminant validity was tested using three approaches: (1) Heterotrait-Monotrait (HTMT) ratio, (2) Fornell–Larcker criterion, and (3) Cross-loadings. The HTMT values for all construct pairs were below the conservative threshold of 0.90, indicating that the constructs were empirically distinct from each other (Henseler et al., 2015). These results are presented in Table 2.

Table 2. Discriminant Validity - Heterotrait-Monotrait (HTMT) Ratio

Construct	SQ	CE	CS	SYQ	PU	PEOU	US	BI	SC	DL	SC x US	DL x PU	DL x PEOU
SQ													
CE	0.897												
CS	0.742	0.798											
SYQ	0.664	0.692	0.765										
PU	0.717	0.754	0.823	0.804									
PEOU	0.776	0.799	0.821	0.754	0.875								
US	0.320	0.375	0.303	0.307	0.326	0.315							
BI	0.830	0.827	0.831	0.736	0.791	0.861	0.304						
SC	0.232	0.304	0.329	0.251	0.297	0.314	0.774	0.276					
DL	0.274	0.285	0.347	0.252	0.321	0.342	0.825	0.317	0.882				
SC x US	0.122	0.163	0.168	0.088	0.129	0.193	0.380	0.167	0.386	0.384			
DL x PU	0.111	0.138	0.161	0.095	0.166	0.131	0.155	0.121	0.115	0.111	0.261		
DL x PEOU	0.064	0.105	0.111	0.109	0.129	0.148	0.213	0.086	0.181	0.173	0.352	0.840	

Note(s): SQ: Service Quality; CE: Cost-Effectiveness; CS: Customer Support; SYQ: System Quality; PU: Perceived Usefulness; PEOU: Perceived Ease of Use; US: User Satisfaction; BI: Behavioral Intention; SC: Switching Cost; DL: Digital Literacy.

The square roots of the AVE values (diagonal elements) were greater than the inter-construct correlations in the Fornell–Larcker matrix, further supporting discriminant validity (Hair et al., 2019). Detailed results can be seen in Table 3.

Table 3. Discriminant Validity - Fornell–Larcker Criterion

Construct	SQ	CE	CS	SYQ	PU	PEOU	US	BI	SC	DL
SQ	0.859									
CE	0.769	0.906								
CS	0.640	0.717	0.954							
SYQ	0.571	0.620	0.690	0.910						
PU	0.631	0.690	0.756	0.738	0.939					
PEOU	0.670	0.717	0.743	0.679	0.803	0.914				
US	0.274	0.335	0.273	0.277	0.298	0.284	0.907			
BI	0.710	0.736	0.748	0.660	0.725	0.774	0.271	0.906		
SC	0.199	0.270	0.295	0.224	0.270	0.280	0.687	0.247	0.947	
DL	0.235	0.254	0.310	0.224	0.292	0.305	0.734	0.283	0.781	0.904

Note(s): SQ: Service Quality; CE: Cost-Effectiveness; CS: Customer Support; SYQ: System Quality; PU: Perceived Usefulness; PEOU: Perceived Ease of Use; US: User Satisfaction; BI: Behavioral Intention; SC: Switching Cost; DL: Digital Literacy.

Cross-loading analysis revealed that each indicator loaded more strongly on its respective latent variable than on other constructs. This provides additional evidence for discriminant validity. The cross-loading values are detailed in Table 4.

Table 4. Discriminant validity - Cross-loadings

Construct	SQ	CE	CS	SYQ	PU	PEOU	US	BI	SC	DL	SC x US	DL x PU	DL x PEOU
BI_1	0.661	0.686	0.701	0.630	0.689	0.722	0.273	0.935	0.228	0.284	-0.163	-0.114	-0.077
BI_2	0.639	0.655	0.578	0.518	0.587	0.642	0.243	0.875	0.182	0.224	-0.094	-0.107	-0.083
BI_3	0.631	0.660	0.744	0.638	0.688	0.733	0.221	0.906	0.257	0.259	-0.172	-0.090	-0.060
CE_1	0.685	0.899	0.596	0.537	0.587	0.618	0.306	0.657	0.240	0.212	-0.148	-0.134	-0.092
CE_2	0.701	0.913	0.672	0.581	0.672	0.679	0.314	0.662	0.258	0.240	-0.147	-0.127	-0.102
CE_3	0.704	0.905	0.676	0.565	0.611	0.650	0.290	0.682	0.235	0.237	-0.123	-0.093	-0.076
CS_1	0.609	0.684	0.951	0.643	0.701	0.673	0.254	0.724	0.258	0.289	-0.165	-0.123	-0.071
CS_2	0.612	0.683	0.958	0.673	0.741	0.742	0.267	0.705	0.304	0.301	-0.139	-0.169	-0.130
DL_1	0.211	0.229	0.277	0.222	0.251	0.275	0.676	0.255	0.723	0.924	-0.367	-0.110	-0.165
DL_2	0.221	0.220	0.245	0.168	0.224	0.258	0.639	0.268	0.687	0.907	-0.283	-0.052	-0.089
DL_3	0.205	0.240	0.322	0.222	0.321	0.298	0.680	0.245	0.710	0.882	-0.332	-0.122	-0.189
PEOU_1	0.567	0.600	0.615	0.587	0.695	0.873	0.238	0.666	0.241	0.269	-0.153	-0.046	-0.075
PEOU_2	0.642	0.684	0.692	0.644	0.763	0.934	0.288	0.718	0.291	0.297	-0.189	-0.150	-0.165
PEOU_3	0.624	0.679	0.725	0.628	0.742	0.933	0.251	0.735	0.236	0.272	-0.160	-0.144	-0.144
PU_1	0.590	0.667	0.739	0.700	0.936	0.748	0.277	0.689	0.259	0.268	-0.135	-0.177	-0.126

Construct	SQ	CE	CS	SYQ	PU	PEOU	US	BI	SC	DL	SC x US	DL x PU	DL x PEOU
PU_2	0.564	0.613	0.669	0.669	0.932	0.726	0.272	0.634	0.235	0.253	-0.070	-0.121	-0.097
PU_3	0.620	0.662	0.721	0.707	0.948	0.786	0.291	0.716	0.266	0.298	-0.145	-0.153	-0.128
SC_1	0.197	0.258	0.294	0.210	0.253	0.264	0.629	0.244	0.951	0.739	-0.347	-0.100	-0.152
SC_2	0.178	0.254	0.264	0.215	0.260	0.267	0.673	0.223	0.942	0.740	-0.339	-0.105	-0.171
SQ_1	0.868	0.659	0.566	0.501	0.565	0.606	0.221	0.623	0.167	0.219	-0.127	-0.117	-0.077
SQ_2	0.838	0.616	0.508	0.463	0.484	0.555	0.200	0.587	0.167	0.201	-0.069	-0.044	-0.007
SQ_3	0.871	0.705	0.573	0.505	0.571	0.563	0.285	0.619	0.179	0.185	-0.088	-0.098	-0.064
SYQ_1	0.485	0.562	0.721	0.900	0.690	0.622	0.248	0.590	0.227	0.181	-0.067	-0.090	-0.106
SYQ_2	0.541	0.549	0.569	0.905	0.611	0.582	0.232	0.602	0.174	0.194	-0.069	-0.029	-0.052
SYQ_3	0.534	0.580	0.590	0.924	0.706	0.645	0.273	0.610	0.209	0.236	-0.092	-0.125	-0.125
US_1	0.261	0.263	0.236	0.237	0.269	0.219	0.888	0.235	0.621	0.631	-0.337	-0.142	-0.171
US_2	0.244	0.325	0.233	0.229	0.241	0.261	0.910	0.257	0.610	0.676	-0.316	-0.108	-0.171
US_3	0.242	0.321	0.272	0.284	0.300	0.288	0.922	0.244	0.636	0.689	-0.322	-0.148	-0.207
SC x US	-0.111	-0.154	-0.159	-0.084	-0.126	-0.184	-0.358	-0.160	-0.363	-0.361	1.000	0.261	0.352
DL x PEOU	-0.059	-0.100	-0.106	-0.105	-0.125	-0.142	-0.202	-0.080	-0.170	-0.161	0.352	0.840	1.000
DL x PU	-0.102	-0.130	-0.154	-0.092	-0.161	-0.126	-0.147	-0.114	-0.108	-0.104	0.261	1.000	0.840

Note(s): SQ: Service Quality; CE: Cost-Effectiveness; CS: Customer Support; SYQ: System Quality; PU: Perceived Usefulness; PEOU: Perceived Ease of Use; US: User Satisfaction; BI: Behavioral Intention; SC: Switching Cost; DL: Digital Literacy.

B. Structural Model Evaluation

The structural model evaluation aims to assess the hypothesized relationships among latent variables and to determine the model's explanatory and predictive capabilities. This evaluation includes the analysis of path coefficients, significance testing, coefficient of determination (R^2), effect sizes (f^2), and predictive relevance (Q^2). The complete model structure is visualized in Figure 1.

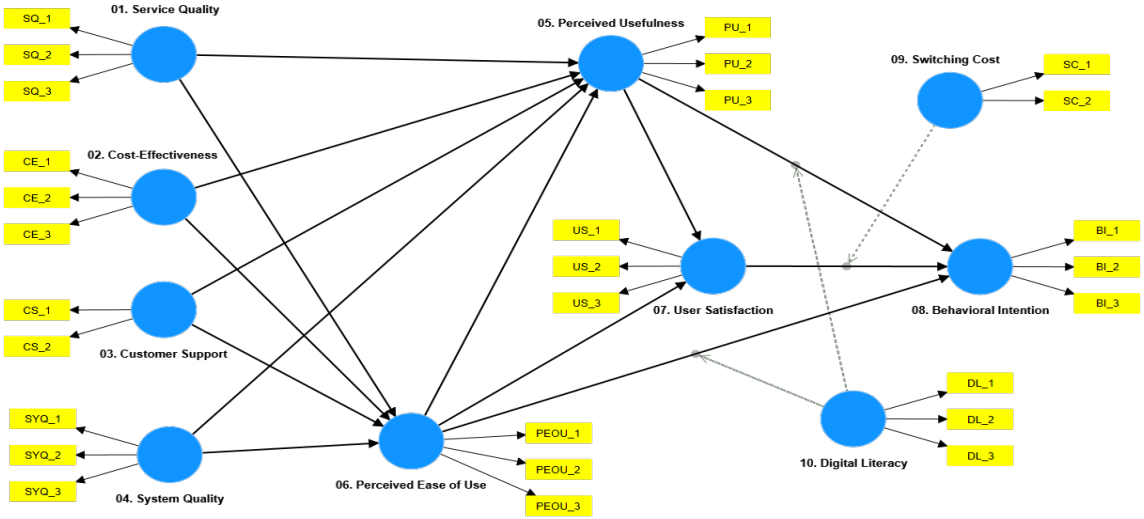

Figure 1. Structural model path diagram
(Source: SmartPLS output)

The model's explanatory power was assessed using R^2 and adjusted R^2 values. As presented in Table 5, the constructs Perceived Usefulness (R^2 = 0.739) and Perceived Ease of Use (R^2 = 0.661) demonstrate strong and moderate explanatory power, respectively, indicating that the external constructs (service quality, cost-effectiveness, customer support, system quality, and ease of use) successfully explain the variance in these core TAM variables. Meanwhile, Behavioral Intention has moderate explanatory power (R^2 = 0.635), while User Satisfaction shows relatively low explanatory power (R^2 = 0.094), suggesting that other unexamined factors may also influence user satisfaction. In terms of predictive relevance, all Q^2 values were greater than zero, affirming that the model has sufficient predictive capability for all endogenous constructs (Hair et al., 2019). The significance of hypothesized relationships was tested using the bootstrapping procedure with 10,000 subsamples. The path coefficients, along

with standard deviations, T-statistics, p-values, f^2 effect sizes, and multicollinearity (VIF) values, are detailed in Table 6.

Out of the 19 tested hypotheses, a total of 12 showed statistically significant relationships ($p < 0.05$), thereby providing strong empirical support for the proposed extended TAM-ECT framework in the context of RT/RW Net services. Among the external variables, Service Quality was found to significantly influence Perceived Ease of Use (H2), but not Perceived Usefulness (H1), which aligns with prior studies emphasizing that users in community-based digital environments often prioritize ease of interaction over functional attributes (Mahadin, 2019).

Table 5. Coefficient of Determination (R^2) and Predictive Relevance (Q^2)

Construct	Variance Explained (R^2)	R^2 adjusted	Predictive Accuracy	Predictive Relevance (Q^2)	Predictive Relevance
Perceived Usefulness	0.739	0.738	High	0.644	Yes
Perceived Ease of Use	0.661	0.660	Moderate	0.547	Yes
User Satisfaction	0.094	0.092	Low	0.075	Yes
Behavioral Intention	0.635	0.632	Moderate	0.508	Yes

Table 6. Structural Model Results

Hypothesis	Relationships	Path Coefficients	SD	T- value	Effect size (f^2)	P-value	VIF	Supported
H1	SQ -> PU	0.022	0.042	0.533ns	0.001	0.594	2.664	No
H2	SQ -> PEOU	0.165	0.036	4.635	0.031	0.000	2.583	Yes
H3	CE -> PU	0.068	0.051	1.351ns	0.005	0.177	3.300	No
H4	CE -> PEOU	0.217	0.059	3.713	0.044	0.000	3.160	Yes
H5	CS -> PU	0.213	0.059	3.617	0.059	0.000	2.933	Yes
H6	CS -> PEOU	0.326	0.052	6.247	0.120	0.000	2.620	Yes
H7	SQ -> PU	0.262	0.042	6.250	0.119	0.000	2.209	Yes
H8	SQ -> PEOU	0.225	0.042	5.306	0.072	0.000	2.060	Yes
H9	PU -> US	0.198	0.069	2.868	0.015	0.004	2.815	Yes
H10	PU -> BI	0.275	0.047	5.825	0.070	0.000	2.955	Yes
H11	PEOU ->PU	0.403	0.047	8.571	0.211	0.000	2.953	Yes
H12	PEOU -> US	0.124	0.069	1.815ns	0.006	0.070	2.815	No
H13	PEOU -> BI	0.542	0.047	11.564	0.275	0.000	2.928	Yes
H14	US -> BI	0.025	0.057	0.435ns	0.001	0.664	2.415	No
H15	SC -> BI	-0.028	0.040	0.692ns	0.001	0.489	2.796	No
H16	DL -> BI	0.040	0.046	0.872ns	0.001	0.383	3.214	No
H17	SC x US -> BI	-0.021	0.021	1.008ns	0.002	0.314	1.323	No
H18	DL x PU -> BI	-0.081	0.051	1.589ns	0.008	0.112	3.524	No
H19	DL x PEOU -> BI	0.107	0.051	2.092	0.013	0.036	3.714	Yes

Note(s): Significance based on T-value: ns = non-significant ($p \geq 0.05$), *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.
β : Path Coefficients; SD: Standard Deviation; VIF: Variance Inflation Factor;
SQ: Service Quality; CE: Cost-Effectiveness; CS: Customer Support; SYQ: System Quality; PU: Perceived Usefulness; PEOU: Perceived Ease of Use; US: User Satisfaction; BI: Behavioral Intention; SC: Switching Cost; DL: Digital Literacy.

Similarly, Cost-Effectiveness had a significant positive effect on Perceived Ease of Use (H4), yet failed to demonstrate a significant impact on Perceived Usefulness (H3). Customer Support, on the other hand, significantly influenced both Perceived Usefulness (H5) and Ease of Use (H6), reinforcing the critical role of accessible and responsive support services in shaping user engagement (Keshta & Odeh, 2021). In the same vein, System Quality exerted a significant effect on both Perceived Usefulness (H7) and Perceived Ease of Use (H8), confirming that reliability, speed, and error-free performance are vital determinants of user perception and system acceptability (Wang et al., 2020).

The model also confirmed key relationships in the mediation chain. Perceived Ease of Use had a significant effect on Perceived Usefulness (H11), while Perceived Usefulness significantly predicted both User Satisfaction (H9) and Behavioral Intention (H10), reflecting the classical expectations of the Technology Acceptance Model. Interestingly, while Perceived Ease of Use also directly affected Behavioral Intention (H13), it did not significantly influence User Satisfaction (H12),

suggesting that perceived usability may drive adoption more than it fosters emotional gratification. Notably, User Satisfaction itself did not have a significant effect on Behavioral Intention (H14), implying that users' intention to continue using RT/RW Net services may be more dependent on their evaluation of utility and usability than on overall satisfaction.

In terms of interaction effects, three moderating hypotheses were examined. The interaction between Switching Cost and User Satisfaction (H17) was not significant, suggesting that the perceived difficulty or cost of switching does not amplify the relationship between satisfaction and continued usage intention. Similarly, the interaction between Digital Literacy and Perceived Usefulness (H18) also yielded non-significant results. However, the interaction between Digital Literacy and Perceived Ease of Use (H19) was found to be significant, indicating that users with higher levels of digital literacy are more likely to translate ease of use into sustained behavioral intention. This finding is consistent with Ngah (2024), who argues that digital competency strengthens users' confidence in navigating and continuing with digital services.

Effect sizes (f^2) were also evaluated following the guidelines by Hair et al. (2019). Large effect sizes were observed for the relationships between Perceived Ease of Use and Behavioral Intention ($f^2 = 0.275$), as well as Perceived Ease of Use and Perceived Usefulness ($f^2 = 0.211$), indicating substantial contributions of usability perceptions to both perceived utility and intention to continue. Moderate effects were noted for the paths from System Quality to Perceived Usefulness ($f^2 = 0.119$) and from Customer Support to Perceived Ease of Use ($f^2 = 0.120$), while most other relationships demonstrated small effect sizes ($f^2 < 0.05$). Lastly, all VIF values were below the conservative threshold of 5, signifying that multicollinearity was not a concern within the tested model (Hair et al., 2019).

Beyond statistical significance, the structural model results reveal several context-specific patterns that distinguish community-based internet services from commercial ISP environments. Notably, perceived ease of use demonstrates a consistently strong effect on both perceived usefulness and behavioral intention, indicating that usability considerations play a central role in shaping continuance decisions. In contrast, user satisfaction exhibits a weaker explanatory power, as reflected by its relatively low R^2 value and non-significant path to behavioral intention. This pattern suggests that, within decentralized service settings such as RT/RW Net, behavioral intention may be driven more by functional accessibility and operational convenience than by affective satisfaction alone.

C. Importance-Performance Map Analysis (IPMA)

The Importance-Performance Map Analysis (IPMA) provides a valuable extension of the traditional PLS-SEM evaluation by not only examining the relative importance (total effects) of each construct on a target endogenous variable, but also integrating performance values (on a 0–100 scale). This dual insight enables researchers and practitioners to prioritize strategic interventions in areas that are both impactful and underperforming (Hair et al., 2019).

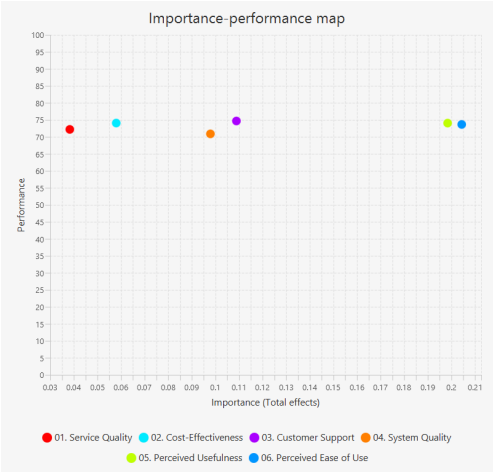

Figure 2. IPMA map for user satisfaction (Source: SmartPLS output)

As visualized in Figure 2 and detailed in Table 7, the construct with the highest importance for *User Satisfaction* is Perceived Ease of Use (importance = 0.204; performance = 73.654), followed closely by Perceived Usefulness (importance = 0.198; performance = 74.042), and Customer Support (importance = 0.109; performance = 74.670). These findings highlight that users are more likely to be satisfied with the RT/RW Net service if they find the system easy to use, useful in their daily activities, and supported by responsive service personnel. Interestingly, although System Quality and Cost-Effectiveness showed moderate levels of importance (0.098 and 0.058, respectively), their performance scores were relatively high (>70), suggesting that while these factors contribute less to satisfaction directly, they have already met acceptable user expectations. Service Quality, despite its centrality in many traditional service

models, showed the lowest importance (0.038) for *User Satisfaction* in this context, implying that ease and functionality outweigh network performance considerations for community-based internet users.

Table 7. Importance and Performance Values for User Satisfaction and Behavioral Intention (IPMA Results)

Constructs	User Satisfaction		Behavioral Intention	
	Important	Performance	Important	Performance
Service Quality	0.038	72.195	0.115	72.195
Cost-Effectiveness	0.058	74.057	0.162	74.057
Customer Support	0.109	74.670	0.274	74.670
System Quality	0.098	70.881	0.221	70.881
Perceived Usefulness	0.198	74.042	0.280	74.042
Perceived Ease of Use	0.204	73.654	0.657	73.654
User Satisfaction	-	-	0.025	75.602
Switching Cost	-	-	-0.028	75.063
Digital Literacy	-	-	0.040	74.117

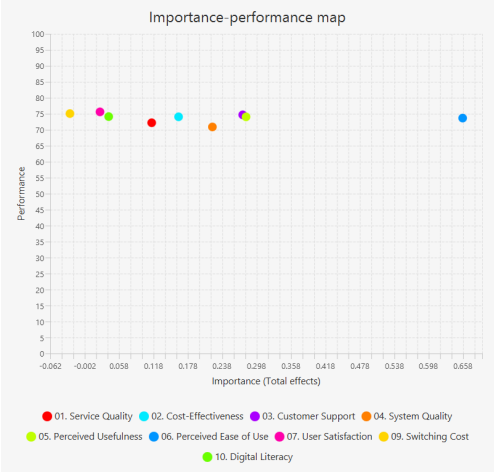

Figure 3. IPMA map for behavioral intention (Source: SmartPLS output)

Figure 3 presents the IPMA results for Behavioral Intention, identifying Perceived Ease of Use as the most critical determinant (importance = 0.657; performance = 73.654). This finding reaffirms the pivotal role of usability in predicting long-term engagement with digital platforms in underserved communities. Perceived Usefulness (importance = 0.280) and Customer Support (importance = 0.274) follow closely, suggesting that both the value users derive from the system and the quality of interaction they experience with service providers shape their intention to continue using RT/RW Net.

The IPMA map also indicates that System Quality and Cost-Effectiveness contribute moderately to behavioral intention (importance = 0.221 and 0.162, respectively), reinforcing the idea that users weigh platform stability and affordability in their decisions. Conversely, Switching Cost displayed a negative importance (-0.028), reflecting its lack of predictive contribution and implying that barriers to leaving the service are not a significant consideration for these users. Additionally, Digital Literacy had a modest positive effect (importance = 0.040), aligning with the hypothesis that users with higher digital competence are more inclined to persist in using the service. While User Satisfaction registered the lowest importance (0.025), it exhibited the highest performance score (75.602), suggesting that satisfaction levels are high but not necessarily influential in driving future behavioral intention in this context.

D. Discussion

This study successfully developed and tested a modified TAM-ECT model in the context of community-based internet services (RT/RW Net), integrating external constructs such as service quality, cost-effectiveness, system quality, and customer support, as well as moderating constructs including digital literacy and switching cost. The structural model findings revealed that out of 19 proposed hypotheses, 12 were statistically significant, strengthening the theoretical validity of the proposed model in the context of community-based internet services. Theoretical implications suggest that this model is appropriate as an evaluative framework in decentralized community technology systems. Practically, the findings highlight the importance of measuring not only users' general perceptions but also considering technical dimensions and community support.

The results indicated that Perceived Ease of Use emerged as the most influential construct affecting both Perceived Usefulness and Behavioral Intention. This finding aligns with TAM theory (Davis, 1989) and studies by Cheng (2020) and Liao et al. (2022), emphasizing that ease of use enhances the likelihood of sustained adoption. This is further supported by IPMA

results, which positioned ease of use as the most critical construct with high performance toward continued usage intention. Theoretically, this reaffirms the relevance of TAM in community contexts. Practically, service providers should prioritize training programs and process simplifications to enhance user engagement.

Furthermore, Perceived Usefulness also significantly influenced User Satisfaction and Behavioral Intention, supporting the Expectation-Confirmation Theory. Interestingly, User Satisfaction did not significantly affect Behavioral Intention, contrasting with findings by Al-Mamary et al. (2024). This suggests that, in community-based services, users prioritize efficiency and technical ease over emotional satisfaction. Theoretically, this challenges the classical ECT assumption that satisfaction is the primary determinant of usage intention. Practically, service managers should not solely rely on user satisfaction but must continue innovating functionality.

External constructs such as Customer Support and System Quality significantly influenced both Perceived Usefulness and Perceived Ease of Use. This confirms the essential role of technical and support aspects in shaping positive user perceptions, as also noted by Keshta (2021) and Wang et al. (2020). Meanwhile, Service Quality and Cost-Effectiveness influenced only Perceived Ease of Use but not Perceived Usefulness. Theoretically, this indicates that external factors in TAM need to be more specifically contextualized. In practice, RT/RW Net managers must maintain network stability, ensure responsive customer service, and provide systems with minimal errors.

The two moderating constructs, Switching Cost and Digital Literacy, showed mixed results. Digital Literacy significantly moderated the relationship between Perceived Ease of Use and Behavioral Intention, consistent with Ngah (2024). However, Switching Cost did not significantly moderate any relationship, implying that RT/RW Net users may not perceive switching barriers as crucial in determining continued usage. Theoretically, this underscores the importance of Digital Literacy as a moderating variable in technology adoption models. Practically, local governments or service providers should organize digital literacy training to sustain user engagement.

Although most hypothesized relationships were supported, several were statistically insignificant and warrant further discussion. Service Quality and Cost-Effectiveness did not significantly affect Perceived Usefulness, indicating that users focus more on technical reliability than general service attributes. Moreover, Perceived Ease of Use did not directly impact User Satisfaction, highlighting the need for tangible benefits to enhance satisfaction.

User Satisfaction did not significantly influence Behavioral Intention, reinforcing the findings of Alshammari (2024) that community-based users assess utility more pragmatically. Additionally, Switching Cost and Digital Literacy did not directly affect Behavioral Intention, although Digital Literacy significantly moderated the link between Perceived Ease of Use and Behavioral Intention, supporting Ngah (2024). Moderation hypotheses involving Switching Cost and User Satisfaction, and Digital Literacy and Perceived Usefulness, were also unsupported, suggesting that adoption dynamics in community services are more complex and may require exploring additional factors such as trust and risk perception (Wang et al., 2020).

The Importance-Performance Map Analysis (IPMA) results revealed that Perceived Ease of Use, Perceived Usefulness, and Customer Support are key areas for improvement. Ease of Use emerged as the construct with the highest importance for continued usage intention. Theoretically, these findings suggest that IPMA can be an effective complementary tool in behavioral-based SEM analysis. Practically, RT/RW Net providers should allocate resources efficiently to enhance ease of access, perceived service value, and technical support, thereby boosting user loyalty.

One of the most theoretically salient findings of this study is that user satisfaction does not significantly influence behavioral intention, diverging from the core assumption of Expectation Confirmation Theory (ECT). In traditional commercial service contexts, satisfaction is commonly positioned as a key antecedent of continuance intention. However, the present findings indicate that such satisfaction-driven mechanisms may not fully apply to community-based internet services. In RT/RW Net environments, users often prioritize functional reliability, ease of access, and affordability over affective evaluations, suggesting that continuance intention is shaped by pragmatic considerations rather than post-consumption satisfaction. This finding highlights an important boundary condition of ECT and underscores the need for contextual adaptation when applying continuance models to decentralized digital infrastructures.

E. Managerial Implications

From a managerial perspective, this study offers several actionable insights for community-

based internet service providers. First, enhancing the ease of use of the RT/RW Net platform should be prioritized through user-friendly interface designs, simplified onboarding processes, and intuitive navigation systems. Second, service providers should focus on increasing the perceived usefulness of their services by offering functionalities that address real user needs, such as improved connection stability and data security features. Third, investments in high-quality, responsive customer support systems are crucial to improve user experience and foster long-term loyalty. Service providers should establish dedicated customer service teams capable of addressing technical issues promptly and empathetically. Fourth, given the significant role of digital literacy as a moderator, community training initiatives aimed at boosting users' digital skills can significantly enhance technology adoption and continued use. Collaboration with local governments to organize digital literacy programs can help bridge knowledge gaps and foster digital inclusion.

Finally, although switching costs were not found to directly impact behavioral intention, it is important for providers to continually innovate and add value to retain users rather than relying on lock-in strategies. Service providers should regularly monitor user satisfaction and gather feedback to adapt services to evolving user needs, ensuring sustainable engagement with the community-based internet services.

CONCLUSION

This study aimed to develop and validate a modified Technology Acceptance Model–Expectation Confirmation Theory (TAM-ECT) framework in the context of community-based internet services (RT/RW Net). The proposed model integrated external constructs service quality, cost-effectiveness, system quality, and customer support as well as moderating constructs, namely digital literacy and switching cost. The findings revealed that out of 19 hypotheses tested, 12 were statistically supported. Perceived Ease of Use emerged as the strongest predictor influencing both Perceived Usefulness and Behavioral Intention. Additionally, Perceived Usefulness significantly impacted both User Satisfaction and Behavioral Intention, although User Satisfaction did not directly affect Behavioral Intention. External factors such as Customer Support and System Quality were found to play a critical role in shaping user perceptions, while Digital Literacy significantly moderated the relationship between Perceived Ease of Use and Behavioral Intention. These results emphasize that in community-based service contexts, technical aspects such as system usability, service stability, and customer support outweigh emotional factors like satisfaction. Furthermore, the Importance-Performance Map Analysis (IPMA) identified that enhancing ease of use, service usefulness, and customer support should be prioritized to strengthen user loyalty. This study makes a theoretical contribution by extending the application of TAM and ECT in decentralized internet service settings and offers practical insights for RT/RW Net service providers. To promote sustainable adoption, service managers should focus on technical quality improvements, functional innovations, and initiatives to enhance digital literacy among users.

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