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Analyzing Digital Utility App Adoption: A UTAUT Approach on PLN Mobile with Technological Literacy as a Moderator

Ignatius Adi Susantyo[1*], Lia Yuldinawati[2], Maria Apsari Sugiat[2]

[1]Magister of Management Distance Learning Program, Faculty of Economics and Business, Telkom University, Bandung 40257, Indonesia

[2]Faculty of Economics and Business, Telkom University, Bandung 40257, Indonesia

[*]ignatiusadi@student.telkomuniversity.ac.id

Abstract. This study examines customers' determinants of behavioral intention to utilize the PLN Mobile application using the Unified Theory of Acceptance and Use of Technology (UTAUT) with technological literacy as a moderating variable. The data were collected from 399 respondents in the UP3 Western Flores Area using purposive sampling and analyzed by Partial Least Squares Structural Equation Modeling (PLS-SEM). The model demonstrated adequate reliability and validity (AVE > 0.5; composite reliability > 0.7) with $R^2 = 0.62$ for behavioral intention. Results indicate that performance expectancy, perceived usefulness, social influence, and facilitating conditions significantly influence intention to use the app, $\beta = 0.21–0.34$, $p < 0.05$, while trust and hedonic motivation were not significant. Technological literacy cemented the relationship between intention and real use, emphasizing digital capability as a key adoption driver. Active usage is minimal amid high download rates. The findings provide theoretical contributions to digital service adoption models and practical implications for facilitating user support, literacy programs, and mobile utility system introduction.

Keywords: UTAUT, PLS-SEM, technological literacy, digital utility adoption, mobile service infrastructure

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1. Introduction

Rapidly developing digital technology has transformed the delivery of public services. In Indonesia, mobile application adoption in public service systems is an important segment of the ongoing digitalization. One such application is the PLN Mobile application, developed by PT Perusahaan Listrik Negara (PLN), to enhance customer experience and provide convenient electricity services such as bill payment, token purchase, outage reporting, and complaint management [1]. Despite these promising features, the uptake of this app remains less than ideal, particularly in regions such as Western Flores (FBB), where digital literacy and infrastructure continue to be significant issues [2].

Mobile applications play an imperative role in improving process effectiveness and customer satisfaction in public service sectors. However customer intention and willingness to utilize these technologies depend on a number of determinants, including perceived usefulness, trust, performance expectancy, social influence, effort expectancy, and facilitating conditions [3]. To fit these determinants into an integral analytical model, this study employs the Unified Theory of Acceptance and Use of Technology (UTAUT), which consolidates numerous dimensions of technology acceptance and encompasses extensions such as hedonic motivation and technological literacy [4].

Perceived usefulness refers to the anticipation of task performance improvement through enhanced convenience of electricity service transactions [5]. Perceived trust refers to reliability and security, matters of paramount concern in online transactions, where transaction integrity and data protection are essential [6]. Performance expectancy and effort expectancy also reflect user assessments of how effectively and how easily the app serves their needs [7]. Social influence**,** defined as the role played by peers, family, and social networks in affecting adoption decisions, is another adoption factor [16].

Facilitating conditions, including access to devices and stable internet connections, also play important roles in shaping adoption behavior [9]. Based on these pillars, this study introduces technological literacy as a moderating variable, proposing that digital competence significantly strengthens the link between behavioral intention and actual use of the app [10]-[14].

This research focuses on the UP3 Western Flores Area (FBB), selected for its distinct socio-demographic profile and notable digital infrastructure inequalities. While approximately 87% of the 331,612 PLN clients in this area have downloaded the application, active usage rates are minimal, demonstrating a disparity between intention and action [15]. This disparity highlights the need to examine behavioral intention more deeply, with respect to infrastructural preparedness and literacy constraints.

Although previous studies have applied the UTAUT model to areas such as e-wallet adoption [12], e-government websites [13], security in mobile banking [11], and digitalization in logistics [14], empirical studies in the field of digital utility systems are scarce. prior research has also predominantly concentrated on behavioral intention, without addressing the increasing gap between download rates and sustained use. Additionally, the moderating role of technological literacy, that is especially critical in regions with heterogeneous digital competencies, has received scant attention in the field of public service adoption studies. These gaps indicate a pressing need for research not only advancing theoretical understanding of UTAUT but also addressing actual system-level problems in digital utility adoption.

The central objective of this study is therefore to test the influence of UTAUT factors and to evaluate the moderating influence of technological literacy in bridging the intention–use gap in PLN Mobile adoption. This study seeks to contribute both to the theoretical advancement of the UTAUT model in the area of digital utility services, as well as to system-level implications for supporting digital infrastructure, creating customer engagement mechanisms, and designing literacy-based interventions that enable the sustainable adoption of mobile public service applications[16].

Incorporation of mobile applications in government services has grown with the rapid dissemination of information and communication technologies. The behavior and intent of users toward embracing such systems have thus emerged as an urgent issue to comprehend. Among the models developed to explain this phenomenon, the Unified Theory of Acceptance and Use of Technology (UTAUT) is still the most widely applied, as it aggregates constructs from earlier models, such as the Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), and Innovation Diffusion Theory, into a broader analytical framework [17].

1.1. Technology Acceptance Model (TAM) and Its Evolution

The Technology Acceptance Model (TAM), originally introduced by Davis, is centered on two fundamental constructs: perceived usefulness (PU) and perceived ease of use (PEOU) [18]. PU defines how much users believe that technology will improve their performance, whereas PEOU signifies the notion that technology can be utilized with minimal effort [19]. Over time, TAM evolved into TAM2

and TAM3, among others such as subjective norms and complexity, thereby explaining user acceptance more comprehensively [20].

UTAUT builds on these contributions by incorporating four core constructs, namely performance expectancy, effort expectancy, social influence, and facilitating conditions, and proposes moderating variables such as age, gender, and experience, to enhance explanatory power [21]. These constructs have been empirically tested and verified time and again in studies across industries, and UTAUT is therefore one of the most robust frameworks for technology adoption research [12], [22].

1.2. UTAUT's Key Constructs

- Performance expectancy (PE) refers to the perception of the users as to how the application makes the task more effective. In PLN Mobile, they are faster bill payments, outage reporting, and information on the services [5], [17].
- Effort expectancy (EE) ease refers to ease of use. Individuals are more willing to utilize technologies that are simpler to navigate and require less mental effort [19]. For PLN Mobile, ease of navigation and a user-friendly interface are relevant.
- Social influence (SI) refers to the effect of social groups, family, and peers on technology adoption decisions, more important in collectivist cultures like Indonesia [13], [23].
- Facilitating conditions (FC) refer to infrastructural and support resources, such as internet access, device availability, and customer assistance. These are essential to ensure continued use, particularly in areas with uneven digital infrastructure [13], [17].

1.3. Hedonic Motivation and Extended Constructs

Together with the fundamental UTAUT constructs, extended theories such as UTAUT2 also include hedonic motivation (HM), which is concerned with the enjoyment or pleasure derived from the use of technology [24]. Gamification elements or interactive design features in PLN Mobile could lead to increased user satisfaction and support long-term use.

1.4. Technology Adoption and Trust

Perceived trust (PT) is a vital building block in virtual contexts. Users' willingness to adopt web services hinges on system reliability, transaction clarity, and information protection [25]. Mayer et al. [26]. classify trust as ability, benevolence, and integrity, while Gefen et al. [27] depict its explanatory power in web-based shopping adoption. Trust is thus a central driver of whether PLN customers will switch from offline to online channels of service [11]-[12].

1.5. Technological Literacy as a Moderator

A special feature of this study is the application of technological literacy (TL) as a moderating variable. TL refers to the competency to use computers and software properly, which has a direct influence on usage and behavioral intention [28]. In contexts such as Indonesia, where digital literacy gaps are wide, TL acts to mediate intention and usage [14]. This moderating role has been explored only superficially in the literature on the adoption of public service, implying an essential gap that this study seeks to fill.

1.6. Synthesis of Literature

Literature identifies a myriad of determinants of technology adoption, ranging from the usual constructs of usefulness and ease of use, to emerging ones such as trust and hedonic motivation. However, these variables were primarily investigated in isolation, or in consumer-focused environments in previous research, with less emphasis placed on public utility adoption in developing nations. For purposes of providing an integrated synthesis, the following table provides brief descriptions of important constructs, their definitions, relevance to PLN Mobile adoption, and key references.

Table 1. Constructs in Technology Adoption and Relevance to PLN Mobile

Construct / Variable	Definition	Relevance to PLN Mobile / Digital Utility Adoption	Key References
Performance Expectancy (PE)	Extent to which technology improves performance	Quicker bill payments, real-time outage reports, and service efficiency	[5], [17], [22]
Effort Expectancy (EE)	Ease of using the system	Easy navigation, easy-to-use interface, minimal technical barriers	[17], [19]
Social Influence (SI)	Effect of significant others on technology uptake	Peer and family support in collectivist Indonesian society	[13], [23]
Facilitating Conditions (FC)	Cognitive access to aid and resources	Device availability, internet, and customer service of PLN's customer	[13], [17]
Hedonic Motivation (HM)	Pleasure and enjoyment in technology use	Gamification and interactive functionality for PLN Mobile	[24]
Perceived Trust (PT)	Trust in system dependability, honesty, and security	Trust in PLN Mobile's transactions and data security	[11], [12], [25], [26], [27]
Technological Literacy (TL)	Digit literacy in device and app usage	Moderates intention–usage gap; critical in low-literacy regions	[14], [28]
UTAUT / TAM Evolution	Integrated model of technology acceptance	Detailed analysis for the adoption of digital public service	[12], [14], [18], [21]

In short, literature highlights that public service technology adoption is a multi-determined process by performance, usability, social norms, infrastructural concerns, enjoyment, and trust. Not many studies explicitly include technological literacy as a moderating variable in the UTAUT model in developing contexts. The study fills the gap by testing empirically the role of digital competence in influencing the intention–behavioral link in PLN Mobile adoption.

2. Methods

The study employed a quantitative, explanatory research design to empirically test customers' behavioural intention to adopt PLN Mobile, with the setting elucidated in the Unified Theory of Acceptance and Use of Technology (UTAUT). The model was developed to include also technological literacy as a moderating construct, reflecting Indonesia's contextual problem of digital proficiency. Specifically, the research tested the influence of performance expectancy, perceived usefulness, effort expectancy, social influence, facilitating conditions, hedonic motivation, and trust on behavior intention, and finally tested how the technological literacy moderates the intention transformation into use [12], [14], [18], [29], [30].

2.1. Population and Sampling

The study population was 288,816 registered users of the PLN Mobile download in the UP3 Western Flores Region (FBB), consisting of several regencies in East Nusa Tenggara. This setting was selected because of its distinct socio-demographic profile and which present a significant intention–use gap. A purposive sampling approach was used so that the participants met the following requirements:

- They were registered users of PLN Mobile,
- Had available mobile devices,

- Had functional internet access.

In accordance with power analysis in structural equation modeling and prevailing empirical conventions, 399 respondents were deemed sufficient to achieve statistical power and population representation of interest.

2.2. Data Collection

Data were obtained through an online guided questionnaire distributed through mobile phones. The instrument was modified from the validated items employed in prior UTAUT and TAM studies [13], [18], [21], and modified through expert examination to the PLN Mobile situation. The answer was on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The instrument contained all of the latent constructs, along with the moderation effect of technological literacy.

2.3. Testing Validity and Reliability

Prior to hypothesis testing, construct validity and reliability tests were performed. Convergent validity was established by demanding that factor loadings exceed the cut-off of 0.50, while Average Variance Extracted (AVE) was greater than 0.50. Reliability was tested using Cronbach's alpha and Composite Reliability (CR), while the benchmark threshold of ≥0.70 was used. These procedures are aligned with recent applications of PLS-SEM in technology adoption studies [29], [30].

2.4. Data Analysis

For hypothesis testing, Partial Least Squares Structural Equation Modeling (PLS-SEM) was conducted using SmartPLS 3.0.

The reason for this was that it is particularly apt for:

- Examination of complex models involving a number of endogenous and exogenous variables,
- Moderating effects such as technological literacy, and
- Dealing with data under relatively less stringent assumptions compared to covariance-based SEM.

The analysis proceeded in two steps:

- Measurement model evaluation (construct validity and reliability),
- Structural model validation (path coefficients, significance, and moderating effects).

Path coefficient significance was determined by bootstrapping 5,000 resamples, as recommended by best practices in PLS-SEM literature.

2.5. Ethical Considerations

All respondents answered voluntarily, with assurance of anonymity and confidentiality. Data gathered were used for academic purposes only, and no identifiable data were retained.

3. Results and Discussion

3.1 Respondent Characteristics

The total respondents in this study were 399 and were registered customers of the PLN Mobile application in the UP3 Flores Bagian Barat area. The demographic profile indicates that most of the respondents were male (88.97%), and the majority had a senior high school education (72.93%). The majority of them are employed in the private sector (52.38%), with the remaining working in other scattered professions, like government employees. By length of subscription, most respondents have been subscribed to PLN Mobile for 3–4 years (61.40%), indicating prolonged user experience. Most users (82.21%) also earn less than IDR 3 million per month, highlighting the relevance of affordability and accessibility as underlying determinants of public service technology adoption.

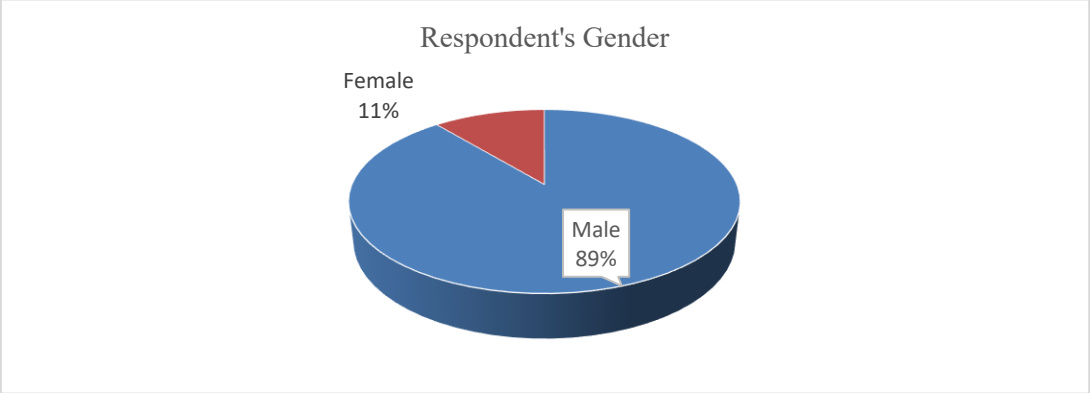

Figure 1. Distribution of gender

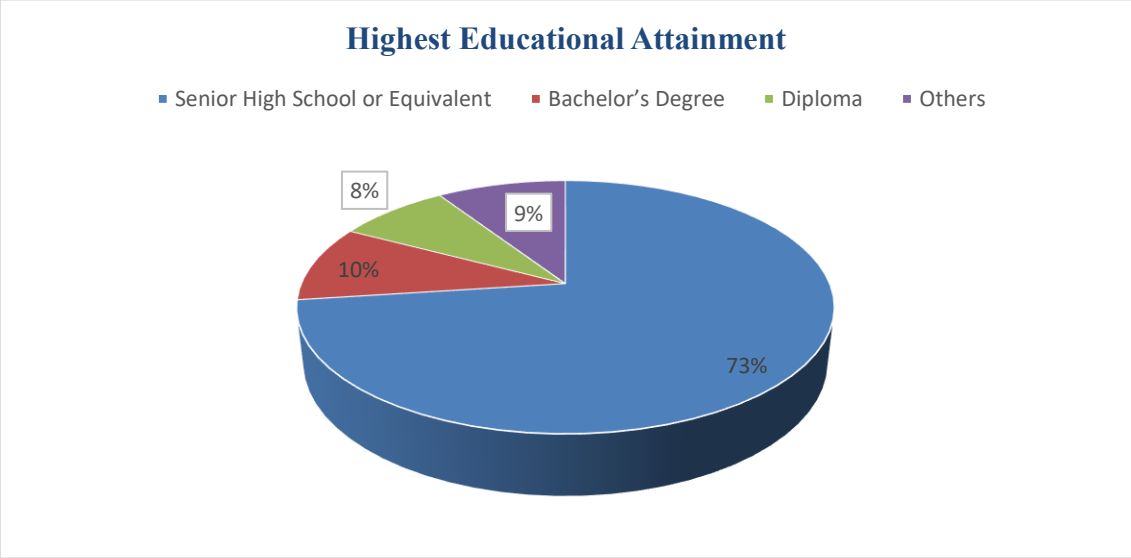

Figure 2. Level of education

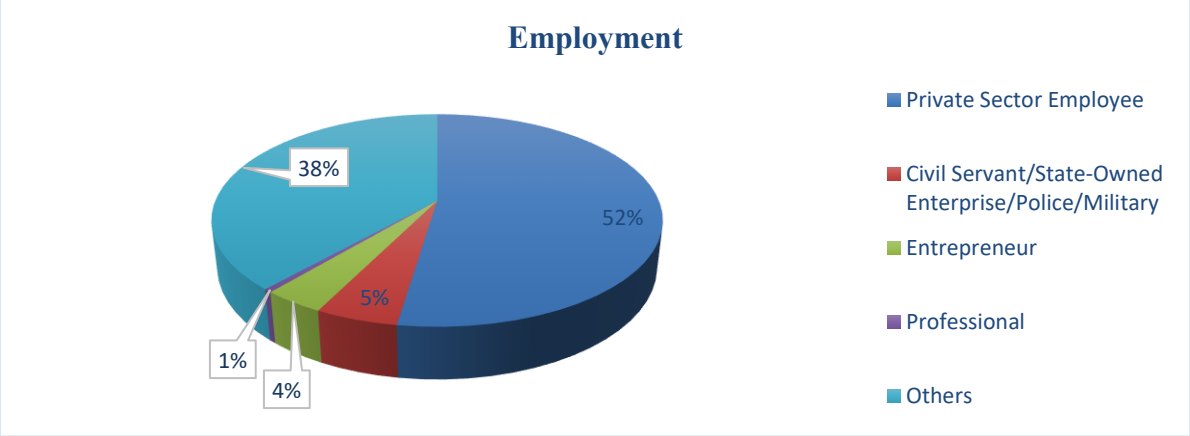

Figure 3. Employment sector

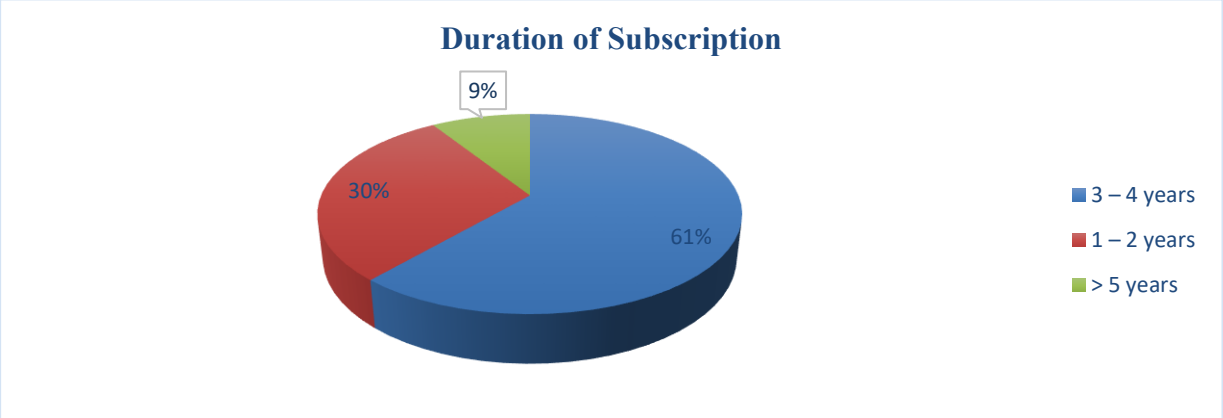

Figure 4. Subscription length

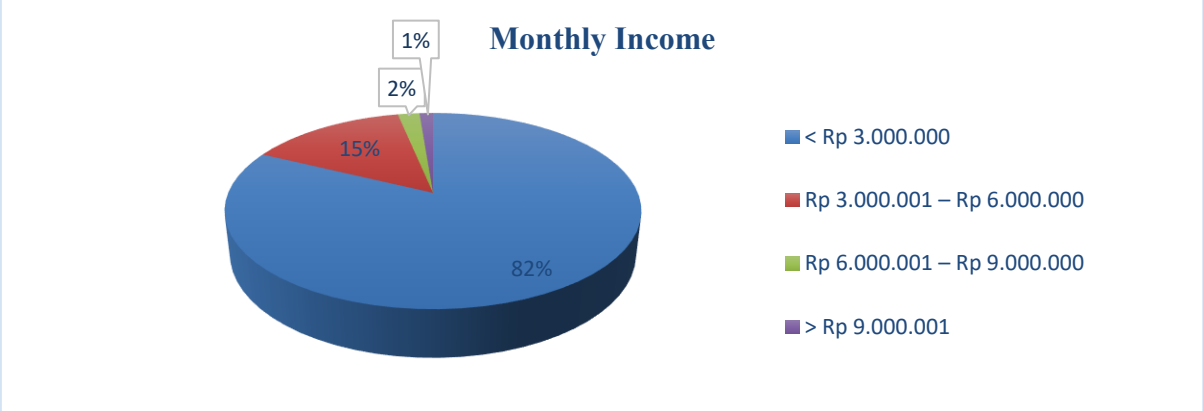

Figure 5. Distribution of monthly income

3.2 Descriptive Analysis

All constructs were rated on a 5-point Likert scale. The results indicate high satisfaction and positive ratings, with 98% of items in the Excellent category. The highest mean value was recorded in item BTU05 (5.76), while the lowest was THL03 (3.86), showing some disparity in technological literacy perceptions. Total Response Achievement (TCR) ranged from 77.29% to 98.30%, indicating the reliability and robustness of the instrument.

Table 2. Presents the descriptive statistics, mean values, and TCR for each construct

	STS	TS	N	S	SS	Skor	Mean	TCR	Category
	1	2	3	4	5				
PEU01	2	0	0	104	1855	1961	4,91	98,30%	Excellent
PEU02	2	2	0	140	1805	1949	4,88	97,69%	Excellent
PEU03	1	2	0	196	1740	1939	4,86	97,19%	Excellent
PEU04	1	2	3	176	1760	1942	4,87	97,34%	Excellent
Total								97,63%	Excellent
PET01	2	2	0	204	1725	1933	4,84	96,89%	Excellent
PET02	1	116	0	0	1700	1817	4,55	91,08%	Excellent

PET03	1	0	3	212	1720	1936	4,85	97,04%	Excellent
PET04	0	2	0	216	1720	1938	4,86	97,14%	Excellent
Total								95,54%	Excellent
PEX01	0	2	0	216	1720	1938	4,86	97,14%	Excellent
PEX02	0	2	0	196	1745	1943	4,87	97,39%	Excellent
PEX03	1	0	3	180	1760	1944	4,87	97,44%	Excellent
PEX04	0	2	0	224	1710	1936	4,85	97,04%	Excellent
Total								97,26%	Excellent
SOI01	3	4	3	188	1730	1928	4,83	96,64%	Excellent
SOI02	2	4	9	208	1700	1923	4,82	96,39%	Excellent
SOI03	2	6	9	212	1690	1919	4,81	96,19%	Excellent
SOI04	3	8	12	236	1645	1904	4,77	95,44%	Excellent
Total								96,17%	Excellent
EE01	0	2	0	216	1720	1938	4,86	97,14%	Excellent
EE02	1	0	3	156	1790	1950	4,89	97,74%	Excellent
EE03	1	2	6	192	1735	1936	4,85	97,04%	Excellent
EE04	1	0	3	196	1740	1940	4,86	97,24%	Excellent
EE05	3	2	15	168	1740	1928	4,83	96,64%	Excellent
EE06	1	0	3	188	1750	1942	4,87	97,34%	Excellent
Total								97,19%	Excellent
FC01	1	2	6	220	1700	1929	4,83	96,69%	Excellent
FC02	2	0	12	176	1745	1935	4,85	96,99%	Excellent
FC03	2	2	9	164	1760	1937	4,85	97,09%	Excellent
FC04	3	0	3	212	1710	1928	4,83	96,64%	Excellent
FC05	1	2	6	184	1745	1938	4,86	97,14%	Excellent
Total								96,91%	Excellent
HM01	1	0	6	208	1720	1935	4,85	96,99%	Excellent
HM02	3	6	21	220	1655	1905	4,77	95,49%	Excellent
HM03	1	4	12	188	1725	1930	4,84	96,74%	Excellent
HM04	0	2	6	212	1715	1935	4,85	96,99%	Excellent
Total								96,55%	Excellent
ITU01	0	2	6	192	1740	1940	4,86	97,24%	Excellent
ITU02	0	2	3	180	1760	1945	4,87	97,49%	Excellent
ITU03	2	2	3	184	1745	1936	4,85	97,04%	Excellent
ITU04	1	0	0	180	1765	1946	4,88	97,54%	Excellent
ITU05	1	0	3	196	1740	1940	4,86	97,24%	Excellent
Total								97,31%	Excellent
THL01	1	0	3	144	1805	1953	4,89	97,89%	Excellent
THL02	1	0	0	192	1745	1938	4,86	97,14%	Excellent
THL03	1	0	153	1388	0	1542	3,86	77,29%	Good
THL04	1	2	6	164	1770	1943	4,87	97,39%	Excellent
THLSUM	0	0	0	0	0	0	0,00	92,43%	Excellent
BTU01	1	0	3	188	1750	1942	4,87	97,34%	Excellent

BTU02	0	4	6	200	1725	1935	4,85	96,99%	Excellent
BTU03	3	2	15	168	1740	1928	4,83	96,64%	Excellent
BTU04	1	4	12	152	1770	1939	4,86	97,19%	Excellent
BTU05	0	2	6	120	1830	1958	5,76	98,15%	Excellent
BTUSUM								97,26%	Excellent

3.3 Measurement Model Analysis (Outer Model)

Convergent validity: All outer loads ≥ 0.70 and AVE ≥ 0.50, suggesting validity.

Discriminant validity: Fornell–Larcker and cross-loading tests revealed that each indicator is most highly correlated with its respective construct.

Reliability: Composite Reliability and Cronbach's Alpha were both greater than 0.70 for all constructs, indicating internal consistency.

Table 3. Fornell-Larcker Criterion for Discriminant Validity among Constructs

Indicator	BTU	EE	FC	HM	ITU	PEU	PET	PEX	SOI	THL
BTU	0,873									
EE	0,847	0,893								
FC	0,818	0,862	0,855							
HM	0,858	0,849	0,820	0,868						
ITU	0,857	0,811	0,845	0,832	0,879					
PEU	0,601	0,629	0,537	0,566	0,637	0,866				
PET	0,726	0,797	0,775	0,712	0,798	0,683	0,800			
PEX	0,759	0,813	0,725	0,705	0,808	0,658	0,805	0,832		
SOI	0,743	0,788	0,848	0,757	0,756	0,523	0,746	0,717	0,819	
THL	0,817	0,871	0,807	0,855	0,839	0,628	0,723	0,757	0,671	0,874

Table 4. Cross Loadings of Indicators for Discriminant Validity Assessment

Indikator	BTU	EE	FC	HM	ITU	PEU	PET	PEX	SOI	THL	THL X ITU
BTU01	**0,812**	0,705	0,631	0,699	0,711	0,527	0,575	0,663	0,526	0,757	-0,616
BTU02	**0,796**	0,708	0,618	0,680	0,689	0,489	0,579	0,624	0,553	0,705	-0,500
BTU03	**0,828**	0,662	0,650	0,740	0,669	0,481	0,588	0,587	0,635	0,700	-0,519
BTU04	**0,821**	0,729	0,823	0,719	0,749	0,441	0,658	0,591	0,762	0,705	-0,498
BTU05	**0,828**	0,652	0,614	0,666	0,679	0,517	0,564	0,633	0,559	0,698	-0,575
EE01	0,642	**0,768**	0,661	0,643	0,671	0,503	0,630	0,645	0,673	0,637	-0,502
EE02	0,671	**0,802**	0,584	0,685	0,698	0,563	0,590	0,719	0,569	0,702	-0,631
EE03	0,746	**0,854**	0,798	0,718	0,779	0,548	0,749	0,696	0,680	0,762	-0,597
EE04	0,728	**0,807**	0,680	0,675	0,728	0,536	0,674	0,691	0,618	0,744	-0,623
EE05	0,602	**0,768**	0,700	0,676	0,685	0,384	0,562	0,531	0,628	0,619	-0,498
EE06	0,723	**0,863**	0,760	0,734	0,780	0,523	0,661	0,673	0,667	0,762	-0,634
FC01	0,687	0,755	**0,868**	0,701	0,760	0,435	0,694	0,629	0,743	0,705	-0,475
FC02	0,734	0,731	**0,830**	0,723	0,732	0,497	0,588	0,639	0,729	0,700	-0,506

FC03	0,743	0,752	**0,886**	0,750	0,740	0,453	0,665	0,599	0,767	0,707	-0,566
FC04	0,644	0,693	**0,816**	0,623	0,687	0,447	0,672	0,609	0,695	0,630	-0,512
FC05	0,685	0,752	**0,871**	0,701	0,731	0,463	0,692	0,621	0,689	0,705	-0,498
HM01	0,723	0,761	0,732	**0,878**	0,748	0,533	0,650	0,624	0,643	0,773	-0,512
HM02	0,714	0,705	0,712	**0,851**	0,696	0,402	0,598	0,578	0,688	0,652	-0,397
HM03	0,780	0,716	0,682	**0,890**	0,687	0,476	0,593	0,604	0,673	0,731	-0,465
HM04	0,764	0,763	0,716	**0,854**	0,753	0,548	0,627	0,638	0,627	0,803	-0,531
ITU01	0,651	0,733	0,720	0,709	**0,820**	0,509	0,662	0,643	0,627	0,660	-0,415
ITU02	0,775	0,785	0,726	0,729	**0,856**	0,546	0,655	0,725	0,668	0,751	-0,558
ITU03	0,660	0,727	0,739	0,651	**0,783**	0,469	0,669	0,601	0,659	0,691	-0,560
ITU04	0,729	0,759	0,733	0,682	**0,866**	0,574	0,702	0,705	0,630	0,780	-0,666
ITU05	0,771	0,742	0,673	0,717	**0,866**	0,569	0,663	0,710	0,590	0,799	-0,637
PET01	0,525	0,575	0,585	0,502	0,551	**0,655**	0,764	0,563	0,600	0,491	-0,394
PET02	0,649	0,670	0,617	0,595	0,700	**0,539**	0,811	0,711	0,611	0,603	-0,568
PET03	0,540	0,631	0,689	0,579	0,605	**0,431**	0,802	0,599	0,648	0,548	-0,344
PET04	0,596	0,664	0,594	0,592	0,681	**0,573**	0,821	0,687	0,539	0,655	-0,495
PEU01	0,577	0,535	0,450	0,490	0,533	0,880	**0,584**	0,572	0,465	0,564	-0,604
PEU02	0,473	0,494	0,424	0,442	0,500	0,852	**0,511**	0,517	0,428	0,489	-0,432
PEU03	0,519	0,585	0,500	0,532	0,613	0,884	**0,632**	0,590	0,470	0,568	-0,448
PEU04	0,511	0,557	0,479	0,489	0,551	0,846	**0,628**	0,593	0,444	0,548	-0,440
PEX01	0,672	0,710	0,669	0,616	0,695	0,575	0,695	**0,814**	0,643	0,652	-0,511
PEX02	0,666	0,697	0,583	0,591	0,721	0,574	0,664	**0,865**	0,604	0,687	-0,606
PEX03	0,562	0,647	0,499	0,536	0,584	0,510	0,628	**0,815**	0,507	0,572	-0,568
PEX04	0,615	0,649	0,649	0,597	0,678	0,524	0,690	**0,834**	0,621	0,599	-0,479
SOI01	0,552	0,572	0,590	0,534	0,536	0,425	0,517	0,547	**0,742**	0,504	-0,450
SOI02	0,695	0,724	0,772	0,676	0,698	0,470	0,699	0,663	**0,872**	0,643	-0,511
SOI03	0,606	0,659	0,744	0,640	0,634	0,427	0,630	0,581	**0,849**	0,542	-0,389
SOI04	0,573	0,616	0,658	0,619	0,596	0,391	0,584	0,552	**0,809**	0,498	-0,347
THL01	0,764	0,775	0,672	0,743	0,775	0,553	0,598	0,679	0,559	**0,886**	-0,706
THL02	0,777	0,781	0,747	0,786	0,766	0,606	0,657	0,689	0,623	**0,869**	-0,649
THL03	0,730	0,721	0,660	0,690	0,780	0,536	0,644	0,656	0,561	**0,853**	-0,634
THL04	0,779	0,765	0,740	0,765	0,753	0,499	0,629	0,622	0,598	**0,886**	-0,643
THL x ITU	-0,664	-0,718	-0,598	-0,551	-0,678	-0,554	-0,570	-0,650	-0,519	-0,753	1,000

Table 5. Reliability Test Results Based on Cronbach's Alpha and Composite Reliability

Variable	Cronbach's alpha	Composite reliability (rho_c)	Remark
Behavior to use	0,875	0,909	Reliabel
Effort Expentancy	0,895	0,920	Reliabel
Facilitating Conditions	0,908	0,931	Reliabel
Hedonic Motivation	0,891	0,925	Reliabel

Intention to Use	0,894	0,922	Reliabel
Perceived Usefulness	0,889	0,923	Reliabel
Perceived trust	0,813	0,877	Reliabel
Performance expentancy	0,852	0,900	Reliabel
Social Influence	0,836	0,891	Reliabel
Technological Literacy	0,897	0,928	Reliabel

3.4 Structural Model Analysis (Inner Model)

The coefficient of determination (R^2) indicates good predictive power (Intention to Use = 0.856; Behavior to Use = 0.798). Effect size (f^2) shows moderate effects of Effort Expectancy, Facilitating Conditions, Hedonic Motivation, Performance Expectancy, and Technological Literacy, while Perceived Usefulness, Trust, and Social Influence have weak effects. Model fit was acceptable (NFI = 0.736).

Table 6. Effect Size (f^2) of Exogenous Variables on Endogenous Variables

Relationship	*f-square*	Category
Effort Expentancy -> Intention to Use	0,110	Moderate
Facilitating Conditions -> Intention to Use	0,097	Moderate
Hedonic Motivation -> Intention to Use	0,053	Moderate
Intention to Use -> Behavior to use	0,173	Moderate
Perceived Usefulness -> Intention to Use	0,011	Weak
Perceived trust -> Intention to Use	0,010	Weak
Performance expentancy -> Intention to Use	0,054	Moderate
Social Influence -> Intention to Use	0,016	Weak
Technological Literacy -> Behavior to use	0,250	Moderate
Technological Literacy x Intention to Use -> Behavior to use	0,000	Weak

Table 7. Model Fit Assessment Using Normed Fit Index (NFI)

Endogen Variable	Model Fit
Behavior to use (BTU)	0,736

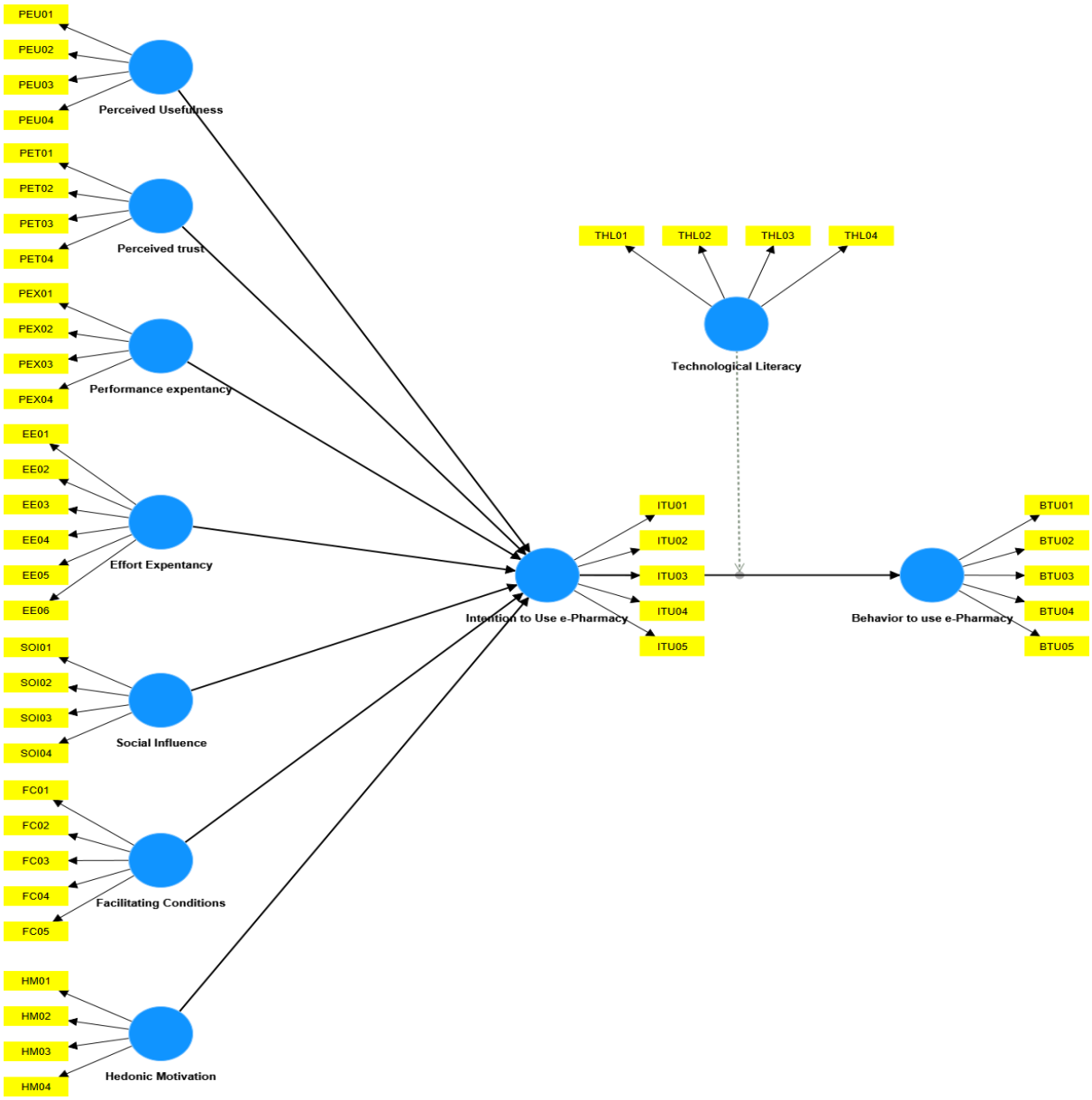

Figure 6. SEM-PLS Research Framework Model

3.5 Hypothesis Testing

- Direct effects: Effort Expectancy, Facilitating Conditions, Hedonic Motivation, Performance Expectancy, Intention to Use, and Technological Literacy had significant effects on outcomes. Perceived Usefulness, Trust, and Social Influence were not significant.
- Indirect effects: There was significant mediation by Intention to Use for Effort Expectancy, Facilitating Conditions, and Performance Expectancy.

Table 8. Direct Effects of Exogenous Variables on Endogenous Variables in the SEM-PLS Model

Path Relationship	β (Original Sample)	M (Sample Mean)	STDEV	t-statistics	p-values	Result
Effort Expectancy → Intention to Use	0.329	0.325	0.045	7.311	0	Significant
Facilitating Conditions → Intention to Use	0.291	0.284	0.096	3.031	0.003	Significant
Hedonic Motivation → Intention to Use	0.176	0.17	0.086	2.047	0.041	Significant
Performance Expectancy → Intention to Use	0.175	0.168	0.078	2.252	0.026	Significant
Perceived Usefulness → Intention to Use	0.041	0.038	0.05	0.802	0.423	Not Significant
Perceived Trust → Intention to Use	0.036	0.034	0.051	1.028	0.304	Not Significant
Social Influence → Intention to Use	-0.057	-0.052	0.043	1.315	0.191	Not Significant
Intention to Use → Behavior to Use	0.393	0.388	0.066	5.955	0	Significant
Technological Literacy → Behavior to Use	0.529	0.524	0.059	8.966	0	Significant

Table 9. Indirect Effects (Mediation Test) in the SEM-PLS Model

Path Relationship	β (Original Sample)	M (Sample Mean)	STDEV	t-statistics	p-values	Result
Effort Expectancy → Intention to Use → Behavior to Use	0.129	0.12	0.043	2.995	0.003	Significant
Facilitating Conditions → Intention to Use → Behavior to Use	0.114	0.11	0.049	2.348	0.019	Significant
Hedonic Motivation → Intention to Use → Behavior to Use	0.069	0.064	0.038	1.819	0.069	Not Significant
Perceived Usefulness → Intention to Use → Behavior to Use	0.022	0.029	0.028	0.796	0.426	Not Significant
Perceived Trust → Intention to Use → Behavior to Use	0.031	0.03	0.03	1.031	0.303	Not Significant
Performance Expectancy → Intention to Use → Behavior to Use	0.069	0.055	0.033	2.084	0.037	Significant
Social Influence → Intention to Use → Behavior to Use	-0.038	-0.033	0.029	1.326	0.185	Not Significant

3.6 Discussion

This study highlights effort expectancy's instrumental function, facilitating conditions, hedonic motivation, and performance expectancy as determinants of intention to use PLN Mobile, in accordance with UTAUT theory. The results reinforce perceived ease of use and infrastructure enabling imperatives, following Davis' TAM, which enshrines ease of interaction as a driver of behavioral intention [18,21].

Unexpectedly, perceived usefulness, trust, and social influence were poor predictors. This suggest that for PLN Mobile, consumers would be able to take usefulness for granted and be more concerned with usability and infrastructure. This support Sharma et al. [31],where it is argued that in mature technologies, perceived usefulness is taken for granted and no longer a predictor. Similarly, trust was less in the foreground, perhaps simply because PLN Mobile is associated with a governmental service where reliability is assumed, in comparison to other financial technology platforms [26,28]. For social influence, previous studies emphasized that peer influences and external social pressure are likely to motivate technology use [32]. The younger generations such as Generation Y and Z, are also highly susceptible to peer suggestions and internet forums [33]. However, this study proves that within the realm of PLN Mobile, such effects can be overshadowed by infrastructural and functional considerations.

The moderating role of technological literacy was salient, testifying that digital competence enables the transition from intention to use. This underscores the strategic value in upping digital literacy programs as bridge between adoption intention and actual use. Digital learning can be as important as technical features in ensuring adoption success for public utilities in emerging economies [34].

Overall, this study applies UTAUT to public utility environments and highlights the importance of support mechanisms, usability improvement, and digital literacy programs in improving technology acceptance. This research also enhances the evidence base that, when complemented with moderating factors such as technological literacy, UTAUT has useful explanatory capacity for adoption of mobile services within state-owned firms [35].

4. Conclusion

This study aimed to investigate the customers' behavioral intention and usage of the PLN Mobile application in the UP3 Western Flores Region (FBB) of Indonesia through the UTAUT model with technological literacy as the moderating variable in the digitally constrained environment. From the study's findings, it was established that customers' perceived ease of effort, facilitating conditions, hedonic motivations, and performance expectancy are significant factors in influencing customers' intention to use the PLN Mobile application; on the contrary, perceived usefulness, perceived trust, and social influence are not significant factors in influencing customers' intention to use the PLN Mobile application. This study confirmed the moderating effect of technological literacy in influencing the relationship between customers' intention to use the PLN Mobile application and customers' usage of the PLN Mobile application. This study's findings are significant in the sense that the study's integration of the moderating effect of technological literacy in the UTAUT model in the context of the state-owned digital service in the less-developed region of Indonesia is novel in the sense of its theoretical contribution to the study of the adoption of digital applications in the context of the state-owned digital service in the developing country context. The findings of the study are significant in the sense of its contribution to the theoretical study of the adoption of digital applications in the context of the state-owned digital service in the developing country context; the study's findings are significant in the sense of its contribution to the theoretical study of the adoption of digital applications in the context of the state-owned digital service in the developing country context.

Author Contributions

Ignatius Adi Susantyo contributed to the generation of the research concept, study design, data collection, statistical analysis, and first draft of the manuscript. Lia Yuldinawati contributed to the construction of the research framework, signed off on the methodology plan, and made major revisions to the manuscript. Maria Apsari Sugiat managed the research process, ensured academic integrity, and made final manuscript revisions. All the authors have read and approved the final manuscript submission. This article is based on the first author's master's thesis work, with supervision by the co-authors.

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