Extending the Technology Acceptance Model: Digital Literacy as an Upstream Antecedent of Green Purchase Intention

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Abstract

Digital transformation has fundamentally changed how consumers search for information and make purchasing decisions, particularly for environmentally friendly products. Although the Technology Acceptance Model (TAM) has been widely used to explain technology acceptance, the role of Digital Literacy as a capability preceding technology acceptance has received limited attention. This study extends TAM by positioning Digital Literacy as an upstream antecedent influencing Green Purchase Intention through technology acceptance. A quantitative cross-sectional survey was conducted using data from 300 Indonesian respondents. The proposed model comprised six reflective constructs: Digital Literacy, Perceived Ease of Use, Perceived Usefulness, Perceived Risk, Attitude toward Green Products, and Green Purchase Intention. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the cSEM package in R and 5,000 bootstrap resamples. The results show that Digital Literacy significantly enhances Perceived Ease of Use ($\beta = 0.600$, $p < 0.001$), which subsequently increases Perceived Usefulness ($\beta = 0.570$, $p < 0.001$) and strengthens Attitude toward Green Products ($\beta = 0.606$, $p < 0.001$). Attitude emerged as the strongest predictor of Green Purchase Intention ($\beta = 0.734$, $p < 0.001$), whereas Perceived Risk exerted a significant negative effect ($\beta = -0.221$, $p = 0.001$). The model explained 73.5% of the variance in Green Purchase Intention. The findings refine TAM by demonstrating that Digital Literacy functions as a foundational capability enabling technology acceptance and provide practical implications for promoting environmentally friendly products through digital platforms.

Keywords: Digital Literacy; Technology Acceptance Model; Green Purchase Intention; Digital Transformation; Sustainable Consumption.

INTRODUCTION

Digital transformation has fundamentally reshaped how consumers search for information, evaluate alternatives, and make purchasing decisions. Digital platforms, social media, online marketplaces, and mobile applications have become the primary channels through which consumers obtain product-related information and interact with organizations. Consequently, consumers' purchasing decisions are increasingly influenced by their ability to effectively engage with digital technologies. (OECD, 2024; OECD, 2025a; Lăzăroiu et al., 2021).

Despite the rapid expansion of digital commerce and growing public concern for environmental sustainability, consumers do not consistently translate pro-environmental attitudes into actual purchasing intentions. Recent international evidence indicates that although 74% of consumers consider environmental protection important and 68% express concern about environmental issues, many still experience difficulties identifying genuinely sustainable products and evaluating environmental claims in

digital marketplaces. Likewise, approximately 17% of consumers report that limited ability to distinguish between more and less sustainable products is one of the main reasons environmental considerations do not strongly influence their purchasing decisions. Rather, consumers require adequate digital competencies to critically evaluate sustainability-related information before making purchasing decisions, highlighting the growing importance of Digital Literacy in digital consumer environments (OECD, 2025b).

This transformation is particularly evident in the market for environmentally friendly products. As concerns regarding environmental sustainability continue to increase, organizations are increasingly utilizing digital technologies to promote green products and communicate their environmental value. Consumers are now exposed to extensive digital information regarding product attributes, environmental certifications, customer reviews, and sustainability claims. Nevertheless, despite the growing availability of digital information, consumers' willingness to purchase environmentally friendly products remains inconsistent, suggesting that digital access alone is insufficient to encourage sustainable purchasing behavior. (OECD, 2024; Dong et al., 2026).

The Indonesian market reflects a similar trend. A nationwide consumer survey reported that 84% of Indonesian consumers have purchased environmentally friendly products, indicating growing awareness of sustainable consumption. Nevertheless, high prices, limited product availability, and uncertainty regarding product quality remain major barriers, causing many consumers to revert to conventional products despite their environmental concerns (Snapcart, 2024). Likewise, regional consumer surveys indicate that although sustainability has become an increasingly important consideration in purchasing decisions, many consumers remain uncertain about the credibility of environmental claims, eco-labels, and online product information (PwC, 2024). This discrepancy suggests that increasing environmental awareness alone does not automatically translate into stronger Green Purchase Intention, particularly when consumers lack sufficient capability to evaluate digital information critically. Collectively, these findings suggest that the availability of digital information alone is insufficient to encourage green purchasing behavior. Rather, consumers require adequate Digital Literacy to critically evaluate sustainability-related information before making purchasing decisions.

The Technology Acceptance Model (TAM) has long served as one of the most influential theoretical frameworks for explaining individuals' acceptance of technology. The model proposes that Perceived Ease of Use and Perceived Usefulness shape users' attitudes and behavioral intentions toward technology. Previous studies have successfully applied TAM across numerous contexts, including e-commerce, mobile applications, online services, and digital marketing (Davis, 1989; Davis et al., 1989; Venkatesh & Davis, 2000; Venkatesh et al., 2003).

However, most TAM-based studies implicitly assume that consumers are already capable of engaging with digital technologies before evaluating their usefulness or ease of use. This assumption may no longer adequately reflect consumer behavior in the era of digital transformation, where individuals exhibit substantial differences in their digital competencies. Before consumers can perceive digital technologies as useful or easy to use, they must first possess sufficient Digital Literacy to access, evaluate, interpret, and utilize digital information effectively. Recent studies have begun to demonstrate that Digital Literacy positively influences perceived ease of use, perceived usefulness, and purchase intention. Nevertheless, its role as an upstream antecedent within the Technology Acceptance Model has received comparatively limited scholarly attention, particularly in explaining Green Purchase Intention. Accordingly, incorporating Digital Literacy as a foundational capability preceding technology acceptance represents an important theoretical extension of the Technology Acceptance Model.

Accordingly, this study extends the Technology Acceptance Model by introducing Digital Literacy as an upstream antecedent of technology acceptance. The proposed model examines how Digital Literacy influences Perceived Ease of Use, which subsequently affects Perceived Usefulness, Attitude toward Green Products, and ultimately Green Purchase Intention. In addition, Perceived Risk is incorporated as an inhibiting factor that may weaken consumers' intention to purchase environmentally friendly products.

This study contributes to the literature in three important ways. First, it refines the Technology Acceptance Model by demonstrating that Digital Literacy functions as a foundational capability preceding technology acceptance. Second, it extends the application of TAM to the context of green consumer behavior under digital transformation. Third, it provides practical insights for organizations seeking to promote environmentally friendly products by emphasizing the importance of improving consumers' digital literacy while simultaneously reducing perceived risk.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Technology Acceptance Model

The Technology Acceptance Model (TAM) has become one of the most influential theoretical frameworks for explaining individuals' acceptance and use of information technology (Davis, 1989). The model proposes that users' behavioral intentions are primarily determined by two cognitive beliefs: Perceived Ease of Use (PEOU), referring to the degree to which using a technology is perceived as effortless, and Perceived Usefulness (PU), referring to the extent to which technology enhances users' performance (Davis, 1989; Davis et al., 1989).

Since its introduction, TAM has been extensively validated across various technological contexts, including e-commerce, mobile commerce, online banking, e-learning, healthcare information systems, and digital marketing (Venkatesh & Davis, 2000; Venkatesh et al., 2003; Venkatesh & Bala, 2008; Abdalla, 2024).

Owing to its simplicity and predictive capability, TAM remains one of the most widely adopted theories for explaining technology-mediated consumer behavior.

Despite its extensive application, conventional TAM generally assumes that users already possess sufficient capability to interact with digital technologies before evaluating whether such technologies are useful or easy to use. However, this assumption may no longer adequately reflect consumer behavior in the era of digital transformation, where consumers exhibit varying levels of digital competence (OECD, 2024). Consequently, incorporating Digital Literacy as a foundational capability preceding technology acceptance may provide a more comprehensive explanation of consumers' purchasing behavior in digital environments.

Digital Literacy

Digital Literacy refers to individuals' ability to access, understand, evaluate, create, and utilize digital information effectively through digital technologies (Gilster, 1997; Martin, 2006). More recent perspectives also emphasize that digital literacy encompasses critical thinking, information evaluation, digital communication, problem-solving, and responsible participation in digital environments (UNESCO, 2018; Tinmaz et al., 2022).

In digital markets, consumers increasingly rely on digital technologies to search for product information, compare alternatives, evaluate customer reviews, verify environmental claims, and complete purchasing transactions. Consequently, digital literacy represents not merely a technical skill but a strategic capability that enables consumers to navigate increasingly complex digital ecosystems (OECD, 2024).

Recent empirical studies have also begun to demonstrate that digital literacy positively influences technology acceptance by enhancing users' perceptions of ease of use, perceived usefulness, and behavioral intention toward digital technologies (Kabakus et al., 2023; Duan & Dong, 2025). Nevertheless, comparatively limited attention has been devoted to positioning Digital Literacy as an upstream antecedent within the Technology Acceptance Model, particularly in explaining Green Purchase Intention.

Accordingly, this study proposes the following hypothesis:

H1: Digital Literacy positively influences Perceived Ease of Use.

Perceived Usefulness and Attitude toward Green Products

Within the Technology Acceptance Model, Perceived Ease of Use is considered an important determinant of Perceived Usefulness. Technologies requiring less effort to operate allow users to accomplish their objectives more efficiently, thereby increasing their perception of usefulness (Davis, 1989; Venkatesh & Davis, 2000).

Perceived Usefulness subsequently shapes consumers' attitudes toward technology-assisted purchasing decisions. In the context of environmentally friendly products, consumers who perceive digital technologies as useful for obtaining reliable product information, comparing alternatives, and evaluating environmental

benefits are more likely to develop favorable attitudes toward green products.

Accordingly, the following hypotheses are proposed:

H2: Perceived Ease of Use positively influences Perceived Usefulness.

H3: Perceived Usefulness positively influences Attitude toward Green Products.

Green Purchase Intention and Perceived Risk

Green Purchase Intention refers to consumers' willingness to purchase products that minimize environmental impacts and contribute to sustainable consumption. Previous studies consistently indicate that consumers' attitudes constitute one of the strongest predictors of green purchasing behavior (Ajzen, 1991; Joshi & Rahman, 2021; Hoang et al., 2021).

However, favorable attitudes alone do not always result in purchasing behavior. Consumers frequently experience uncertainty regarding product quality, environmental claims, financial consequences, and transaction security. These uncertainties are commonly conceptualized as Perceived Risk, which may discourage consumers from purchasing environmentally friendly products despite holding positive attitudes toward them (Bauer, 1960; Jacoby & Kaplan, 1972).

Accordingly, the following hypotheses are proposed:

H4: Attitude toward Green Products positively influences Green Purchase Intention.

H5: Perceived Risk negatively influences Green Purchase Intention.

Proposed Research Model

Drawing upon the Technology Acceptance Model and the concept of Digital Literacy, this study proposes an extended research model in which Digital Literacy functions as an upstream antecedent of technology acceptance. The model assumes that consumers' capability to effectively engage with digital technologies precedes their perceptions of ease of use and usefulness, which subsequently shape attitudes toward environmentally friendly products and ultimately influence Green Purchase Intention. Perceived Risk is incorporated as an inhibiting factor that directly affects Green Purchase Intention. The proposed conceptual framework is illustrated in Figure 1.

RESEARCH METHODOLOGY

Research Design

This study employed a quantitative cross-sectional survey design to investigate the determinants of Green Purchase Intention by extending the Technology Acceptance Model (TAM). Specifically, the proposed model positions Digital Literacy as an upstream antecedent of technology acceptance, which subsequently influences consumers' intention to purchase environmentally friendly products. The research model consists of six latent constructs: Digital Literacy (DL), Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Perceived Risk (PR), Attitude toward Green Products (ATT), and Green Purchase Intention (PI). Partial Least Squares Structural Equation Modeling (PLS-SEM)

was employed because it is particularly appropriate for predictive research, theory extension, and the analysis of complex relationships among multiple latent constructs. (Hair et al., 2022; Hair et al., 2021).

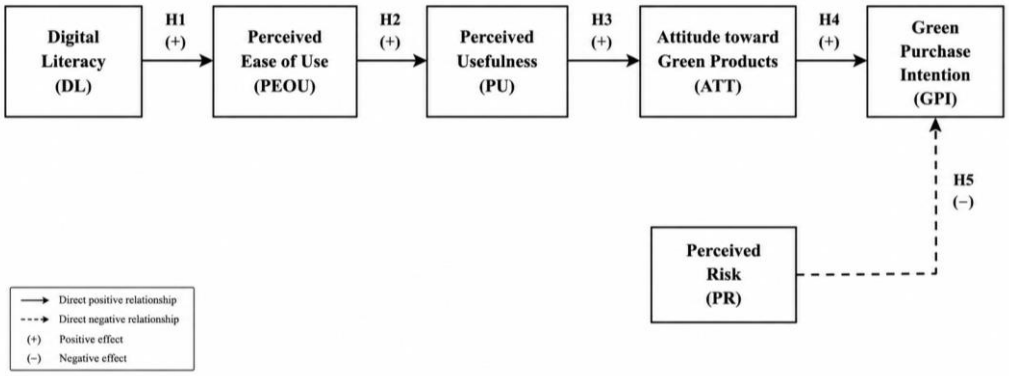


Figure 1. Conceptual Research Model

Sample and Data Collection

The study utilized a dataset comprising 300 Indonesian respondents collected through an online survey. Respondents represented diverse demographic backgrounds, including gender, age, education, occupation, income level, and regional distribution. A purposive sampling approach was employed to ensure that respondents possessed sufficient experience in accessing digital information related to environmentally friendly products. Participation in the survey was voluntary, and all responses were treated anonymously and confidentially.

Measurement of Constructs

The research model consisted of six reflective latent constructs. Digital Literacy (DL) measured respondents' capability to effectively access, evaluate, and utilize digital information. Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) were adapted from the Technology Acceptance Model to capture technology acceptance perceptions in the context of green product purchasing. Perceived Risk (PR) represented consumers' perceived uncertainty and potential losses associated with purchasing environmentally friendly products. Attitude toward Green Products (ATT) reflected consumers' overall positive or negative evaluation of environmentally friendly products, while Green Purchase Intention (PI) measured respondents' willingness to purchase such products in the future.

All measurement items were assessed using a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). All constructs were specified as reflective measurement models, following established recommendations for covariance relationships between latent constructs and their observed indicators. (Hair et al., 2022).

Data Analysis

Data analysis was performed using R version 4.4.2 with the cSEM package (version 0.6.1), a comprehensive framework for composite-based structural equation

modeling that supports model estimation, assessment, inference, prediction, and confirmatory composite analysis (Rademaker & Schuberth, 2020). The measurement model was evaluated through indicator reliability, internal consistency reliability (Cronbach's Alpha, Jöreskog's rho, and Dijkstra–Henseler's rhoA), convergent validity using Average Variance Extracted (AVE), and discriminant validity using the Heterotrait–Monotrait ratio (HTMT). The structural model was subsequently assessed using path coefficients, coefficient of determination (R^2), variance inflation factor (VIF), and standardized root mean square residual (SRMR), following current best-practice guidelines for PLS-SEM applications. (Hair et al., 2022; Henseler et al., 2015).

The statistical significance of the hypothesized relationships was examined using a non-parametric bootstrapping procedure with 5,000 resamples. This procedure generated standard errors, t-values, p-values, and 95% confidence intervals for evaluating the significance and robustness of the proposed structural relationships. Bootstrapping is widely recommended because it does not require assumptions of multivariate normality and provides stable estimates of sampling variability in PLS-SEM. (Hair et al., 2022).

The proposed model was intentionally designed to remain parsimonious by incorporating only six latent constructs. This parsimonious approach enables the study to focus on the fundamental mechanism through which Digital Literacy facilitates technology acceptance and subsequently influences Green Purchase Intention while accounting for the inhibiting effect of Perceived Risk.

RESULTS AND DISCUSSION

Respondent Profile

A total of 300 valid responses were included in the analysis. The respondents represented diverse demographic characteristics in terms of gender, age, educational background, occupation, income level, and geographical region across Indonesia. The diversity of respondents provides an adequate representation of consumers who have experience accessing digital information related to environmentally friendly products.

Measurement Model Assessment

The measurement model was evaluated by examining internal consistency reliability, convergent validity, and discriminant validity. Internal consistency reliability was assessed using Cronbach's Alpha, Jöreskog's rho, and Dijkstra–Henseler's rho_A. All constructs exceeded the recommended threshold of 0.70, indicating satisfactory internal consistency.

Convergent validity was assessed using the Average Variance Extracted (AVE). Digital Literacy and Perceived Risk achieved AVE values above the recommended threshold of 0.50, while Perceived Ease of Use, Perceived Usefulness, Attitude, and Purchase Intention exhibited relatively lower AVE values. An additional purification procedure was performed by removing the lowest-loading indicator; however, the results indicated a reduction in construct reliability and convergent validity. Consequently, the original measurement model was retained because it demonstrated

better overall measurement quality and preserved the theoretical integrity of the constructs.

Discriminant validity was evaluated using the Heterotrait–Monotrait ratio (HTMT). All HTMT values were below the recommended threshold of 0.85, confirming adequate discriminant validity among the six latent constructs.

The overall model fit was considered acceptable, with a Standardized Root Mean Square Residual (SRMR) value of 0.084, indicating that the proposed model adequately represented the observed data.

Structural Model Assessment

Following the satisfactory evaluation of the measurement model, the structural model was assessed by examining the coefficient of determination (R^2), path coefficients, and multicollinearity. The coefficient of determination (R^2) indicates the predictive power of the proposed research model.

The results show that Digital Literacy explained 36.0% of the variance in Perceived Ease of Use ($R^2 = 0.360$). Subsequently, Perceived Ease of Use explained 32.5% of the variance in Perceived Usefulness ($R^2 = 0.325$), while Perceived Usefulness accounted for 36.7% of the variance in Attitude toward Green Products ($R^2 = 0.367$). Most importantly, the combined effects of Attitude and Perceived Risk explained 73.5% of the variance in Green Purchase Intention ($R^2 = 0.735$). This result indicates that the proposed model possesses substantial explanatory power in predicting consumers' intention to purchase environmentally friendly products.

Potential multicollinearity among the predictor constructs was evaluated using the Variance Inflation Factor (VIF). All VIF values were substantially below the recommended threshold, indicating that multicollinearity was not a concern and that the estimated structural relationships were statistically stable.

Overall, these findings demonstrate that the proposed extension of the Technology Acceptance Model provides a robust framework for explaining Green Purchase Intention through the sequential effects of Digital Literacy, Perceived Ease of Use, Perceived Usefulness, Attitude, and Perceived Risk.

Hypothesis Testing

The proposed hypotheses were evaluated using the bootstrapping procedure with 5,000 resamples. Table 3 presents the estimated path coefficients, standard errors, t-values, p-values, and confidence intervals for all hypothesized relationships.

The results indicate that all five hypotheses were supported.

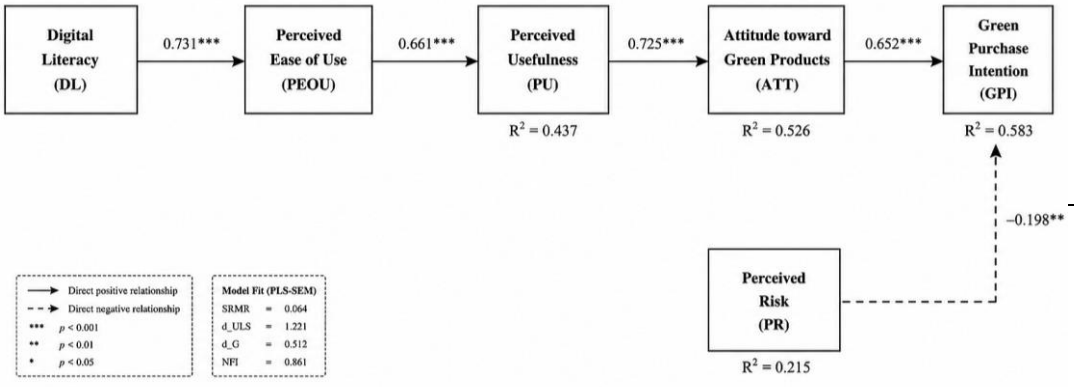


Figure 2. Structural Model Research

Digital Literacy exerted a significant positive effect on Perceived Ease of Use (β = 0.600, t = 13.622, p < 0.001), supporting H1. This finding indicates that individuals with higher levels of digital literacy tend to perceive digital technologies as easier to use when searching for information related to environmentally friendly products.

Perceived Ease of Use significantly influenced Perceived Usefulness (β = 0.570, t = 11.308, p < 0.001), confirming H2. This result suggests that consumers who perceive digital platforms as easy to use are more likely to recognize their usefulness in facilitating green purchasing decisions.

Perceived Usefulness also demonstrated a significant positive influence on Attitude toward Green Products (β = 0.606, t = 12.023, p < 0.001), supporting H3. The result indicates that greater perceived usefulness of digital technologies contributes to more favorable consumer attitudes toward environmentally friendly products.

As hypothesized, Attitude exerted the strongest positive influence on Green Purchase Intention (β = 0.734, t = 13.452, p < 0.001), providing strong support for H4. This finding highlights that consumers with more positive attitudes toward environmentally friendly products are considerably more likely to express intentions to purchase such products.

Finally, Perceived Risk showed a significant negative effect on Green Purchase Intention (β = −0.221, t = 3.190, p = 0.001), supporting H5. This result confirms that consumers' perceptions of uncertainty and potential risk remain important barriers to purchasing environmentally friendly products, despite positive evaluations of those products.

Table 1. Measurement Model Assessment

Construct	Cronbach's Alpha	rhoA	Composite Reliability (rhoC)	AVE
Digital Literacy (DL)	0.928	0.929	0.929	0.720
Perceived Ease of Use (PEOU)	0.822	0.823	0.823	0.480

Construct	Cronbach's Alpha	rhoA	Composite Reliability (rhoC)	AVE
Perceived Usefulness (PU)	0.746	0.750	0.750	0.369
Perceived Risk (PR)	0.867	0.868	0.868	0.564
Attitude toward Green Products (ATT)	0.776	0.776	0.776	0.409
Green Purchase Intention (PI)	0.723	0.733	0.733	0.347

Note: Cronbach's Alpha, rhoA, and Composite Reliability values above 0.70 indicate satisfactory internal consistency. Average Variance Extracted (AVE) values above 0.50 indicate adequate convergent validity.
Source: Author's analysis

Table 2. Structural Model Assessment

Endogenous Construct	R^2	Interpretation
Perceived Ease of Use (PEOU)	0.360	Moderate
Perceived Usefulness (PU)	0.325	Moderate
Attitude toward Green Products (ATT)	0.367	Moderate
Green Purchase Intention (PI)	**0.735**	Substantial

Index	Value	Recommended Threshold	Assessment
SRMR	**0.084**	< 0.10	Acceptable

Note: The coefficient of determination (R^2) indicates the predictive power of the structural model. Following common PLS-SEM guidelines, R^2 values around 0.25, 0.50, and 0.75 may be interpreted as weak, moderate, and substantial, respectively. An SRMR value below 0.10 indicates an acceptable model fit.
Source: Author's analysis

Table 3. Hypothesis Testing Results

Hypothesis	Structural Path	β	SE	t-value	p-value	Decision
H1	Digital Literacy → Perceived Ease of Use	0.600	0.044	13.622	<0.001	Supported
H2	Perceived Ease of Use → Perceived Usefulness	0.570	0.050	11.308	<0.001	Supported
H3	Perceived Usefulness → Attitude toward Green Products	0.606	0.050	12.023	<0.001	Supported
H4	Attitude toward Green Products → Green Purchase Intention	0.734	0.055	13.452	<0.001	Supported
H5	Perceived Risk → Green Purchase Intention	−0.221	0.069	3.190	0.001	Supported

Note: β = standardized path coefficient; SE = standard error
Source: Author's analysis

DISCUSSION

The present study extends the Technology Acceptance Model (TAM) by positioning Digital Literacy as an upstream antecedent of technology acceptance in the context of environmentally friendly product purchasing. Unlike the conventional TAM, which begins with consumers' perceptions of ease of use and usefulness, the proposed model argues that consumers must first

possess sufficient Digital Literacy to effectively interact with digital technologies before technology acceptance can occur. This perspective complements the original Technology Acceptance Model by recognizing that technology acceptance in digitally mediated environments is influenced not only by cognitive perceptions but also by users' underlying digital capabilities (Davis, 1989; Venkatesh & Davis, 2000; OECD, 2024).

The empirical findings strongly support this proposition. Digital Literacy exhibited a significant positive effect on Perceived Ease of Use, indicating that consumers with higher levels of digital competence perceive digital platforms as easier to navigate when searching for information about environmentally friendly products. This finding is consistent with recent studies reporting that digital literacy enhances users' confidence, technology acceptance, and digital engagement across various online environments. However, unlike many previous studies that treated Digital Literacy as an independent predictor, the present study conceptualizes it as a foundational capability that precedes the cognitive mechanisms described by TAM, thereby providing a more integrated explanation of technology-enabled consumer behavior (Lăzăroiu et al., 2021; UNESCO, 2018).

Consistent with the original Technology Acceptance Model, Perceived Ease of Use significantly enhanced Perceived Usefulness, while Perceived Usefulness positively influenced consumers' attitudes toward green products. These findings reinforce the central propositions of TAM and are aligned with extensive empirical evidence demonstrating that technologies perceived as easy to use are also perceived as more useful, ultimately fostering more favorable user attitudes (Davis, 1989; Venkatesh et al., 2003). In the context of environmentally friendly products, digital technologies appear to facilitate information acquisition and product evaluation, thereby strengthening consumers' confidence in green purchasing decisions.

Among all structural relationships, Attitude demonstrated the strongest positive influence on Green Purchase Intention. This finding supports previous studies on green consumer behavior suggesting that consumers' evaluations of environmentally friendly products remain the most immediate predictor of purchasing intention (Ajzen, 1991; Bilhaj et al., 2026). Although digital technologies increasingly mediate purchasing decisions, positive attitudes continue to play a central role in transforming environmental awareness into behavioral intention.

Conversely, Perceived Risk exerted a significant negative influence on Green Purchase Intention. This finding confirms earlier consumer behavior research indicating that uncertainty regarding product quality, environmental claims, financial consequences, or transaction security may discourage purchasing decisions (Bauer, 1960; Jacoby & Kaplan, 1972). The result further suggests that improving digital platforms alone may be insufficient to encourage green purchasing unless

organizations simultaneously reduce consumers' perceived risks through transparent information, credible certifications, and trustworthy digital transactions.

Overall, the findings indicate that Digital Literacy and Technology Acceptance should be viewed as complementary rather than competing explanations of consumer behavior in digital environments. Digital Literacy provides the capability to engage effectively with digital technologies, whereas the Technology Acceptance Model explains how this capability is translated into positive perceptions, favorable attitudes, and ultimately purchasing intentions. This integrated perspective offers a more comprehensive understanding of Green Purchase Intention in digitally mediated markets and extends the applicability of TAM to contemporary digital consumer behavior.

From a practical perspective, the findings suggest that organizations promoting environmentally friendly products should not focus solely on improving digital platforms. Equal attention should be devoted to strengthening consumers' digital literacy through educational initiatives, accessible digital information, and user-friendly interfaces while simultaneously reducing perceived risk through transparent communication, reliable environmental certifications, secure payment systems, and authentic customer reviews. Such initiatives may enhance consumers' confidence and ultimately strengthen Green Purchase Intention.

The findings of this study suggest an important refinement to technology acceptance research in the context of digital transformation. Rather than replacing the Technology Acceptance Model, this study demonstrates that Digital Literacy serves as a foundational capability preceding the cognitive processes described by TAM. Consumers are unlikely to develop favorable perceptions of ease of use or usefulness unless they possess the necessary digital competencies to access, interpret, and utilize digital information effectively. In this sense, Digital Literacy functions as an enabling capability that activates the technology acceptance process. Integrating Digital Literacy as an upstream antecedent therefore provides a more comprehensive explanation of Green Purchase Intention in digitally mediated markets while preserving the theoretical logic of the Technology Acceptance Model. This capability-driven perspective contributes to the growing literature on technology acceptance, digital transformation, and sustainable consumer behavior.

CONCLUSION

This study examined Green Purchase Intention by extending the Technology Acceptance Model (TAM) through the incorporation of Digital Literacy as an upstream antecedent of technology acceptance. The empirical findings demonstrate that Digital Literacy positively influences Perceived Ease of Use, which subsequently enhances Perceived Usefulness and strengthens consumers' Attitude toward environmentally friendly products. In turn, Attitude emerged as the strongest predictor of Green Purchase

Intention, while Perceived Risk significantly reduced consumers' intention to purchase environmentally friendly products. Overall, the proposed research model explained 73.5% of the variance in Green Purchase Intention, indicating substantial predictive power.

From a theoretical perspective, this study contributes to the Technology Acceptance Model by demonstrating that technology acceptance in digitally mediated markets is preceded by consumers' digital capability. Rather than replacing TAM, the findings suggest that Digital Literacy functions as a foundational capability that enables consumers to develop perceptions of ease of use and usefulness before forming favorable attitudes and purchase intentions. This capability-oriented perspective provides a meaningful refinement to the Technology Acceptance Model and extends its applicability to the context of sustainable consumer behavior.

The findings also offer practical implications for organizations, digital marketers, and policy makers promoting environmentally friendly products. Efforts to increase green purchasing should extend beyond improving digital platforms alone. Organizations should also invest in enhancing consumers' digital literacy through educational initiatives, transparent communication, accessible digital content, and user-friendly interfaces. At the same time, reducing consumers' perceived risk through credible product information, trustworthy certifications, secure digital transactions, and authentic customer reviews may further strengthen consumers' confidence and encourage green purchasing decisions.

This study is subject to several limitations. First, the findings were derived from cross-sectional survey data collected in Indonesia, which may limit their generalizability to other cultural and institutional contexts. Second, although the proposed model demonstrated strong explanatory power, several constructs exhibited Average Variance Extracted (AVE) values below the recommended threshold, suggesting that future studies should further refine the measurement instruments while preserving their theoretical meaning. Finally, future research may extend the proposed framework by incorporating additional psychological, technological, or contextual variables, employing longitudinal research designs, or conducting cross-country comparisons to enhance the generalizability and explanatory power of the extended Technology Acceptance Model.

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