

The Influence of App Visual Design and Perceived Product Freshness on Repurchase Intention in E-commerce Applications

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Keywords

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food freshness,
customer trust,
customer satisfaction,
repurchase intention

Abstract

The acceleration of the online food retail (e-grocery) industry in Indonesia faces challenges regarding low customer retention, driven by consumer skepticism concerning physical product quality and digital security. This study aims to analyze the impact of App Visual Design and Perceived Product Freshness on consumer Repurchase Intention by examining the dual mediating roles of Customer Trust and Customer Satisfaction. Employing a quantitative approach based on the Technology Acceptance Model (TAM), primary data were collected via an online cross-sectional survey of 210 urban respondents who had purchased fresh groceries online within the past month. Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results indicate that, out of seven direct structural paths, four hypotheses were supported while three were rejected. App Visual Design proved to be the dominant antecedent in building Customer Trust, whereas Perceived Product Freshness was the absolute determinant of Customer Satisfaction. Furthermore, Customer Satisfaction emerged as the single strongest factor directly influencing Repurchase Intention. Analysis of indirect effects revealed a full mediation pattern, demonstrating that digital interface aesthetics cannot trigger repurchase behavior without being channeled through consumer trust and emotional satisfaction. This study offers practical insights for e-grocery managers, highlighting the need to align platform visual quality with cold-chain reliability to ensure long-term profitability.

INTRODUCTION

The post-pandemic acceleration of digital transformation has brought about significant structural changes to Indonesia's economic ecosystem. As a key pillar of the digital economy, the e-commerce industry has experienced massive growth, positioning Indonesia as the largest e-commerce market in Southeast Asia and accounting for over 52% of the total business volume within ASEAN (International Trade Administration, 2023). Recent market research indicates that Indonesia's e-commerce market is projected to grow from a transaction value of USD 90.35 billion in 2025 to USD 104.21 billion in 2026, maintaining a Compound Annual Growth Rate (CAGR) of 15.32% in the coming years (Mordor Intelligence, 2026). High internet penetration connecting over 220 million people, or 80% of the national population combined with the fact that 95% of online activity occurs via smartphones, serves as the primary driver behind the widespread adoption of online shopping among urban consumers (DataReportal, 2024; Magpie IQ, 2026). This trend has fostered the integration of e-commerce into the daily consumption habits of people across various regions (Magpie IQ, 2026).

Amidst the massive online shopping ecosystem, the e-grocery and fresh food e-commerce sub-sector has experienced the most aggressive growth acceleration (Mordor Intelligence, 2026). The urban population's need for time efficiency is driving a shift in how essential goods are purchased moving away from traditional markets toward the use of digital app-based platforms (Ken Research, 2025). Quantitatively, Indonesia's food e-commerce sector has generated significant revenue, reaching USD 7.616 billion, reflecting an annual growth rate of between 20% and 25% (ECDB, 2025). This positive trend is projected to continue its upward trajectory, with annual growth accelerating to between 25% and 30% (ECDB, 2025). Industry data also indicates that the food and beverage category is growing with the strongest momentum, as the average urban consumer in Indonesia allocates approximately IDR 1.5 million in monthly spending specifically for purchasing essential goods via online platforms (MarkNtel Advisors, 2024; Research and Markets, 2025).

However, in practical implementation, the online grocery retail industry in Indonesia faces challenges stemming from the unique nature of fresh food commodities specifically their short shelf lives which makes them vulnerable to spoilage during logistical operations (Anisa & Purwanegara, 2024). Furthermore, the e-grocery industry encounters behavioral barriers; not all segments of Indonesian society can immediately adopt this digital system, as traditional consumers often rely on a strong sensory experience such as touching textures, smelling aromas, and personally verifying the freshness of staple foods before completing a transaction (Péneau et al., 2006). The e-grocery business model, which relies on multi-brand digital platforms rather than direct product ownership, leads to significant variations in delivery quality standards; if not managed effectively, this inconsistency risks causing customer dissatisfaction and eroding loyalty (Daya et al., 2022).

To overcome these penetration barriers, the development of e-grocery technology in Indonesia is shifting toward serving as a bridge for supply chain efficiency by optimizing two key stimuli: a digital stimulus specifically, reliable app visual design and a physical stimulus namely, the assurance of perceived product freshness (Ferreira et al., 2025). Through a professionally designed, aesthetic, and interactive app interface, companies can create a strong impression of service quality, capture user attention, and communicate verified reviews to

eliminate customers' functional doubts (Li & Peng, 2021). When this visual appeal is aligned with the consistent delivery of fresh food products, a solid foundation of customer trust and post-purchase satisfaction is established (Ferreira et al.). Ultimately, fostering a sense of security against cyber-fraud risks and consistently meeting product quality expectations serve as primary psychological drivers that reduce the likelihood of consumers switching to competitor platforms while consistently fostering long-term repurchase intentions (Zahira & Kurniawati, 2022).

Most prior studies on customer retention tend to examine the technological aspects of the application and the physical aspects of the product separately. Previous researchers have rarely integrated the stimuli of app visual design and perceived product freshness into a single structural model. Consequently, there is a research gap regarding how digital and physical elements interact to influence loyalty. This study makes a theoretical contribution by addressing this gap through the simultaneous examination of a dual mediation role. This integration strengthens the application of Expectation-Confirmation Theory within a new digital ecosystem. The study utilizes the Technology Acceptance Model (TAM) as a theoretical foundation to reinforce the proposed structural model. Based on this background, a study titled "The Influence of App Visual Design and Perceived Product Freshness on Repurchase Intention in E-Commerce Applications" was conducted.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The Technology Acceptance Model (TAM) is a consumer behavior framework that explains the process of user acceptance regarding new technological systems (Davis, 1989). This theory posits that consumer behavioral intention is determined by two interacting psychological perceptions (Davis, 1989). The first factor is perceived usefulness, which measures the user's belief regarding the efficiency of the technology's added value (Davis, 1989). The second factor is perceived ease of use, which assesses the practicality of the system's operation (Davis, 1989). Within the e-commerce ecosystem, these two pillars of TAM have consistently proven capable of fostering positive consumer attitudes. Such positive attitudes underpin the consumer's decision to engage in sustained repeat purchasing behavior (Shaker et al., 2023).

A key attribute influencing consumers' assessment of an application's ease of use is its visual design. Visual design refers to the arrangement of aesthetic elements within the digital platform's interface as experienced during the consumer's shopping journey (Lima et al., 2025). This visual structure encompasses the configuration of graphic elements, typography, color harmony, and the quality of product photo galleries (Gupta & Duggal, 2021). Applications featuring high-quality, modern visuals can effectively enhance users' perceptions regarding the ease of navigating the shopping experience (Alalwan, 2020). Effective menu visualization serves as a crucial communication tool for reducing the cognitive load associated with information search (Vermeir & Roose, 2020). A significant advantage of this variable is its ability to boost user engagement and create a strong impression of service quality (Kapoor & Vij, 2018). However, a drawback lies in the high costs associated with developing interface aesthetics and implementing periodic system updates (Patsiotis et al., 2020).

Beyond the ease of digital operations, a primary utility factor in the online grocery shopping category is measured by the perception of product freshness. Perceived product

freshness is a consumer's subjective evaluation regarding the physical quality and functional suitability of food commodities purchased online (Ferreira et al., 2025). This freshness attribute is measured across two key consumer dimensions: sensory and non-sensory attributes (Péneau et al., 2006). Sensory attributes involve physical assessments of appearance such as color, aroma, and texture while non-sensory attributes include the harvest date (Daillant-Spinnler et al., 1996; Péneau et al., 2009). Consistent delivery of physical product freshness is a key determinant of the utility value of e-grocery platforms (Ferreira et al., 2025). Its advantage lies in the ability to enhance the product's functional value and build a competitive advantage for the company (Esteves and Aníbal, 2021). However, a drawback is that the inability to perform sensory verification prior to delivery often triggers consumer hesitation regarding the purchase (Morales et al., 2024).

An internal consumer driver influenced by visual elements and physical freshness is customer trust. Customer trust is defined as the level of confidence and willingness of a consumer to rely on the service competence of an e-commerce platform (Lima et al., 2025). This trust is shaped by several fundamental psychological dimensions, including integrity, benevolence, competence, and system reliability (Maia et al., 2022). Within the digital commerce ecosystem, trust plays a role in minimizing the perceived risk associated with financial transactions (Singh and Sinha, 2020). This variable has proven successful in acting as a mediator that transforms technological stimuli into behavioral adoption (Lima et al., 2025). Its primary advantages are the ability to reduce transaction costs and eliminate consumer anxiety regarding digital fraud (Maia et al., 2022). Unfortunately, the downside is that a reputation for trustworthiness is highly vulnerable to being destroyed by a single data security system failure (Kang and Namkung, 2019).

The next psychological variable serving as a direct determinant of successful technology system adoption is customer satisfaction. Customer satisfaction is an emotional response specifically a sense of pleasure arising from a consumer's comparison of initial expectations against actual performance (Agag et al., 2024). Dimensions of satisfaction include service quality, price fairness, delivery systems, and staff competence (Liu et al., 2023). Customer satisfaction serves as a key indicator for measuring the market penetration success of an online shopping platform (González et al., 2021). Satisfied consumers tend to perceive the transaction value as fairer (Zihayat et al., 2021). A strength of this variable is its ability to consistently stimulate free promotion through positive word-of-mouth recommendations (Liu et al., 2023). However, a weakness is that customer satisfaction is highly dynamic and susceptible to change based on competitors' service trends (Zihayat et al., 2021).

The ultimate outcome of the technology acceptance model developed in this study is the variable of repurchase intention. Repurchase intention represents the level of commitment or behavioral willingness of consumers to make future purchases (Dash et al., 2023). This intention is measured through dimensions such as the desire to purchase similar products, the willingness to recommend the platform, and reluctance to switch brands (Lin & Lekhawipat, 2014). In the competitive e-commerce landscape, customer retention costs are far more efficient than the costs of acquiring new consumers (Ferreira et al., 2025). Increased repurchase intention directly determines a company's cash flow stability and future profitability (Dash et al., 2023). Its strength lies in being a prime predictor of actual market share and future consumer loyalty

(Dash et al., 2023). Conversely, a limitation is that behavioral intention does not necessarily translate immediately into actual purchasing action (Dash et al., 2023)..

The first causal pathway in this study examines the link between the visual appeal of the interface and customer trust. The quality of an application's interface has been empirically shown to shape consumer perceptions of store reliability (Su et al., 2022). Well-managed visual aesthetic stimuli are effective in bolstering the credibility of shopping platforms (Hlee et al., 2019). Furthermore, professional visual elements consistently foster customer confidence in conducting transactions (Lima et al., 2025). Strategic graphic layout and color harmony have been proven to eliminate functional doubts among users (Alalwan, 2020). Based on these empirical findings, the study's first hypothesis is formulated: App Visual Design has a positive effect on Customer Trust (H1).

The second causal pathway in the structural model examines the impact of the application's visual aesthetics on customer satisfaction. The visual appeal of a shopping application significantly contributes to emotional satisfaction during the information-seeking process (Vermeir & Roose, 2020). A modern application interface design positively enhances the comfort of users' digital interactions (Alalwan, 2020). Previous research confirms that the use of aesthetic visual elements significantly contributes to increased customer satisfaction (Cho et al., 2019). Dynamic graphic characteristics effectively meet consumer expectations for an enjoyable online shopping experience (Lima et al., 2025). Based on these empirical findings, the study's second hypothesis is formulated: App Visual Design has a positive effect on Customer Satisfaction (H2).

The third causal path in the structural model examines the direct influence of product freshness utility on customer satisfaction. The freshness quality of delivered food commodities has been proven to be a primary determinant of shopping satisfaction (Ferreira et al., 2025). Consistently meeting the sensory attributes of fresh products has been shown to effectively satisfy customer consumption requirements (Péneau et al., 2009). Previous analyses confirm that the physical quality conformity of fresh food items successfully enhances consumer satisfaction (Zheng et al., 2020). Efforts to consistently maintain fresh food product freshness are positively correlated with post-purchase satisfaction levels (Zhang et al., 2024). Based on these empirical findings, the study's third hypothesis is formulated: Perceived Product Freshness has a positive effect on Customer Satisfaction (H3).

The fourth causal path in the structural model examines the influence of the functional value of physical product freshness on customer trust. Aligning the physical characteristics of food products with their descriptions strengthens the foundation of buyer confidence (Monoarfa et al., 2024). Consistent delivery of fresh food products significantly minimizes customer anxiety regarding functional risks (Morales et al., 2024). Well-maintained actual product quality contributes positively to enhancing the company's reputation for reliability (Ferreira et al., 2025). Ensuring the physical freshness of commodities optimizes consumer trust in the store's integrity (Zhang et al., 2024). Based on these empirical findings, the study's fourth hypothesis is formulated: Perceived Product Freshness has a positive effect on Customer Trust (H4).

The fifth causal path in the structural model examines the psychological link between trust and customer satisfaction. Consumer trust in the capabilities of shopping platforms has

been shown to drive perceptions of far fairer transaction value (Miao et al., 2022). High levels of confidence in online adoption systems are positively correlated with customer satisfaction (Ferreira et al., 2025). This psychological sense of security consistently enhances consumers' post-purchase emotional satisfaction (Liu et al., 2023). Customer trust is a fundamental prerequisite for fostering sustained shopping satisfaction (Lima et al., 2025). Based on the insights from these empirical studies, the fifth hypothesis of this research is formulated: Customer Trust has a positive effect on Customer Satisfaction (H5).

The sixth causal path in the structural model examines the influence of customer trust on repurchase intention. Customer trust has been shown to act as a primary driver of long-term repurchase commitment (Escobar-Rodríguez & Bonsón-Fernández, 2017). A sense of security regarding the privacy of transaction data has been proven to positively foster online shopping retention (Kang & Namkung, 2019). Empirical evaluations indicate that strengthening customer trust can drive consumers' intentions for continued adoption (Miao et al., 2022). Confidence in the perceived utility and reputation of a shopping platform has been shown to successfully lead consumers to engage in repeat transactions (Lima et al., 2025). Based on these empirical findings, the sixth hypothesis of this study is formulated: Customer Trust has a positive effect on Repurchase Intention (H6).

The final causal path in the structural model examines the influence of satisfaction with adoption on consumer repurchase intention. Accumulated past shopping satisfaction has been proven to be the most crucial factor in maintaining consumer loyalty (Ferreira et al., 2025). Consumers satisfied with the fulfillment of expectations regarding system ease-of-use demonstrate a very high behavioral intention to repurchase (Shin et al., 2013). A pleasant transaction experience has been shown to significantly drive consumer commitment to reuse the platform (Tsao, 2013). Customer satisfaction consistently triggers the desire to repurchase food products online (Liu et al., 2023). Based on these empirical findings, the seventh hypothesis of this study is formulated: Customer Satisfaction has a positive effect on Repurchase Intention (H7).

RESEARCH METHODS

The research design aims to provide a structured framework for the entire process, spanning from data collection to statistical analysis. The primary objective of this structural analysis is to test the hypotheses formulated in the preceding chapter. A cross-sectional approach is employed for field data collection, meaning data is gathered from respondents

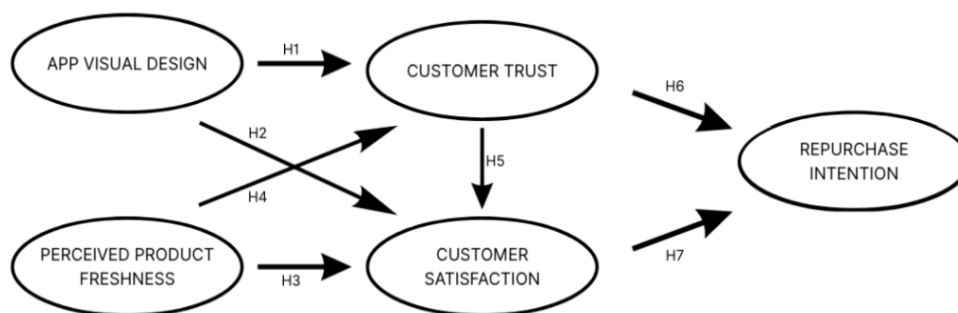


Figure 1. Framework
Source: Processed data (2026)

during a single observation period. The unit of analysis and thus the primary subject of the study is the individual level, specifically capturing the independent personal responses of consumers. The questionnaire administration takes place in a "non-contrived setting," as consumers complete it naturally without laboratory manipulation.

The target population consists of all consumers in Indonesia who have experience purchasing groceries online (e-grocery). Given that the exact size of the actual population is unknown, a non-probability sampling approach is used to select sample elements. Specifically, purposive sampling is employed based on predetermined inclusion criteria. The primary criterion for respondents is having purchased fresh food products online at least once within the last month. Additionally, consumers must have active experience using the relevant e-commerce applications for these orders. Structural Equation Modeling (SEM), facilitated by Amos software, is the analytical method used in this study. The minimum sample size is set at 250 respondents, in accordance with Amos model requirements.

Primary data collection is conducted by distributing a structured questionnaire digitally via Google Forms. This online method ensures transparency and documentation of the respondents' data entry records. The questionnaire utilizes closed-ended questions, with each variable indicator measured using a five-point Likert scale. The scale ranges from a value of one ("strongly disagree") to five ("strongly agree"). Demographic data collected includes gender, age group, monthly shopping frequency, and estimated e-grocery transaction expenditure. All operational indicators for the variables included in the questionnaire were adapted from reliable literature on digital marketing and fresh food commodities.

The research model tested in this study simultaneously integrates stimuli related to digital technology aspects and physical product quality aspects. The exogenous independent variables consist of App Visual Design (X1) and Perceived Product Freshness (X2). The model also incorporates two simultaneous endogenous mediating variables: Customer Trust (M1) and Customer Satisfaction (M2). The ultimate outcome of these structural causal relationships is the primary endogenous dependent variable: Repurchase Intention (Y). The mathematical structural path equation within this model is designed to examine how the indirect contribution of digital platform quality elements drives commitment to repurchase.

The quantitative data analysis technique applied to process the raw questionnaire data is Partial Least Squares Structural Equation Modeling (PLS-SEM). The evaluation of this PLS-SEM statistical model is conducted in two main stages: outer model analysis and inner model analysis. The first stage the outer model aims to assess convergent validity using factor loading values and Average Variance Extracted (AVE) values. Instrument reliability consistency is evaluated based on Cronbach's alpha and Composite Reliability (CR) values, both of which are required to exceed 0.7. The second stage the inner model evaluates the coefficient of determination (R^2), the level of predictive relevance (Q^2), and the significance of all hypothesized paths using a bootstrapping procedure.

RESULTS AND DISCUSSION

Respondent Profile

A descriptive analysis of respondent profiles was conducted to map the demographic characteristics of the 210 individuals participating in this study. All respondents (100%) had

experience purchasing fresh food online via e-commerce applications within the past month, thereby meeting the purposive sampling criteria. Details regarding respondent characteristics are presented in Table 1.

Table 1. Respondent Characteristic Profile (N = 210)

Demographic Characteristics	Category	Frequency	Percentage (%)
Gender	Man	66	31.4%
	Women	144	68.6%
Age	17 - 22 years old	25	11.9%
	23 - 28 years old	136	64.8%
	29 - 33 years old	41	19.5%
	34 - 39 years old	6	2.9%
	> 40 years old	2	1.0%
	Senior High School / Equivalent	25	11.9%
	Diploma (D1/D2/D3/D4)	20	9.5%
Last education	Bachelor degree	156	74.3%
	Postgraduate (Master's/Doctoral)	9	4.3%
	University Students / Students	25	11.9%
	ASN / BUMN	25	11.9%
Primary Job	Private sector employee	110	52.4%
	Entrepreneur / Self-employed	39	18.6%
	Housewife	8	3.8%
	Other	3	1.4%
Monthly Shopping Frequency	Rarely (1–2 times per month)	75	35.7%
	Quite often (3–4 times a month)	98	46.7%
	Frequently (5–6 times per month)	30	14.3%
	Very frequently (> 6 times per month)	7	3.3%
Monthly Expenses	< Rp 400.000	62	29.5%
	Rp 400.001 - Rp 800.000	100	47.6%
	Rp 800.001 - Rp 1.200.000	31	14.8%
	> Rp 1.200.001	17	8.1%

Source: data processed by the author (2026)

Based on Table 1, the majority of respondents were female (68.6%), reflecting the dominant role women play in managing household food-related matters. The respondent pool was dominated by the productive young adult age group of 23–28 years (64.8%), followed by the 29–33 age group (19.5%). Regarding educational attainment, a Bachelor's degree (S1) was the predominant qualification (74.3%), aligning with the respondents' primary occupations, which were mainly private-sector employment (52.4%) and self-employment (18.6%). From a shopping behavior perspective, most respondents shopped with "fairly frequent" intensity specifically 3–4 times a month (46.7%) with monthly e-grocery expenditure concentrated in the IDR 400,001 to IDR 800,000 range (47.6%).

Regarding the most frequently used e-commerce/e-grocery platforms, data indicates that Shopee/Shopee Supermarket held the top position, used exclusively by 75 respondents (35.7%), followed by GoMart/GrabMart (21 respondents, 10.0%) and the quick-commerce platform Astro (19 respondents, 9.0%). The remainder of the respondents utilized a combination of multiple platforms (e.g., Shopee & GoMart at 7.1%, Shopee & Tokopedia at 5.7%). This indicates the dominance of major marketplaces that provide integrated online supermarket ecosystems to meet the food-related needs of urban consumers.

Validity and Reliability Testing of the Instrument

The measurement model (outer model) was evaluated using Confirmatory Factor Analysis (CFA) to ensure that the quality of the research instrument met empirical standards for validity and reliability. Validity was assessed based on Standardized Regression Weights (Factor Loading) values, while reliability was measured using Cronbach's Alpha values. A summary of the test results is presented in Table 2.

The analysis results in Table 2 indicate that all research indicators possess factor loading values exceeding the minimum threshold of 0.50. The lowest value was observed for indicator AVD4 (0.565), while the highest was achieved by CS3 (0.895), confirming adequate convergent validity for the measurement model. Furthermore, reliability testing via Cronbach's Alpha values revealed that all constructs exceeded the standard criterion of 0.70. Cronbach's Alpha values ranged from 0.818 (Repurchase Intention) to 0.889 (Customer Satisfaction), indicating a very high level of internal consistency for the instrument.

Based on the descriptive statistical analysis of indicator mean values, all research variables recorded very high scores (ranging from 4.25 to 4.62 on a 5-point scale). This reflects highly positive consumer perceptions regarding the quality of the application interface and the actual freshness of the food products received, as well as robust satisfaction and repurchase loyalty within the e-grocery digital ecosystem.

Model Fit Test (Goodness of Fit)

An evaluation of the structural model's accuracy was conducted to ensure that the developed theoretical model fits the empirical data. The results of the Goodness of Fit (GoF) test using Amos are presented in Table 3.

Table 2. Results of Validity and Reliability Tests for Research Variables

Latent Variable	Indicator	Factor Loading	Mean Indikator	Cronbach's Alpha
App Visual Design (AVD) Mean Global: 4.3401	AVD1	0.605	4.5286	0.852
	AVD2	0.624	4.3048	
	AVD3	0.704	4.3238	
	AVD4	0.565	4.6238	
	AVD5	0.632	4.3333	
	AVD6	0.727	4.4857	
	AVD7	0.880	4.4381	
Perceived Product Freshness (PPF) Mean Global: 4.3238	PPF1	0.732	4.3667	0.843
	PPF2	0.793	4.2571	
	PPF3	0.888	4.3476	
Customer Trust (CT) Mean Global: 4.4345	CT1	0.789	4.4762	0.884
	CT2	0.788	4.4143	
	CT3	0.850	4.4000	
	CT4	0.816	4.4476	
Customer Satisfaction (CS) Mean Global: 4.4397	CS1	0.786	4.4190	0.889
	CS2	0.855	4.4190	
	CS3	0.895	4.4810	
Repurchase Intention (RI) Mean Global: 4.4222	RI1	0.774	4.4190	0.818
	RI2	0.816	4.4476	
	RI3	0.746	4.4000	

source: Amos output (2026)

Based on Table 3, the majority of the primary model fit criteria fall into the "Good Fit" category. The CMIN/DF ratio of 1.616 indicates an excellent model fit, as it is well below the maximum threshold of 2.00. The RMSEA value of 0.054 demonstrates that the model's approximation error within the population is at a very low level. Comparative fit indices such as CFI (0.962), TLI (0.955), and IFI (0.962) all exceed the 0.95 standard, confirming a very high degree of structural model fit. Although the GFI (0.890) and AGFI (0.857) values fall slightly below 0.90, they remain above the 0.80 tolerance threshold, thus classifying them as an acceptable "Marginal Fit."

Table 3. Model Goodness-of-Fit Test Results

Goodness-of-Fit Indices	Cut-off Score	Fit Threshold Standard	Model Conclusion
CMIN / DF	1.616	1.00 - 5.00	Good Fit
RMSEA	0.054	≤ 0.08 (Good Fit); ≤ 0.05 (Close Fit)	Good Fit
CFI	0.962	≥ 0.90 (Good Fit); ≥ 0.95 (Very Good)	Good Fit
TLI	0.955	≥ 0.90 (Good Fit)	Good Fit
IFI	0.962	≥ 0.90 (Good Fit)	Good Fit
GFI	0.890	≥ 0.90 (Good Fit); ≥ 0.80 (Marginal Fit)	Marginal Fit
AGFI	0.857	≤ 0.90 (Good Fit); ≤ 0.80 (Marginal Fit)	Good Fit

source: Amos output (2026)

Analysis of Structural Path Hypothesis Testing

The testing of causal relationships between latent variables was conducted by evaluating path coefficients (Standardized Estimates), Critical Ratio (C.R.) values, and significance (P-values). The hypothesis test results are comprehensively summarized in Table 4.

Table 4. Summary of Structural Path Coefficient Test Results

Hypothesis	Causal Relationship	Estimate	P-value	Conclusion
H1	Customer Trust <--- App Visual Design	0.780	***	Accepted
H2	Customer Satisfaction <--- App Visual Design	0.162	0.0735	Rejected
H3	Customer Satisfaction <--- Perceived Product Freshness	0.256	0.0005	Accepted
H4	Customer Trust <--- Perceived Product Freshness	0.044	0.324	Rejected
H5	Customer Satisfaction <--- Customer Trust	0.565	***	Accepted
H6	Repurchase Intention <--- Customer Trust	-0.043	0.3715	Rejected
H7	Repurchase Intention <--- Customer Satisfaction	0.938	***	Accepted

Note: *** indicates significance at $p < 0.001$.

source: Amos output (2026)

Based on the structural model estimates in Table 4, the explanatory power (coefficient of determination) of the latent variables was assessed using Squared Multiple Correlations. The results indicate R-square values of 0.661 (66.1%) for Customer Trust and 0.804 (80.4%) for Customer Satisfaction, while the primary target metric Repurchase Intention reached 0.813 (81.3%). These figures demonstrate that the model possesses a very strong capability to predict e-grocery consumers' repurchase intentions.

The Effect of App Visual Design on Customer Trust

This relationship path yielded an estimated coefficient of 0.780 and a P-value < 0.001 (***). These findings provide strong empirical evidence that app visual design has a positive and significant impact on customer trust; thus, H1 is accepted. Theoretically, the visual aesthetics of the interface serve as an initial quality cue for users. E-grocery apps featuring neat graphic layouts, logical navigation, and high-resolution photos of fresh produce successfully establish an impression of reliability and professionalism regarding the service provider in the eyes of consumers.

The Effect of App Visual Design on Customer Satisfaction

The analysis results showed an estimated coefficient of 0.162 and a P-value of 0.0735 (> 0.05). Since the P-value exceeds the 5% significance threshold, H2 is rejected. This indicates that the visual appeal of the app does not directly drive satisfaction among e-grocery consumers unless accompanied by other essential satisfaction-forming factors, such as actual product quality and a sense of security during transactions.

The Effect of Perceived Product Freshness on Customer Satisfaction

This relationship path recorded an estimated coefficient of 0.256 and a P-value of 0.0005 (< 0.05), meaning H3 is accepted. These findings confirm that the perception of physical product freshness consistently proves to be a key pillar of post-purchase customer satisfaction. In the e-grocery industry, the actual freshness of vegetables, meat, fruit, and dairy products delivered to the customer's doorstep represents the most crucial fulfillment of the service promise.

The Effect of Perceived Product Freshness on Customer Trust

The estimation results yielded a very small coefficient of 0.044 and a P-value of 0.324. Therefore, this direct relationship was found to be insignificant, and H4 was rejected. These results indicate that the perceived freshness of physical products received after delivery does not automatically build trust in the digital shopping platform system on its own; consumers tend to evaluate the platform's credibility based on application capabilities first.

The Effect of Customer Trust on Customer Satisfaction

This structural path yielded an estimated coefficient of 0.565 and a P-value < 0.001 (***), meaning H5 was accepted. These findings clearly demonstrate that customer trust is a powerful psychological antecedent for the formation of customer satisfaction. When consumers place high trust in the competence, price transparency, and data security of an e-grocery application, their tolerance regarding convenience increases, which automatically reinforces emotional satisfaction with the shopping experience.

The Effect of Customer Trust on Repurchase Intention

The analysis results show a path coefficient of -0.043 and a P-value of 0.3715. Since this relationship is not significant, H6 is rejected. This reveals an interesting phenomenon: trust alone is not strong enough to directly trigger a commitment to repurchase in the digital realm if consumers do not experience deep satisfaction with the overall shopping experience.

The Effect of Customer Satisfaction on Repurchase Intention

This final causal path yields a highly dominant estimated coefficient of 0.938 and a P-value of < 0.001 (***). These findings confirm that customer satisfaction is the single most dominant factor directly influencing e-grocery repurchase intention; thus, H7 is fully accepted. Satisfied consumers demonstrate a strong commitment to continuing transactions on the same platform, resist switching to competitors, and are willing to recommend the service to their social networks.

Analysis of the Mediating Role (Indirect Effect)

Analysis of the effect matrix (Total, Direct, and Indirect Effects) within the Amos structural model reveals interesting mediation dynamics. The direct effect (Standardized Direct Effect) of App Visual Design (AVD) on Repurchase Intention (RI) is 0.000, whereas the indirect effect (Standardized Indirect Effect) is highly significant at 0.532. This demonstrates a phenomenon of full mediation, wherein the stimulation provided by AVD's digital elements cannot directly drive repurchase intention; instead, it must be fully channeled through the mediating chain of Customer Trust and Customer Satisfaction.

Conversely, Perceived Product Freshness (PPF) influences Repurchase Intention through an indirect effect of 0.262, mediated by Customer Satisfaction. The strongest causal chains for driving repurchase retention in the e-grocery ecosystem are the AVD $\rightarrow$ CT $\rightarrow$ CS $\rightarrow$ RI path (total standardized effect = 0.532) and the PPF $\rightarrow$ CS $\rightarrow$ RI path (total standardized effect = 0.262). The integration of these two paths indicates that successful e-grocery consumer retention results from a harmonious collaboration between superior digital interface design and consistent physical product quality.

CONCLUSION

This study successfully validates an integrative structural model linking digital attributes (app visual design) and physical attributes (perceived product freshness) to e-grocery customer loyalty in Indonesia, mediated by the dual roles of customer trust and customer satisfaction. Of the seven direct hypotheses proposed, four were accepted with high significance (H1, H3, H5, H7), while three were rejected (H2, H4, H6). Customer satisfaction emerged as the strongest and absolute single mediator directly determining consumer repurchase intention (estimated score = 0.938).

Theoretically, this study extends the scope of the Technology Acceptance Model (TAM) and Expectation-Confirmation Theory by demonstrating that in the online grocery industry, digital visual aesthetics (app visual design) are the primary driver of customer trust, whereas the fulfillment of actual product quality in the physical realm (perceived product freshness) is the absolute determinant of customer satisfaction. Crucially, digital trust must first be converted into tangible emotional satisfaction before it can stimulate repurchase intention.

Suggestions

From a practical standpoint, e-grocery management is advised against focusing solely on in-app visual marketing strategies or short-term price discounts. Management must allocate strategic investment toward strengthening cold chain logistics infrastructure to ensure product freshness stability until delivery to the consumer, as this physical reality serves as the primary anchor for customer satisfaction. Simultaneously, professional standards regarding app layout aesthetics, navigation clarity, and product gallery visualization must be maintained to uphold the credibility of the digital shopping platform.

Limitations

The study's limitations lie in its cross-sectional design and broad geographical scope across Indonesia, without distinguishing between platform types (e.g., quick-commerce versus conventional marketplaces). Future research is advised to adopt a longitudinal approach to examine the consistency of consumer loyalty over the long term and to incorporate demographic moderating variables (such as income level or age generation) to provide a more in-depth analysis of market segments.

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