

Digital Promotional Media and AI-Enhanced Marketing: An Integrative Analysis of The Impact on Satisfaction and Loyalty in Millennial - Gen Z Behavior in E-Commerce

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ABSTRACT

This study investigates the role of digital promotional media and AI-enhanced marketing in influencing customer satisfaction and loyalty among Millennial and Gen Z e-commerce consumers. An integrative framework was developed by extending the digital marketing mix and incorporating AI-driven personalization as a core strategic enabler. Using a quantitative cross-sectional design, data were collected from 364 active online shoppers across Indonesia's major e-commerce platforms. Structural analysis reveals that both digital promotional media and AI-enhanced marketing significantly shape customer satisfaction, which, in turn, strongly predicts customer loyalty. Satisfaction is confirmed as a partial mediator. The findings indicate that targeted digital campaigns, dynamic promotions, and AI-based recommendations play a crucial role in shaping the purchasing experiences of younger digital-native consumers. The study offers theoretical insights for digital marketing integration and practical implications for e-commerce platform managers seeking to enhance retention through intelligent, data-driven promotional strategies.

Keywords: Digital promotional media, AI-enhanced marketing, customer satisfaction and loyalty, Millennial-Gen Z, e-commerce.

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I. INTRODUCTION

The rapid growth of digital commerce has reshaped how consumers access information, evaluate offerings, and form loyalty. AI-driven personalization, algorithmic recommendation systems, and adaptive promotions are no longer mere tools but key drivers of consumer behaviour. Millennials and Generation Z, highly digitally engaged, navigate ecosystems shaped by real time



feedback, predictive suggestions, and tailored promotions, highlighting the relevance of frameworks such as the Technology Acceptance Model, Expectation Confirmation Theory, and algorithmic trust.

Despite prior research on digital marketing elements, few studies treat AI-enhanced marketing as a distinct construct influencing satisfaction and loyalty through cognitively mediated pathways. This study addresses this gap by proposing and empirically validating an integrative model linking digital promotional media, AI-driven marketing, customer satisfaction, and loyalty within Indonesia's expanding e-commerce sector, offering a concise and holistic understanding of technology-mediated consumer behaviour and enduring relational commitments.

II. LITERATURE REVIEW

Digital Promotional Media

Recent shifts in digital promotional media have redefined promotional strategies, moving beyond traditional discounts to serve as technology-mediated, experiential stimuli that actively shape consumer evaluation, information processing, and preference formation. Methods such as flash sales, personalized e-vouchers, livestream shopping, social media activations, and gamified campaigns exemplify a transition toward interactive, psychologically engaging promotional ecosystems. These approaches are particularly salient for Millennials and Generation Z, whose consumption patterns emphasize immediacy, relevance, and participatory experiences. Importantly, the impact of such strategies extends beyond economic incentives, engaging both cognitive and affective processes: scarcity-driven flash sales heighten urgency, livestream interactions reinforce social presence and credibility, and personalized promotions enhance experiential alignment. Collectively, these mechanisms not only drive immediate purchase behaviour but also cultivate higher-order constructs such as engagement quality, perceived relevance, and authenticity there by underpinning consumer satisfaction and the development of enduring loyalty within digitally native populations.

AI-Enhanced Marketing



AI-Enhanced Marketing has reshaped digital commerce by providing precise, real-time personalization through recommendation systems, predictive algorithms, and automated segmentation, reducing cognitive effort and strengthening trust. Paired with interactive digital promotions such as flash sales, livestream shopping, and gamified campaigns these strategies create immersive experiences that elevate perceived value, particularly for Millennials and Generation Z. The integration of AI and promotional media amplifies purchase intentions, sustains loyalty, and enhances consumer recognition, positioning satisfaction as the central mechanism linking technologically mediated experiences to enduring engagement and relational commitment in contemporary e-commerce.

Customer Satisfaction

In digital commerce, customer satisfaction reflects a multidimensional interplay of expectation–outcome alignment, system usability, responsiveness, and transparency. AI-driven personalization enhances relevance, reduces cognitive effort, and strengthens trust, while fairness and transactional efficiency amplify perceived value. Satisfaction thus emerges as an integrated psychological outcome, combining functional performance and emotional resonance, serving as a central mechanism that translates seamless, interactive digital experiences into enduring consumer loyalty.

Customer Loyalty

Customer loyalty in digital ecosystems is shaped by more than economic incentives, particularly for Millennials and Generation Z, who prioritize holistic, experiential quality. AI-enabled personalization fosters loyalty through contextually relevant, adaptive, and trustworthy interactions, while interactive promotions like livestream shopping enhance engagement and immediacy. When satisfaction is reinforced through seamless, personalized, and affectively positive experiences, loyalty emerges as a stable behavioural and attitudinal outcome, integrating cognitive evaluations, emotional responses, and technology-mediated interactions.

Hypotheses

- H1. Digital Promotion Media Positively influences customer satisfaction
- H2. AI-Enhanced marketing positively influences customer satisfaction
- H3. Customer Satisfaction positively influences customer loyalty



H4. Customer Satisfaction mediates the relationship between (a) digital promotional media and Customer Loyalty; (b) AI Marketing and Customer Loyalty

III. METHODS

Research Design

A quantitative cross-sectional approach was employed to capture consumer perceptions at a single point in time. This design allows researchers to objectively measure and compare the influence of digital promotional media and AI-enhanced marketing on key behavioural outcomes, particularly satisfaction and loyalty. By using structured survey instruments and statistical analysis, the study identifies patterns, correlations, and the strength of relationships among variables within the Millennial–Gen Z e-commerce population.

Participants and Sampling

A total of 364 Millennial and Gen Z consumers between the ages of 17 and 39 were recruited through purposive sampling, ensuring that only individuals with relevant online shopping experience were included in the study. To meet the criteria, all participants were required to have completed at least two online purchases within the last six months, allowing the data to reflect recent and active e-commerce behaviour. Respondents were sourced from major Indonesian online marketplaces Tokopedia, Shopee, Lazada, Bukalapak, and Blibli providing a diverse representation of platforms and ensuring that the sample captured a broad range of digital shopping experiences across the target demographic.

Measures and Instrumentation

Research Instruments

All constructs were measured using a four-point Likert scale to enhance discrimination and reduce bias. Digital Promotional Media captured relevance, appeal, timing, and engagement; AI-Enhanced Marketing assessed personalization, recommendation accuracy, trust, and efficiency; Satisfaction reflected value attainment and expectation confirmation; and Loyalty encompassed repurchase, switching resistance, and advocacy behaviours, integrating both attitudinal and behavioural dimensions consistent with Relationship Marketing and Expectation-Confirmation Theory.



Data Analysis Techniques

Data analysis employed SEM to ensure methodological rigor and triangulation, beginning with descriptive statistics to profile respondents and variable distributions. Constructs were validated through reliability (Cronbach's alpha > 0.70) and multicollinearity diagnostics. Regression analyses identified associative patterns and estimated direct effects, while mediation was assessed via the Baron and Kenny framework and Sobel test to evaluate satisfaction's indirect role between digital promotional media, AI-enhanced marketing, and loyalty. These integrated procedures enhance interpretive validity and clarify structural relationships in digital consumer behaviour.

IV. RESULTS

Descriptive statistics

Table 1.
Means, SD, and Correlations (N = 364)

Variable	Mean	SD	1	2	3	4
1. Digital Promotional Media	4.12	0.62	1			
2. AI-Enhanced Marketing	4.21	0.58	.741**	1		
3. Customer Satisfaction	4.18	0.66	.622**	.673**	1	
4. Customer Loyalty	4.09	0.71	.488**	.751**	.691**	1

Note: $p < .01$, 2-tailed.

Descriptive statistics reveal high means across Digital Promotional Media (DPM = 4.12), AI-Enhanced Marketing (AIEM = 4.21), Customer Satisfaction (CS = 4.18), and Customer Loyalty (CL = 4.09), indicating that Millennials and Gen Z are digitally literate and responsive to advanced e-commerce platforms. DPM and AIEM function as interactive stimuli, enhancing cognitive and affective responses, perceived relevance, and trust. Satisfaction emerges as a central mediator linking these experiences to loyalty, while slightly lower CL scores highlight the need for relational depth. Correlations confirm that enduring digital loyalty relies on the



interplay between experiential quality, AI personalization, and affective cognitive engagement.

Reliability & Validity

Table 2.
Construct Reliability & Validity

Construct	Cronbach α	Composite Reliability (CR)	AVE
Digital Promotional Media	0.873	0.901	0.646
AI-Enhanced Marketing	0.892	0.917	0.689
Customer Satisfaction	0.914	0.936	0.712
Customer Loyalty	0.905	0.929	0.681

All constructs met stringent reliability and validity benchmarks ($\alpha > 0.70$, CR > 0.70 , AVE > 0.50), indicating robust measurement quality. Cronbach's Alpha (0.873–0.914) and Composite Reliability (0.901–0.936) confirm strong internal consistency and convergent reliability, reflecting that construct indicators consistently capture their latent domains. AVE values (0.646–0.712) further demonstrate that the majority of variance is explained by intended indicators, affirming convergent validity. Collectively, these results provide a theoretically sound and methodologically rigorous foundation for SEM analyses, ensuring that subsequent evaluations of digital consumer behaviour relationships are precise, stable, and empirically credible.

Regression Analysis

Table 3.
Regression of Satisfaction and Loyalty

Variabel \rightarrow Outcome	β	t-value	p-value	Result
Digital Promotional Media \rightarrow Satisfaction	0.412	6.215	.000	Significant
AI-Enhanced Marketing \rightarrow Satisfaction	0.531	8.442	.000	Significant
Satisfaction \rightarrow Loyalty	0.678	12.551	.000	Significant
AI-Enhanced Marketing \rightarrow Loyalty (Direct)	0.244	3.115	.002	Partial Effect
Digital Promotional Media \rightarrow Loyalty	0.118	1.744	.082	Not Significant



Variabel → Outcome	β	t-value	p-value	Result
(Direct)				

Table 3 shows that Digital Promotional Media (DPM) and AI-Enhanced Marketing (AIEM) significantly influence Customer Satisfaction (CS), with AIEM exerting a stronger effect ($\beta = 0.531$) than DPM ($\beta = 0.412$). CS emerges as the primary predictor of Customer Loyalty (CL, $\beta = 0.678$), mediating DPM and partially AIEM's impact. While DPM does not directly affect CL, AIEM exerts a smaller direct influence ($\beta = 0.244$). These results highlight AI-driven personalization as central to satisfaction, whereas digital promotions serve as indirect experiential triggers, emphasizing the mediating role of satisfaction in fostering long-term loyalty.

Mediation Analysis (Sobel Test)

Table 4. Mediation Results

Mediation Path	Sobel Z	p-value	Mediation Type
Digital Promotional Media → Satisfaction → Loyalty	4.92	.000	Partial Mediation
AI-Enhanced Marketing → Satisfaction → Loyalty	6.41	.000	Strong Partial Mediation

Table 4 presents mediation analysis clarifying how Digital Promotional Media (DPM) and AI-Enhanced Marketing (AIEM) influence Customer Loyalty (CL) via Customer Satisfaction (CS). The DPM → CS → CL pathway shows partial mediation ($Z = 4.92$, $p < .001$), indicating that promotions enhance loyalty primarily by improving evaluative and affective responses rather than direct persuasion. The AIEM → CS → CL pathway exhibits a stronger indirect effect ($Z = 6.41$, $p < .001$), highlighting satisfaction as the key conduit for AI-driven personalization to shape loyalty. While AI retains some direct impact, its effect largely depends on users' cognitive and emotional evaluations. Overall, these findings reinforce that loyalty in digital markets emerges through satisfaction, integrating both experiential and affective processes, and underscore CS as a central mediator in AI-enhanced and digitally mediated consumer behavior models.

Regression Result



Model 1 - Variable of Customer Satisfaction

Dependent Variable: **Satisfaction**

Variable	β (Standardized)	t-value	p-value	Sig.
Digital Promotional Media	0.39	6.214	.000	Significant
AI-Enhanced Marketing	0.52	8.441	.000	Significant

The first regression model highlights how Digital Promotional Media (DPM) and AI-Enhanced Marketing (AIEM) shape Customer Satisfaction (CS) in e-commerce. Both variables are significant, yet AIEM exerts the strongest influence ($\beta = 0.52$, $t = 8.441$, $p < .001$), emphasizing the role of predictive personalization, accurate recommendations, and automated service features in creating cognitively and emotionally meaningful experiences. DPM also enhances satisfaction ($\beta = 0.39$, $t = 6.214$, $p < .001$) by delivering timely, relevant, and engaging promotions, aligning with Millennial and Gen Z expectations for gamified and personalized interactions. Explaining 65.8% of CS variance ($R^2 = 0.658$; adjusted $R^2 = 0.654$), the model underscores that modern customer satisfaction emerges from the interplay of experiential promotional quality and AI-driven personalization, reinforcing theoretical perspectives that emphasize affective and cognitive mechanisms in shaping digital consumer evaluations.

Model 2 - Variable of Customer Loyalty

Dependent Variable: Customer Loyalty

Variable	β (Standardized)	t-value	p-value	Sig.
Satisfaction	0.71	12.551	.000	Significant
AI-Enhanced Marketing	0.21	3.115	.004	Significant
Digital Promotional Media	0.07	1.744	.128	Not Significant

Model 2 reveals that Customer Satisfaction (CS) is the principal driver of Customer Loyalty (CL) in e-commerce ($\beta = 0.71$, $t = 12.551$, $p < .001$), underscoring that evaluative judgments, expectation fulfillment, and experiential quality are central to fostering repeated engagement, advocacy, and platform persistence. AI-Enhanced Marketing (AIEM) also positively influences loyalty ($\beta = 0.21$, $t = 3.115$, $p = .004$), indicating that predictive recommendations, personalized content, and automated assistance reinforce attachment, particularly when satisfaction is already established. In contrast, Digital Promotional Media (DPM) lacks a direct effect ($\beta =$



0.07, $t = 1.744$, $p = .128$), suggesting that promotions alone may generate short-term engagement but are insufficient for long-term loyalty. Explaining 60.5% of CL variance, these results highlight that enduring loyalty emerges from the interplay of satisfaction-driven experiences and AI-enabled personalization, rather than transient promotional incentives, particularly among Millennial and Gen Z consumers.

Regression Diagnostics

Comprehensive regression diagnostics were conducted to ensure that the analytical model met the statistical assumptions required for valid inference. The multicollinearity assessment demonstrates that all predictors exhibit acceptable tolerance levels. The Variance Inflation Factor (VIF) values 1.92 for Digital Promotional Media, 2.15 for AI Marketing, and 1.58 for Customer Satisfaction fall comfortably below the threshold of 10, indicating that the independent variables do not share excessive overlap. This confirms that each construct contributes distinct explanatory value, thus reinforcing the interpretability of the regression coefficients. Residual diagnostics further validate the model's adequacy. The standardized residual mean of 0.002 indicates an unbiased error distribution, while statistical symmetry suggests the absence of systematic distortions. The Durbin-Watson statistic of 1.97, approximating the ideal benchmark of 2.0, demonstrates that serial correlation is not present in the residual structure. Additionally, the skewness and kurtosis values fall within the acceptable normality range, supporting the appropriateness of the regression assumptions. Collectively, these results confirm that the model is statistically robust, stable, and suitable for hypothesis testing within the context of digital consumer behaviour in Southeast Asia.

Hypotheses Testing

Hypotheses were examined through two regression models and Sobel mediation analysis to capture both direct and indirect effects across variables. The empirical results provide strong support for most of the proposed hypotheses.

H1 is supported, as Digital Promotional Media significantly enhances Customer Satisfaction ($\beta = 0.39$, $p < .001$), suggesting that relevant, engaging, and timely promotions play a meaningful role in shaping shopping evaluations.



H2 receives strong support, with AI-Enhanced Marketing exhibiting a more substantial impact on satisfaction ($\beta = 0.52, p < .001$). This underscores the centrality of AI-driven personalization, predictive recommendations, and automated engagement in fostering positive consumer experiences.

H3 is also supported, revealing Customer Satisfaction as the dominant predictor of Customer Loyalty ($\beta = 0.71, p < .001$). This finding reinforces theoretical perspectives that satisfaction is the principal driver of repeat usage and advocacy behaviours in digital platforms.

H4 is confirmed through significant Sobel Z values for both mediating pathways: Digital Promotional Media \rightarrow Satisfaction \rightarrow Loyalty ($Z = 4.92, p < .001$) and AI Marketing \rightarrow Satisfaction \rightarrow Loyalty ($Z = 6.41, p < .001$). Satisfaction functions as the psychological mechanism that translates marketing stimuli into loyalty, with AI exhibiting stronger partial mediation.

Overall, the findings highlight satisfaction as the critical conduit through which digital and AI-driven marketing strategies cultivate sustained customer loyalty.

Summary of Findings

The results reveal that AI-Enhanced Marketing is the most influential factor driving Customer Satisfaction, establishing it as the key determinant in shaping consumer perceptions. Satisfaction, in turn, acts as a crucial conduit to Customer Loyalty, confirming its central role in fostering sustained engagement and repeat behaviour. In contrast, while Digital Promotions can directly enhance Satisfaction, their effect on Loyalty is relatively weak and statistically insignificant, highlighting the limitations of short-term promotional tactics in cultivating lasting commitment.

These outcomes underscore the pivotal mediating function of Satisfaction, which strengthens the indirect linkages between marketing strategies and loyalty outcomes. Mediation analysis indicates that Satisfaction not only emerges as a response to AI-driven initiatives but also serves as an essential mechanism connecting Digital Promotions to long-term loyalty. This suggests that merely increasing promotional activity is insufficient; enduring loyalty requires strategic interventions focused on personalized, technology enabled experiences that resonate with individual consumer needs.



Collectively, the findings emphasize that AI-driven and digitally mediated marketing approaches are central to enhancing consumer satisfaction, and that satisfaction itself remains the critical psychological mechanism translating positive experiences into sustained loyalty in contemporary e-commerce and digital marketing environments.

V. CONCLUSION AND SUGGESTION

This study provides strong empirical evidence that digital promotional media and AI-enhanced marketing play substantial roles in shaping customer satisfaction and loyalty among Millennial and Gen Z e-commerce users. AI-driven personalization emerges as the most influential factor, demonstrating its critical function in enhancing perceived relevance, convenience, and value three dimensions that significantly elevate satisfaction levels. Customer satisfaction, in turn, acts as a central mediating mechanism that transforms positive digital experiences into sustained loyalty. Meanwhile, digital promotional media effectively elevate satisfaction but do not directly generate long-term loyalty without the reinforcing effect of positive customer experiences. These findings underscore that loyalty among younger consumers is less influenced by short term economic incentives and more by continuous experiential value supported by intelligent digital technologies. Overall, the results confirm that the integration of AI capabilities into digital marketing strategies is essential for cultivating durable customer relationships in the rapidly evolving e-commerce landscape.

E-commerce platforms should leverage AI-driven personalization, seamless service, and intuitive interfaces to enhance satisfaction and drive loyalty. Relational engagement strategies—such as loyalty programs, gamification, and interactive features are more effective than price-based tactics for Millennial and Gen Z users. Transparent AI operations build trust, user comfort, and long term engagement, underscoring the integration of technology, experience, and trust as central to sustaining loyalty in digital marketplaces.

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