

AI-Driven Gamification as a Predictor of Customer Engagement in Digital Commerce

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Abstract

Over the past decade, the digital commerce market has surged in growth, with businesses compelled to integrate new technologies to better engage and connect with customers. Artificial Intelligence (AI) is the breakthrough technology that gives businesses the ability to provide intelligent suggestions, forecasts and recommendations, resulting in a customized customer journey. At the same time, gamification has become a marketing tool of great interest due to the use of elements like points, badges, rewards and leaderboards in digital platforms, which boosts the participation of consumers. These technologies have been combined to create AI-powered gamification, in which AI algorithms are used to tailor gamified experiences in real time to each individual customer's preferences and actions. As these technologies come together, AI-driven gamification has emerged, using AI algorithms to customize the gamification experience as it unfolds. AI and gamification are being used in the research world but there is not yet enough evidence that has examined gamification with the usage of AI directly as a predictor of customer engagement. The present study aims to bridge this gap by studying the impact of AI gamification on customer engagement in the context of digital commerce. The proposed method used in the research design is quantitative and cross-sectional research that will use a structured questionnaire to collect data from consumers via AI platforms in digital commerce. Descriptive statistics, reliability analysis, Pearson correlation and simple linear regression will be used to analyze the data in IBM SPSS Statistics. The results will show that the application of AI-based gamification can greatly improve customer engagement, making shopping more personalized, interactive and fun. The study adds to the growing body of literature on AI-driven marketing,

offering empirical insights into the predictive power of AI gamification and valuable take aways for digital retailers aiming to enhance customer engagement and bolster their competitive edge through intelligent digital experiences.

Keywords— Artificial Intelligence, Gamification, AI-driven Gamification, Customer Engagement, Digital Commerce, Consumer Behaviour.

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1. Introduction

Commerce is changing radically because of digital transformation, transforming consumer purchasing habits and business strategies. Digital commerce has advanced at a rapid pace due to the availability of internet technologies, smartphones and digital payment methods, which allow businesses to offer personalized, convenient and seamless shopping experiences. Recent industry estimates indicate that retail e-commerce sales are still growing at a brisk pace, with consumers turning to the internet as their primary source for product discovery, comparison and buying (Statista, 2025). As a result, digital retailers are constantly looking for ways to continue to differentiate themselves and have any sort of relevant contact with increasingly demanding customers.

AI (Artificial Intelligence) is one of the most impactful technological advancements in the realm of digital commerce. By applying AI, businesses can process vast amounts of consumer data, forecast buying habits, streamline customer interactions, and even offer tailored suggestions on the fly (Dwivedi et al., 2023). From recommendation engines to virtual shopping assistants, from intelligent chatbots to predictive analytics, AI-driven applications have revolutionized traditional online shopping, creating a new concept of highly personalized customer experiences. These smart systems not only help companies optimize operations, but also give them a better understanding of customer preferences, which boosts customer satisfaction and builds lasting customer relationships (Huang & Rust, 2021).

Gamification, a marketing technique for incentivizing consumers to engage, has also been a growing trend in the development of AI. Along with the growth of AI, gamification is an emerging marketing strategy for encouraging consumers to take part and make their digital experiences better. Gamification is the use of game design concepts in non-game contexts to foster motivation and promote positive user behaviors, including points, badges, rewards, leaderboards, levels and challenges. Gamification has proven effective in the context of digital commerce to boost web traffic, drive repeat sales, engage customers and foster brand interactions. New research has shown that gamified experiences are more enjoyable, motivating and engaging than traditional promotional strategies (Rodrigues et al., 2024).

AI and gamification have ushered in a new era of gamification: AI-powered gamification. This has given rise to a new and sophisticated form of gamification — AI-powered gamification, which adapts game mechanics to the specific preferences and behaviors of each customer. Unlike the standard gamification, which usually gives the very same rewards, challenges, recommendations and feedback to all consumers, AI-powered gamification provides customized, real-time rewards, challenges, recommendations and feedback based on user's browsing history, purchasing behaviour and tastes. This smart personalization can lead to highly personalized shopping experiences that make consumers want to engage with digital platforms more often (Costa et al., 2024). Thus, AI-powered gamification has come to be seen as a strategy for increasing customer engagement in today's fiercely competitive digital landscape.

One of the key metrics of success in digital commerce has become customer engagement. It is a representation of the cognitive, emotional and behavioural investment that customers demonstrate when engaging with brands and digital platforms (Brodie et al., 2011). Highly-engaged customers spend more time researching products, are more involved in promotional programs, recommend brands to friends and family, and create deeper emotional ties with retailers, which all help to drive better organizational performance and lifetime value. Thus, a number of studies and practical applications have focused on studying and improving customer engagement.

While there is wide-ranging research on AI applications in marketing and gamification's impact on customer engagement on their own, empirical research that explores the intersection of gamification and AI has been limited. Most of the research has been on customer satisfaction, purchase intention, technology adoption or loyalty, while there is less research that addresses the direct link between AI gamification and customer engagement in digital commerce. Moreover, the majority of empirical studies have used complicated and complex structural equation modeling methodology, with few studies using regression methods to provide evidence of the predictive capability of AI gamification.

This study aims to explore how AI can impact customer engagement in eCommerce by bridging these gaps. This study uses a regression-based method to analyze this relationship,

thereby adding to the current literature on AI-based marketing and digital consumer behavior. The results will give theoretical insights into how intelligent gamification can be used to engage customers and give more practical guidance to digital retailers who wish to create more personalised, interactive and engaging customer experiences.

Theoretical Background

A. AI in E-commerce: Assessing its Impact and Future Courses. AI as a Strategic Asset for E-commerce Businesses. AI has emerged as a game-changer, empowering businesses to make informed decisions, deliver personalized customer experiences, and streamline operations through digital channels. Through the use of AI-powered tools like machine learning, predictive analytics, recommendation systems, natural language processing, and conversational chatbots, businesses can gain real-time insights into their customers' behavior, enabling them to provide highly personalized shopping experiences (Dwivedi et al., 2023). Some recent research suggests that AI can provide better service quality, minimize decision-making burdens, and make product suggestions more relevant, which all boost customer satisfaction (Huang & Rust, 2021). As such, AI has emerged as a vital strategic asset for businesses aiming to enhance customer experience and maintain competitive edge in digital landscapes.

B. Gamification in Digital Commerce

Gamification is the use of game design features outside of the game to achieve the goal of motivating users and inducing desired behaviour. In the digital commerce world, gamification uses points, badges, leaderboards, challenges, rewards, progress tracking and achievement systems to make the online shopping experience more interactive and engaging. Recent research has shown that gamification improves the engagement of consumers, prompts them to return to the platform, and fosters emotional consumer-brand relationships, making ordinary consumer buying habits fun. Recent studies have found that gamification can improve consumer engagement, encourage repeat visits to platforms, and drive emotional connections between brands and consumers, making mundane purchasing activities more enjoyable. In a digital age where competition is growing, gamification has now become a strategic way for customer engagement rather than a promotional technique.

C. AI-Driven Gamification

Artificial Intelligence (AI) and gamification have merged into a new paradigm, referred to as AI-driven gamification. Instead of reward systems and gaming mechanics that are set in stone and provide the same experience for all users, AI-based gamification systems provide a personalized experience by continuously analyzing user behavior and adjusting game mechanics in real-time. AI has the potential to provide highly personalized gamified experiences by adapting to the challenges, rewarding with intelligent rewards, recommending personalized content and giving real-time feedback, which maximizes user engagement (Costa et al., 2024). These adaptive experiences make them more relevant, which helps to foster customer engagement with digital commerce platforms.

D. Customer Engagement

Customer engagement is the mental and emotional bonding that a customer forms with a brand after repeated use over time, across digital channels. It includes customers' mental focus, emotional bonding, and their involvement in organizational events. In recent years, customer engagement has been found to be a key factor in the success of e-commerce organizations, as it is related to higher customer interaction, increased brand loyalty, and improved customer advocacy (Żyminkowska, 2025). Therefore, it is crucial to identify technological factors that can improve customer engagement and this has been identified as an important research focus.

Research Gap

While recent studies have recognized the increasing significance of AI and gamification in digital commerce, the majority of the investigations have focused on each individually. The existing literature focuses mainly on the personalization aspect of AI, customer satisfaction, technology acceptance, or purchase intention, with few studies investigating the gamification aspect of AI as an integrated attribute. Moreover, there is limited empirical research examining the direct predictive effect of the use of AI-based gamification on customer engagement, and even less empirical research with regression-based analytical techniques. Hence, the present study contributes to the existing research by investigating whether

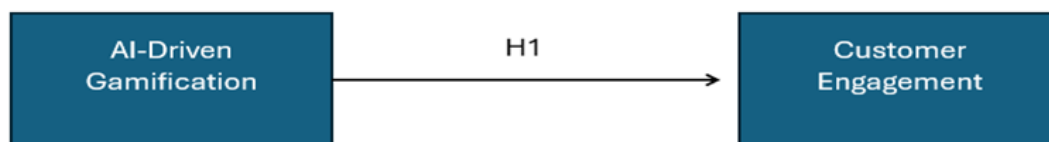
AI-based gamification is a significant predictor for customer engagement in digital commerce users.

Hypothesis Development

The combination of AI features with gamification invents adaptive, customized and rewarding digital experiences that are set to boost consumers' engagement with digital platforms. The use of AI-powered personalised challenges, intelligent suggestions, and rewards in real-time enhances the fun and value consumers experience on the platform, helping to improve their mental, emotional, and behavioral engagement. The studies conducted in recent years have shown that personalization of digital experiences has a significant impact on improving the quality of customer interactions and relationships in online environments (Dwivedi et al., 2023; Żyminkowska, 2025). For this reason, it is suggested that:

H1: AI-driven gamification has a significant positive influence on customer engagement in digital commerce.

Fig. 1: Conceptual Framework



Source: Author's Creation

Research Methodology

A. Research Design

This study employed a quantitative, cross-sectional and explanatory research design to study the impact of AI-driven gamification on customer engagement in digital commerce. A quantitative method was deemed suitable as it allows for statistical analysis of relationships between variables, thus offering objective evidence of the ability of AI-based gamification to

predict. The cross-sectional design was used since data were gathered at a single point in time, thus enabling the examination of the perception and experiences of customers interacting with AI-powered digital commerce platforms.

The unit of analysis was single consumers who had previously been users of digital commerce platforms that contained AI-based tools or gamified applications such as customized product suggestion, incentive programs, achievement badges, interactive challenges, or loyalty programs. The concept model that was proposed was that AI-powered gamification would be the independent variable and customer engagement would be the dependent variable.

B. Sampling and Data Collection

The target customers were consumers who bought from AI-powered digital commerce platforms like Myntra, Nykaa, Temu, Ajio, Meesho, Flipkart, and Amazon in the last six months. The respondents were selected by non-probability convenience sampling technique as online shoppers from different groups are easily available.

The data were gathered using a structured online questionnaire, which was created in Google Forms. The participants of the survey were briefed on the purpose of the study, and assured that their responses would be anonymous and kept only for academic research purposes. There was no compulsory participation, and informed consent was attained with all respondents.

A total of 412 questionnaires were sent out and 387 (93.5%) were returned. A total of 365 questionnaires were retained for final analysis after discarding the questionnaires with incomplete responses and responses with too many missing values and/or straight-lining.

C. Instrument Development

The questionnaire consisted of two sections.

The first section gathered demographic data of the respondents such as gender, age, education, occupation, monthly income, and frequency of online shopping. The second section involved the measurement of the study variables by revalidated scales adapted from

the recent literature. Some minor changes were made to fit the Digital Commerce environment.

Items were adapted from recent research on AI personalization (Costa et al., 2024), AI intelligent customer experience (Rodrigues, et al., 2024), and gamification in digital platforms (Żyminkowska, 2025). The measures of customer engagement were adapted from Hollebeek et al. (2014), Vivek et al. (2014), and recent digital commerce engagement studies. Items were all rated on a 5-point Likert scale, which ranged from 1 = Strongly Disagree to 5 = Strongly Agree.

Analysis

A. Respondent Profile

Table 1: Demographic Profile of Respondents (N = 365)

Variable	Category	Frequency	Percentage
Gender	Male	208	57.0
	Female	157	43.0
Age	18–25 years	89	24.4
	26–35 years	141	38.6
	36–45 years	87	23.8
	Above 45 years	48	13.2
Education	Undergraduate	98	26.8
	Postgraduate	212	58.1
	Doctorate	55	15.1
Online Shopping Frequency	Weekly	96	26.3
	Monthly	181	49.6
	Occasionally	88	24.1

Source: Primary Survey

The demographic profile further highlighted that the respondents' age range of 26-35 years (38.6%) and the majority holding post graduate degrees (58.1%) and online shopping at least once a month (49.6%) warranted that the sample size was representative of active customers of the digital commerce.

B. Reliability Analysis

Table 2: Reliability Statistics

Construct	No. of Items	Cronbach's Alpha
AI-driven Gamification	5	0.913
Customer Engagement	5	0.896

Source: SPSS Output

The internal consistency of the measurement scales was satisfactory as the Cronbach's alpha values were higher than the recommended value of 0.70 (Hair et al., 2022).

C. Descriptive Statistics

Tables 3 shows the mean and standard deviation for data collected from the observations.

Variable	Mean	SD
AI-driven Gamification	4.02	0.63
Customer Engagement	3.91	0.69

Source: SPSS Output

Results from the descriptive statistics indicated that overall, the respondents had a positive attitude towards AI-driven gamification and reported moderate usage of digital commerce platforms.

D. Correlation Analysis

Table 4: Pearson correlation matrix

Variable	1. AI-driven Gamification	2. Customer Engagement
1. AI-driven Gamification	1	
2. Customer Engagement	0.691	1

Note: *Correlation is significant at $p < 0.001$.*

Correlation analysis shows that there is a strong positive correlation ($r = 0.691$) between AI-enabled gamification and customer engagements, which means that higher customer perception of AI-powered gamified experiences is associated with more customer engagement with digital commerce platforms.

E. Regression Analysis

Table 5: Model Summary

Model 1	R	R ²	Adjusted R ²	Std. Error of the Estimate
1	0.691	0.477	0.476	0.501

Source: SPSS Output

The model accounts for 47.7% of the variance in customer engagement, suggesting that AI-powered gamification is a strong predictor of customer engagement.

Table 6: ANOVA

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	84.56	1	84.56	331.42	0.000
Residual	92.67	363	0.255		
Total	177.23	364			

Dependent Variable: Customer Engagement

Independent Variable: AI driven Gamification

The regression model is statistically significant ($F = 331.42$, $p < 0.001$), indicating the model's appropriateness for predicting customers' engagement.

Table 7: Regression Coefficients

Predictor	β	t	Sig.
Constant	1.214	6.54	0.000
AI-driven Gamification	0.691	18.21	0.000

Source: SPSS Output

The regression analysis results show that gamification using AI has a significant and positive effect on customer engagement ($\beta = 0.691$, $p < 0.001$). Thus, the hypothesis that consumers who have more positive attitudes towards AI gamified experiences are more likely to be engaged with digital commerce platforms is accepted.

Results and Discussion

The results prove AI gamification is a substantial factor in digital commerce customer engagement. The positive regression coefficient suggests that the intelligent gamified experience has a significant impact on consumers' cognitive, emotional, and behavioural involvement with digital platforms. The results are supported by recent research which has indicated that personalization and adaptive gamification have the potential to produce an immersive shopping experience thereby enhancing customer engagement and platform interaction (Costa et al., 2024; Dwivedi et al., 2023; Żyminkowska, 2025).

This research study explored the impact of Artificial Intelligence (AI) based gamification on customer engagement in digital commerce. The regression analysis showed that the proposed hypothesis was supported by the fact that AI gamification significantly and positively predicted customer engagement. The results confirm the increasing awareness of how AI-fueled gamification can improve consumers' digital commerce experiences by making them personalized, adaptive, and fun.

Unlike regular gamification, AI-based gamification continuously learns about the consumers' browsing habits, buying pattern and consumer preferences, which is used to tailor rewards, suggestions and interactive challenges. This customization makes digital interactions more relevant to the user, which drives more engagement and time on the platform, and also incentivizes consumers to engage in promotional activities. This means that customers make deeper cognitive, emotional and behavioral bonds with digital retailers, which further enhances customer engagement.

The results are aligned with the recent studies that found that AI personalization has a positive impact on customer interactions and digital customer experience (Dwivedi et al., 2023; Huang & Rust, 2021). Likewise, the latest research on gamification has revealed that intelligent reward structures and adaptive game mechanics have a positive impact on customer participation and engagement with platforms (Costa et al., 2024). In contrast to the existing literature, the present study does not investigate the potential of AI and gamification as distinct technological interventions but rather adopts an empirical approach to understand that AI-driven gamification is a strong predictor of customer engagement.

The other important contribution of this research is the use of regression based analytical approach. Although previous research mainly used SEM to analyse AI-enabled marketing, the results of this study show that simple regression analysis was also strong evidence of the predictive power of AI gamification. The study provides an easy-to-replicate empirical model, therefore, that can be used in different digital commerce environments.

Theoretical Contributions

The present research has several significant contributions to literature. First, it contributes to the growing body of literature on AI-powered marketing by conceptualizing the use of AI in gamification as a whole, instead of splitting it into two parts: artificial intelligence and gamification. The studies in the past have mostly concentrated on either personalization using AI or gamification, but in this study, it has been shown that both are effective in driving customer engagement. Second, the research extends the literature on customer engagement by uncovering the strong technological antecedent of customer engagement in the context of digital commerce: AI-driven gamification. The results support the hypothesis that intelligent and adaptive digital experiences enhance customers' cognitive, emotional and behavioral engagement with online shopping platforms. Thirdly, the study adds methodological terms by illustrating the AI-powered gamification's predictive power with regression analysis. This offers a methodological approach that can be used in addition to more advanced structural equation modelling techniques used in digital marketing research.

Lastly, the study advances the current literature on digital commerce by adding empirical evidence from an emerging market context, which broadens the generalizability of AI customer engagement studies beyond developed market settings.

Managerial Implications

The results have some implications for managers and digital commerce practitioners. Combining AI with gamification can enhance digital retailers' ability to offer a personalized shopping experience. Rather than giving everyone the same rewards, organizations should tailor offers to individuals, offer rewards that are customized to them, offer variable challenges and create personalized campaigns based on an algorithm that learns from their past purchases. AI-powered gamification can boost customer engagement by offering

personalized loyalty programs, intelligent reward systems, achievement badges, progress tracking, and shopping missions tailored to customers' browsing and buying habits through platforms like Ajio, Nykaa, Temu, Meesho, Flipkart, and Amazon.

Moreover, AI-driven predictive analytics can help marketing managers uncover customers with high engagement levels and tailor personalized gamified journeys that foster repeat purchases and sustain platform usage. This intelligent customer engagement will most likely enhance customer retention and drive-up customer lifetime value.

Also, companies need to continually audit how customers react to various gamification elements through AI-backed analytics. Real-time customer insights can help businesses optimize game mechanics and create even more personalized digital experiences that can help capture their customers' attention in a very competitive digital environment.

Limitations And Future Research

While the present study helps to build the body of research on the use of AI in marketing, there are some limitations that should be noted. This study used a cross sectional research design, which did not allow for causal relationships over time. Longitudinal trials could be used in future research to investigate the effects of gamification using AI on customer engagement throughout the customer lifecycle. Secondly, convenience sampling was used to collect the data, which could limit the external validity of the results. Future studies could employ probability sampling methods and larger sample sizes from a variety of geographical areas. Third, the study only used customer engagement as outcome variable. Other behavioral responses like customer loyalty, eWOM, customer advocacy, purchase intention, customer retention, and customer LTV could be explored in future research. Fourthly, the present study took a holistic approach towards digital commerce platforms. Comparative analyses can be implemented in certain industry sectors, such as online retailing, banking, hospitality, health care, tourism, education and mobile commerce, in future studies. Finally, future studies can explore demographic factors like age, digital literacy, and shopping experience as segmentation criteria to grasp the differences in customer segments' reactions to AI-powered gamification.

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