The Impact of AI-Enabled Service Quality and Perceived Convenience on AI-Enabled Customer Experience: A Quantitative Study in E-Marketing

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Abstract

This study examines the influence of AI-enabled service quality and perceived convenience on AI-enabled customer experience in the online shopping sector. Using structural equation modeling (SEM), data was collected from 302 users of AI-based virtual beauty applications. The results indicate that perceived convenience significantly enhances customer experience through improved trust and interaction efficiency. However, AI-enabled service quality shows no statistically

significant impact on customer experience. The findings contribute to the understanding of which technological factors directly shape user satisfaction and engagement.

Keywords: AI-enabled service quality, perceived convenience, customer experience, online shopping, structural equation modeling

1. Introduction

With increasing digital transformation in e-commerce, retailers have integrated AI technologies to improve service delivery and customer interaction. Key elements under examination include AI-enabled service quality and perceived convenience, which potentially influence the overall customer experience. While perceived convenience reflects how easily users can interact with services, AI-enabled service quality encompasses reliability, responsiveness, and system capability.

Despite the emphasis on personalization and automation, questions remain regarding which factors most directly contribute to enhancing AI-enabled customer experience. This paper isolates and examines only two variables—AI-enabled service quality and perceived convenience—and their impact on customer experience in an AI-supported virtual shopping context.

The advent of artificial intelligence (AI) has triggered a significant evolution in the domain of customer experience and

transformed how customers engage with brands (Omeish, Al Khasawneh, & Khair, 2024). Companies are adopting AI technologies and data analytics to address rising customer expectations. This shift changes how businesses engage with customers, offering the opportunity to strengthen customer-brand relationships, better understand their customers' preferences and shopping patterns.

Companies that integrate AI into their operations can automate routine tasks, particularly in sales. However, the most notable benefit is their ability to boost sales through customization, personalization, and enhanced service quality, all while improving efficiency. This capability also extends to using AI as an advanced analytics tool, enabling activities such as offering personalized recommendations based on customer preferences, providing virtual agents for online communication, and proactively addressing potential customer issues (Ifekanandu, et. al., 2023).

2- Research Problem

The rapid adoption of artificial intelligence (AI) technologies in the retail sector has significantly changed how businesses interact with customers. Supported by advancements in data analytics, AI is helping companies respond to shifting market dynamics, and rising customer expectations. Strategic

deployment of AI at key customer touchpoints has shown potential to enhance customer satisfaction and strengthen brand relationships by delivering personalized experiences based on individual preferences and behavior patterns.

As investment in AI technologies continues to rise sharply, with forecasts predicting billions of dollars in spending and widespread adoption across the retail industry, understanding the effects of AI on customer experience becomes crucial.

Despite the promise of greater automation, cost savings, and more flexible customer service, challenges remain. Heavy reliance on customer data can lead to concerns about trust, privacy concerns, and the reduced presence of human interaction.

This study incorporates a range of variables that not deeply investigated together before either in academic literature or in Egyptian context which experimentally investigate the impact of Artificial intelligence technologies on AI- enabled customer experience in online shopping context using Virtual Artist App of a beaty brand.

The study problem could therefore be embodied in the following major questions:

RQ.1: How can the integration of Artificial intelligence technologies can improve AI-enabled customer experience throughout customer journey?

RQ.2: What is the effect of perceived convenience on AI-enabled customer experience?

RQ.3: What is the effect of AI-enabled service quality on AI-enabled Customer Experience?

3- Research Objectives

Here are the objectives and purpose of the study:

First, this study aims to critically analyze and understand the role of Artificial Intelligence (AI) technologies in improving the AI-enabled customer experience throughout the customer journey.

Second, examine the effect Perceived convenience attached to Artificial Intelligence technologies on AI-enabled customer experiences.

Third, investigating the effects of AI-enabled service quality on AI-enabled customer experience.

3. Literature Review

3.1 AI-Enabled Service Quality

AI-enabled service quality refers to the performance and capability of AI systems in delivering efficient and responsive service (Nguyen et al., 2022). It includes dimensions like accuracy, timeliness, and reliability. Several studies (Le et al., 2024; Satheesh & Nagaraj, 2021) note that service quality should

improve user satisfaction; however, conflicting results suggest the relationship may be moderated by other variables.

A study by (Nguyen, Quach, & Thaichon, 2022) explores the impact of AI quality on customer experience and brand relationships, focusing on dimensions such as flow, customer-brand identification, and customer advocacy, with the moderating role of employee responsiveness.

They highlighted that AI information currency and system flexibility significantly enhance customer flow, while system timeliness influences customer-brand identification. Both flow and customer-brand identification mediate the relationship between AI quality and customer advocacy.

Employee responsiveness moderates the effect of AI system reliability on brand identification, highlighting the interplay between AI tools and human service. They used a survey of 350 hotel guests in Vietnam using AI-enabled services. Structural Equation Modeling (SEM) was employed to analyze the effects of AI information and system quality on customer outcomes. The results emphasized the importance of investing in high-quality AI systems to enhance customer engagement and brand loyalty. Businesses should focus on delivering accurate, current, and flexible AI-enabled services while maintaining strong employee responsiveness to optimize customer experiences.

As well, Satheesh and Nagaraj, (2021) further emphasized the role of artificial intelligence (AI) in enhancing customer experience by improving service quality within the banking sector.

The research systematically reviews literature on the emerging applications of AI and its impact on banking operations. AI significantly improves the banking experience for both customers and employees by streamlining processes and reducing workloads. For employees, AI applications include credit score analysis, system failure prediction, fraud detection, phishing website identification, emergency alert systems, liquidity risk assessment, and customer loyalty evaluation. For customers, AI enhances experiences through technologies such as mobile banking, chatbots, and augmented reality, delivering more efficient and personalized services.

Another study by Le et. al., (2024) emphasized that AI-powered services which directly cater to customers are increasingly present across various sectors, including healthcare, education, finance, retail, tourism, and e-commerce.

Despite this widespread adoption, limited review studies examine the impact of AI on customer experience within commercial services, prompting the research team to address this gap. This study analyzed the effects of AI integration on enhancing customer experience.

Data was collected through 335 online responses and analyzed using a structural equation model. The results indicate that perceptions of AI service quality, customer satisfaction with AI, and overall customer experience are significantly interlinked.

The study also emphasizes the critical role of personalization in AI-powered services, which fosters customer trust and commitment to brand relationships, further enriching the customer experience. These findings offer valuable insights into the practical application of AI technology to improve commercial customer experiences. The study presents both theoretical contributions and actionable recommendations for leveraging AI in customer-facing services.

On the other hand, Sardesai, D'Souza, and Govekar, (2024) examined the impact of artificial intelligence service quality (AISQ) and human service quality (HSQ) on customer satisfaction (CS) and loyalty (CL) in the hospitality sector, highlighting the role of customer satisfaction as a mediator.

Both AISQ and HSQ positively influence customer satisfaction, which in turn mediates their impact on customer loyalty. HSQ demonstrates a stronger effect on customer satisfaction and loyalty compared to AISQ, emphasizing the importance of human empathy in service delivery.

The findings also indicate that while AI enhances operational efficiency and guest convenience, the integration of human interactions remains critical for fostering long-term loyalty.

The findings suggest that hospitality providers should balance AI efficiency with human empathy to optimize service quality and customer loyalty. By integrating AI with human interactions, organizations can enhance customer experience while maintaining a competitive edge in the service industry.

2.2 Perceived Convenience

Perceived convenience is defined as the degree to which a service simplifies the customer journey, reducing time and effort (Roy et al., 2017). In AI-supported contexts, it includes 24/7 availability, real-time assistance, and proactive service interaction. Studies (Walch, 2019; Rana et al., 2024) have shown that convenience enhances engagement and trust, thus improving overall experience.

Rana, Jain, & Nehra, (2024) explored the utility and acceptability of AI-enabled chatbots in e-retail, focusing on their impact on the online customer journey, customer attitudes, and purchase decisions.

They highlighted that Perceived usefulness, ease of use, and trust significantly influence customer attitudes toward

chatbots, which in turn affect purchase decisions. While trust plays a critical role, concerns about chatbot reliability and security remain key challenges. The study highlights that chatbots enhance the customer journey by offering convenience, personalization, and real-time support.

Moreover, Tulcanaza-Prieto et al. (2023) demonstrated that customer perception factors have a significant impact on AI-enabled experiences, as AI algorithms are designed to optimize service delivery. These algorithms enhance convenience by automating processes, reducing effort, and providing timely solutions. Additionally, AI tailors interactions to individual customer needs, making experiences more personalized, engaging, and relevant.

This integration of efficiency and personalization enriches overall customer satisfaction, fostering stronger connections between customers and services. Furthermore, Ho and Chow (2023) found that AI marketing efforts positively affect brand preference; however, the impact varies among different customer segments.

This suggests that while AI improves convenience and personalization, its effectiveness depends on aligning with the unique needs, preferences, and expectations of each customer group. Factors such as demographics, purchasing behavior, and familiarity with technology influence how customers perceive

and respond to AI-driven marketing strategies. Therefore, a one-size-fits-all approach may not yield consistent results, highlighting the need for segment-specific customization.

Thus, an increase in convenience means that as services become more convenient, the effort or cost perceived by the customer diminishes. In the context of AI-enabled services, this relationship becomes even more apparent, as these services allow customers to access them at any time and from any location.

The ability to provide round-the-clock availability and flexibility enhances the overall ease of use, reducing the effort required from customers and minimizing any perceived drawbacks.

2.3 AI-Enabled Customer Experience

AI-enabled customer experience encompasses the emotional, cognitive, and behavioral responses users have when interacting with AI-driven services (Ameen et al., 2021). It includes two major components: hedonic experience and recognition-based experience. Prior work suggests that factors like convenience and personalization significantly affect these outcomes.

This allows businesses to tailor their offerings to align with emotional and sensory preferences, further enhancing hedonic experiences and reinforcing customer loyalty (Tulcanaza, et.al., 2023).

Customer recognition involves acknowledging and appreciating individuals or businesses that purchase a firm's products or services. It is a crucial element of business strategy, fostering customer loyalty and engagement. Recognizing customers incorporates attributes such as making them feel valued, safe, connected, and appreciated, while also emphasizing their importance and creating a welcoming experience (Rose, et. al., 2012; Li, 2024).

In today's competitive marketplace, innovation in products and services plays a pivotal role, transforming into significant competitive advantages. Advances in information technology, including artificial intelligence, have strengthened the concept of customer recognition. AI enables brands to track customers' purchase histories, distinguishing between new and repeat customers and tailoring offerings based on their preferences and consumption patterns. This capability has heightened competition among brands, driving them to innovate further in product and service design. By integrating customer recognition with AI and technological advancements, businesses not only strengthen their competitive edge but also improve the overall customer experience, creating a mutually beneficial relationship between the brand and its consumers. This trend underscores the growing importance of personalization and innovation in maintaining a strong market position. (Foroudi, et. al., 2018; Tulcanaza, et.al., 2023).

Studies demonstrate that technologies such as virtual reality (VR), augmented reality (AR), mixed reality, and machine learning offer consumers realistic and innovative shopping experiences by influencing cognitive processes and enabling advanced decision-making in production and operations (Hoyer et al., 2020; Kushwaha et al., 2021; Pillai et al., 2020). To maximize the benefits of these technologies in improving customer experiences, a thorough understanding of customers' preferences, behaviors, and past interactions is essential. AI technologies, including machine learning and natural language processing, can expedite this process by analyzing customer data to provide tailored engagement and insights (Paschek et al., 2017; Gartner, 2020). AI is also used in combination with tools like AR, computer vision, and predictive inventory systems to further enhance retail experiences (Saponaro et al., 2018; Newman, 2019).

3. Hypotheses Development

Based on the literature, the following hypotheses are proposed:

- **H1:** Perceived convenience has a significant positive effect on AI-enabled customer experience.

- **H2:** AI-enabled service quality has a significant positive effect on AI-enabled customer experience.

Therefore, the research proposed model has been developed in the figure below:
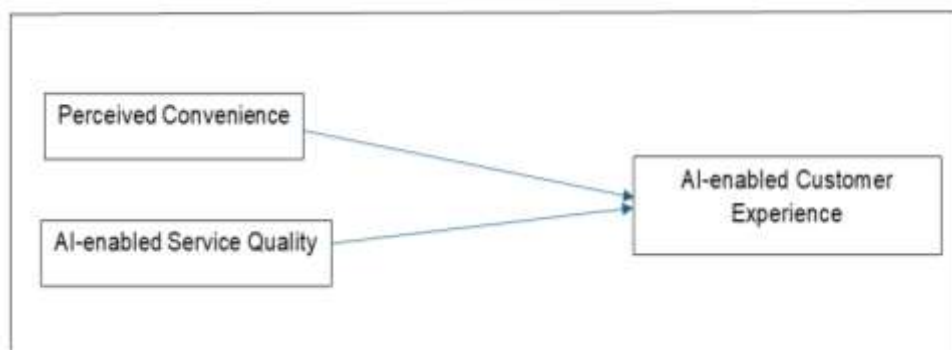
Figure1: The Research Proposed Model, the Relationship between Perceived Convenience, AI-enabled Service Quality, and AI-enabled Customer Experience.

4. Methodology

4.1 Research Design

An online questionnaire-based survey was employed as the primary data collection method. This approach is well-suited for empirical research settings, as it facilitates the collection of measurable data such as customer experience, ease of use, and trust. The structured and replicable nature of this method ensures both the reliability and generalizability of the findings (Mikalef et al., 2020).

This study employed a quantitative, cross-sectional design using an online survey to gather empirical data. The focus was on evaluating the effect of perceived convenience and AI-enabled service quality on AI-enabled customer experience.

4.2 Sample and Data Collection

Participants were recruited online through social media platforms using purposive sampling. Data collection was conducted via an online questionnaire using Microsoft forms distributed on these platforms. The study focused on a stimuli involving an AI-enabled customer experience, integrating a color-matching tool and augmented reality (AR) technology.

Data was collected from 302 participants who had recently used an AI-based virtual beauty application. A non-probability purposive sampling method was applied. Respondents were primarily female online shoppers within Egypt, reflecting the market context of AI-enabled beauty services.

4.3 Measurement Instruments

All variables were measured using validated items from prior studies, adapted for the AI shopping context. Each item was rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

- **Perceived Convenience (PCONV)**: Measured through items evaluating ease of access, time-saving features, and overall effort reduction (e.g., Walch, 2019).

- **AI-Enabled Service Quality (ASQ)**: Measured by indicators such as responsiveness, accuracy, and system reliability (e.g., Nguyen et al., 2022).

- **AI-Enabled Customer Experience (AICX)**: Assessed through both hedonic and recognition sub-dimensions (Ameen et al., 2021).

4.4 Data Analysis

The online questionnaire combines measuring scales of constructs and sociodemographic variables. The online questionnaire should be designed to provide seamless navigation between sections, reducing measurement errors, encouraging respondents to complete it, and ensuring accurate answers (Hewson, 2017).

Partial least squares structural equation modeling (PLS-SEM) was used for hypothesis testing, employing SmartPLS 4.1 software. Model reliability and validity were verified through Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE). Bootstrapping with 5000 samples was applied to evaluate significance.

5. Results

5.1 Measurement Model Assessment

All constructs met the threshold for internal consistency (Cronbach's alpha > 0.7; CR > 0.8) and convergent validity (AVE > 0.5). Discriminant validity was confirmed using the HTMT ratio.

5.2 Structural Model and Hypothesis Testing

- **H1 (Perceived Convenience → AI-Enabled Customer Experience): Supported**

  o Path coefficient = **0.321**,

  o t-statistic = **5.787**,

  o p-value = **0.000**

This indicates that perceived convenience has a significant positive impact on customer experience. It enhances trust and user satisfaction, supporting previous literature findings.

- **H2 (AI-Enabled Service Quality → AI-Enabled Customer Experience): Not Supported**

  o Path coefficient = **-0.019**,

  o t-statistic = **0.218**,

  o p-value = **0.829**

The analysis revealed that AI-enabled service quality does not significantly influence the customer experience in this context. This may be due to users perceiving these technical features as baseline expectations rather than experience enhancers.

6. Discussion

The findings reveal a differentiated impact of perceived convenience and AI-enabled service quality on AI-enabled customer experience. Perceived convenience emerged as a strong, positive contributor to user satisfaction. Its role in reducing effort, saving time, and facilitating smoother interactions was appreciated by users, reinforcing its importance in AI-supported environments.

Conversely, AI-enabled service quality did not significantly influence the customer experience. This contradicts earlier assumptions and some prior studies (e.g., Nguyen et al., 2022), where service quality was seen as a key driver. One explanation may be that technical service efficiency is now considered a standard expectation in AI systems and no longer differentiates the experience unless paired with more humanized or personalized interactions.

This result also aligns with recent evidence that consumers have begun to normalize AI-driven technical performance.

Features like fast response times and accurate suggestions are now perceived as defaults, not value-added services. As such, their absence may cause dissatisfaction, but their presence alone does not improve experience.These insights emphasize the growing need for businesses to focus less on baseline automation performance and more on features that contribute to effortless and intuitive customer journeys.

7. Conclusion

The transformation of customer experience through Artificial Intelligence (AI) represents a significant shift in the business world. AI technologies, such as data analytics, machine learning, natural language processing, and robotics, have redefined how businesses interact with and understand their customers, enhancing experiences across various touchpoints.

Similarly, digital technologies have played a pivotal role in shaping customer interactions. Innovations like the internet introduced new communication and transaction platforms, while e-commerce provided consumers with access to products beyond physical stores. Mobile platforms consolidated multiple commercial applications onto single devices, and social media created networks for sharing content and fostering consumer connections.

This study explored the specific effects of AI-enabled service quality and perceived convenience on AI-enabled customer experience within the context of online beauty services. The key conclusions are:

Perceived convenience significantly enhances AI-enabled customer experience by increasing efficiency and reducing friction in the shopping process.

AI-enabled service quality does not show a significant direct effect on customer experience, suggesting that users take such technical functionalities for granted.

For practitioners, the findings suggest prioritizing system design that maximizes perceived ease of use and real-time assistance over purely technical enhancements. For scholars, these results call for deeper examination of evolving consumer expectations in AI service contexts.

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