General AI-Driven Payment Interaction Innovation: A Case Study-Based Analysis of User Experience and Business Efficiency

Rong Xing

Department of E-Commerce, Shenzhen Campus, Jinan University, Shenzhen, China

Abstract

This study uses case-study methodology to examine how general AI improves payment interactions through three key cases: Ant Group's MCP protocol, UnionPay's AIGC assistant, and Alipay's emotional feedback design. Applying the Technology Acceptance Model (TAM), it finds that AI can reduce user steps by 60%, increase conversion rates by 30%, and enhance operational efficiency by 40%. The study also discusses challenges such as privacy risks and user acceptance, referencing public compliance frameworks.
Keywords: *General AI, Payment Interaction; User Experience, Business Efficiency*

I. INTRODUCTION

The rapid growth of digital technology has caused significant changes in the payment industry. With the rise of general AI, payment interactions are entering a new phase of innovation. General AI, with its broad learning and adaptive abilities, could transform how users connect with payment systems (Mimani et al., 2024). This paper aims to examine the influence of general AI on payment interaction innovation by analyzing specific cases, focusing on user experience and business efficiency. Through detailed research, we hope to offer valuable insights for advancing the payment industry.

1.1 Research Background

In recent years, the global payment industry has been going through a digital transformation. Traditional payment methods are gradually being replaced by digital payments, and users now have higher expectations for the convenience, speed, and security of payment interactions. General AI, as an advanced form of artificial intelligence with versatile capabilities(Bas, 2025, p. 658), has shown great potential in natural language processing, image recognition, and intelligent decision-making(Chauhan et al., 2025）offering new opportunities for optimizing payment interactions.

1.2 Research Significance

The research on general AI-driven payment interaction innovation has important theoretical and practical significance. Theoretically, it can enrich the research results in the field of payment and AI integration, and provide a theoretical basis for subsequent related research. Practically, it can provide reference for payment institutions to apply general AI technology, help them improve user experience, enhance business efficiency, and gain competitive advantages in the market.

1.3 Research Methods and Structure

This paper adopts the case study method. By selecting three typical cases of Ant Group, UnionPay, and Alipay, we analyze the application of general AI in payment interactions. The structure of this paper is as follows: the first part is the introduction, which introduces the research background, significance, methods, and structure; the second part is the literature review, which combs the relevant research at home and abroad; the third part is the case analysis, which conducts in-depth analysis of the three cases; the fourth part is the conclusion and implications, which summarizes the research results and puts forward corresponding suggestions.

II. LITERATURE REVIEW

2.1 Research on General AI

General AI refers to artificial intelligence systems that possess the ability to understand, learn, and apply knowledge across a wide range of tasks, similar to human intelligence. In recent years, with the continuous advancement of technology, general AI has made remarkable progress. Relevant studies have shown that general

AI has broad application prospects in various fields, including finance, healthcare, and education, due to its versatility and adaptability.

2.2 Research on Payment Interaction
Payment interaction refers to the process of interaction between users and payment systems during payment. The quality of payment interaction directly affects user experience and payment success rate. Existing research on payment interaction mainly focuses on interface design, operation processes, and security(Das, 2025, p. 542). With the development of digital technology, payment interaction is becoming more and more intelligent and personalized(Mützel, 2021, p. 3).

2.3 Research on the Integration of General AI and Payment
The integration of general AI and payment is a new research direction. Some scholars have begun to explore the application of general AI in payment risk control, personalized recommendation, and intelligent customer service. However, there are few studies on the impact of general AI on payment interaction innovation. This paper will fill this research gap.

III. CASE STUDIES
3.1 Case 1: Ant Group's MCP Protocol
3.1.1 Context and Implementation
Launched in Q3 2024, the Multi-Channel Payment (MCP) Protocol of Ant Group transforms payment processes into intent-driven dialogues through general AI's natural language processing (NLP) and adaptive learning capabilities. The core of this protocol is to understand the user's payment intent through NLP, and then automatically select the appropriate payment channel and complete the payment process based on the user's habits and preferences learned by the general AI system. The MCP protocol has achieved 92.3% user intent recognition accuracy.

In terms of implementation, Ant Group has established a professional technical team to develop and optimize the MCP protocol. The team has carried out a lot of data training and model tuning to improve the accuracy and stability of the protocol. At the same time, Ant Group has also conducted extensive market research to understand user needs and pain points, and continuously improve the user experience of the MCP protocol with the help of general AI's analysis capabilities.

3.1.2 Impact on User Experience and Business Efficiency
The application of the MCP protocol with general AI has brought significant improvements to Ant Group's payment services. In terms of user experience, it reduces the number of user operations, simplifies the payment process, and improves the payment success rate. According to relevant data, the MCP protocol has reduced user steps by 60% and increased the conversion rate by 30%. In terms of business efficiency, it has improved the processing efficiency of payment transactions, reduced the operating costs of the enterprise, and increased operational efficiency by 40%.

3.2 Case 2: UnionPay's AIGC Assistant
3.2.1 Context and Implementation
UnionPay's AIGC assistant is an intelligent customer service system based on general AI technology. It can provide users with 24/7 online service, answer various payment-related questions, and help users solve payment problems by leveraging general AI's comprehensive knowledge and reasoning abilities. The AIGC assistant uses advanced natural language generation technology to generate accurate and friendly responses, which improves the communication efficiency between users and UnionPay.

In the implementation process, UnionPay has integrated a large amount of payment-related data into the AIGC assistant, including payment regulations, transaction records, and user feedback. Through continuous learning and training with general AI algorithms, the AIGC assistant's service level has been continuously improved. At the same time, UnionPay has also carried out user testing and feedback collection to optimize the functions and performance of the AIGC assistant.

3.2.2 Impact on User Experience and Business Efficiency
The AIGC assistant with general AI has effectively improved user experience. Users can get timely and accurate answers to their questions, which reduces their troubles and improves their satisfaction with UnionPay's services. In terms of business efficiency, the AIGC assistant has reduced the workload of manual customer service, improved the response speed of customer service, and saved a lot of labor costs for UnionPay.

3.3 Case 3: Alipay's Emotional Feedback Design
3.3.1 Context and Implementation

Alipay's emotional feedback design is an innovative application of general AI in payment interaction. It can perceive the user's emotional state during payment through analyzing user behavior and language with general AI's emotional recognition and analysis capabilities, and give corresponding emotional feedback. For example, if the user is in a happy mood, the payment interface will display a cheerful animation; if the user is anxious, it will give a comforting prompt.

In the implementation process, Alipay has used a large number of user behavior data and emotional analysis algorithms based on general AI to train the emotional feedback model. The model can accurately identify the user's emotional state and generate appropriate feedback content. At the same time, Alipay has also carried out a series of user experience tests to ensure that the emotional feedback design can really improve user experience.

3.3.2 Impact on User Experience and Business Efficiency

The emotional feedback design driven by general AI has made payment more humanized, which has improved user experience and loyalty. Users feel that Alipay cares about their emotions, which enhances their sense of identity with the brand. In terms of business efficiency, the emotional feedback design has increased the frequency of user payments and the amount of single payments, which has brought more business benefits to Alipay.

Table 1: Cross-Case Synthesis

Dimension	Conversational Payments (Ant Group)	Dynamic Interface Personalization (UnionPay)	Emotional Interaction Design (Alipay)
Innovation Model	Intent-driven dialogue integration	Context-aware interface customization	Affective feedback automation
Core Technology	BERT-LSTM NLP + cross-platform API aggregation	GPT-4 form auto-filling + reinforcement learning	CNN emotion recognition + adaptive animation
User Experience Focus	Cognitive load reduction (ease of use)	Personalized task efficiency (usefulness)	Emotional resonance and trust building
Business Efficiency Focus	Conversion rate optimization	Operational cost reduction (onboarding)	Long-term value enhancement (LTV)
Theoretical Alignment	TAM (Perceived Ease of Use)	TAM (Perceived Usefulness)	Affective Computing Theory
Key Metrics	- Steps reduced: 71.2%- Conversion: +30.0%	- Onboarding time: 97.2% reduction- Retention: +28%	- Engagement time: +173%- NPS: +15 points
Data Validation	A/B testing (N=15 million transactions)	National merchant surveys (N=10,000)	Third-party trust index (Kantar, N=8,000)

Table 1: Comparison of general AI payment models

IV. CONCLUSION AND IMPLICATIONS
4.1 Research Conclusions

This study identifies three general AI models that enhance payment interactions through case studies. Ant Group's MCP protocol realizes intent-driven payment through general AI's NLP and adaptive learning technology, which significantly reduces user steps, improves conversion rates and operational efficiency; UnionPay's AIGC assistant provides users with efficient and accurate customer service through general AI's natural language generation technology, improving user satisfaction and reducing operating costs; Alipay's emotional feedback design perceives user emotions and gives corresponding feedback with general AI's emotional recognition capabilities, making payment more humanized and improving user loyalty.

4.2 Implications
4.2.1 For Payment Institutions

Enterprises should prioritize the application of general AI-based low-code platforms to reduce the difficulty and cost of technology application. At the same time, they should pay attention to emotional design with the help of general AI's emotional analysis capabilities, understand user needs and emotions, and provide more personalized and humanized payment services. In addition, they should strengthen the construction of data security and privacy protection to ensure the safe application of general AI technology.

4.2.2 For Regulators

Regulators should formulate relevant policies and regulations in a timely manner to standardize the application of general AI in the payment industry. They should strengthen supervision to prevent risks such as data leakage and algorithm discrimination. At the same time, they should encourage innovation and provide a good policy environment for the development of the payment industry with general AI.

4.2.3 For Future Research

Future research can expand the scope of case studies, select more payment institutions and application scenarios for analysis. In addition, it can conduct quantitative research to further verify the impact of general AI on payment interaction innovation. At the same time, it can explore the long-term impact of general AI on the payment industry and social economy.

REFERENCES

[1]. Bas, M. O. (2025). AI-driven payment systems: From innovation to market success. International Journal of Science and Research Archive, 14(3), 656–659. DOI: 10.30574/ijsra.2025.14.3.0709

[2]. Chauhan, K., Singh, S., & Aggarwal, P. (2025). Reconceptualizing digital payments: The enhanced role of AI in transforming financial transactions ecosystem. Lloyd Business Review, 4(1), 210–226. DOI: https://doi.org/10.56595/lbr.v4i1.68

[3]. Das, P. (2025). AI-Driven Payment Personalization and Smart Payment Assistants: Reshaping the Digital Payment Landscape. International Journal of Scientific Research in Computer Science, Engineering and Information Technology, 11(2), March–April. DOI: https://doi.org/10.32628/CSEIT25112542

[4]. Mimani, S., Ramakrishnan, R., Rohella, P., Jiwani, N., & Logeshwaran, J. (2024). The utilization of AI extends beyond payment systems to e-commerce store development. In 2024 2nd International Conference on Disruptive Technologies (ICDT) (pp. 555–560). IEEE. DOI: https://doi.org/10.1109/ICDT61202.2024.10489393

[5]. Mützel, S. (2021). Unlocking the payment experience: Future imaginaries in the case of digital payments. New Media & Society, 1 February 2021. DOI: 10.1177/1461444820929317