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A Literature Study on GenAI Adoption Behavior from the UTAUT Perspective

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Abstract

Based on the Unified Theory of Acceptance and Use of Technology (UTAUT) and its extended frameworks, this study addresses the existing issues in current research on Generative Artificial Intelligence (GenAI) adoption behavior, including scattered research scenarios with insufficient cross-scenario comparisons, inadequate focus on dynamic adoption processes, gaps in research on specific population groups, and incomplete systematic application context of the UTAUT framework. Employing the literature review method, the study systematically retrieves and organizes literature related to the developmental history of the UTAUT theory and GenAI adoption behavior, aiming to clarify the research context of GenAI adoption behavior and identify the conclusions and limitations of existing studies. The research findings indicate that existing studies have confirmed that technological characteristics, individual traits, and environmental support are key factors influencing GenAI adoption, with widespread attention paid to trust and ethical issues. However, the aforementioned limitations still persist. Ultimately, at the theoretical level, the study proposes future research directions—strengthening cross-disciplinary integration, exploring dynamic evolution mechanisms, and expanding sample coverage—to enrich the relevant theoretical system. At the practical level, it provides targeted recommendations for enterprises, organizations, and policymakers to enhance the efficiency and rationality of GenAI adoption.

Keyword

UTAUT, GenAI, Adoption behavior, Literature review

Introduction

The origins of modern research on GenAI can be traced back to breakthroughs in generative models within the framework of deep learning. Firstly, in their paper "Auto-Encoding Variational Bayes", Diederik P. Kingma and Max Welling proposed the Variational Autoencoder (VAE). Through the collaborative training of encoders and decoders, VAE can learn the probability distribution of data and generate new samples, laying the foundation for subsequent generative

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models (Kingma, D. P., & Welling, M., 2013). Secondly, Ian J. Goodfellow and others, in their paper "Generative Adversarial Nets", pioneeringly proposed the Generative Adversarial Network (GAN). This architecture has become one of the most influential paradigms in the field of generative artificial intelligence, widely applied to multimodal generation tasks such as images, text, and videos (Goodfellow, I. J., Pouget-Abadie, J., Mirza, M., Xu, B., Warde-Farley, D., Ozair, S., ... & Bengio, Y., 2014).

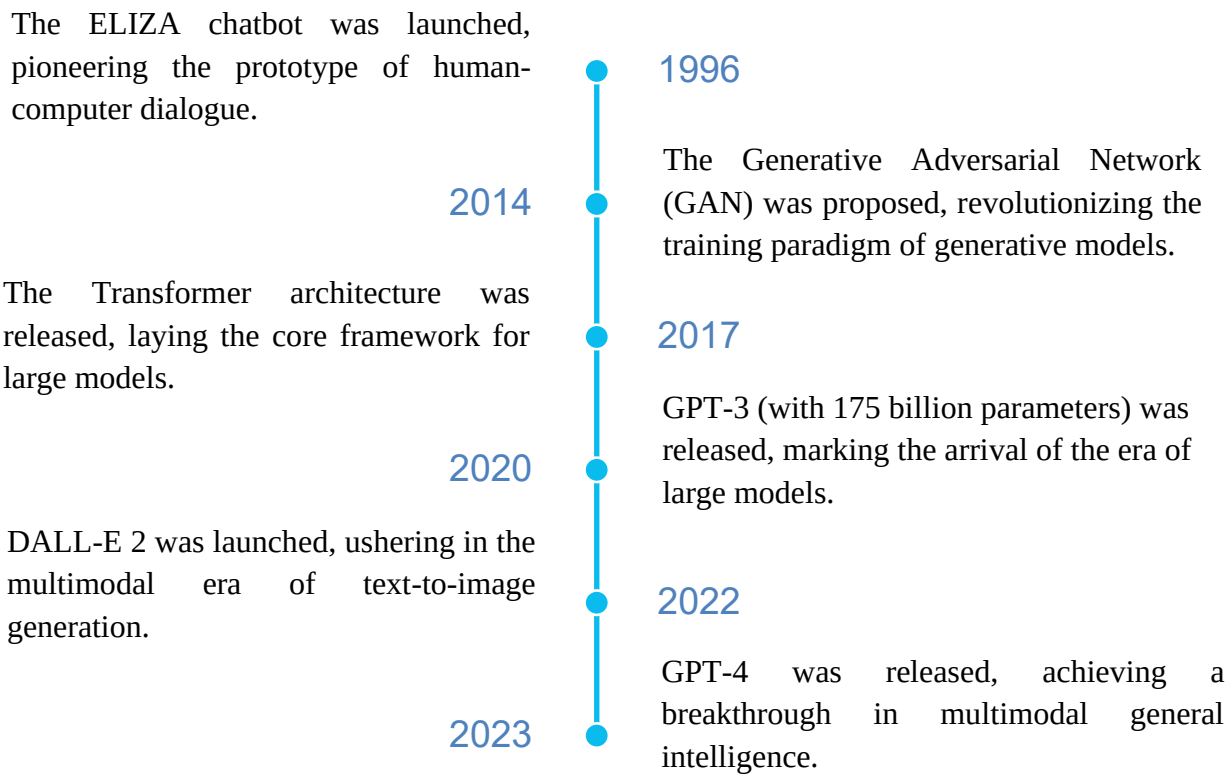

Figure 1. Timeline of Generative Artificial Intelligence Development

Currently, the systematic review of the modern research origins and key technological breakthroughs of GenAI in the academic community still needs to be improved. Additionally, there is a lack of clear focus on the specific opportunities, challenges, and impact pathways of GenAI (such as large language models and generative tools) in higher education—a core field for knowledge production and dissemination—making it difficult to clearly present the logical connection between the development context of GenAI technology and its application in educational scenarios. The research aims to achieve two goals: first, systematically review the modern research origins of GenAI and identify key technological breakthroughs in its development process (with a focus on core generative models); second, analyze the characteristics of GenAI's technological development in recent years and the capabilities of typical application tools (e.g., large language models), focus on the field of higher education, clarify the opportunities and challenges brought by GenAI to this field, and construct a framework for the connection between technological development and educational application. By systematically reviewing the research

origins and key technological breakthroughs of GenAI, this study fills the gap in the systematic review of the development context of GenAI technology, clarifies the foundational role of core generative models in the GenAI field, and provides a clear historical context reference for subsequent research on GenAI technology evolution.

Methodology

The Unified Theory of Acceptance and Use of Technology (UTAUT) was proposed by Venkatesh et al. in 2003 in their paper "User Acceptance of Information Technology: Toward a Unified View". It aims to predict complex scenarios of future technology adoption and serves as a core paradigm guiding technology design, policy - making, and academic research. By integrating multiple theoretical models on technology adoption research, Venkatesh et al. formed the core determinant variables of UTAUT: performance expectancy, effort expectancy, social influence, and facilitating conditions. They believed that technology adoption behavior is driven by both rational decision - making paths and social influence paths, breaking through the limitation that early models only focused on individual cognition and revealing the deep logic of technology adoption (Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D., 2003). In terms of research methods, the paper, first, verified the universality of UTAUT by synthesizing data from 467 existing studies through meta - analysis. Second, it used multi - group SEM for the first time in technology adoption research to systematically test the role of moderating variables. Third, it compared the predictive ability of UTAUT with several other models on technology adoption research and proved that UTAUT is significantly better than a single model in explaining behavioral intention and usage behavior. Through rigorous empirical methods, UTAUT has become the first integrated theory verified by data, providing a methodological template for subsequent cross - cultural and cross - domain research and theoretical guidance for enterprise technology promotion.

In 2012, in their paper "Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology", Venkatesh et al. optimized the Unified Theory of Acceptance and Use of Technology model by integrating relevant theories from psychology and economics. On the original basis, they constructed UTAUT2, which combines instrumental rationality and emotional experience, extending the application of the theory to consumer scenarios. Specifically, "UTAUT2 explains the complex motivations behind consumers' technology adoption and achieves precise adaptation to different user groups by adding three core variables—hedonic motivation, price value, and habit—and refining the action paths of moderating variables" (Venkatesh, V., Thong, J. Y., & Xu, X., 2012). It can be considered that this paper has significant academic significance in the development of technology adoption theories, and at the practical level, it guides enterprises to shift their product design strategies from "function-oriented" to "user experience-oriented".

In 2016, in their paper "Unified Theory of Acceptance and Use of Technology: A Synthesis and the Road Ahead", Venkatesh et al. conducted a comprehensive theoretical evaluation and critical reflection on UTAUT and its extensions, and constructed a multi-level theoretical integration framework. "Specifically, through horizontal integration, extended variables from different fields are classified into a unified framework; at the same time, through vertical integration, a multi-level analytical model of "individual - organization - society" is established"

(Venkatesh, V., Thong, J. Y., & Xu, X., 2016). In terms of research methods, addressing the methodological flaws in existing studies, this paper proposes a solution combining dynamic tracking and mixed research: adopting a "baseline survey & multiple follow-ups" model to verify the impact of dynamic processes such as habit formation and technological iteration on usage behavior, thereby realizing a longitudinal tracking design. Meanwhile, it combines quantitative analysis with qualitative research, using questionnaire survey results to verify impact paths, which makes up for the shortcomings of a single method in explaining complex behaviors. This iteration of the theory provides an evolving methodological foundation for understanding the complex landscape of interaction between technology and humans, and remains a core principle guiding technology design, policy-making, and academic research to this day.

In 2022, Venkatesh's paper "Adoption and Use of AI Tools: A Research Agenda Grounded in UTAUT", published in Annals of Operations Research, constitutes a significant extension of the UTAUT theory in the field of artificial intelligence. Its core achievement lies in deconstructing the threefold uniqueness of AI tools: algorithmic black boxes and iteration speed at the technical level, trust paradox and algorithm anxiety at the user level, and ethical risks and institutional pressures at the organizational level. Additionally, it proposes a four-dimensional research agenda of "individual - technology - environment - intervention," covering variables such as technological anxiety, algorithmic trust, and institutional pressure, and verifies the dynamic moderating effects of technical experience and ethical sensitivity (Venkatesh, V., 2022). The contributions of this paper to UTAUT are reflected in three aspects: first, it expands the variable system by adding dimensions such as algorithmic trust and data privacy concerns, thereby enhancing the model's explanatory power for AI adoption; second, it innovates research methodologies by advocating dynamic tracking and mixed methods research to capture the interaction between technological iteration and user adaptation; third, it integrates ethical theory and institutional theory to construct a "ethical risk - trust - adoption" path, promoting the transformation of the theory towards a responsibility - oriented direction. This paper provides a theoretical framework for the adoption of AI tools and points out the direction for UTAUT to adapt to emerging technological scenarios.

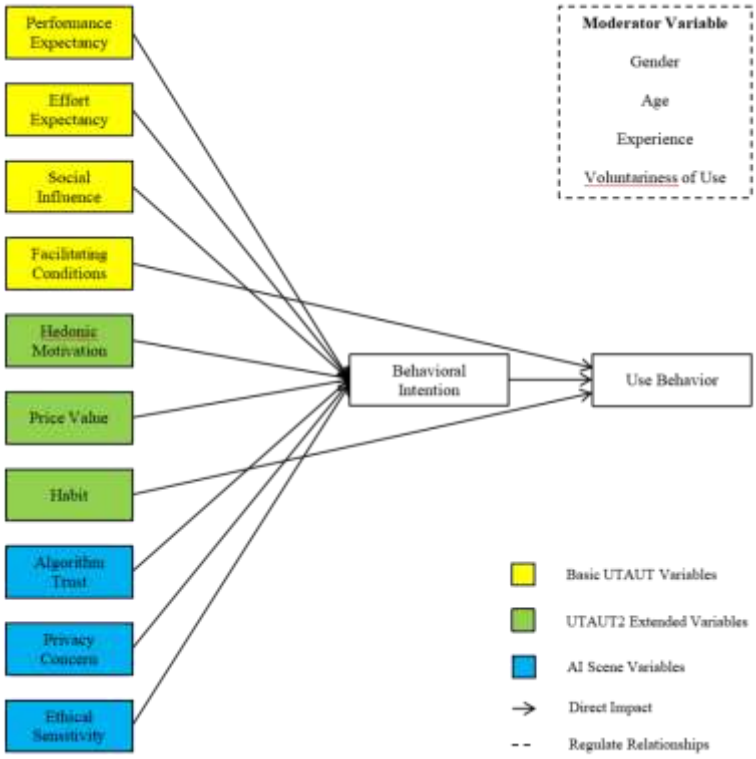

Figure 2. Types of UTAUT Extensions

To sum up, the development of the Unified Theory of Acceptance and Use of Technology has gone through an evolutionary process from fragmentation to integration and from static to dynamic. The development of this theory presents three major characteristics: first, integrity, which forms a unified framework by absorbing multidisciplinary theories; second, dynamics, which continuously expands variables and scenarios with technological changes; third, practicality, which is widely applied in fields such as medical care, education, and e-commerce to guide technology design and promotion strategies. The research on the Unified Theory of Acceptance and Use of Technology not only maintains the stability of the core framework but also, through variable innovation and methodological upgrading, has become the core paradigm in the field of technology adoption, continuously promoting the interactive development of theory and practice.

Results and Discussion

The rapid development of generative AI is redefining the boundaries of human-computer interaction, with increasingly significant impacts on the workplace and even the entire society. In 2024, Bick et al. conducted a survey among thousands of American working professionals of different ages. The survey results showed that the usage rate of generative artificial intelligence among people under the age of 50 was approximately 30% (Bick, A., Blandin, A., & Deming, D. J., 2024). As shown in Figure 3.

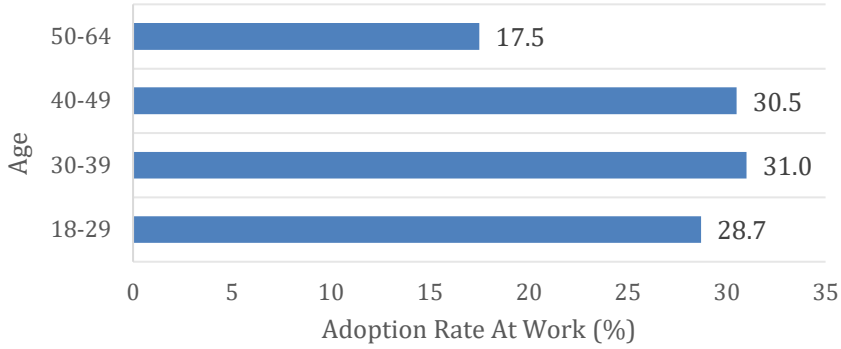

Figure 3. Adoption of Generative AI Work by Age of American Population

By reviewing the literature on the adoption behavior of generative artificial intelligence, a representative work is the paper "Trust in Automation: Designing for Appropriate Reliance" published by Lee and See in 2004. This paper is a foundational literature in the field of human-machine trust research, providing a theoretical framework for understanding users' trust mechanisms and behavioral reliance on automated systems (such as AI and robots) (Lee, J. D., & See, K. A., 2004). In 2024, Zhang et al. analyzed 48 empirical studies to sort out the application status and core issues of generative artificial intelligence (GenAI) in the field of education. They emphasized that the application of technology should be combined with the essence of education, balancing technological empowerment and ethical governance, thus providing empirical references for the rational application of GenAI in education (Zhang, X., Zhang, P., Shen, Y., Liu, M., Wang, Q., Gašević, D., & Fan, Y., 2024). In 2024, Guo Shunli and Zhang Xuening published a study in "Information Science" entitled "Identification of Key Influencing Factors of Knowledge Adoption Behavior in Researchers' Application of Generative Artificial Intelligence", which focused on the key influencing factors of knowledge adoption behavior of researchers in the application scenarios of generative artificial intelligence (Guo Shunli, Zhang Xuening, 2024). In 2025, Dai Bao et al. conducted a comprehensive review of research in this field. Their study integrated 36 domestic and foreign literatures and summarized the influencing factors of users' adoption of generative artificial intelligence, covering three dimensions: technical characteristics, individual traits, and environmental support (Dai Bao, Yang Liying, Zheng Yiqing, 2025). In 2025, Zheng Han et al. focused on the adoption behavior of practitioners in the publishing industry towards artificial intelligence-generated content (AIGC) in their paper "Research on the Configuration Effect of Influencing Factors of AI-Generated Content Adoption Behavior among Publishing Practitioners". They revealed the interaction mechanism of multiple factors from a configurational perspective (Zheng Han, Xiao Qian, He Chen, 2025). The research results of the above literature are shown in Table 2.

Conclusion

By reviewing the evolution of theories on technology adoption and application integration, as well as relevant studies on the adoption behavior of generative artificial intelligence, existing research findings have clearly indicated that performance expectancy, effort expectancy, social influence, and facilitating conditions are key factors affecting adoption behavior. Additionally, issues related

to trust and ethics have become focal points of widespread concern in academic circles. However, there are still obvious shortcomings in current research: the research scenarios are relatively scattered, lacking cross-scenario comparative analysis; insufficient attention has been paid to the dynamic process of adoption behavior; and research on certain groups is inadequate. Future studies should focus on strengthening integrated research across different fields, delving into the dynamic evolution mechanism of generative artificial intelligence adoption behavior, and expanding the coverage of research samples. In this way, the theoretical system of generative artificial intelligence adoption behavior can be continuously improved, providing more robust guidance for practical applications.

Future research should focus on strengthening cross-disciplinary integrated studies. In the field of education, it is essential to prioritize cross-stage integrated analysis across higher education, basic education, and vocational education, so as to extract the common laws and differentiated needs of GenAI adoption in different educational scenarios. Meanwhile, future research can further link educational policies with practice, providing more targeted practical guidance for smart campus construction, GenAI-assisted personalized teaching, and balanced allocation of educational resources. This will promote the in-depth integration of GenAI with education and teaching.

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