

The Impact of Generative AI Adoption on Faculty Job Performance in Private Universities in Shandong Province: A Technology Acceptance Model Perspective

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ABSTRACT: Generative AI (GenAI) reshapes teaching, research and administration in higher education. Private universities in Shandong feature constrained budgets, heavy teaching loads and urgent digital transformation demands, forming a unique research context. Based on the Technology Acceptance Model (TAM), this study explores how perceived usefulness and ease of use drive faculty's GenAI adoption intention, and further analyzes AI's multidimensional effects on their teaching, research and administrative performance. A context-specific framework is constructed through literature review. Results show rational GenAI application effectively eases institutional resource shortages and improves overall faculty efficiency. However, academic integrity risks, data privacy threats, algorithm bias and uneven digital literacy hinder sustainable AI adoption. This paper proposes tiered training, standardized ethical rules and optimized technical support for local private universities, offering references for similar private higher education institutions worldwide.

KEYWORDS : *Generative Artificial Intelligence, Private University, Faculty Job Performance, Technology Acceptance Model, Educational Digital Transformation, Shandong Higher Education*

I. INTRODUCTION

Since ChatGPT's public release in 2022, GenAI has evolved from experimental technology into a pervasive productivity tool for multiple industries and educational scenarios. Capable of autonomous text generation, multimedia creation and data-driven analysis, GenAI has been widely embedded into curriculum design, academic research and daily institutional management. To advance educational modernization, the Chinese central government has prioritized educational digitalization via multiple national strategies, urging all types of universities to leverage intelligent technologies to strengthen operational competitiveness and educational quality.

As a vital component of China's diversified higher education ecosystem, private universities undertake substantial talent cultivation tasks. Compared with public counterparts, private institutions across Shandong Province suffer from limited research funding and insufficient high-end academic platforms. Compounded with heavier repetitive teaching and administrative assignments imposed on faculty, these resource constraints create unique obstacles for digital transformation. Additionally, intensified peer competition and mandatory digital upgrading policies further compel local private universities to embrace GenAI as a cost-effective solution to optimize resource allocation and reduce faculty work pressure.

Even with evident practical merits, faculty hold divided attitudes toward GenAI. Frontline teachers acknowledge its strengths in simplifying repetitive work, while researchers and administrators express growing concerns over algorithmic inaccuracy, data leakage and AI-induced academic misconduct. Such cognitive inconsistency impedes unified and normative GenAI adoption within regional private higher education. Introduced by Davis (1989), TAM provides a parsimonious and validated theoretical lens to interpret users' technology acceptance based on perceived usefulness and ease of use. Applying TAM to unpack the linkage between faculty's GenAI cognition, adoption behaviors and job performance can fill the research gap regarding regional private higher education and guide the digital upgrading of similar institutions.

1.1 GenAI Applications in Higher Education

GenAI refers to iterative-updated artificial intelligence systems that generate customized original content based on user prompts and large-scale training datasets. Unlike traditional retrieval-based educational tools, it supports intelligent content creation, automatic summarization, error diagnosis and data-assisted decision-making, covering core operational scenarios of modern universities.

In teaching practices, GenAI streamlines lesson preparation by generating syllabi, teaching materials and assessment questions, and delivers personalized feedback to accommodate diverse student learning needs. In academic research, it simplifies routine work including literature screening, reference formatting and linguistic polishing, greatly shortening research cycles. For institutional administration, GenAI automates report drafting, minute sorting and routine correspondence, effectively cutting down faculty's non-academic workload. Despite these benefits, unregulated GenAI use also brings pervasive challenges such as ambiguous copyright ownership, biased algorithm outputs and potential privacy risks. These hidden hazards are particularly prominent for resource-limited private universities lacking dedicated AI risk supervision systems.

1.2 Research Objectives and Research Questions

1.2.1 Research Objectives

1. Validate TAM's contextual adaptability for explaining GenAI adoption among faculty at Shandong's private universities;
2. Clarify the causal relationships between TAM core variables and faculty's GenAI adoption intention under resource-constrained scenarios;
3. Analyze how GenAI reshapes private faculty's teaching, research and administrative performance to relieve their inherent work dilemmas;
4. Identify context-specific barriers restricting sustainable GenAI integration within local private higher education;
5. Formulate differentiated and feasible strategies for institutional administrators and faculty to achieve responsible GenAI utilization.

1.2.2 Research Questions

1. RQ1: How do perceived usefulness and perceived ease of use affect GenAI adoption intention among faculty from Shandong's private universities?
2. RQ2: In what ways does GenAI optimize the teaching performance of overloaded private university faculty?
3. RQ3: How can GenAI compensate for resource shortages and improve the research productivity of private university educators?
4. RQ4: To what extent can GenAI reduce non-academic burdens and elevate private faculty's administrative efficiency?
5. RQ5: What unique challenges hinder the deep integration of GenAI into daily operations of regional private universities?

1.3 Research Significance

1.3.1 Theoretical Significance

This study extends TAM's application scope to GenAI scenarios and private higher education contexts. Most existing TAM-centered GenAI studies prioritize public universities and overlook institutional heterogeneity across higher education sectors. This research reinterprets TAM's core variables based on the actual pain points of resource-constrained private universities, and establishes an integrated analytical chain of "technology perception - adoption intention - practical behavior - job performance". The constructed framework supplements targeted theoretical evidence for technology acceptance research and enriches the theoretical system of educational technology and faculty performance management.

1.3.2 Practical Significance

The research findings deliver targeted decision-making references for private university administrators to design GenAI development strategies, including customized training plans and ethical supervision rules matching their resource endowments. Meanwhile, the results help faculty develop rational cognition of GenAI's pros and cons, and adopt appropriate AI tools to alleviate work pressure. Overall, this research assists Shandong's private universities in breaking dual constraints of insufficient resources and excessive workloads, and promotes high-quality digital transformation across the regional private higher education industry.

II. LITERATURE REVIEW AND RESEARCH GAPS

2.1 GenAI Adoption in Higher Education

Global academia has extensively explored factors influencing faculty's GenAI adoption in higher education. Prior empirical studies confirm that individual adoption behavior is jointly determined by technical attributes, personal cognition and organizational support, with perceived usefulness, perceived ease of use, AI literacy and institutional backing serving as core predictors [1]. Educators with higher digital literacy are more inclined to integrate GenAI into daily teaching and research activities.

Based on the UTAUT2 model, Cabero-Almenara et al. (2024) demonstrated that performance expectation and pedagogical beliefs significantly predict educators' AI adoption willingness, which relies heavily on sufficient organizational resource support [3]. As the dominant theory for technology acceptance research, TAM has been widely applied to GenAI-related educational studies. Alotaibi and Alayed (2025) verified that perceived usefulness directly facilitates adoption intention, while perceived ease of use exerts indirect positive effects by enhancing users' perceived usefulness [2], a conclusion validated across multiple educational contexts.

Domestic Chinese studies also recognize GenAI's efficiency advantages for higher education, yet widespread concerns over academic ethics and data security restrict its large-scale application [7]. Notably, existing domestic literature focuses predominantly on public universities; relevant discussions targeting private institutions remain scarce. Unlike public universities, private counterparts in Shandong operate under tighter resource constraints and heavier workloads, leading to distinct technology adoption logics that cannot be generalized from existing public-university research outcomes.

2.2 Faculty Job Performance in Universities

Consistent with mainstream higher education management research, faculty job performance is categorized into three interrelated dimensions: teaching, research, and administrative performance, which comprehensively evaluate educators' duty completion and institutional contributions.

Teaching performance evaluates curriculum delivery quality and student training outcomes. As a transformative educational tool, GenAI optimizes the full teaching cycle and enables adaptive personalized teaching, effectively improving classroom quality and student learning experiences [8]. Research performance is measured by academic publications, research projects and innovative outputs. GenAI simplifies repetitive research procedures to boost productivity, though ambiguous AI authorship and unvalidated generated content also create new academic normative risks [6]. Administrative performance reflects faculty's engagement in institutional services. Given private universities' shortage of specialized administrative staff, GenAI can streamline redundant office procedures and free faculty from fragmented trivial work [5].

2.3 Research Gaps & Research Contributions

2.3.1 Research Gaps

1. Biased research samples: Most existing studies focus on students or public university faculty, while GenAI adoption among private university educators with unique work constraints remains understudied;
2. Fragmented research content: Prior literature usually discusses GenAI adoption intention or faculty performance separately, lacking systematic analysis of the complete causal chain connecting technology perception and multi-dimensional job performance;
3. Regional research vacancy: Few studies focus on GenAI application within Shandong's private higher education cluster, despite its large scale and regional representativeness;
4. Insufficient theoretical contextualization: Current research rarely integrates TAM with private-oriented faculty performance evaluation systems, resulting in the absence of context-adaptive analytical frameworks.

2.3.2 Research Contributions

1. Contextual innovation: This study targets resource-constrained private universities in Shandong, filling the regional research vacancy of private higher education GenAI research and improving the practical applicability of relevant theories;
2. Theoretical expansion: A TAM-based integrated framework tailored for private universities is constructed to elaborate the transmission mechanism from technology perception to job performance, enriching TAM's application scenarios;
3. Practical value: Differentiated countermeasures for institutions and individuals are proposed to address private universities' unique pain points, providing replicable solutions for peer private colleges;
4. Perspective upgrading: This research shifts from descriptive phenomenon sorting to analytical mechanism discussion, exploring how GenAI alleviates private faculty's work dilemmas rather than merely summarizing superficial application modes.

III. THEORETICAL FRAMEWORK AND RESEARCH PROPOSITIONS

3.1 Core Connotation of the Technology Acceptance Model (TAM)

Davis (1989) developed TAM based on behavioral science theories to explain users' acceptance of information technologies [4]. The model centers on two core variables: perceived usefulness (users' perception of a technology's capacity to enhance work performance) and perceived ease of use (users' perceived learning and operational difficulty of a technology). Its fundamental logic indicates that perceived ease of use positively affects perceived usefulness, and the two variables jointly determine users' technology attitude, adoption intention and actual use behavior. Despite multiple extended versions emerging in decades of development, the two core variables still serve as the most stable predictors of individual technology acceptance, making TAM highly suitable for this study.

3.2 TAM Adaptation for Faculty's GenAI Adoption

This study adapts TAM to fit the operational characteristics of Shandong's private universities. For overloaded faculty facing resource shortages, GenAI's ability to reduce workloads and compensate for resource deficiencies constitutes the primary source of perceived usefulness. Meanwhile, low learning thresholds and user-friendly interfaces can lower faculty's technological anxiety and enhance perceived ease of use, further promoting active adoption. Beyond TAM's basic logic, external factors including academic ethics norms, individual digital literacy and institutional AI support also moderate the correlation between GenAI adoption and job performance. The above contextual adaptations lay a solid foundation for targeted proposition formulation.

3.3 Research Propositions

P1: Private university faculty's perceived usefulness of GenAI positively affects their adoption intention.

P2: Faculty's perceived ease of use of GenAI exerts a positive influence on perceived usefulness.

P3: GenAI adoption positively correlates with private faculty's comprehensive teaching performance.

P4: GenAI adoption positively correlates with private faculty's comprehensive research performance.

P5: GenAI adoption positively correlates with private faculty's administrative work efficiency.

3.4 Conceptual Framework

This research forms a complete one-way transmission path adapted to private higher education: Perceived Ease of Use → Perceived Usefulness → GenAI Adoption Intention → Actual GenAI Adoption → Teaching / Research / Administrative Performance. TAM acts as the core theoretical pillar to explain faculty's adoption generation mechanism, while practical GenAI adoption functions as the mediating variable linking technological cognition and multi-dimensional performance indicators. This framework clarifies progressive variable relationships and conforms to the actual work demands of private university faculty.

IV. IMPACTS OF GENAI ON FACULTY JOB PERFORMANCE AND EXISTING RISKS

4.1 Impact on Teaching Performance

Constrained by limited auxiliary teaching resources and high student-to-teacher ratios, private university faculty bear heavier teaching burdens than their public university counterparts. GenAI optimizes the full teaching cycle to address such pain points: it accelerates pre-class material preparation, supports differentiated in-class tutoring, and simplifies post-class assessment and feedback. By reducing time spent on repetitive work, GenAI enables faculty to prioritize innovative teaching design and student-oriented instruction, thereby improving overall teaching quality and student satisfaction. For teaching-oriented private universities, standardized GenAI application has become a viable approach to strengthen core teaching competitiveness.

4.2 Impact on Research Performance

Insufficient research funding and scarce high-end platforms are long-term bottlenecks for private universities. GenAI effectively bridges this resource gap by assisting faculty in literature analysis, manuscript polishing and data interpretation throughout the research process. It notably lowers the threshold of academic research and improves research efficiency, especially for non-native English-speaking faculty. Nevertheless, over-reliance on AI-generated content may weaken academic originality, and unresolved copyright issues also pose challenges to existing academic norms. When applied under standardized ethical constraints, GenAI can significantly elevate private faculty's research productivity.

4.3 Impact on Administrative Performance

Due to inadequate specialized administrative staff, private university faculty are frequently distracted by fragmented non-academic tasks. GenAI automates routine administrative work such as document drafting, meeting minute sorting and policy summarization. It not only improves administrative standardization and efficiency but also cuts faculty's non-academic burdens, allowing them to allocate more time to core teaching and research tasks. This efficiency-enhancing effect helps private universities optimize internal management and form a sustainable high-efficiency operational mode.

4.4 Core Challenges and Risks of GenAI Integration

Combined with private universities' resource endowments and operational traits, five major risks restricting GenAI integration are summarized as follows:

1. Academic integrity risks: Low barriers to GenAI misuse increase academic misconduct risks, while limited supervision resources prevent private institutions from effective real-time identification;
2. Data privacy risks: The lack of exclusive campus AI platforms forces faculty to use third-party tools, bringing potential data leakage hazards for confidential teaching and research information;
3. Algorithmic defects: Biased training data may lead to inaccurate AI outputs, and most private faculty lack the professional ability to identify algorithmic errors;
4. Digital literacy disparity: The absence of systematic AI training widens the capability gap among faculty of different ages and disciplines, causing stratified differences in application effects;
5. Over-reliance risk: Excessive dependence on AI outputs may erode faculty's independent thinking ability and damage the fundamental value of academic and teaching work.

V. PRACTICAL RECOMMENDATIONS

5.1 Suggestions for Private Universities in Shandong Province

5.1.1 Develop Hierarchical AI Training

Design tiered training programs based on faculty's differentiated demands and digital literacy levels. Basic training covers fundamental tool operations and prompt engineering; advanced training focuses on AI-enabled teaching innovation and empirical research; normative training clarifies relevant academic ethics and privacy rules. Regular workshops and peer sharing activities should also be organized to narrow internal digital capability gaps.

5.1.2 Formulate Context-Specific AI Ethical Norms

Issue targeted management regulations to clarify GenAI's applicable boundaries across teaching, research and administration, and specify requirements for AI content disclosure, copyright protection and misconduct punishment. Establish a dedicated AI ethics supervision team to monitor norm implementation and curb potential academic integrity risks.

5.1.3 Upgrade Digital Infrastructure & Technical Support

Develop closed-loop exclusive campus GenAI platforms to replace unregulated third-party tools and mitigate data security risks. Arrange full-time technical personnel to resolve faculty's operational problems in a timely manner, reduce AI learning costs and enhance perceived ease of use.

5.1.4 Optimize Incentive Mechanisms and Academic Culture

Incorporate AI-driven teaching and research innovation into institutional development strategies, and set up special incentives for outstanding GenAI application cases. Guide faculty to establish correct technological cognition and treat GenAI as a supplementary auxiliary tool rather than a complete substitute for human work.

5.1.5 Improve Data Security Governance

Formulate unified campus data protection policies to standardize the uploading, storage and utilization of internal sensitive data. Conduct regular cybersecurity publicity to raise all faculty's risk prevention awareness regarding data privacy.

5.2 Suggestions for Faculty Members

5.2.1 Continuously Improve Personal AI Literacy

Participate in institutional training and high-quality online courses to master the strengths, limitations and applicable scenarios of mainstream GenAI tools. Exchange practical experience with peers to continuously optimize personal AI operation skills.

5.2.2 Adhere to Ethical and Rational AI Usage

Take GenAI as an auxiliary tool instead of a replacement for independent work. Verify the accuracy and originality of all AI-generated content, actively mark AI-assisted parts in academic and teaching achievements, and resist all forms of AI-induced academic misconduct.

5.2.3 Explore Customized Application Modes

Combine GenAI functions with personal work pain points to develop personalized application modes for curriculum reform, academic research and daily administration, so as to maximize GenAI's efficiency advantages targetedly.

5.2.4 Maintain Independent Critical Thinking

Retain absolute dominance in teaching design, academic research and decision-making processes. Avoid blind over-reliance on AI outputs, and take critical thinking as the bottom line of daily GenAI application.

VI. CONCLUSION

6.1 Main Findings

Targeting resource-constrained private universities in Shandong Province, this study adopts TAM to explore the correlation between faculty's GenAI acceptance and multi-dimensional job performance. The core findings are summarized as follows: First, perceived usefulness and perceived ease of use are two indispensable drivers of faculty's GenAI adoption intention, and perceived ease of use can indirectly boost adoption willingness by enhancing perceived usefulness. Second, standardized GenAI application can comprehensively improve private faculty's teaching, research and administrative performance, effectively solving resource shortages and overloaded workloads—two core pain points of regional private institutions. Third, academic misconduct, data leakage, algorithmic bias and unbalanced digital literacy are primary obstacles to sustainable GenAI integration, which requires joint governance from both institutions and individual faculty.

6.2 Research Limitations and Future Research Directions

This study only conducts theoretical analysis based on existing literature without empirical questionnaire verification. Subsequent research can collect first-hand sample data from local private universities to quantitatively test and revise the proposed conceptual framework. For research scope, future studies can carry out horizontal comparisons between public and private universities or expand research coverage nationwide to enhance conclusion universality. In terms of theoretical expansion, researchers can integrate TAM with UTAUT or Innovation Diffusion Theory by adding perceived risk and institutional support variables. Additionally, longitudinal tracking research can be implemented to reveal the dynamic evolution of faculty's GenAI cognition and adoption behavior over time.

6.3 Concluding Remarks

GenAI-driven digital transformation has become an irreversible trend across global higher education. For private universities in Shandong Province, rational and normative GenAI deployment is a critical opportunity to break developmental bottlenecks and strengthen core competitiveness. As a neutral emerging technology, GenAI's practical value hinges on institutional governance capabilities, supporting systems and users' application concepts. Only by combining mature theoretical guidance with private-university-oriented practical demands, standardizing full-scenario GenAI usage and preventing potential risks, can regional private institutions realize deep integration between GenAI and daily educational operations, elevate overall faculty job performance, and ultimately achieve high-quality digital transformation.

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