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Research on the Optimization of University Financial Management Models Empowered by Artificial Intelligence

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Abstract: Against the backdrop of the modernization of university governance, the digital transformation of education, and the continued development of smart campuses, financial management in higher education institutions is shifting from a traditional accounting- and support-oriented model toward one that is more intelligent, collaborative, and governance-oriented. However, in practice, university financial management still faces a number of challenges, including insufficient system coordination, cumbersome operational processes, limited data utilization capacity, and increasing pressure in risk prevention and control, all of which constrain further improvements in financial management effectiveness. Based on an examination of the current development status and major challenges of university financial management, this paper analyzes the mechanisms and practical significance of AI empowerment in this field, arguing that artificial intelligence can play an important role in improving operational efficiency, strengthening decision-support capacity, and enhancing risk prevention and control. On this basis, the paper further identifies the objectives and key directions for optimizing university financial management models under AI empowerment, emphasizing the transition of financial management from traditional transactional processing to modern governance support. It also proposes implementation paths from the perspectives of data governance, platform development, and process reengineering, while outlining supporting mechanisms in terms of institutional regulation, interdepartmental coordination, and evaluation and feedback. The study concludes that AI-empowered financial management should be integrated into the overall digital governance framework of universities, and that sustained improvements in financial governance capacity and management performance can be achieved only through the coordinated advancement of technological application, process optimization, and institutional innovation.

Keywords: University Finance; Artificial Intelligence; Optimization of Management Models; Digital Governance

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1. Current Development Status and Major Challenges of University Financial Management

In recent years, against the background of reforms in budget management, strengthened performance management, and accelerated smart campus development, university financial management has gradually shifted from the traditional accounting-oriented model toward greater standardization, informatization, and refinement, with its overall management level steadily improving. Relying on financial information systems, some universities have incorporated such functions as budget management, accounting, reimbursement approval, and fee management into online operations. Application scenarios such

as e-invoices, online reimbursement, and financial information inquiry have continued to expand, significantly improving the convenience and service efficiency of financial management [1]. Nevertheless, university financial management still faces many practical problems and challenges.

To begin with, the problems of fragmented financial data and insufficient system coordination remain prominent. Although many universities have established multiple business systems, the data standards, interface rules, and operating logic among these systems have not yet been fully unified. Data sharing between the financial system and systems for personnel, research, assets, procurement, and academic affairs remains limited, and information silos still exist. This not only affects data integration and utilization, but also constrains the transformation of financial management toward comprehensive analysis and coordinated governance.

In addition, financial management processes in universities remain relatively cumbersome. Influenced by traditional management models, some universities still face such problems as too many approval levels, repeated reviews, and strong manual intervention in reimbursement approval, fund auditing, budget adjustment, and project settlement. As a result, financial operations remain inefficient, and the service experience for faculty and students still needs improvement. Especially in areas such as research fund management and the supervision of special-purpose funds, financial personnel often have to devote substantial effort to manual verification and procedural review, which easily leads to a heavy burden of transactional work and insufficient performance of management functions.

Moreover, the data analysis and decision-support capacity of university financial management remains inadequate. Although many universities have accumulated a certain scale of financial data, applications in data mining, trend analysis, risk identification, and performance evaluation remain limited. Financial data are still largely confined to recording, statistics, and aggregation, and have not yet been fully transformed into effective support for resource allocation optimization, cost structure analysis, and management decision-making. To some extent, this constrains the expansion of financial management from result reporting to process management, and from ex post summarization to forward-looking prediction.

Furthermore, university financial management is also under new pressure in internal control and risk early warning. With the expansion of university operations, increases in funding volume, and increasingly diversified sources of funds, financial risks have become more complex, and the requirements for risk identification and prevention have become significantly higher. Traditional management methods that rely on manual review and experience-based judgment often suffer from delayed identification, insufficient early warning, and untimely response when confronted with high-frequency, complex, and multi-scenario financial activities, and are no longer able to meet the practical needs of refined financial governance.

Overall, university financial management has already established a certain developmental foundation, and positive progress has been made in information infrastructure, institutional regulation, and management philosophy. However, it still faces major challenges in system coordination, process optimization, data application, and risk prevention and control. This indicates that although university financial management has entered the stage of digital transformation, it still falls short of a more efficient, precise, and intelligent modern financial management model. Therefore, actively introducing new technologies such as artificial intelligence and promoting the optimization and upgrading of university financial management models has become an important direction for improving university financial governance capacity and management performance.

2. Mechanisms and Practical Significance of AI Empowerment in University Financial Management

As an important driving force of the new round of scientific and technological revolution and industrial transformation, artificial intelligence is profoundly reshaping organizational operation modes and resource allocation patterns. For university financial management, AI is not only a technical tool for improving work efficiency, but also an important force for promoting management model optimization and governance capacity enhancement. With the continuous development of big data, machine learning, natural language processing, and intelligent recognition technologies, application scenarios of AI in university financial management are becoming increasingly rich, and its influence is gradually extending from basic business assistance to deeper areas such as process optimization, risk prevention and control, and decision support [2].

In terms of its mechanism of action, the empowering effect of AI on university financial management is first reflected in

the improvement of financial operational efficiency. University financial management involves a large amount of repetitive and procedural work, such as invoice review, reimbursement approval, data entry, and information verification. Traditional approaches rely heavily on manual operations, which not only prolong processing cycles but also tend to generate errors. With the help of intelligent recognition, process automation, and rule-matching technologies, AI can rapidly handle part of these basic affairs-like tasks, reduce the manual workload, and improve the speed and accuracy of financial business processing.

AI empowerment is also reflected in the enhancement of decision-support capacity. University financial systems accumulate large amounts of data on budget execution, fund utilization, cost distribution, and asset allocation. However, such data can become true governance resources only after effective integration and in-depth analysis. AI can identify patterns, detect deviations, and predict trends from massive volumes of data, thus providing a more scientific basis for budget preparation, resource allocation, performance evaluation, and fund utilization optimization, and promoting a shift in financial management from experience-based judgment to data-driven decision-making.

At the same time, AI empowerment is also manifested in the strengthening of risk prevention and control. University financial activities are diverse in type and frequent in capital flows, while traditional supervision methods relying on manual review often suffer from limitations such as delayed identification and insufficient coverage. By relying on model analysis and intelligent comparison, AI can timely identify and dynamically warn against risk points such as abnormal invoices, irregular expenditures, and budget deviations, thereby improving the precision and forward-looking nature of internal control and enhancing the proactiveness of financial supervision.

From the perspective of practical significance, AI empowerment in university financial management carries evident value. On the one hand, it helps improve the efficiency and service quality of financial management, alleviates the transactional workload of financial personnel, and enables them to devote more energy to management analysis and value creation. On the other hand, it helps improve the utilization efficiency of financial data, enhances the scientific basis of budget management, performance evaluation, and resource allocation, and provides stronger data support for university governance. Meanwhile, AI also helps strengthen internal control and risk prevention, promotes the shift of financial supervision from ex post review to whole-process monitoring, and further facilitates the transformation of financial management functions from traditional accounting support to management service and governance support.

Overall, what AI brings to university financial management is not merely efficiency improvement at the technical level, but also a systematic transformation in management philosophy, operational methods, and governance capacity. Through automation, intelligence, and data-driven approaches, AI provides important support for the optimization of university financial management models and lays the foundation for clarifying optimization objectives and identifying key directions in subsequent sections.

3. Objectives and Key Directions for Optimizing University Financial Management Models Under AI Empowerment

On the basis that the mechanisms and practical significance of AI empowerment in university financial management have become increasingly clear, further clarifying the objectives and key directions of financial management model optimization has become an important link in promoting the transformation and upgrading of financial management. Optimization under AI empowerment should not merely remain at the level of improving business processing efficiency and reducing transactional burdens, nor should it be confined to local process improvements and single-item technological applications. Rather, it should focus on the restructuring of financial functions, the transformation of management methods, and the enhancement of governance capacity, thereby promoting the transformation of university financial management from a traditional accounting-support model to an intelligent collaborative and governance-support model [3].

In terms of objective positioning, the optimization of university financial management models under AI empowerment should place greater emphasis on governance orientation. Traditional university financial management has focused more on accounting, fund review, and rule implementation, emphasizing compliance and accuracy. Under the background of digital and intelligent development, however, the functional boundaries of financial management are continuously expanding. Financial departments should not only undertake the responsibility of fund support, but also play a more active role in

budget performance management, resource allocation optimization, risk identification and early warning, and management decision support. In other words, the core of optimizing university financial management models lies not merely in improving processing speed and technical capability, but in using AI to promote a shift in financial management from "bookkeeping and reimbursement handling" to "analysis and judgment," and from "ex post supervision" to "whole-process governance."

On this basis, the optimization of university financial management models should focus on such directions as process coordination, data-driven governance, service enhancement, and risk control. In terms of process coordination, financial operations should be transformed from fragmented handling to intelligent collaboration. University financial management involves multiple links such as budget preparation, reimbursement approval, fund management, asset allocation, and performance evaluation. Under the traditional model, these links often suffer from fragmented processes, disconnected procedures, and insufficient coordination. AI-empowered financial management should therefore place greater emphasis on process reshaping and business collaboration, promoting financial matters from isolated processing points to whole-process linkage, and continuously improving the integrity and operational efficiency of management.

In terms of data application, financial management should be transformed from experience-based judgment to data-driven governance. As university operations become increasingly complex, financial management can no longer rely solely on experience-based judgment and static statistics, but should instead be based on fuller data integration and intelligent analysis. Through AI empowerment, optimization of university financial management models should pay greater attention to the correlation analysis between financial data and business data related to personnel, research, assets, and procurement, thereby continuously improving the scientific basis of budget arrangement, cost control, performance evaluation, and resource allocation, and turning financial data into an important resource supporting university governance.

In terms of service functions, financial management should shift from passive response to precise services. Traditional financial management has emphasized procedural review and institutional constraints, and service provision has been relatively single and unable to fully meet the diversified and convenient needs of faculty, students, and administrative departments. With AI support, the optimization of university financial management models should place greater emphasis on service awareness and service capability, continuously improving the timeliness, convenience, and relevance of financial services through intelligent Q&A, information reminders, process guidance, and personalized feedback.

In terms of risk governance, financial supervision should be transformed from ex post control to whole-process risk prevention and control. Faced with the new situation of expanding fund scales, growing business scenarios, and rising regulatory requirements, traditional supervision methods that rely solely on ex post review and experience-based judgment can no longer meet practical needs. AI-empowered financial management model optimization should integrate risk identification, early-warning monitoring, and dynamic control throughout budget execution, fund utilization, invoice review, and fund supervision, thereby continuously enhancing the forward-looking, precise, and continuous nature of internal control.

Overall, the objective of optimizing university financial management models under AI empowerment is to promote the transformation of financial management from traditional transactional processing to modern governance support, while the key directions are concentrated in process coordination, data-driven governance, precise services, and whole-process risk prevention and control. These directions not only respond to the practical problems currently faced by university financial management, but also provide clear guidance for the subsequent design of implementation paths and supporting mechanisms.

4. Implementation Paths and Safeguard Mechanisms for Optimizing University Financial Management Models Under AI Empowerment

On the basis that the objectives and key directions have become basically clear, the key to transforming the conceptual design of AI-empowered university financial management model optimization into actual results lies in forming clear and feasible implementation paths, together with corresponding safeguard mechanisms to ensure stable operation and sustained deepening. The optimization of university financial management models cannot remain at the level of local technological embedding and single-function improvement. Rather, it should be advanced in a coordinated way around data governance, platform development, process reengineering, and talent support, while being safeguarded through institutional regulation, coordinated linkage, and evaluation and feedback mechanisms.

From the perspective of implementation paths, data governance is the fundamental link in AI-empowered university financial management. The effective functioning of AI depends to a large extent on data quality and data connectivity. Therefore, universities should strengthen the standardization of financial data, promote data sharing and business coordination between financial systems and systems for personnel, research, assets, procurement, and academic affairs, gradually break down information silos, and improve the capacity for data integration and utilization. At the same time, they should strengthen the classified management, dynamic updating, and standardized use of financial data so as to provide authentic, complete, and usable data support for budget preparation, performance evaluation, risk early warning, and management decision-making [4].

On the premise of consolidating the data foundation, platform development serves as an important support for the practical application of AI. Universities should build on existing financial informatization conditions, promote interconnection among business platforms for budget management, accounting, reimbursement approval, fee management, asset management, and performance evaluation, and gradually establish an intelligent platform system covering the whole process of financial management. By integrating fragmented systems, optimizing functional modules, and expanding application scenarios, universities can promote the in-depth application of AI in invoice recognition, intelligent review, anomaly warning, data analysis, and service consultation, thereby continuously improving the operational efficiency and collaborative capacity of financial management.

Process reengineering, in turn, is the key lever for achieving model optimization. AI empowerment in university financial management does not simply mean replacing manual work with technology; rather, it means using technological means to reshape business processes. In response to problems such as lengthy reimbursement approval chains, repetitive review procedures, and poor cross-departmental coordination, universities should systematically sort out financial business processes, reduce unnecessary intermediate links, optimize approval logic and processing routes, and promote financial matters from fragmented handling to whole-process coordination, so that technological application can truly be transformed into improvements in management performance.

Meanwhile, the in-depth application of AI in university financial management also relies on corresponding talent support. Universities should therefore continuously improve the data analysis, information technology application, and collaborative management capabilities of financial personnel through special training, on-the-job practice, and interdisciplinary cooperation, promoting their transformation from traditional business executors into participants in intelligent finance and supporters of governance, thereby providing sustained momentum for AI-empowered financial management.

From the perspective of safeguard mechanisms, the first requirement is to improve the institutional regulatory system. The application of AI in university financial management must be grounded in sound institutional development. Universities should establish and improve relevant institutional systems concerning data usage permissions, business operation standards, risk control requirements, and boundaries of responsibility, so as to ensure that AI applications are advanced on a compliant, secure, and controllable track [5].

The second requirement is to improve cross-departmental coordination mechanisms. AI empowerment in university financial management cannot be accomplished by the financial department alone; rather, it requires the joint participation and coordinated advancement of departments such as finance, information technology, research, personnel, assets, and auditing. Universities should establish linkage mechanisms with clear responsibilities, reasonable division of labor, and smooth communication, thereby forming a work pattern characterized by vertical connection and horizontal coordination and providing strong organizational support for the optimization of financial management models.

The third requirement is to establish evaluation and feedback mechanisms. Whether AI applications can truly be transformed into management effectiveness must ultimately be tested through practice. Universities should establish a scientific evaluation system around such aspects as application effectiveness, service quality, risk control, and governance outcomes, and should promptly adjust technological application and management processes according to evaluation results, so as to continuously deepen AI empowerment in university financial management.

Overall, the implementation paths for optimizing university financial management models under AI empowerment focus on solving the problem of “how to advance implementation,” while the safeguard mechanisms focus on solving the problem

of "how to ensure stable operation." Only by organically integrating implementation paths with safeguard mechanisms can universities truly promote the in-depth application of AI in financial management and continuously improve their financial governance capacity and management performance.

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