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HOW THE CONSTRUCTION OF UNIVERSITY FINANCIAL INTELLIGENCE EMPOWERS FINANCIAL OPERATION MANAGEMENT UNDER THE ORIENTATION OF DEVELOPING NEW QUALITY PRODUCTIVE FORCES

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Abstract: Against the backdrop of the national strategic initiative to foster and develop new quality productive forces and advance digital and intelligent development, this paper reviews the evolutionary process of financial digital transformation in universities. Drawing on the current state of universities' financial intelligent construction, it identifies practical dilemmas existing in such transformation. From the two dimensions of technical concepts and implementation paths, this study systematically analyzes and summarizes universities' financial digital transformation. The findings provide practical references for universities to achieve full-scenario and comprehensive deployment of digital and intelligent financial management.
Keywords: New quality productive forces; University financial intelligence; Financial operation management

1 INTRODUCTION

It is vital to vigorously cultivate and develop new quality productive forces, advance the deep integration of the real economy and digital economy, and comprehensively deepen the application of management accounting. The Guiding Opinions on Comprehensively Deepening the Application of Management Accounting (Cai Kuai〔2024〕No. 22) puts forward the major task requirement of comprehensively improving the level of digital and intelligent development.
In response to the national strategy of invigorating China through science and education, universities shoulder the missions of integrated development of education, science, and technology and talent cultivation, building world-class universities with Chinese characteristics, conducting international exchanges, providing social services, and inheriting culture. Driven by intelligence in the new era, digital transformation promotes the reform of university finance toward an all-round financial system that is strategic, management-oriented, service-oriented, and intelligent.

2 DEVELOPMENT HISTORY, CURRENT SITUATION, AND DILEMMAS OF UNIVERSITY FINANCIAL DIGITAL TRANSFORMATION

2.1 Development History of University Financial Digital Transformation

Over more than 20 years of exploration and practice in university financial reimbursement modes, the system has evolved from on-site queuing and number calling, online form filling and reservation, front-end business control, and intelligent reimbursement to self-service reimbursement. A relatively complete information-based financial reimbursement model has been established, and it is now advancing toward the digital and intelligent stage (see Table 1) [1].

Table 1 Exploration and Practice of University Financial Reimbursement Modes

Financial Reimbursement Mode	Description of Advantages and Disadvantages of Reimbursement Mode
On-site Queuing and Number Calling	High time cost; prone to anxiety and conflicts, resulting in poor user experience.
Online Form-filling and Reservation	Time reservation available online; lacking front-end business control, and reimbursement progress is hard to track.
Front-end Business Control	Equipped with budget control, a logistics system, and self-service delivery machines. However, problems such as incomplete or wrong seals and missing documents cannot be resolved.
Intelligent Reimbursement Mode	Supports control of complex businesses and online intelligent review and signature, prevents repeated reimbursement of invoices, standardizes financial supervision, and realizes zero-delivery reimbursement.
Self-service Reimbursement Mode	Single-page operation, automatic matching of expense items, precise reminders for attachments, and automatic calculation of travel itineraries.

2.2 Current Situation and Dilemmas of University Financial Digital Transformation

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First, the level of financial intelligence development varies widely among universities. Some universities suffer from insufficient funding for financial intelligence construction, which slows down the progress of digital transformation [2-4].

Second, there is an absence of an integrated mechanism for desensitized information sharing and compliant utilization in university financial intelligence. Systems, including the asset management system, contract management system, government procurement system, scientific research platform data system, logistics expense data system, and the national unified electronic voucher system, lack such an integrated mechanism, restricting the development of intelligent decision support [5-6].

Third, the adaptability of digital implementation for university cost accounting needs to be improved. Current research on university cost accounting management mainly focuses on defining accounting boundaries, selecting accounting methods, designing indirect cost allocation models, and analyzing financial informatization paths. The research is extending from theoretical exploration to practical application, yet the adaptability of digital implementation for cost accounting remains insufficient [7].

Fourth, for the full life-cycle digital management of electronic accounting archives under university financial intelligence, mechanisms for classified storage, destruction, and traceability management of electronic accounting archives are lacking.

Fifth, in terms of the data architecture of university financial intelligence, traditional data warehouses and ETL (Extract, Transform, Load) processes cannot meet agents' requirements for data immediacy and contextual understanding [8].

Sixth, regarding process reengineering with intelligent agents in university financial intelligence, some universities attempt to use intelligent agents to automate existing fragmented processes without redesigning workflows, failing to achieve value reconstruction in the true sense [9-10].

3 CONCEPT AND PATH OF UNIVERSITY FINANCIAL DIGITAL TRANSFORMATION

3.1 Strategic Guidance for University Financial Digital Transformation

The digital and intelligent development strategy of accounting aims to promote the digital and intelligent transformation of accounting work, support the in-depth application of information technologies such as artificial intelligence and big data in the accounting field, and expand accounting functions in management decision-making and risk control. The state encourages institutions to actively explore the application of modern information technologies, including big data, artificial intelligence, mobile Internet, cloud computing, Internet of Things, and blockchain in accounting, to improve the level of accounting informatization. Eligible entities shall leverage information technologies to realize intensive, automated, and intelligent accounting operations. Meanwhile, accounting software can integrate functions such as intelligent review, intelligent account reconciliation, intelligent tax calculation, and financial analysis. It shall ensure that accounting data is authentic, complete, and secure, comply with the requirements of the unified national accounting system, and support the intelligent upgrading of accounting work.

3.2 Technical Concept for University Financial Digital Transformation

The technical support and breakthrough of university financial digital transformation require "artificial intelligence plus science and technology" to strengthen basic research and technical research, and breaking through core bottlenecks is the key. First, AI technology is advancing from specialized intelligence toward general intelligence; large models, multimodal technology, and intelligent agents have become core trends. Second, reasoning optimization: AI is shifting from "rapid generation" to logically capable "deep thinking". It can simultaneously understand and process various forms of information, such as text, images, audio, and video, to achieve comprehensive perception. Third, AI is evolving from text generation to task execution, with capabilities of autonomous planning and decision-making to accomplish complex tasks.

Ten categories of information technologies supporting university financial digital transformation are as follows: AI and intelligent decision support include general large AI models, data mining, and multimodal data analysis. Data-layer technologies cover accounting big data analysis and processing, data governance, and business intelligence. Infrastructure-layer technologies consist of financial cloud and middle-platform technology. Process automation and application technologies include process automation and electronic invoices (see Table 2).

Table 2 Ten Categories of Information Technologies for University Financial Digital Transformation

Category	Name of Information Technology	Technical Introduction	Application Scenarios
AI and Intelligent Decision Support	General Large AI Model	A pre-trained model based on deep learning with capabilities of comprehension and reasoning, capable of handling complex financial texts and business logic.	Intelligent financial Q&A, automatic financial report generation, intelligent risk identification, and intelligent audit working paper preparation.

Category	Name of Information Technology	Technical Introduction	Application Scenarios
Data Governance and Analysis	Data Mining	Applying statistics and machine learning to discover hidden patterns, abnormal trends, and potential risks from massive historical data.	Revenue trend forecasting, credit rating, and in-depth analysis of cost drivers.
	Multimodal Data Analysis	Advanced analysis integrating multiple data types, such as text, images, and audio, to realize cross-modal understanding and associative reasoning.	Intelligent contract parsing, intelligent review of expense invoices, full-text intelligent reading of financial reports, and correlation of audit evidence chains.
	Accounting Big Data Analysis and Processing	The process of collecting, cleaning, storing, analyzing, and visualizing massive structured and unstructured accounting data with big data technologies.	Financial forecasting, budget preparation, cost analysis, risk assessment, consolidated financial statement preparation, and customer & supplier analysis.
	Data Governance	Establishing standardized data formats and rules, focusing on data quality, security, and compliance to provide reliable data support for decision-making.	Data standard management, standardization of business terminology, data quality monitoring, compliance control, and permission allocation.
	Business Intelligence	The process of collecting, managing, and analyzing business information. It provides business insights and decision support through data integration, in-depth analysis, and visualization.	Financial dashboards and reports, budget implementation and multi-dimensional analysis, business performance data analysis, etc.
Infrastructure-layer Technologies	Middle-platform Technology	Precipitating common financial, data, and business capabilities into a shared service layer to achieve "one-time construction and reuse across all systems" and break down information silos.	Construction of financial middle platform, data middle platform, business middle platform, and group management & control center.
	Financial Cloud	Built on cloud computing architecture, financial systems and data services are deployed on the cloud. It supports multi-tenant mode and on-demand resource scaling, removing physical and time restrictions.	Group shared service center, SaaS finance for small and medium-sized institutions, mobile reimbursement and approval, remote bookkeeping, and real-time financial monitoring.
Execution-layer Technologies	Process Automation	RPA processes structured data via rule engines and simulates human-computer interaction; IPA integrates AI, low-code, and other technologies to process unstructured data and achieve hyperautomation.	Automatic invoice entry and compliance verification, automated reimbursement workflow, automatic bank-enterprise reconciliation and write-off, one-click tax declaration, etc.
	Electronic Invoices	Characterized by medium-free, format-free, tagging, element-based management, credit granting, and code assignment. It realizes full-process digital management of invoice issuance, delivery, verification, accounting, and archiving.	Issuance and delivery of fully electronic invoices, automatic collection and verification of input invoices, full-chain traceability of expense reimbursement, and tax audit.

3.3 Practical Path for the Development of University Financial Digital Transformation

The digital transformation of university finance will usher in a new era of autonomous and intelligent financial management. First, the extensive application of AI agents enables the autonomous execution of complex financial tasks and realizes unattended, fully automatic financial operations. Second, it achieves in-depth business-finance integration and penetrating management, supports automatic data circulation and conversion, and realizes real-time accounting and forward-looking decision support. Third, it releases the value of data assets, regards financial data as core strategic assets, and deeply explores the inherent business value of data resources.

The construction of a digital and intelligent financial system empowering high-quality development requires the transformation of three major businesses: financial accounting services, professional financial operations, and financial supervision. It also needs four fundamental supporting guarantees in organization, system, process, and technology, namely full-staff participation with full business coverage, improved institutional system construction, value reconstruction via business process optimization, and construction of financial agents based on technical microservice architecture.

3.3.1 Full-staff participation and full business coverage

The construction of university financial digitalization requires the participation of all staff and full coverage of all business scenarios. First, clarify the economic responsibilities of all levels, including university presidents, school

leaders in charge of finance and other work, and heads of functional departments (personnel, assets, finance, procurement, scientific research, logistics, etc.), principals of colleges, departments, and directly affiliated units, and project leaders. Second, strengthen horizontal collaboration, move the control terminal forward, and form a closed-loop management mechanism extending from financial supervision to front-line business operations. Third, implement vertical linkage and grid-based business management, establish a two-level financial management responsibility system at the university and college levels, and clarify the financial management responsibilities, major decision-making responsibilities, budget management, and revenue and expenditure management responsibilities of secondary units. Fourth, build a joint prevention and control linkage mechanism covering finance, audit, inspection, and discipline supervision.

3.3.2 Improvement of institutional system construction

A sound institutional system serves as the foundation for the construction of a digital and intelligent financial system. The institutional system consists of three levels. The first is financial management decision-making and deliberation systems, such as the Implementation Measures for the Decision-making System of Major Issues. The second is basic financial work systems, including the Basic Norms for Financial Management of Secondary Units and the Internal Control Implementation Manual. The third is professional business management systems, covering the Budget Management Measures, Special Financial Fund Management Measures, Interim Measures for Large-sum Fund Payment Management, Scientific Research Fund Management Measures, Interim Measures for Travel Expense Management, Interim Measures for Conference Fee Management, and other standardized management systems.

3.3.3 Value reconstruction and business process restructuring

Business-finance integration is the integration of concepts and management, driven by value co-creation thinking and business process optimization. Only by restructuring original business processes and building full-scenario process support for business-finance integration can fundamental business value reconstruction be realized. The optimized business processes include automatic online revenue processing, one-stop full-process online services, closed-loop budget integration for resource allocation, overseas affairs management processes, infrastructure business processes, student scholarship and grant processes, tuition and student status management processes, various fee collection processes, whole-process management of scientific research business under streamlining administration and delegating power, full-life-cycle asset management, and full-coverage contract management (see Table 3).

Table 3 List of Closed-Loop Management for Business-Finance Integration

Finance + Business Management Mode	Key Control Items
Finance + Assets	Control of asset allocation and utilization, decision support, and daily monitoring.
Finance + Procurement	Contract control, monitoring of fund payment, and business progress.
Finance + Student Affairs	Management of student status and fee collection, monitoring of fund income, and fiscal remittance.
Finance + Scientific Research	Control of project and fund revenue and expenditure, daily management, and performance evaluation.
Finance + Double First-Class Initiative	Control of major projects, decision support, and performance evaluation.
Finance + Overseas Affairs	Full-process control of overseas reimbursement and special monitoring of the Three Public Expenses.
Finance + Logistics Expenses + Human Resource Compensation	Cost control, cost accounting, and performance evaluation.
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3.3.4 Construction of financial agents based on technical microservices

Financial agents represent a new form of quality productive forces and constitute a new type of labor force. When it comes to reshaping workflows via agents in university financial intelligence, merely deploying agents to automate fragmented existing processes is unworkable. Work patterns must be redesigned to achieve genuine value reconstruction. Meanwhile, this approach does not aim to build an all-powerful super agent. Instead, it adopts a microservices-oriented paradigm: numerous small, task-specific agents are deployed, and an orchestration framework enables them to collaborate as an integrated agent system.

4 CONCLUSION

Driven by intelligence in the new era, digital transformation is advancing the transformation of university finance toward an all-round finance that is strategic, managerial, service-oriented and intelligent. On the one hand, the intelligent development of university finance integrates, underpins and achieves breakthroughs in multiple technologies by strengthening basic research and technological research. On the other hand, it empowers the construction of a digital-intelligent financial system for high-quality development, enabling the transformation of three core functions: accounting services, accounting operations, and accounting supervision. In the future, the empowerment of high-quality development through university financial intelligence will be manifested in optimizing user experience, improving operational efficiency, identifying business patterns, strengthening internal control, and supporting managerial decision-making. The value creation carriers of financial digital intelligence mainly include experiential accounting services, end-to-end automated workflows, full integration of internal and external holographic data, integrated budget

management, decision-support reporting systems, and multi-dimensional risk prevention and control systems. Promoted jointly by fiscal support, consensus building, talent allocation and other enabling factors, university finance will fully cover digital-intelligent scenarios, ranging from basic accounting to strategic decision-making and from financial support to value creation.

COMPETING INTERESTS

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