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Original Paper

Digital Finance Talent Reform in Vocational Undergraduate Education under Digital Transformation

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Abstract

The rapid development of digital technologies such as big data, blockchain, cloud computing, and artificial intelligence is accelerating the transformation of the financial industry toward digitalization and intelligence. This shift has led to a growing demand for interdisciplinary talents who understand finance, possess digital literacy, and are capable of practical application. However, the current vocational undergraduate training system struggles to meet this demand due to outdated curricula, limited integration of technology, and weak industry–education collaboration. This paper analyzes the talent gap and structural challenges in digital finance education and proposes a reform path centered on optimizing professional positioning, reconstructing curriculum systems, enhancing multi-party collaboration, and building dual-teacher teams. The study aims to provide a practical model for cultivating high-level, application-oriented digital finance professionals, and to support the sustainable development of vocational education in the digital economy.

Keywords

Digital finance, vocational education, curriculum reform

1. Introduction

The development of new-generation digital technologies, such as big data, blockchain, cloud computing, and artificial intelligence, is profoundly reshaping the service model and organizational structure of the financial industry. This change drives the financial industry to accelerate into a new stage of digital and intelligent transformation (Barroso & Laborda, 2022; Dafri & Al-Qaruty, 2023). The digital and intelligent transformation of finance promotes the comprehensive upgrade of financial products, services, and regulatory models and builds a new ecology that serves the economy, enhances system resilience, and promotes high-quality development (Mhlanga, 2024; Wang et al., 2025). In this

context, the financial industry has seen a significant rise in the demand for composite digital financial talents who understand finance, are versed in technology, and are adept at application. However, there are still many mismatches between the current financial talent training system and industrial practice. For example, the rapid evolution of digital financial core technology and job requirements has led to a mismatch between the supply and demand of fintech composite talents. In addition, banks, securities, insurance, and other subsectors have obvious differentiation of the ability requirements for digital financial positions. Digital positions put forward higher standards for data analysis, system development, intelligent risk control, and other comprehensive capabilities. In the face of the reality of structural shortage of talents, financial professions urgently need to dock the trend of industry change, optimize the professional positioning and curriculum system, adjust the objectives of talent cultivation, build a practical educating mechanism based on the integration of industry and education and digital and intellectual synergy, and strengthen the cross-border capacity of the faculty so as to respond to the new demand for technical and skilled talents by the transformation of digital finance with a systematic reform and to promote the connotative development and quality leap of vocational education.

This paper reviews the current state of digital finance talent development in China, identifies key challenges within the vocational undergraduate education system, and puts forward targeted reform suggestions. These include enhancing interdisciplinary curriculum design, improving the alignment between educational programs and industry needs, strengthening industry–education integration mechanisms, and cultivating composite, application-oriented digital finance professionals. Through this analysis, the study aims to contribute to the construction of a more responsive and future-ready vocational education system that supports the sustainable digital transformation of the financial industry.

2. The Current State of Digital Transformation in the Financial Industry

2.1 Overview of the Development of the Digital Finance Sector

The need for digital transformation is particularly time-sensitive in the financial sector. Digital finance, as a technology-driven financial innovation, has become an important engine for deepening the structural reform of the financial supply side and enhancing the ability of financial services to the real economy. According to the Report on the Development of China's Digital Economy released by the China Academy of Information and Communication Research in 2024, the scale of China's digital economy reached 53.9 trillion yuan in 2023, accounting for 42.8% of GDP, and the digital economy is booming. With the continuous progress of digital technology and the depth of its application, the digital economy will play a more crucial role in promoting the process of Chinese-style modernization and become the core force driving the high-quality development of the economy and society. The cultivation and development of digital financial talents has also become an important focus of national development planning. 2024 In April, the Ministry of Human Resources and Social Security and other departments put forward six key tasks, including the implementation of the Digital Technology

Engineer Cultivation Program, the promotion of digital skills enhancement initiatives, and the development of international exchange activities for digital talents, to accelerate the cultivation of a high-level digital talent team to support the high-quality development of the digital economy. The vigorous rise of the digital economy has set up a broad stage for the innovative development of finance. In the face of the rapidly developing digital finance industry, there is still an insufficient supply of high-quality and composite digital finance talent, especially in financial service institutions and small and medium-sized fintech enterprises. Digital finance requires practitioners to have traditional financial knowledge, but they also need to master digital technology and thinking, including programming skills, data analysis, platform operation, information security, and so on. Some key universities and financial institutions in China have taken the lead in promoting the strategic reserve of digital finance talents, setting up fintech majors and promoting the cross-fertilization of finance disciplines with computer science, statistics, engineering, and other disciplines. At the same time, there are also vocational schools that are actively responding to the national call to explore new types of courses and program settings related to digital finance. However, there are still supply and demand mismatches, structural imbalances, and insufficient capacity landing between the training of digital financial talents in colleges and universities and the actual needs of the industry. In particular, vocational colleges and universities have not yet developed a coordinated system for training talent that includes teaching resources, teacher skills, course offerings, and practical experience, making it hard to meet the urgent need for skilled workers in digital finance.

Therefore, it has become an important direction for the reform of higher vocational education to explore the reform path of vocational undergraduate digital finance talent cultivation in the context of digital transformation and to build a talent cultivation system that is close to the industry practice, integrates digital skills, and strengthens innovation ability. Therefore, it has become an important direction for the reform of higher vocational education to explore the reform path of vocational undergraduate digital finance talent cultivation in the context of digital transformation and to build a talent cultivation system that is close to the industry practice, integrates digital skills, and strengthens innovation ability. To support the ongoing digital changes in the financial industry, vocational undergraduate education needs to quickly improve its curriculum, teaching methods, collaboration with industry, and teacher training.

2.2 Analysis of Digital Finance Talent Demand

Digital financial talents have become the core resources to drive the high-quality development of finance as the digital transformation of the financial industry continues to deepen. Currently, the demand for digital financial talents in the financial industry exhibits several characteristics, including a surge in quantity, structural transformation, and composite abilities, resulting in a new type of talent profile that is primarily technology-composite, application-oriented, and innovation-driven.

2.2.1 Accelerated Expansion of Talent in the Digital Finance Sector

The first is the rapid growth in the total demand for digital finance practitioners. According to the

Fintech Development Plan (2022-2025) issued by the People's Bank of China and the relevant talent report of the Ministry of Industry and Information Technology, the current proportion of Chinese financial institutions with technical backgrounds such as data analytics, artificial intelligence, and blockchain is still low, at around 5%, far from meeting the needs of the future financial digital operation. The digital financial talent gap is mainly concentrated in commercial banks, Internet financial platforms, securities companies, third-party payment institutions, and other fields, especially in positions such as big data risk control, intelligent investment advisors, blockchain product design and operation, and financial platform architecture development. According to Deloitte's 2023 survey, the overall shortage of digital talent in China is projected to reach 25 to 30 million by 2025, with finance, manufacturing, and healthcare identified as the sectors facing the most severe talent gaps. In addition, the Fintech Committee of the People's Bank of China also pointed out in its assessment that the demand for fintech composite talents from financial institutions across the country will grow by more than 30% annually in the next three years.

2.2.2 Structural Differences in the Demand for Digital Finance Talent

Companies are demanding a higher competency structure for digital finance talent. Talents needed for emerging positions generally require the ability to simultaneously possess financial logic, digital technology, and business understanding. For example, intelligent investment positions should not only be familiar with financial product design and customer service but also need to master algorithm modeling and data analysis. Fintech risk control positions, on the other hand, emphasize a high degree of integration of model construction and risk judgment. This kind of cross-border and application-oriented talent is precisely the type that is most scarce among college graduates at present.

Digital financial talents also present a stratified, multi-dimensional structural demand. The first layer of requirements is high-end scientific research talent, focusing on the innovation of the underlying technology and financial models. The second category is middle-level platform operation and product design talents, who undertake the responsibility of landing technical products in financial scenarios. The third category is grass-roots executives and service personnel, who need to have basic financial knowledge and technical operation abilities and be able to adapt to the new workflow under the intelligent system. The current vocational undergraduate education is still deficient in meeting the above multi-level and composite talent supply. Some colleges and universities still follow the traditional financial curriculum system, weakening the digital technology module. The practical ability training lacks pertinence, and it is difficult for students to meet the comprehensive requirements of technology sensitivity, innovation ability, and scene adaptability of digital financial positions after graduation. Therefore, from the perspective of supply and demand structure, China's vocational undergraduate colleges and universities still have a significant opportunity to improve their supply of digital financial talents.

3. Analysis of the Current State of Digital Finance Talent Development

3.1 Current Status of Finance-Related Program

Recently, with the rapid development of fintech and the digital economy, institutions of higher education across China have responded to the policy orientation and have successively added fintech-related professional directions and course modules. The addition of fintech majors in the catalog of majors published by the Ministry of Education in recent years signifies that China's higher education system has continued to pay more attention to the cultivation of fintech talents. However, from a practical point of view, the current setup of financial majors still faces many problems.

The first is the dominance of the traditional financial curriculum system and insufficient coverage of digital content. In most higher education institutions, especially at the vocational undergraduate level, finance majors are still dominated by traditional courses, such as Monetary Banking, International Finance, Securities and Investment, Financial Management, etc., with limited coverage of courses on Big Data, Artificial Intelligence, Blockchain, and Financial Programming. According to the research data of a local higher vocational undergraduate college in 2023, nearly 70% of the finance courses are still focused on traditional financial basic content, and the cultivation of students' digital literacy and technology application ability is obviously insufficient. Secondly, the curriculum structure is scattered and lacks cross-fertilization design. Even if some colleges and universities have opened the direction of financial science and technology. Most related courses are scattered and disconnected, which prevents the establishment of a systematic knowledge system that integrates finance, technology, and business. As a result, the linkage and coherence between the courses are lacking, leading to a fragmented knowledge structure for students and making it challenging for them to develop comprehensive application skills. The third is the limited resources of the practice platform. Vocational undergraduate education should pay more attention to practice-oriented learning, but at present, most institutions still focus on classroom teaching and lack training base construction and internship synergy mechanisms with banks, technology companies, and other organizations. Even if practical training courses are set up, they are mostly simulations or case studies, and it is difficult to get close to the real business processes, such as intelligent wind control systems, digital credit scenarios, and financial model training. It is difficult to effectively improve the students' practical digital financial ability. Finally, the faculty's digital background is weak, and the teaching transformation is slow. Although some teachers have a solid theoretical background in finance, they have limited mastery of digital technology, making it difficult for them to be competent in teaching cross-border courses. Most of the new teachers come from a financial background and still lack systematic technical training support, resulting in lagging behind in updating the course content and uneven teaching quality, which restricts the overall improvement of the quality of talent cultivation.

3.2 Challenges in the Cultivation of Finance Talent

The current vocational specialization level of fintech talents has been difficult to meet the rapid development of the financial industry's technical and composite talent needs. The financial industry is

in urgent need of vocational undergraduate fintech application talents with higher-level theoretical foundations and technical abilities. Compared with vocational specialties, vocational undergraduate students have significant advantages in theoretical literacy, knowledge structure, accumulation of technical skills, and composite ability, and they are more capable of mastering high-end fintech tools and system applications and can adapt to the new job requirements in the context of the transformation of the financial industry into an intelligent, platform-oriented, and data-oriented industry so as to satisfy the industry's urgent demand for high-level technical and skill-oriented talents.

Structural differences exist between the cultivation of vocational undergraduate fintech talents and that of general undergraduate financial talents, particularly regarding target orientation and cultivation paths. Therefore, it is essential to maintain staggered development and synergistic complementation. Academic undergraduate education focuses on theoretical research and knowledge innovation in financial disciplines, aiming to cultivate academic, research, or engineering talents, mainly serving in the field of knowledge production and technology research and development. Vocational undergraduate education, on the other hand, focuses on the application methods, process standards, and practice optimization of fintech in front-line business scenarios. emphasizes the functional transformation and landing application of technology in jobs and is committed to cultivating high-quality, practice-oriented fintech talents who can be directly on the job in the fields of banking, insurance, securities, and fintech enterprises. Therefore, vocational undergraduate fintech talent cultivation should not only highlight the application orientation of technical skills and job adaptation but also build a scenario-based teaching system for specific job groups around the trend of digitalization and intelligentization of financial business so as to promote the in-depth fit between talent ability structure and industrial development needs.

4. Pathways for Cultivating Digital Finance Talent

To cope with the profound changes of digital transformation of the financial industry, vocational undergraduate colleges and universities urgently need to systematically reconstruct the original talent cultivation path and comprehensively improve the adaptability of talent supply to the industry demand. Based on the talent structure gap and cultivation realities analyzed in the previous section, this part proposes reform paths in four aspects, namely, professional setting, curriculum system, industry-teaching integration, and faculty construction, to build a high-quality technical and skilled talent cultivation system for digital finance.

4.1 Interdisciplinary Approaches to Advancing Curriculum System Reform

The construction of the curriculum system should take cross-border integration as the core path and reconstruct the knowledge structure, integrating finance, technology, and business. Based on the experience of creating modular courses, we should develop general education modules, basic professional modules, smart finance modules, and practical financial technology modules that meet the needs of key jobs in digital finance, creating a well-organized, step-by-step, and skill-focused course

system. Real business processes should guide the course content, providing a pathway from conceptual cognition to practical skills training. For example, courses like Blockchain Finance, Python Financial Data Analysis, Fintech Risk Control, and Intelligent Investment System Design have been included in the main module, and teaching methods that focus on projects and tasks have been used to ensure the course content fits well with real business processes. At the same time, the project-based transformation of professional backbone courses should be promoted to enhance the adaptability of the course content to the actual positions and improve the competence level of students.

4.2 Multi-Stakeholder Collaboration in Industry–Education Integration Mechanisms

The cultivation of digital financial talents must rely on real scenarios and industry resources and promote the mechanism of collaborative education of multiple subjects. Vocational undergraduates should give full play to the resource advantages of industry associations, leading enterprises, and high-level scientific research institutions to build a collaborative education mechanism between schools and enterprises. Through the joint construction of specialties, textbooks, practical training platforms, and project tasks, the university and enterprises can realize the complementary resources and co-parenting of talents. At the mechanism level, we should promote the Modern Industrial College, Joint Laboratory, and other forms of in-depth collaboration to truly realize students into the enterprise and enterprises into the classroom. For example, we can jointly develop the practice platform of blockchain finance with financial technology enterprises or introduce a digital banking system and intelligent investment advisor simulated real training environment so as to realize the online and offline integration of financial technology courses and the combination of theory and practice. At the same time, an evaluation system for the effectiveness of industry-teaching integration should be established, and a third-party evaluation mechanism should be introduced to ensure that the quality of collaborative education is controllable, the process is traceable, and the results are verifiable.

4.3 Strengthening Cross-Disciplinary and Digitally Competent Faculty Development

The composite characteristics of digital finance require teachers not only to have solid financial theory skills but also to master the application of digital technology and the ability to teach scenarios. The shortcomings of the current faculty structure are the key bottleneck that restricts the reform of the curriculum and the improvement of teaching quality. On the one hand, we can attract frontline technologists and fintech practitioners as visiting professors and practical training lecturers to participate in curriculum construction and practical training teaching so as to enhance the industry relevance and technological frontiers of the classroom. On the other hand, existing teachers should be trained to improve their digital technology literacy and cross-border teaching ability by participating in enterprise practice, scientific research projects, and curriculum co-construction. At the same time, we should create a teaching team for specific projects made up of skilled teachers and technical experts from companies, and set up a system where everyone shares responsibility to help train together and combine course materials, ensuring a strong support system for teachers in developing digital financial skills.

5. Conclusion

The financial industry faces an urgent need for high-level, interdisciplinary talents capable of integrating financial knowledge with digital technologies in the accelerating digital transformation. This paper has identified key challenges in vocational undergraduate education, including outdated curricula, insufficient technical integration, limited industry–education collaboration, and weak faculty capacity. To address these issues, the study proposes a comprehensive reform framework focused on optimizing program structures, reconstructing interdisciplinary curricula, strengthening collaborative training mechanisms, and building dual-qualified teaching teams. These strategies aim to cultivate digital finance professionals who are application-oriented, technically skilled, and responsive to evolving industry demands. The research contributes to the broader agenda of aligning vocational education with the digital economy and supporting the sustainable development of the financial sector.

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