

Research Article

THE DIGITAL MODE OF PRODUCTION AND THE TRANSFORMATION OF HIGHER EDUCATION IN THE ERA OF DIGITAL TRANSFORMATION

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Abstract

This study examines the relationship between the digital mode of production and the transformation of the higher education model, using the Ho Chi Minh University of Banking as an empirical case study. Based on a political economy and educational governance framework, the research demonstrates that big data and artificial intelligence are restructuring the division of labor, thereby requiring higher education institutions to shift from a closed knowledge-transmission model toward an open, co-creative digital university ecosystem. In the case of HUB, the study identifies two key pillars of transformation: the restructuring of interdisciplinary digital-oriented curricula and data-driven training governance associated with a tripartite collaboration model. The findings provide significant scientific foundations for policy formulation and contribute to the development of high-quality human resources in the digital era.

Keywords: Digital mode of production; Digital transformation in higher education; Data-driven governance; Open university ecosystem; Ho Chi Minh University of Banking (HUB).

1. Introduction

The Fourth Industrial Revolution, characterized by the convergence of artificial intelligence, big data, cloud computing, the Internet of Things, and digital platforms, is fundamentally transforming socio-economic structures. According to the World Bank, the digital economy and information technology sector have become key drivers of economic growth and employment generation, demonstrating remarkable development momentum while simultaneously creating an urgent demand for enhancing digital capabilities to narrow development gaps among economies (World Bank, 2023). In the digital era, data, algorithms, connectivity infrastructure, and knowledge have emerged as distinctive means of production. The integration of human resources, data, technology, and digital platforms is reshaping labor organization, value distribution, organizational governance, and competitive capabilities. Therefore, digital transformation is not merely the application of technology but rather a structural transformation of productive forces and relations of production, leading to the emergence of a digital mode of production.

The digital mode of production is characterized by the digitization and interconnectedness of production factors through data-driven platforms. Data has become an essential input resource, an object of exploitation, and a foundation for decision-making; digital platforms serve as spaces for coordination, organization, and distribution of activities; while labor is increasingly evaluated through capabilities in knowledge creation, innovation, collaboration, and technological mastery. This transformation creates an urgent requirement for comprehensive development of human quality and competencies to adapt to new standards of the modern labor market (Tran Mai Uoc, 2024). This article emphasizes the shift in the nature of means of production toward data, digital infrastructure, platforms, and algorithms, accompanied by the need to adjust organizational relationships, management mechanisms, and institutional frameworks. This perspective suggests an essential analytical framework: higher education does not exist outside the emerging mode of production; rather, it functions as an institution responsible for educating, researching, innovating, and reproducing the digital productive forces (Tran Mai Uoc, 2023).

The traditional university model has played a significant role in supplying specialized human resources; however, in the context of rapid technological advancement and labor market transformation, its limitations have become increasingly evident. Training content risks becoming outdated; teaching, research, and community engagement remain relatively

fragmented; assessment practices tend to emphasize outcome measurement rather than competency-based evaluation; and learners have not yet fully assumed the role of co-creators of knowledge. These limitations reduce the capacity of higher education institutions to meet the growing demands for digital human resources, innovative thinking, and lifelong learning competencies.

The development of the digital mode of production necessitates the transformation of higher education models toward greater openness, flexibility, personalization, connectivity, and ecosystem-based development (Tran Mai Uoc, 2023a). Universities need to shift from transmitting existing knowledge toward fostering learners' capacities to create, exploit, evaluate, and responsibly apply knowledge. Learning analytics and digital platforms should be leveraged to support personalized learning, early identification of learning risks, innovative assessment approaches, and evidence-based quality management. Nevertheless, technology can only generate meaningful value when accompanied by the assurance of privacy protection, data security, equitable access, and institutional accountability.

At the governance level, transforming the university model requires redesigning the relationships among universities, faculty members, learners, enterprises, the State, and society. Universities need to become core actors within innovation ecosystems, connecting scientific knowledge with socio-economic development needs. Research into this issue carries both theoretical and practical significance, contributing to the development of a human-centered, inclusive, autonomous digital university model and the preparation of high-quality human resources for sustainable development.

2. Research Methodology

This study employs a qualitative research approach, utilizing a design that integrates a systematic literature review and in-depth expert interviews to elucidate the dialectical relationship between the digital mode of production and the transformation of higher education models. The research subjects include strategic documents, policy frameworks related to higher education development, and a purposive sample of experts comprising educational administrators, political economists, and leaders of higher education institutions in Ho Chi Minh City.

Data collection instruments consist of a thematic coding framework and a semi-structured interview protocol focusing on the structure of digital productive forces and digital university models. The research process was conducted in three stages: (1) reviewing secondary sources

to establish the theoretical framework; (2) conducting in-depth expert interviews; and (3) performing multidimensional discourse analysis.

3.1. What Is the Nature of the Digital Mode of Production and How Is It Restructuring the Social Division of Labor?

Fundamentally, the digital mode of production is not merely the application of information technology; rather, it represents a new stage of economic development in which data has become a strategic means of production, while artificial intelligence (AI) and algorithmic systems have emerged as dominant instruments of labor. This transformation profoundly reshapes the structure of employment, replacing numerous traditional technical and operational positions while simultaneously creating new forms of flexible and decentralized labor.

Clarifying this issue constitutes an essential theoretical foundation. Without deciphering the operational dynamics and underlying principles of the emerging mode of production, research would lack a solid theoretical basis and fail to accurately define educational objectives. Specifically, the digital labor market is fundamentally redefining the expected learning outcomes and competency requirements for human resources, including digital thinking, interdisciplinary capabilities, human-machine interaction skills, and adaptive capacity in rapidly changing technological environments.

The digital mode of production represents a new stage in the development of social modes of production, reflecting profound transformations in the dialectical relationship between productive forces and relations of production.

From the perspective of productive forces, big data has transcended its conventional role as merely an object of representation and has become a strategic means of production with the capacity for continuous regeneration. Meanwhile, artificial intelligence (AI), cloud computing, and algorithmic systems have assumed the role of new intellectual labor instruments, directly replacing and augmenting human cognitive and analytical capabilities.

From the perspective of relations of production, the establishment of control over digital data infrastructures and transnational platforms has restructured governance mechanisms from hierarchical administrative models toward decentralized network-based structures. At the same time, it has shifted the distribution of surplus value toward actors that possess and control core technological resources.

This transformation fundamentally reshapes the social division of labor: automation processes increasingly eliminate repetitive and operational tasks, generating a profound polarization of employment structures while simultaneously accelerating the expansion of creative labor, interdisciplinary labor, and complex forms of human–machine collaboration.

From the perspective of its operational dynamics, the digital mode of production is profoundly governed by the laws of data accumulation and network effects. These mechanisms have accelerated real-time connectivity and shortened technological innovation cycles from decades to merely months, resulting in the rapid obsolescence of static professional knowledge.

This objective transformation process reveals deep internal contradictions within the traditional higher education model, which has long been structured around fixed academic cycles, fragmented disciplinary boundaries, and a predominantly one-way transmission of knowledge. In this context, the emergence of advanced automation tools (such as ChatGPT) has further intensified the urgent need to innovate both theoretical and professional teaching approaches, shifting from unilateral knowledge delivery toward the cultivation of learners' critical thinking and creative capabilities (Tran Mai Uoc, 2023b).

From the perspective of relations of production, digital infrastructure and data-driven platforms are transforming governance structures toward decentralized networks while simultaneously intensifying polarization within labor markets. In the context of the “Second Machine Age,” the wave of automation has profoundly affected both manual and cognitive labor, compelling education systems to move beyond standardized and rigid knowledge transmission toward the cultivation of creative thinking and adaptive competencies. (Brynjolfsson & McAfee, 2014). To adapt to and avoid falling behind the structural transformation of the economy, higher education must inevitably undergo a comprehensive paradigm shift from the model of a “closed physical university” toward an “open digital university ecosystem” that is dynamically adaptive and capable of continuous interaction with the production environment.

Within such an ecosystem, the educational philosophy must decisively shift from equipping learners with pre-existing knowledge toward cultivating critical thinking, technological mastery, lifelong learning capabilities, and flexible adaptability in response to unpredictable changes in the digital labor market.

At the same time, educational processes must be fundamentally restructured through the application of learning analytics to personalize training pathways and integrate micro-credential components, thereby enabling timely responses to the societal demands for reskilling and upskilling. In this transformation process, the tripartite collaboration among universities, the State, and enterprises serves as a core driving force for sustainable development.

3.2. The Paradigm Shift in Higher Education: From Closed Knowledge Transmission to Open, Adaptive, and Co-Creative Digital Universities

From Closed Transmission Institutions to Open and Dynamically Adaptive Digital University Ecosystems

The traditional higher education model, which was shaped during the era of industrialization, has been characterized by a fragmented structure based on isolated disciplinary faculties, rigid academic cycles, and a passive one-way knowledge transmission process from lecturers to learners. This model has revealed profound limitations in the face of the rapid transformation of the digital economy. Under increasing pressure from the obsolescence and intangible erosion of static forms of knowledge, higher education institutions are compelled to undergo comprehensive restructuring in order to establish an “open digital university” model. Within this emerging model, boundaries of physical space, learning time, and disciplinary barriers are gradually dissolved, giving way to digital connectivity infrastructures, open data ecosystems, and shared academic resources beyond geographical limitations.

The adaptive nature of this new paradigm is clearly demonstrated through the transition from fixed learning outcomes toward the development of lifelong self-learning capabilities, critical thinking, interdisciplinary competencies, and mastery of digital technologies. This transformation enables learners to proactively design personalized learning pathways through advanced learning analytics, interactive artificial intelligence systems, and flexible micro-credential frameworks.

Reconfiguring the Knowledge Co-Creation Model and Transforming Educational Governance Institutions

The decisive breakthrough of the emerging paradigm lies in the mechanism of “co-creation,” through which higher education moves beyond the position of a closed “academic ivory tower” and transforms into an open knowledge ecosystem, fundamentally redefining pedagogical relationships and multidimensional institutional collaboration mechanisms.

Within this environment, learners are no longer passive recipients of knowledge but become active agents in the process of knowledge co-creation. Likewise, lecturers shift from the exclusive role of knowledge authorities toward becoming facilitators who coordinate learning processes, inspire research engagement, promote scientific inquiry and critical reflection, and guide ethical standards in the use of technology.

Alongside technological competencies, educating individuals in the context of innovation and international integration continues to require the preservation of fundamental humanistic values, connecting contemporary knowledge with ethics and approaches to holistic human development (Tran Mai Uoc, 2022). At the same time, the relationship among universities, technology enterprises, and the State is being established as an organic and sustainable strategic alliance network. Enterprises directly participate in curriculum evaluation, provide evidence-based data resources, and share high-performance computing infrastructure; universities serve as central hubs for nurturing innovative solutions; while the State plays the role of institutional architect and strategic investor.

From a political economy perspective, this transformation is not merely the superficial application of technological tools; rather, it represents a comprehensive restructuring of educational relations of production to achieve compatibility with the developmental level of digital productive forces, thereby ensuring the capacity to reproduce high-quality human resources for national development.

3.3. Key Practical Implications Associated with the Context of the Ho Chi Minh University of Banking

With reference to the Ho Chi Minh University of Banking (HUB), the digital mode of production imposes two fundamental requirements for education, teaching practices, and training management.

First, restructuring training programs and teaching methodologies toward digitalized interdisciplinary integration

The development of the digital mode of production in the banking and finance sector places the Banking University of Ho Chi Minh City under the imperative to fundamentally transform its training activities and teaching approaches. The university needs to make a decisive shift from traditional single-disciplinary professional training toward a deeply integrated interdisciplinary approach combining Finance, Data, and Digital Technologies, with a particular focus on FinTech, Applied Artificial Intelligence (AI), and Green Finance.

In teaching practices, lecturers need to transition from the role of one-way transmitters of static theoretical knowledge toward becoming facilitators and co-creators of knowledge. This transformation requires the effective exploitation of simulation-based laboratories (FinTech Lab, Core Banking systems) to connect learning activities with real-world digital banking operations.

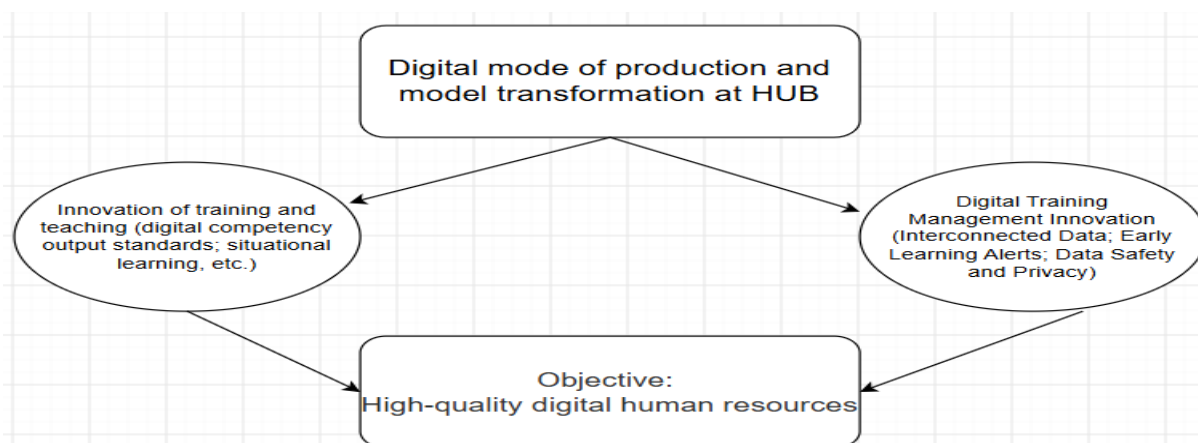
Learning outcomes must also be elevated beyond purely technical operational skills, with greater emphasis placed on cultivating critical thinking, lifelong learning capabilities, big data analytics competencies, and professional ethics in the digital environment.

Second, innovating training governance toward an open digital university model and an institutional co-creation mechanism

In training management, universities need to shift from administrative-based management approaches toward data-driven university governance (Tran Mai Uoc, 2023a). The application of learning analytics enables real-time monitoring of learning progress, personalization of training pathways, development of flexible micro-credential components, and accurate measurement of course-level learning outcomes.

At the same time, in alignment with the context of establishing an International Financial Center in Ho Chi Minh City, the university needs to position itself as an “open digital university” through a tripartite collaboration mechanism among universities, commercial banks, and FinTech enterprises. This co-creation model enables financial institutions to directly participate in curriculum evaluation, share computing infrastructure and real-world data resources, and contribute to assessing learners’ competencies. This institutional framework serves as a strategic foundation for opening new development pathways, strengthening training quality assurance, and enhancing academic reputation.

The above relationship can be summarized through the following diagram:



Source: Compiled and developed by the authors using the diagrams.net software platform:

<https://app.diagrams.net/>

The two pillars above are mutually complementary: while innovative teaching practices cultivate learners' competencies, digital governance provides the organizational framework for managing, monitoring, and ensuring the quality of the training process. The ultimate goal is to develop a high-quality digital workforce capable of meeting the development requirements of society and the finance–banking sector.

4. Conclusion

This study has elucidated the dialectical relationship between the digital mode of production and the imperative for transforming the higher education model. Under the influence of big data, artificial intelligence, and algorithmic systems—the core means and instruments of production in the new era—the structure of the social division of labor and knowledge-based relations of production are undergoing profound transformations. These changes require higher education institutions to make a decisive shift from a linear knowledge transmission approach toward an open, dynamically adaptive, and co-creative digital university ecosystem. For the Ho Chi Minh University of Banking (HUB), the study identifies two strategic pillars: (i) restructuring curricula and teaching methodologies toward digitalized interdisciplinary integration; and (ii) developing data-driven training governance organically connected with a tripartite collaboration model among universities, banks, and enterprises.

From a scientific perspective, the integration of the political economy approach (through the analytical categories of productive forces and relations of production) with contemporary educational governance theories has established a novel analytical framework. This framework demonstrates that digital transformation in education is fundamentally a restructuring process of knowledge-based relations of production rather than merely the adoption of technological applications.

From a practical perspective, the research findings provide a solid scientific foundation for improving digital education policy frameworks, standardizing mechanisms for recognizing micro-credentials, and promoting innovation ecosystems within economics and finance-oriented higher education institutions.

However, due to the limitations of the qualitative research approach and the single-case study design focusing on HUB, these findings require further validation through large-scale quantitative surveys across the higher education system. Building upon this foundation, future

research directions may focus on developing quantitative indicators to assess levels of digital maturity, examining the practical effectiveness of micro-credentials, and measuring the long-term impacts of the “triple-helix” collaboration model on research capacity and innovation performance of higher education institutions within the digital economy.

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