

Innovation and Practice of Carbon Finance Talent Cultivation Models in Higher Education Institutions under the New Economics and Management Strategy

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Abstract: With the proposal of the Carbon Peak and Carbon Neutrality Goals, China's medium- and long-term economic structure and financial system will undergo profound transformations, making carbon finance a critical field for driving green economic development and creating an urgent demand for specialized carbon finance professionals. As the primary institutions for talent cultivation, higher education institutions must explore innovative pathways to carbon finance talent development under the New Economics and Management Strategic framework. This paper begins by examining the practical context of carbon finance talent demand, analyzes the current status and constraints of carbon finance talent cultivation in higher education, and proposes concrete implementation pathways encompassing curriculum reform, faculty development, pedagogical innovation, and practical platform construction. The study aims to provide both theoretical references and practical guidance for universities to cultivate high-quality carbon finance professionals capable of meeting the needs of a low-carbon economy.

Keywords: Carbon Finance, Talent Cultivation, New Economics and Management.

1. Introduction

Against the backdrop of intensifying global climate change and the deepening advancement of the Ecological Civilization Construction, China formally announced its strategic goals of “achieving carbon peak by 2030 and carbon neutrality by 2060” (hereinafter referred to as the Dual Carbon Goals) in 2020. This landmark strategic decision not only demonstrates China's commitment as a responsible global power but also represents an inherent requirement for promoting comprehensive green transformation of the economy and society. The realization of these Dual Carbon Goals constitutes a systemic societal transformation, presenting novel research imperatives for economics and management disciplines while catalyzing profound changes in traditional theoretical frameworks and research paradigms. Within this context, carbon finance has emerged as a critical nexus connecting green economy and financial markets, serving as a pivotal enabler for achieving the dual carbon objectives. Concurrently, the New Economics and Management (NEM) strategy proposed by Anhui University of Finance and Economics that talent cultivation in economics and management disciplines must adapt to the demands of the digital economy era, foster interdisciplinary integration, and develop compound talents with innovative spirit and practical capabilities. This strategic initiative provides fresh perspectives and directions for cultivating carbon finance professionals. Nevertheless, China's carbon finance talent development faces significant challenges: On the one hand, there exists an acute shortage of interdisciplinary professionals with specialized carbon finance knowledge to meet the rapidly expanding market demands. On the other hand, the current higher education system for carbon finance talent cultivation remains underdeveloped, exhibiting deficiencies including outdated curriculum design, inadequate practical training, and insufficient interdisciplinary integration. Higher education institutions

must proactively respond to national strategic needs by systematically exploring innovative approaches to carbon finance talent cultivation that align with NEM strategy requirements, which carry substantial theoretical significance and practical value [1, 2].

2. The Practical Necessity of Carbon Finance Talent Cultivation

2.1. Strategic Imperatives at the National Level

The proposal of the Dual Carbon Goals signifies a profound transformation in China's economic and social development paradigm. As a critical component of green finance, carbon finance effectively channels social capital toward low-carbon sectors, stimulates green technology innovation, and facilitates industrial green transition, playing an indispensable role in achieving these climate objectives. However, most current carbon finance practitioners in China have transitioned from traditional financial sectors, lacking systematic knowledge and professional competencies in carbon finance, which inadequately meets market demands. Cultivating interdisciplinary carbon finance talents with both industry-specific knowledge and financial expertise has become an urgent imperative to drive the green transition.

Enhancing carbon finance talent development constitutes an essential requirement for: implementing national Dual Carbon Strategies, advancing industrial green transformation, deepening higher education reform, and participating in global climate governance. Higher education institutions should leverage the NEM framework to innovate talent cultivation models, thereby providing robust human capital support for socio-economic green development [2].

2.2. Development Pathways for Higher Education Reform

Under the NEM strategy, economics and management disciplines are required to actively adapt to the demands of

the digital economy era, foster interdisciplinary integration, and cultivate innovative, interdisciplinary professionals [1]. Carbon finance, as an emerging interdisciplinary field combining finance with environmental science and energy economics, represents a quintessential embodiment of the NEM initiative. The conventional finance education model, characterized by its overemphasis on theoretical instruction and excessive specialization, fails to meet carbon finance's requirements for cross-disciplinary knowledge and practical competencies. Current carbon finance education in higher institutions exhibits several critical deficiencies: (1) an underdeveloped curriculum system, with most universities lacking comprehensive carbon finance programs; (2) insufficient faculty expertise, as most instructors lack practical experience in carbon finance; (3) inadequate practical training components, resulting in limited hands-on learning opportunities for students; (4) insufficient integration of ideological and political education, neglecting the cultivation of green finance concepts and social responsibility. These systemic shortcomings significantly constrain the quality of carbon finance talent development. To address these challenges, higher education institutions are actively exploring innovative approaches to carbon finance education, thereby providing valuable references for curriculum development and disciplinary reform in this emerging field.

2.3. Strategic Imperatives for Carbon Finance Market Development

Within the context of global climate governance, international competition in carbon finance has intensified significantly. The European Union's Carbon Border Adjustment Mechanism (CBAM), scheduled for full implementation in 2026, along with anticipated analogous carbon tariff policies in the United States, will substantially impact China's export economy. Concurrently, accelerated development of international carbon markets has precipitated fierce competition for rulemaking dominance in carbon finance mechanisms. Cultivating carbon finance professionals with global perspectives has thus emerged as a strategic priority to enhance China's influence within the international carbon finance architecture. Furthermore, climate change constitutes a transnational challenge necessitating strengthened multilateral cooperation. China's active participation in global climate governance, particularly through green development initiatives under the Belt and Road framework, generates substantial demand for carbon finance specialists proficient in international carbon market regulations and Cross-cultural communication competencies.

3. Current Status and Constraints in Carbon Finance Talent Cultivation

3.1. Analysis of Carbon Finance Talent Cultivation in Chinese Higher Education Institutions

The current development of carbon finance curricula in Chinese higher education institutions exhibits a distinct pyramidal distribution pattern, where a select group of specialized finance universities have established relatively comprehensive carbon finance programs while the majority of institutions remain in the early stages of curricular development. Empirical research indicates that approximately 65% of regional universities' finance

departments have yet to systematically incorporate carbon finance courses into their curricula, with such content only sporadically addressed through occasional lectures or special topics, an imbalanced developmental landscape that significantly impedes the scaled cultivation of carbon finance professionals. Three critical deficiencies characterize existing course content: (1) a pronounced disconnect between theoretical instruction and practical application, with hands-on training components constituting less than 30% of contact hours on average; (2) a marked lag in content updates failing to reflect key market developments such as the evolution of China's national carbon market architecture and emerging carbon financial instruments; (3) insufficient international perspective evidenced by minimal coverage of global frameworks including the CBAM and cross-border carbon market linkage mechanisms [3].

3.2. Analysis of Key Constraints

As an emerging interdisciplinary field, carbon finance faces significant constraints from traditional disciplinary boundaries, where the current academic structure and departmental organization in higher education institutions have led to fragmented development among finance, environmental science, and energy economics, hindering deep integration. This institutional inertia manifests in three critical dimensions: (1) uncoordinated curriculum design with poor articulation between disciplinary courses; (2) insufficient high-quality teaching resources that fundamentally limit the effectiveness of carbon finance education; (3) rigid academic evaluation systems that discourage the formation of interdisciplinary teaching teams despite carbon finance's inherent demand for faculty with cross-disciplinary expertise and practical experience. Simultaneously, the cultivation of carbon finance talent requires substantive industry-academia collaboration, yet current partnerships encounter systemic barriers including misaligned institutional objectives—where universities prioritize talent development while enterprises focus on economic returns—resulting in weak collaboration incentives, the absence of sustainable engagement mechanisms that relegates most cooperation to superficial levels, and inadequate policy support mechanisms to effectively incentivize corporate participation in human capital development.

4. Innovative Pathways for Carbon Finance Talent Development

4.1. Constructing an Interdisciplinary Curriculum Framework

Higher education institutions should prioritize developing specialized courses that deeply integrate carbon finance with green finance, with curricula designed to systematically examine how carbon market mechanisms drive low-carbon transition and optimize resource allocation through the unique lens of carbon finance. These courses must comprehensively cover core elements of carbon finance—including emissions trading, carbon asset management, and carbon financial derivatives—alongside their innovative applications in green finance, while maintaining strong alignment with China's carbon market development realities through sector-specific analyses of practical implementations in key industries such as power generation, steel, and building materials. For instance, the “Carbon Finance Market” course could employ

case-based pedagogy to train students in utilizing financial instruments for carbon asset management and price risk mitigation, while the “Carbon Derivatives Design and Pricing” course might explore risk management applications of carbon futures and options. Specialized modules like “Carbon Asset Management for Key Industries” should address sector-specific challenges including allowance allocation methodologies and emission reduction technology selection. Pedagogically, these courses should adopt interactive methodologies combining case studies, simulated trading platforms (particularly those leveraging real transaction data from China's national carbon market to replicate allowance trading and product innovation scenarios), and project-based learning, supplemented by practitioner-led sessions featuring experts from carbon exchanges and asset management firms to enhance authenticity through real-world case demonstrations.

To advance interdisciplinary integration, universities should establish cross-departmental curriculum development teams comprising faculty from finance, environmental science, energy economics, and related disciplines to collaboratively design syllabi and course content, while implementing credit reciprocity systems that enable students to pursue cross-disciplinary electives and developing interdisciplinary textbooks through coordinated efforts among domain experts. Furthermore, institutions ought to create dedicated interdisciplinary research and teaching initiatives that incentivize faculty to conduct cutting-edge collaborative research on carbon finance, thereby fostering systemic knowledge synthesis across traditional academic boundaries through institutionalized support mechanisms including joint appointment structures, integrated grant funding, and hybrid evaluation metrics that recognize interdisciplinary scholarship.

4.2. Faculty Capacity Building

The cultivation of carbon finance talent in higher education institutions fundamentally depends on robust faculty development, which necessitates strategic emphasis on targeted recruitment by prioritizing the hiring of doctoral candidates with interdisciplinary “finance + environment” competencies while concurrently engaging practicing experts from carbon exchanges and asset management firms as adjunct faculty. For existing faculty development, institutions should implement structured programs to foster interdisciplinary growth among junior faculty through support for second degree pursuits and specialized professional training. Institutionally, the establishment of “1 + N” teaching teams—where a lead faculty member oversees curricular architecture while module specialists (the “N” cohort) respectively assume responsibility for theoretical instruction, case study development, and practical training—creates an integrated framework for collaborative pedagogy, reinforced through regular teaching-research seminars and coordinated curriculum delivery to ensure knowledge integration across disciplinary boundaries [4].

4.3. Innovative Pedagogical Approaches and Methodologies

4.3.1. Implementation Pathways for Case-Based Pedagogy

Case-based pedagogy should be systematically integrated throughout the entire carbon finance talent cultivation process, with foundational cases—such as the evolution of the EU

Emissions Trading System and China's carbon market development experience—being utilized for classroom instruction through 2-4 contact hours of intensive analysis per case. Comprehensive cases addressing real-world scenarios like power generation companies' carbon asset management practices or financial institutions' carbon product innovations should be deployed for group-based seminar discussions, requiring students to collaboratively produce analytical reports and deliver formal presentations. Practitioner-oriented cases featuring authentic datasets from China's national carbon market transactions or hands-on carbon financial product pricing exercises ought to be implemented through workshop formats for extracurricular skill development, while concurrent case repository construction must emphasize multidimensional case sourcing (incorporating corporate disclosures, regulatory filings, and field research), typological diversity (balancing descriptive, analytical, and decision-focused cases), and institutionalized update mechanisms (ensuring quarterly revisions aligned with carbon policy developments and market innovations).

4.3.2. Development of Virtual Simulation-Based Pedagogy

Virtual simulation-based instruction should comprehensively encompass core carbon finance business processes, beginning with foundational simulations replicating emissions trading workflows—including account establishment, bid/ask quotation, transaction execution, and clearing settlement procedures—progressing to specialized simulations employing Black-Scholes and related models for carbon derivative pricing, and culminating in integrated decision-making simulations where learners develop emission reduction strategies and trading tactics by analyzing authentic corporate carbon emission datasets [5].

The development of virtual simulation platforms must incorporate authentic market data to preserve environmental verisimilitude, implement tiered difficulty levels accommodating diverse learning progression requirements, and establish dynamic updating protocols to ensure timely integration of evolving market regulations and parametric adjustments, thereby maintaining pedagogical relevance and operational fidelity throughout the experiential learning continuum.

4.4. Establishment of Industry-Academia-Research Collaboration Platforms

4.4.1. Practice Base Development

Deepening industry-academia-research collaboration constitutes a critical pathway for enhancing the quality of practice-oriented carbon finance talent cultivation[6], wherein higher education institutions should proactively engage with specialized organizations—prioritizing partnerships with carbon exchanges, verification bodies, and asset management firms—while establishing multifunctional practice bases integrating pedagogical training, joint research, and community services through standardized internship management protocols, safety assurance mechanisms, and competency evaluation frameworks. Concurrent institutional initiatives should incorporate practitioner expertise into curriculum delivery via guest lectures, seminar series, and other experiential knowledge-sharing formats to broaden students' professional horizons, with recommended implementation of a “1+N” structural model comprising one university-level carbon finance innovation hub networked with multiple discipline-specific practice centers across

academic units to create an articulated, multi-tiered experiential learning ecosystem [7].

4.4.2. University-Enterprise Collaborative Education Mechanism

Innovating university-enterprise collaborative education models requires multidimensional integration, beginning with co-developed curricula that incorporate industry experts in instructional design and textbook compilation, followed by implementing a dual-mentorship system pairing academic advisors with professional practitioners to provide comprehensive student guidance, while facilitating authentic carbon finance project engagement where learners participate in corporate initiatives, and ultimately establishing demand-driven talent pipelines through customized training programs that address industry-specific workforce needs [8]. To ensure sustainable implementation, institutions should formalize partnership mechanisms through legally binding strategic cooperation agreements delineating mutual obligations, constitute joint steering committees convening regular progress reviews, and allocate dedicated collaborative funding pools to operationalize key initiatives with financial stability.

5. Conclusion

Under the NEM strategy, higher education institutions must ground carbon finance talent cultivation in national strategic priorities while upholding the fundamental mission of virtue cultivation through developing an integrated trinity system encompassing theoretical instruction, practical training, and ideological-political education. The theoretical dimension necessitates dismantling traditional disciplinary silos to establish cross-disciplinary curricula synthesizing finance, environmental science, and energy economics, systematically delivering core knowledge domains including carbon market mechanisms, financial instruments, and risk management frameworks. Practically, this requires enhancing students' professional competencies—particularly in carbon asset valuation and trading strategies—through multifaceted approaches such as virtual simulation labs, university-enterprise partnership platforms, and discipline-specific competitions. Concurrently, ideological education must permeate the entire pedagogical process by embedding

national policies like the Dual Carbon Goals to foster ecological civilization awareness and social responsibility. Through coordinated reforms in curriculum design, faculty development, pedagogical innovation, and experiential learning implementation, this comprehensive framework cultivates high-caliber carbon finance professionals capable of supporting the green economic transition and advancing carbon neutrality objectives through synergistic integration of specialized expertise, practical skills, and value-oriented leadership.

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