

Research and Application of Innovation and Entrepreneurship Education Reform on Carbon Audit Talent Training under the Background of "Dual Carbon"

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Abstract

In the context of committed to achieving the "Dual Carbon" target, the importance of carbon audit talents is increasing day by day. Colleges and universities in China have set up carbon audit related majors, but they are faced with the problems of curriculum design, practical teaching and insufficient teachers. Drawing on the "magnet model" of innovation and entrepreneurship education, carbon audit education can integrate interdisciplinary content, enhance practical and innovative ability, enhance teachers' industry experience and teaching level, and improve students' career adaptability and flexibility. The establishment of a carbon audit talent cultivation system featuring attractiveness, practical opportunities, support systems, interdisciplinary learning, a lifelong learning culture, and community networks can help cultivate carbon audit talents that meet the needs of the new era.

Keywords

Innovation and entrepreneurship education; Carbon audit; Dual carbon targets; Talent cultivation.

1. Introduction

In order to cope with global climate change and mitigate the threat of greenhouse effect to ecosystems, many countries have set targets to reduce carbon dioxide emissions. Assuming the responsibility of a major country, China has actively responded to the call for global climate governance, and put forward the "Dual Carbon" target of peaking carbon emissions by 2030 and achieving carbon neutrality by 2060.

Driven by the "Dual Carbon" target, the importance of carbon audit has become increasingly prominent. Carbon audit not only helps enterprises identify and quantify carbon emissions, but also provides scientific basis for formulating emission reduction strategies and achieving sustainable development.

The study will focus on the following core issues, aiming to provide theoretical support and practical guidance for innovation and entrepreneurship education in carbon audit talent cultivation in colleges and universities: The first is how to learn from existing experience and explore an innovation and entrepreneurship education system that is consistent with the "Dual Carbon" target, so as to cultivate interdisciplinary talents with professional knowledge and skills of carbon audit. The second is how to learn from the international advanced carbon audit talent cultivation experience and combine with China's national conditions to innovate and optimize the carbon audit talent cultivation mode. The third is how to effectively integrate the innovation and entrepreneurship education process into the related core knowledge of carbon audit, so as to improve students' cognition of carbon audit practice and innovation.

2. Literature Review

2.1. Theory of Innovation and Entrepreneurship Education

Innovation and entrepreneurship education, as an educational concept, aims to cultivate students' innovative thinking, entrepreneurial awareness, and practical abilities. Foreign scholars have developed relatively complete theoretical models such as the magnet mode, radiation mode, and hybrid mode[1]. In contrast, research on innovation and entrepreneurship education in China started relatively late, but has developed rapidly. In recent years, with the sustained development of the national economy and the deepening implementation of innovation driven strategies, the status of innovation and entrepreneurship education in China has become increasingly prominent, and domestic universities and research institutions have opened innovation and entrepreneurship courses one after another. The government has provided solid support for the practice of innovation and entrepreneurship education through policy support, financial investment, project support, and other means.

2.2. Theory of Carbon Audit Talent Cultivation

Under the background of "Dual Carbon", the rapid growth of carbon audit demand, the continuous progress of carbon audit technology and the trend of carbon audit internationalization highlight the importance of carbon audit talent cultivation in colleges and universities. However, China's universities still face many problems and challenges in the carbon audit talent cultivation. First, in terms of curriculum setting, the number and content of courses set by colleges and universities do not match the actual demand, which restricts the effect of talent cultivation. Second, the practice is obviously insufficient, and it is difficult for students to get in touch with real carbon audit cases, which affects the cultivation of practical operation ability and experience accumulation. Third, there is a shortage of teaching staff. Carbon audit involves multiple disciplines and requires teachers to have interdisciplinary knowledge and practical experience. However, the teaching staff of carbon audit in many colleges and universities is not perfect, which is difficult to meet the teaching needs.

The combination of innovation and entrepreneurship education and carbon audit talent cultivation is an innovative education model, which can guide carbon auditors to flexibly use cutting-edge technologies and methods in practical work, and cultivate practical and problem solving skills. Such talents not only master professional knowledge and skills, but also have innovative thinking, higher comprehensive quality and competitiveness, and can better cope with the challenges of carbon audit and sustainable development. We should actively explore and practice this model to cultivate carbon audit talents with innovative thinking[2].

3. The Enlightenment of Three Typical Models of Innovation and Entrepreneurship Education Development in Universities on the Cultivation of Carbon Audit Talents

3.1. Typical Models for the Innovation and Entrepreneurship Education

Innovation and entrepreneurship education can be divided into three main paths. The first path is a "focused model" centered around the construction of innovation and entrepreneurship disciplines, adopting a centralized teaching model with specialized training of innovation and entrepreneurship talents as the core, aiming to cultivate talents with entrepreneurial awareness. The second path is a "radiation model" that focuses on improving students' innovation and entrepreneurship qualities and abilities, adopting a distributed teaching model throughout the school, aiming to cultivate students' entrepreneurial spirit. Between the two paths is the "magnet model" education path, which emphasizes interdisciplinary entrepreneurship education while maintaining a certain level of professionalism. Promote

innovation and entrepreneurship development through interdisciplinary research and collaborative projects.

In China, innovation and entrepreneurship education mainly adopts the "magnet model", which integrates education, talent, and government resources to build a strong innovation and entrepreneurship ecosystem. In this model, universities, enterprises, and governments collaborate to establish innovation and entrepreneurship platforms, incubators, and science parks to attract and cultivate outstanding innovation and entrepreneurship talents. The "magnet model" emphasizes six characteristics: attractiveness, practical opportunities, support systems, interdisciplinary learning, lifelong learning culture, and community network:

Attraction: Emphasizing the provision of cutting-edge course content, innovative teaching methods, and practical projects closely related to the industry, creating an attractive learning environment, and stimulating students' interest and enthusiasm.

Practical opportunities: Emphasis is placed on gaining practical experience through internships, entrepreneurship competitions, incubators, and accelerator projects, which helps students develop key skills such as teamwork, problem-solving, and project management.

Support system: Emphasis is placed on establishing a comprehensive support system, including mentor guidance, funding, and technical resources, to help students solve entrepreneurial difficulties and improve the success rate of entrepreneurship.

Interdisciplinary learning: Emphasis is placed on encouraging students from different disciplinary backgrounds to collaborate, promoting innovative thinking and diverse perspectives. Interdisciplinary teams combine their respective expertise to create more comprehensive and feasible entrepreneurial solutions.

Lifelong learning culture: Emphasizes the cultivation of students' interest and abilities in learning, focusing not only on their current academic achievements, but also on their ability to continue to grow and adapt in a rapidly changing world in the future.

Community Network: Emphasis is placed on establishing an active community network that includes students, teachers, alumni, industry experts, and investors, providing valuable resources, feedback, and connections for students, and establishing an ecosystem that supports innovative spirit.

3.2. Case Analysis of the Application of Innovation and Entrepreneurship Education in Talent Cultivation

In recent years, innovation and entrepreneurship education has received widespread attention and application worldwide, and numerous excellent cases have emerged at home and abroad, demonstrating the diversity of innovation and entrepreneurship education models. We have conducted an in-depth analysis of representative domestic and foreign cases of innovation and entrepreneurship education applications to gain a more comprehensive understanding of the actual development of innovation and entrepreneurship education models.

3.2.1. Tsinghua University

Tsinghua University's innovation and entrepreneurship education started early. In 1997, Tsinghua University established the Student Entrepreneurship Association and the following year, they prepared an entrepreneurship plan competition in Tsinghua[3]. As of now, innovation and entrepreneurship education has achieved significant results, and Tsinghua University's X-lab has incubated hundreds of meaningful products or projects. Tsinghua University adopts a "magnet model" and is committed to integrating entrepreneurship courses with students' professional courses[4].

In addition, Tsinghua University tracks and provides regular guidance on student performance in real-time. Each project is evaluated comprehensively by instructors, entrepreneurial

mentors, external experts, etc. based on the provided business plan and roadshows, creating a new training model of "university+government+company".

3.2.2. Peking University

In 2013, the "Peking University Innovation and Entrepreneurship Support Program" was officially launched, led by the Peking University Alumni Association, in collaboration with the Peking University Entrepreneur Club, and coordinated with 15 relevant departments and departments of Peking University[5]. On this basis, Peking University Entrepreneurship Training Camp provides free public welfare education, focuses on the development of interdisciplinary "radiation paths", and forms a new entrepreneurial ecosystem with resources and assistance. Nowadays, Beichuangying has established 17 regional carriers to provide first-class training and guidance for outstanding talents, enabling them to circulate highly and contributing new strength to the construction of national innovation and entrepreneurship education.

3.2.3. Harvard University

As a world-class top university, Harvard Innovation Laboratory (i-lab) allows student teams to participate in a 12 week industry incubation program every semester. Under the concept of "people-centered", the i-lab tests the feasibility and practicality of innovative enterprises and technologies by establishing prototypes and simulation experiments. At the same time, high-quality alumni resources also provide the laboratory with an EIR plan, inviting first-class investors and others to provide project guidance and planning for students.

3.2.4. Nanyang University of Technology

The "5C" talent cultivation concept of Nanyang University of Technology was founded in 2003, and its basic elements are: character, innovation, ability, communication, and civic awareness[6]. Over the past two decades, Nanyang Technological University and the Singapore Development Authority have jointly established the Nanyang Technology Development Center. The university has also adopted high salaries and benefits to attract high-quality mentors to join the teaching team and attract outstanding overseas students to study.

Top universities at home and abroad are fully aware of the importance of innovation and entrepreneurship education. Each university, relying on its own faculty, chooses to cooperate with enterprises and establish innovation and entrepreneurship courses to provide students with development platforms and professional support.

4. Building a New Path for Carbon Audit Talent Training

Both carbon audit talent cultivation and the innovation and entrepreneurship education system emphasize the application of interdisciplinary knowledge, the development of practical skills, the fostering of innovative and critical thinking, the enhancement of teamwork and communication abilities, the cultivation of adaptability and flexibility, and the formation of a lifelong learning attitude. Drawing on the "magnet model" of innovation and entrepreneurship education and applying it to carbon audit talent training can provide students with more practical and innovative experiences, enhancing their comprehensive competence in the field of carbon auditing. Starting from the six characteristics of the "magnet model"-attractiveness, practical opportunities, support systems, interdisciplinary learning, lifelong learning culture, and community networks-we propose the following suggestions and ideas for constructing a talent training system for carbon audit professionals in the new era:

4.1. Establishment of Carbon Audit Laboratory

Carbon auditing is an important branch of the auditing field, characterized by its strong professionalism. The education and research in this area are distinguished by their integration

of theoretical knowledge with practical operations, ensuring that students become proficient in financial and other professional skills, and are able to simulate and analyze complex auditing issues in a risk-free environment.

To cultivate students' practical abilities, a carbon audit laboratory can be established, equipped with advanced carbon measurement instruments and simulated carbon trading platforms. This allows students to learn and master the carbon audit process in a simulated environment. Through this simulation, students will gain a deeper understanding of the content, types, steps, and methods of carbon auditing, and master knowledge related to carbon emission reduction policies, carbon accounting, and low-carbon product certification[7].

Additionally, the carbon audit laboratory can enhance students' computer application skills by training them to use relevant auditing software and perform tasks such as carbon data statistics and processing. During the learning process in the laboratory, students will cultivate communication skills and teamwork abilities through interactions, information sharing, and collaborative coordination among group members.

4.2. Enterprise Cooperation Projects

Colleges and universities can establish cooperative relationships with leading domestic companies in industries such as energy, construction, and transportation to jointly carry out actual carbon audit projects, providing students with real-world training opportunities. In a genuine corporate environment, students can gain a comprehensive understanding of business operations, utilize actual energy data from the companies to calculate energy consumption indicators, analyze the carbon emission issues within the companies, and propose practical and feasible suggestions, thereby enhancing their data statistics and analysis capabilities.

Additionally, colleges and universities can regularly organize exchange activities, inviting authoritative experts and senior scholars from environmental engineering, environmental protection, and international organizations to interpret policies and evaluation indicators related to carbon emissions for students. Outstanding individuals with rich practical experience in carbon auditing can be invited to share their experiences and insights, giving students the opportunity to engage in face-to-face discussions with corporate experts and gain insights into the latest trends in the industry.

4.3. Cross Disciplinary Integration

Carbon auditing covers a wide range of industries, involving knowledge from multiple disciplines including environmental science, management, economic law, and law. It places high demands on the professional abilities and practical skills of auditing talents. Universities should promote the integration of carbon audit talent cultivation with other majors, such as collaborating with environmental science, economics, information technology, and other majors, offering interdisciplinary carbon audit courses, practical projects, research projects, academic exchanges and cooperation, cultivating students' comprehensive qualities in multiple fields, and making them more global and innovative in thinking.

4.4. Construction of Teaching Staff

Building a strong carbon audit faculty team is crucial for the cultivation of professional talent, the dissemination of knowledge and technology, the provision of policy consulting services, the formulation of industry standards, the deepening of international cooperation, and the enhancement of society's low-carbon consciousness. Colleges and universities should establish a team of experienced experts who, through regular seminars and lectures, integrate the latest industry trends, case analyses, and professional experience into teaching, helping students to discern future trends in carbon auditing.

At the same time, cooperation with enterprises and research institutions should be pursued to introduce practitioners to teach, providing students with abundant practical opportunities.

Such a teaching model, combined with forward-looking curriculum content, innovative teaching methods, and industry practice, will promote the comprehensive development of students.

4.5. The Concept of Lifelong Education

The field of carbon auditing is constantly evolving, covering dynamic issues such as climate change, environmental protection, and energy efficiency. When cultivating talent in carbon auditing, colleges and universities should emphasize the concept of lifelong learning, enhancing students' self-learning and critical thinking abilities to adapt to the changing social and professional environments.

To achieve this goal, colleges and universities should adopt flexible curriculum designs, introducing interactive, case-based, and project-oriented teaching methods to stimulate students' enthusiasm for active learning and critical thinking. They should provide access to the latest research papers, online databases, and open courses as learning resources, enabling students to engage in self-directed learning.

4.6. Establish a Community Network of Carbon Auditors

Colleges and universities should establish a carbon auditor community network as a platform for professionals to exchange ideas. This network would facilitate the sharing of the latest practices, technologies, and research findings in carbon auditing, thereby enhancing the capabilities of the industry. The network would also gather student opinions and provide suggestions on carbon emission reduction and environmental protection policies to governments and enterprises, promoting industry development.

The carbon auditor community network can also raise public awareness of climate change by organizing promotional activities and publishing research reports, thereby increasing attention on carbon auditing. The network offers opportunities for carbon auditors to establish professional connections, helps students stay informed about the latest trends in the industry, find job opportunities, and explore career development paths.

4.7. The Belt and Road Joint Training

The "Belt and Road" initiative provides a platform for international cooperation, where talent in carbon auditing plays a significant role. Through this initiative, countries can jointly cultivate carbon auditing talent, share experiences, promote technology exchange, and jointly address climate change. Colleges and universities can establish mechanisms for international cooperation, sharing courses, teaching materials, and educational resources, combining remote education with offline methods to provide transnational educational resources. At the same time, scholars, professionals, and students from countries along the route are encouraged to engage in joint research and exchange visits, promoting the direct exchange of knowledge and experience. Implementing student and teacher exchange programs enhances mutual understanding and cooperation. Providing internship and employment opportunities in countries along the route for students and graduates majoring in carbon auditing helps them gain practical work experience.

5. Conclusion and Outlook

With the global focus on climate change and the proposal of the national "Dual Carbon" goals, the demand for carbon auditing talent is increasing. The innovative and entrepreneurial education model offers a new development path for cultivating interdisciplinary talents with both innovative capabilities and carbon auditing skills.

Traditional carbon auditing education emphasizes the cultivation of professional skills. By integrating innovative and entrepreneurial education, it enriches students' knowledge

structure, allows them to communicate with experts at the forefront of the field, and hones their professional skills through project practice. This model better exercises students' creativity and professional level while fostering a sense of team collaboration. The carbon auditing talents cultivated under this model are more flexible and creative, able to quickly adapt to various project environments. Relying on their professional technology, they can promote the evolution and upgrading of management models and audit systems, injecting new vitality into further achieving the "Dual Carbon" goals.

Since the "Belt and Road" initiative was proposed more than a decade ago, joint construction has become the most popular international public good and the largest platform for international cooperation in today's world. It has also become a path of cooperation, opportunity, and prosperity for the countries involved. Leveraging the broad global platform of the "Belt and Road," we can develop and promote carbon auditing, enhance academic exchange between countries, and drive new industry-academia collaborations. By strengthening the integration of disciplines and deep cooperation with enterprises, the innovative and entrepreneurial education model can cultivate more interdisciplinary talents under the new international model. This will create a broader development space for carbon auditing and the achievement of the goal of a community with a shared future for mankind.

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