

A Collaborative Training Mechanism for Accounting Digital Intelligence Talents Based on the Triple Helix Theory

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Abstract: In the age of digital intelligence, the accounting industry is undergoing significant transformations and encountering challenges. The Internet, big data, information technology and artificial intelligence are gradually becoming central to all aspects of accounting practice. This digital acceleration has placed greater demands on the quality of accounting talent, as businesses undergo transformations and upgrades. Accounting education must adapt to these trends to meet the demand for intelligent accounting talent. From the perspective of the "triple helix" theory, this paper examines the role and influence of tripartite collaboration among the government, universities, and industry in developing accounting talent in China. It addresses the development dilemma of accounting talent and proposes a mechanism for collaborative training of accounting talent between multiple stakeholders.

Keywords: Triple Helix Theory; Intellectualized Talents; Multidisciplinary Synergistic Cultivation

1. Training Dilemma in China's Accounting Intellectualization

1.1 Discrepancy between Talent Supply and Demand

A discrepancy between the education system and industry demands exists. Despite attempts by educational institutions to adjust their curricula, the rate of change remains slow in responding to the industry's urgent demand for skilled accounting professionals. Considering the swift development of accounting knowledge, current teaching materials and techniques find it challenging to integrate the latest advances in data analysis and artificial intelligence. Apparently, emphasis is still

placed on fundamental business aspects, resulting in many novices who lack the competence in contemporary intelligent financial practices. As a result, there is a shortage of intermediate and advanced-level experts. This causes a significant incongruity between job requirements and the abilities of potential candidates [1].

1.2 Rigidity of the Educational Framework

The standardized nature of the educational system impedes the development of talent. The traditional approach to accounting education prioritizes theoretical knowledge while ignoring its practical application in real-life situations [2]. With the everyday use of big data, cloud storage, and artificial intelligence, accountants are required to have skills in data analysis, data mining, strategic management, financial forecasting, and the effective implementation of emerging technological tools. The conventional educational model, centred around textbooks, does not adjust to these developing demands. The content of classes and lecture schemes often diverge from the current market needs, hindering students' potential for versatile learning. Therefore, the traditional model often lacks in fostering the complete array of skills necessary in this developing landscape [3].

Furthermore, the training system is not sufficiently adaptable to the growing demand for professionals with numerical intelligence skills in various industries. In accounting, digital intelligence covers many areas, such as big data analysis, artificial intelligence applications, risk management, and business intelligence. Each sector requires different skillsets. Moreover, talent development within various sectors comprises nuanced subdivisions. For example, the field of intelligent finance can be divided into applications for financial decision-making, as well as the design and implementation of

intelligent systems. In the context of business, meeting the digital market's demands requires not only strengthening hardware infrastructure, but also customizing financial decision-making to meet individual organizational needs. Unfortunately, the current training paradigm has not yet achieved the required level of accuracy in its methodology, as it fails to provide tailored and personalized training initiatives.

1.3 Limited Collaboration among Government, Industry, and Academia

The Government, Industry and Universities are not co-operating to a sufficient extent. Although some educational institutions have established partnerships with enterprises, these endeavours can often remain superficial and fail to integrate academia, industry and research to the necessary depth. Although the government has outlined strategies for digitalisation and intelligent development, additional policy support is necessary to promote the development of adept accounting professionals.

Moreover, the diverse objectives of these three entities have created challenges in establishing a coherent policy orientation, setting research priorities, delineating research directions and sharing benefits equitably. Consequently, the collaborative framework finds it difficult to achieve the desired synergy, leading to distinct boundaries within the collaborative relationship. The lack of appropriate motivations and limitations aggravates the difficulty of reconciling all stakeholders' interests. Therefore, achieving a successful collaboration between the government, industry and academia faces significant impediments [4].

In summary, the development of intellectualised accounting skills in China faces several challenges that require proactive solutions on multiple fronts. These challenges include reforming the education system, improving approaches to cultivation, fostering industrial partnerships, and strengthening policy support. Building a flexible cultivation framework through multi-party collaboration is required to successfully address these complexities. This framework aims to produce accounting professionals who are well equipped to meet the demands of the digital age. This will enable them to make high

quality contributions to China's economy through development efforts.

2. Explanation of the "Triple Helix" Theory and Role Alignment of Educational Institutions, Government, and Corporations

2.1 Explanation of the "Triple Helix" Theory

In the mid-1990s, sociologist Henry Etzkowitz of the State University of New York and Professor Loet Leydesdorff of the Technical University of Amsterdam introduced the triple helix theory. This theory, inspired by the biological concept of a triple helix, evaluates the new form of interaction that is developing between educational institutions, government bodies, and industries in the knowledge economy era. Within the context of a knowledge-based economy and society, the government, corporations, and universities make up the three key components of the innovation system landscape. These groups are interconnected in response to market dynamics, creating a triadic influence that leads to the formation of what is known as the "triple helix" theory [5].

The core tenet of the triple helix theory proposes a shift from the traditional binary connections (university-industry, government-industry) to a more complex, three-way interdependence. This symbiosis between educational establishments, government agencies, and industries constitutes the central hub of the innovation ecosystem. The theory highlights that the interactions between these three entities are not merely sequential but also non-linear. These interactions are complex and mutually influential, extending beyond their conventional roles [6]. In the context of the knowledge economy, the importance of such nonlinear interactions becomes more prominent, as innovation and knowledge dissemination often transcend disciplinary and boundary constraints.

Essentially, the triple helix theory emphasizes collaboration, innovation, and knowledge sharing. It suggests a mutual relationship between universities, industry, and government to enhance efficiency and creativity in societal progress. This theory has numerous practical applications, particularly in

fields such as science and technology innovation and higher education reform. It provides a strong conceptual framework for considering collaborative development.

2.2 Role of the University, Government and Enterprises in the Synergy Mechanism

2.2.1 Government role

Within the synergy mechanism, the government assumes roles that cover policy formulation, resource guidance, driving force, and direction control. It establishes a specialised policy entity, creates a policy framework for training, performs industry analyses, and regulates market demands to chart the course for cultivating intellectual talents. Furthermore, the government provides assistance for collaborative training initiatives via targeted funding, tax policy incentives, the establishment of official platforms, and industrial support programs [7].

Additionally, the government guides education reform, shapes industry standards, and encourages industry-academia collaboration, promoting greater alignment between educational institutions and industry requirements. These measures guarantee that the cultivation of talent closely aligns with real-world requirements, promoting a harmonious match between academic and industrial imperatives.

2.2.2 Industry role

In the context of the synergy mechanism, the industrial sector plays a crucial role in providing tangible opportunities for developing intellectualised accounting talents. It serves as the direct demand side for such talents. By collaborating with universities, the industry can jointly establish training standards to ensure that the talent produced has practical and operational skills. The sector can facilitate placements, enabling students to learn and apply their knowledge within authentic work settings, gaining insights into industry realities.

Moreover, industry involvement in curriculum design enhances practical relevance by providing real-world cases and challenges. Establishing bursaries and investing in research projects incentivises students to pursue studies and research in accounting and intellectualisation. Collaboration with universities on research projects gives the industry access to state-of-the-art

technological advancements, promoting its own innovation. This partnership facilitates the translation of academic research outcomes into practical applications, driving intelligent and digitalised advancements across industries.

2.2.3 University role

Universities play a central role in cultivating intellectual accounting talent as the primary drivers of knowledge innovation and talent supply. They function as knowledge creation epicentres and talent nurseries. Universities can receive government support as a mediator to promote collaboration and subsidise joint scientific and technological innovation efforts between universities and enterprises by means of government-backed funding or policy support. In this way, collaborations are encouraged.

Furthermore, universities proactively align themselves with industry requirements. This involves revising course content, closely monitoring industry needs and technological advancements, and providing customized services for talented individuals. This proactive approach assists companies in overcoming technological challenges, creating a pool of highly skilled workers who contribute to long-term sustainable growth of society and corporations.

3. Designing a Multi-Stakeholder Synergy Mechanism for Cultivating Intellectualized Counting Talents

Viewed through the lens of the "triple helix" theory, collaboration among the Government, industry, and universities is essential for creating a closely-knit and intricate tripartite interactive network to cultivate intellectualized talents. Each helix leverages its respective strengths. The Government is the initial collaborator, capitalizing on its capacity for policy formulation, financial support, and official validation. Universities, as the second helix, execute their strengths in providing talent, disciplinary education, and cultivation mechanisms. At the same time, the industry, as the third helix, capitalises on its platform provision, technology integration, and capability to utilise talent [8]. These three primary entities operate interdependently, with their interactions forming the heart of the innovation ecosystem. By promoting consistent and thorough communication and collaboration, they improve the cooperative

approach, ultimately resulting in optimal outcomes for cultivating talent.

3.1 Government Policy Guidance for Mechanism Operation

In the era of digitalisation, the digital economy is essential, and digital enterprises are vital for the numerical economy. The quality of numerical intelligence professionals significantly affects the transformation and advancement of enterprises' numerical intelligence. Nationwide and societal attention has been drawn to the development of such talents. As the national economy undergoes high-quality development, the pursuit of Chinese-style modernisation requires a significant influx of skilled, high-level accounting professionals tailored to regional progress [9].

Hence, the central mission of universities is not only to cultivate advanced scientific and technological talents and research innovation teams, but also to generate research results to address pressing technological challenges. Concurrently, the government has the significant responsibility of supporting, guiding, and incentivising collaborative efforts between universities, businesses, and diverse community sectors. This includes creating a stable and favourable market environment for the development of talent.

Efforts to develop a system to support the growth of intelligent people must be led and coordinated by the government. An enduring communication mechanism, involving the government, educational institutions, research centres, enterprises, and other stakeholders, should be established. To strengthen bidirectional talent exchanges between schools and enterprises, the government should also examine and implement a mutually beneficial and cooperative model.

Furthermore, the tendency to prioritize theory over practice and the emphasis on academic papers rather than patents is widespread in many UK colleges and universities. A significant proportion of highly educated individuals concentrate on theoretical innovation, often with restricted knowledge of the practical technological needs of businesses and industrial advancements. This mismatch results in a shortage of industry-relevant knowledge, hindering the rapid integration and application of numerous high-quality scientific

and technological advancements.

Therefore, the role of the government expands to improving legal frameworks, enhancing performance evaluation mechanisms for technological advancements, and implementing a hierarchical assessment system for individuals involved in various activities, including basic research, innovative technology exploration, practical research, and the conversion of scientific and technological breakthroughs. This approach maximises the incentive, proactivity, and ingenuity of innovative talent in translating scientific and technological advancements into real-world applications. It ensures that the value of talent is commensurate with the value attained through successful transfer and transformation.

3.2 Enhanced School-Enterprise Collaboration for Educational Model Development

The progress of the industry relies on science, technology, and high-level talent aligned with government policies. A collaborative cultivation mechanism ensures significant incentives and team support for industry development. Moreover, it accelerates the transformation of fresh production methodologies from novel technologies and ideas, promoting societal advancement.

Enterprises must recognise their role as primary innovation agents. Leveraging their unique characteristics, they should utilise platforms, technology and talent to their advantage. This involves fostering stronger collaboration between educational institutions and enterprises, establishing conditions that align the two innovation systems and encourage harmonious, synchronised development.

In parallel, educational institutions and enterprises ought to cooperate to form R&D platforms. By hosting enterprise R&D centres and utilising university talent stations, universities can take advantage of this collaboration to recruit and train skilled individuals. Online information technology can aid in the development of industry-education integration service platforms. These platforms can display real-time processing methods for online business accounting activities, present real-world cases in classrooms, facilitate self-directed learning for students, and

simulate actual business processes. This gradual progression results in a teaching model suited to industry-education integration.

To encourage successful collaboration, businesses should strengthen their ties with important institutions, such as university science and technology parks or national university science and technology parks. This approach enables them to access policy support, work closely with local governments and universities, combine vital resources, and facilitate a deeper integration of industry, academia, research, and practical application. Simultaneously, it is crucial to establish monitoring and evaluation mechanisms to regularly assess the effectiveness of collaborative training initiatives. Enterprises can adjust their cooperation strategies and refine training approaches based on the evaluation outcomes. By utilising both inbound and outbound approaches and capitalising on the academic strength of universities, we can establish a smooth link between enterprise requirements, technological research and development from universities, and the transformation of scientific and technological breakthroughs.

3.3 Revamping University Education to Align with Industrial Advancement

As the primary source of talent development, universities have a societal responsibility to ensure that their professional provision meets the needs of economic and social development. They must produce professionals who are seamlessly attuned to societal needs. However, the changing market landscape, dynamic technological changes and evolving business models are placing greater demands on higher education systems.

Universities can deepen collaboration by involving educational institutions, government agencies and businesses. This approach involves closely integrating local industrial development needs with university talent training systems. Tailor-made talent training programmes can be developed through consultation between schools and enterprises. Teaching methods should emphasise moving away from textbooks and adopting a comprehensive approach in which "the government contributes to model building, enterprises participate in teaching processes, and industries evaluate the effectiveness of

education".

To enrich the teaching staff, emphasis should be placed on cultivating "dual-teacher" teachers. These teachers have practical skills and can translate theoretical knowledge into practical applications. School-enterprise cooperation will be deepened by inviting technical and managerial talents from enterprises to provide on-site training. In addition, academic exchanges and regular interaction between university lecturers and industry practitioners facilitate the continuous updating of knowledge and skills.

It is also essential to strengthen the standardized management of university-business cooperation projects. This includes giving enterprises a prominent role in the cultivation of high-level talents and strengthening their commitment to talent cultivation. Clearly defining the rights and responsibilities of enterprises in this process, protecting intellectual property rights and safeguarding the interests of enterprises are essential measures. The aim is to achieve harmonious win-win cooperation that benefits both sides.

4. Achieving Operational Synergy in University-Government-Enterprise Collaborative Training Mechanism

Triple helix theory emphasises the importance of establishing a dynamic balance in the collaborative interplay between government, academia and industry. Within the framework of collaborative talent development, this equilibrium is orchestrated to ensure that the interests of all stakeholders are met equitably. This orchestrated balance ensures organisational dynamism and stability, thereby facilitating the seamless operation of the synergy mechanism.

4.1 Dynamic Equilibrium within the Synergy Mechanism

Shared Objective: The dynamic equilibrium in the synergy mechanism depends on a common goal the development of intelligent counting talents. This collaborative structure is based on the shared interests of multiple stakeholders [10]. While the government, universities and industry each have their own interests and objectives, their convergence centres on societal development, knowledge dissemination, research, practical application

and economic gain. In this collaborative context, all parties make concessions and gains by harmonising their interests to maintain a balanced cultivation mechanism.

Synergistic Harmony: The synergy mechanism breaks down barriers between government, universities and businesses. It brings together the policy framework of the state, the academic aspirations of universities and the technological capabilities of businesses into an integrated system. Mutual recognition, trust and tolerance form the basis for collective action. This model exemplifies multi-party fusion, cooperative development and harmonious operation.

Information exchange: Talent development requires a variety of resources - financial, physical, informational and human - each held by different entities. Collecting and utilising all these resources individually is challenging. Transparent resource allocation and utilisation is essential. Ensuring the smooth flow of information and facilitating the open sharing of resources between government, academia and business is paramount.

4.2 Facilitating Smooth Synergy Mechanism Operation

4.2.1 Establish a comprehensive information platform

This platform serves as a centralised and accessible hub for information exchange and collaboration, promoting strong cooperation, shared information and harmonious development among the parties involved. The comprehensive information platform is characterised by openness and diversity. Firstly, it facilitates interaction, cooperation and resource sharing according to the needs and roles of each party. Secondly, the platform is characterised by efficient information exchange and transmission. It provides fast, secure and convenient information exchange mechanisms, including real-time communication, online messaging and file sharing, ensuring a seamless flow of information.

In addition, the platform places a premium on data security and privacy. Given the sensitive nature of the information shared by government, academia and industry, the platform employs stringent data security and privacy measures to prevent unauthorised access or misuse. Finally, usability is a key

consideration. Representatives from different sectors may have different levels of technical expertise and usage habits. The platform has an intuitive interface to facilitate rapid adoption by all parties. In addition, user training and technical support are provided to enhance collaboration and information sharing through the platform.

4.2.2 Collaborative policy and standards development

Collaborative policy and standards development ensures that collaborative activities comply with legal, regulatory and normative frameworks, thereby facilitating the achievement of synergistic integration objectives.

First, government, academia and industry should define their respective roles and responsibilities in collaborative agreements or protocols. This step enforces adherence to rules and principles, maintains transparency, and ensures equitable collaboration.

Second, representatives from each entity should engage in collective deliberation and research when formulating policies and standards. This approach balances and respects the interests of all parties and results in policies and standards that are better suited to the practical context. The formulation process should prioritise transparency and openness, involving extensive consultations, multi-party discussions, seminars and careful consideration of input from all stakeholders to ensure that policies and standards are rational and comprehensive.

Finally, policies and standards should remain adaptable to contemporary needs. They should be regularly adjusted and refined in line with the evolving cooperative landscape and changing needs. Government, academia and industry can update these policies and standards to reflect changes in the cooperative environment and emerging needs.

4.2.3 Implementation of a synergy evaluation mechanism

The purpose of this mechanism is to assess the progress and results of the collaborative synergy on a regular basis, provide feedback and identify opportunities for improvement for all stakeholders, thereby promoting the achievement of the synergy integration goals.

Firstly, the synergy evaluation mechanism must outline the scope and criteria for evaluation. Together, government, academia

and industry can develop assessment indicators that cover all facets of the collaboration. By setting explicit criteria, the quality and effectiveness of collaborations can be quantified.

Second, this evaluation mechanism should follow a cyclical pattern. A mutually agreed timeframe, such as every six months or annually, can be set for assessment and feedback. This periodic assessment facilitates real-time understanding of the progress and challenges of the collaboration, allowing for timely adjustments and optimisation.

Furthermore, the assessment approach, methods and procedures need to be clarified. Together, government, academia and industry can choose appropriate assessment methods: qualitative, quantitative or case studies. The steps of the assessment process should be well defined and include collecting data, analysing results and reporting to maintain the scientific and unbiased nature of the assessment.

Finally, the assessment mechanism should be subject to continuous refinement. As collaboration progresses, the evaluation mechanism must adapt and improve. Government, academia and industry can refine the scope, methods and procedures of the assessment according to actual circumstances to ensure that the mechanism remains effective and relevant.

5. Conclusion

With the constant changes in digital intelligence, technology, business models, and the market environment, the field of accounting undergoes constant transformation. As industry requirements for accounting talent increase, the training mechanism for such individuals must also continually evolve. This paper is grounded on the "triple helix" model, which integrates the features of higher education institutions, the government, and businesses, to elucidate the roles and responsibilities of every stakeholder in the talent development process. Furthermore, it aims to establish a collaborative talent cultivation mechanism involving multiple entities. Through the collaborative cultivation mechanism, the education system's nurturing model and the alignment of talent and industrial development fully leverage the deep integration of resources between universities, government, and enterprises. This enables the

main body to fully utilise their advantages in the talent cultivation process, contributing to an innovative ecosystem that achieves the best results in talent cultivation and addresses the challenges in training digital and intellectual talents. To remain adaptable to changes in the social environment and needs, we have established a stability programme for our collaborative training mechanism, which aims to ensure its effectiveness and applicability, while nurturing accounting talent that can adapt to changing times.

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