



Ecological System Analysis of U.S. Innovation and Entrepreneurship Education and Its Inspiration for Chinese Universities

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Abstract: The United States is the first country to offer innovation and entrepreneurship education courses and one of the most developed countries in the world. After nearly a century of development, it has formed a complete innovation and entrepreneurship education ecosystem constructed by the government, schools and society from aspects of curriculum system, service support, incentive mechanism and financial support. The innovation and entrepreneurship education in Chinese universities starts late and has a short development time. Although it has made obvious progress, compared with the national innovation and entrepreneurship strategic needs, it should accelerate the pace of deepening reform, transformation and upgrading. This paper focuses on the analysis of the structure of the ecosystem of innovation and entrepreneurship education in U.S. universities, draws on the advanced experience, and takes solving the problems existing in the innovation and entrepreneurship education in Chinese universities as the starting point. It explores how to form the innovation and entrepreneurship education system in Chinese universities and promote the connotative development of innovation and entrepreneurship education in China from the five dimensions of curriculum system, teaching staff, institutional system, financial guarantee and time and space. Chinese universities should overcome the concept deviation, realize the concept of innovation and entrepreneurship embedded in specific disciplines to build 'embedded' innovation and entrepreneurship education mode. In the construction of the teaching staff of innovation and entrepreneurship education, we should absorb more people with successful entrepreneurial experience, academic background and social resources to engage in part-time teaching. State and local governments should work together to promote the formation of a series of guiding, supportive, subsidizing and preferential policies. The funding sources and guarantee of innovation and entrepreneurship education in universities are not only relies on school itself, but also the three major education implementation subjects. In terms of extracurricular platforms, it is necessary to actively build practice cooperation bases and college students' Maker Space in universities, and further cooperate with the local government's innovation and entrepreneurship industrial park, build off-campus practice platforms. Finally, based on the research results, the paper puts forward the policy suggestions for the construction and further development of innovation and entrepreneurial education ecosystem in China.

Keywords: Innovation and Entrepreneurship, U.S., Ecosystem, Application-Oriented Undergraduate University

1. Introduction

With the promotion of Chinese 'mass entrepreneurship and innovation' strategy, as a breakthrough in the comprehensive education reform of undergraduate colleges and universities, the new concept of innovation and entrepreneurship education, reform breakthrough of application-oriented undergraduate university, is deeply integrated into the training system of

applied talents. However, at present, there are some problems in the innovation and entrepreneurship education of some undergraduate colleges and universities in China, such as the low participation rate, the disconnection between innovation and entrepreneurship education and professional education, and the imperfect industry-university cooperation mechanism of innovation and entrepreneurship education. At present, through a variety of innovation and entrepreneurship

competition projects, Australia closely connects students with entrepreneurs, investment funds and innovation and entrepreneurship tutors with professional service and enthusiasm. [1] There are five significant participants (students, colleges, universities, governments, business and alumni), four main components (innovation and entrepreneurial atmosphere, knowledge platform, practice platform and innovation, and entrepreneurial network platform), and nine key factors of the entrepreneurial education ecosystem (innovation and entrepreneurial thinking, support, curriculum, teachers, community, practice, government, business and alumni) in the innovation and entrepreneurship education ecosystem of developed countries such as Japan and the UK. [2] As the first country to start innovation and entrepreneurship education, the United States has formed a collaborative promotion model with government guidance, school subjects and social participation. After nearly a century of continuous exploration, practice and research, the three main subjects have worked hard in financial support, development space, curriculum system, service system and incentive mechanism, and finally formed the U.S. innovation and entrepreneurship education ecosystem.

2. The Origin and Development of U.S. Innovation and Entrepreneurship Education

The United States is the first country to offer innovation and entrepreneurship education courses and one of the most developed countries in the world. In 1919, the Youth Business Association was established in the United States, which was founded by businessman Holles. Moses. Its establishment represented that social subjects began to participate in innovation and entrepreneurship education in colleges and universities. [3] In 1947, Professor Myles Mace of Harvard Business School added a new MBA course, Management of New Enterprises in U.S. universities.[4] In the 20th century, foundations represented by the Coleman Foundation were widely established. They provided strong support for innovation and entrepreneurship education in colleges and universities in the form of funding, and set off an upsurge of entrepreneurship among American college students. In 1974, the first course of entrepreneurship education in Harvard Business School, 'new enterprise management', was the sprout of university subjects participating in innovation and entrepreneurship education. [5] So far, more than 1,800 universities have opened such courses. In the process of implementing innovation and entrepreneurship education in American universities, the government has given universities and society great autonomy, and has introduced 'Patent Law', 'Bayh-Dole Act', 'Technology Transfer Commercialization Law' and other regulations. Ten departments of the federal government have funded entrepreneurial projects. In 2012, the U. S. government began to strengthen entrepreneurship guidance, guide the transformation of entrepreneurial achievements,

and provide comprehensive support. The Entrepreneurship America Program was born, which directly promoted entrepreneurship education to the national strategic level. By the end of the 20th century, the innovation and entrepreneurship education in the United States has achieved professional and systematic development, and has become an independent discipline and has been recognized by the academic community. [6] It has formed an innovation and entrepreneurship education ecosystem with strong support from the three implementation subjects of government, school and society in curriculum system, service support, incentive mechanism and financial support, it has important reference value for Chinese universities under the background of "mass entrepreneurship and innovation". [7]

3. The Ecological System Analysis of U.S. Innovation and Entrepreneurship Education

3.1. Government: Top-Level Design, Policy Support

The U. S. government has introduced a number of policies and laws to support innovation and entrepreneurship, such as the series of laws on "American Innovation Strategy", "Entrepreneurial America Plan" and "Supporting the Development of Small Enterprises," aiming at the top-level design of the innovation and entrepreneurship ecosystem. At the same time of social and economic development, the government pays attention to the continuation and upgrading of innovation and entrepreneurship system. For example, in 2009, the Obama administration first proposed 'innovation strategy' to increase basic investment in innovation; the 2011 update of the 'Innovation Strategy' emphasizes that it will promote economic growth and prosperity, with the core being supported by three major strategies: education, scientific research and infrastructure; in 2015, the 'innovation strategy' was upgraded again to increase R & D investment in scientific and technological innovation in nine priority development areas such as clean energy. The release and continuous upgrading of the "American Innovation Strategy" all provide policy support for innovation and entrepreneurship at the national level. [8]

3.2. School: Curriculum Design, Complete System

Primary, junior and senior high schools in the United States have innovation and entrepreneurship education courses at each stage of education. Schools, as the main front for the implementation of innovation and entrepreneurship education, encourage breakthrough thinking, challenge authority and explore innovation, laying a solid foundation for the development of innovation and entrepreneurship education in American universities. The curriculum system of innovation and entrepreneurship education in U.S. universities includes: innovation and entrepreneurship curriculum, innovation and entrepreneurship competition, and entrepreneurship incubation.

Innovation and entrepreneurship courses are generally composed of theoretical courses, entrepreneurship courses and entrepreneurship practice courses. Taking Stanford University as an example, theoretical courses include entrepreneurial basic courses, financial elective courses, market and operation elective courses and other types. [9] Entrepreneurship courses are offered by relevant departments. The entrepreneurship practice course is mainly provided by the entrepreneurship studio of Stanford University to students with a platform for entrepreneurship practice.

Universities in the United States also encourage students to formulate business plans, actively strive for investment and establish companies by organizing innovation and entrepreneurship competitions. Universities help students to put creative ideas into practice by building a communication platform between projects and entrepreneurs and investors. Many new ventures were born from the entrepreneurship plan competition and developed into excellent high-tech companies.

At the same time, many universities have built or shared incubators for student innovation and entrepreneurship project management, experimental equipment, professional guidance and other services. Taking Stanford University as an example, who's innovation and entrepreneurship education has been at the forefront of the world, forming a three-dimensional framework of innovation and entrepreneurship teaching system, including 'innovation and entrepreneurship teaching system, innovation and entrepreneurship research platform, innovation and entrepreneurship service system'.

3.3. Society: Deep Participation, Entrepreneurial Practice

In the United States, social institutions such as business, investment and non-governmental organizations are also deeply involved in the practice of innovation and entrepreneurship education, providing support for entrepreneurs in terms of funding, venues and guidance. Some famous American enterprises (such as Hewlett-Packard, Intel, IBM, etc.) actively support innovation and entrepreneurship activities, provide investment funds for start-ups, and provide technical support and business guidance combined with academia and investment circles. The National Association of Investment Companies (NAIC) provides financial support and consulting services for college students' entrepreneurial projects and start-ups every year. Social foundations support entrepreneurship education by promoting the concept of entrepreneurship education, represented by the Kaufman Foundation, the largest entrepreneurship education foundation in the United States, and the United States Entrepreneurship Guidance Network (NFTE). These social subjects are deeply involved in the innovation and entrepreneurship education in colleges and universities, actively cooperate with the opening of off-campus entrepreneurship practice courses and the development of entrepreneurship internship projects, and continuously contribute to the promotion of innovation and

entrepreneurship education in American colleges and universities.

4. Development and Problems of Innovation and Entrepreneurship Education in China

Innovation and entrepreneurship education in China has experienced four stages: spontaneous exploration stage (1997-April 2002), multiple exploration stage (April 2002-April 2010), comprehensive promotion stage (April 2010-May 2015) and in-depth promotion stage (May 2015-present). In 1997, Tsinghua University and Intel Corporation carried out close cooperation in the field of computer teaching and research, and opened courses in the direction of innovation and entrepreneurship. In April 2002, the Ministry of Education in nine universities to carry out innovation and entrepreneurship education pilot work [10]; in May 2010, the Ministry of Education issued the "Opinions of the Ministry of Education on Promoting Innovation and Entrepreneurship Education in Colleges and Universities and College Students' Self-employment"; "Opinions of the State Council on Several Policies and Measures to Promote Mass Entrepreneurship and Innovation" was issued in 2015, which gradually pushed the innovation and entrepreneurship education in Chinese universities to a further stage under the unified leadership of the state. [11]

Although entrepreneurship education in Chinese universities has made significant progress, compared with the strategic needs of innovation and entrepreneurship, there are still problems such as backward ideas, function-separated courses, weak faculties, and the closed service systems. [12] Therefore, China's innovation and entrepreneurship education should accelerate the pace of deepening reform, transformation and upgrading, and strive to achieve 'curriculum practice, practice curriculum.'

5. Inspiration to Innovation and Entrepreneurship Education in Chinese Universities

5.1. Curriculum System Is the Foundation

Only by integrating professional education into innovation and entrepreneurship education, can we avoid the problems of the parallel development and irrelevance between professional education and innovation and entrepreneurship education in Chinese universities. Referring to the curriculum setting of innovation and entrepreneurship education in the United States, Chinese universities should overcome the concept deviation, combine the theory and practice of innovation and entrepreneurship education, combine innovation and entrepreneurship with professional disciplines, and combine classroom education with off-campus practice, so as to realize the concept of innovation and entrepreneurship embedded into

specific disciplines and realize the embedded innovation and entrepreneurship education. Universities can set up embedded courses, innovation and entrepreneurship theory courses, practice courses in the form of required courses in various professional undergraduate teaching plans; expand the implementation platform for students, the results of the entrepreneurial competition can be transformed into elective credits, encourage students to actively participate in various competitions; build Maker Space for students, transform specific achievements of product placement and enterprise establishment into practical credits, encourage students to practice.

5.2. Teaching Staff Is Fundamental

The implementation of the innovation and entrepreneurship education strategy requires a sound teaching staff. Its success or failure depends not only on whether there are appropriate personnel to implement, but also on the need for full participation. In addition to the original teachers of industrial and commercial management or economic management in the main subject of the school to serve as the teaching of theoretical courses, in the construction of the teaching staff of innovation and entrepreneurship education, more people with entrepreneurial experience and academic background in the social subjects should be absorbed to engage in part-time teaching, or successful entrepreneurs can be hired as the guest tutor of entrepreneurship education, and social activists, business management personnel and other people interested in public welfare undertakings who are keen to cultivate college students' innovation and entrepreneurship ability should be hired to serve part-time. It is also possible to invite administrative personnel or talent market leaders in charge of college students' employment in government to make policy announcements, popularize preferential policies of local governments for college students' innovation and entrepreneurship, carry out financing negotiations between enterprises and new projects, and promote creative ideas to land in industrial parks. Finally formed the college type, professional type and public welfare type three types of innovation and entrepreneurship teacher system.

5.3. Institutional System Is the Guarantee

As the top-level designer of innovation and entrepreneurship education, the state should guide innovation and entrepreneurship macroscopically through policy layout. Local governments should plan the adaptability of talent types and industrial structure, integrate the innovation and entrepreneurship development of college students into the overall strategy of economic and social development, target the innovation and entrepreneurship education of local colleges and universities, and take the five development concepts of 'innovation, coordination, green, openness and sharing' as guidance to promote the formation of a series of guiding, supportive, subsidizing and preferential policies. [13] Universities should take the performance evaluation of

innovation and entrepreneurship as one of the indicators of teaching quality evaluation, and form a system of innovation and entrepreneurship all teachers to promote full education. At the same time, we should increase special funds investment, build innovation and entrepreneurship platform, play a leading role in leading social capital investment, increase innovation and entrepreneurship risk compensation and other forms of funding, and give support in a policy manner. Develop preferential policies such as tax relief, cost deferral, simplified approval process, and carry out investment conferences to promote the implementation of innovative and entrepreneurial projects.

5.4. Financial Security Is Crucial

The funding sources and guarantee of innovation and entrepreneurship education in universities are not only relies on school itself, but also the three major education implementation subjects. Education Bureau, Human Resources and Social Affairs Bureau and other relevant government departments should promote the reform of innovation and entrepreneurship education in universities in the form of preferential policies and financial support. Universities should set up the working group of innovative venture capital guarantee, and the functional departments such as the League Committee, the Student Department and the Finance Department, refine their tasks, clarify their responsibilities and jointly manage the funds. The academic affairs office can set up special funds for college students to promote construction by competition, form incentive and incentive policies, so that students do not have financial worries and ensure students' enthusiasm for innovation and entrepreneurship. At the same time, universities should establish a mechanism for the introduction of social resources, actively build a communication bridge between social resources such as enterprises and institutions, private enterprises, public welfare groups and school innovation and entrepreneurship practice. Introduce foreign capital, subsidize the implementation of innovation and entrepreneurship projects, and reduce students' entrepreneurial risks. [14]

5.5. Practice Space Is Support

The implementation of innovation and entrepreneurship education strategy requires students to have certain practical ability, which requires strict, systematic and scientific training. School subjects need to design the curriculum system and practice platform of innovation and entrepreneurship. On the one hand, the design of curriculum system needs to adhere to the combination of technical skills education and innovation and entrepreneurship education, and build a dynamic and advanced innovation and entrepreneurship curriculum system. The cultivation of innovative entrepreneurship, entrepreneurial skills and practical ability runs through the all-round and whole process of talent training. On the other hand, in terms of extracurricular platforms, it is necessary to actively build

practice cooperation bases and college students' Maker Space in universities, and further cooperate with the local government's innovation and entrepreneurship industrial park, build off-campus practice platforms, and use investment promotion and enterprises and governments to jointly build innovation and entrepreneurship incubation channels to promote the landing of creative projects.

6. Conclusion

The process of innovation and entrepreneurship is a process of constantly finding, analyzing and solving problems, which requires innovation entrepreneurs to be able to push the boundaries of knowledge and ability to break through the routine and solid landing. Innovation and entrepreneurship has long been the drive of economy, and innovation and entrepreneurship activities are inseparable from the cultivation of innovative and entrepreneurial talents. [15] When learning from the advanced experience of the innovation and entrepreneurship education ecosystem of U.S. universities, Chinese universities should explore a set of innovation and entrepreneurship education system suitable for China according to local conditions, combined with China's national conditions, economic development and social structure, and finally realize the win-win situation of students and society.

References

- [1] SHI Guangdong. (2019). Research on the Innovation and Entrepreneurship Education of Foreign College Students: Taking Some College and Universities in Britain, Australia and the US as Examples. *Journal of Changzhou College of Information Technology*. 1672-2434(2019)04-0065-04.
- [2] JIA Jian-feng, ZHAO Ruo-nan & ZHU Zhu. (2021). The Construction of Innovation and Entrepreneurial Education Ecosystem in Universities: Multi-case Study Based on the Universities in the U.S. the UK and Japan. *Journal of Management Case Studies*, 11.7511/JMCS20210306.
- [3] HUANG Shoujing & DU Chenyang. (2017). The Subjective Function of Society, College and Government in College Entrepreneurship Education—A Comparative Analysis Between China and the U. S.. *International and Comparative Education* (09), 79-88+111.
- [4] LI Wen-jing, WU Yan & KONG Dan-dan. (2021). Research on Curriculum Construction of Innovation and Entrepreneurship Education in American Universities. *Journal of Beijing Institute of Graphic Communication*. 10.19461/j.cnki.1004-8626.2021.01.038.
- [5] LI Li-hong, GAO Gui-juan & JIN Zi-qi. (2020). The Trend and Inspiration of Introducing and Entrepreneurship Education into Engineering Education in the United States. *Theory and Practice of Education*. 40. 34 (2020): 33-37.
- [6] Xia Shiwu & Mao Yaoqing. (2020). On the Systemization of the U.S. Entrepreneurship Education: History and Enlightenment. *Jiangsu Higher Education* (08), 69-75. doi: 10.13236/j.cnki.jshe.2020.08.010.
- [7] WANG Huai-jun. (2020). The Innovation and Entrepreneurship Education Ecosystem and Its Enlightenment of American Research Universities. *Heilongjiang Researches on Higher Education*. 10.19903/j.cnki.cn23-1074/g.2020.06.014.
- [8] Wang Dan & Zhao Xinli. (2021). Innovation and Entrepreneurship Ecosystem of American Land-Grant Universities and its Enlightenment to China. *Science and Technology Management Research* (16), 10.3969/j.issn.1000-7695.2021.16.014.
- [9] Hao Jie, Hu Aihua & Hou Yongfeng. (2016). Construction and Enlightenment of the Innovation and Entrepreneurship Education System in America. *Research in Higher Education of Engineering* (02), 7-12.
- [10] LUAN Pei-xin. (2018). Research on Education of Innovation and Entrepreneurship Based on STS (Degree of Doctor, Northeastern University). <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CDFD-LAST2022&filename=1021141758.nh>
- [11] WANG Zhanren. (2016). Evolution and Development Trend of China Entrepreneurship Education. *Journal of East China Normal University (Educational Sciences)* (02), 30-38+113. doi: 10.16382/j.cnki.1000-5560.2016.02.004.
- [12] ZHANG Qing-xiao, XU Li-gang & WANG Yi-zhen. (2020). Experience and Inspiration from the First -Class Innovation and Entrepreneurship Education of American Universities. *Heilongjiang Researches on Higher Education*. 10.19903/j.cnki.cn23-1074/g.2020.04.019.
- [13] LIU Fang-na. (2020). The Analysis of Government's Role in Innovation and Entrepreneurship Education in University. *Education Modernization* (46), 44-47. doi: 10.16541/j.cnki.2095-8420.2020.46.014.
- [14] WANG Lin, WANG Chang-ru & Chen Jin. (2018). Thoughts on Constructing the Guarantee System of Innovation and Entrepreneurship Funds in Colleges and Universities under the Background of 'Internet + '. *Health Vocational Education* (19), 11-12.
- [15] XU Tao & ZHENG Wen-jiang. (2019). Developments of Innovative and Entrepreneurial Education in American Universities and New Characteristics. *Modern Educational Technology*. 10.3969/j.issn.1009-8097.2019.04.017.