

UNDERSTANDING THE ECOSYSTEMS OF CHINESE AND AMERICAN ENTREPRENEURSHIP EDUCATION

Chien Wen Yu, Bridgewater State University

ABSTRACT

Since the 1980s, entrepreneurship education in the United States has become increasingly popular. The system of entrepreneurship education in the United States is characterized by relatively scientific and systemic teaching and research. The concept of ecosystems, which comes from the natural sciences, is increasingly applied to regional development and focused on inter-organizational relationships. One way to assess the ecosystems of entrepreneurship education is to consider all components of the whole—the business model, teaching philosophy, curriculum, teaching content, teacher training, infrastructure, culture, network and practices of each country. A useful tool for understanding these interrelationships is the Triple Helix Model (university-government-industry). This approach is applied in here this research to compare and analyse the ecosystems of entrepreneurship education in the United States and China, the top two economic and entrepreneurial powers in the world. Government support and industry involvement have helped to make entrepreneurship education in the US successful. Compared with the US, entrepreneurship education has started late in China, where a pilot entrepreneurship program was launched at nine universities in April 2002. Teacher training in both entrepreneurship and entrepreneurial consultant team-building was based on the entrepreneurship education project known as Know About Business (KAB), a model created during the 1990s by the International Labour Organization (ILO) for developing countries and adopted by the All China Youth Federation in 2005. At present, China is launching a “Mass Entrepreneurship and Innovation” campaign and investing heavily in universities and government youth agencies. Using the Triple Helix Model, the ecosystems of the Chinese and US entrepreneurship education will be compared and analysed.

Keywords: Ecosystems of Entrepreneurship Education, Triple Helix Theory, American Entrepreneurship Education, Chinese Entrepreneurship Education, Impacts of Entrepreneurship Education.

INTRODUCTION

Entrepreneurship education is a new concept of education created and applied during the late 1980s in Western countries. Its focus is on developing students' entrepreneurial skills and knowledge of entrepreneurship as a fundamental goal of higher education. Entrepreneurship education at colleges and universities can also be traced back to the 1940s in Australia where it has a history of more than seventy years. In China, entrepreneurship education training objectives or training programs are not formally integrated into the mission of the majority of colleges and universities. Yet these objectives and programs are considered essential for increasing the employment rate and supporting new government initiatives. Entrepreneurship

education has raised new approaches in entrepreneurship curricula and teaching methods (Liu et al., 2014).

Since the introduction of entrepreneurship education in the United States in the 1980s, there has been a strong upsurge in its application. In 2001 the United States offered entrepreneurship education at more than 1,500 baccalaureate degree-granting universities and colleges. The system of entrepreneurship education in the United States is characterized by relatively scientific and systemic teaching and research. Among the more distinctive entrepreneurship business models are those of Babson College, Massachusetts Institute of Technology, Stanford University, etc. Government support and industry involvement have contributed to the success of entrepreneurship education in the United States. Compared with the United States, entrepreneurship education in China is new to higher education, beginning as recently as April 2002. The China Ministry of Education started pilot programs for entrepreneurship education at nine universities, including Tsinghua University, Beijing Aeronautics and Astronautics University, China Renmin University, Shanghai Jiangtong University, Nanjing University of Economics, Wuhan University, Xi'an Jiaotong University, Northwest University and Heilongjiang University (Liu et al., 2014).

The entrepreneurship education and teacher training model used in the early stage in China was based on the entrepreneurship education project known as Know About Business (KAB) developed in the 1990s by the International Labour Organization (ILO) of the United Nations for use in developing countries. It was adopted by the Central Committee of Communist Youth League of China and All China Youth Federation in 2005. The national requirements essential for ordinary college entrepreneurship education teaching were promulgated by the Ministry of Education in August 2012. In 2015, entrepreneurship education in China, under the "Mass Entrepreneurship and Innovation" campaign, was launched with significant political and financial support.

The mass entrepreneurship and innovation campaign was key to implementing a new growth strategy, as China entered a "new normal" phase of slower growth. China needed to develop the "twin engines" of popular entrepreneurship and mass innovation, paired with increased supplies of public goods and services, to drive economic and community development. The Chinese government attempted to provide a better environment for entrepreneurship and innovation, by lowering barriers, strengthening public services and encouraging college students, scientists and engineers to start new businesses. China piloted equity-based, online crowd-funding and encouraged banking and financial institutions to provide loans as financing channels to support small businesses (Xinhua English, 2016). Chinese university administrators and professors, as well as Chinese government delegations and China Youth Federation study groups, were sent to the United States and Europe to observe the entrepreneurial practices and learn about the experiences of universities, government agencies and enterprises in the United States and Europe (Winters, 2015).

The concept of ecosystem, which comes from the natural sciences, is increasingly applied to regional development and focused on the inter-organizational relationships. When assessing entrepreneurship education ecosystems around the world, it is important to understand the business model, teaching philosophy, teacher training, curriculum, course content, teacher training, infrastructure, culture, network and practices of each country. The emergence of start-ups and support mechanism such as accelerators, incubators, venture capital firms and angel investors improve the start-up ecosystem. What needs more attention is the fostering of an entrepreneurship culture and environment that encourages and supports individuals to establish

new ventures or start-up (Salamazadeh et al., 2017). The Triple Helix model (university-government-industry) is a useful tool for comparing and analysing the ecosystems of entrepreneurship education in the United States and China, the top two economic and entrepreneurial powers in the world.

RESEARCH METHODOLOGY

Countries with sophisticated educational systems help entrepreneurs to develop ideas and confidence, while, at the same time, enhancing their economies by incorporating the most advanced technology. While industry and government have traditionally been considered as primary institutional spheres of influence and engagement, the Triple Helix Model posits the university as the leading sphere (Etzkowitz, 2002). By developing new industries and creating new jobs, universities are now taking the leading role in economic development. Universities are using their entrepreneurship centres or incubators to create internships, increase jobs and to attract new faculty and clients to campus. In assuming their leading role of teaching, research and economic development, universities, are asking state, city and town governments to be actively involved and to provide financial support for their entrepreneurship centres and incubators, as well as for related services.

The research methodology of this paper is to apply the Triple Helix Theory to understand the roles of government, industry and university for developing entrepreneurship and innovation in the United States and China. The paper attempts to establish which ecosystems have the greatest influence on entrepreneurial activities and which drive entrepreneurship and innovation in the United States and China. What is an effective ecosystem for entrepreneurship/innovation and entrepreneurship education? Is the Chinese government's "top-down" approach or the American "bottom-up" approach more efficient? Specific entrepreneurship education models at US and Chinese universities are compared and analysed here to answer these questions. The author has conducted on-site visits to the incubators and science parks and acquired first-hand knowledge about the entrepreneurship and innovation in the US and China. There are two top entrepreneurship and innovation hubs in the world: Zhongguancun Science Park and Silicon Valley that have the best and innovative ecosystems and culture. Both hubs are examined to demonstrate their importance and the competition that occurs in the entrepreneurship ecosystem. Finally, the impacts and outcomes of the entrepreneurship and entrepreneurship education are examined. Statistics of cities around the world with the highest venture capital investment and on the universities from which venture capitalists graduate show the effects and results of the US approach to entrepreneurship education over the Chinese program of entrepreneurship education. Previous literature only provides general facts of the entrepreneurship education ecosystems in both countries, but not specific examples, impacts and statistics of outcomes. My comparisons and findings show the details and strengths of the US entrepreneurship education ecosystem and the efficiency of the bottom-up approach to entrepreneurship. They also show both the weaknesses of the Chinese entrepreneurship education ecosystem and culture as well as the strengths of the effectiveness Chinese top-down approach to entrepreneurship and economic development.

CHINA EMERGING AS THE NEXT STARTUP DESTINATION IN THE WORLD

Numerous start-up accelerators are now claiming their spots at Zhongguancun, an area in Beijing which, only a few years ago, was a hub for electronic hardware stores. In 2015 China

experienced what might be called “The Fourth Wave” of entrepreneurship. Innovation, start-ups and entrepreneurs have now taken central stage in this “wave”, boosted by governmental support and a flood of venture capital investments. The very word “start-up” has come to embody the dreams of a rising generation. In 2014, evaluations for “start-ups” grew at a staggering and unprecedented speed globally, surpassing the “pre-dot-com” crash era. Since 2010, the number of start-up companies in China has been growing at more than 100% annually, reaching approximately 1,610,000 in 2014. Even though China is generally in the midst of an economic slowdown, it is reported that there are eight new companies being founded every minute (Lee, 2015).

According to the report and statistics compiled by the Zhongguancun Development Group, Zhongguancun Science Park was officially approved by the China State Council and strategically positioned as China’s First National Innovation Demonstration Zone in 2009. After almost 20 years, Zhongguancun National Innovation Demonstration Zone has expanded in size to 88 square kilometres and 16 parks in Greater Beijing. It is currently ranked as the second largest entrepreneurship and innovation hub in the world after Silicon Valley. These economic and technology changes in China are astonishing and the material and structural contrasts between the United States and China are becoming smaller and smaller. The advantages of the Zhongguancun entrepreneurship and innovation ecosystem are characterized by the number of top universities, research institutes and incubators located there. There are 41 top universities (like Tsinghua University, Peking University and Renmin University), 206 national academies and institutes (like China Academy of Science and China Academy of Engineering), 122 national-level labs and research institutes and 60 university and returned-overseas-student science parks. There are also 97 start-up incubators and accelerators that claim partnerships with firms such as Microsoft, ARM, Plug & Play and Trendline.

Today’s competitive landscape in the world’s internet business is dominated by two powers: The United States and China. Although the value of the top American internet companies is three times more than that of the top Chinese internet companies, this situation of internet start-ups is likely to be reversed or even overturned by China surpassing the United States. The value of the internet is measured in square of node. The United States has 200 million users who are worth 200 million square of node. China has 700 million users who are worth 700 million square of node. The difference of square of node between the two countries is not 3.5 times larger (Lee, 2015).

In 2016, there were 75,000 Chinese enterprises established. China is now the fastest enterprise developing country in the world. However, 50 percent of those 75,000 enterprises have already disappeared or failed, because of poor business planning and execution. Without good guidance for entrepreneurial projects and ecosystems of entrepreneurship education to support and train the entrepreneurs, there will be a huge waste of entrepreneurship resources in Chinese society and business (Innovation and Entrepreneurship Weekly, 2017). Therefore, Chinese investment in the ecosystem of entrepreneurship education is essential to the success of the “Mass Entrepreneurship and Innovation” campaign.

COMPARISON OF THE US AND CHINESE ENTREPRENEURSHIP AND EDUCATION MODELS

The US and Europe are not the only places in the world where entrepreneurship is recognized as playing a major role in economic development. Even countries with communist economics in the past such as China are focusing a great amount of effort on fostering

entrepreneurship. Following government initiatives, universities are not only offering entrepreneurship courses. They are also conducting a growing amount of both practical and theoretical research on entrepreneurship issues (Brockhaus Sr., 1991).

In accordance with the Triple Helix Model of University-Industry-Government Interactions, the United States is a Laissez-Faire Triple Helix. Universities are basic research and human resource providers for industries and firms linked by markets. The government is limited to addressing market failures. It is an individualistic mentality with heroic entrepreneurs and a bottom-up approach. The private capitalist system stimulates bottom-up initiatives from universities and university spin-offs. China is not a pure Statist Triple Helix, but an improved Statist Triple Helix in which government dominates other spheres with top-down bureaucratic co-ordination. It has a large project mentality where industry encourages national champions. Universities have become the teaching and research providers under the government.

Entrepreneurship education in the United States is based primarily on the government's entrepreneurship support agencies and relevant supportive policies. The United States Small Business Administration's role is to provide venture capital and loan guarantees for small businesses, especially for underrepresented and disadvantaged groups. The main purpose of these investments is to help the small businesses overcome initial financial barriers. At the same time, with the participation of venture capital firms, the government encourages more investment funds to compensate for the lack of support for the system of entrepreneurship education in American universities. Thus, a United States university entrepreneurship education project model has gradually evolved—the universities provide talent; enterprises provide the project; private foundations provide money; and research centres provide guidance, advice and models of entrepreneurship for collaborative research and projects (Zhang, 2011).

China witnessed a start-up boom during the first eleven months of 2015, when newly registered enterprises jumped from 19 percent a year to 3.9 million or 11,700 new companies every day. Reform and innovation inspire creativity, create new growth engines, upgrade traditional industries and foster emerging ones. Government support includes simplified procedures, subsidies and financial aid during the early phases of business. Because of such favorable measures, many college students, business executives, scientific researchers and returnees from overseas are emerging as major forces in entrepreneurship activities. In 2016, China boasted more than 200 makerspace projects, 1,600 business incubators and 129 high-tech zones and science and technology parks, all of which helped to allocate resources and to nurture innovative growth from companies. A new entrepreneurial wave has arrived, improving China's productivity and pushing forward the country's economic transformation, resulting in millions of "start-ups" (Xinhua English, 2016).

The mass entrepreneurship and innovation campaign of the Chinese government has taken a foothold throughout the business and society. Entrepreneurship in China has never been as strong as in the past two decades, a period that has brought dramatic changes and advances in technology and business models. This is represented by the rise of China's internet tycoons: Pony Ma of Tencent, Ren Zhengfei of Huawei, Lei Jun of Xiaomi and Jack Ma of Alibaba who is the owner of the South China Morning Post. They have in turn inspired a new generation of young people in their 20s and 30s with soaring aspirations (Wang, 2017). Approximately 82 percent of Chinese universities and colleges have opened either compulsory or optional courses on entrepreneurship and innovation, according to statistics from the Ministry of Education (MOE). The number of such courses offered in Chinese universities increased by 14 percent in 2015 compared to 2014. Universities and colleges have established special funds for

entrepreneurship and innovation projects totalling 1.02 billion Yuan (160.4 million USD). In 2015, more than three million college students participated in innovation and entrepreneurship activities. Universities and colleges respond to employer demands by providing needed information, services and training that help graduates find proper entrepreneurship programs. Preferential policies are implemented which support college graduates who are creating “start-ups” (Xinhua, 2015).

Entrepreneurship education in China has gone through rapid expansion and is government-driven from the top down. All Youth Federation, the largest government youth organization in China, has initiated entrepreneurship centres and training programs in each province, city and town across the country. Various other government agencies and employment offices provide additional services to encourage self-employment and entrepreneurship. Many Chinese universities and colleges have started to offer new undergraduate and graduate degrees in entrepreneurship and innovation. In addition, there are joint entrepreneurship programs with US and foreign universities. In cooperation with Rochester Institute of Technology, Beijing Jiaotong University offers a master’s degree program in entrepreneurship and innovation. This is one of the first few international cooperative entrepreneurship programs approved by the China Ministry of Education. The program, composed of 30 credits of courses, using English as the language of instruction, can be completed within one year, either in China or the US (Beijing Jiaotong University, 2018).

TEACHING CONCEPT, PHILOSOPHY AND INFRASTRUCTURE OF ENTREPRENEURSHIP EDUCATION

American universities have established a unique entrepreneurship-education concept for the purpose of serving the needs that students have for academic and career development. This model is designed to foster each student’s enterprising spirit and engagement in active entrepreneurship, to raise the level of economic and social development and to create social vitality for the mission of society. The purpose is not to pursue immediate and utilitarian success in entrepreneurship, but rather to develop talents and prepare for future entrepreneurial development. By contrast, at most Chinese universities, entrepreneurship education attempts to cultivate talents directly related to employment, in order to alleviate pressures on students and to help them to find jobs. Entrepreneurship education is viewed as mandatory and utilitarian by the Chinese universities and government. It is often evaluated and assessed in terms of how many entrepreneurship projects and competitions are accomplished by students, how much government funding is acquired by university for entrepreneurship programs and how many jobs are created through student entrepreneurship projects.

The basic purpose of the American entrepreneurship education model is to encourage different colleges and universities to participate in substantial entrepreneurship educational activities and to prepare funding, teacher training and program development. Babson College in Massachusetts is a small liberal arts college that is considered to be the best example of entrepreneurship education in the United States. Its entrepreneurship education research centre is committed to developing innovative teaching programs, outreach expansion plans and academic research to support and promote of entrepreneurship education. However, in China, the model that is used at most colleges and universities is a single form of entrepreneurship education that is separate from other disciplines, such as the science, professional education, engineering, business and the arts. Moreover, the sole focus is only on practical part of entrepreneurship education activities such as the creating actual products and services. The entrepreneurship

education programs do not include teaching the theories about teaching entrepreneurship business practices which create the rationale and theoretical foundations for implementing entrepreneurial projects (Liu et al., 2014).

As a leader in entrepreneurship education, Babson College is deeply involved with theoretical study and research in entrepreneurial management and education. At Babson, entrepreneurship is a process of adjusting, integrating and balancing three important factors—opportunities, resources and teams. Entrepreneurs should not only take advantage of evident opportunities, but also explore and discover new opportunities. How to control and optimize resources is a difficult, but critical question to address in establishing a new enterprise. An efficient team is also indispensable for the success of a new company. All in all, opportunities, resources and teams are closely interrelated with each other. This concept of entrepreneurship education has guided the formation of the entrepreneurship curriculum and its theoretical framework at Babson College. The Babson Entrepreneurship Education and Research Centre has also designed a famous entrepreneurship curriculum and supports research projects on “back-end” theories of entrepreneurship education. This model advances entrepreneurship and advocates an enterprising spirit, by using innovative teaching programs, extensive planning and academic research (Zhang, 2011).

A complete infrastructure and maturing level of entrepreneurship education has been established in the United States. Each university designs its entrepreneurship education according to the particular characteristics and culture of the university or college. Although Massachusetts Institute of Technology (MIT) is not representative of most universities in the United States, it has a unique business model for entrepreneurship education institutions to learn from. MIT has a complete infrastructure of entrepreneurship education units and organizations that cover every aspect of entrepreneurship and process of innovative development. The infrastructure system includes an entrepreneurship centre, social entrepreneurship centre, incubator, accelerator, patent office, global industrial alliances, etc. Each unit exists to play a role in the entrepreneurship and innovation process:

Martin Trust Centre for MIT Entrepreneurship

Martin Trust Centre is not an incubator in a strict sense, but an entrepreneurship centre providing entrepreneurship education, funds and services for start-ups, such as consultations, networking opportunities and rental spaces for meetings and events.

MIT Media Lab

Located in the School of Architecture and Planning at MIT, Media Lab is both an interdisciplinary and academic lab as well as a unit offering undergraduate, graduate and Ph.D. courses and programs. At any one time, as many as 30 groups with about 300-350 people are working on various innovative and entrepreneurial projects in the lab.

MIT Deshpande Centre for Technological Innovation

It provides seed money, research funding and incubation support to potential projects. The central focus is to promote new technologies by integrating industry and research in different labs, such as biochemistry, biomedicine, information technology, new materials and energy innovation.

MIT Legatum Centre for Development and Entrepreneurship

Legatum Centre administers programs that promote and shape discourse on “bottom-up” development, especially in emerging economies. It provides funds and networking opportunities with investors and courses for students who are engaged in entrepreneurial projects and social entrepreneurship in developing countries.

MIT Industrial Liaison Program (ILP)

Commissioned by the United States government to engage in technological research and transfer the results to business products, MIT established the Industrial Liaison Program in 1948 to connect and cooperate with global enterprises.

MIT Start-up Exchange

MIT Start-up Exchange actively promotes collaboration and partnerships between MIT-connected start-ups and industry. STEX25 is a start-up accelerator within MIT Start-up Exchange, featuring 25 “industry ready” start-ups that have proven to be exceptional with early use cases, clients, demos or partnerships and are poised for significant growth.

The Engine

MIT’s new accelerator is to provide funding, space and expertise—powering a network of innovative works. In April 2017, it set up its first investment fund of \$150 million to support start-ups developing breakthrough scientific and technological innovations with potential for societal impact (MIT, 2018).

Unlike MIT and other American universities, most of the newly formed entrepreneurship colleges at Chinese universities are independent programs that are not closely connected with different schools of their universities. Typically, they offer the basic “Principles of Entrepreneurship and Innovation” courses and provide students with general advising services on entrepreneurial activities, business plan competitions and limited research funds. Each university should aim to position its entrepreneurship programs according to the features and needs of its respective institution. The functions of the Chinese entrepreneurship colleges and programs are not specifically defined as incubators, entrepreneurship centres, social entrepreneurship centres, patent/license registration and industrial liaison services. They do not develop the ecosystems and strong interrelationships neither within the university, nor with and among industry and government.

CURRICULUM, COURSE CONTENT AND TEACHING STYLE OF ENTREPRENEURSHIP EDUCATION

A relatively complete and mature curriculum for entrepreneurship education has been established in the United States while the Chinese course system is still being tested and constructed. Thus, the Chinese teaching models, teaching methodologies and teaching practices are new, relatively weak and untested. Although there are many conferences, seminars and training programs organized on the topics of entrepreneurship education in China, there is no lead university, professor or theory that has established its own model. The teaching approaches and formats follow Chinese textbooks that on Western business models and theories. The course

curriculum is not closely connected with practical activities and systemic design. Although entrepreneurship colleges are set up at selective universities, they still seem to be basic entrepreneurship programs, but only on a larger scale.

A rich course content of entrepreneurship education has been established in the United States and focuses on entrepreneurship in accounting, management, finance and other areas. The typical courses may include “Investment and Risk,” “Recognition of Opportunities,” “Entrepreneurship Studies,” and so on. The critical point for teaching content depends on the situation and realities of society. The content is designed according to the factors required for successful promotion of the entrepreneurship process. The analysis of real cases and practice activities are immersed in the teaching process from beginning to end. The learners are involved in course activities for establishing an enterprise and are guided in the dynamic state of developing an enterprise. By comparison, the entrepreneurship courses in China are mainly focused on start-up operations and management. The course content is primarily about the principles and formulation of methodology. Most of the cases are set in a foreign context and adapted from Europe and North America. There is very little exploratory and experiential learning content.

In the United States, each university or college determines the course curriculum and content according to its own situation; there is no unified format. The undergraduate curriculum of Babson College, for example, consists of a combination of compulsory and optional courses. Many courses have unique features and characteristics, such as the topic “New Management Experience.” The new management experience classes are divided into several groups. Under the guidance of a professor, each group develops a business plan. The College provides each team a maximum of 3,000 USD in seed capital to establish and operate a new company. The company is liquidated at the end of the academic year. The profit from the hypothetical original capital is used to develop charitable funds (Liu et al., 2008). By contrast, most of the classes in China are in the same form of lectures, assignments and case studies. Most of the lectures are in a didactic style of preaching, but do not incorporate experiential or team-based learning.

Most of the American classes are experiential and team-based learning, where students participate under the guidance of the professor or instructor. Usually, the first half of class is devoted to reading and understanding a case. The second half of the class is dedicated to discussing and analysing the case in depth. The instructor leads the discussion and shares important knowledge about the points of the case. Whenever the case touches on these knowledge points, the instructor engages extensively in case discussion and brings out various aspects of the knowledge points. This teaching style is different from the Chinese lecture style and quite challenging for Chinese instructors. Many American instructors have had entrepreneurship experience and may even be entrepreneurs themselves. Most of them are from industry and are hired by universities as professors of practice and adjunct professors to teach courses and to share their own experiences in industry when dealing with points of case analysis. In the process of discussion with professors, American students learn the entrepreneurship knowledge, and, more importantly, develop innovative and critical thinking.

TEACHING METHOD AND TEACHER TRAINING IN ENTREPRENEURSHIP EDUCATION

Driven by market demand, entrepreneurship consulting has emerged and has become a new and popular career in recent years in China. The Central Committee of Communist Youth League of China and All China Youth Federation, together with the International Labour

Organization (ILO) of the United Nations, have launched the Know About Business (KAB) entrepreneurship education project. The KAB project, developed by ILO, is a special curriculum for training student entrepreneurship and entrepreneurial awareness. The KAB project and the “Start and Improve Your Business” (SIYB) project, widely implemented in developing countries of Africa, Middle East and Asia, constitute early entrepreneurship training and education in China. The project, through teaching of basic knowledge of business and entrepreneurship, improves entrepreneurial awareness and skills in developing countries.

Entrepreneurship education requires teachers to possess extensive theoretical knowledge as well as rich social and work experiences. Lacking industry experiences and entrepreneurship education models, the majority of Chinese colleges and universities treat entrepreneurship classes as extensions of management courses and use management professors and employment guidance counsellors. Teachers usually are not trained to carry out entrepreneurship research, nor do they have entrepreneurial experience. When lecturing, they feel upset and disrespected if students interrupt by asking questions. Their teaching methodologies in entrepreneurship courses are traditional, lecture-based and usually do not result in positive learning outcomes.

Most Chinese entrepreneurship courses are lacking in uniform standards and specific examples. Thus, the effect of understanding entrepreneurship concepts and practices is difficult to guarantee. Many of the Chinese textbooks are based on the western business context or the KAB model, originally designed for developing countries in the Asia, Middle East and Africa so they seem too out of time and place to keep pace with the rapid economic development of China. When all the universities are teaching the courses of the same type with similar textbooks, they cannot reflect the different features that make each university unique. In addition, the KAB education model developed by its KAB instructors is not being updated frequently, nor is it fully supported by the international entrepreneurship research institutions and universities. Only full recognition of university research on entrepreneurship theory can enhance education development of the entrepreneurial potential and keep it on a sustainable and healthy development track.

American professors of entrepreneurship classes include those who have both professional entrepreneurship knowledge and entrepreneurial experiences. Professors of practice and adjunct professors from enterprises and industry take a big part in teaching assignments for entrepreneurship education courses. There are also many entrepreneurship education teaching and research institutions involved in the process. In China, most of the instructors who teach entrepreneurship courses are management specialists or staff career service counsellors who lack advanced academic training in entrepreneurship or real entrepreneurship experience. Due to the State employment system and low salaries, it is difficult for Chinese universities to hire adjunct professors from enterprises and industries to teach on a regular basis. Part-time teachers and practitioners occupy only a small part of entrepreneurship course teaching assignments.

Continuing education is an important feature of entrepreneurship education in the United States. Babson College is also known for its continuing education and teacher training programs in entrepreneurship education. It designs comprehensive and customizable learning Modules for Entrepreneurship Educators (MEE). At the heart of the MEE program is the belief that teaching effectiveness should be learned and improved upon regularly. These customized multi-module programs have been demonstrated at institutions around the world, including the Babson College-Xiamen University training program for Chinese entrepreneurship professors and teachers in 2017. The goal of the MEE program is to increase an institution’s capacity and capability to teach entrepreneurship effectively through a variety of pedagogies. The

customizable programs include 6 teaching modules and 15 content modules in a systemic way (Babson MEE, 2018) (Table 1):

Teaching Modules	Content Modules
Entrepreneurial Teacher and Action Learning	Entrepreneurship Thought and Action
Case Writing	Creativity and Idea Generalization
Case Teaching	Design Thinking
Online Distance Learning	Opportunity Evaluation and Business Planning
Curriculum Design and Development	Entrepreneurship Marketing
Challenges in Teaching Entrepreneurship	Public Policy and Economic Development
	New Venture Creation
	Social Entrepreneurship
	Giving Voice to Values
	Family Enterprising
	Women and Minority Entrepreneurship
	Corporate Entrepreneurship
	Technology Entrepreneurship
	Entrepreneurial Finance
	Managing Growing Ventures

ENTREPRENEURIAL PRACTICE ACTIVITIES AND PROJECTS IN ENTREPRENEURSHIP EDUCATION

Talent training and knowledge transfer in entrepreneurship education is not only accomplished through classroom learning and business competition, but also through a variety of entrepreneurial practices. There are many types of practice activities for entrepreneurship education in the United States including practice-oriented classes about opportunity selection, business plan writing and the raising of capital. There is also a wide variety of approaches to practice activities, such as market research, on-site enterprise investigation, experiential learning, entrepreneurial business plan competition, pitch competition, entrepreneurship forum (sponsored by student clubs and associations) and so on. In addition, the practice activities are supported by corporate donations and university funds for undergraduate research and directed studies, start-up competitions, academic conferences, publications and hackathon opportunities closely related to entrepreneurship.

Founded in 1998, the Harvard China Forum is the oldest and largest continuous student-organized conference in the world dedicated to constructive dialogues on the challenges, trends and issues affecting China. Each year the Forum invites the most representative speakers of various fields in China and the world's most able scholars to address different issues. More than 1,200 delegates and 100 speakers attended the forum in 2017, making it the largest of its kind. A dozen professional judges evaluated over 200 start-up business proposals from entrepreneurs in the United States and China.

Founded in 2011, MIT-China Innovation and Entrepreneurship Forum (MIT-CHIEF) is committed to promoting intellectual exchanges and collaborations between China and the United States in technology, innovation and entrepreneurship. MIT-CHIEF hosts an annual conference with distinguished scholars, seasoned investors and experienced industry leaders and entrepreneurs. So far, start-ups in MIT-CHIEF community have acquired more than \$150 million

investments. In the 2017 this conference was attended by more than 500 participants from around the world.

Start-up Weekends or Competitions are very popular and held on many different American college campuses. The University of Massachusetts (UMass), Dartmouth's Centre for Innovation and Entrepreneurship (CIE) hosted the campus's second Start-up Weekend on December 14, 2015. It was attended by more than 60 students from a number of colleges. The typical Start-up Weekend is a 54 hour event, at which participants first "pitch" their business ideas on Friday (Stapleton, 2015).

Hackathon is one of the most relevant entrepreneurial activities and known as a Hack Day, Hackfest or Codefest. At this event, computer programmers and others involved in software and hardware development, including graphic designers, interface designers and project managers, collaborate intensively on software projects (Leckart, 2012). Hackathons typically start with one or more presentations about a project and specific subject. American university students can participate in the hackathons across the country free of charge and receive partial reimbursement for their transportation expenses.

Undergraduate research and directed (independent) study are engaging and popular programs at American universities. The mission is to provide opportunities for students to engage in research with a university faculty mentor. These close collaborations between faculty and students provide a forum for faculty to teach and mentor undergraduates on a one-on-one basis outside the traditional classroom. Most universities allocate sufficient financial resources and provide grants to fund student research, directed studies and travels to conferences. Undergraduate research journals publish student research and creative work, which has been reviewed and recommended by faculty reviewers (Shanahan et al, 2015).

In China, there are not as many entrepreneurial practice classes and activities as in the United States. There are business plan writing classes and competitions at each university. There are also business plan contests and shows sponsored by commercial television stations and All China Youth Federations programs. However, university financial sources and funds for student entrepreneurship projects and activities are limited in the monetary amount and number of participants. Chinese universities offer entrepreneurship classes in theory and are not actively engaged in entrepreneurship practice classes and activities outside the university. Outside events as "Entrepreneurship Competition", "Debate Competition", "On-Site Visit to High-Tech Park" and "Leadership Training Camp", replaces the actual entrepreneurship classes and practice activities. Entrepreneurial activities outside of classroom or campus are not integrated into the Chinese curriculum. Financial support for entrepreneurial activities, such as innovation and entrepreneurship forums, start-up weekends, hackathons and undergraduate research projects are only available to an elite group of Chinese students. Such institutional support is not a popular resource, because of the limited resources and large number of students. Funds and grants to support student trips to conferences and on-site research trips are minimal. There is no undergraduate research journal in China in which to publish student research, entrepreneurial experience and innovative work.

INNOVATIVE AND COOPERATIVE CULTURE AND ENVIRONMENT OF ENTREPRENEURSHIP EDUCATION

A good ecosystem of entrepreneurship education is not possible without the open, interactive cooperative culture and network of entrepreneurship educators. The entrepreneurship culture of active involvement, cooperation and risk-taking is reflected in faculty entrepreneurs,

student entrepreneurs and faculty/student team entrepreneurs. An open network of entrepreneurship education is accessible to the entrepreneurship community internally and connected externally to the global industrial network, such as MIT Industrial Liaison Program, MIT Start-up Exchange, Stanford Entrepreneurship Network and Stanford Roundtable on Entrepreneurship Education. Entrepreneurship education is implemented ecologically through the industry-university-research cooperation and value chain. There are many successful examples of the industry-university-research cooperation, one of which is Stanford University. If all the enterprises established by the faculties, students and alumni of Stanford University are considered a complete economic identity, its GDP would rank tenth in the world (Kechuang China, 2017). Famous companies, founded and managed by Stanford alumni, include such high-tech giants as Hewlett-Packard, Cisco, SUN, Yahoo and Google.

The source of innovation and entrepreneurship at Stanford University comes from its faculty and students. Education has two parts: Knowledge itself and transfer of the knowledge. When the professors pass the knowledge and experience of their first-hand scientific discoveries to students, the knowledge that the students acquire is active and vibrant knowledge. Stanford University gives attention to both research and teaching. Most of the professors are actively engaged in research projects and serve as mentors to their faculty/student research teams. As a result of the scientific experiments and faculty/student team efforts, many innovative products have been developed and patented in the University's laboratories, programs and departments. Google, for example, was founded with initial funding of \$100,000 from a Stanford professor (Kechuang China, 2017).

In addition to the interactive faculty-student research, there is open and cooperative research relationship among faculty. One third of the Stanford professors live on campus and are able to communicate easily and frequently. One operations system professor wanted to establish a company to solve the problems of correcting student homework, which had become evident in different operations systems. He discussed this plan with his neighbour, Zhang Shouyong, a physics professor and angel investor. The idea captured the interest of both Professor Zhang and the Stanford President, who became the first angel investors for this project. This entrepreneurial company was named VMware, which is now worth \$45 billion. Because of VMware, cloud computing technology came into being afterwards (Kechuang China, 2017).

In China today, the industry-university-research cooperation has just started and has not quite yet developed close partnerships with tangible results. Most of the successful product applications are based on those of soft science and e-commerce business models. The hard and basic scientific research, conducted by university faculty and students, takes a longer time and is not attractive to the Chinese venture capitalists at this time. It is not yet common among Chinese businessmen and entrepreneurs to sponsor long-term research of basic science projects. Most of the research funds at universities are provided by the government and research institutions. Because of the fierce competition among faculty for the government funds and institutional grants, faculty do not usually share information, nor network with each other for cooperative and joint research projects. Sometimes government research grants and funds acquired by faculty are not used wisely to pay students and purchase lab equipment, but in wrong and inappropriate ways, producing unsatisfactory results. If Chinese universities want to become the best and most entrepreneurial, like those of the United States, then they need to have good industry-university-research cooperation and to establish an open, innovative and cooperative culture and network of entrepreneurship education.

FINDINGS OF ECOSYSTEMS OF ENTREPRENEURSHIP EDUCATION

Ecosystems of entrepreneurship education cover many aspects including business models, teaching concepts, infrastructure, teaching curriculum, teaching content and style, teacher training, culture, networking and entrepreneurial practice activities. Comparing the ecosystems of the entrepreneurship education in China and United States, we apply the Triple Helix Theory to understanding the different roles of the government, industry and university in each country. Chinese entrepreneurship education uses a government and “top-down” approach to entrepreneurship education while the approach of American entrepreneurship education, which include universities, businesses and self-support, is therefore more “bottom-up”.

With the Chinese “top-down” model, the government is leading the effort and allocating funds and resources for entrepreneurship education. Answering the government’s call, universities are cooperating to set up entrepreneurship programs to help students and young people establish new businesses and find employment. Successful entrepreneurs and industries come to universities to promote entrepreneurship initiatives and to serve as judges on entrepreneurship competitions/television shows, which are gaining considerable publicity and remarkable results. There has been and continues to be a dramatic change in attitude and programs towards entrepreneurship and innovation at universities and in Chinese society.

The American “bottom-up” model entails universities playing an important role in entrepreneurship education and seeking funds from government and industry to create entrepreneurship programs according to their individual needs, time and situation. There is no uniform US government call or any organized effort to create a movement for innovation and entrepreneurship such as is happening in China. The United States government actually provides more services than funds to support the university initiatives. Industry cooperates and volunteers to give advice and create both opportunities and internships for university students. In China, the Triple Helix Model of government-university-industry is applied with more advocacy and reliance upon government, while in the United States, the Triple Helix Model is more university-initiated and self-supported.

The American approach has built a well-rounded foundation for entrepreneurship education ecosystem in various aspects and is an example for the Chinese to learn from during the entrepreneurship and innovation. Chinese entrepreneurship education is influenced by the Chinese political situation and system and it has financial backing from the government. Entrepreneurship programs have been launched at almost every university and college in China within the past two or three years. The ecosystem of entrepreneurship education is the key to assessing the outcomes of entrepreneurial businesses and activities. The ecosystem of American entrepreneurship education is somewhat more complete and effective than that of the Chinese approach at this time, because it produces greater practical results and effects on start-up activities businesses. The following tables of contributions and impacts of the venture capital investments and start-up activities in different cities of the world demonstrate the case in point. The results can also be shown by studying American or Chinese universities and colleges and determining which have the highest number of alumni who are venture capitalists (Table 2).

University/College	Numbers of Alumni
Standard University	33
Harvard University	25
University of Pennsylvania	12
Massachusetts Institute of Technology	9
University of California	7
Cornell University	6
Dartmouth College	6
Columbia University	6
Yale University	4
University of Virginia	3
University of Chicago	2
Northwest University	2
Duke University	2
Rice University	2
Brown University	2
Boston University	2
Shanghai Jiao Tong University	1
China Europe International Business School	1
University of Science and Technology of China	1

Source: Hainabaichuang, March 31, 2016

The comparisons and findings show the strengths of the US entrepreneurship education ecosystem and the efficiency bottom-up approach of entrepreneurship. They also show both the strength and the effectiveness of the Chinese top-down approach to entrepreneurship and the weaknesses of the entrepreneurship education ecosystem and culture. As the next start-up destination in the world, China needs to take advantage of financial and human resource inputs to improve its entrepreneurship ecosystem and culture. For the United States, more investment is needed for the entrepreneurship and entrepreneurship education to match that of the Chinese.

IMPACTS OF ENTREPRENEURSHIP EDUCATION ON GLOBAL STARTUP CITIES AND ENTREPRENEURSHIP ACTIVITIES

Entrepreneurship education contributes to start-up and venture capital investment activities. There is a relationship between the level of entrepreneurship education and the level of start-up investment activities. Given business concepts, teaching and curriculum development models and an infrastructure of entrepreneurship education conducive to a business environment, the United States is at the top in terms of start-ups and innovation across the world. Richard Florida, Director of Cities at the Martin Prosperity Institute at the University of Toronto's Rotman School of Management, issued a report on January 26, 2016, entitled "Rise of the Global Start-up Cities: The Geography and Venture Capital Investment in Cities and Metros across the Globe." In this paper, Florida tracked global start-up and venture capital investment trends. His analysis followed global venture capital investment, totalling \$42 billion in 2012 and includes the most recent and complete data collected. The largest venture capital investments belong to the first tier of large cities in the United States East Coast, the United States West Coast, Western Europe, China and India (Florida, 2016).

Venture capital investment across the world totalled \$42 billion in 2012, spread across more than 150 cities and metropolitan regions. The top 10 "metros" account for more than half (52 percent) of all venture capital investments while the top 20 "metros" account for almost two-

thirds and the top 50 for more than 90 percent of total global venture investment. The United States accounts for nearly 70 percent (68.6 percent) of total global venture capital, followed by Asia (14.4 percent) and Europe (13.5 percent). The San Francisco Bay Area, which spans Silicon Valley and San Francisco proper, remains the world's leading centre for venture capital investment attracting nearly \$11 billion dollars, more than a quarter of all global venture investment. Boston is the second with \$3.1 billion, followed by New York with \$2.1 billion and Los Angeles with \$1.5 billion. Outside of the United States, London ranks seventh with \$842 million, Beijing ninth with \$758 million, Toronto 12th with \$628 million, Shanghai 14th with \$510 million, Mumbai 15th with \$497 million, Paris 16th with \$449 million and Bangalore 17th with \$419 million (Table 3). Just two broad regions—the San Francisco Bay Area and the Boston-New York-Washington Corridor—account for more than 40 percent of global venture investment (Florida, 2016).

Rank	Metro	Venture Capital Investment*	Share of Global Venture Capital Investment
1	San Francisco	\$6,471	15.40%
2	San Jose	\$4,175	9.90%
3	Boston	\$3,144	7.50%
4	New York	\$2,106	5.00%
5	Los Angeles	\$1,450	3.40%
6	San Diego	\$1,410	3.30%
7	London	\$842	2.00%
8	Washington, D.C.	\$835	2.00%
9	Beijing	\$758	1.80%
10	Seattle	\$727	1.70%
11	Chicago	\$688	1.60%
12	Toronto	\$628	1.50%
13	Austin	\$626	1.50%
14	Shanghai	\$510	1.20%
15	Mumbai	\$497	1.20%
16	Paris	\$449	1.10%
17	Bangalore	\$419	1.00%
18	Philadelphia	\$413	1.00%
19	Phoenix	\$325	0.80%
20	Moscow	\$318	0.80%
	TOP 20 METROS	\$26,790	63.6%
	TOTAL	\$42,121	100.0%

*United States million dollars;

Source: Competitiveness and Prosperity, January 26, 2016

The university or college from which the venture capitalist graduates is another indicator of the effects of entrepreneurship education. Stanford University is ranked as one of the best universities in the world and has among its alumni one fifth of the world's top venture capitalists.

We can say that Silicon Valley leads the world venture capital and entrepreneurial activities and that Stanford University leads in the Silicon Valley. The alumni of Harvard University, Massachusetts Institute of Technology (Sloan School of Management), University of Pennsylvania (Wharton Business School) are also very strong leaders in the innovation and venture capital activities on the East Coast of the United States. Except those in the United States, no university has more than two alumni on the list of top venture capitalists. In the Chinese university system, Shanghai Jiaotong University, China Europe International Business School and University of Science and Technology of China are on this list, but each has one only alumnus among the top venture capitalists.

CONCLUSION

Entrepreneurship education is popular and emphasized in China and the United States. At present, China is launching a strategic “Mass Entrepreneurship and Innovation” campaign and plays an important role in entrepreneurial initiatives and mobilization of the society. In this aspect, the United States is lagging behind in government supported efforts to invest in entrepreneurship education and initiatives, but it still actively supports entrepreneurship education by providing services for entrepreneurship strategy and research, as well as help for creating better business and an entrepreneurship environment. The Triple Helix Model of government-industry-university is applied to compare and evaluate the Chinese and American entrepreneurship education ecosystems and interactions. The Chinese Triple Helix interactions are “top-down”, government effort and policy-oriented. The United States interactions are “bottom-up”, self-supported by universities and business-oriented. In China’s economic development, the government’s efforts and policies are effective and have produced immediate results and benefits for society. The situation in the United States is different due to the long history of its educational system and its legal and social environment. There is a complete infrastructure and ecosystem in American entrepreneurship education, with an effective system of curriculum, business models, teaching styles and practice programs, as well as an entrepreneurship culture, network, practice and maturity level that produces good outcomes. Although the present Chinese government’s efforts and policies on entrepreneurship education are strong and effective, Chinese universities need to build an entrepreneurship education ecosystem, adopt appropriate education models, develop their own infrastructure and curriculum and invest in teacher training and practice activities. The United States has the world in the “start-up” and venture capital investment activities, according to the 2012 statistics. But China is making rapid gains with government investment in entrepreneurship education on a massive scale. The statistics on present and future years for “start-up” and venture capital investment could be dramatically different or reversed for China. The United States government “start-up” investment and policy on entrepreneurship education should increase support for economic and entrepreneurship development, as well as for entrepreneurship education, in order to match the massive efforts and investment in entrepreneurship and innovation of the Chinese.

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