

# THE INNOVATION AND ENTREPRENEURSHIP EDUCATION ECOSYSTEM IN THE CONTEXT OF THE GLOBAL DIGITAL ECONOMY: AN EXPLORATORY COMPARATIVE STUDY OF MULTIPLE CASES

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## ABSTRACT

In the context of the rapidly evolving global digital economy, higher education—particularly innovation and entrepreneurship education—faces significant challenges and opportunities. This study utilizes an exploratory multiple-case analysis to compare the innovation and entrepreneurship education ecosystems across various countries and regions, including China, the United States, and Europe. The objective is to identify similarities and differences in areas such as policy support, curriculum design, technological application, and university-industry collaboration. Our analysis highlights that while foreign universities often prioritize interdisciplinary integration and the use of digital technologies, Chinese universities demonstrate distinct advantages in policy support and entrepreneurial practice. This study distills key elements of innovation and entrepreneurship education ecosystems within the global digital economy and proposes strategies for optimizing these ecosystems in Chinese universities. The findings offer both theoretical insights and practical recommendations to enhance innovation and entrepreneurship education in China during the digital economy era, and they also provide valuable references for global education policymakers.

**Keywords:** digital economy; innovation and entrepreneurship education; ecosystem; multiple-case study; international comparison

## 1.0 INTRODUCTION

The rapid advancement of the global digital economy is fundamentally reshaping both economic and social structures. The widespread integration of digital technologies is not only transforming traditional business models and operational processes but also creating new demands for higher education, particularly in the fields of innovation and entrepreneurship education. Recent studies highlight that the digital economy continues to expand globally, with a strong emphasis on digital transformation and the development of innovation ecosystems within higher education institutions. According to projections from the World Economic Forum, the digital economy is expected to contribute over \$20 trillion to the global economy by 2025 (World Economic Forum, 2022). This swift expansion highlights the critical need for secure digital environments, as the digital economy increasingly drives global GDP growth and influences industries worldwide. Moreover, a report by McKinsey Global Institute (2017)

offers an in-depth analysis of how AI and automation may displace jobs and reshape industries by 2030, underscoring the economic potential of automation and the need for workforce skill adjustments to maintain competitiveness.

To address these evolving challenges, governments and higher education institutions worldwide are increasingly investing in innovation and entrepreneurship education. Their goal is to cultivate talent capable of thriving in the rapidly evolving digital economy. Recent efforts in digital entrepreneurship education have focused on integrating advanced technologies such as AI and machine learning into curricula, equipping students with the skills needed for the future workforce (Munir, Vogel & Jacobsson, 2022). The Silicon Valley model in the United States, alongside the entrepreneurial ecosystem fostered by the Massachusetts Institute of Technology (MIT), has emerged as a global benchmark. This is largely due to its robust technological infrastructure and well-established entrepreneurial culture (Pique, Berbegal-Mirabent & Etzkowitz, 2018). Similarly, European nations like the United Kingdom and Germany have been actively promoting innovation and entrepreneurship education through interdisciplinary curricula and strong university-industry partnerships (Russell Group, 2021; O'Dwyer, Filieri & O'Malley, 2023). Concurrently, China has made significant progress in this area, driven by government-backed policies and practical entrepreneurial initiatives across its universities.

Nevertheless, significant disparities exist between the mechanisms of innovation and entrepreneurship education in China and those in other countries. While international universities typically prioritize interdisciplinary integration and the comprehensive application of digital technologies, Chinese universities demonstrate distinct strengths in policy support and entrepreneurial practice. This study endeavors to conduct an exploratory comparative analysis of multiple international cases, to thoroughly investigate the similarities and differences within innovation and entrepreneurship education ecosystems across diverse national contexts. The findings will elucidate the strengths and limitations of these systems and offer strategic recommendations for optimizing China's innovation and entrepreneurship education ecosystem, thereby providing valuable insights for policymakers and educators.

## 2.0 REVIEW OF LITERATURE

### 2.1 Definition and Evolution of the Digital Economy

The digital economy is a paradigm primarily driven by digital technologies such as the internet, cloud computing, big data, artificial intelligence, and blockchain. In recent years, this economy has evolved rapidly, with notable advancements in digital infrastructure and a growing emphasis on integrating emerging technologies. This transformation has not only accelerated global economic expansion but also catalyzed the digital transformation of enterprises and societies, resulting in the creation of novel economic structures (World Economic Forum, 2020). This shift places new demands on higher education, especially in the cultivation of talent equipped with digital literacy and innovative capabilities.

### 2.2 Theoretical Foundations of Innovation and Entrepreneurship Education

Innovation and entrepreneurship education has its roots in the mid-20th century, and its development has deepened alongside globalization and technological progress. Recent studies

have expanded on Schumpeter's theory, emphasizing the role of digital innovation in modern entrepreneurship education (Nambisan, 2017). Ecosystem theory has also become prevalent in this context, positing that educational ecosystems are comprised of various interconnected elements such as policy frameworks, resources, culture, and technology, which together shape educational outcomes and quality (Autio et al., 2017).

### **2.3 Global Development of Innovation and Entrepreneurship Education**

Globally, innovation and entrepreneurship education follows diverse development trajectories. The United States is recognized as a leader in this field, emphasizing experiential learning and strong industry-academia collaboration. Recent developments in the U.S. have focused on integrating digital technologies and data analytics into entrepreneurship curricula (Giones & Brem, 2017). Institutions like MIT and Stanford have built robust ecosystems that integrate technology, funding, and human capital, thereby nurturing entrepreneurial leaders (Roberts & Eesley, 2011). Silicon Valley serves as an exemplary model of how entrepreneurship education is seamlessly integrated with industry.

European nations, such as the United Kingdom and Germany, promote innovation and entrepreneurship education through policy initiatives and interdisciplinary collaboration. In the UK, institutions like University College London (UCL) emphasize interdisciplinary curriculum design and academia-industry partnerships (Morris, 2019). Germany's "dual education" system, known for integrating theoretical and practical training, advances innovation and entrepreneurship through collaborations between government, industry, and educational institutions (Federal Ministry of Education and Research, 2021).

China, though a later entrant in this field, has made considerable progress in recent years, driven by strong government support. Studies indicate that Chinese universities are increasingly integrating digital entrepreneurship education with traditional curricula (Hao & Gao-ya, 2023). Leading universities, such as Tsinghua University, Zhejiang University, and Wenzhou University, have achieved notable success in policy implementation, curriculum innovation, and entrepreneurial incubation. Moreover, China's innovation and entrepreneurship education is heavily policy-driven, with government initiatives establishing incubators and innovation labs across universities (Sun, 2021).

### **2.4 Construction and Optimization of the Innovation and Entrepreneurship Education Ecosystem**

The construction and optimization of innovation and entrepreneurship education ecosystems have emerged as critical research areas. Ecosystem theory highlights the interactions and synergies of various elements within educational systems, including policy environments, technological infrastructure, cultural contexts, and resource allocation (Autio et al., 2017). A well-functioning ecosystem integrates these components to provide comprehensive support and development opportunities for students (Stam, 2015).

In the United States, such ecosystems are often created through collaboration among government, industry, and academia. Universities leverage industry partnerships to translate research into commercial opportunities, giving students both theoretical and practical knowledge (Nambisan, 2017). In Europe, particularly in Germany, the ecosystem model

emphasizes interdisciplinary collaboration and international education, with the "dual education" model effectively bridging the gap between education and industry (Reichert, 2019).

Although China has made initial progress in constructing its innovation and entrepreneurship education ecosystem, it still lags behind Western nations in some areas. China's ecosystem is primarily policy-driven, and while the policy support is strong, there remains significant room for improvement in interdisciplinary integration, international collaboration, and the application of technologies (Zhuang & Liu, 2022). Thus, a critical research challenge is to explore how China can further optimize its ecosystem within the global digital economy, while accounting for its unique context.

### **3.0 METHODOLOGY**

#### **3.1 Research Methodology and Data Sources**

This study adopts an exploratory multiple-case study methodology to investigate and synthesize the successful practices of five international universities in developing innovation and entrepreneurship education ecosystems within the context of the digital economy. The primary aim is to identify key stakeholders, core components, and critical success factors, which will ultimately guide the development of a model tailored for Chinese universities. The multiple-case study approach is particularly suited for addressing "what" and "how" research questions, as it facilitates iterative validation of findings across various cases, enhancing the reliability and generalizability of the proposed model (Van de Ven et al., 2018). In contrast to single-case studies, multiple-case studies offer cross-case comparisons, contributing to the theoretical robustness and empirical validity of the model.

This research employs classification and comparative analysis methodologies. Through systematic examination of commonalities across multiple cases and the application of grounded theory, this study constructs an innovation and entrepreneurship education ecosystem model designed to meet the specific needs of Chinese universities. The model aims to provide both theoretical insights and practical recommendations for enhancing innovation and entrepreneurship education in China.

#### **3.2 Case Selection**

The selection of case study subjects was guided by criteria of cultural diversity, representativeness, and institutional strengths, ensuring the relevance and broad applicability of the research findings. Initially, universities from diverse cultural contexts were selected, including Babson College, the Massachusetts Institute of Technology (MIT), and Stanford University from the United States, the University of Oxford from the United Kingdom, and Osaka University from Japan. These institutions represent successful innovation and entrepreneurship education models across different cultural settings. Furthermore, the selection was based on the global influence of these universities, recognized leaders in their respective countries with widely emulated educational models. Babson College, MIT, and Stanford University, in particular, are globally renowned for their pioneering efforts in innovation and entrepreneurship education. Following the inclusion of cases from the UK and Japan, a theoretical saturation check was conducted, confirming that no new concepts emerged.

Therefore, constructing the innovation and entrepreneurship education ecosystem model based on the successful experiences of these five universities is deemed reasonable and appropriate.

### 3.3 Data Collection

This study primarily relies on secondary data for case analysis, based on several key considerations. First, innovation and entrepreneurship education is a dynamic and evolving process, particularly in universities with long histories, making comprehensive collection of primary data challenging. Second, the high costs associated with large-scale primary data collection make secondary data a more practical and economical choice, particularly given the broad institutional collaborations involved in these universities' innovation and entrepreneurship initiatives. Additionally, the selected secondary data sources are diverse, including official university websites, reputable media reports, and academic journals, ensuring the reliability of the data. Secondary data, such as journal articles and media reports, also offer traceability, facilitating longitudinal comparisons. To enhance the reliability and validity of the data, this study employs triangulation, drawing from multiple data sources, including academic literature and monographs (labeled as "S"), official university websites and related promotional materials (labeled as "P"), and information disclosed by global mainstream media, covering text, video, and photo content (labeled as "W"). Through the systematic collection of data, a detailed research database was built for all the case study universities. This enabled consistent cross-case verification and comparison, ensuring the saturation and robustness of the theoretical framework. Specific examples of data sources can be found in Table 1. By collecting and analyzing this data, the study established a research database for each of the universities under investigation. On the basis of individual case analysis, repeated validation and comparison across cases were conducted to ensure the completeness and rigor of the theoretical conclusions.

**Table 1: Information Samples from Various Data Sources**

Data Source	Primary Channel	Information Samples
Research Publications	CNKI (China National Knowledge Infrastructure)	Papers: <i>"A study on the ecosystem model and essential elements of entrepreneurship education in the international higher education sector – Based on the case of MIT"</i> , <i>"Reflections on the construction of the entrepreneurial ecosystem in British universities"</i> , <i>"Exploring the innovative ecosystem in U.S. national research universities"</i> , <i>"New explorations of entrepreneurship education in the crowd innovation era"</i> , and more.
	Web of Science	Papers: <i>"The entrepreneurial ecosystem"</i> , <i>"The timeline and intellectual history of entrepreneurship education in the U.S.: 1876–1999"</i> , Author of: <i>"Engines of Innovation: The Role of the Entrepreneurial University in the 21st Century"</i> , etc.

University Promotion	Official University Websites	An example from Babson College: " <i>Babson nurtures entrepreneurs of all varieties</i> ", demonstrating the institution's commitment to entrepreneurial education. Additionally, MIT's homepage highlights the " <i>1 Million Dollar Competition</i> ", showcasing the significance of entrepreneurship events within the university.
Media Channels	Media Sites	Using platforms like the Globalization Think Tank (CCG), reports and data on student entrepreneurship in the U.S. can be accessed. The American Kauffman Foundation and other relevant sources publish updated information on entrepreneurial trends among university students.

### 3.4 Data Coding Strategy

This study applies a grounded theory approach, utilizing an exploratory research method to code the collected data (Xudong, 2020). Grounded theory coding techniques enable the systematic collection, analysis, and development of theories through structured, data-driven processes. The coding process in this study followed three key steps: First, a coding team was established, with each member independently responsible for screening, categorizing, and coding the data. Discrepancies in coding were resolved through collaborative discussion to ensure consistency. Second, a dynamic database was created to store journal articles, news reports, and online resources, which was continuously updated and supplemented throughout the coding process. Lastly, new coding results were iteratively compared with existing categories to assess whether they represented new findings. By employing this structured coding strategy, the study offers an in-depth comparison of innovation and entrepreneurship education ecosystems between Chinese and international universities, providing valuable insights and recommendations for optimizing innovation and entrepreneurship education in China.

## 4.0 RESULTS

### 4.1 Open Coding

In the initial phase of data analysis, open coding was employed to extract relevant content from a large volume of raw data, with the aim of conceptualizing and categorizing the findings. Through preliminary analysis, 46 initial categories were identified, highlighting specific practices within the innovation and entrepreneurship education ecosystems of various universities in the context of the global digital economy. Table 2 presents examples of the open coding results.

**Table 2: Examples of Open Coding**

Exemplary Quote	Initial Category
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Stanford University: "Teaching students to apply knowledge effectively"	Educational Philosophy
Babson College: "Embedding an 'entrepreneurial DNA' in future talent"	Educational Philosophy
Osaka University: "Developing talent that is beneficial to the world"	Educational Philosophy
Tsinghua University: "Promoting a rigorous, diligent, realistic, and innovative academic atmosphere"	Educational Philosophy
Zhejiang University: "Fostering entrepreneurship based on innovation"	Educational Philosophy
Wenzhou University: "Advocating the integration of entrepreneurship education with professional education"	Educational Philosophy
Stanford University: "Established in 1891, with a long history in entrepreneurship education and technological innovation"	Long-standing History of Entrepreneurship Education
Babson College: "Founded in 1919, recognized as a leader in global entrepreneurship education"	Long-standing History of Entrepreneurship Education
Osaka University: "Founded in 1931, one of Japan's top research universities"	Long-standing History of Entrepreneurship Education
Tsinghua University: "Founded in 1911, established the university department in 1925 to cultivate local talent"	Long-standing History of Entrepreneurship Education
Zhejiang University: "Launched the first 'Innovation and Entrepreneurship Intensive Class' (ITP) in China in 1999"	Long-standing History of Entrepreneurship Education
Wenzhou University: "A local university known for its entrepreneurship education"	Long-standing History of Entrepreneurship Education
Stanford University: "Campus-wide entrepreneurship competitions"	Entrepreneurship Competitions
Babson College: "Entrepreneurship Plan Competition"	Entrepreneurship Competitions

Osaka University: "National Business Koshien"	Entrepreneurship Competitions
Tsinghua University: "Tsinghua University Entrepreneurship Plan Competition"	Entrepreneurship Competitions
Zhejiang University: "Zhejiang University Alumni Entrepreneurship Competition"	Entrepreneurship Competitions
Wenzhou University: "New Lake Cup 'Internet +' University Student Innovation and Entrepreneurship Competition"	Entrepreneurship Competitions
Stanford University: "Stanford Entrepreneurship Network, with participation from all students and access to all resources"	Campus Entrepreneurship Network
Babson College: "Establishing global entrepreneurship education spaces"	Campus Entrepreneurship Network
Osaka University: "Leveraging key resources for targeted cultivation"	Campus Entrepreneurship Network
Tsinghua University: "i-Center, a space offering cloud desktop services within the campus network to provide resources for students"	Campus Entrepreneurship Network
Zhejiang University: "Established the Zhejiang University Institute of Innovation and Entrepreneurship"	Campus Entrepreneurship Network
Wenzhou University: "Creating a reliable supply chain platform"	Campus Entrepreneurship Network
Stanford University: "Teaching and research teams composed of experts in entrepreneurship education, successful entrepreneurs, and government officials"	Diverse Faculty Team
Babson College: "Courses delivered by professional professors and experienced entrepreneurship mentors"	Diverse Faculty Team
Osaka University: "Regularly invites high school teachers and industry professionals to discuss progress in entrepreneurship education"	Diverse Faculty Team
Tsinghua University: "Collaborating with various companies, recruiting experienced external instructors in entrepreneurship"	Diverse Faculty Team
Zhejiang University: "Hiring experienced external instructors in entrepreneurship"	Diverse Faculty Team
Wenzhou University: "Each entrepreneurship team is equipped with experienced mentors"	Diverse Faculty Team



Stanford University: "Establishing an alumni alliance"	Alumni Network
Babson College: "Babson alumni resource network supporting entrepreneurship"	Alumni Network
Osaka University: "Organizing the 'OBP' course association to facilitate communication between graduates and current students"	Alumni Network
Tsinghua University: "Establishing the Tsinghua University Alumni Association"	Alumni Network
Zhejiang University: "Establishing the Zhejiang University Alumni Association"	Alumni Network
Wenzhou University: "Wenzhou University Education Development Foundation issuing alumni cards"	Alumni Network
Stanford University: "Entrepreneurship education practice characterized by comprehensiveness, experiential learning, openness, and specificity"	Entrepreneurship Practice Base
Babson College: "Establishing the Arthur M. Blank Entrepreneurship Research Center and leading entrepreneurship research conferences"	Entrepreneurship Practice Base
Osaka University: "Forming an Entrepreneurship Education Pioneer Class"	Entrepreneurship Practice Base
Tsinghua University: "Launching the 'Creativity + Student Innovation and Entrepreneurship Practice Base'"	Entrepreneurship Practice Base
Zhejiang University: "'e-Works Entrepreneurship Laboratory'"	Entrepreneurship Practice Base
Wenzhou University: "Collaborating with the Marine Science and Technology Entrepreneurship Park to establish an innovation and entrepreneurship practice base"	Entrepreneurship Practice Base

#### 4.2 Axial Coding

Following the initial open coding phase, axial coding was employed to organize the relationships among the identified categories, leading to the abstraction of higher-level categories. Through further analysis of the 46 initial categories and the original data, nine major categories were identified. Table 3 presents the results of axial coding, which reveal the core components of the innovation and entrepreneurship education ecosystems within universities.

**Table 3: Results of Axial Coding**

Initial Categories	Major Categories
Long-standing history of entrepreneurship education; Entrepreneurial-oriented educational philosophy; Institutional philosophy focused on practical innovation	Innovation and Entrepreneurship Philosophy

Strong support from institutional leadership; Supportive policies; Entrepreneurial organizational structures	Innovation and Entrepreneurship Support Factors
Diverse course offerings; Well-structured curricula; Tiered course levels; Extensive course coverage; Comprehensive systems; Inclusive to all students; Innovative courses; Effective assessment; Interdisciplinary courses; Simulation-based courses	Course-related Factors
Diverse teaching teams; High-caliber faculty; Fair evaluation systems; Rich teaching methods; Advanced teaching philosophies; Professional entrepreneurship educators; Frequent academic exchanges; Faculty training; Performance metrics that include entrepreneurship education	Faculty-related Factors
Student participation in extracurricular activities; High impact of student organizations; Large membership in student organizations; Formation of entrepreneurial teams; Campus entrepreneurship networks	Extracurricular Activity Factors
Entrepreneurship competitions; Practical bases; Entrepreneurship seminars and salons; Entrepreneurship exchange activities	Practice-related Factors
Policy guidance; Ongoing communication with government; Collaborative projects with government; Undertaking government projects; Policy incentives	Government-related Factors
Corporate partnerships; Corporate training programs; University-industry collaborations; Establishment of entrepreneurial bases	Enterprise-related Factors
Robust alumni networks; Active alumni contributions; Alumni engagement in activities; Support from distinguished alumni	Alumni-related Factors

### 4.3 Selective Coding

Selective coding further abstracted the major categories identified during axial coding, examining their interrelationships to form a unified core category framework. Throughout this process, the research team continuously interacted with the original data to prevent omissions and biases. The final outcome is a comprehensive model of the innovation and entrepreneurship education ecosystem, centered on universities and encompassing multiple internal and external factors. This model is applicable to universities operating within the global digital economy context.

### 4.4 Theoretical Saturation Verification

To validate the theoretical saturation of the constructed innovation and entrepreneurship education ecosystem model, a comparative analysis was conducted across five university cases using the established model. The results indicated that the key factors of each university could be effectively classified into the components of the model, confirming that the multiple-case study approach reached theoretical saturation.

**Table 4: Comparative Analysis of University Innovation and Entrepreneurship Education Ecosystems**

Component	Babson College	Massachusetts Institute of Technology (MIT)	Stanford University	University of Oxford	Osaka University
Innovation and Entrepreneurship Atmosphere	Cultivating entrepreneurial spirit and entrepreneurial qualities (S-W-P)	Motto: "Mens et Manus," with entrepreneurial spirit born at its inception (S-W-P)	Motto: "The Wind of Freedom Blows," fostering an open and independent cultural atmosphere (S-W-P)	Innovation and entrepreneurship education is the process of cultivating "synergy between elites and teams" (S-W-P)	Promoting the "entrepreneurial spirit as the driving force for creating new ventures" (S-W-P)
Innovation and Entrepreneurship Support	Internal research institutions and funding support, such as the Retail Supply Chain Institute and the Global Entrepreneurship Education Alliance (S-P)	The Entrepreneurship Center as an independent organization within the university, coordinating entrepreneurial activities and incubation services (S-P)	The Entrepreneurship Research Center providing centralized support for innovation and entrepreneurship (S-P)	The Entrepreneurship Club serving as the university's entrepreneurial incubation space (S-P)	The Entrepreneurship Education Research Group providing entrepreneurial education platforms for high school and university students (S-P)
Curriculum Factors	Four-year undergraduate curriculum divided into "Discover, Explore, Focus"	Emphasis on interdisciplinary collaboration in innovation and entrepreneurship project	Curriculum modules include basic entrepreneurship courses, experiential	Providing subject-related courses and project training in innovation and	The Entrepreneurship Pioneer Class curriculum includes practical

	stages (W-P)	teaching, promotion of online course platforms (W-P)	courses, functional courses, industry-specific courses, and social innovation courses (W-P)	entrepreneurship education, with students simulating business or industry operational environments in virtual settings (W-P)	courses in business management (W-P)
Faculty Factors	Courses jointly delivered by experienced professors and entrepreneurs, with the Price-Babson Fellowship Program enhancing faculty training (W-P)	The Entrepreneurship Center's faculty team includes successful entrepreneurs, co-founders, or CEOs of commercial companies (W-P)	New venture creation courses taught by experienced Silicon Valley entrepreneurs and venture capitalists (W-P)	Small teams of faculty from different colleges and fields (W-P)	The Entrepreneurship Pioneer Class has a dedicated faculty team, regularly inviting entrepreneurs to interact with students (W-P)
Student Organizations	Over one hundred student organizations within the college, offering opportunities to find entrepreneurial partners (S-P)	18 student entrepreneurship clubs, such as the Energy Club, Fintech Club, etc. (S-P)	14 student entrepreneurship clubs, such as the Student Business Association, etc. (S-P)	The Entrepreneurs' Association has over 10,000 members, making it the largest student entrepreneurship organization globally (S-P)	Students voluntarily form investment groups, management research clubs, and other organizations (S)

<p>Practical Activities</p>	<p>Undergraduate and graduate entrepreneurship plan competitions (S-W-P)</p>	<p>MIT \$100K Entrepreneurship Competition, held for over 30 years (S-W-P)</p>	<p>Innovation and entrepreneurship competitions and seminars, such as the Social Entrepreneurship Challenge and Innovation and Entrepreneurship Education Roundtable (S-W-P)</p>	<p>"Real-world projects" in entrepreneurship practice, including entrepreneurship roadshows and strategic consulting projects (S-W-P)</p>	<p>National High School Business Koshien, successfully held for over ten years (S-W-P)</p>
<p>Government Factors</p>	<p>Federal government legislation, such as the Patent Law, Bayh-Dole Act, and Technology Transfer Commercialization Act (W-P)</p>	<p>U.S. Small Business Investment Fund (SBIC) program (W-P)</p>	<p>The U.S. established the Small Business Administration, Women's Business Centers, and other service institutions (W-P)</p>	<p>The UK Department for Education established the National Centre for Entrepreneurship in Education (NCEE) to promote youth entrepreneurship (W-P)</p>	<p>The Japanese government amended the Company Law and enacted the New Business Activity Promotion Law for Small and Medium Enterprises (W-P)</p>
<p>Corporate Factors</p>	<p>Collaboration with Walnut Risk Partnership, integrating entrepreneurial resources (S-W-P)</p>	<p>Partnerships with over 200 renowned global enterprises, establishing a Global Industry</p>	<p>StartX Accelerator collaborates with most tech companies in the San Francisco</p>	<p>Collaboration with Facebook on digital marketing industry transformation</p>	<p>Entrepreneurship training for social individuals, deepening ties with local</p>

		Alliance (S-W-P)	Bay Area (S-W-P)	on research (S-W-P)	businesses (S-W-P)
Alumni Factors	Alumni support entrepreneurial education through the Arthur M. Blank Entrepreneurship Center and Babson Alumni Resource Network (W-P)	Sources of entrepreneurship education funding include government support, tuition income, entrepreneur donations, and alumni contributions (W-P)	The Stanford Angels and Entrepreneurs Group Alumni Alliance strengthens the connection between entrepreneurial teams and alumni (W-P)	The Oxford Business Alumni Association has over 19,300 members from 145 countries (W-P)	The "OBP Course Association" promotes friendships between graduates and current students (W-P)

## 5.0 DISCUSSION

### 5.1 The Critical Role of Innovation and Entrepreneurial Ecosystems

Research indicates that, in the context of the global digital economy, digital ecosystems play a vital role in overcoming innovation barriers and fostering entrepreneurship, particularly in regions facing digitalization challenges (Pigola, Fischer & Moraes, 2024). Within higher education institutions, the integration of digital platforms in building innovation and entrepreneurial ecosystems has become a key driver of success in entrepreneurship education. Institutions like Babson College, MIT, Stanford University, Oxford University, and Osaka University exemplify how institutional values, educational philosophies, and strong leadership support create an environment conducive to innovation. This environment permeates not only curriculum design and teaching methods but also broader campus culture, inspiring students' innovative thinking and entrepreneurial ambitions. As Cai and Ahmad (2023) emphasize, cultivating an entrepreneurial culture is essential for universities aiming to transform into entrepreneurial institutions. Through the alignment of internal and external resources, universities can co-create and enhance value within their innovation ecosystems, embedding entrepreneurial efforts in a collaborative framework that fosters sustainable and effective entrepreneurial environments (Cai & Ahmad, 2023).

### 5.2 Synergistic Interaction between Knowledge and Practice Platforms

In the digital economy era, digital platforms facilitate the acquisition of complementary resources within ecosystems (Bejjani, Göcke & Menter, 2023). Research suggests that the effectiveness of innovation and entrepreneurship education in universities largely depends on the synergistic interaction between knowledge platforms and practice platforms. Knowledge platforms encompass curriculum development, faculty expertise, and interdisciplinary integration, collectively providing students with a comprehensive foundation in

entrepreneurship. Practice platforms, on the other hand, offer practical entrepreneurial experiences through student organizations, entrepreneurship competitions, and training programs. Institutions like Babson College and MIT demonstrate the effectiveness of this synergy, leveraging strong curricula and extensive practical opportunities to foster entrepreneurial awareness (Shi & Wei, 2024). The integration of theoretical knowledge and practical application underscores the importance of coordinating knowledge and practice platforms, aligning ecosystem actors toward shared innovation goals to maximize educational impact.

### 5.3 The Role of External Innovation and Entrepreneurial Networks

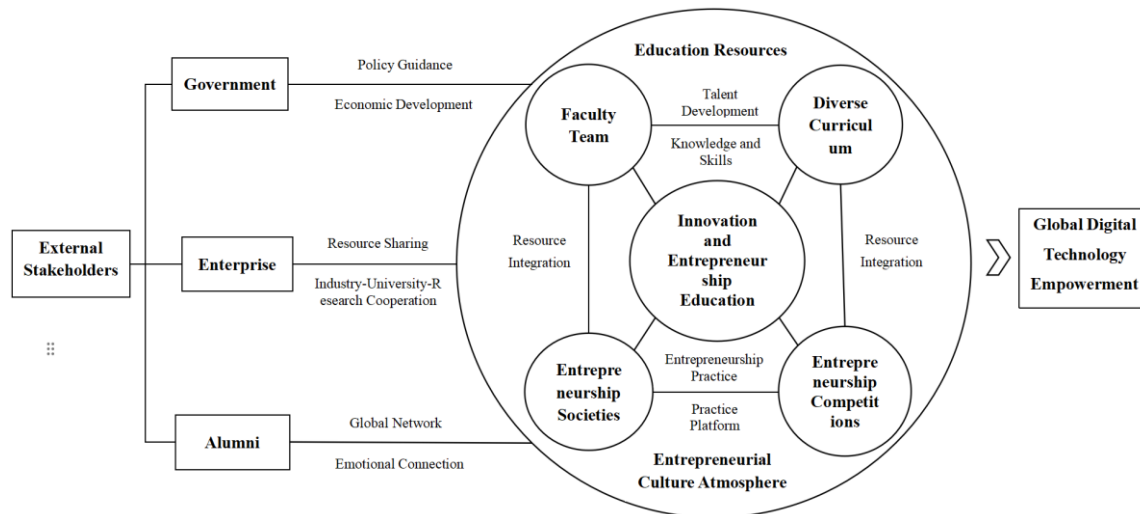
External innovation and entrepreneurial networks play a crucial role in enhancing the impact of university-based innovation and entrepreneurship education (Zeng, Tavalaei & Khan, 2021). Support from policy, resource allocation, and networks—including government initiatives, industry partnerships, and alumni networks—significantly contributes to the success of these educational efforts. International collaborations, incubators, and academia-industry partnerships are increasingly vital in developing entrepreneurial ecosystems within universities. For example, Stanford University's strong ties with Silicon Valley enterprises and Oxford University's collaboration with the UK government and industry associations have greatly improved the effectiveness of their entrepreneurship education programs (Pigola, Fischer & Moraes, 2024). Similarly, Chinese universities can enhance their innovation and entrepreneurial ecosystems by expanding collaborations with government entities, businesses, and alumni networks, driving further advancements in entrepreneurship education (Liu, Kulturel-Konak & Konak, 2021).

### 5.4 Cross-National Comparative Insights

A comparative analysis of global universities reveals that, despite substantial progress in innovation and entrepreneurship education, significant operational differences persist. Western universities tend to prioritize interdisciplinary integration and the advanced application of digital technologies, particularly emphasizing the deep integration of theory and practice (Qiu, García-Aracil & Isusi-Fagoaga, 2023). In contrast, Chinese universities excel in policy support and entrepreneurial practice, with government initiatives playing a central role in the rapid development of their innovation and entrepreneurship ecosystems. However, there remains considerable room for improvement in the deep integration of interdisciplinary courses and the inclusion of international educational resources within Chinese universities. To promote the internationalization and regional development of education, Chinese universities require increased funding, stronger management support, and better interdisciplinary integration (Qiu, García-Aracil & Isusi-Fagoaga, 2023).

### 5.5 Model Development and Optimization Recommendations

Building on these findings, this study proposes a comprehensive model for university innovation and entrepreneurship education ecosystems, tailored to the global digital economy context.



**Figure 1: University Innovation and Entrepreneurship Education Ecosystem Model in the Context of the Global Digital Economy**

The proposed model emphasizes the central role of universities in cultivating innovative talent and facilitating entrepreneurial practice. It comprises four key components: core educational elements, innovation practice platforms, global stakeholder collaboration, and the integration of digital skills with interdisciplinary education. The core educational elements focus on diversifying educational resources and curricula to enhance students' entrepreneurial capabilities. The innovation practice platform offers hands-on entrepreneurial experiences, including competitions and incubators. Global stakeholder collaboration involves partnerships with governments, businesses, and alumni networks, providing essential support and resources for entrepreneurship. Finally, integrating digital skills and interdisciplinary education ensures that students are equipped to navigate the challenges of the global digital economy. The interaction and collaboration of these components are vital for maintaining universities' leadership in global innovation and entrepreneurship education.

Chinese universities should focus on enhancing the integration of internal and external resources, developing a diversified talent cultivation system, and emphasizing the synergy between theory and practice. Additionally, efforts should be made to brand and differentiate the culture of innovation and entrepreneurship, establish and strengthen innovation and entrepreneurship networks, deepen collaboration with governments, businesses, and alumni, and drive the commercialization and industrialization of entrepreneurial projects. These strategies will collectively enhance the global competitiveness and overall quality of entrepreneurship education in Chinese universities, ultimately fostering entrepreneurial talent with a global perspective and innovative capabilities.

## 6.0 CONCLUSION

In the era of the global digital economy, innovation and entrepreneurship education has become a pivotal concern for the advancement of higher education institutions. Exploring the structure and critical components of its ecosystem is of significant practical and academic value. This study employed a multi-case analysis approach to comprehensively examine the ecosystems of



maker spaces in universities worldwide, identifying their primary elements, core components, and key factors. Consequently, an integrated ecosystem model was developed. The findings highlight that a strong innovation and entrepreneurship culture, alongside well-established knowledge platforms, practice platforms, and entrepreneurial networks, are essential for the effective functioning of university maker space ecosystems.

Despite the rigorous application of grounded theory and multi-case analysis, the variability in external environments introduces differences across university maker space ecosystems. Future research should delve deeper into regional and sector-specific studies to provide more nuanced insights. Such research would be instrumental in optimizing the entrepreneurial ecosystems within Chinese universities, particularly in the context of the global digital economy.

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### **Conflict of Interest**

The authors declare no conflict of interest.

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