

Chapter 3

Innovation and University Entrepreneurship: Challenges Facing Japan Today

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CHAPTER 3

Innovation and University Entrepreneurship: Challenges Facing Japan Today

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This paper examines the challenges facing Japan in recovering from two decades of economic depression, and the recent role of national universities in addressing the entrepreneurial gap and in fostering technology commercialization for innovation through university start-ups. In the early 2000s, government policymakers acknowledged the importance of innovation in restarting the economy and identified national universities as drivers of innovation through increasing academic entrepreneurship. In 2004, universities were made independent from the national government and given the mandate to disseminate and utilize their research for the benefit of society. The University of Tokyo provides an example of how these goals have been implemented over the last 10 years since 2004 through technology transfer, university–industry collaborations, entrepreneurship education, and start-up support including incubation and venture capital funding. This paper begins with the specific measures for university entrepreneurship innovation to be implemented under the latest policies of the Government of Japan through the Industrial Competitiveness Enhancement Act. The paper then briefly goes through the history of Japan’s economic growth and the depression during the past two decades, the key initiatives under the university reform for innovation after the incorporation of national universities in 2004, and some of the important innovation challenges facing Japanese research universities including The University of Tokyo.

Keywords: University Reform, Technology Commercialization, Technology Transfer, University-Industry Relationship, University Entrepreneurship, Incubation, Venture Capital, Entrepreneurship Education, and Innovation Ecosystem

1. Introduction

This paper examines the challenges facing Japan in recovering from two decades of economic depression, the recent role of national universities in addressing the entrepreneurial gap and in fostering technology commercialization for innovation through university start-ups.

In the early 2000s, government policymakers acknowledged the importance of innovation in restarting the economy and identified the national universities as driver of innovation through increasing academic entrepreneurship. In 2004, the universities— leaders in Nobel Prize–winning researches such as Light-Emitting Diode (LED) and Induced Pluripotent Stem Cells (iPS Cells)—were made independent from the national government and given the mandate to disseminate and utilize their research for the benefit of society. The University of Tokyo provides an example of how these goals have been implemented over the last 10 years since 2004 through technology transfer, university–industry collaborations, entrepreneurship education, and start-up support including incubation and venture capital (VC) funding.

This paper starts with a discussion of the specific measures for university entrepreneurship innovation to be implemented under the latest policy of the Government of Japan, the Industrial Competitiveness Enhancement Act. The paper then briefly goes through the history of Japan’s economic growth and the depression during the past two decades, the key initiatives under the university reform for innovation after the incorporation of national universities in 2004, and some of the important innovation challenges facing Japanese research universities including The University of Tokyo.

2. The Industrial Competitive Enhancement Act

On 4 December 2013, the Industrial Competitiveness Enhancement Act came into effect with the Japan Revitalization Strategy, the third ‘arrow’ of Abenomics, as its background. The Act is the basis for securely implementing this strategy, which aims to ‘create new frontiers through participation by all

and bringing forth the strength of the private sector to the fullest extent.’

The Act enables a wide variety of measures according to different business development stages. It contains measures to support businesses in their stages: initiation, growth, maturation, and stagnation in a balanced manner. The targets of these measures are not only the large companies but also the small- and medium-sized enterprises (SMEs), including start-ups.

The Act also enables the Government of Japan to enhance Japan’s industrial competitiveness by allowing preferential regulatory flexibility to individual enterprises, facilitating approaches to the renovation of industries, and promoting venture businesses.

The key measures under this program include the following:

- Enhanced support for regional SMEs to start and rehabilitate businesses;
- Special provisions of Patent Act to reduce or exempt patent fees for SMEs when filing domestic and international applications
- Measures to encourage the Innovation Network Corporation of Japan to accelerate in venture businesses;
- Measures to promote early business rehabilitation (facilitating voluntary liquidation); and
- Special provisions allowing national universities to invest in venture funds and other entities.

Before the enactment of the Industrial Competitiveness Enhancement Act in December 2013, due to the National University Corporation Law enacted in 2003, Japanese national universities were not legally allowed to own any particular enterprise, including their university start-ups and its dedicated VC arm, except for their technology transfer offices (the technology licensing organizations [TLOs]).

The Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT) and the Ministry of Economy, Trade and Industry of Japan (METI) have created a scheme that allows the four leading national universities to invest in companies (such as an Special Vehicle Company [SVC] dedicated to each university) supporting university-launched venture businesses. For this

purpose, the government and the two Ministries have decided to create the Public Innovation Fund Program, which provides a fairly large amount of money to the four universities to let them fund their own VC management organizations.

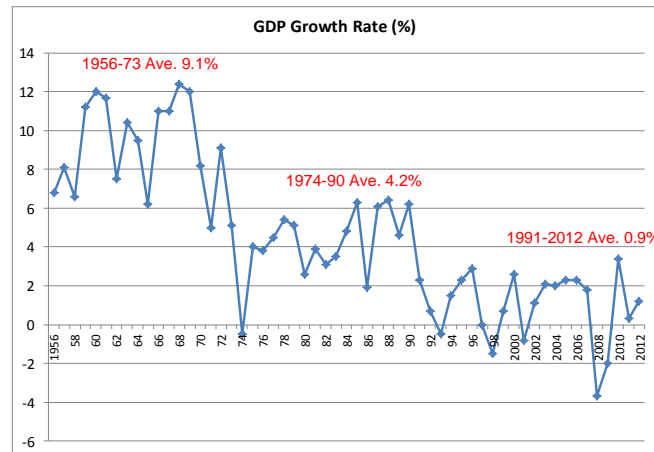
The money to be provided by the government to fund the four universities amount to (1) US\$500 million for The University of Tokyo (US\$83 million as special operational grant, US\$417 million for the source for investment, where US\$1 = JPY 100); (2) US\$350 million and US\$58 million for Kyoto University; (3) US\$200 million and US\$ 34 million for Osaka University; and (4) US\$150 million and US\$25 million for Tohoku University, respectively.

As of September 2014, the four universities have been preparing the necessary documents and taking the required steps for the final government approval. The government has requested the universities to earn a high return on this investment project, and for university start-ups to report a positive return on investment based upon university technologies to satisfy the Japanese taxpayers.

3. Economic Depression in Japan: The Lost Decades

Since the 1990s, Japan has been in economic depression. Average growth rates relative to the previous years' gross domestic product (GDP) were 9.1 percent for 1956-1973, 4.2 percent for 1974-1990, and only 0.9 percent for 1991-2012 (Figure 3.1). What happened to Japan during the last two decades?

Figure 3.1: Japan's Economic Growth, 1956–2009



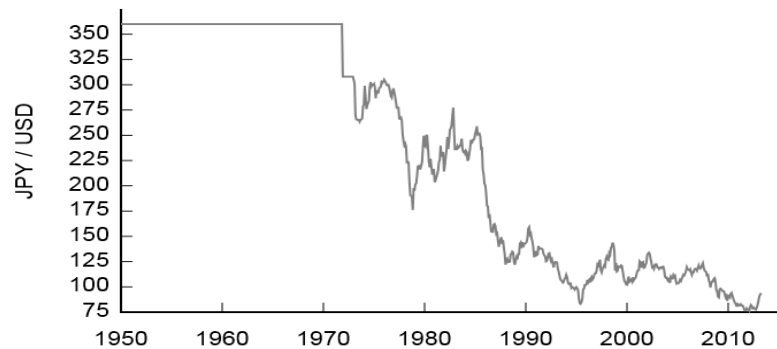
Source: Cabinet Office, Government of Japan.

GDP growth derives from three factors: an increase in the workforce, invested capital, and the productivity of labor and capital. Given Japan's shrinking population and overstretched national treasury, economic expansion must arise from productivity gains. Generally speaking, new companies have propelled most of the productivity growth and job creation. Professor Kyoji Fukao of Hitotsubashi University noted that Japanese companies founded after 1996 contributed a net positive of 1.2 million new jobs, whereas older companies shed a net of 3.1 million jobs (Fukao and Kwon, 2011). In 1989, Japan's then Ministry of International Trade and Industry (now called Ministry of Economy, Trade and Industry of Japan or METI) cautioned that a reduction in entrepreneurship would result in economic slowdown.

Dramatic appreciation of the Japanese yen against major currencies (Figure 3.2), a rapidly ageing population combined with decreasing population, the emergence of new economies in Asia, and the increasing prices of energy resources are all possible reasons for Japan's depressed economy. Natural disasters, including the Great Hanshin earthquake (Kobe earthquake) in 1995 and the Great East Japan Earthquake in 2011 could also be factors contributing to the weakening of Japan's economic fundamentals. More importantly, however, the lack of innovation is a key to explaining why Japan has experienced minimal growth in the last 20 years. Japan used to be an innovative nation after World War II – otherwise, Japan's economic miracle could not be explained. In fact, many innovative companies emerged after the war, including Sony, Honda, Yamaha, and other world-class companies (Table 3.1).

Why has there been a recent lack of innovation in Japan, particularly during the lost decades?

Figure 3.2: Depreciation of the US Dollar against the Japanese Yen



Source: Bank of Japan, Time-Series Data Search (2013).

Table 3.1: Year of Foundation of the Leading Japanese Companies

Company	Year of Foundation		Company	Year of Foundation
Nippon Yusen	1885		Toyota Motor	1937
Nisshinbo	1907		Isuzu Motor	1937
Hitachi	1910		Sony	1946
Toray	1926		Nintendo	1947 (Incorporated)
Nissan	1933		Honda	1948
Panasonic	1935		Yamaha Motor	1955
Ricoh	1936		Kyocera	1959
Canon	1937			

Source: Nikkei Kaisha Joho (2013).

4. Incorporation of National Universities as Drivers of Innovation

The national universities, such as The University of Tokyo and Kyoto University, have been leading scientific researches in Japan and contributing to new knowledge creation in the international academic communities. In fact, Japan has been one of the greatest producers of Nobel Prizes in the world in the last couple of decades.

Contribution to Innovation

National universities were formerly part of the government, with university staff recognized as civil servants. This made the universities bureaucratic, unresponsive to changing demands, and unable to effectively engage with other actors in society, including the private industry sector. However, the institutional diversification of the universities and the enhancement of performance in education, research, and innovation based upon their research results would be increasingly important to compete in the global arena for the 21st century. Soon after the new century started, Japan's policymakers began to develop ideas for granting the national universities greater independence from government. A government announcement in June 2001 suggested that the universities be granted independence. Following the passage of the National University Incorporation Law in the summer of 2003, national universities were granted independence from government on 1 April 2004.

In terms of being drivers of innovation, 'independence' basically means three things:

- 1) That national universities should disseminate and utilize their research results to society and contribute to its development, including innovation. This is clearly stipulated in the National University Corporation Law.
- 2) That national universities must gain more external funding to maintain the level of quality and quantity of their research and education. Soon after the incorporation of national universities, the government began

to decrease its budget allocation to each national university by one percent per annum. This meant, for example, a deduction of US\$10 million a year from the annual revenue of The University of Tokyo. In 2004, the university depended on tax money or ‘operational grants’ from MEXT for approximately 60 percent of its budget. In 2012, these funds comprised only 36 percent of the university’s budget.

- 3) That Japanese universities need to be creative and motivated to contribute to the commercialization of their technologies for innovation, with the goal of making the world better. After the incorporation of national universities in 2004, intellectual properties such as patents derived from research activities of university professors have become a university asset. Before April 2004, though researchers needed to report their inventions to their universities, intellectual property rights and ownership belonged to the individual researchers.

The rules of intellectual property management have changed accordingly. The royalties for technology licensing by national universities are distributed among the inventors (researchers), the departments the inventors belong to, and the university headquarters with a ratio of 40 percent, 30 percent, and 30 percent respectively. This new intellectual property rights rule is almost equivalent to that of the leading universities in the United States (US) including Stanford University and Massachusetts Institute of Technology (MIT). The researchers no longer have to pay patent fees, and intellectual property rights including patents are now owned by an institution rather than an individual, which is usually much more effective and efficient in terms of licensing practices.

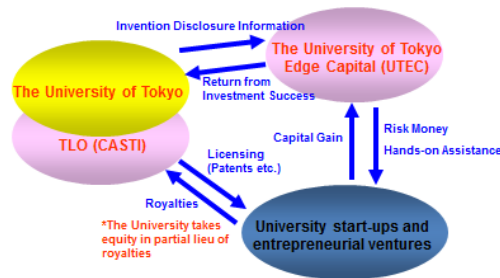
5. The University of Tokyo as a Model for University Entrepreneurship and Innovation in Japan

The University of Tokyo's Innovation and Entrepreneurship Office, formerly the Office of Science Entrepreneurship and Enterprise Development (SEED), is part of the Division of University Corporate Relations. It was founded in 2004 at the time of incorporation of the national universities, with a mission to promote university entrepreneurship at the university. The office has been evolving its functions during the past 10 years. The author of this paper has been involved with all the activities of SEED since 2004.

Probably, SEED's most important contribution was the establishment of a tripartite system for effective support of university entrepreneurship. This includes (1) SEED, a central office for entrepreneurship education, consulting and mentoring, and venture incubation; (2) TODAI TLO Ltd. (CASTI), a technology licensing organization (TLO) dedicated to The University of Tokyo; and (3) The University of Tokyo Edge Capital Co. Ltd. (UTECH), a venture capital arm dedicated to the university (Figure 3.3).

TODAI TLO (TODAI means The University of Tokyo in Japanese) is the only wholly owned technology transfer subsidiary of the university. It acts as a bridge to pass technologies developed at the university to industry, offering a one-stop service providing access to intellectual property belonging to the university. Founded in August 1998 (six years before the incorporation of national universities) by several faculty members of the university, TODAI TLO became the university's wholly-owned company in 2009 and now employs more than 20 professional staff.

Figure 3.3: University Entrepreneurship Ecosystem in The University of Tokyo



Source: Author.

UTEC is an early stage technology-focused VC firm associated with The University of Tokyo. UTEC was founded in 2004 when the Japanese national university reform took place. UTEC currently manages first fund of JPY8.3 billion (approximately US\$80 million), second fund of JPY7.15 billion (approximately US\$70 million), and third fund of JPY13.5 billion (approximately US\$130 million), and invests these in seed and early stage start-ups based on technologies and talents from the university. Having exclusive access to the university’s inventions, UTEC works closely with its researchers to ‘co-found’ start-up companies for innovation. As of September 2014, UTEC has invested in more than 50 companies, with nine initial public offerings (IPOs) and five mergers and acquisitions (M&As) to date. PeptiDream Inc., a profitable biotechnology venture founded in June 2006 and based upon the research of The University of Tokyo, went public on the Mothers Market of the Tokyo Stock Exchange on June 2013. This is an example of a university start-up co-founded by a scientist, an entrepreneur, TODAI TLO, and UTEC. The details of this company will be discussed later in this chapter.

Another important task that this author was involved with during SEED’s early period was the establishment of the university’s policy to promote university entrepreneurship. Under the National University Corporation Law (Article 22, Clause 5), returning the fruit of a national university’s research to society became one of the important missions of the university. One way to accomplish this mission is to ensure that its intellectual property, including patents, is put to practical use. Accordingly, The University of Tokyo officially drew up its Intellectual Properties Policy. The policy clearly asserts the importance of

promoting the practical application of inventions and other intellectual property through university start-ups. The policy states: ‘As one measure to return the fruit of intellectual creativity to society, the University should proactively be involved in using start-up businesses to commercialize inventions.’ Thus, maintaining an environment favourable for supporting start-ups became one of the strategic tasks assigned to SEED.

Table 3.2: The University of Tokyo’s Entrepreneur Dojo’s Students’ enrolment (2005–2014)

	Freshman & Sophomore	Junior & Senior	Graduate School	Total
Science & Engineering	56	328	913	1,297 (71.14%)
Humanities & Social Science	67	288	171	526 (18.86%)
Total	123	616	1,084	1,823
%	(6.7%)	(33.8%)	(59.5%)	(100.0%)

Source: Office of Innovation and Entrepreneurship, DUCR, the University of Tokyo.

As the head of SEED, this author assumed other responsibilities. The most critical element would probably be entrepreneurship education. SEED started its entrepreneurship education program called The University of Tokyo Entrepreneur Dojo (training school) in FY 2005. This program is designed for undergraduate and graduate students. They can learn how to commercialize their ideas and inventions. The program provides 150-250 students with entrepreneurship education and a business plan competition every year (Table 3.2). During the past 10 years, more than 1,800 students completed the program. About 70~80 ‘graduates’ are involved with newly created entrepreneurial ventures.

Another critical component for cultivating university entrepreneurship is building an incubation facility. The University of Tokyo Entrepreneur Plaza opened in 2007 to provide facility support for university technology start-ups. The facility is equipped with wet laboratories to meet the increasing demands

of life science–related technology venture businesses originating from the university. The construction of this entrepreneur plaza was made possible by a charitable contributor, a founder of the Japanese public company. More than 40 university start-ups have been incubated by the university so far. As of September 2014, more than 30 companies were being incubated through the Office of Innovation and Entrepreneurship. Several companies, including PeptiDream, have gone public or have been acquired by big corporations as successful exits.

The other component of promoting university entrepreneurship is creating a professional mentoring network known as The University of Tokyo Mentors. SEED’s Office of Innovation and Entrepreneurship has been working very closely with the Alumni Office of the university in developing this network. The mentors include venture capitalists, consultants, accountants, attorneys, bankers, analysts, and entrepreneurs who are mostly graduates of the university. The network offers voluntary mentoring or consulting to young entrepreneurs, including students, who have just started their own businesses. These mentors sometimes help the young entrepreneurs fund seed money as angel investors.

6. Kashiwa-No-Ha Campus Area and Asian Entrepreneurship Award as Core Components for a New Innovation Cluster

Kashiwa-no-ha Campus, the northern campus of The University of Tokyo, is located 30 minutes from downtown Tokyo, midway between Akihabara (central Tokyo) and the city of Tsukuba. The Tsukuba rail line connecting the campus to downtown Tokyo passes through the four prefectures of Tokyo, Saitama, Chiba, and Ibaraki. Kashiwa-no-ha Campus has an unusually high potential for innovation due to its proximity to the Chiba University Campus, the National Cancer Center Hospital East, and incubation facilities. There are innovative urban development projects already implemented in the area that are collaborating closely with the public, private, and academic sectors. Kashiwa-no-ha Campus was formally selected as one of five cities to be supported by the Government of Japan’s ‘Future City Initiative’ in December 2011, after Kashiwa City, Chiba Prefecture recommended Kashiwa-no-ha Campus as an ‘Innovative City for New Industries’. The University of Tokyo

is trying to lead and develop the Kashiwa-no-ha Campus area as one of the most prestigious Japan-based innovation clusters primarily addressing the emerging Asian economies with their high economic growth.

The university of is taking leadership in the new initiative called the Asian Entrepreneurship Award (AEA), a global entrepreneurship and business competition that started in 2012 in Kashiwa-no-ha Campus. In July 2014, 18 teams of young technology entrepreneurs from 12 Asian economies participated in the third annual AEA conference for three days at the Kashiwa-no-ha Campus. When young entrepreneurs have exciting and valuable experiences of mutual learning and inspiration from peers from all over the world, they gain huge confidence to overcome numerous difficulties and move forward with their own businesses. Co-hosted by The University of Tokyo and other Japanese sponsors, in collaboration with other Asian countries, AEA aims to create a network for entrepreneurship development attracting mentors and venture capitalists not only from Japan but also from Asia and the world.

7. Case Study: Peptidream Inc.

PeptiDream is a Tokyo-based biopharmaceutical company founded on 3 July 2006 based on novel peptide expression and platform selection technologies developed by the company co-founder Dr. Hiroaki Suga, Professor at the Graduate School of Science of The University of Tokyo and previously at the State University of New York at Buffalo. PeptiDream has about 40 employees and has laboratories in a state-of-the-art commercial research centre at The University of Tokyo's Komaba Research Campus and the university's entrepreneur plaza. Proprietary Peptide Discovery Platform System (PDPS) is a highly versatile peptide generation and selection platform consisting of three core technologies: flexizyme technology; translation, cyclization, and peptide modifying technologies; and phage display technology. The combination of these technologies allows PeptiDream to engineer peptide libraries consisting of trillions of unique macrocyclic and helical non-standard peptides that exhibit improved physical, chemical, and pharmacological properties compared to conventional peptides. With this system, hundreds of highly potent non-standard peptides can be identified against any target in weeks, covering a wide variety of peptide classes and structures without the bottleneck of expensive

and time-consuming chemical synthesis, significantly increasing the speed of lead identification. Leads can then be chemically synthesized and purified for downstream validation and further development.

PeptiDream has a very strong company foundation. It is built on a strong intellectual property portfolio around core technologies, an experienced management team, and a number of strong partnerships with the world's top pharmaceutical companies including AstraZeneca, Novartis, Bristol-Myers Squibb, Amgen, GlaxoSmithKline, and Daiichi-Sankyo. The company's intellectual property management has been strongly supported by TODAI TLO, and the company has been financially supported by UTEC as a lead investor. Both TODAI TLO and UTEC have been fully involved with the company's business growth even before the company was incorporated. SEED, currently the Office of Innovation and Entrepreneurship, has also been helping the company as an incubator by offering laboratory and office spaces, and other professional services.

PeptiDream is one of the role models of a typical and ideal university technology start-up. The tripartite system of SEED, TODAI TLO, and UTEC worked together very effectively to foster the growth of the company. The market capitalization of PeptiDream once reached over US\$2 billion. The company went public in June 2013.

8. Lack of Entrepreneurship for Innovation

Researchers argue that the lack of entrepreneurship during the past decades in Japan could be an answer to the question on the major reasons for Japan's economic depression. Since entrepreneurship is the wellspring of growth in the modern market economy, the relative dearth of entrepreneurship in Japan has contributed to the nation's economic malaise over the past two decades. Although there are some encouraging signs, such as the sophistication of Japan's technological base and the rise of 'intra-preneurship' in established big companies, entrepreneurship levels today are markedly low relative to pre-1991 Japan and the current levels in other developed countries. To revitalize its sluggish economy, Japan must create incentives to promote start-ups and

rapidly commercialize patented, cutting-edge technologies.

The World Bank (2008) has shown that among Organisation for Economic Co-operation and Development (OECD) countries, Japan ranks last in the average annual entry rate of new enterprises. This rate recently slumped to less than a third of that in the US. The Kauffman Foundation (2012) found that nearly one out of every eight American adults (11.9 percent) is currently engaged in ‘entrepreneurial activity’. This is among the highest rates for a large developed economy. The Global Entrepreneurship Monitor (GEM, 2010) found that 4.8 percent of US adults between the ages of 18 and 64 are working actively to establish new businesses, compared to only 1.5 percent in Japan. Recent surveys by GEM (2010) also measured perceptions about entrepreneurship in 20 innovation-based advanced economies. Japan demonstrated the highest level of fear of failure. Moreover, Japan, followed by Korea, had the fewest citizens who saw opportunities in entrepreneurship.

We could attribute Japan’s entrepreneurship gap to several factors including cultural, societal, educational, legal, and financial factors.

8.1. Culture

The impact of culture should not be underestimated. Japanese culture is not one that encourages risk-taking behaviours. Unlike the American culture that embraces individualistic behaviour, fosters debate, forgives failure, and cultivates open-mindedness, Japanese culture emphasizes conventionality and consistency, and is, therefore, relatively risk averse. The fear of failure and resulting social alienation of the Japanese pose a huge psychological barrier for entrepreneurship.

8.2. Social Status

The social status of entrepreneurs in Japan is not as high as it should be. Typical Japanese parents do not support their children’s aspirations for becoming entrepreneurs. These parents tend to want their children to go to an elite national university and join a government bureaucracy or a major corporation. The majority of parents still encourage their children to pursue the most stable

careers, the highest cumulative pay, and the most prestigious companies, although, these traditional values have been slowly eroding.

8.3. Educational System

Another factor is the educational system introduced after World War II. From the earliest age, Japanese children are being indoctrinated in government-run schools to work within a group. Individuality is sacrificed for the achievement of this goal; the most important objective is consensus. This ‘group thinking’ method is continued throughout the education of children until they graduate from high school. ‘The nail that sticks out gets hammered down’ is a common saying that describes the typical behaviour of the Japanese, where anything not part of the status quo is discouraged, and no one offers new ideas for fear of becoming the nail.

8.4. Legal Framework

The Japanese legal frameworks must also be adjusted. Many argue that the first thing that needs to be addressed to promote domestic entrepreneurship is the bankruptcy law. In Japan, if a start-up fails, the founder’s guarantor or family assumes responsibility for the unpaid debt. Even if the founder dies, the family is still liable for the debt. In other words, the law of limited liability is not nearly as clearly delineated as in the US. This is one of the primary factors blocking would-be entrepreneurs in Japan.

8.5. Capital

One of the most challenging tasks for start-ups is raising capital. Capitalization of start-ups in Japan is not as easy as it should be. Risk money (VC and angel investment) available for entrepreneurs in Japan is quite limited. Since most Japanese local venture capitalists are spin-offs from Japanese banks or securities firms, they are generally conservative, domestic-oriented, and unprofessional. They are often not administered by professionals who have operational experience running start-ups, and they tend to make decisions that

are as risk-averse as possible. Banks are unwilling to lend to entrepreneurs. Even if they did, their troublesome lending practices would sometimes impose harsh conditions on start-ups, such as demands to collateralize all of the assets. US-based venture capitalists are generally disengaged from Japan and see the Japanese market as too small. They are willing to interact only with Japanese start-ups whose founders speak English proficiently or who are interested in establishing a head office in the US or expanding their services outside Japan.

9. Challenges Facing University Entrepreneurship for Innovation in Japan

9.1. Supply of Risk Money

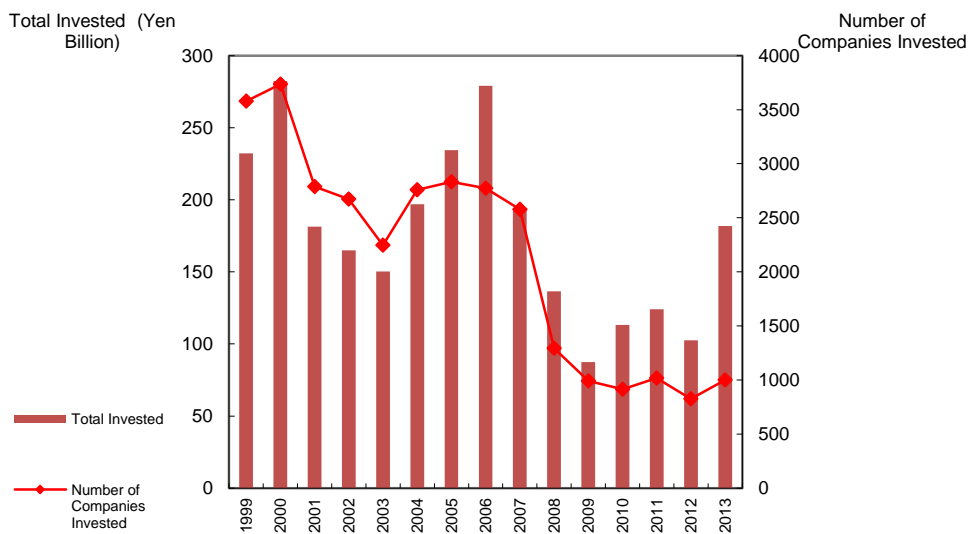
Obtaining the needed financing to grow a new business is a crucial test for an entrepreneur. Supply of VC or risk money available for university start-ups is still very limited in Japan. Of course, as indicated in the beginning of this paper, the Industrial Competitiveness Enhancement Act and the Public Innovation Fund Program may make the lives of the four national universities easier for university entrepreneurship. However, the amount of risk money available every year in Japan is approximately only one-fifteenth of the amount available in the US in 2013.

In 2013, the amount of VC investments made during the year by Japanese and US VC firms were approximately US\$1.8 billion and US\$29.6 billion, respectively (Figures 4 and 5).

The total amount of VC investments in FY 2013 (April 2013 to March 2014) was JPY181.8 billion, with a total of 1,000 start-up companies invested (Figure 3.4). Compared to FY 2012, the investment amount rose 77.2 percent, with a 21.4 percent increase in the number of start-up companies invested. With regard to new VC funds, 35 funds were launched in 2013, the second largest number after 39 funds of FY 2007. However, only JPY92.1 billion was raised in 2013 (Figure 3.6). This is less than the JPY119.7 billion raised in FY 2011 or the JPY103.6 billion raised in FY 2012, the fourth-largest commitments

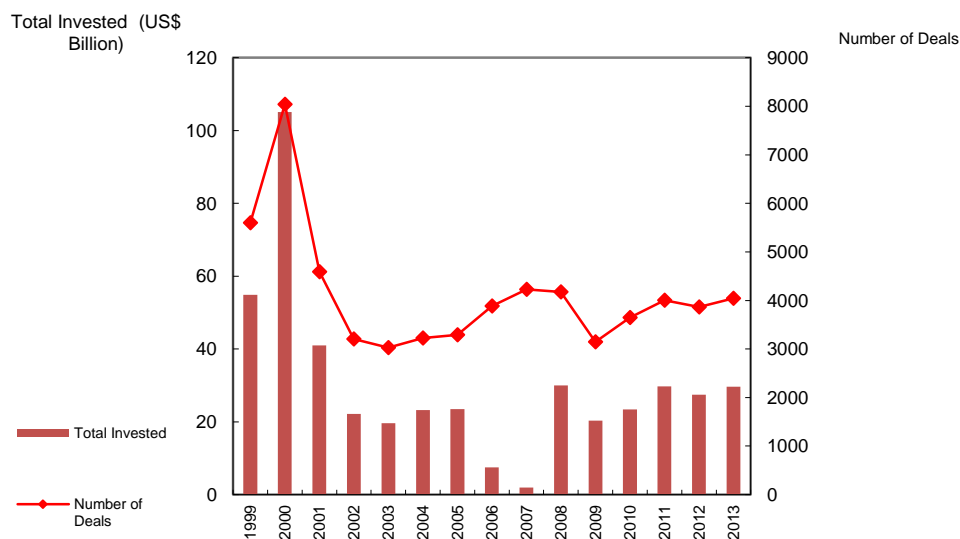
during the past seven years.

Figure 3.4: Trend of Venture Capital Investments in Japan



Source: Annual Report on Japanese Startup Businesses, Venture Enterprise Center, Japan (VEC) 2014.

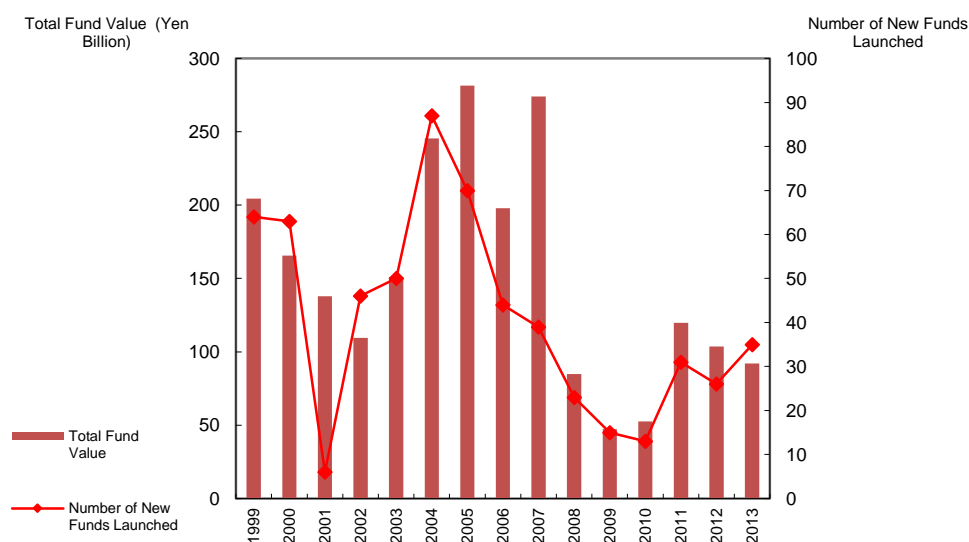
Figure 3.5: Trend of Venture Capital Investments in US



Source: NVCA Yearbook, Venture Enterprise Center, Japan (VEC) 2014.

Despite this challenge, the present entrepreneurial environment offers more potential sources of venture financing than ever before in Japan. Traditional venture capitalists have been joined by many new players after 2000, including individual angel investors, ‘accelerator’ funding, and corporate venture funds. Despite the proliferation of funding sources, however, the government can still play a useful policy role in encouraging venture financing through several means: (1) setting up tax incentives, particularly for angel investors; (2) loosening regulations that may discourage university endowments or large pension funds from venture investments; (3) establishing funding mechanisms at Japanese research universities to bridge the gap between research and commercial application (gap funding); (4) creating research programs aimed at the development and commercialization of new technology in which small businesses are encouraged to participate; and (5) establishing government-backed venture funds.

Figure 3.6: Total Value of Funds Raised and Number of New Funds Launched in Japan



Source: Annual Report on Japanese Start-up Businesses, Venture Enterprise Center, Japan (VEC) 2014.

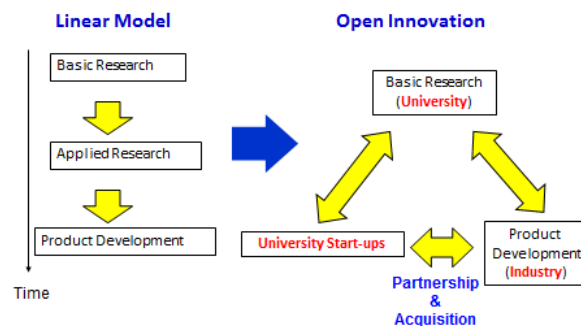
9.2. M&A Exit Strategies for Entrepreneurial Ventures

In general, start-up companies can exit the venture stage by merger, acquisition by another business, or by listing on a stock exchange with an IPO. In the US, exit via IPO has declined while exit via M&A has gained in importance. In Japan, IPOs still predominate while M&As remain relatively rare.

Government policy may facilitate all three options, with perhaps greatest attention to encouraging an active and efficient M&A environment, including wider use of preferred stock. Making creative use of tax incentives can encourage acquisitions of entrepreneurial ventures by large corporations, thereby expanding the number of exit opportunities for entrepreneurs.

In cultivation innovation ecosystem, the relationship between universities, corporations, and university start-ups should be evolving from what is called lineal model to open innovation model (Figure 3.7).

Figure 3.7: 'Paradigm Shift' in Innovation Ecosystem



Source: Author.

9.3. Entrepreneurship Education as a Critical Part of the Innovation Ecosystem

The business environment conducive to the emergence and growth of entrepreneurial ventures is often compared to an ecosystem because its many elements work in combination with each other. Entrepreneurship education is an essential component of innovation ecosystem.

What should be taught in entrepreneurship education? As a process, entrepreneurship can be analysed, understood, and taught. It is possible to increase the likelihood of success of those who embark on entrepreneurial careers by effectively teaching the process part of entrepreneurship. There are three key components in entrepreneurship education, namely: (1) creativity, (2) project management and team building, and (3) business basics.

9.3.1. Creativity

Creativity education is a fundamental element of entrepreneurship education—teaching students to identify social or commercial problems and to recognize the business opportunities of solving those problems. This part of entrepreneurship education may need to effectively apply to younger pupils and students.

9.3.2. Project Management and Team Building

Entrepreneurs also need to be fully aware that the success of their entrepreneurial ventures comes from the management of a series of pivotal events as their organizations evolve, and the management of these events must be done by their leadership team.

9.3.3. Business Basics

The knowledge of key business basics is also critical. These include accounting and financial analyses; marketing and sales strategies; competitive analyses; dynamism of angels and VC communities; and writing an effective business plan that communicates with possible partners, employees, angels, venture capitalists, and customers. Business plan competitions can be an effective tool for enhancing entrepreneurship education for both students and educators.

In universities in Japan, researchers and students whose majors are science or

basic research arenas may never learn about business or innovation. However, the academic entrepreneurship is characterized as an effort to create a bridge between basic science and business. Therefore, it is extremely important for scientists and engineers to have basic knowledge on how to showcase their research to the business community, what the essential mechanisms and processes for innovation are, and how university scientific outcomes are translated into business.

The Office of Innovation and Entrepreneurship, DURC at The University of Tokyo received a 2.5-year grant from MEXT in September 2014. The name of the program is Enhancing Development of Global Entrepreneur (EDGE) Program. Thirteen research institutions out of 55 proposals have been selected for the EDGE program, and each of these selected institutions, including The University of Tokyo, will be given about US\$0.5–1 million per year.

The program offers an entrepreneurship education for university researchers to provide them with knowledge and skills in writing a business plan using the researchers’ own research, namely, their technologies or intellectual properties; and to mentor them on how to write realistic business proposals (Figure 3.8).

Figure 3.8: Enhancing Development of Global Entrepreneur Program (EDGE Program)



Source: Author.

9.4. Celebrating Entrepreneurs and Creating Young Entrepreneur Role Models

The government has a crucial role to play in celebrating entrepreneurs publicly and in promoting a positive public image of innovation and entrepreneurship in general. Media should contribute to this process by cultivating journalists' knowledge about university start-up businesses based upon science and technology, and other issues related to innovation and entrepreneurship.

Conclusion

Approximately a decade has passed since the incorporation of national universities in 2004. During the past 10 years, different kinds of initiatives for academic entrepreneurship have been taking place, although most of them have not seemed to have produced good role models for university entrepreneurship. Japanese universities have learned a lot from universities outside of Japan, particularly the leading universities in the world including the University of California at Berkeley; Stanford University, MIT, University of Cambridge, University of Oxford, Imperial College London, and others.

With some solid and successful examples of academic entrepreneurship, including PeptiDream and others, the innovation ecosystem practices at The University of Tokyo could be an effective model in Japan for university-based entrepreneurship and innovation. Its tripartite structure, consisting of the university itself (the SEED program, currently the Office of Innovation and Entrepreneurship), TODAI TLO Ltd, and UTEC (a VC arm dedicated to the university), plays a collective role to encourage university entrepreneurship. The university's initiatives in entrepreneurship education, incubation, mentoring and consulting, and graduate entrepreneurs' networking, as a joint effort with the Alumni Office, help cultivate university entrepreneurship. The AEA program and the extension of the innovation model to Kashiwa-no-ha Campus, are models for partnership involving local governments, corporate sponsors, great research universities in Asia, and entrepreneurs from Asian countries and economies. The University of Tokyo, through the evolution of the innovation ecosystem, is moving toward its goal of contributing more to

the world through innovation based on university entrepreneurship.

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