

Missing Link of National Entrepreneurial Business Model
-Issues of High-tech Start-up in Japan,
in comparison with US and German Model

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Summary

The new wave of Information and Knowledge, so called The Third Wave, is demanding the structure change of the industry and economy all over the world. Japan, once a leader in the 1980's industrial age, looks very much behind to change the industry structure, and suffering for more than a decade.

In the age of Information and Knowledge, industrial core business is still critically vital. The industrial core business, however, need to be drastically changed to cope with the IT, Information Technology. Core business is needed to be combined with virtual business. Without innovation of the old core technology, it will not fit to the IT business environments. In US and Europe, in many cases with some exceptions, big and old corporations are usually not good at it, and many risk taking high-tech start-up companies are contributing to make the breakthrough.

In Japan, very few high-tech start-ups are established in the past few decades, and this is one of the main reasons of Japan's delay of industry structure change. In this paper, I am trying to find out why Japanese high-tech start-up are not emerging, using the Entrepreneurial Business Model, comparing to US and German model. The components of the Entrepreneurial Business Model are different by country, because of the industry structure and maturity of entrepreneurial business.

American Silicon Valley model is well known. The Venture Economy is drastically running with Pension Fund/Angel, Venture Capital, NASDAQ and University.

Germany, until recently, was not active in High-tech Start-up development. Federal government, with drastic and strategic policies, and with cooperation of local governments, developed a dynamic Entrepreneurial Business model. It started working well, and the number of IPO since 1996 are doubling each year for three years in a row.

In the Japanese Entrepreneurial Business Model, there are some missing links to make it work. One of the key factors missing is the involvement of big corporation as a cooperator, and the other missing link is the highly educated engineers in universities and research laboratories. These missing links in the Entrepreneurial Value Chain are the critical factors for Japan's high-tech Start-ups.

There are often many opinions, however, that Japanese culture is not suitable to encourage Entrepreneur. I disagree to this. In Japan, many excellent start-ups are established and put to the IPO successfully. The issue of Japan is that majority of these start-ups are service and internet related ones and not R&D technology oriented ones.

Of course these service related start-ups are very essential for Japanese economy. But on top of these, we need to develop high-tech oriented start-ups to develop new industry. In this high-tech oriented start-up, Japan, unfortunately, is very much behind compared to US and Germany. And so far, there are no clear strategic direction setting how to conquer this serious problem of Japan.

In this paper, I will first analyze why US and Germany are succeeding to develop high-tech oriented start-ups from the view of its structural system and business model as a nation, showing the three different types of national venture business model for each country. And analyze if these advanced method or system can be applied to Japan, where the cultural, social and business systems are very different to the western world.

At the later part of this paper, I will suggest the realistic stream to quickly build up Japanese structure to construct the platform to foster Japanese style high-tech start-ups, which is very different from the US model, and relatively close to the German model in a long view. My conclusion is that within ten years, Japanese high-tech start-ups will drastically become active and contribute to stimulate old style big companies, some of which are still not taking the gear change actions to survive in the Third Wave age.

1. Real Key Issue of Japanese Entrepreneur

How to promote entrepreneurship and start-up is one of the latest hottest issue among government, industry and universities in Japan. It is a sure consensus of everybody that start-ups are the key trigger to develop new business and to restructure old business, and eventually create masses of new employment. In the past two or three decades, many governmental actions have been taken to support start-ups, and Japanese were learning mainly from Silicon Valley in US.

Talking about the Japanese start-up in general, there are two basic misunderstandings. One is Japan's capability of entrepreneurship, and the other is the purpose and target of start-up supporting policies. Not clarifying these two misunderstandings, it is not possible to gather energy of the Government, industry and universities to promote Japanese start-up.

My answer to these misunderstandings are, first, Japanese start ups are very successful and many companies succeeded IPO, except R&D oriented high-tech start-ups. And it is the key issue of japan, and second, the purpose to promote start-up support is not to help the slow growing small and medium

enterprises (SME), but to foster fast growing start-ups, who will eventually create new industry structure transformation and create masses of new employment. To support weak SMEs are important, but it should not be related to foster entrepreneur and start-ups.

1-1 Issue of Japanese Entrepreneur Business

After learning the Silicon Valley culture, many people are starting to say that Japanese social and business culture is not suitable to promote start-up, and that is why we are not succeeding to develop entrepreneurial business in Japan. I agree that Silicon Valley culture and business style is too different for Japanese to import, and it is better not to follow the Silicon Valley Business Model. I, however, do not agree that Japanese have less entrepreneurial mind and start-ups are not well developed like US.

If you ask any Japanese who the successors are as entrepreneur in Japan in the past 50 years, many can easily name it from the old famous ones like Sony, Honda and Kyocera to the latest Softbank, an internet company, Rakuten, a virtual shopping center, HIS, a travel agent, Doutor, coffee shop chain, and NOVA, an English conversation school. We can classify these start-ups into 3 groups in a time series as chart-1.

Chart-1

Generation	Year	Group Name	Industry	Start-up company
First	1945-	Post-War Start-up	Manufacturing	Sony, Honda, Kyocera, Cacio, Rohme
Second	1970-	Guts Start-up	Service	Pasona, NOVA, Doutor, HIS, Takefuji
Third	1990-	Internet Start-up	E-business	Softbank, Rakuten, Asukuru, Manex
Fourth	?	High-tech Start-up	Real+E-business	???

Japanese start-ups were very successful until 1980. The first generation succeeded in manufacturing industry and created firm industry basement for Japan and still dominating as the world's strongest industry. Hungry entrepreneurs have succeeded as the so called "Catch-up Business Model".

The second generation created many varieties of service industry from education, restaurants, retail to finance industry. Many of the entrepreneurs in this generation are not highly educated, and not possible to be promoted in a big company. That kind of background contributed to have guts in mind to succeed in start-up. The third generation of start-up was triggered by internet technology and Softbank's CEO Mr. Son's leadership. Young students or business persons are starting business with minimum investment and enjoying IPO in a few years like in USA.

The third generation is so far successful against the delay of Japanese network deregulation. They will manage the internet bubble situation which everybody in the world is suffering now. The problem is the Fourth generation. In Japan, number of IPO in the stock market is constantly high as shown in chart-2.

However, since the 1970's, majority of IPO are service-related companies, and technology oriented

companies are very few and R&D related high-tech start-ups are nil. This is a serious problem for Japan. New industry development is totally depending on this. Without these high-tech start-ups, industrial structure change of Japan to the next century is next to impossible.

Chart-3 shows the government and private total Science and Technology expense ratio to GDP of Japan, USA and Germany. Japanese rate is constantly the highest in the world, and the effect is not related to high-tech start-up development. This is the critical key issue of Japanese entrepreneur business development. Japan is successful in entrepreneur business development, except for the most important R&D related high-tech area in the coming new century. I will analyze why, and propose how we can solve this critical issue.

Chart-2

No. of IPO in Japanese New Market “Tento &”

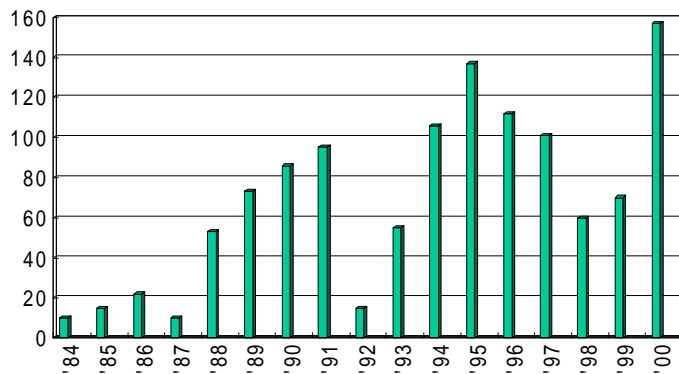
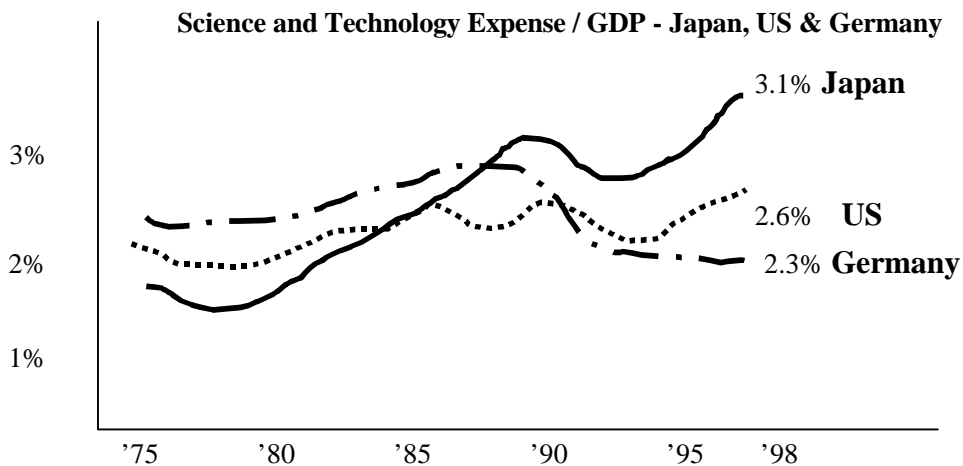


Chart-3



1-2 Issue of Japanese Start-up Support Policy

Until recently, Japanese supporting policies for the SME were focused to help them to survive, rather than to be a rule breaker with innovative technologies or business methods. So the policies needed for entrepreneurs such as Stock Option, Angel Tax, TLO, Japanese version of Bayh-Dole Law, Japanese version SBIR and etc. were not set up until 1995. Japan is 15 to 20 years behind compared to US in these supporting policy setting as law as shown in Chart-4.

Chart-4

Supporting Policy / Registration etc. in US and Japan			
	US	Japan	Year Difference
Venture Capital Co.	1946	1972	-26
SBIC	1958	1963	-5
Bayh-Dole Law	1980	1999	-19
SBIR	1983	1998	-15
Stock Option		1995	
Angel Tax		1997	
TLO	1940	1999	-50
Public Univ. Prof's side job		1999	
Japan is 15 to 20 years behind USA			

The contents of these important regulations to promote entrepreneurial start-up is not yet fully close to US regulations. Many restrictions to apply these supporting policies needed to release, so that entrepreneurs can easily and fully enjoy the merit of it. In 1999, Ministry of International Trade and Industry (MITI) and its Agency of SME declared to shift their support from helping the weak to promoting the growing start-up to achieve IPO. I believe this is a good direction change to foster challenging entrepreneurs, rather than taking care of monotonous SME, who are not willing to grow fast and put the company to the open market.

At the same time, Japanese supporting policy needs to concentrate on how to promote R&D oriented high-tech start-ups. The issue is how to do it. Is it really good just to follow US start-up supporting policies? We need to identify Japanese business model in comparison to US business model to set up the right supporting policies.

2. Sources of High-tech Entrepreneur in Japan

The potential human sources' organizations who can initiate high-tech start-up is limited, of course. Only the highly educated entrepreneur can create the high-tech start-ups, which may create new industry and eventually lead to change industry structure. The sources are universities, enterprises and laboratories. I classified potential human resources into six groups with some start-up examples as shown in chart-5.

Chart-5

Human Sources for High-tech Start-up in Japan	
Group	Example / Comments
1. Spin out Elite Engineer	Several success
2. Corporate Engineer	Very few are In-house Start-ups
3. University Professor	Several has started since 1999 approval for public university Osaka Univ. Prof. Shirakawa LSI design Tohoku Univ. Prof. Yagi Waste disposal Tokyo Univ. Prof. Tsubouchi Solar battery material Kyoto Univ. Prof. Asada LCD display technology Kochi Univ. of Tech. Diamond thin film display
4. University Student	Doctor course student as Research Assistant with high knowledge Osaka Univ. Pprof. Shirakawa's students for LSI design
5. National R&D Lab.	A few communication with Industry, with less human exchange Several examples as side job in Riken Lab under STA.

professionals wish The problem of Japan is that in the above sources, nobody has the entrepreneur spirit to start its own company with their own developed technology, except the spin out elite engineers. I will analyze the basic reason of it later, comparing to the US and German active situation. Young scientists and engineers in universities and national laboratories are very important potential resources to boost high-tech start-up in Japan. How to encourage them to take risk and challenge as entrepreneurs with their own technology and IPR is the critical issue for Japan. Unless some of the well educated professionals wish to be entrepreneurs, there are no ways to promote high-tech start-up. All the supporting policies are in vain.

3. Comparison of US, Germany and Japan

The key for high-tech start-up is whether the well educated researchers and engineers wish to be entrepreneurs or not. In Japan, unfortunately, very less are willing to be independent. Majority of them

prefer to stay safe in a large organization. In US, it was so two or three decades ago, but it changed drastically. In Germany, where the social and business culture is relatively close to Japan, it was very similar to Japan a decade ago, but a drastic change is happening now. It is worth to analyze the factors which made this change. Before that, let me clarify some facts among US, Germany and Japan. Chart-6 shows the source of high-tech start-ups for three countries as an image, and Chart-7 shows the number of start-ups established from universities.

Chart-6

Spin Out Source Comparison US-Germany-Japan (Image Chart)			
<u>Spin Out from</u>	<u>US</u>	<u>Germany</u>	<u>Japan</u>
University	many	many	very few
National Laboratory	many	many	nil
Corporation	many	few	few

Chart-7

R&D Start-ups established from University			
<u>Country</u>	<u>Year</u>	<u>No. of Companies</u>	<u>Source</u>
US	1998	279	AUTM Survey 1998
Germany	1997	650	ATHENE Project 1998
UK	1996	46	MITI-Tohoku 1999
France	1990-97	40-50	Prof. Muster ATHENE Project 1998
Japan	1999	few	my estimation

It is a surprise that the number of German start-ups from universities are 2.5 times bigger than US is a surprise. The Japanese amount will come close to UK and France in a few years, because of the Japanese regulation change in 1999 as mentioned before. The German background of the high number is worth to analyze.

4. German Model

The number of IPO in Germany is drastically increasing. In the past three years, number of IPO doubled in a row, compared to the declining number of Japan. In Germany, majority of IPO are in the New Market, and most of them are technology or internet related business. No service oriented business like coffee shop chains or English conversation school chains are included in the German New Market. Innovative business is the requisition of the German New Market. On the contrary, majority of Japanese IPO in the New Market like Tendo, Mothers and NASDAQ-Japan, are service and internet related business, and technology oriented are very few. Chart-8 shows the comparison of number of IPO between Japan and Germany.

Chart-8

		Number of IPO Japan –Germany				
		1996	1997	1998	1999	2000(my estimation)
Germany		14	35	67	168	250
Japan		112	101	60	75	157

Chart-9 shows the sources of number R&D oriented start-ups established in 1990 compared to 1997 in Germany. University professors and students, national laboratories like FhG and MPG, and company researchers and engineers are all increasing, based on the ATHENA Project report in 1998.

Chart-9

Number of R&D Oriented Start-ups Established in Germany		
Spin out from	1990	1997
University Professor	140	240
University Student	205	395
University Total	345	635
National Laboratory (FhG, MPG, etc)	73	152
Company	247	458

Total	665	1,245
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In my research in Germany, I found four key programs which is generating these rapid increase of R&D oriented technology start-up and IPO. They are the followings :

1. An-Institute
2. . Limited hire period for researchers
3. . Regio Method.
4. . VC Matching Fund

I will explain the secret factor of each of these.

4-1. An-Institute

In Germany, 81 Universities have research and engineering departments, and 90 engineering colleges. Among those universities and colleges, those who are located in the south-west of Germany are very active for start-ups. And they have many research laboratories as university arms by the university campus, not in the university campus. They are called as An-institute (Institute an der Universitat).

This An-Institute is a official laboratory approved by law and supported by universities and the state. An university professor is the head of the institute and company engineers and researchers are working as joint research with the university. Companies pay for the joint research, and many graduate course students are working as research assistants and get paid. In the institute, students and company researchers and engineers are handling the latest industry data to create new products or technology. Students can learn the state of the art technology from business people face to face, and learn what the real business is.

Companies can get the professors' latest research results, and ask students to apply the technology to the real business. Students can sometimes utilize the experimental data for their doctor degree thesis. For the students, by joining the An-institute, they can get three birds in one stone; money, business experience with latest data and technology, and data for their doctor degree thesis.

The most important thing among all of these three is the business experiences, which many student never can obtain before graduation. For some of the student who have the An-Institute experiences, it may be a good idea to star his or her own business with the experienced technology and business sense. After two or three years joint work with business people, he or she is already a kin of specialist in the industry's niche area.

In Germany, many universities require industry experiences for about five years. So professors are used to manage their new technology or IPR to be utilized for the industry. This is totally different from Japan, and very similar to US. The only difference between US and Germany is whether the institute is by the campus like in Germany or in the campus like in US. These collaboration among professors, students and industry researchers and engineers surely create the interactive and nonlinear mode, mode II compared to

Japanese linear mode or mode I.

In Japan, Professor Shirakawa of Osaka university has set up a company in Osaka near his university, and set up joint research with system LSI companies, involving his doctor course students as research assistants. This is a kind of An-Institute in Japan. In order to import German An-Institute to Japan, we need registration by law, and support by university and prefecture to make the operation easy for professors and industry.

4-2. Limited Hire Period for Researchers

In Germany, there is a built in system to generate high-tech start-up from national research laboratory like Fhg for applied research, MPG for basic research and GFE for big project research. The secret is the limited period to hire for the young researchers. Three years for FhG, and only once, they are allowed to extend the period. So the maximum period is 6 years. And for the MPG and GFE, five years is the period.

This rule was set up about ten years ago. Due to the economic recession, capable young post doctors had difficulty finding a job, and the government decides the limited employment period to hire these researchers. Initially many people worried about the deterioration of the quality of researchers to ask limited employment, but no worry is needed. Due to the big name of these historic research institute with many Nobel Prize winners, the excellent researchers joined the institute. A year before the termination, some researchers found it difficult to get a job in a university or in business, and decide to run his or her own business.

FhG, MPG and GFE are recently setting up start-up support centers with technical and administrative support team. Some of the institute has set up incubation centers, and FhG head office is even considering to set up their own venture capital functions. For Japanese, it is incredible that national research institute are taking that kind of rule-breaking actions. For the institute, due to the decrease of government fund support, it is a necessity to think how to survive. These competitive capitalism is the factor of the German high-tech start-up success. Over 20,000 researchers are working in public laboratory as shown in Chart-10. The human source of high-tech start-up is deep, big and alive in Germany.

4-3.Regio Method

In Germany, three regional contests have been successfully conducted. They are BioRegio, for bio technology start-up, EXIST, for start-up from universities, and InnoRegio, for innovation start-up. These contests are very strategically designed based on fair and fruitful competition concept among regions with clear federal government direction and target. Through the research of these three Regional Contests, I identified the following seven factors to make it successful.

- 1) Select strategic field only... Bio technology, Start-up from universities, Innovation Start-up
- 2) Clear direction and Target... Responsible Minister officially announces the strategic background and target with numbers. Eg. Be number 1 in Europe

by 2000 in bio technology business and create 110,000 new employment in Germany.

- 3) Fair competition... Each region or state can compete only once, and support only three to five winners, and not for everybody.
- 4) Ample preparation period and money... 6 to 18 months preparation period after announcement to final decision. Regions compete to be fully prepared, preparing missing factors for the region. Even not awarded at the end, the region with state support will proceed to achieve the target, because already fully prepared to promote start-up.
- 5) Federal support is only to top regions... Strong model case development, rather than helping everybody. Make the world's strongest model region.
- 6) Continuous fund support for five years... Eg. BioRegio DM50,000,000 each year for 5 years to each of the winning 5 regions.
- 7) Empowerment to region... Once winning region is decided, Operation is dedicated to region. Each region can operate considering the local specialties.

Chart-10

High-tech Start-up Potential Researchers in Germany				
<u>Institute Name</u>	<u>No.of Institute</u>	<u>No.of Researchers</u>	<u>*Potential Entrepreneur %</u>	
MPG (Basic Research)	81	4,700	12%	600
FhG (Applied Research)	47	2,600	67	1,500
GFE (Big Project)	16	8,000	30	2,400
Blue List (Federal&State)	51	3,000	14	400
Federal/State Institute	71	2,200	67	1,500
Total	266	20,500	28%	5,800 Persons

4-4. Bold Venture Capital Matching Fund

In Germany, they have over 1,000 start-up supporting programs. Each program has little impact to promote start-up, and the entrepreneur business was not active at all in Germany. Ten years ago, one of the government officers proposed a very bold support program to change this inactive situation. His idea

was to believe in private independent venture capital (VC), and put in the same amount of the fund to the start-ups, which the VC selected and funded.

At the same time, federal government assured the VC fund for five years. If the start-up goes to bankrupt, federal government will pay off the same amount to the VC. This means almost no risk to the VC. This is a very drastic and risky policy for the federal government. Because of this drastic and attractive supporting policy, many new VC companies are created in Germany, and famous capable VC companies came into Germany from UK and US. VC companies hands on support promoted many start-ups.

In the first two years, half of the start-ups funded went to bankrupt, and the government officers who proposed and approved this program were not able to sleep well. In the third year and after, it worked as a initial plan and in 1999, about DM1,200,000,000 are invested to over 1,000 high-tech start-ups.

The interesting thing is that the requested form is only one page long to apply this matching fund. Prepared business plan and board members CV with free format can be attached. The answer to the application is expected within six weeks, and about 70 % of the application pass the selection. This government support program is really drastic and bold.

Government took risk to build a new support program to the risk taking start-up. This means, unless the government has the entrepreneurial spirit and takes risk, the real support programs to the risk takers will not be developed. Supporter to the risk taker must take the risk, too.

5. US Model

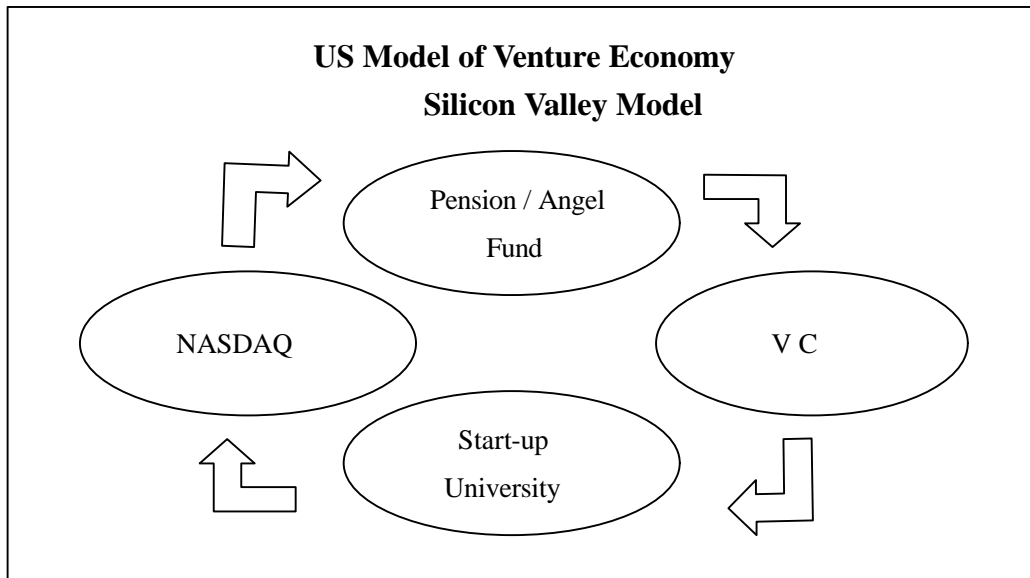
For the US Silicon Valley Model, many analysis has been done by many researchers. Universities, Venture Capitals, Angels, Pension Funds, NASDAQ, Chinese and Indian students and companies, etc are well circulating and combining in a very rapid speed, creating and destroying every day. Current Silicon Valley Venture Model can be explained in Chart-11. I picked up the key four key factors to drive the business model.

In US, Pension / Angel Fund is flowing into VC. And VC with hands on support foster Start-ups with Universities, and lead to IPO at NASDAQ. Pension / Angel Funds are expanded through IPO and the US model circulation go to another round. This is a very strong venture economy model.

In Japan, compared to this Silicon Valley model, Pension / Angel Fund and University / Start-up is totally missing, and VC with hands on support is still very far to be close. Thanks to NASDAQ-Japan, the stock market for start-up is well prepared jointly with Mothers Market and Tendo Market in Japan. Private equity market, however, is not yet well prepared in Japan.

Another business model working well in US for high-tech start-up is the SBIR model. 2.5% of outsourcing federal research money of each ministry must go to start-ups. It is forced by law. Phase I is Feasibility Research and phase II is Prototype Research. Government support phase I and II by competition. For phase III, which is Product Development to Market, government is not supporting fund. Start-ups must ask private VC / Angel to support if the product is marketable.

Chart-11



This program has been very successful, and in 1999 about \$1,000million is granted to about 4,000 start-ups. Key success factor of the SBIR are 1) selection of capable start-up through phase I and II selection 2) Government purchase of the high-tech products of these selected start-ups. About 30 % of the sales amount of the selected start-up after phase III are government purchase through official bit process.

The important concept of the SBIR model is that Federal Government does not worry about each of the failure of funded start-ups. Even if the nine start-ups out of the ten invested failed, if one of the ten makes a big success and eventually pay big tax to compensate the total investment, it is fine. This concept will not be justified in Japan, and this is the problem. In Japan most of the start-ups invested by tax, must not fail. With this Japanese concept, risk business never make success.

6. Japanese Issue and the New Wave

Key issues of the Japanese high-tech start-up are three fold.

- 1) Japanese educated engineers and researchers have no interest to spin out from big companies, laboratories and universities.
- 2) Japanese business customers do not want to be the first buyer of the new technology products.
- 3) Japanese founders wants to hold the majority of the company stock forever.

Knowing these Japanese characteristics of high-tech start-up and knowing the US and German Venture

Model, how to build the Japanese Venture Mode is the key issue. Before going to the target point, to know the recent movement of Japanese high-tech start-up is worthy. A very interesting movement is happening. In other words, at last, something is happening to promote high-tech start-up in Japan in a very different way to US and Germany. Several high-tech start-ups are emerging and so far very successful. Some of them already went to public, and others are going to make IPO in a year or so. And there is some possibility that the movement will expand in some years.

They are shown in Chart-12:

Chart-12

The New Wave - The Emerging High-tech Start-ups in Japan					
Company	Founder	Ex-company	Founded	IPO	Application
Incs	Mr. Yamada	Mitsui Metal	1990	2001?	3D CAD Die Molding
Thine	Mr. Iizuka	Toshiba	1992	2001?	LCD System LSI Design
Megachips	Mr. Shindo	Mitsubishi Elec.	1990	1998	Digital Image LSI Design
Samco	Mr. Tsuji	NASA	1979	2001?	Thin Film Technology
Yozan	Mr. Takatori		1990	1999	Cell Phone System LSI Design
Optware	Mr. Horimai	SONY	1998		Tera Byte Optical Storage
Cristague	Mr. Morozumi	Hoshiden	1999		New LCD
Millennium Gate			1999		DNA Chip

Characteristics of the emerging high-tech entrepreneurs / start-ups are as follows:

- 1) They are Elite Engineers, spinning out from big companies.
- 2) They are good at Strategic Collaboration with big companies
- 3) They produce profit from the first year, with phase management.
- 4) They utilize government fund cleverly.
- 5) They aim early stage IPO for further expansion and recruiting.
- 6) They have close relation with professors.
- 7) They seek global collaboration from early stage.

Meeting with these founders of the high-tech start-up new wave, they say the most critical matter in the past 5 to 10 years was hiring good engineers. Japanese elite engineers had no intention to join unknown tiny organization. Without capable engineer, start-ups can't proceed something ahead to the big companies. Since last year, however, it became very easy to get top-notch engineer from leading big

company and from highest ranked universities. Because of the increase of many internet start-ups, some of their friends or friend's friends have succeeded in start-ups, and realized the merit of working in small entrepreneur company. Another reason is the continuous big company's bankrupts, which never happened in Japan before. The high-tech start-up human sources finally start to show the tendency to become active. This could be the important trigger for Japanese new wave of high-tech start-up.

Another thing I realized talking with these founders, and very different to other start-up founders, is that they manage to be profitable from the first year, by doing business with big companies and by doing phase management. In the first phase after founding a company, they do not proceed their intended business, knowing the lack of money and lack of staff engineers and skill. In order to achieve their targeted business, ex. System LSI design for LSD display, they devote 80% of their energy in the first two years not to system LSI design, but to simple LSI design with cheap pay from big companies working as a engineering vender. By doing so, they can survive and learn how to run a company and to increase number of engineers to share the dream and join the start-up.

In the second phase, the start-up develops system LSI for specific customers, and the start-up got credibility as vender engineer. By doing so, they can brush up their engineering capability and prepare to phase three, where they will develop first their own unique niche products with their brand name, and with sales and inventory responsibility. They can proceed business with big companies as an equal partner with their unique technology, which big companies need in a dog year age.

Thine corporation, in Tokyo, hold 70% of world market share in LCD display driver system LSI. In the web site of the company, it says "Will you join my company to share the joy of coming IPO?". This is a killer copy for young engineers who are tired of working in a big and old organization.

Yozan Corporation, in Tokyo, achieved IPO in 1999, nine years after foundation. Three years ago, they had joint research agreement with NTT Docomo on less energy consumption system LSI, which they invented. At that time half of the engineers of total ten were Chinese who graduated the famous Tokyo University and Tokyo Institute of Technology doctor course. Big corporation in Japan has tendency not to hire them because of the nationality. Yozan Corporation is a equal partner to NTT Docomo, and with this high-tech start-up's technology, NTT Docomo succeeded to hold Euro-Japan alliance with Nokia and Erikson on coming new generation of cell phone, WCDMA technology.

Incs Inc., in Tokyo, succeeded first in the world to the full automation of die molding (Kanagata) in 1999 with MITI's grant of a few million dollars. From the computer 3D design data, without any design paper, automobile engine die can be made by drilling machine in three days, instead of three months by experts hands made. Cell phones die by 3 hours instead of 3 days. By this technology, product development period can be shortened drastically. Molding is one of Japanese manufacturing industry's specialty, and special know-how is needed with ten to twenty years experience. Young engineers don't like these heavy works with oil stain. Now a young lady is taking care of siting in front of workstation in a remote office.

There was a fear that US IT technology may some day take over the Japanese dominating die molding industry. Japanese famous JIT, Just In Time, or Kanban system turned to SCM, Supply Chain Management by US's IT technology. And Japanese famous TQC, Total Quality Management, turned to Six Sigma. Japanese big companies are seriously importing these new technologies from US. Thanks to Incs Inc., a high-tech start-up in Japan, the Japanese manufacturing industry is creating a new industry and shifting the industry structure to The Third Wave Industry. High-tech start-ups are really the key of innovation of Japan.

7. Hypothesis of Japanese Venture Model

Observing these emerging high-tech start-ups in Japan, I can show the following stream of developing high-tech entrepreneur movement of Japan as a hypothesis (Chart-13).

Chart-13

Drastic progress will happen by ten years in Japanese high-tech start-up with four steps.

Phase 1: (1990-2001) Some elite engineers spin out from big companies and create start-up.

Phase2: (2001-2003) Many young engineers from big companies spin out and join them.

Phase 3: (2003-2006) Many university students join them.

Phase4: (2006-2010) After IPO, young engineers spin out from the company
and create new start-ups.

Phase5: (2010-) Many university students jointly with professors create high-tech start-ups.

Phase6: (2010-) Many national laboratory researchers create high-tech start-ups

These steps can be shown by diagram as Chart-14.

8. Entrepreneurial Diamond Model, US-Germany-Japan

When the nation wide business trend moves dynamically, a simple business model is working. In the business model, in many cases, there are few key engines to move the economic model works. I picked up four engines for Venture Business Model of US, Germany and Japan. The shape of the four engines looks like a diamond, and named as a "Diamond Venture Model".

The US Diamond Venture Model , as shown in Section 5, Chart-11, has the following four engines :

- 1) Pension / Angel Fund
- 2) NASDAQ Market
- 3) Start-up / University
- 4) Venture Capital

Three or four decades ago, when the Silicon Valley started the business model movement, universities were the "Generator" to move the value chain of venture economy. But as the venture economy model

grew, Pension / Angel Fund is taking the drivers seat as a “Generator”, and VC is working as a “Supporter”. Start-up / University is working as a “Technology Source”. NASDAQ is working as a “Hot Plate” to cook the start-ups. If the performance of the start-up after IPO is not good, the NASDAQ will kick out the company, and if the performance is good, the NASDAQ will cook the start-up to taste better.

In the Entrepreneurial Diamond Venture model, unless we have these four factors working active, the venture economy will not work. And the members of these four factors will be different by country.

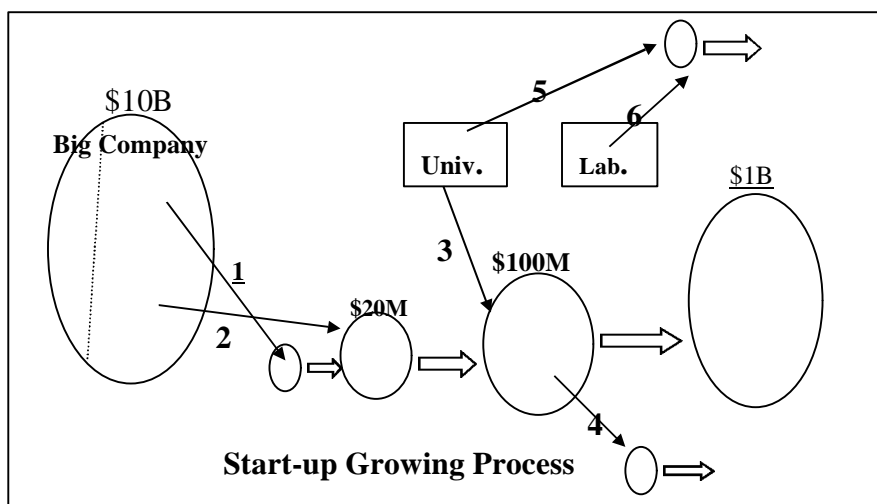
The US Diamond Venture Model can be shown as Chart-15.

The German Diamond Venture Model can be shown as Chart-16

The Japanese Diamond Venture model can be shown as Chart-17

Chart-14

High-tech Start-up
Growing Process



The Federal government is working as a generator of the German Entrepreneurial Diamond Model, and the Regional Governments are working as hot plates to cook the start-ups.

Very possibly, in some years, the German Entrepreneurial Diamond Model will change, and come close to US Entrepreneurial Diamond Model. The Entrepreneurial Diamond Model is very dynamic and the actors or actress who take care of the Generator, Supporter, Technology Source and Hot Plate to cook are going to be changing in five to ten years.

Now, who are the actors or actresses in Japanese Entrepreneurial Diamond Model? Is the Entrepreneurial Diamond Model working in Japan? Is it like US or German Models? Who on earth is the Generator in Japanese Entrepreneurial Model, which is running the venture economy? Many questions arise.

Based on my research on Japanese start-up business in section 6, and my hypothesis on Japanese Entrepreneurial Movement Model, the Japanese Entrepreneurial Diamond Model can be shown as Chart-17. The Generator of Japanese Model are the spin out elite engineers who set up start-ups five to ten years ago, and currently moving to IPO.

When we look back the past history of Japan, from Edo era to Meiji era, the people or the government did not take actions until the last minute. And finally some of the hero, like Ryoma Sakamoto, Kaishu Katsu and so on, took leadership as a generator on the new age. Japan needs these hero in the coming Third Wave age.

The Hot Plate to cook in Japan has just started to actively work thanks to NASDAQ-Japan's introduction to Japanese market. Tokyo stock exchange quickly reacted setting up relatively less regulation market named Mothers. On top of the Tendo Market for the start-ups in Japan, now three new markets are competing to accept start-ups to go to public. Venture capital companies are rushing to find the good seeds to foster, with hands on support, which was rare in Japan until recently.

Everything is ready for Japanese Venture Economy to actively work, except the technology source. And unless the university and national laboratory technology source become hot to start business, high-tech start-ups in Japan will not succeed. But, as I am predicting in section 7, in five to ten years the sleeping universities and national laboratories will be obliged to awake, thanks to the heros, the spinout elite engineers. So the dotted lines of Japanese Entrepreneurial Diamond Model will turn to solid lines within ten years and drastic progress of Japanese high-tech start –up will happen.

These movements with many high-tech start-ups, will eventually create new industry of Japan and change Japanese industry structure, and gradually shift employment to the new industry. The missing link of the Japanese Entrepreneurial Diamond Model will be connected.

9. Conclusion

Japan, as a strong key devices manufacture such as system LSI, LSD, DVD, miniature motor, molding, and so on, can take a good leadership to combine the Real Core Business and Virtual Business. This is a new “Neuer Kombinationen” for innovation in the information and knowledge age.

Sony, Toyota and NTT-Data, jointly with Thine, Incs and Yozan, the high-tech start-up new wavers, will create Japan unique Entrepreneurial Diamond Model. And the business model will be more powerful compare to US and German Model to create new industry, which is different from PC based business model.

Japan can drastically change to a high-tech start-up active nation within ten years, if the right supporting policies and actions as a nation can be taken in line with the proposed Japan Model concept.

Chart-15

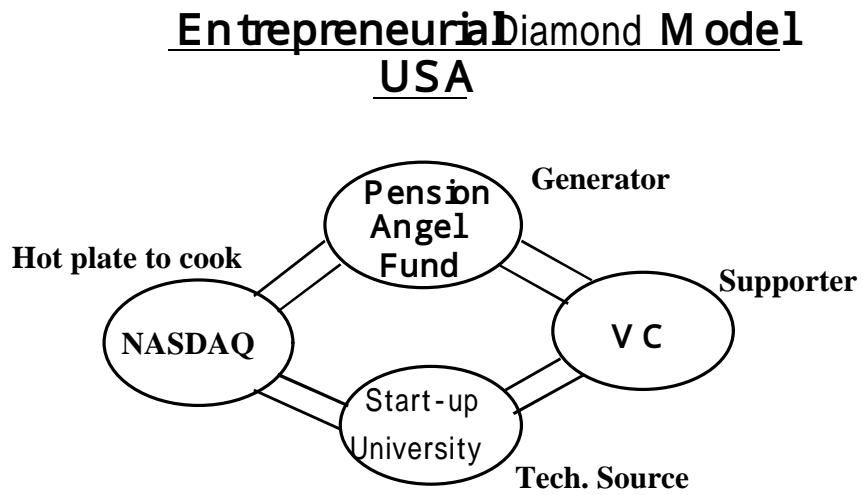


Chart-16

Entrepreneurial Diamond Model Germany

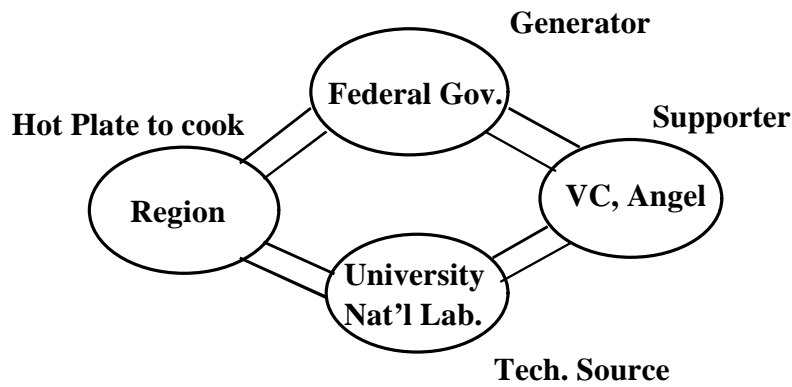
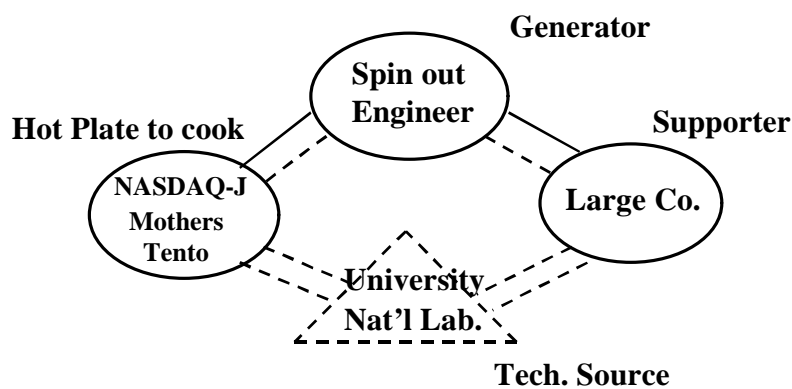


Chart-17

Entrepreneurial Diamond Model Japan



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