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# ARTICLES

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## Proposal for Successful Industry/Academia Collaboration\*

Industry/Academia Collaboration Project Team

### (Abstract)

The present paper intends to summarize the basic ideas of the Industry/Academia Collaboration from the standpoint of the industries. What is important for successful collaboration is the achievement of three viewpoints including, “establishment of better communication between universities and companies”, “flexibility to use the results from the Industry/Academia Collaboration” and “transparency of the rules for the use of the universities’ research results”. And what is indispensable to realize these viewpoints is a set of three conditions, namely; (1) a sole university organization which has functions and authorities for promoting the collaboration; (2) flexibility in contracts between universities and companies; and (3) handling of universities’ research results in accordance with its patent policy.

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## 1. Introduction

In July 2002, “Intellectual Property Policy Outline” was issued from the Government of Japan, which stated that Japan will aim to be-

come “a nation built on intellectual property”. Whether or not Japan can achieve this goal is dependent upon how efficiently we can create and utilize intellectual properties of high quality. One of the key aspects of which is the “Industry/Academia Collaboration”.

Originally, universities have their native and important missions of “research” and “education”. The “Industry/Academia Collaboration” expects, in addition to the foregoing, universities to assume the new mission of “returning the research results to the industry” in the form of “contribution to the society” while retaining the diversity of their researches.

It is needless to mention that private companies are busy with plotting their business strategies aiming to receive the largest-possible gains, and competing in their fields of research and development. Now, in order to deepen the collaborative relationship between universities and industry, who have cultures so different from each other, and to successfully provide the research results to the society, what sort of considerations are desirable?

The present paper is provided to summa-

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rize one idea from the standpoint of the industries for successful Industry/Academia Collaboration, which proposes the following set of three conditions to be satisfied.

- (1) A Sole University Organization which has Functions and Authorities for Promoting the Collaboration
- (2) Flexibility in Contracts Between Universities and Companies
- (3) Handling of Universities' Research Results in accordance with its Patent Policy

The present paper is authored by Takashi Sawai (leader, NTT ADVANCED TECHNOLOGY CORPORATION), Yuji Ohmagari (Hitachi Metals, Ltd.), Akihiko Asai (Mitsubishi Chemical Corporation), Toshio Isohara (NIPPON STEEL CORPORATION), and Shin-ichi Matsumoto (Nippon Telegraph and Telephone Corporation).

## 2. Goals of Industry/Academia Collaboration

How shall the "Industry/Academia Collaboration" be provided from the standpoint of both the industries and universities?

One idea is given in Figure 1 showing "Economic Revitalization Cycle through the Industry/Academia Collaboration". In this cycle, the collaboration is viewed as a means to link those technologies evaluated and extracted

from the results of researches in universities to those that can become new industrial seeds to help creating new markets in the industries and expanding the same. That is, under the Industry/Academia Collaboration scheme, companies collaborate with universities to select, from new industrial seeds created by the universities, one that matches to their business needs, and to evaluate their feasibilities for commercialization. For any seed that is deemed feasible for commercialization, a company and a university collaborate together to solve any problems in order to fit the seed into business application, and to transfer the university's research result to that company.

The company brings a product etc. into market based on the result of the collaboration, and creates a new market. As a result of the expansion of this market, there will be the "expansion of employment" (return to industries). The expansion of employment will result in an increase in the amount of tax corrected, and the increase in the amount of tax corrected will result in an "increase in the budget for research activities in universities" (return to universities). Consequently, the research activities of universities will be more active, so that it will result in the creation of new seeds, which, in turn, will result in further acceleration of the Industry/Academia Collaboration.

In this way, the Industry/Academia Col-

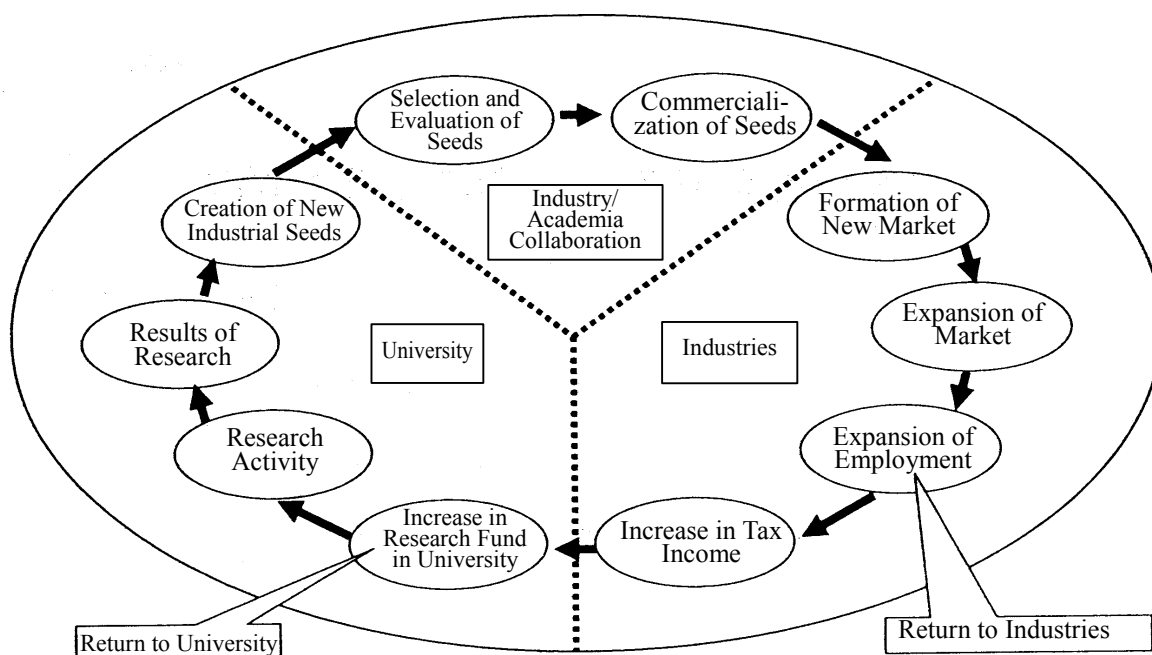


Figure 1 Economic Revitalization Cycle through Industry/Academia Collaboration

laboration should provide “win-win” returns for both the industries and universities such as “expansion of employment” (return to industries) and “increase in budget for universities’ research” (return to universities). By circulating this cycle, the “win-win” returns may continuously be obtained, and in turn, it will introduce more importance to the Industry/Academia Collaboration.

### 3. Evolving University Research Results Into Industrial Seeds

One thing that the industries expect from universities, in order to keep circulating the cycle shown in Figure 1, is “the creation of new industrial seeds”.

“The creation of new industrial seeds” is believed to require long term, and continuous research activities. While the changes in technologies are so drastic and the business environments of companies are increasingly diversified, the risk is too large for one company to invest in a long-term research and development on its own.

Accordingly, there is a large expectation from the industries for universities to “create new industrial seeds”. It is important to effec-

tually match the industrial needs and the seeds available in universities, and to utilize the resources of the both through the collaboration.

Of course, what is important for the universities’ research is the diversification that is free from any frameworks, and not all the researches carried out by universities shall be directed to satisfy the industrial needs. It is expected that any research results that may become new industrial seeds would arise from voluntary and innovative research activities that are driven by the wide range of interest and intellectual curiosity of university researchers.

Then, what would the industries desire in order to have some of those university research results to be the new industrial seeds?

One idea of it is shown in Figure 2 which shows “Evolution to the Industrial Seeds”. In universities, many research results are output from various research activities. Accordingly, the universities shall be able to evaluate these research results based on their possibilities for industrial contribution to extract those that may possibly be the new industrial seeds. For those research results evaluated to have the possibility to become the new industrial seeds, the universities shall take necessary measures including making such research results into “intellectual properties”, in order to resolve them into the

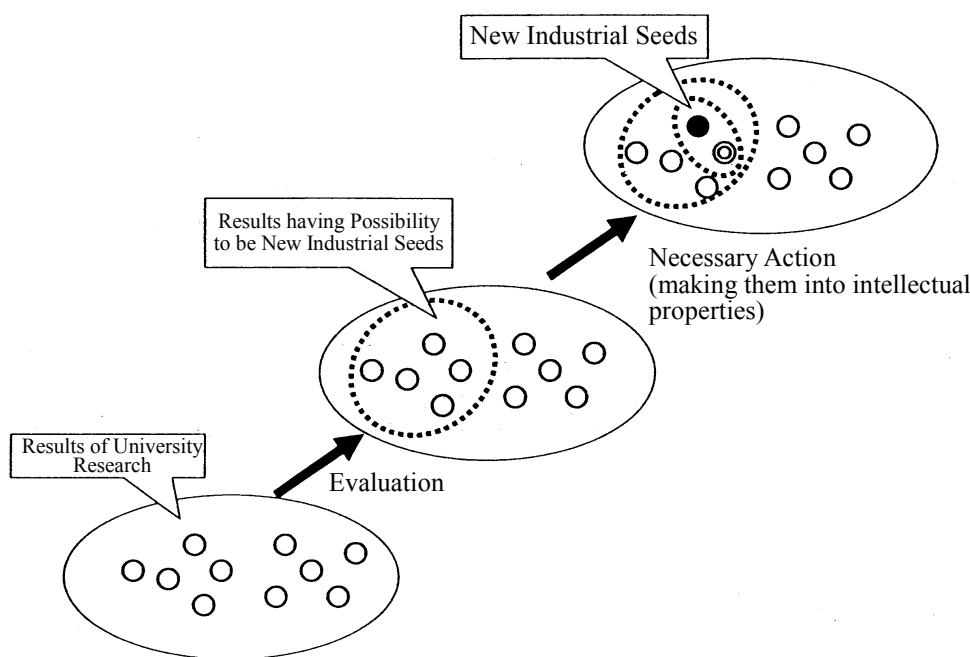


Figure 2 Evolution to the Industrial Seed

society through i.e. commercialization.

Any research results made into intellectual properties to have industrial values added may be called as new industrial seeds. Examples of efforts for making them into intellectual properties include the following;

- (1) Right obtainment such as patent rights
- (2) Documentation of the research information
- (3) Selection of research information to be published and not published (selection of research information which accrues value by being kept under secrecy)

Among the above, the right obtainment such as patent etc. is important also in universities. If a university obtains patent rights etc. to provide protection over its new industrial seed, its superiority in the market is secured when a company attempts to develop a business based on that university-based technology. Also, the protections provided by patent rights etc. may serve as an incentive over the new industrial seeds developed by universities during evaluation by companies.

#### 4. A Set of Three Conditions for Successful Collaboration

The flow of new industrial seeds from the time when they are created in universities to the time when they are introduced into the businesses of companies will be something like the one shown in Figure 3. That is, from a number of industrial seeds, a company selects ones that match to the needs of its businesses and performs evaluation on them. For those seeds that have higher commercialization feasibility, the company will collaborate with the university to solve any problems that may block their commercialization, and to transfer the university technology to the company. The company may then introduce into its businesses the fruits of the Industry/Academia Collaboration that matches to the needs of its own businesses.

Those companies which collaborate with universities are able to obtain new information and patents etc. (fruits of the Industry/Academia Collaboration) through the collaboration efforts, and this is what enables the companies to secure their superiority over others in the market. That is also the aim of companies in attempting

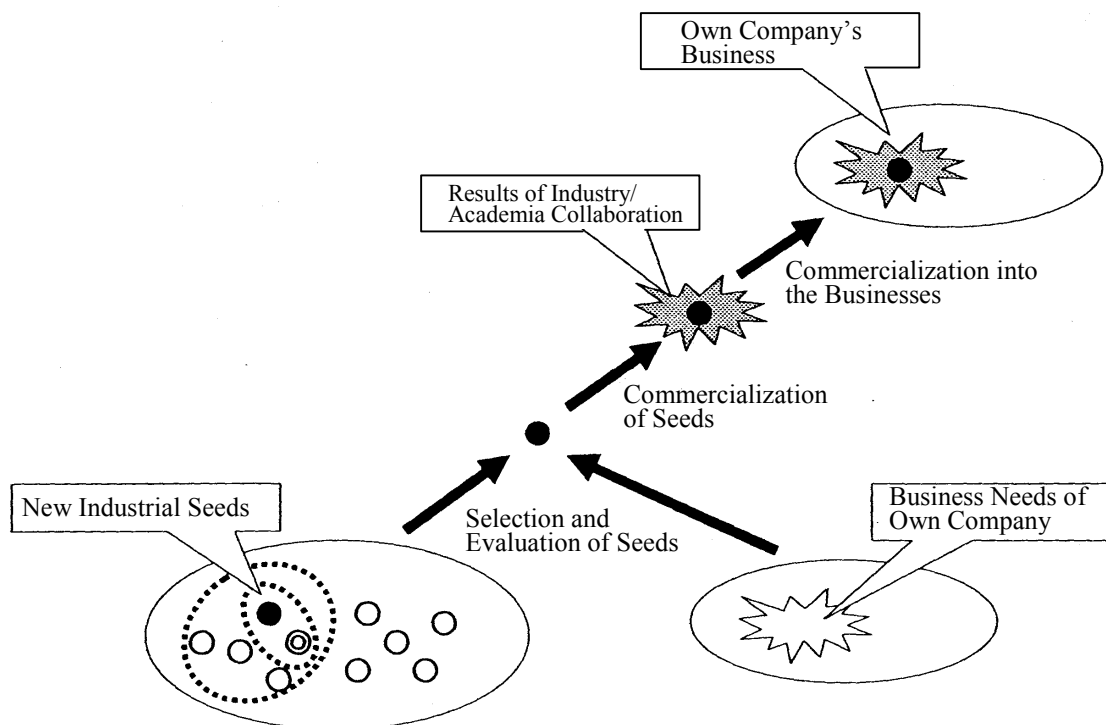


Figure 3 Commercialization of Seeds

the Industry/Academia Collaboration.

One important thing within this flow is the matching between “Company Needs” and “University Seeds”. Where there is not enough communications between a company and a university, and where the each party continues to work on its research or business plans without knowing what “Needs” or what “Seeds” the other party has, it will become difficult to give a birth to any fruit that may possibly create a new business for that company (results of university research that are returned to the society, in terms of industrial contribution). Furthermore, where there is no degree of flexibility for the company to handle the fruits of the Industry/Academia Collaboration according to its strategy, then the company will not be able to handle the fruits in an effective manner. Also, the lack of clarity in the rules for the utilization of the fruits of university research, such as patents, will not allow the company to clearly plot its future business deployment plans, and this will make it difficult for the company to attach any value to the collaboration with universities within its business strategies.

From the above, we may say that there are three viewpoints that are important to achieve for successful collaboration between companies and universities that are, “establishment of better communication between universities and companies”, “flexibility to use the results from the Industry/Academia Collaboration” and “transparency of the rules for the use of the university's research result”. And what is indispensable to realize these viewpoints is a set of three conditions; (1) A sole university organization which has functions and authorities for promoting the collaborations; (2) flexibility in contracts between universities and companies; and (3) handling of universities' research results in accordance with its patent policy.

The set of these three conditions will now be explained.

#### **4.1 A Sole University Organization which has Functions and Authorities for Promoting the Collaboration**

In order to establish better communication between a company and a university, it is important for the university to have an organization, as a single body to drive the collaboration efforts,

that unitarily has the following three basic functions and the authorities relevant thereto;

- (1) evaluating university research results and making them into intellectual properties;
- (2) coordinating between the company and the university; and
- (3) licensing university research results.

Unifying contact windows for the coordination of collaboration between a company and a university such as joint or commissioned research, and those for licensing the university research results, is especially important in order to implement a smooth flow from the collaboration to the use of the results. From a viewpoint of a company, the unified contact windows in each university is effective in order for the company to communicate its “needs” to the university as well as to grasp the “seeds” the university has.

Some universities may entrust a part of the above functions to their external organizations such as Technology Licensing Organizations (TLOs). Even if such were the case, it is still necessary to establish a relationship between each of the universities and the external organizations such as TLOs that will show the university and the external organization as a single unit when viewed from the side of companies by centralizing the first contact to each of the universities.

Furthermore, the conventional Industry/Academia Collaboration may be seen as having an aspect that it had been driven mainly by personal relationships between companies and individual professors. When, in the future, the systematization of the Industry/Academia Collaboration is considered, the organization management may be seen as the key aspect, and what is fundamentally needed in the universities is the obtainment of human resources. In other words, in order to make the organization (the organization mentioned as one of the three conditions) practically work, the organization should be the one having a wide range of discretionary power, a power to manage research results, and an authority to carry out contractual negotiation with companies flexibly and promptly. And those individuals to fulfill these tasks should be ones who are capable of recognizing the importance of the practical tasks and providing flexible correspondence with sophisticated business sense.

#### 4.2 Flexibility in Contracts Between Universities and Companies

The contractual conditions for those contracts for the use of results of the Industry/Academia Collaboration such as those obtained through commissioned or joint researches should be ones that are favorable to both the companies and universities. Universities may desire to publicize the academic information as a result of the Industry/Academia Collaboration to contribute to the academic progress. On the other hand, companies may want to handle the results according to their business strategies by commercializing the results to evolve them into strong businesses that will secure their competitiveness in the market.

Business strategies of companies vary from a company to another, so that the companies may have different demands in handling the results of the collaboration with universities. Furthermore, even within a single company, the demands may vary depending on the subjects of the collaboration research. Accordingly, the results of the collaboration may sometimes not be commercialized when the contractual terms on the handlings of the results are disadvantageous if they are commercialized, or when it is difficult for a company to secure the competi-

tiveness in the market, or, there may even be a case where the collaboration with universities is fundamentally difficult for research that is critical to the company.

As can be seen, when viewed from the side of the industries, contractual terms between universities and companies should not be monolithic such as those seen in the conventional contracts, but should be more flexible so as to provide a wider range of selection on the terms of handling the results, so that the companies may select one from several alternatives (option items) on the contractual terms in order to handle the results according to their own business strategies.

The following explains an example of "flexible contractual terms". Table 1 shows "Exemplary Terms on the Handling of the Results of Industry/Academia Collaboration".

##### (1) Commissioned Research (Research Commissioned by a Company)

In a case of a conventional contract for commissioned research, even if "law for promoting research exchanges" is applied to a patent which is the result of the commissioned research, only up to 50% of the share of the patent right may be assigned to the company. In this case, there is no much chance for the company

Table 1 Exemplary Terms on the Handling of the Results of Industry/Academia Collaboration

	Contractual Term Option	Patentee	Companies' Right etc.	Licensing from University to Third Party	Company's Business Strategy
Commissioned Research	1	Government (Univ.)	No Fee Payment Non-Exclusive License	Possible	Small ↑ Importance in the Commissioning Company's Business Strategy ↓ Large
	2	Government (Univ.)	Fee Payment Exclusive License	Not Possible In Principle	
	3	Commissioning Company	Assigned to Commissioning Company*	Not Possible	
Joint Research	A	Jointly Owned by Company & Government (Univ.)	Payment of Compensation for non-commercialization	Not Possible In Principle	Desire for securing superiority during the initial period after the formation of the market
	B	Jointly Owned by Company & Government (Univ.)	No Payment of Compensation for non-commercialization	Possible	Desire to increase the number of companies entering into the market

\* Where the company becomes the right holder, it is able to; (1) freely use the right; and (2) correspond as a party concerned in an injunction or infringement trial.

to intervene in the filing and intermediate proceedings of the patent application, so that the right obtainment of claims necessary for the company to work the patent right seems to be difficult in this case.

Accordingly, it is quite natural for a commissioning company to desire the assignment of the right to obtain a patent from the university in order to file an application therefor on its own, especially for those researches that are important and have required a large amount of investment. Also, if the company is the right holder, the company itself can file requests for injunction against right-infringing parties or can act as a concerned-party in any infringement cases. In this way, if a commissioning company desires, commissioned research contracts should allow the selection of a contractual term that realize the assignment of patent rights to the company (Table 1: Option 3 of Contractual Term).

In case a company and a university co-owned a patent as a result of collaboration, where the company judges that it can secure a competitiveness within a market by exclusively using a patent co-owned by a university, the company may select a contractual term that allows the company to use the patent exclusively and pay some fee to the university instead (Table 1: Contractual Term Option 2). However, if the company judges that it does not wish to use the patent exclusively, and where the university has a chance to obtain license fee by granting any third parties to use the patent, the company should be able to select a contractual term that the company do not have to pay any fee to the university to secure its competitiveness in the market using the patent not exclusively (Table 1: Contractual Term Option 1).

## (2) Joint Research

Under a conventional joint research contract, for any patent jointly owned by the university (Government) and a company as a result of the succession to the university (Government) of the share of an inventor who belongs to the university, if the share-holding company intends to use the patent, it must pay fee, so-called "compensation for non-commercializing", to the Government even though the company is the co-owner of the patent. However, that may sometimes result in limiting the deployment of the company's businesses using the patent be-

cause of the difficulty in securing competitiveness in the market due to the burden of payment of the fee, which is reflected to the costs of its products.

With this regard, if the company can secure its competitiveness in the market upon commercialization of the result of the collaboration by making it practically impossible to license to any third parties on the initial stage when the company introduces a product to the market, the company may pay some fee as a compensation for non-commercializing to the university (Table 1: Contractual Term Option A). However, where the company desires to increase the number of others to enter into the market in order to expand the market according to its business strategy, the university may grant a license of the jointly-owned patent to third parties (others entering into the market) to obtain license fees, and the company shall no longer be obliged to pay the compensation for non-commercializing in order to secure the competitiveness against the newly entered competitors (Table 1: Contractual Term Option B). Such options should be permitted for jointly-owned patents.

As explained heretofore, from the standpoint of the industries, it is important to secure the freedom for the use of results from the collaboration, and one way to realize that may be the implementation of the aforementioned "contractual terms to which flexibility is given".

There is believed to be a big expectation of the industries for the realization of the ability to flexibly set the contractual terms in joint or commissioned research contracts. If such a system is implemented, companies will be able to foster closer ties with universities and further accelerate the Industry/Academia Collaboration, and that in turn, will result in the facilitation of university research results to be returned to the society through commercialization by the collaborated companies.

## 4.3 Handling of Universities' Research Results in accordance with its Patent Policy

It is important for a university to publicize its patent policy, which is a basic idea provided for its research results, as their policy for returning its research results to the society in the industrial point of view, in order to let its policy known to those who are outside the university,

such as those in the industries.

The patent policy is expected to indicate the basic idea of the university on how it intends to return its research results to the society, for example, by including policies for licensing its research results to a company or policies relevant to the handling of the result of the Industry/Academia Collaboration. It is the patent policy from which companies may know the attitudes of the universities, that allows the companies to select a university having a patent policy that goes along with their business strategies in their joint or commissioned researches or obtainment of the licenses of the university's patents.

It is further important that, in order that universities can handle the research results according to the patent policy, any rights of patents related to inventions made by individual professors etc. of universities shall be vested to the universities to allow the universities to unitarily handle the task of licensing those patents.

Since the purposes of licensing of patents etc. by universities include commercialization of the results of university research as new industrial seeds and providing returns to the society,

the amounts of royalties should be somewhere at the reasonable level. Furthermore, it is important to allow flexibility in license contracts, such as to allow companies to select i.e. exclusive or non-exclusive license etc. depending on the business strategies of the respective companies. It is assumed to be effective if the patent policy clearly indicates these issues for the smooth licensing of patent etc. from universities to private companies.

## 5. For the Enhancement of Industrial Competitiveness by Industry/Academia Collaboration

We would like to expect the above-mentioned set of three conditions to facilitate the progress in the Industry/Academia Collaboration and active circulation of the cycle shown in Figure 1.

However how the Industry/Academia Collaboration should be deployed around the set of these three conditions? One idea thereof is shown in Figure 4 as the "Deployment of Industry/Academia Collaboration".

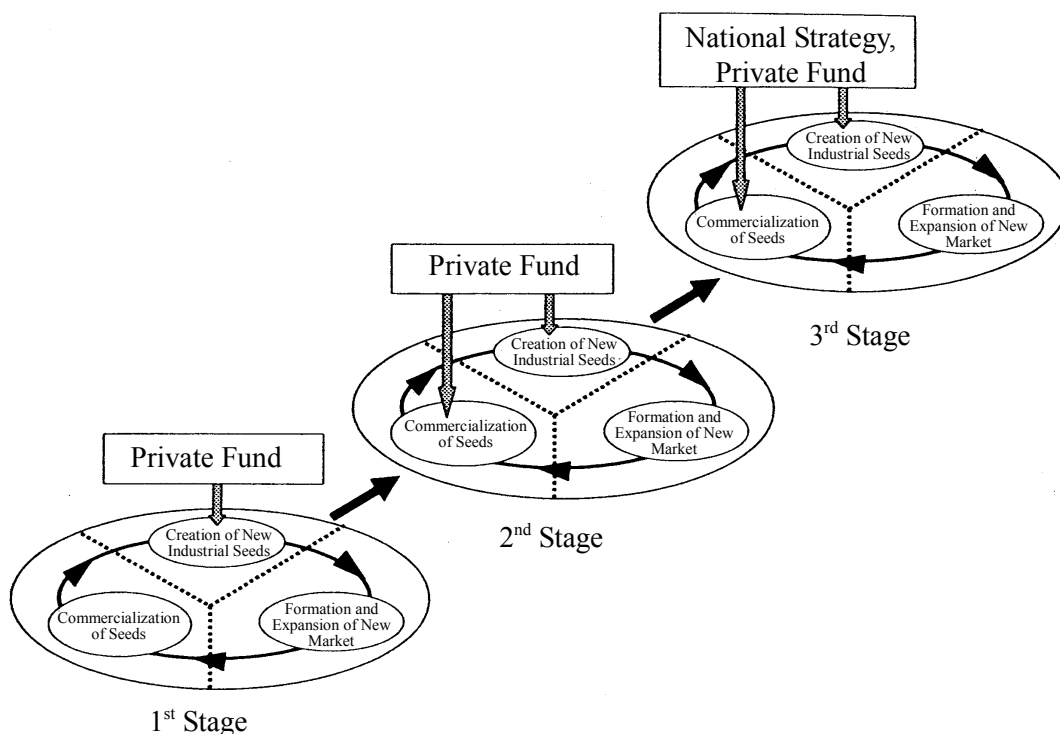


Figure 4 Deployment of Industry/Academia Collaboration



(1) 1<sup>st</sup> Stage

In the 1<sup>st</sup> stage, the creation of new industrial seeds shall be done by universities at public expense (tax), and commercialization of the new industrial seeds (results of researches by universities) shall be carried out by companies at private expense. The Industry/Academia Collaboration in the 1<sup>st</sup> Stage may serve to provide researchers of universities the information on what the current industrial needs are.

(2) 2<sup>nd</sup> Stage

Any university researchers will come to have the knowledge of the industrial needs by experiencing the 1<sup>st</sup> Stage Industry/Academia Collaboration. Accordingly, on the 2<sup>nd</sup> Stage, the researchers may have more motivations to set their research themes in their universities at those that are more relevant to the industrial needs. Since such the researches will more likely result in the creation of new industrial seeds that are more closely matched with the industrial needs, it is believed to be easier for private companies to invest more of their private funds in the university research activities even though there still are risks to a certain extent. As a result, universities will have a chance to collect private funds directly from the private companies for their research, in addition to the securement of indirect research funds resulted from the increase in the amount of tax corrected.

(3) 3<sup>rd</sup> Stage

In the 3<sup>rd</sup> Stage, from those research themes to which private funds are invested, the Government shall extract, as its strategic research themes, those themes that have a chance to create technologies that will enhance the national industrial competitiveness of Japan, and under the national strategic schemes, enhance the subject research efforts, thereby to enhance the technological growth.

In order to further enhance the industrial competitiveness through the Industry/Academia Collaboration in this way, the Collaboration shall be evolved from the 1<sup>st</sup> stage to the 2<sup>nd</sup>, and

then to 3<sup>rd</sup> Stage, and such evolution is believed to allow the creation of highly competitive technologies.

As for the driving force to push the Industry/Academia Collaboration, the set of three conditions are believed to function sufficiently. It is also believed that among those collaboration efforts being underway, there are ones that already reached to the 2<sup>nd</sup>, or even to the 3<sup>rd</sup> Stage. For those that are currently at the 1<sup>st</sup> or 2<sup>nd</sup> Stage, the above mentioned development should be considered.

## 6. Conclusion

Heretofore, we have explained one idea toward the successful Industry/Academia Collaboration.

The Japan-type Industry/Academia Collaboration, which combines the technologies of existing companies having extensive accumulations of technologies and those research resources of universities, is believed to be one good method to capitalize on Japanese advantages.

Furthermore, the evaluation of the Industry/Academia Collaboration shall be performed from a macroscopic viewpoint, based on whether it is contributing in the "expansion of employment" and "increase in research funds in the universities". Accordingly, it is believed to be necessary to keep on verifying the effect of the set of three conditions over the Industry/Academia Collaboration efforts that contributed to the expansion of employment and increase in research funds in the universities, to evolve them into a better effectual form. The macroscopic evaluation on the Industry/Academia Collaboration efforts and the verification on the effect of the set of three conditions shall be continued over a long term to extract the know-hows for activating economy through the Industry/Academia Collaboration, and accumulate and share the resultant know-hows in both the industries and universities.

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