

# The Improvement and Upgrade of Conventional Industries through University-Industry Collaboration

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**Abstract:** The aim of this paper is to present a long-term program schemed specifically for the improvement and upgrade of conventional industries in Taiwan, Republic of China. “The Conventional Industries Upgrading Program” have been strongly supported by the Industrial Development Bureau, Ministry of Economic Affairs and selectively assigned to many organizations (research institutes, universities, associations, etc.) for over ten years. Tze-Chiang Foundation of Science and Technology (TCFST) which was founded by the alumni of the National Tsing Hua University plays a successful university-industry collaboration model among all of the executive organizations.

The TCFST executed 93 projects from 1990 to 2000, and for each project at least one (maybe two or three) companies of conventional industries were assisted by each project. As a bridge between the university and industry, the excellent performance of TCFST can be realized through the fact that most of the projects kept close cooperation with the academic. There are thirty professional administration staffs and thirty R&D staffs in TCFST. After evaluating each project, TCFST will decide either to execute the project by its own R&D staffs or invite proper professors to do the research work cooperatively. The professors who are invited enjoy participating the projects, because they can apply their knowledge and R&D results to the industry and TCFST can help them control the schedule and deal with all of the administrative affairs by its professional staffs. Besides the National Tsing Hua University, TCFST looks for the proper professors and open the services to every university. The focuses of the programs are the executive processes, the control and check methods, which will be discussed separately. The relation between the TCFST and the academic are also introduced. At the end, how TCFST does the future planning to provide more complete services will be addressed.

## 1.Introduction

Tze-Chiang Foundation of Science and Technology(TCFST), a non-profit organization, was founded in 1973 by the alumni of the National Tsing Hua University. The primary goal of the TCFST is to build up connections among academic, research, industrial and governmental institutes in order to promote economic growth and upgrade the industry[1].

In the evolutionary process of the economic development of the Republic of China, conventional industries have played a significant role. In the past ten years, however, due to the domestic economic and environmental changes, the proportion of the conventional industries in the domestic manufacturing industry has been continuously declined. Even though this declination can be seen as a normal phenomenon in the economic development, however, to help stabilize the society during this economic transition, the government should provide whatever assistance available to conventional industrial companies to speed up the upgrade in their technological level and diversification of their products.

There is one point that should be mentioned, that is "there are no such things as conventional industries, but conventional products"[2]. In fact, by employing new technologies and enhancing design capabilities, the conventional products can be revitalized.

## **2.The Roles TCFST Plays**

Government policy on assistance to conventional industries has been focused on two aspects[2]. The first one is "Technology R&D". Every year there is a budget for developing all kinds of new technologies and products. The R&D outcomes will then be utilized and commercialized by industries for upgrading levels of products. The second one is the "individual assistance". Essentially, the government offers a number of projects for individual applications. The Industrial Development Bureau (IDB) of the Ministry of Economic Affairs (MOEA) of the Republic of China operates "The Conventional Industries Upgrading Program" for providing assistance on operation procedure, quality control or design mending.

The staffs in the TCFST catch the information of government's programs constantly. The collected information is not only provided to the researchers in the TCFST but also released to the selected firms and professors. It's not cost-effective for any firms to hire extra staffs to gather and update the latest development of the technologies. At the same time, the professors would not like to spend time to understand the game rules of different programs offered by the government. The TCFST plays the role of an "information supplier", it regards its own R&D staffs as its internal clients and it is willing to open the services to the external clients too.

## **3.The Executive Processes of the Programs**

After acquainted itself with the programs messages, the TCFST has to evaluate and decide the executive model firstly. For each program, depends upon the government and industry requirement, different decisions will be made. For each project, different conditions including the budget, timing and capacity etc. must be considered. The TCFST will choose either to execute the project by its own R&D staffs or invite proper professors to do the research

work cooperatively. The TCFST looks for the proper project members (including firms and professors) by announcing the information to the relative departments in the universities and contacting some potential professors at the same time. Although the TCFST is founded by the alumni of the National Tsing Hua University, the services which TCFST has provided are open to all universities.

"The Conventional Industries Upgrading Program" has supported hundreds projects annually in many fields. The TCFST has focused on the metal products and chemical industries. Regarding the budget of each project, the government subsidizes half of the budget and the companies which join the project are responsible for the other half. Before deciding the executive model, the TCFST will communicate and coordinate with the project members sufficiently. They discuss and decide the budget distribution, check points, working progress, project results and effects, payment deal and division of manpower. If all of the project members agree with the obligation and requirements, the TCFST will prepare the draft of the contract and request the project members sign the three-parties contract together.

During the executing period, the TCFST will deal with all of the administrative affairs by its professional staffs, including regular report to the IDB, schedule control of the work and budget schedule, visit to the firm to realize the progress of each project. Even after the executive period, TCFST is still in charge of the client's service by following the ISO accredited procedures.

#### **4.The Achievement of the TCFST[3]**

The achievement from the academic are generally not well informed to the industry, and the academic people don't know how to apply their research outcomes to the industry properly. The TCFST has continuously encouraged professors participating the projects and applying their knowledge and R&D results to the industry. On the other hand, the TCFST endeavors to push the project members to operate the budget effectively and achieve the expected results .

In the past ten years, the TCFST has devoted itself to improve and upgrade the conventional industries. From 1990 to 2000, the TCFST executed 93 projects and for each project at least one company (most of the time two or three companies) of conventional industries were assisted by each project. For most of the projects, the TCFST kept close cooperation with the academic. The excellent performance of the TCFST is being a convenient and efficient bridge between the university and industry.

To provide more complete services to both the academic and the industry is the most essential part of the TCFST future planning. The TCFST is presently located on the campus of the National Tsing Hua University and is very close to the Hsinchu Science- Based Industrial Park. Accompany with the development of the hi-tech and internet

industries, the TCFST has expanded the clients and service items of hi-tech industries and elevated the service quality to improve and upgrade itself. No matter which subjects in the hi-tech field, TCFST can practice University-Industry collaboration well. The TCFST not only has served as a liaison or integration office for implementing the Upgrading Program, but also has set the goal for itself that it should become the best program office for technology transfer from the academic to the industry in the whole country.

## **5. Conclusion and Suggestions**

Each project is a new challenge to the TCFST, there would be different situations and problems. The staffs of the TCFST are still engaged to accomplish the objectives by themselves or with the collaboration of professors or consultants. There are two suggestions hopefully to be accepted by the government for further planning.

(1)"Release the Intellectual Property Rights to the Industry". As mentioned earlier, the government subsidizes half of the budget for each project and share the same ratio of intellectual property rights. Practically, it's difficult for a company to share the rights or benefits with the government. Sometimes the company gives up the opportunity to apply patents to avoid violating the regulations. Since the current regulation confuses the companies very much, we think it will be more clear and motivated for the company to pay more attention to the intellectual property rights if the government promise to "Release the Intellectual Property Rights to the industry".

(2)"Always Keep Close Collaboration with the Academic and Apply Research Outcomes from the Academic to the Industry". The government has strongly supported the academic research and subsidized considerable budget annually to cultivate the manpower and capacity in the universities and academies, it would be most cost-effective to integrate and operate all of the existing resources and outcomes. The government has considered to encourage the companies to take the initiative in submitting the project this year, therefore the game rules for the upgrading program are revising. Under the new game rule, it's possible for companies to try executing the project by themselves to reserve budgets in their own company. After all, 98% of Taiwan's companies are of small and medium size. By doing this, it will be cost-ineffective and indirectly limit the participation of the academic. As above mentioned, we believe it's unfortunate if the channel of the academic research outcomes apply to the industry is dwindled and it will be more efficient and effective to promote the development of technology if we "always keep close collaboration with the academic".

## **6. References**

1. Wang, W. C. and M.H. Yu, 1999.08, "A successful University-Industry Collaboration Model-TCFST", Proceedings of the International Conference on Engineering Education, paper No.285, 8 pages, Technical University of Ostrava, Czech Republic, August 10-12.

2. Sandy Sun (translated by Gertrude Vong), 2000.01, "A Whole New World for Traditional Industries", Taiwan Turnkey Magazine, No.67, pp.2~11.
3. Yu, M. H. and W. C. Wang, 1999.08, "On Emulation of Special Projects", Proceedings of the International Conference on Engineering Education, paper No.284, 8 pages, Technical University of Ostrava, Czech Republic, August 10-12.