

Taiwan's Higher Education Reform towards Building a Knowledge-Based Economy

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I. Introduction

For the past thirty years or so, Taiwan has made tremendous progress in the area of higher education. Indeed, it is well recognized that the high quality man-power produced by our education system is one of the major factors for Taiwan's economic success. However, as we enter the new century, into the new era of globalization and knowledge-based economy, we find ourselves facing multi-faceted challenges in higher education. On the one hand, increasing demand from the populace for access to university education as the result of the democratization processes has helped pushing up the number of universities in Taiwan from about 60 to over 150 in the last decade or so, severely diluting the available resources for individual universities. On the other hand, we all realize that in the age of knowledge-based economy, to help Taiwan remain competitive in the world, it is essential that we cultivate a pool of knowledgeable and innovative workers who are able to create new knowledge and willing to take risks in their career development. This pool can only be cultivated by world class research universities. How can we establish first rate research universities in Taiwan amid diminishing per capita higher education investments? Obviously changes have to be made. Realizing the seriousness of the matter, the Science Advisors of the Executive Yuen suggested to the Premier in 2002 to establish a cross-ministry committee to draw up a master plan for Taiwan's higher education for the next decade or so. A nine-member committee was appointed by the Premier in the Spring of 2002. The Committee Report was completed in 2003 and submitted to the Premier. Major recommendations from the report were approved by the Government and are being implemented. In the following sections, some of the findings and recommendations from the report will be summarized.

II. Classification of Universities

A recent survey on the per capita resources enjoyed by the students of leading universities in Asia has confirmed the shocking disparity among the institutions, with Taiwan near the bottom of the ladder. At Tokyo University, the per capita spending is 2.3M NTD. It is 1M at Australia National University, 1.4M at Hong Kong University, 1M at National Singapore University. At National Taiwan University, the highest in Taiwan, the number is 0,22M. With the number of universities still increasing, further cuts in funding from the Government are expected. The major problem is that all universities in Taiwan aspire to become research universities. They expect to share government educational funds equally. For years this demand of funding equity among universities in Taiwan has more or less prevailed in our Ministry of Education's funding policy. Among all public universities, the major portion of government support is distributed on per head basis. The limited annual increase in higher education funds in recent years is easily outpaced by the increase of the number of students attending the new universities. Even if the higher education budget is doubled, under the current system, National Taiwan University does not have any chance to make up for the disparity. The obvious thing to do is to change this head count based funding policy to one that is merit based. The fact that this has not been done reveals the heavy bureaucratic and cultural baggage our higher education system has been carrying. Therefore the first thing the Committee has decided to recommend is to do the obvious: to classify the universities into four different categories, according to their functions. Funding for universities in each category will be different, based on realistic needs and merits.

1. The research universities

These are the few universities in the country that are responsible for conducting cutting-edge research. State-of-the-art equipments are provided to top notch researchers in these universities to help them create new knowledge, invent new technology and train students who will be future leaders in their chosen professions. We hope to see that several of the research universities in Taiwan will eventually achieve world class status. These universities will be expensive. So the total number in this category should not be large. Only by funneling sufficient new funds into these few

qualified universities can we hope to achieve the goal. Helped by a group of external independent scholars, an open, transparent process based on a set of performance indicators should be followed to select the research universities.

2. The teaching universities

The majority of Taiwan's universities fall into this category. The major responsibilities of these universities are to teach students the state-of-the-art knowledge in their chosen fields and to provide fundamental general education courses for the students to choose. The graduates from these universities are expected to be able to think independently, to learn new knowledge by themselves, and to function as good citizens. They will be the future merchants, bankers, engineers, politicians, doctors, CEO's, etc. The professors in these universities will also do research to keep themselves abreast of their own fields and to train students.

3. The special purpose universities

This is a somewhat unique situation in Taiwan. For years, vocational schools for technicians, nurses and elementary school teachers have contributed significantly to Taiwan's education. In the past two decades, prompted by the Government, most of these vocational schools have been transformed into four year colleges and poly-tech universities. In addition, there are quite a few medical colleges and universities as well as universities of fine arts and performing arts. So this is the third category of Taiwan universities. They are quite large in number and play a rather important role in our higher education system.

4. Community colleges

These are local two year colleges replacing the old vocational schools to be set up by local governments, as part of the life-long learning network in the Country.

Evaluations criteria should be established for each category. In addition to the new funds for the research universities, the Government should also provide new money for the other categories, according to the realistic needs

of each. The universities are given the opportunity to compete for the additional funds to pursue excellence in their chosen categories.

To implement the plan, the Committee specifically recommended that the Government should increase the higher education budget by an additional 5 billion NT dollars per year for the next ten years. The Government responded by putting in 50 billion NTD for the next five years. This budget is now in the Legislature.

III. Changes in Regulations

It turns out that having sufficient funding is only the necessary condition for Taiwan's universities to pursue excellence. Regulations on accounting and personnel procedures have long contributed to the stagnation of higher education development. The Committee recommended that existing regulations be reviewed and replaced by new and more flexible ones in the efforts to raise the academic level of our universities.

1. Overhaul of the academic rewarding system

Currently, there are essentially no differences in compensations for every professor of the same rank. The small differences are due to seniority only. The committee recommended to set up differential steps for professors of all ranks including the to be established Chair Professors so that salaries can become competitive in the world academic market. Merit increases should become a common practice. Also, it is noticed that competition for research grants and awards at the National Science Council are currently based more or less on the number of publications by the applicants. This has affected, to certain degree, the research behavior of many of our professors. Short communications are preferred over full articles. Follow-on studies are considered more rewarding than risk taking cutting edge investigations. How to reward quality has become one of the urgent tasks in our universities.

2. Separation of national university governance from government regulations

Historically, national universities have been under the Ministry of Education as part of the government. In recent years, the universities are allowed to set up the so-called University Operation Funds so that partial financial autonomy is achieved by operating within the Fund. However, the university personnel system is still closely tied to the government, in salary schedule and retirement benefits. Therefore, the universities depend on the Ministry of Education for new quota on hiring. The flexibility in personnel matters can only be achieved if new rules for national university governance can be established independent of governmental personnel regulations. The Committee recommended that the government speed up its deregulation efforts.

IV. Closer university-industry collaborations

1. Current status of university-industry relation in Taiwan

In Taiwan, most of the talents capable of helping the industry to carry out high tech research and development are in the universities. However, up to now, the industry has not seriously attempted to tap into this pool of talents. Many companies do ask professors to help on specific problems from time to time. But most of these interactions are in the form of individual consultations by professors, helping the companies to find ready solutions to problems concerning certain processes and materials, or to acquire information about relevant new technology. A few companies have engaged university professors by awarding research contracts to them to carry out well defined projects. The contracts are usually of limited size and often short term. Almost no companies in Taiwan offer summer internship to university students, none offer co-op programs either. The National Science Council (NSC), in an attempt to improve the situation, has initiated a special Industry-University collaboration program. The participating companies can form partnership with university professors to work on specific research and development problems. Depending on the proposal, NSC will provide up to 75% of the funds for the projects. However, the responses to this initiative from both the industry and the academia were lukewarm at best. In the past, ITRI has helped by providing R and D results for new technology and trained personnel to the industry. Spin-off companies from ITRU have played an important role in Taiwan's

high-tech industry. But the R and D capacity of ITRI is far from sufficient for the whole country. That capacity exists only in the universities. Therefore, in a knowledge-based economy, Taiwan's industry can not afford not to forge closer collaborative relationship with the academia.

2. Changes in university regulations to improve university-industry relations

There are several major reasons for the lack of success of the effort to form closer collaboration relationship between the universities and the companies. The first is the matter of incentives. The existing academia rewarding system does not encourage the faculty members to work with the industry unless publishable results are generated from the collaboration. This, obviously, is usually not high on the priority list of the company. Secondly, the regulations of most universities for appointing adjunct professors from industry are too rigid to allow the university to widely hire those people from the industry with real working experience so that the students can benefit from interacting with them. The Committee recommended that governmental as well as university regulations regarding industry-university collaborations be relaxed, Patents, success in technology transfer as well as consulting should be taken into account when a person is being considered for promotion or merit increase. The universities are urged to establish new degree programs with full participation of the appropriate personnel from the industry. The companies are urged to provide summer internship opportunity for the students and to start co-op program in which students can spend a year or more working in the company during their college careers. The universities should allow students to participate in these co-op programs.

3. Technology transfer and IP issues

Another reason for the lack of closer relationship between university and industry in Taiwan is the lack of experience in dealing with IP and technology transfer issues from both sides. Recently, the NSC has issued guidelines regarding IP rights on research results generated from research carried out by university professors and students supported by the NSC. Also the Small Business Administration of the Ministry of Economic Affairs has provided funding for many universities to establish Incubation

Centers. The centers are organized to help entrepreneurs with appropriate background, tapping into the R/D resources of the universities, to start new companies based on new technologies. The matter of setting up spin-off companies by the professors themselves and/or by the national universities using university funds should be discussed seriously by parties involved, including the Government, to find a reasonable solution. In addition, the university professors should be encouraged to conduct research aimed at helping industry to overcome fundamental technical barriers in their efforts to develop new products. These mission orientated research programs are rather new to professors. They require more discipline and are sometimes deadlines driven. The Ministry of Economic Affairs has recently established a new program to award large multi-year grants to university research centers in order to promote this type of research in the academia. More technology transfers are expected from this effort.

V. Conclusions

In this talk I have tried to summarize the main recommendations by the Higher Education Planning Committee in Taiwan in an effort to reform the universities so that they can play an important role in Taiwan's efforts to keep herself competitive in the new era of knowledge-based economy. Some of the recommendations are already being acted upon by the Government. Hopefully, in the next few years most of the necessary ingredients for establishing a world class university in Taiwan as recommended by the Committee will be in place. However, I have always reminded my faculty members that the real challenging tasks to reach this lofty goal remain within the university. Only when the faculty members are serious about achieving the goal does the university have a realistic chance to succeed.