



**Business-University  
Forum of Japan**

## ASIA BUSINESS-UNIVERSITY WORKSHOP

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## SUMMARY

Business-University Forum of Japan (BUF) held the first Asia Business University Forum at Academy Hills in Tokyo on March 24, 1997. The aim is to contribute to promoting collaboration between universities and industries in Asia. Nine representatives from seven neighbouring Asian countries, eleven representatives from Japanese academia and industry, seventeen floor members gathered to exchanged opinions on problems in human resource development in diverse Asia and the present situation and obstacles for collaboration between universities and industries.

Dr. Hiroyuki Yoshikawa, the president of the University of Tokyo, made the opening remark. He spoke of the aim of the First Asia Business University Workshop as follows. Now that the structure of international relations: the two big camps of the United States and Russia collapsed, mankind has not yet found the way to go. In this situation, the mission of university is to educate youngsters into intelligent people able to understand and manipulate and find out good ways to cope with difficult and complicated situations. In Asia, compared with industrial or technological collaboration, educational collaboration is not enough. We hope to deepen mutual understanding how Asian countries can collaborate in the field of human development in the future.

In Session One: Human resource development - views from academia. Under the theme, representatives from each country exchanged views on present status and problems in human resource development, present status and problems in collaboration between universities and industries, and problems relating to students educated abroad. Dr. Guan Zhicheng, vice president of Tsinghua University, China, pointed that human resource development is important in the 21st century when the fierce competition is expected. As concrete measures, he proposed the development of higher education and enhancing collaboration between university and industry. He introduced examples in Tsinghua University such as setting up Industry Cooperation Committee including foreign companies, technology transfer through engineering research center and benefit of continuing education.

Dr. Richard Mengko, lecturer in Bandung Institute of Technology, Indonesia, made his presentation focusing on what service university provide to the society. He said that it is made through consulting, laboratory research and development, education and training programs. As an example for bridging the gap between industrial needs and academic research theme, he introduced "Link & Match Program." Under the program, universities are expected 1) research activities to develop human resource capability through scientific publications, 2) research activities to develop human resource capability through fulfilling the present needs of industries. Finally, he introduced entrepreneurship development programs.

Dr. Isao Karube, professor of the University of Tokyo, presented present situation in which Japanese universities are, and efforts to meet industrial needs as he introduced a results of survey to Japanese CEOs conducted by a working group in BUF.

Dr. Young-Dal Cho, associate dean of college of education, Seoul National University, made his presentation under the title of "An Understanding of Korean Higher Education in Human Resource

Development." He spoke of what human resource development is, present situation of Korean higher education and catch-up strategy for the future. Defined human resource development as a process of developing and/or leashing human expertise, he described Korean human resource development by three stages after 1960s; the expansion of higher education, specialization of higher education and imbalance of demand and supply in labor market due to flux of university graduates. Regarding obstacles for university reform, he mentioned difficulty in diversifying university because of strictly fixed hierarchy, lack of financial sponsorship, governmental control. For the future, he proposed collaboration between university and industry, research park and scholarship offered by private sector.

Dr. Reynaldo B. Veal, dean of college of engineering, the University of the Philippines, made his presentation on status of higher education in the Philippines, issues of obtaining a foreign education, the future of and obstacles to business-university collaboration. He pointed that the quality of higher education is not high for its numbers and the problem of underemployment. To overcome these problems, he introduced some efforts: classification of higher learning institutions in a better way, the accreditation system, setting-up national and regional centers for excellence. On issues of obtaining a foreign education, the problem is really afford ability, he said. Although the existence of language barrier, in recent years, more and more students are trained in Japan. Another problem is the equivalence of the education. Diploma obtained in the different system is not commensurate with the Philippines diploma programs. Regarding business-university collaboration, he introduced function of a science and technology coordinating council advising the President of the Republic as an example of government involvement. Then, continuing education, technology park, a manufacturing linkage program, internships for students and faculty, and a adjunct professorship program followed as examples. Finally referring to ongoing efforts for setting up a higher engineering education network in Asia, he expected the linkage between industries would underpin the networking.

Dr. Wei-Chung Wang, professor, Department of Power Mechanical Engineering, National Tsinghua University, made presentation entitled "the status and problems of higher education and human resource development in Taiwan." Firstly, he introduced a unique system which high students obtained degrees from either vocational schools or universities. Recently the Ministry of Education has just passed six vocational schools to become science and technology universities. Regarding issues of students studying abroad, he pointed culture shock when they return to Taiwan is bigger and increasing number of students obtained higher degrees chose to stay in Taiwan. Among problems are gap in supply and demand in labor market due to more students going to universities after finishing vocational schools, lack of personnel having technological and management skills to catch up rapid changes in society. Obstacles to collaboration between business and university are, he added, the different needs between the two. For example, small and medium sized companies comprise 98 percent of the businesses in Taiwan need people who can solve the problem right away. The other obstacle is over support from the government. Because of it, there is no motivation for universities to get support from businesses. Lack of full time staff for collaboration between the two is another problem. Solutions he proposed are; a

re-engineering of the higher educational system, closer communications between different educational system, and designing and implementing a mechanism for promoting collaboration between academia and industry.

The final presenter was Dr. Narong Yoothanon, Dean of Engineering, Chulalongkorn University. Under the title of human resource development and the shortage of manpower in Thailand, he explained that they had more than 100 colleges and universities and the Ministry of Education is for primary, public high schools and vocational schools while the Ministry of University Affairs is for all colleges and universities. He pointed out that the most serious problem is lack of engineers. Remedies taken are: expanding the existing universities or establishing new universities to recruit more students. The obstacles to human resource development are three. The first is that human resource development planning must take technological change in both quality and quantity. The second is that the base of manpower development must expand even to the primary and high school education. The third is that training process is essential.

Session Two: Human Resource Development -- views from industry. At the beginning, the chairman--Dr. Akinobu Kasami, Senior Vice President of Toshiba Corporation-- pointed out that we needed personnel having a wider scope and able to make a good network among themselves. For that more discussions and exchange of personnel between business and university are important.

Presentations by representatives of each country followed. Firstly, Mr. Subirman, Assistant Vice President on Human Resource Development, PT Telekomunikasi Indonesia, introduced what kind of cooperation PT Telekomunikasi had been doing with universities in the field of human resource development. More concretely, they are academic or cooperative education programs, upgrading education programs, and sponsoring of educational institutes. He put emphasis on the cooperation program or co-op program and an educational upgrading program having many strata.

Representing Malaysia, Mr. Nik Mustapha Nik Mohamed, General Manager Human Resource and Corporate Affairs Division, PNB, made presentation on the present state of business-higher education collaboration, PNB's examples, and obstacles and future direction. As factors of human resource development, he pointed out three aspects; training which is refereed as preparing people for the present job; education which is basically culminating in getting a paper qualification; development which is basically preparing our people to face changes of direction in organization. He said that, in terms of education, the higher educational institutions are doing a good job in Malaysia. But, not in terms of training and development. There are a lot of training providers while their quality of training is doubtful. There is now interest shown by the higher educational institutions to come up with MBA programs.

Actual case of collaboration with higher education institutions is certificate in Investment Analysis in associated with the Institute of Technology of Malaya. For the future of business-higher education collaboration, he pointed that

we must ensure not only quantity but also quality.

Representative from the Philippines, Mr. Edogardo A. Paynor, Vice President of Microelectronics, Inc., minutely explained UPMLP, a manufacturing linkage program with the University of the Philippines, which Dr. Reynaldo B. Veal mentioned. About 15 companies join the program. They encourage the university students to visit plants to be exposed on manufacturing. Then he introduced a linkage with AOTS under the program, DGPPST partnership, a collaborative program between the Semiconductor and Electronic Industry Foundation Inc (SEIFI) and Polytechnic University of the Philippines (PUP). At the last, he mentioned "Electronics Kapihan" which produced the collaboration between SEIFI and PUP.

Final presenter was Mr. Kataoka, Senior Executive Advisor Tokyo Gas Co., Ltd., made presentation about the involvement of Japanese industry with education and human resource development, as well as related business-university cooperation with other Asian countries, placing the emphasis on the role that Japanese industry can play in this sphere. He introduced that Japanese industry furnishes generous support for research activities in universities. The results of university research activities make a practical contribution to industrial activities. Because Japanese companies located in other Asian countries transfer technology to the host country, it may be said that the fruits of business-university cooperation in Japan are also indirectly enjoyed by the other Asian countries. He pointed out that Japanese companies are carrying out human resource development programs for on-the-job training in their local affiliates as well as accepting trainees for programs in Japan. He expected that financial, technical and human resources to Asian higher education institutions would amplify international exchange among industrial and academic engineers and researchers.

Session Three: Towards international collaboration. Following presentations and discussions in Session One and Two, participants discussed how an international collaboration in Asia should be. Chairman Dr. Takashi Inoguchi, Senior Vice Rector of United Nation's University, pointed out the three major structural trends; the relentless tide of technological progress; the globalization of economic activities and growing economic interdependence; government deregulation and the concomitant government revenue decline. He proposed "flexibility," "determination or strong will" and "creativity" as guiding principles for further discussion.

Through discussion, participants agreed to adopt "flexibility," "practicality," "creativity," "determination," "shared mind," "collaboration," "agility" and "stressed goals" for guiding principles.

For institutional framework, participants agreed to exchange opinions using E-mail, then have a meeting on their own expense.

## Opening Address and Welcome Remarks

Dr. Hiroyuki Yoshikawa: The purpose of this workshop is to understand each other -- the necessity and possibility to undertake some collaboration in the field of education among Asian countries. Education, of course, is the most crucial subject among modern mankind, and also, every country is trying to develop its educational system. But compared with the industrial or technological collaboration, educational collaboration is rather sparse, is not enough. So, I think it is necessary for us to exchange our ideas about methodology and status of education in different countries, and to start the collaboration in this field. First, I would like to say that the urgent task for mankind in our modern society -- is to find out the method, how to develop our countries under the constraints of sustainability. Sustainable development might be one of the most important tasks for us, which was already pointed out at the Rio de Janeiro conference five years ago. But unfortunately, I think, we have not yet found out the possible way to go. I can say very simply that in modern society we are now confronted with a problem, that is, the shortage of intelligent brains. If you look at the international relations, we are now in a very confused and complicated situation. In the past, for example, if you looked at the two giant countries, it is rather simple that countries took side of the two superpowers; the United States and Russia. But now, there are many, many independent countries which are going their own ways, and the unified direction of mankind is still quite

obscure. So it might be that to understand the situation which is happening on the earth is quite difficult for us. So, we need a lot of intelligence to understand the situation and to find out the right direction where we should go.

Also, if we look at the technological system, I think there is still very difficult complexity -- for example, the system of manufacturing, the system of plantation, the system of operation, has become very complicated because of the very high level of technological development in many fields. So, operation of a machine, for example, is very, very difficult to understand. In the past, machinery was made of just machine parts, or just an electrical system, so an electrical engineer or a mechanical engineer could deal with that kind of machinery. But at this moment, all systems are composed of different kinds of elements, like electrical, software, mechanical, and sometimes biological. So, in order to operate even a single machine, the operator might be asked to carry various kinds of knowledge. So, from the educational point of view, the international relations point of view, and technological point of view, we need a lot of intelligent people, which must be produced by our institutions -- that is, universities. It is quite necessary for us to educate youngsters into intelligent people able to understand and manipulate and find out good ways to cope with such kind of difficult, complicated situations which are now arising us. So, maybe, in this session, we can exchange our efforts going on in every country, and find out direct ways how to collaborate with each other.



Session 1: Human Resource Development  
-- Views from Academia

<Presentation>

Dr. Guan Zhicheng: The 21st century is coming with peace and development as major current themes, and intense competition is integrated in social development. The competition is mainly carried out in the arena of economy and national power, and is intrinsically the competition in science and technology as well as in specialized personnel. Sustainable development of economy depends on science and technology, as well as specialized personnel, hence, the cooperation between institutions and industries.

Universities in China should train personnel with specialized knowledge and skill, and pursue R&D in accordance with their own social conditions, to meet the needs of the development of the national economy. On the other hand, industry should pay attention to the development of education, strengthen its links with educational institutes, maintain close cooperation with universities in a more efficient way, and guide the development of higher education in a correct direction, so as to meet the challenge of the coming century.

Second, enhanced cooperation with industry is one of the key issues. Universities should meet actively the requirements of the social and economical developments. Universities should also strengthen through R & D their cooperation with industry, accelerate technology transfer into industry, so as to serve better social and economical development. Chinese industry has a relatively weak research capability at the moment. With the establishment and the development of our market economy, under the shifting of scientific research resources to industry, Chinese industry has gradually become the main part for technical development. Industry needs support from scientific institutions and the universities. Scientific institutions and universities can become a force for promoting scientific progress only when they link themselves closely with industry. The Chinese university has a very strong research ability. For example, each year, Chinese universities undertake 90,000 research projects.

Third, cooperation between Tsinghua University and industry. Tsinghua University is a national key university, comprising disciplines of engineering, sciences, management and liberal arts with engineering as its main focus. Tsinghua University has a fine tradition of cooperation with industry. The University has taken a series of important measures to strengthen its cooperation with industry, for example: 1) Setting up the Tsinghua University Industry Cooperation Committee in July 1995. I am in charge of this committee. At the moment, more than 60 Chinese enterprises and 25 foreign companies have become the member companies of the committee. This includes more than 10 Japanese famous companies -- for example, Hitachi, Panasonic, NEC, and so on; 2) Establishing engineering research centers to carry out leading R&D and conduct intermediate tests so as to promote technology transfer; 3) Establishing joint research centers with both Chinese and foreign enterprises; 4) Setting up joint research foundation with local governments and enterprises; 5) Developing university-run high-

tech enterprises and planning to establish Tsinghua Science Park on the campus of our university; and 6) Strengthening cooperation with industry through continual education. The Continuing Education School of Tsinghua University is the first continuing education institution ratified by the State Education Commission of China. Students of continuing education are mainly experienced leading persons. They get their knowledge and skills renewed, improved, broadened and perfected. Their participation in continuing education also promotes the education reform, research cooperation, and the disciplinary development of the university. Continuing education is an important channel linking university with society and a bridge between university and industry, too. For more than ten years, we have already run 900 different seminars, advanced training courses, and short-term courses, and more than 40 international seminars supported by UNESCO, UNDP and the World Bank. A good source of benefits has been achieved with the continuing education.

<Question & Answer>

Dr. Hiroyuki Yoshikawa: What is the relationship between the educational program and research programs?

Dr. Guan Zhicheng: The University has two centers. One is education center, and the other is research center. For the research center, one is the basic research and another is applied research. At Tsinghua University, the engineering is very strong. There are 31 departments, and among them 17 engineering departments. The research income, last year, maybe half from the government for the fundamental research programs and half comes from the industry. When finished, the result of the research projects can be directly used in the industry. In the Industry-University Cooperation Commission, we make joint research projects, and give training programs for the enterprises. Also, we have the university enterprises and a factory. Some professors just work in the enterprises as a business professor. I think in these university enterprises, some high technology transfer is accomplished to the industry. Also, we have set up so many joint laboratories, joint training centers, and joint research institutes in the university. I think about 40 of the foreign famous companies already have joint centers in the university. The companies give some donation, for example, some equipment. With the joint center we can train some people coming from all other countries.

Dr. Shuzaburo Takeda: In addition to education and research, maybe a third very important role for the university might be how the university collaborates with society. Could you emphasize or elaborate on those points?

Dr. Guan Zhicheng: I think the situation is different between China and Japan. In China, the university has a strong research ability. Chinese economy is developing very fast, and the industry needs high technology. With the cooperation between universities and industry, the high technology can transfer from university

to the industry. Now, "Engineering Key Projects" in our university come just from industry, when finished, we just give the key to industry. With the close cooperation with industry, the university will give a great contribution to the society.

Dr. Takashi Inoguchi: Basically, there are four general patterns of foreign students studying in the United States: one is going to the States, getting a degree and staying there; second is getting a degree and then coming back; third is studying, getting a degree in the home country, and then going to the United States and staying there forever; the fourth type is getting a degree here, further training in the United States, and then coming back here to live. Which types are emerging in China nowadays?

Dr. Guan Zhicheng: At the moment, I think there are more students, when graduating, go abroad to study for a Ph.D. In our university, there are more than 300 young people having returned from the U.S., Japan and Europe. I think the majority of the people should get their Master and Doctorate degrees in China, and after that, they can go abroad to do some joint research projects for one or two years, just like me.

Mr. Hirofumi Kataoka: What is the function, or obligation, of foreign companies of the University-Industry Cooperation Commission?

Dr. Guan Zhicheng: For Commission members, our university send some information -- for example, some newspapers and magazines of university just introducing the situation of economic development in the country and in the university, and some opportunities to do joint research projects and cooperation between our university and the industry. We will introduce some graduate students from our university to have jobs in the foreign company. We often hold some seminars and international conferences to discuss something both the company and the university are interested. We can invite some important persons in the Government, there are so many graduate students from Tsinghua university now becoming very important persons in the Government.

<Presentation>

Dr. Richard Mengko: This presentation is much influenced by the engineering fields; not social sciences universities. So, these services basically are done by the universities because of four basic reasons: 1) to maximize the utilization of facilities and capabilities on the campus; 2) to enrich lecturers or researchers with practical or real experiences. 3) to direct students and research groups on the campus so that they are more sensitive to the needs of industry; 4) to add collaborative partners.

In Indonesia the universities handle services to the public and industries through consulting; laboratory research and development; education and training programs. In the case of the Bandung Institute of Technology, we have three different units in the campus to handle these various types of services. The first unit is the Foundation for Research and Industrial Affiliation. Contacts through this unit are more

based on commercial and professional business deals. Normally, it includes consultative contracts, training for executives, professionals. The second unit is the Institute for Research which is focusing on organizing research funding. The third is the Institute for Community Service. This unit normally concentrates on activities for dissemination of science and technology; so, it is more to the social activity.

Part two is how much universities can meet the public and industrial needs. Indonesian industries are just trying to develop their capabilities in the last two decades. What they really need is actually support to improve their production outputs. On the other hand, in universities young lecturers or researchers that have studied abroad normally come back having a scientific objective, rather than helping industries' problems. We have a gap. Our Ministry of Education tried to promote a program three years ago to narrow this gap. It is now popularly known as the Link & Match Program. So, the Ministry asked universities to re-orient themselves to serve the industrial needs. By consequence, universities should be aware now of two different types of research. The first type is research activities to develop human resource capability through scientific publications. The second type of research is also to develop human resource capability, but through fulfilling the present needs of industries.

Part three is about the entrepreneurship development program. Since we tried to improve the intellectual capability of human resources, the young graduates came to feel that they can do something more than the existing industries. I think that this is an asset for the national development. So, we started organizing entrepreneurship development programs so they can improve their capabilities. These programs are done in the universities with the help from venture capital. These entrepreneurship development programs normally include: first, giving the young graduates opportunities to manage small projects; second, giving them basic management courses; third, linking these young graduates with financial sources.

May I propose a type of regional or international "Link & Match Program" and also a type of entrepreneurship development program?

<Question & Answer>

Dr. Yoichi Okabe: How many students will go into venture businesses?

Dr. Ir. Richard Mengko: It is very small here because we just started 16 months ago and there are three or four universities also starting at the same time -- so it is very small in percentage. We now have only about 30 willing to be entrepreneurs.

Dr. Young-Dal Cho: I am very interested in the Link & Match Policy. Please give me a concrete example activated in recent years in your country.

Dr. Ir. Richard Mengko: Since two years ago, our government has a research grant to universities. With this research grant, we are forced to work together with industry, and you receive no research grant if you do not work together with



industry. That is one of the examples.

Dr. Takashi Inoguchi: I have had an opportunity to teach at Gadjah Mada University of // Jogjakarta, Java, Indonesia in 1990 very briefly. Indonesia is very interested in keeping students studying abroad as diversified as possible. This is something that has to do with the Indonesian belief that industry has to be built independently from too much predominant foreign influences. In relation to it, the center for student entrepreneurship development is an excellent idea. How are you going to do this?

I think the government's revenue is going to decrease because oil and other natural resources will be utilized for domestic industrialized purposes. How much are you willing to accept the situation in which industry determines the nature of this entrepreneurship project largely financed by the industrial sector? How do you keep the university's ability to shape the project?

Dr. Ir. Richard Mengko: This was created by help from the private-sector one and a half years ago. After the program, the graduates can build their own independent companies that does not need to be strongly related to the university. The only thing we need from them is that we still need help later on to create new other entrepreneurs.

About four or five years ago, a very innovative group of lecturers opened a company for lightening protection. But, now, the university thought that it was not a good decision because to be a lecturer and executive in a company could not accomplish anything good to competitors in this era. We now have to re-orient ourselves and companies like that should be given to the professionals. The ideal owner should have a share and let the university have a small share. // In that way, we can grow much more industries or companies around the university rather than keeping the whole thing in our hands. We have tried to build industry independently and I think that is the only solution.

Dr. Shuzaburo Takeda: How many universities or higher institutions of education in your country are founded by foreigners? In Japan, 100 universities have been founded by outsiders since Meiji Restoration. The Japanese never try to establish universities outside of Japan.

Dr. Ir. Richard Mengko: The law in Indonesia required only for domestic sources of education. But I have heard that there would be a change in the law this year. That law would give foreign sources the opportunity to do educational activities in Indonesia.

Dr. Shuzaburo Takeda: How would you read your people's reaction, do they welcome such a movement? The people in Japan welcomed that movement.

Dr. Ir. Richard Mengko: In Indonesia today, we have 1200 private universities throughout the country. These universities have completely different levels of quality and everything else. We Indonesians still have certain problems to unify the levels.

<Presentation>

Dr. Isao Karube: I am working as a Chairman of the Business-University Cooperation. We have made an interview with the CEOs of industries and corporations. Most of the CEOs have been more or less satisfied with the university graduates. They say that university graduates have enough knowledge, that they are obedient and very bright and cheerful, and they work very hard taking instructions. They are rather popular with CEOs. But at the same time, CEOs want personnel with diversity, creativity and of problem-solving types. We say that the kind of person would become presidents or CEOs. CEOs would like to have that sort of person for their replacement. But universities are not educating students to turn out to be CEOs. It is difficult to send out such kind of people to the society.

What the university is trying to become institutions that can cope with social changes or to educate people who can cope with that changes. Particularly in Japan, there is a rapid popularization of university education due to a rapid increase in the number of students. On the other hand, there is also a popularization of university professors. In the past, only 5% of high school graduates proceeded to university education, but today that figure has increased to 46%. Many people do receive a university education, in other words, you have diversity in the students.

So, industries make a great deal of efforts in undertaking examinations to select the best students based on their character and abilities. On the part of the university, reform has began for their survival because every family has fewer children. Particularly in 1992, a peak was recorded in the number of university students at 2.05 million, but by the year 2010, in 18 years later, it will be reduced to 1.1 million — one-half. There are about 1000 universities in Japan of which 100 are national universities. There are four-year private universities which number more than 500, apart from that, there are two-year junior colleges. Half the universities are going to disappear. So, universities are trying to stimulate diligent students by adopting syllabus for courses. Particularly here in Japan, it takes a great deal of competition for the student to enter a university. It is said that once they enter the university, they lose a will to study.

Particularly our study group is preparing a report in business-university collaboration focusing on how the university can collaborate with industry on training people needed by them. It is very difficult to educating students to become CEOs in the future. But, the university is trying to meet the needs from the industry. The Ministry of Education also came up with a report on educational reform so that we can foster rich human nature. In the report the Ministry acknowledges the need for reform of educational system, flexible institutions, curriculum restructuring, fostering rich human nature, improvements in education on environmental concerns and so on. The demand of the society is changing. The Japanese industry now need creative R&D very much. Educating people who can meet such a demand is put the center in the report.

In Japan increasing number of graduate schools focus on themselves. At the University of Tokyo, we are refocusing on our graduate school through

an institutional reform. Those who have a master's degree are in much demand by industry. So, many students came to go on to master's degree, but very few would go on to Ph.D courses. One reason is that very few graduates having Ph.D. take jobs in companies. The other reason is they are not yet ready to welcome and accept students with Ph.D. The focus for universities in the future is to open up or create a career path for young students who completed their course work and working on thesis. Some of Japanese companies are more aggressive about recruiting people with a Ph.D., we expect there will be the career path.

Also, the Research Center for Advanced Science and Technology, where I am with, will create a doctorate course to re-educate researchers from companies. This is a course which researchers in companies go back to university with the support from their companies.

Many universities now are trying hard to train students who are going into a venture business. The Ministry of Education, in particular, in order to encourage such students, has come up a special program. In 1996, 114.6 billion was budgeted for this purpose to aggressively train students who would go into a venture business. The University of Tokyo also has established an intelligent modern laboratory, where lays emphasis on fields such as artificial structure engineering offered by Dr. Yoshikawa.

In conclusion, the Ministry of Education as well as the universities and the industries, particularly the Japan Federation of Economic Organizations, are conducting dialogue in order to promote business-university collaboration. I think this will be strengthened much more in the future.

<Question & Answer>

Dr. Guan Zhicheng: What is the purpose of the Research Center of Advanced Science and Technology at the University of Tokyo? How many people work in this center and what is the direction of the center?

Dr. Isao Karube: Our research center was established ten years ago to promote high tech areas in research, mainly material science, electronic and system engineering, biotechnology and socio-technology. The number of the staff of the center is about 50; professors including full-time and associate professors. In the next fiscal year, we will start a department of intellectual property. This is for mainly studying what is intellectual property and what kind of roles are for universities. We are inviting professors of faculty of the law. also We also established an international collaboration center for universities and industries. Professor Okabe is a professor of Center for Collaborative Research (CCR), a special research center for industry and university cooperation. We have much activity on the promotion of science and technology and also we are educating many people in industry for promoting science and technology research.

Dr. Young-Dal Cho: Could you give me some more examples about the very stringent regulations in Japan for university professors?

Dr. Isao Karube: We have a very strict regulation

on other governmental people, but recently, the Ministry of Education made some sort of special program for loosening such a system. A professor, for example, can walk into an industrial research laboratory without any regulations if some type of cooperation research is going on

Mr. Subirman: First, how many foreign students actually come to enroll in any degree program at the University of Tokyo? Second, have you also conducted any customized degree programs for industry in Japan?

Dr. Isao Karube: I think that 40% of the students are from foreign countries -- almost half. We have the largest number of graduate students coming from China. I think in my laboratory, around 20 are foreign students.

We have a program called in Japanese, "paper doctor" which is a special program for industrial people who apply for a Ph.D. program at the university. They do not attend graduate school, they can submit a doctoral thesis to the university. In our case, around 7-10 papers have to be published in a journal, an international journal, if possible, before we would accept a paper doctor. This is a tailor-made special program, but not only for the university people, governmental people.

Dr. Hiroyuki Yoshikawa: Students from China, which is 43% and from Korea, which is 24%. From Taiwan, it is 11% and Malaysia is 4%. Indonesia is 2.2%. Thailand is 1.9% and the Philippines is 1%.

Dr. Narong Yoothanom: I hope they have done that research paper in industry. What about a patent or an intellectual property right in that paper? Would it belong to the university or the industry?

Dr. Isao Karube: If the cooperative research is made by the industrial side, I think the patent belongs to the industry. If the idea comes from the university, it will be shared. A university professor originally owns a patent by himself/herself. If it is a big national project, which 90% or more of the money comes from a national source, they would have to apply through the university for a patent. But, in any case, more than 90% belong to the professor.

Dr. Reynaldo B. Veal: Can you offer any explanation why the industry does not appear to be ready to accept Ph.D.s from universities?

Dr. Isao Karube: Under the Japanese doctoral system, most of the doctoral course students are working hard in the professor's field. So I think that there is a little problem for them of producing a narrow specialist while the private company requires wide specialist for any type of research. There is some mismatching between students and industries; the Ph.D. students have the intent to continue basic research and all industries like applied research. We hope that industrial industry intends to take Ph.D. students in the future.

Dr. Akinobu Kasami: In Toshiba R&D Center, 15% of the freshman are from a doctorate course.

In selection, what very important are; the technical potential, the flexibility, whether they can see how the next generation technology or market is. Our doctoral graduates do good work at Toshiba and they can get a good position after ten years.

<Presentation>

Dr. Young-Dal Cho: My presentation's title is "An Understanding of Korean Higher Education in Human Resource Development." It has five parts: 1) an introduction; 2) what human resource development is; 3) the stages of Korean higher education; 4) obstacles for improving Korean higher education in human resource development; and 5) catch up strategies for future direction in Korean higher education.

Korean society of today can be characterized as follows: the democratization of society; the fast entrance to an information society; the emergence of social problems from economic growth; the rigidity in the labor market; the decline of industrial competitiveness in international society; etc. Under these circumstances, many Korean economists and scholars indicate that human resource development is one of the important keys to Korean economic social development in the coming century. Higher education plays key roles in human resource development. Higher education graduates represent about 17% of the population and above 20% in the labor market. Recently, universities in Korea pay greater attention to human resource development in both the research area and a field of public service.

What is human resource development? It is a process of developing or/and unleashing human expertise through organizational development and personnel training for the purpose of improving performance. Organizational development is defined as the process of organizational change for improving performance. Training and development is the process of developing expertise systematically in individuals for improving performance. In addition, human resource development has, I guess, three application areas: human resource management; career development; and quality improvement.

Higher education in Korea and Korean human resource development passed through three stages after the 1960s. Around the 1960s (the first stage) the expansion of higher education was needed in order to stimulate economic growth, to supply needed by industry and to establish a modern and democratic society in Korea.

In the second stage, the point of view about the expansion of higher education was somewhat modified. After the 1970s, the structure of the Korean economy was transformed from light industry to heavy industry and saw a high economic growth. The size of the Korean economy became much bigger than the past. According to this industrial change, many specialized colleges were built. Also, two-year junior colleges were built for meeting industry's expectation. The discussions were originated to the need of remodeling higher educational systems in response to the growing diversity of industry needs, and the students needs. Also, in this stage, many students left for abroad to study and to be trained.

In the third stage, recently the optimistic view

of the expansion of higher education was replaced by a sort of negative criticism or a crisis. The expansion of higher education was intended to be considered over education or education inflation. Despite so many university graduates in the labor market, some areas of industry suffers from a lack of skillful and appropriate labor in the workplace. In other words, the imbalance of demand and supply and the widening gap between student's expectations and industry's expectations. It causes this criticism and the crises in recent Korean higher education.

Regarding obstacles for improving Korean higher education, there are several obstacles to be optimistic about Korean higher education in human resource development. First, among some 100 universities, there is a strictly fixed hierarchy from the top to bottom. The university which rests on the top might be Seoul National University which dominates every field of Korean society. Given this circumstance, the diversity of universities is practically impossible to be expected which is necessary for industry needs and the development of higher education. Second, most Korean universities do not have a solid financial sponsorship. Third, the universities including private ones, are under government control. For example, the number of entrance students, the entrance examination system, financing, etc. This was also another obstacle for an appropriate change of Korean higher education institutions. To conclude, we may point out that Korean higher education is hardly catching up to industry's expectations and student needs due to the reasons mentioned above.

Finally, I would like to mention a kind of concept for future direction. I call it "catch-up" strategy -- it is my conception. Until now, Korean higher education in human resource development is trying to catch up to the demands for economic expectations and students aspirations. This effort can be made by these three aspects: human resource management; career development; and quality improvement. One of the themes for "catch-up" is collaboration between business and higher education in the aspect of human resource management. One is the idea of a research park and the system of industry and academic collaboration can be defined as a catch up effort. Recently in Seoul National University, there is a plan to build a research park around the university. The other possibility is an adult education program proposed by higher education institutions. Recently, many prolonged educational programs came into being in Korean higher education. Finally, we can mention that industry provides financial support for higher education's quality improvement, which may take the form of scholarships, research funding, etc. In addition, recently the Korean Government has a plan to build a governmental vocational development institute. So many degree programs in universities coping with industries and companies.

<Question & Answer>

Dr. Yoichi Okabe: Could you comment about the role of the student from domestic universities and the role of the student which has come back from the United States?

Dr. Young-Dal Cho: It may be the case that domestic graduates work mainly in working places but they lack certain skills, such as language skills and higher technical skills. Students who studied abroad come back to Korea and introduce the technical skills and, in some cases, language cooperation with other businessmen. I think it is a type of labor division. But recently there have been some problems. 20-30 years ago, students who studied abroad were elite students. But recently, many students go to the United States and Japan not only because some are very intelligent, but some of the students not. Some of students just go abroad without any concrete objects. Recently, it became a kind of social problem.

Dr. Isao Karube: I heard from my Korean student that Korean industries like to take Japanese style Ph.D. students recently. Is that true or not?

Compared to a Ph.D. student from the United States, a Ph.D. student from Japan knows how to do research. So Korean industries like to take Ph.D. students from Japan. In Japan, the experiment is a very important factor for study in a Ph.D. course. In the United States, most of the study emphasizes theory.

Dr. Young-Dal Cho: The Japanese style is very practical and the United States and European style is very theory oriented. But, at this stage, due to the decline of international competitiveness in Korea, we need practicality. So, it might be why so many companies like Ph.D.s from the area of practical side.

Dr. Takashi Inoguchi: //Your country has produced so many prime ministers, foreign ministers and deputy prime ministers from Seoul National University professors. Deputy Prime Minister Cho Soon and the Mayor of the City of Seoul were Seoul National University professors of economics previously, and then Prime Minister Lee Honggu was also from Seoul National University. Foreign Minister Han Sung Joo was a Korea University professor. Why is that?

I hear that the Japanese Ph.D.s have been on the steady increase possibly surpassing the number of Ph.D.s from the United States in the recent past. That is the impression contrary to my impression because my area of specialty is political science, so there people like Lee Honggu and Han Sung Joo, etc are all American Ph.D.s. Probably a current sign is that the current President of the Korean Political Science Association is Choe Sanyong of Korea University who is a Ph.D. from the University of Tokyo. It seems to be changing and I would like to have a clearer picture regarding this.

Dr. Young-Dal Cho: That is right. Seoul National University has a lot of politicians in government. President Young Sam Kim, he was also a graduate from Seoul National University. In old Korean society, I think, following kind of tradition existed; the scholars do not exactly divide practicality and academy. They pursued both things in the same way. So that kind of tradition makes the recent phenomenon possible.

In Korea recently, students who study in Japan are increasing rather than in America. Maybe it depends on the situation of world culture and the world political system. We Koreans look at what parts in the world will rule in the 21st century and we think that it is Asia, especially Asia-Pacific nations of Japan, Korea, China, Indonesia, Taiwan, Thailand, something like that. Thus, we focused on Asian countries and we are researching Asian countries. Because of that, maybe many students want to go to Japan and the other Asian countries..

Dr. Hiroyuki Yoshikawa: You mentioned educational inflation and that is very interesting. You are suffering from a gap on supply and demand. Also, you mentioned that maybe a possible way to solve this problem is to increase the diversity among the universities without suppressing the number of students. What is your plan to increase the diversity policy?

Dr. Young-Dal Cho: In Korea there are several universities and so many graduates. In some areas of industry, they lack skillful labors. So if we diversify universities, for example, if one university focuses on the fiber industry or marketing and management, and another university focuses on education and something like that, we can appropriately supply the needs for industry.

Dr. Hiroyuki Yoshikawa: So, you mean that diversity is coming from the domain of academic fields?

Dr. Young-Dal Cho: Yes, that is right.

Dr. Narong Yoothanom: You think that specialized universities is your solution to solve your problems. One university concentrates on one area such as engineering and another university for economics or something like that. Is that your solution?

Dr. Young-Dal Cho: A specialized university policy is one solution. Maybe, other solutions are a prolonged educational program and cooperation with companies. Also, I guess, a research park program is a kind of solution. Recently in Seoul, there are three or four places where venture enterprises gather. One is near Seoul National University. In that case, so many venture capitalists want labors and researchers. Seoul National University supplies those types of researchers.

Dr. Shuzaburo Takeda: You said that even a private university in Korea is under control of the government. And you also said that this is going to change. My question is, who initiated these things? The person or the industry, or government or some intelligent people, who are driving those forces?

Dr. Young-Dal Cho: The Korean level of democratization in society is more advanced than I guess Japan. Because we made big political reforms three or four times in recent years. In future situations, the government control of power will decrease in universities and this is a type of environmental solution. Secondly, entrepreneurs in industry request that type of

thing as a second solution. It might be that universities and colleges, themselves, will make efforts to survive. This is a third kind of solution. These kinds of things will make it possible.

<Presentation>

Dr. Reynaldo B. Vea: I plan to speak on the following points: 1) the status and problems of higher education in the Philippines; 2) the issues of obtaining a foreign education; and 3) the future of and obstacles to business-university collaboration.

A congressional study committee made a report in the early 90s. This became the basis for laws that now underpin the reforms that are occurring in the Philippines. First, there was an observation that the enrollment of Philippine Universities was very large. We have about 1.2 million college students studying in 1,755 institutions of higher learning. There was also an observation that 68% of the enrollment is concentrated in only three basic areas: 30% in business and commerce; 20% in engineering; and 18% in teacher education. In the Philippines, after graduation, one has to take an examination before he can practice his profession. The passing rate has been less than desirable. This has been taken as a reflection on the quality of education. 85% of our educational institutions are in private hands. They can only increase their tuition at the risk of becoming unaffordable. Consequently, investment in education is low, salaries of the faculty are low and facilities can stand improvement. There is also a limited number of graduate programs, 42% are in teacher training and education, 30% are in Masters of Arts in arts and sciences. In engineering, there are 12 schools that offer a Master's degree and only two that offer Ph.D. programs.

Against this backdrop, there have been some moves made by our legislators to improve higher education. Firstly, we are trying to classify the institutions of higher learning in a better way. For example, we want to have more community colleges which will be occupationally oriented. They will have strong linkages with business and industry in their localities. This would also be a way to offer junior college courses to those high school graduates wishing to take a four-year course in a university. So, we will have more community colleges. In the universities and four-year colleges, we will emphasize the training of higher-level professionals and research. We will also be setting up specialized colleges, for example, for agriculture, business, teacher education and so on. Technical and vocational education will be further strengthened. Based on this congressional study, there was also a decision to involve leaders in business industry and higher education to a greater extent. In the organization right now, there are technical panels in higher education. In each one of these panels, there is a representative from industry. So, when they discuss the curriculum, we get input from industry and the private sector.

There are incentives now for students to pursue scientific, engineering and technician careers. When they sold the big army base in Manila, a big chunk of the money went to higher education with the condition that it be used for scholarships for science and engineering. There is also a system of accreditation in the Philippines

where a school can voluntarily say to an accrediting agency, "Come over and evaluate our programs and see how we are doing." But, so far, only 15% of all programs are accredited. If your program is accredited, you become eligible for financial support from government and relief from some regulatory aspects.

Another response has been to set up national and regional centers of excellence. We are in the process of identifying the schools which will be held up as national and regional centers of excellence. We also have recently established a Commission on Higher Education (CHED) and a Higher Education Development Fund (HEDF). It used to be that there was just one department for education from the primary to the tertiary level. Now, we have established a commission just for tertiary education or higher education. The fund could be used to support not only the public institutions but the private institutions as well.

Now, about the issue of a student from the Philippines obtaining a foreign education. First, the problem is really affordability. We have to depend on scholarships from abroad or from our own government. So, there are a few students, Filipino students, getting graduate education or undergraduate education abroad. In countries like Japan, France and Germany, it is very difficult for us to send students because of the language barrier. However, more students are now willing to study despite the fact that they have to undergo one year of language training before they can go on. This is already reflected in the number of faculty members in our own universities where we have more and more faculty being trained in Japan in recent years. Another problem is the equivalence of the system of education. For example the European diploma is not commensurate with our own diploma program. The system of education in the Philippines is more or less modeled after the American system where there is a lot of course work in graduate school. For example, if our faculty members study in the U.K., they do mostly research and no course work. The expectations for them when they come back is to teach some graduate courses and they will be able to do that only after considerable preparations. It is because of the difference in the educational systems.

Thirdly, on business university collaboration. In the Philippines, the collaboration also involves government. At the highest levels of government, we have a science and technology coordinating council that advises the President of the Republic and where there are representatives from industry, academia and from government. These linkages are most pronounced in the science and technology sector. We have private sector representatives in the governing councils of the research funding agencies.

In my own university, we offer continuing engineering education holding about 60 short courses every year for about 2000 students. studying a whole range of engineering subjects. We also established a technology park and we now have 12 tenants. As a specific example, we have a manufacturing linkage program. Under this program, we have been able to do internships for student and faculty, we have a round table where industry and academia are able to discuss

pertinent issues. We also have an adjunct professorship program and industry and plant visits. We believe, in the future, there will be more collaboration research in industry and academia in the Philippines. The Dean of Chulalongkorn University Dr. Narong and I were in a meeting last month where there was a collaboration between Asian and European universities and I think about the same time in Bandung, there was a meeting to establish a higher engineering education network in Asia under the auspices of JICA. So, in the future, there will be a lot more networking among universities and what will underpin the networking of universities is the linkage between industries. We also realize that in APEC there is move for mutual recognition of engineering qualifications which underlines the importance of the university network if we are going to have comparable standards for our engineering education.

<Question& Answer>

Dr. Guan Zhicheng: Is it easy for the students when they graduate from university to find a job? For the University of the Philippines, how much percentage of the income comes from government and how much percentage come from industry?

Dr. Reynaldo B. Veal: Our own graduates have no problems finding jobs. In general, there may be some problems of the absorption of graduates into industry. It is not so much a problem of unemployment, but a problem of underemployment. We recently conducted a survey of 7000 engineers in about 40 companies. We found that 1% are engaged in R&D, 12% do actual engineering work, 30% are doing sales work, and the rest are doing technician level work. I also think that many of our graduates get hired overseas.

Regarding the funding of our university, we do not get funding from industry. We are a public university. On average our student are 50% subsidized by the government. Support from industry is not really very significant. This happens only in terms of contract research, consultancy work, and so on, which is not very significant in terms of the revenues that are generated.

Dr. Hiroyuki Yoshikawa: Does that panel have some discretion to hire or fire professors? Who has the most power within the university? Who has the discretion to change the structure of the university?

Dr. Reynaldo B. Veal: Actually it is the university that has that power. The role of the panel is more of an advisory nature. The department chairman may have the option to recommend to renew or not to renew appointments. He also has the discretion to recommend changes to the structure of the university. The final decision is with higher authorities but the input of the chairman is given a lot of weight.

Dr. Ir. Richard Mengko: Under business and university collaboration in the Philippines, how does the business side take responsibility for things like sponsorship, especially for funding or a scholarship for the encouragement of a

collaboration?

Dr. Reynaldo B. Veal: We have a good number of what we call private scholarships. But, it has not been working quite so well in our own university. Because in our university we have what is called a socialized tuition fee structure. So, if you come from an underprivileged family, you may not only not pay for your tuition, but you may also get stipends from the university. The stipends given are at a comparable level to that given by private scholarships. So, in recent years, we have been suggesting to industry to increase significantly the level of stipends so that the students would be attracted to private scholarships.

Mr. Subirman: Do you also have any other partnership between industry and university which is funded by the industry side?

Dr. Reynaldo B. Veal: I guess the most significant step we have taken is to establish our technology business incubators. We offer them a preferential rate for the building they occupy within the university; they get access to our faculty; and we provide them with the infrastructure to be able to do research. Right now, the university does not get really very much out of the arrangement.

Dr. Shuzaburo Takeda: Do you have some idea to promote the tendencies for networking of those collaborations? Mostly in the United States, they have strategic alliances among universities -- not only between industries.

Dr. Reynaldo B. Veal: Since some three years ago, we have been doing research on industrial waste water treatment mainly with Delft University of Technology in the Netherlands. We just sent two of our own researchers and together with researchers from the National University of Singapore, the University of Malaya and Bandung Institute of Technology and the partner European universities, they are able to do research that is answering a particular need of industry. I think networking will become meaningless if it is not linked with industry. We have a lot of memoranda of understanding with other universities. We also have a lot of exchange programs but sometimes you wonder if there is a lot of value to this as far as mutual understanding is concerned. The significant thing is when all these activities get linked with industry.

<Presentation>

Dr. Wei-Chung Wang: I will try to give you an overall description of the status and problems of higher education and human resource development in Taiwan. First, the situation in Taiwan. We have a unique system like in which for vocational or technical training education. High school graduates have choices. They may want to work for one year and then go on to vocational schools to receive a degree equivalent to a bachelor's degree. For those who pass the very screening entrance examination, they can go to the academic institutes to receive a bachelor's degree as most university students do. However,

the situation has changed a lot because, for those students who are now in the technical vocational training schools, they want to get a degree at a university. The Ministry of Education just passed six vocational schools to become science and technology universities.

Secondly, we have a centralized education and administrative control -- like in Korea. But this situation will be changed very soon. The other thing is that we have a very low tuition fee policy. For a student in a national university, he pays only US\$1,000 per year. For private university, it is only US\$3,000 per year. For a national university, 87% of the funding comes from the government, which is not quite reasonable for today's issues. The other thing is that, many years ago, many students went abroad to get an advanced degree and they did not come back. But now, the situation has changed quite a lot. Many good students now choose to stay in Taiwan and pursue their own advanced degrees, for example a Master's or Ph.D., choose to stay in Taiwan. The other thing is, under the pressure of legislative representatives and because of a traditional concept to get an advanced degree, the government has to establish or expand the establishment of universities. Several years ago, we opened eight universities. This has caused the existing universities to have a budget problem.

We are now facing these problems. Students who have just graduated from vocational schools and go to universities instead of technical jobs. The other thing is that since there are too many people getting advanced degrees, it is becoming difficult to find jobs in the market. The other thing is, due to the rapid change of this world, in the universities we lack people and experts with both technological and managerial capabilities. Professors were trained when they were students in a certain field and when they became professors, they only knew one field and may not have the managerial capabilities to train students on how to manage a plant or a group of people. About the issues of students educated by foreign higher educational institutes, the problems of reentry will be serious for many students. For students who get a degree, for example, in the U.K. where they have a different educational system, when they come back, what kind of position can they get? The other issue is job hunting, most of the best students chose to stay in Taiwan, they decide to get an advanced degree. When they are graduate students, they can work for a project or company for their degrees so they know Taiwan better than the students who choose to go abroad. At least students who go abroad have a several year deficiency, so they have a problem finding a job when they come back.

Regarding the obstacles for business and higher education collaboration, I have several points to point out. The first one is the different needs between academia and business. 98 percent of the businesses in Taiwan are small and medium sized. They need people who can solve the problem right away. When students graduate

from university, they are not ready for that. The other thing is over support from the government. Because the government has been responsible for all the budget of the universities, including private universities. The government tries to subsidize the budget for private universities. The professors are overly supported from the government and they do not have the incentives to help the industries. The other thing is, in order to have cooperation and collaboration with industry, you do need full time staff both in the university and industry who can handle these deals. This is very difficult sometimes because of intellectual properties, what would be the share ratio? Who can handle all these kinds of things? If we do not have a full-time staff, it is going to be very tough.

One solution is, I think, a re-engineering of the current higher educational system. The other one is closer communications between different educational systems. The other thing is to design and implement a mechanism for promoting collaboration between academia and industry. I would like to give an example of my own Foundation on how to implement these kinds of programs. Tsinghua University is a national university with about 800 full-time employees, including professors, technicians and other staff. We have an Industrial Technology Research Institute (ITRI) with about 6,000 people. It is a non-profit organization founded by the government. We have a Science-Based Industrial Park near my university. It has about 50,000 employees. At the Tze-Chiang Foundation of Science and Technology, we have 49 people. This Foundation was founded by the alumni of Tsinghua University in 1973. We have several research laboratories and also training and development departments to offer continuing education. I am serving as the Executive Director for the Foundation. ITRI's mission is different from my Foundation. In the Science-Based Industrial Park, we have precision machinery, electronics, computers and peripherals and integrated circuits. One of the major tasks of my Foundation is to support Science-Based Industrial Park to help them train semiconductor engineers.

I would like to introduce the roles we play at our Foundation. For example, we have the flexibility in both financial and personnel respects. As a university, employers are civil service people. You cannot fire them unless they have big problems. Also, we are eligible to apply for large-scale oriented R&D and professional training government projects. The other thing, we can cooperate with all the departments at Tsinghua University and provide professional services in many respects. In fact, most of the continuing education programs for Tsinghua University have been run by our own Foundation. We already have trained about 14,000 semiconductor engineers from 1 July 1986 to 13 May 1995. The other thing is for the university, we have many good equipment, so the Foundation can assist Tsinghua University to manage specialty or nationally accredited laboratories to do inspection services for the industries. Another thing is that we can do research projects which

provides opportunities for students of Tsinghua University to understand Taiwan's industry. This is very important because for students, before they go to industry, they have a chance to be acquainted with the industries and to know people and to know how industries run their businesses and how to do research and run projects. The last thing is that the Foundation can provide full-time staff and engineers to carry out in interdisciplinary projects across different institutes. The President may have the problem because of the intellectual properties; what would be the share ratio? The university would make an overhead charge for the intellectual property. If we have a project across five departments, every department will charge an overhead. Since the Foundation is among all these departments, we can handle the whole thing.

<Question & Answer>

Dr. Young-Dal Cho: Excessive support from government is inducing incentive problems. In my opinion, education is a public good, so it is natural that government supports education. It is the power of the university to be flexible in coping with surroundings and a changing environment. What do you think about my opinion?

Dr. Wei-Chung Wang: If the government has to be responsible for all aspects, I do not think it is fair. Because I think professors and students have been treated quite well in Taiwan and we have to do something to help the society and government.

Dr. Akinobu Kasami: What kind of relationship is between universities and the national research institute?

Dr. Wei-Chung Wang: On the campus of Tsinghua University, we have a small clean room which the Foundation runs. All the semiconductor engineers have been trained by the Foundation and university. The research institute provides lecturers for the courses. Some of the instructors also come from industry and the research institute sometimes provide advanced technology for us -- the course contents. We have about six different research institutes in ITRI. Many times, students or professors visit the institute part-time or full-time.

<Presentation>

Dr. Narong Yoothanon: I am going to talk about human resource development and the shortage of manpower in Thailand. First of all, I would like to define higher education as after the high school level, at a bachelor's, master's and Ph.D. level. Higher education started in 1917 when Chulalongkorn University was founded by King Rama V by forming the first school of art, engineering and political science. Right now, there are more than 100 universities, both public and private all around the country. About 25 universities are at a master's degree level and about 10 at a doctorate level. In Thailand, we have two ministries responsible for education. One is the Ministry of Education for primary,

public high schools and vocational schools. We have the Ministry of University Affairs for all colleges and universities. For public institutions, they are automatically accredited by the government because the government approves all the curriculum and the staff and establishment. For private colleges and universities, the Ministry of University Affairs is responsible for the accreditation.

For the industry, we have one big problem which is a shortage of manpower. About 15 years ago, the government turned policy toward the industry. They brought up investment from the government and from foreign countries. However, it takes at least four years to come up with that policy. That is why we have a shortage of manpower in science and engineering. We believe that this shortage is deteriorating and will last at least 10 years. We have a limited resource in universities. The government has been trying to overcome this problem by expanding the existing universities to recruit more students or establish new universities and allowing our private sector to set up private institutes. However, this procedure takes time and seems slower than the increase of demand from the business sectors.

A shortage of manpower also exists in universities. The number of teaching staff in universities is decreasing in the field of science and technology. This is due to the huge demand in the industry and the rather relatively low pay compared to those you can receive from the industry. The existing difference being paid among the universities and industries creates "brain drain" which goes from university to industry or among universities themselves, or among the industries themselves. Because of a shortage of manpower, we are looking at information technology to help the flow of information even in the classroom. In industry, they have automation introduced into manufacturing, so we have to create education or more knowledge of information technology for our students. The demand towards universities might improve their curriculum to accommodate this field. Also, business and industry executives have to set their own training program for any graduate whom they employ. It is very common in Thailand that all industry or companies have to set their own training program for new graduates.

The significant factors for human resource development for the future can be summarized into three very important topics. The first, human resource development planning must take a technological change. Both quantity and quality need to be taken into account. Human resource development must have a compatible linkage to status and direction of technological



development. Secondly, the base of manpower development must expand even to the primary and high school education. In Thailand, the government is taking seriously into consideration the policy of making compulsory education to 12 years from current 7 years. Third, under rapidly changing technology, our training process is essential. This training should be given to all staff, at different levels throughout their career path. This has been done all the time, especially for those in companies like petroleum or telecommunication companies.

For business-university linkage in Thailand, since business is rapidly expanding in Thailand leading to a great demand in manpower in all fields, the businesses should look back into educational institutions instead of waiting for the graduation period to recruit their new employees. There are many means in which businesses can give a big hand. Some suggestions I have raised for discussion have been the following. Some financial support like an endowment fund can be set up in the universities to finance student education and activities, student and staff research projects, to further infrastructure and to facilitate all laboratories or even to set up some chair professor. Help in training such as a summer training program for students and staff can make these people see the differences between the curriculum and the real world. Yet, they can catch up their technologies employed in the existing businesses and industries. In our university program of engineering, it is compulsory that a junior level student enter a summer training program in the industry for two months before coming back to school for their senior year. Third, exchanges of experiences between universities and industry can be done through meetings and seminars so that each other can learn what the other needs. Through these seminars and training, people can get to know each other. Sharing experiences will make everything goes smooth.

In summary, we do not see any industry linkage, the linkage should be strengthened more. Universities and academic institutes wish to make industries implement certain findings for commercial uses. If the university and industry have firmly joined hands together, the theory and implementation will progress steadily and will bring peace and prosperity to our societies.

<Question & Answer>

Dr. Yoichi Okabe: Could you comment about the summer work program? How long and what percentage of the students would join?

Dr. Narong Yoothanom: Usually in the curriculum, it is compulsory for a student to spend at least two months in the industry. Some go abroad. That is compulsory. But, it does not

mean that they cannot go anywhere in the student's life other than summer. By volunteering, they can go anywhere - even the summer of their freshman year they can join. We encourage our students to join industry or business during the summertime. When they come back to the class, they can address those questions to the instructor and get further explanations.

Dr. Reynaldo B. Veja: Regarding the lack of manpower in industry, is it in engineers, or managers?

Dr. Narong Yoothanom: In general, there is a shortage in engineers. In the case of managers, there are two schemes: bachelors degree and MBAs. We try to convince students that all engineers should be in industry or manufacturing so that they can produce products and make more income for the country.

Dr. Isao Karube: Generally speaking, we have a similar problem regarding human resources development. We have a lack of human resources in the science and technology field. I think that human resources development is definitely important for the 21st century -- sustainable development of economics for Asia. Our conclusion today is that this sort of information exchange is very important. We would like to continue to the Asian university business workshop on human resources development. This is the conclusion of this session.

Session 2: Human Resource Development  
-- Views from Industry

Remarks by the Chairman

Dr. Akinobu Kasami: We will start Session 2 entitled, Human Resource Development -- Views from Industry. This morning, we had a good discussion, mainly from the point of view of the university. I think that, in principle, for every country, a very important issue is how to promote new business, how to create new jobs, and how to carry out national will. That is a very common interest to us I think. Industry-university relations are very important at this stage, especially good human resource development for present business and future business, as well.

In the past 30 or 40 years, the university and industry relations in Japan are good, because there are many people with good abilities who have entered industry. These people support the mass production of Japanese industry. Then, the economic growth is very rapid in Japan. But, in these two or three years, especially in the electrical industry, e.g., Toshiba, the business circumstances are changing dynamically. One important change is the information sector; digitalization of information and many kinds of communication tools. These technologies open new business. This is very important. In this case, the market creation and the advance of technology interacts with each other. Therefore, research and market is more closely related in such cases. The second important item relates to "borderless." In the past stages of Japanese companies, all of the technology has been developed within the company. But, in the new stages, the mission is how to strengthen our core technology, then how to make good alliances in the global market. In such a situation, we want to have a new type of freshman with a good ability in technology, as well. We want them to have a wider scope and a visionary scope and able to make a good network among themselves. Such a situation is very important for growth in our new business. Therefore industry-university cooperation is very important at this stage. More interaction is needed in Japan, and there are many problems to solve in Japan, as well. But, at the first stage, we need more and more discussion with university people on each other regarding future trends, the future market, future industry, etc., and they must establish a mutual understanding on each of these items. This is a base for human resource development. The second stage is the exchange of people between industries and universities. Fortunately, the Ministry of Education has a plan to increase flexibility in the exchange of people. For example, if young professors stay in industry, they can obtain much information and make many network with industry people for the future. This provides a very good impact on students, as well.

Therefore, in this session, I want the industry people to give their opinions on such future trends, as well as opinions on university people. First, we would like to get an explanation to understand each country's situation. Then, we can understand the common problems -- such discussion is very important.

<Presentation>

Mr. Subiman : I represent PT Telekomunikasi

Indonesia, a government company which went public in 1995. In terms of human resources development, we have had many cooperation in actual projects, for example, in academic or cooperative education programs, upgrading education programs, and sponsoring of educational institutes. Regarding sponsoring of educational institutes, we will talk about involving the private sector in educational sponsorship, facilitation of research, work internships for students to finalize their theses, exchange of experts, and seminars and workshops.

The cooperation program or co-op program is a structured educational strategy that combines classroom learning with productive work experience in fields closely related to students' career goals. The co-op program is a partnership between students, academic institutes and employers involving a particular objective and responsibility for each of the partners. The basic principle of the co-op program is that students develop their careers while they are still students -- not after graduating. A student has to experience a real work environment for at least six months, so he or she can have time to understand the relation between academic and professional work.

The co-op program should be arranged in memorandum of understanding here between universities and industry which is signed by the presidents of the respective universities and industries. Among issues to be included in the MOU are level of relations between officials of universities and industry or program management, for example, the selection process, monitoring the cancellation and the return of failing students, management fees for universities, student salaries, etc. The next is a selection process. Based on things like grade point average (GPA), hard skills and soft skills are evaluated. For a student to attend the co-op program, certain criteria should be required, for example, excellent academic and extracurricular results and so on. In the first stage, the student will participate in one-day training or will be introduced and shown the system, i.e., procedures and management of the industry. Then they are dispatched to various workplaces to give them work experience. The supervisor in the field evaluates the students based on creativity, innovative ability, and a demonstration of a proper attitude toward work and the working environment. Evaluations are handed out by the co-op program coordinator at the human resources development. Upon termination of the co-op program, the participants shall submit a final report, and give a presentation. PT Telekomunikasi uses such co-op programs to identify potential recruits early on.

Besides co-ops, we have an educational upgrading program. The Telekomunikasi strategy for educational upgrading programs is to upgrade the level of employees' education gradually. Here, the curricula and syllabus are tailored to meet company needs. The course structure and subject

division relate closely to our business. In some cases, they are so specific that universities cannot provide them either. Examples of such subjects are diploma three switching, diploma three network, diploma three outside plan, and also strata one or post-graduate marketing and surveys, etc. In our company, for example, high school graduates have been recruited and had the opportunity to attain a diploma one level of education. For those who have shown the greatest merit after three years in a field, the field provides an opportunity to proceed toward the diploma three, education, etc., right on through to strata one and two and three. This is what we call a gradual process and an upgrading education program.

Also, we are sponsoring an educational institute. The program also has a positive effect on scales development. I can give you an example of junior schools involving around 6,373 people. We have succeeded to improve 1,970 employees to senior high school, and 718 of them have been following diploma one and two. Over 250 have graduate degree one or strata one. Also, in the example here of senior high schools, we have the first entry 25,571, and 23 of them have a masters degree program. This is the sponsored educational institute.

We have a funding program, part-time lecturing assignments, a fellowship program, workshops, facilities, seminars, etc. In conclusion I will say that cultural affiliations need favorable development, particularly in Asia by the year 2001. Until now, cooperation with foreign universities have overwhelmingly been with those in the United States, the United Kingdom and Australia. In the future, it might be more appropriate to extend this cooperation within the universities of Asia.

<Question & Answer>

Dr. Yoichi Okabe: How many companies are doing similar upgrading programs in your country? If the people in your company want to get a certain degree such as Master's or Ph.D., probably, the degree would be given from the university. Could you explain the relationship between the company and the university?

Mr. Subirman: In terms of the upgrading program, we still do not know how many companies are doing this program. I think governments already arranged this a long time ago. It is conducted by the BAPENAS. The Board of National Development has already arranged to send people abroad to get their masters degree and also to take a Ph.D. program.

In addition, our R&D has sent many people abroad to take many of our strata two and three. People who want to participate in any Ph.D. program should pass strata two. They should have a minimum of three years experience in the workplace.

Dr. Reynaldo B. Veal: Is this typical of all government companies in Indonesia?

Mr. Subirman: It is not typical of a government

company, because many other government companies do not have these programs. This program is special to increase our workforce, especially after our company went public.

Dr. Akinobu Kasami: How much support do you get from the government?

Mr. Subirman: It is funded by Telekom's own budget. Sometimes, we also use bank loans. Currently, we do not use bank loans.

<Presentation>

Mr. Nik Mustapha Nik Mohamed: I will go through the three sections of human resource development; First, the present state of business and higher education collaboration in Malaysia. Second, an example of business-university collaboration of PNB. Third, obstacles and the future direction of business-higher education collaboration.

In terms of the present status, I would like to view human resource development from the standpoint of three aspects. We can first look at the aspect of training, which is referred as preparing people for the present job. Secondly is education, which is basically culminating in getting a paper qualification and preparing people for a future job. The third aspect is development, which is basically preparing our people to face changes in direction, in organization, in society, and, at the same time, to develop people with high potential within the organization. In terms of education, the higher educational institutions are doing a good job in Malaysia. But, I am not saying they have completed the job in other two aspects, especially in the areas of science and technology. We are still lacking engineers and scientists and people in the applied and pure sciences.

In the areas of development, I think, the higher educational institutions in Malaysia are not playing a key role yet. At present, development is being addressed in an ad hoc manner in the country. Many companies sent their high potential employees or senior executives to institutions overseas like Harvard, London School of Business to get "management development exposure" in terms of training. I think the primary role of training is the company itself, but companies do need input from higher educational institutions. I think that the higher educational institutions also can learn more about what is required on the job in terms of the skills, knowledge and attitude. So, there is room for more collaboration between business and higher educational institutions. We have a lot of training providers these days. Companies send their people to these training providers to get them trained. However, the quality of training is doubtful. I can say that in terms of the development and education side, there is now interest shown by the higher educational institutions to come up especially with MBA programs -- especially from the commonwealth universities. We have universities from Great

Britain coming to Malaysia to offer MBAs on a part- or full-time basis and this MBA program is meant to develop a bigger number of people for management. We do not have that many institutions coming to offer programs in the technology field. Given that we are gearing toward a technology information-based country, we need more of that kind of collaboration, not just for an MBA. We are also having our vision as a part of our vision of 2020, to make Malaysia a regional center of excellence for education. I think that there is every opportunity for higher educational institutions from every part of the world to come to Malaysia to configure something we would require. We also have a lot of scholarship programs given by industry for people to pursue higher education or undergraduate programs and the government has also instituted what we call a Human Resource Development Fund (HRDF), whereby companies have to contribute 1% of their salary to this particular fund and then use this money to train their employees. Government is mandating companies to train their workforce, not to try to get away trained workforce from other companies.

In terms of specific examples, we, PNB, have a collaboration with MARA Institute of Technology and University Kebangsaan Malaysia. We also send our students for joint programs. We also send our students to do their graduate work overseas. We are doing cooperation actively with local universities. As a fund managing company, we need people who have a good appreciation of investment knowledge, and we need to give them exposure and basic knowledge. So we have a program called a Certificate in Investment Analysis to all of our employees. So, we are working closely with MARA Institute of Technology. In terms of financial adviser's certificate, we work with University Kebangsaan Malaysia to come up with investment modules. We can certify our employees so they are qualified to go out and advise or educate people. On the development side, we also work with other institutions like Sandridge Park of the United Kingdom where we work with them to establish what we call "Management Development Stairway." That is to develop our managers, junior executives and onwards.

In terms of obstacles and the future direction for business-higher education collaboration, I think, we must ensure not only quantity but also quality. The government has taken the initiative to require all lecturers to be registered with the Ministry of Education especially those who teach with other training providers and those who teach with part-time MBA courses offered by foreign universities in Malaysia. In terms of ensuring quality of training, I think that higher educational institutions can probably benefit from more collaboration at the working level. With this mushrooming of training providers, I think that the most important thing is making sure that we are developing adequate leadership. And I think that we are concerned in ensuring our leaders are of high ethical standards and

integrity.

I think, in summary, the status in Malaysia is healthy and we are making good progress in collaborations. In terms of examples, many of the big corporations in Malaysia do have collaborations with local and overseas universities. There is more room to get input from other parts of the world. In terms of obstacles and future direction, we need to ensure quality. Malaysia's direction is towards information and technology-based training, so we look forward to input in the field from all parts of the world.

<Question & Answer>

Dr. Yasunori Nishijima: There is a great plan to construct the Technology Park Malaysia for the incubation and innovation of technology. You also have a sort of training institute. Is that also a university-business sort of comparative core will be built in the Technology Park in Malaysia?

Mr. Nik Mustapha Nik Mohamed: We are having a lot of universities being established now. Telekom Malaysia, National Electricity Board, Petronas are also establishing universities. This is all in collaboration with other universities overseas. I think the focus for us now is a technology-based, information-based, and computer-based kind of training and development.

Dr. Yasunori Nishijima: Your Minister of Education said that they would like to reduce the number of young students being sent abroad down to 30,000, half of current 60,000. The emphasis is to make good training and education in Malaysia in the plan for vision 2020. Instead of sending young students abroad, Malaysia would like to invite more researchers and teachers from abroad to make education and higher education, especially in the field of science and technology. That is my impression. Is my impression right?

Mr. Nik Mustapha Nik Mohamed: Right now, we have 60,000 Malaysian students sent abroad. Because we are continuing to build more universities, we will be able to cater to our students in Malaysia and at the same time, there will be still some sent overseas. But, I think that the fact we are also getting more professors coming into the country is good for us.

Dr. Narong Yoothanom: I wonder how people in companies take a look at the training program. When they come back to the company, do they get a promotion or any recognition?

Mr. Nik Mustapha Nik Mohamed: I alluded to the fact that there are some training providers which are only established with the business community. That has been looked after by the authorities in terms of the Human Resource Development Fund. Because they need to be

approved by the fund in order to be refunded if they attend that training. Thus, there is some control. In terms of the recognition. I think, in many companies, when they plan to train their employees, they are planning them for a higher position and bigger role. But, there will also be cases where they send more for general education where the promotion may not be immediate.

Dr. Narong Yoothanom: Is there a training program for your staff?

Mr. Nik Mustapha Nik Mohamed: We do have one of what we call a Management Development Stairway -- in terms of management development. But, we also have programs in terms of scholarships for people we have identified to be good, of which we sponsor them 100%. For those who would like to enhance their qualifications, we will go on a 70-30 basis and if you pass, we will pay in full. It has to be based on how well they are doing their jobs, not based upon intellectual capability only. They must justify themselves by performance.

Dr. Narong Yoothanom: What percentage of these trained people leave the company?

Mr. Nik Mustapha Nik Mohamed: Quite a substantial number leave their companies. We look at it from a global or national sense: if the industry benefits, we benefit.

Dr. Reynaldo B. Veal: If they send employees to study abroad, are they required to spend a number of years back in the company?

Mr. Nik Mustapha Nik Mohamed: For one year of study, the companies would require them to work for two years and I think that this is a normal practice. For some of the organizations give scholarship to high school graduates for studying abroad, they are on what we call bonded type of contract. It means that if they finish their studies, they have to come back to work. We, ENB, tell high school graduates that if they can enter a top university, we will sponsor them 100%. We want them to enter good universities.

<Presentation>

Mr. Edgardo A. Paynor: I work for Integrated Microelectronics, Inc. We are a subcontractor assembly in the Philippines. I would like to introduce the examples for business university collaboration from the viewpoint of industry.

First we have University of the Philippines Manufacturing Linkage Program (UPMLP). This is a linkage between the University of the Philippines on manufacturing. Our company and other 14-15 or so companies are members of this program. Under this program, we encourage the students of the university to visit our plants to be exposed on manufacturing. On the other hand, we also encourage the university to change their curriculum so that their subjects meet the needs of the industry. During the summer, we have a

summer internship program where we invite graduating students to render six week orientation and on-the-job training in our respective factories. Let us say that there are ten factories, we will have two or three students in our company that will be assigned in mechanical works or industrial engineering. Also, under this program, we have the adjunct professor. During the semester or during the year, a professor from industry goes to the University of the Philippines to teach a subject. The other activity we have under the UPMLP is one program having a linkage with AOTS of Japan -- the Association for Overseas Technical School. We established this about two years ago just to find out what is the industry-academe linkage in Japan. The other example is the DGPPST partnership. Under the collaboration of a multi-national company and a progressive vocational school at the Filipino Science and Technology Center, they deal directly with the training of students. They put up a laboratory in the school and the students are taught specific jobs in a prototype line. Once the student graduates, they go straight to the company. What is taught in the school are very basic technical skills for the industry. The third example is one involving the Semiconductor and Electronic Industry Foundation Inc (SEIFI) and Polytechnic University of the Philippines (PUP). Here, the member companies of this foundation sponsor scholars who are high school graduates with very good scholastic standing. These students will enroll at PUP under a scholarship program partly funded by the industry. The requirement from the industry is that the school should come up with a curriculum that would cater again to the needs of the member companies. The other example is the "electronics kapihan." "Kapi" means coffee in our local dialect. It is a morning breakfast type of discussion in an informal forum. We discuss issues regarding the issues and problems for the electronic industry -- that is why it is also called the "electronic kapihan." Here, the heads of the universities and the other members of the various industries discuss and exchange their needs.

Along the line of airing out of problems and concerns, a collaboration is happening. Collaboration between SEIFI and PUP is a result of this electronic kapihan. The fifth example is a faculty-summer internship which is a result also of the UPMLP. This time, the faculty goes to the factory for maybe six weeks and participates in the activities of the company. This is a program that is still in the making.

What do we have as our problems and obstacles in the future? Companies come to the Philippines for our labor-intensive operations. But, the industry thinks that we should have more value added in the future and therefore our collaboration with universities expresses our concern regarding technology, science and research. In the near future, this is the kind of collaboration we would like to have more on research and technology.

<Question & Answer>

Dr. Yasunori Nishijima: This afternoon's session is not for views from the university side but from the business side. However, I was not able to attend the morning session. I would just like to say some comments. The curriculum planning is one of the most important jobs or missions of the university although it should be adjusted to meet the requirements or demand of human resources of the society. In the 1970s, we had a rather serious condition of pollution in Japan. When I was in the Faculty of Engineering, we were planning to make a new graduate school for humans and the environment. Those days, the society took the issue of environment as the issue of pollution without exception. They only noticed the shadowy side of the environment. We shed light to the bright side of the environment. After 15 years, we finally succeeded in making a new graduate school on humans and the environment. However, we were worried about which company would accept graduates from the first master's course. It was a pleasant surprise that requests came from companies as more than ten times as the number of graduates. Most of them were manufacturing companies and some of them were local governments. But, to make a new curriculum and new vocational organization, it usually takes at least 10 years here in Japan. If you add the time of the discussions, it might take 15-20 years. The academic community should also have a foresight of what the future society needs; what kind of human resources will they need in addition to the immediate necessity.

Mr. Edgardo A. Paynor: In the Philippines, I think, our foresight is shortsighted right now. Our collaboration is more on our needs today and although we are now looking at the experience of Taiwan and Singapore -- higher value-added and research -- but the need in industry in the Philippines is more on catering to the technical requirements of the industry today rather than the future.

Dr. Akinobu Kasami: I am very interested in the "coffee forum" among the university people. How frequently or how many participants are there and what kind of technological fields are involved?

Mr. Edgardo A. Paynor: The kapihan was established by one agency of the Department of Science and Technology, namely: the Philippine Council of Advanced Science and Research Development. They came up with this idea in one of their consultations with industry; how do we solve problems affecting electronics industry? // Thanks to the Kapihan, we were able to air our sentiments. Some member companies were invited to start the discussion. Eventually the industry started saying that we needed members from universities and asked them to participate in the discussions. So, maybe we should tell the teachers to change their curriculum so that it will match ours. This is a monthly meeting. On the

average there are about four or five from the universities, and around ten from industry who participate in the meeting.

<Presentation>

Mr. Hirofumi Kataoka : I would like to offer a few brief comments on the involvement of Japanese industry with education and human resource development, as well as related business-university cooperation with other Asian countries, placing the emphasis on the role that Japanese industry can play in this sphere.

In Japan, industry furnishes generous support for research activities in universities. In terms of university scholarships and donations, it annually contributes a remarkable 50 billion yen, which is not far short of the total of national subsidies for scientific research. The results of university research activities make a practical contribution to industrial activities. Because Japanese companies located in other Asian countries transfer technology to the host country, it may be said that the fruits of business-university cooperation in Japan are also indirectly enjoyed by the other countries in Asia. Developing Asian countries are in a position to turn differences in developmental stages to their advantage and use the transfer of technology to obtain in a short time the benefits of scientific and technological advances which took Japan many years to achieve. In the energy sector, Japanese technology ranks among the highest in the world such as energy conservation, environmental preservation, and safety management. Japanese electric power and gas companies are acting as bridges for the transfer of such technology to counterparts in countries such as China, Korea, Malaysia, and Indonesia. Technology transfer is tangibly accomplished only when indigenous engineers master the know-how through actual application at the companies on location. To assist the development of human resources to this end, Japanese companies are carrying out programs for on-the-job training in their local affiliates as well as accepting trainees for programs in Japan. In this sense, Japanese companies have a crucial role to play in human resource development in other Asian countries.

I understand that the education environment of science and engineering colleges in other Asian countries is not completely satisfactory at present. In Malaysia, for example, there are reportedly only two persons with doctorates in the field of combustion science. Under such circumstances, it would presumably be difficult for programs of business-university cooperation to achieve adequate results even if implemented. There is consequently an urgent need for improvement of the capabilities of universities. Another way in which Japanese companies could further business-university cooperation in the region would be to provide financial, technical, and human resources by, for example, donating research facilities and funding to Asian universities and establishing scholarship programs. They could also amplify international

exchange among industrial and academic engineers and researchers. Such steps would enable local universities to make more concrete progress in effective development of the human resources required by local industry and in joint research with local industry. In my opinion, while backing the cultivation of creative powers in universities at home, Japanese industry also has a distinctive contribution to make in educating and training youth in other Asian countries. Much is to be expected of international business-university cooperation in the Asian region if it is to take place alongside the EU and North American regions in the global community.

<Question & Answer>

Dr. Guan Zhicheng: What kind of support from universities to your company do you need?

Mr. Hirofumi Kataoka: It depends upon each occasion. In principle, one company can not handle some sort of basic research in the field of environmental pollution which might require a very wide range of research. In such a case, we have donated some chair professors to Tokyo University. As for donations, they are directed to some sort of pioneer region or in-depth advanced area of science, e.g., very intricate fields of biochemicals, front-end science handling atomic rearrangement, or other difficult technology which cannot be handled by company employees. Very roughly speaking, very broad range of basic research and in-depth frontier technology is where the needs lie.

Dr. Akinobu Kasami: Toshiba has made many requests to universities, especially regarding their conceptual ideas and innovative ideas for the 21st century. Such ideas can be more easily produced by talented young people, for example, graduate individuals. Interaction between industry and university is very important. Industry makes a good impact on young researchers in universities, and they can make good human networks and technology networks with many people. Such a situation produces new conceptual ideas or technologies and good future cooperation between university and industry.

Dr. Richard Mengko: In most developing countries, normally money is very limited. This is why governments and universities tend to give priorities to the present needs of industries and reorient themselves to the needs. On the other hand, human resource development can be very flexible, depending on the needs. If you start something needed today, maybe ten years later we will not need it anymore. In that case, governments and universities tend to go to basic science to play it safe. If we go to basic science, we have a safer policy in the long term. I would like to get an opinion from an industry point of view regarding this matter -- whether the universities prefer to go to basic science or to the present need of industry.

Mr. Hirofumi Kataoka : Perhaps, some sort of contradictory fields might be both necessary for the function of universities. We want to rely upon basic science. At the same time, we want to have some recommendation or advice even for practical technology.

Dr. Richard Mengko: Are you suggesting that each country should have both of them?

Mr. Hirofumi Kataoka : Perhaps Japanese industry is to some extent doing its own research, which might sometimes include basic science. We have a close exchange of information or knowledge between industry and universities. In some regions, we are doing almost similar research or experiments. But, we want to share the mutual benefit. So, we are not the same, but we seek each other's advantage.

Dr. Akinobu Kasami: Basic research and application research are not too divided at present. At one time applied research pulled the basic research. Also, basic research pushed the applied research.

The most important thing is how to foster and enhance discussion between universities and industry for the future. In universities, one professor works on basic research and the other works on applied research. Such a freedom exists in universities. But, the basic understanding for future trends in industry is very important -- to attain such communication. Detail and a wide band of communication is very important. What do the industry people think?

Mr. Nik Mustapha Nik Mohamed: I think there is room for pure science. In fact, many of the applications that we have in industry comes from basic research. The area of contention is in the areas where industry requires input from universities. This is more in areas relating to management and management of technology, where academia can understand industry better by having electronic coffee breaks together.

Mr. Edgardo A. Paynor: The trend of the times today is that we need universities' support immediately today on applied research. As far as pure research is concerned, maybe you can adopt whatever research has been taking place in more developed countries like Japan and the United States.

Dr. Yoichi Okabe: Japanese industry research abilities have currently become very high. Even in basic areas, Japanese industry has done a lot of things. As a consequence, university people should move the target to a much more advanced area or conceptual area. We are currently very far from practical engineering. So, we should collaborate much more with industry, for example, to get a lecturer from the industry side. For example, in making LSI, we do not actually know anything about "real" fabrication technology. For example, in the semiconductor area, or automobile fabrication area, no one is

able to make a real automobile in a university right now. So, that is another problem happening right now.

Dr. Yasunori Nishijima: About 20 years ago, the executive director of one of the biggest industrial companies in Japan told me in public that the university's job is to make a selection of people. What you need to do is to make a very rigid entrance examination, and select good people. When you send them to us, we will give them education, training and research. So, now we talk of collaboration between business and universities. From the business side, I hear that creative power -- new ideas should come from university research. But, I never forget the very strong argument 20 years ago.

Dr. Akinobu Kasami: I think that there is a turning point of thinking for each other in Japan.

Dr. Guan Zhicheng: Now, in the university, there are two opinions. One opinion is that the students studying in university should get general training. They should have a very strong background in mathematics, physics, chemistry and foreign languages. The specialty training should be done in the company. Another opinion is that students should get a very strong background and research ability in university. We should send students to do some joint research programs for one year in the company. I think these students will have a very strong specialty and ability to do research. I want to know which kind of students are welcome by companies.

Mr. Hirofumi Kataoka: We want to have strong and intelligent people who can challenge the changing circumstances. Frankly, we have to add some capability to the freshman for ourselves in addition to the education in university. In conclusion, I think that we just want to have flexible and strong-willed people with some academic intelligence.

Dr. Akinobu Kasami: I think that professors' influence to students is very much strong not only in technological knowledge, but also in human factor. Therefore, through a collaboration between industry and university, I think, we can expect that the professor himself has a wider thinking and give a good influence on young researchers. Therefore, we want to discuss future technology and society. The technology-society problem is very closely related in the 21st century. Such a dynamic discussions is very important, I think.

Dr. Shuzaburo Takeda: Several years ago, I was in the administration of a university in the United States. Therefore, I know about those types of collaborations in America to the certain extent. There are 3,000 universities in the United States; they are in a great variety. But, if you take the top 100 research universities, their

attitudes are very similar. One is decreasing budget, including research money. Money is decreasing from state government and federal government. Amounts of endowments are also decreasing. What they are doing is having closer relationship with companies, industry or their local society. Most important for universities is how to contribute to society or how to increase knowledge productivity. Knowledge productivity is the most important thing of the coming era -- not like capital productivity, or not like technological productivity. ¶The top 100 universities in the United States are working together and changing their mindset for the future; what does the market or consumer or industry want? In that sense, basic amounts of research are decreasing. However, their dynamics of research are mostly increasing over the last five or ten years. I think we should think about different views and attitudes. That is that same thing as IBM and AT&T are doing. Their research budgets are drastically reduced, including the Department of Energy of the United States Government. The point is, collaboration is the only answer. We are not sure how Japan moves; where there is no consensus as yet. Many countries in the world are now puzzled over what is the best way to improve knowledge productivity.

Dr. Akinobu Kasami: I agree with Professor Takeda. That is one of my closing remarks. The other is that we understood each country's situation on human resources development and also on business-university collaboration. I think that if we have another meeting, we can discuss these things more deeply and widely. Thank you.



### Session 3: Towards International Collaboration

#### Remarks by the Chairman

Dr. Takashi Inoguchi: This session is supposed to achieve something towards clarifying the modus operandi of international cooperation in the area of human resource development in the context of business-university collaboration.

We have already identified the three major structural trends in which this subject is discussed. The first one is the relentless tide of technological progress and the second is the globalization of economic activities and growing economic interdependence. Thirdly, government deregulation and the concomitant government revenue decline. These three backgrounds or structural trends are very important for us when we discuss human resource development and business-university collaboration. Unless these three trends are well attended to and examine these three trends and make necessary adjustments to these trends, very difficult risks will arise despite the great opportunities that may exist when one adopts these things. In other words, against these three trends, both great opportunities and higher risks are abundant -- it is all up to business and university people who may take advantage of these higher opportunities and risks. When things change very quickly, you have to be flexible. The second is determination or strong will. It is not just only God's will, but you have to be strong willed. Third is creativity. You have to be able to adapt to unexpected changes without too much preparation. So, these three attributes are necessary when one tries to adapt to these megatrends. The subject for this session is what sort of modus operandi are necessary to develop human resource development in the context of business-university collaboration. I would like to ask representatives from each country key points.

#### Comments by Each Country

Dr. Yoichi Okabe: I would like to introduce the organizer of this workshop: the Business-University Forum of Japan. They are for better collaboration between businesses and universities in Japan. Under this organization, we have two working groups. One is a group chaired by Dr. Kanube and I chaired the other group and it is for the Japan-Asian relationship. We discuss what would be good for the Japan-Asian relationship in the future and that has been the beginning of this workshop.

Japan contributes a lot financially to Asian countries in educational areas, but, in our working group, we discussed that Japanese support for education looks very inefficient in some sense. We have several ways to support people exchanges but there are a lot of ministries and each ministry has its own support method. For example, we have the JICA (Japan International Cooperation Agency) system which is managed by the Ministry of Foreign Affairs, JETRO (Japan External Trade Organization) is supported by MITI, and so on. Each ministry has a different kind of support, so the efficiency is very low. Several years ago our country started a so-called 100,000 student project. We tried to increase the number of foreign students to visit

Japan up to 100,000. Unfortunately, although the number increased year to year, recently the number has leveled off-- it has become saturated by one half of the target. We could not understand why, but probably one is that there is nothing to learn in Japan right now. Secondly, the accommodations, for example, we have a few number of dormitories, and also there are no good administrative offices for foreign students so the professor has to do everything, thus, the service has gradually become worse. As far as a foreign students invitation program, what is wrong right now? Probably, some of the attendants here might know about it. Also, we have several other programs such as the Association for Overseas Technical Scholarship (AOTS) which could train only industrial people, but probably we should have a better program for not only industrial people but academic students also. If you have some proposal for such type of a project, please comment on it.

Dr. Narong Yoothanom: For international collaboration, I think that most of the countries in Southeast Asia are developing countries. We often accept financial support because we cannot invest in all the problems we know of and want to solve. We have to make friendly relationship with other countries so that we can learn for each other's experiences of problem solving. Also, they can learn from our solutions. So, the key factor is to set up a network. So far, we have set the ASEAN University Network among the universities in Southeast Asia. Through this network, we are able to exchange student and staff and even research topics, and we can visit these universities to work together in some areas. The main point for working together is that we have a common interest and we can benefit together, otherwise, it will be a waste because most of the people in the university are busy.

Dr. Wei-Chung Wang: In National Tsing Hua University, Taiwan, we have a institute called the Precision Instrument Development Center administered by the National Science Council. They train technicians who are responsible for operating precision instruments for free. The center can unify the teaching personnel from universities and research institutes. In fact, the Foundation made a proposal to APEC meeting through Taiwan government in Seoul at the end of last year. Because different departments of the government have different policies on how to support foreign countries. Finally, we have a common foundation to do the same thing. We think that our Foundation can do this kind of training because we have a common interest. For example, many Taiwanese companies made an investment in mainland China, Vietnam, Malaysia, Indonesia, and the Philippines. In all those areas, there is a lack of engineers and we can do this training for them. This benefits both Taiwanese companies and also the local economies, and I think this is one of the best ways to collaborate internationally. At the same time, I am claiming that all the companies in Japan can do the same thing for the people of Taiwan and all other countries. It would be good for both sides because most of the companies in Japan are reluctant to transfer modern technology to neighboring countries and I think that it is a good

time to transfer the necessary technology to neighboring countries so that we can work together toward a global cooperation.

Dr. Richard Mengko: If the common interest for universities and industries is to only take advantage of the output of the university and human resource, I think it can be easily done. But, if the common interest is in research activities, then we have a problem of common interest. Because, universities normally have a culture of a very narrow organization, independent and free from everything that has no intersection with the business environment. In that case, for that type of collaboration, maybe the university needs to add managers on the campuses to deal with that area so that we can interface with businesses.

Dr. Takashi Inoguchi: So, what you are saying is that liaison officers on campus are much more necessary.

Dr. Reynaldo B. Veja : I think there are two basic phenomena that will lead us to find our common interest, or will drive us toward finding it. The first one is the rise of knowledge-based economies. I think more and more industries are realizing that their viability will depend also on their own knowledge base. I think this has put the university on center stage because knowledge is the central concern of universities - the generation, accumulation and the transfer of knowledge. So, I think this is a fact that will bring industry and universities together. The other phenomena is globalization. The reach of industry has been global for a good number of years and in universities it is well known that knowledge knows no national boundaries. Also, the fact is that the problems like environment and energy have a global dimension to it. The scope of business university cooperation, I think, cannot be but global in scope.

What are we supposed to do? I have two ideas to propose. First, we can take a look at the so-called professional societies. The Eastern Asia Society for Transportation Studies (EASTS) was established a year and a half ago with a founding conference in Manila. It is a regional professional society that naturally brings together people from academia and from industry. This one is on transportation maybe it can give us some ideas for the BUF. Second is, as Dr. Takeda suggested, that we establish our own university business forum in the Philippines. Maybe can start with discussions and the discussions can grow into a more formal forum.

Mr. Nik Mustapha Nik Mohamed : I would like to take a notion of technology transfer. Management used to be defined as getting work done through people but I think the paradigm of management now has changed to developing people through work and I think this is the approach we need to take. They can be developed by working in Japan, by working in Taiwan, and by working in Malaysia. The approach whereby, not only between and among industry, it will also be between industry and academia and between academia and academia. I think this is the way we can develop people and in a sense, it is this business-university

collaboration -- developing people through work, developing extraordinary people through extraordinary work.

Dr. Takashi Inoguchi: His idea is much deeper than the Japanese notion of on-the-job training.

Mr. Nik Mustapha Nik Mohamed: The notion of on-the-job training has always been to just try to learn the job. Here I believe we are going much deeper, it is developing the whole person, not just learning the job, which is more about the mechanics of the job.

Dr. Young-Dal Cho: In addition to flexibility, determination and creativity, I think business university relations are based on practicality. Secondly, universities need financial support from industries in a kind of developmental process. Thirdly social justice is also needed for improving labor performance. We all mentioned efficiency and the collaboration of business and universities. In these cases, universities are big and famous ones and the businesses are big and famous ones. What about small businesses and little famous universities? Here, an inequality exists between advanced universities and all the others. Today's discussion is so functional, I guess enterprises only support universities only when something profitable in the future is expected. But, if enterprise development is dependent upon society, the company and enterprise has a duty for giving funds to other areas such as non-profitable and poor areas. I will suggest social justice as a kind of principal for business and university collaboration. Fourthly it is the university's survival strategy. Also, we need one more principle: technical transfer and cooperation. So, I suggest a type of cooperation for a forum, including the participants today. I believe through this type of forum, we can get several benefits such as ideas and mutual understanding and new strategies for business and further our progress for cooperation or research cooperation. Here, maybe each country or member could pay a type of fee, for example, US\$1,000 per year.

Mr. Subirman: I would like to highlight two issues. What should we do for the fulfillment of basic science and research? what should we do to encourage our students for applied research and work experience? Let us do it in a concurrent way by establishing a collaboration between universities and industries. A company will encourage the soft skills for fulfilling the attitude of innovation and adaptability in the work environment. The university can fulfill the hard skills which is a kind of technical knowledge. Let us do our collaboration between industry and universities in a wider region like Asia. For example, PT Telekomunikasi Indonesia sends 100 people abroad every year for taking a master's degree. Maybe after finishing their studies, we can send them to Japan for about six

months in an internship program.

Dr. Guan Zhicheng : I think that cooperation is not only between universities and national industries, but also, cooperation with international companies and foreign universities. I think that universities should have the ability to give a good contribution to economic growth through training program. We have a new training program. It is the interdisciplinary training program and the students are not only familiar with technology, science and engineering, but also familiar with the economy, management and social science. Maybe these types of students are welcome by the companies. Another training program for continuing education is very important for China. That continuing education training programs are welcomed by the industry. I think that the university has a very strong ability to do a training program for continuing education.

Secondly, the university will contribute to economic growth through technology transfer. Now at research universities, they have a very strong research ability, not only for applied research projects but also for fundamental research projects. I think different universities have good experience in different methods. For example, in Tsinghua University, we have a university industry liaison program and it is very successful. We have had so many joint research centers, laboratories and training centers -- they have also been very successful. Applied research projects, I think, are important for economic growth. I think it is easy to get financial support from companies for applied research projects. I think only a few companies give very strong support for pure research projects. For example, we give some support to the chair professor or for long-term joint research projects. I think that this workshop is very good because we can exchange some ideas. I think the situation in different countries is different, but we have so many common points.

<Discussion>

Ambassador Hiromu Fukada: We certainly are quite anxious to increase the number of foreign students who are prepared to study in Japan. Since I was a member of the Japanese Government, I certainly would not like to admit that our bureaucracy is inefficient. On the other hand, I do think that the question of language is very important. We all know that the Japanese language has, unfortunately, a limited use in international society. So, we would like to overcome this difficulty or disadvantage one way or another. At the same time, we would certainly like to hear from our foreign visitors their views on this particular point. We would like to organize the international universities where English can be the common language of communication because it would save a lot of time for foreign students. At the same time, if people are prepared to come to Japan, they will hopefully come to like our society or people and eventually

our language.

Dr. Yasunori Nishijima : May I just mention our plan of the Science Council of Asia. We have been working on a forum for scientists in Asia for the past three to four years and gradually came up with the idea that we should make a permanent organization called the Science Council of Asia. Last February, we had a symposium on what is science in Asia; what unique points of science are in Asia. We put together a general theme, which was called tradition and the new horizon and we had a very nice discussion, and I think that this will also have some kind of impact toward the future of business and industry in Asia. For instance, in the area of traditional medicine and new medicine. We reviewed traditional medicine in Asia and newly developed medicine in Europe and America and modern medicine. Now, there is one new medicine that has come to a sort of stage and people think about what is really the new father of advanced medicine which should be going to Asian medicine. Also, another subject we had a discussion on was natural disasters in Asia, which is closely related to the environment. In the past 10 years, 80% of deaths due to natural disasters are in Asia. Why do we have so much damage? There is something wrong about this and we have to think about it -- we have to think about the future. This is not just business and this is not just the subject of academic research, but we should have our own unique development of science and technology and business and society all together. While we were discussing such a thing, we came to a point in which the next century of science in Asia and business in Asia may lead the world in the direction of the real meaning of the sustainability of human beings.

Dr. Takashi Inoguchi: We have had very deep thoughts in addition to concrete pragmatic proposals as how to institutionalize such interactions between business and universities. If we are interested in focusing on international cooperation, we must at least touch upon three things. One is what are the guiding principles. The second is institutional framework and the third is financial formulas.

Dr. Yoichi Okabe: About the Dr. Subirman's proposal on an internship, I heard some news from MITI and AOTS, they are now planning to start an internship in Japan from Asian countries. It will be summer work, but there are still several problems. One problem is whether Japanese industries would accept foreign students because right now even Japanese students are not being accepted as before. Another problem is, will universities in Asian countries send students to Japanese industries. The third one is that they need much more money than the Japanese Government spend for this program. I would like to ask whether universities in Asian countries be interested in such projects or not.

Mr. Nik Mustapha Nik Mohamed: We send people to go for further studies, to do their MBA and to do their post graduate work, but we also send people to other companies. For example, we send people to work for Nomura. The person is still our employee, but he basically works for Nomura and, of course, after about one or two years, we call him back. What we find is that this person whom we sent to another company to work has developed more than the person whom we sent for study. Based on the notion we need to change our paradigm. We would like to do more of that.

Dr. Takashi Inoguchi: Regarding developing people through work, how widespread is this idea in your country?

Mr. Nik Mustapha Nik Mohamed: It is still the exception to the rule. The rule is that they will send individuals to universities to do their MBAs, etc. We send them to professional accounting firms, to observe mutual funds and fund managers, etc. We do send them, but it is not something that many companies are doing. We also do not get many companies saying please come. So, we would like that to happen more regularly so that it would become a common practice.

Dr. Takashi Inoguchi: How do you share the financing costs?

Mr. Nik Mustapha Nik Mohamed: Basically, we send the person to go and work for Nomura. Nomura pays the person.

Dr. Takashi Inoguchi: Dr. Mustapha advises that there should be more space where creativity can be cooked out by sending people out and letting them work in a totally different environment. That is one way of developing human resources.

Dr. Narong Yoothanom: I think that in universities, we do the same type of exchange as that. We send a professor to work at the University of Tokyo for a while -- say for a few months to interact in the same area of research and to exchange data under the collaboration of our university. When they come back, the professors seem to be more fresh with new ideas.

Dr. Takashi Inoguchi: In a totally opposite direction, I think a number of Japanese engineers teach at the Asian Institute of Technology in Bangkok on a fairly regular basis. I do not know the detail or the impact they have on Thai students there. At least, it is a fairly regular process.

Dr. Narong Yoothanom: Some Japanese professors from the University of Tokyo have visited our laboratories and spent for a week there. They know our students. When these students apply to the University of Tokyo, there is some benefit that they can get.

Dr. Takashi Inoguchi: For business-university collaboration, universities send people to industry and industry people are sent to universities.

Mr. Subirman: The question comes down to three things: 1) guiding principles or guiding spirits; 2) institutional framework; and 3) financing formula.

Dr. Takashi Inoguchi: Shall we proceed in terms of the three subjects, i.e., guiding principles or guiding spirits, institutional framework, and financing formula? Then, we can try to come up with some conclusion or recommendation as to how international cooperation might be more vigorously executed in this region-wide business-university collaboration. As for the guiding principles, a number of things have already been mentioned, e.g., flexibility, practicality, creativity, determination, social justice, etc. Continuity, regularity -- Of course, continuity and regularity depends on institutionalizing formulas, financing formulas, and the way things are managed or run. Our problem is how to start fresh. Are there any other principles that may be needed?

Dr. Takashi Inoguchi: I would like to introduce other principles. The first is a kind of "shared mind." In the information era, the most important thing is not machines or the Internet, but how you can believe in other people, how you can set up a human web. So, a shared mind is sharing the same information.

The second is related to how you can work together, i.e., "collaboration." We have used the word "collaboration" on so many occasions. However, collaboration is a new concept. It is proven that two people can do much better than Dr. Einstein. So, even top or leading companies in the United States set up groups in order to make a new product or get new knowledge. It is like a collaboration among different cultures or among different professions -- a way to increase creativity.

The third is a kind of rapid way to react, because we are in an era of great competition. As information technology (IT) evolves, there are many new niches. The second reason is the globe is going to be a community itself -- there are no "iron curtains." So, every society and company will have to compete against each other. Again, competition or how to be flexible or how to increase competitiveness leads to the terms "nimble" or "agile."

Dr. Takashi Inoguchi: The first is "shared mind" or "trust." The second is "collaboration" and then "agility."

Dr. Shuzaburo Takeda: "Shared mind," having a shared mind is like setting up a target. It is mutual so that all people can work together. Collaboration is a key to flexibility, every person is staying flexible, but still has a set goal.

Dr. Takashi Inoguchi: Are there any other views on the guiding principles or goals, etc.? We may come up with the principles of APEC, which are "loose" and "open." At least at this stage of the discussion, we better say what we feel is important. Regarding application-oriented or theory-oriented, many seem to be more interested in applications rather than theory.

Mr. Nik Mustapha Nik Mohamed: One of the other things we have said, in terms of tolerance, diversity and creativity, that is critical is "stretched goals." In my country there are a lot of stretched goals put in place by our leadership. Because of those stretched goals, everyone feels a sense of urgency -- you inspect what you expect. So, if you expect a lot, you get a lot.

Dr. Takashi Inoguchi: I think that this is very important. Guiding principles and goals and spirits are important, because, otherwise, no one would show strong interest. This means that money is not going to come easily. Somehow, there must be a sense of need or urgency.

We will move to the institutional frameworks. There are many schemes. The APEC scheme is one, i.e., loose and open, and basically region-wide. Each chapter in each country somehow organizes itself as far as national activities are concerned. You fund them yourself, you organize them, and then you invite business and universities -- a certain formula. Then, you nominate a representative. Then, the representatives convene at a certain place. The country where representatives convene should help finance the national convention. That kind of scheme is easy; it is the APEC formula. Other than that, you need to carry out a number of tasks like gathering national figures on business-university collaboration, what aspects, what schemes, etc. All of these studies have to be done and it must be decided who will do it. A secretariat, money, and who will pay money are all necessary. Governments are complex and it is very difficult to organize. Therefore, in what way would we like to set up this kind of institution? What kind of institution would you like to set up?

Mr. Edogardo A. Paynor: I think the idea of APEC is good. At the outset, I would like to support that in the sense it is an accepted organizational structure by countries that are so diverse as far as APEC is concerned. So, if it is running well, maybe we should start using that organization, as well, with slight modifications. But, as a starting point between industry and academia, at the outset, these are already diverse. Maybe we can use that structure so we can tailor it in our own way to achieve our goals. That is a good idea. The other advantage, since we are part of APEC, by using that APEC procedure in our collaboration, we can support APEC, as well. Therefore, we do not have to invent a new structure. We should probably use that same structure so that the two can go

together.

Dr. Takashi Inoguchi: Any ideas related to institutional set-ups. You can go to the extreme of the European Union. The Secretariat of the European Commission basically produces many legislative drafts and national parliaments have to register most drafts without changing much in the national parliament; this is a little too much. Opposite to the European Union is a no-action, talks-only kind of organization.

Dr. Shuzaburo Takeda: Many industries are setting up "virtual corporations." They are different from actual institutes nor actual organizations. They are the place where people want to join or exchange ideas. That is like many joint or new types of business start-ups in the United States. So, I wonder whether or not we need some solid framework. It could be on a more ad hoc basis. Or, we could use Internet very easily or exchange ideas or share views.

Dr. Takashi Inoguchi: I think your message is the more loose the better, at least in the initial stages. If you try to organize each national chapter in a very solid fashion, it will take time, money and much effort; you will exhaust yourself. I think Dr. Takeda's view is very well taken.

Dr. Shuzaburo Takeda: A virtual forum or collaboration is one idea. Once, in the 17th century, there was a group called invisible college located in London. There were many scientists working together and exchanging ideas. Among the people was Newton. Those invisible colleges differ from college professors of that time. And, those invisible college people formed, at that time, a loyal institute or loyal academy.

Dr. Takashi Inoguchi: I think your point is well-taken. But, at the same time, since this concerns business-university interactions, it has something to do with money, profit and technology. Therefore, you have to meet, even if you do not represent a company or a university. Somebody has to meet with these technologies, moneys, etc. Therefore, we cannot indulge in the practice of the 17th century forever. At least in the initial stage this is very important. Without that, without that sharing of minds, nothing will move forward. In that sense, this is fine. The kind of institution we now envision is like that. I think this is wonderful. I think some people in business, government or universities like to -- even at this stage -- make one more step forward. So, I think we need to discuss other aspects of an institutional framework.

Dr. Richard Mengko: I think we need to hear more from the industry side regarding their opinion about this Asia university-business cooperation. How does industry see the industrial framework from the industry point of view. I believe that if the industry really knows, or really can formulate the advantages, and which area --

what kind of support do they really need?

Mr. Edogardo A. Paynor: I just do not know how to institutionalize it, because the countries are in different stages of industrialization. Maybe our problem today on institutionalizing the institutional framework is difficult with respect to different countries. But, I see the value of initial discussion among us, because this is the first stage. Maybe we can throw some ideas into the Internet and we can see how things evolve. Internet is a very cheap way of gathering ideas without being limited by a two-hour session. Maybe through the Internet, we can discuss and see how we can establish a framework. In addition, we can also really listen to what Korea or China or Indonesia or Malaysia will share and see how it relates to us. Then, we can probably come up with another session and discuss other inputs, because I am just one voice today. But, this does not mean it will be approved by other members of industry. In conclusion, my idea is to throw our opinions via Internet(email) with a set time frame of one or two months and then consolidate through your business-university forum in Japan, and then go from there.

Dr. Young-Dal Cho: In the Internet interaction we can use a subscription program. When we subscribe -- maybe human resource developments and we put the ideas on the Internet, the ideas spread to all members. Spreading your ideas to all members is possible through a subscription program. This idea is very useful. Internet is the first stage for making the organization for international Business/University Forum.

Dr. Shuzaburo Takeda: In the business-university forum of Japan, there are about 16 or 17 companies. Those company people may be interested in working together with university. The point is that the university should have some strong point or be attractive, because there is no way to force them. I think the starting point is an informal network. There are qualified people on the floor who are observing and know who or what are on the companies' side. If we open the discussion to the people on the floor, we could hear viewpoints from Toshiba and other companies.

Mr. Mitsuhiro Arinobu: Professor Okabe started out by introducing the AOTS Program. As far as we are concerned, I think that sort of first step is very desirable. We would like to aggressively collaborate. My viewpoint is my own private view, this is not the view of my company, but this is what I feel. That sort of first step is very welcome. As far as I can tell -- as Toshiba -- since Japan is part of Asia and we are a member of the Asian community, we would like to work together with the Asian community and deepen exchange at the corporate level. Particularly, our company does business with Southeast Asian countries and we have production bases in Southeast Asian countries. Since our company is promoting

localization of our production base, this is enough reason for our company to want to be involved in an aggressive way. Therefore, Toshiba is positive about this.

Mr. Hiroshi Okazaki: I am with NEC. I think that our company's technology transfer to Asian companies has a long history -- more than 50 years. So far, we have very little visibility to Asian universities, because most Japanese companies, like NEC, have good relations with American universities. I think the relationship with Asian universities is recently becoming very important. Some of the relations with Asian universities involves establishing foundations in the Philippines, Thailand, etc., to promote the giving of scholarships to students within these countries, as well as submit donations to universities. However, such donations are just for financial support for research professors -- we do not expect research results or collaboration with universities or industry. However, because of the importance of Asian business, we have to foster relations with Asian universities. In this sense, the discussion here regarding virtual collaboration is a very good means to exchange ideas on how to improve relations between Japanese companies and Asian universities.

Dr. Yoichi Okabe: I have a comment on the so-called Internet workshop. I actually was a part of several university committees where I frequently used E-mail. The problem with E-mail is that when the people are very active, E-mail works quite well. But gradually, as they lose interest in E-mail their activity stops. Of course, in the first stage, everyone could not afford to pay so much money. Therefore, E-mail would be very good. However, in the very near future, we would like to have such a real committee. Otherwise, that kind of activity would decay very rapidly. Currently, Japan is providing almost all the financing. But, next time, this will probably not be so easy. So, the best solution would be for each country to pay for their own representatives. This is the only solution we have for the near future -- each country should pay their own representative's travel fees, hotel, etc. Otherwise, this type of committee will not be continued.

Dr. Takashi Inoguchi: In this case, we should hold a meeting at the center of this region, not at the periphery, i.e., Japan -- maybe the Philippines or Singapore.

Dr. Yoichi Okabe: I think the location the office is not so important. To have such a conference by moving to different countries would be very essential.

Dr. Takashi Inoguchi: It is APEC formula. You are self-reliant in terms of the cost.

Mr. Edogardo A. Paynor: I think we are also bordering on the financing aspect. I think that we already agreed that for this to continue on,

there has to be funding and financial support from each and every member of the Business University Forum. This will still go back to the business side, as far as our respective countries are concerned. I think it is very important that we come out with a unified goal and approach which we are going to present to the member companies -- whoever wants to participate -- so that it can be supported. Otherwise, like the saying goes, it will die a natural death also, whether by E-mail or any other means. We have to present this convincingly and get motivation from the rest of the member companies of our representative countries.

Dr. Takashi Inoguchi: We should have a package of important tasks that this Forum is expected to achieve, such as standardization of engineering education, exchange of scholars or collaborative research projects, etc., in relation to those companies which might be interested in helping -- so, at first, a very concrete package. First, very good sounding, guiding spirits. Second, you should have a package of good things you hope to achieve including the institutional set-ups, etc. The first thing can be very loosely and generally phrased. However, the concrete package must be quite clear.

Mr. Edgardo A. Paynor: Also, another suggestion is to use the APEC formula. Since, we have three areas here -- guiding principles, institutional framework, and financing formula -- each country could form three committees: a committee of guiding principles, a committee of institutional framework, and a committee of financing formula where there is a member from a university and another member from industry. Then, these committees together with the respective committees of other countries can talk over the Internet to decide on the right guiding formula or institutional framework. Then, maybe this can spread and we can come up with better ideas. I think this is the basic APEC formula. It is still informal and draws on the ideas of everybody.

Dr. Richard Mengko: A small addition to that is to now set a tentative date so that all of the information is there so we know what our "homework" is and when to submit this.

Mr. Nik Mustapha Nik Mohamed: I think these suggestions, regarding the set-up of in-country committees -- the buy-in will be there. It is a question of the value proposition, that is, how we can attract people to this sort of forum. In the context of Malaysia, in the past, this was very much under the Government. However, now the Government's move to incorporate this requires that they act more like a business. They must think in a business-oriented manner and think about things that would add value and attract industry to use their services. In a forum of this nature, a business university forum to be established in Malaysia is a question of getting in touch with all the universities. As a start, the

Japanese companies in Malaysia -- through contacts from this Forum -- can be the initial members of that particular group, for example, people who are represented here like Toshiba, NEC, Japan Airlines, etc. Then we will call on a few other universities to begin discussion on what we could do. In terms of the deadline, we need to set a deadline so that things can start moving.

Dr. Takashi Inoguchi: As far as the first step is concerned, you can write up what you think is the way that things should be conducted. Then, you send it to the office of this Business University Forum of Japan within two months. On that basis, we will get an aggregate quasi consensus. Further, on that basis, someone will propose to have the next meeting somewhere other than Tokyo, maybe Kuala Lumpur. Only on this basis can we proceed with further discussion more in-depth. At this moment, we have exhausted our initial ideas. Beyond this, you must make a lot of decisions by yourselves, which the businesses are not prepared to do right now, i.e., make binding commitments. For the time being, I think our discussion has been very productive. I think a document will come out, you can make comments on that, we can revise the documents and they will come out again. Then, we can proceed very steadily toward the next step.

## Closing Remark

Dr. Yasunori Nishijima: The world is moving and Asia is changing. An ancient Chinese philosopher said, "the man who knows that matter would not speak about it, the man who talks about it does not know the matter." Somehow, in Asia, regardless of the ethnic background or our religions, we all somehow understand what this philosopher said. However, in western culture, this is a very strange way of expressing things, and they cannot comprehend the meaning of the maxim. They think this is a denial of language or verbal expression. Most of western culture believes in defining the meaning of a word, discussing the matter with each other, then they will both gradually understand the core of the truth. But, in Asia, we approach things in a different way. We all know the whole is not just the total sum of the parts. The whole is always greater than the sum of the parts. We have a very interesting way of integrating knowledge. Also, it is not easy to express, and we all know this. But, we have sort of a mutual understanding of what we would like to find, and what we like to create. When we talk about mutual understanding or working together, or say we should collaborate, we have something more than just finally finding the meaning of the word. But, we have something more. With that language, we have a heart-to-heart conversation and an understanding. In a way, in the development of science in Europe in the 17th Century and the Industrial Revolution of the 18th century, we have a certain pattern of development of so-called development. But, we also know that at the end of the 20th century -- what is really development? This is not just Asia. The whole world is wondering what development really is and what the quality is. Sometimes we have conflict. For example, Americans talk about human rights. I feel very funny about this term. What is their human rights? Are the Americans ever qualified to preach to people about human rights in Asia? If the British can talk about human rights or humanity in Asia -- we think about two centuries ago. I think that something is coming to the end of one period. At the same

time, we have to find the beginning of the next stage. In business university talk with Asians in Asia is really a multi-multilateral discussion. Sometimes I feel as though the academic community or the university community in Asia maybe has a closer understanding than the university business conversation in Japan. In the same way, for business on a global scale, they feel very close, they feel they belong to the global business community. Maybe they feel more estranged to the academic community in Japan or the United States or Asia. So, this is not just international; we need certain states of real understanding of a different community, different culture and we all have to talk and think about the future. In that sense, this workshop is a very important beginning. It is the first workshop, and I was so happy about the Chairman said regarding the second workshop. I think the continuation is very important; we have to take one step at a time. This is not very easy, because we have so many organizations and systems making connections between businesses and universities -- so many networks within Asian countries. Professor Fukada knows more about how we can connect in the foreign affairs system, and what will be the future of Asia. However, we have to think of a new framework for the future. I will go back to human rights, quality of life, and value of life -- I am getting more and more strongly convinced that in the future, the next century, the consensus that we have reached in Asia between universities and business is a very important guiding or leading idea. This is not just for East-West, but for the world -- for human beings. The next step is that we can work with the West. They have been waiting for this and looking for an answer.



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