

# Fukuoka

## Academic, business and governmental partnership

Good morning, ladies and gentlemen. I am Hiroyuki Takada, Chief Executive of the Economic Promotion Bureau of Fukuoka City. Today I'd like to talk about the efforts made through an academic, business, and governmental partnership and their specific undertakings in Fukuoka City.

### **Need for academic, business and governmental partnership in Fukuoka City**

As you are well aware, the need to strengthen research and development has been advocated in Japan to revitalize its stagnant economy. Fukuoka City sees its key industry, wholesale business, reaching its maturity as well. On the other hand, the city is experiencing an outflow of human resources, especially science and engineering graduates. Therefore, it is of great importance for the city to promote R&D-oriented industries, which have a prospect for future growth, to overcome such trends as well as to maintain a dynamic economy into the future.

The city has 12 universities including national universities such as Kyushu University and Kyushu Institute of Design, and 10 junior colleges. Fukuoka's excellent academic environment is statistically indicated, particularly in the category of higher education, ranking 5th in the number of institutions, and 2nd in the number of students per thousand residents among Japan's major cities.

By capitalizing on the high concentration of educational and research institutes, Fukuoka City has been aiming to realize "a city creating knowledge" with the key objectives of 1) strengthening academic research and development functions and 2) promoting industries that create knowledge. The partnership of academia, business and the municipal government is indispensable in bringing this policy into reality.

### **Fukuoka City's measures for academic, business and governmental partnership**

Given such circumstances, Fukuoka City directed its attention to information-related industries as industries for the next generation as early as the mid-80's when the term "IT" was not yet common. Fukuoka Soft Ware Research Park (SRP) was thus envisioned and established on a 6.3 ha lot at the reclaimed site of the Seaside Momochi complex, located in western Fukuoka City. As the information technology R&D stronghold, the research park was built to promote a new type of urban industry and to strengthen R&D functions. The research park aims to 1) attract major IT firms, 2) aggregate local IT firms and 3) nurture and assist local businesses through personnel and technical exchanges between major IT firms and local firms. As a further step to develop the area into a "research park" in the real sense of the term, the city established the Institute of Systems & Information Technologies/Kyushu (ISIT) in 1995. The institute serves as the core of the research park, functioning not only as a hub of ingenious and advanced R&D, but also as a coordinating

body for exchanges between local companies and universities. The significance of the institute has continued to increase; it is currently working on various research projects, including the Fukuoka Silicon Sea-Belt Project, whose objectives are to become a base for designing and developing System LSIs.

As a result of such an industrial policy, Fukuoka Soft Ware Research Park has grown to be one of the nation's largest centers for IT firms and research organizations, with about 6,500 employees working at about 110 organizations within the area. SRP consists of Fukuoka SRP Center Building, whose tenants include ISIT and local IT firms, as well as other buildings housing 6 major domestic and international corporate organizations and groups.

Another action taken by the city to promote academic, business and governmental partnership was to organize the Fukuoka Academy/Business Joint Plaza Executive Committee in 1998. The committee is composed of the Fukuoka municipal government, the Fukuoka Chamber of Commerce and Industry, universities of science and technology and various organizations of related industries in the city, and provides opportunities for exchanges among academia, businesses and the government throughout the year. Such exchange programs include annual "Academia-business exchange seminars," in which representatives from universities and industrial firms present seeds and needs for research and development under the supervision of Professor Sumio Nagata of Fukuoka University, who is here with us today. The programs also include "Tomo-no-kai" (or "friendship society") an evening class which operates at the grassroots-level and will be held bi-monthly and will feature consultations to universities from local business on technical matters. The committee is also engaged in the "Academia-Business joint research project finding" to assist small-and medium-sized companies in their quests for topics for joint research projects with universities.

Apart from the undertakings by the Executive Committee, the city runs its own "Academia-business R&D support project" and "Business-academia partnership promotion project". The former project is designed for small-and medium-sized companies that are involved in R&D of new technologies and new products in the city's strategic industries, IT field in partnership with academic institutions. Companies adopted this project are subsidized in the first year and given support to get the R&D into operation in the second year. The latter, or the partnership promotion project, aims to conduct "Research seeds investigations" during the current fiscal year, 2002, in order to convey the content of academic research to local firms in a simple, easy-to-understand vocabulary.

Incidentally, the city hosted the 6<sup>th</sup> RoboCup World Championships in June this year. The event attracted the participation of about 1,000 researchers from 29 nations around the globe and drew a record number of visitors at 120,000. The event also set the stage for another academia-business exchange seminar during the tournament. This exchange seminar, focused on robots, enjoyed extensive paper coverage.

From the examples I have given you, you will see that Fukuoka City's undertakings are not limited to the tangible examples such as developing an infrastructure but also extend to intangibles such as organizing seminars for icebreaking as well as offering supporting programs. By implementing these measures, Fukuoka City provides integrated assistance ranging from "creating opportunities for academic researchers and local companies to meet and carry out joint research" to "developing new technologies and products." The city is thus working to promote an academic, business and governmental partnership and will continue its commitment to a higher degree of achievements.

#### **Examples of academic, business and governmental partnership**

Thanks to the measures I have just mentioned, some of the joint development efforts have already borne results to be marketed as products. A few examples of such collaborations are a wireless earphone for mobile phones, called "Mikeless Phone" by Fukuoka Institute of Technology, Eiko Printing and New Advertising Promotion Creative Co., Ltd, and environmentally friendly paint materials named "Clothlies" by Kamigakigumi Inc. and Fukuoka Industrial Technology Center.

Current R&D undertakings aimed at practical application include the following: The "fiber-optic display device using polychromatic lasers" by Internet TOQ Co., Ltd and Kyushu University; the "cleaning robot for vertical A/C ducts" by Clean City Co., Ltd. and Fukuoka Institute of Technology and a "nondestructive testing device using the multi-frequency excitation spectrogram technique" by Kyushu Keisokuki Co., Ltd. and Oita University. These undertakings are subsidized as "business-academia R&D support projects".

The Institute of Systems & Information Technologies/Kyushu I mentioned earlier has been involved in a wide range of joint research projects with academic and industrial institutions. Let me give you a couple of the recent examples: One was a joint project between Fukuoka City Children's Hospital and NTT on communication support for children using robots and the internet. Another was the demonstration tests for next generation high-speed internet service conducted in cooperation with relevant firms and universities during the FINA World Swimming Championship Fukuoka in July last year. For the purpose of the test, fiber-optic networks and wireless LAN were used to inform the organizers and the press of the race results.

The partnership among academia, business and the municipal government is not confined to the Economic Promotion Bureau alone but also involves other agencies and departments of Fukuoka City. In the environmental field, the semi-aerobic landfill method, also referred to as the Fukuoka Method, jointly developed by Fukuoka City and Fukuoka University has been adopted in the Final Waste Disposal Guidelines issued by the Ministry of Health and Welfare and is actually applied at landfill sites throughout the country. The Fukuoka Method, presented at the 2nd Working-level meeting of the Asia-Pacific City Summit held in November 1997, features a branch-like drainage system at the bottom section of a landfill that hastens the decomposition process of waste in contact with the air. The technology has also been transferred to Malaysia, Iran and China through Japan International Cooperation Agency (JICA) and the United Nations Human Settlements Program (UN-Habitat) as part of Fukuoka City's overseas technical assistance involvement.

In medical and welfare fields, Fukuoka University and companies dealing with welfare products have perfected, with the cooperation of the municipal and prefectural governments of Fukuoka, the technology to recycle disposable diapers, the use of which is rapidly increasing, reflecting new demands from an aging society. They are planning commercial application that will utilize this achievement.

### **Providing contact points at universities of science and technology for academic, business and governmental partnership**

As I mentioned at the beginning of my talk, a large number of universities and colleges are concentrated in Fukuoka City. The Law for Promoting University-Industry Technology Transfer, or the TLO Law, is the Japanese version of the Bayh-Dole Act. It was put into effect in 1998, establishing a system for technology transfer at universities. Contact points for academic, business and governmental partnerships have gradually been established in our city, especially among universities of science and technology which are members of the Fukuoka Academy/Business Joint Plaza Executive Committee. The prime example is Kyushu University. A TLO or Technology Licensing Organization called the Kyushu TLO Company Ltd. (also known as University Industry Partnership or UIP) was founded on the university campus in 2000, receiving investment from about 300 instructors. In its close cooperation with the university's internal organization, Business Liaison Office, the company is engaged in 1) discovering, assessing and selecting research outcomes which have reached commercialized standards, 2) acquiring, retaining and protecting patent and other rights resulting from the research, 3) providing technical information on the outcome of research and 4) services related to patent transfers to industrial firms. Technologies acquired by private firms through these activities include stainless steel sheet processing techniques achieving uniform, smooth finishing, and the long-life fatigue strength design method for improved reliability of metal parts for machinery.

### **Sites for national facilities related to academic, business and governmental partnership**

Fukuoka City has attracted a number of national facilities related to academic, business and governmental partnership since last year, helped by the high concentration of academic institutions it boasts. Last November saw the inauguration of Innovation Plaza Fukuoka, a local branch of the Japan Science and Technology Corporation in the Seaside Momochi district. The aim of the facility is to help create new technologies by utilizing research outcomes of academic and research institutions and to launch new businesses and venture business corporations. Five selected research projects involving most advanced technologies such as IT and nano-technology are presently ongoing as joint research projects between local universities and companies. Commercialization of the achievements is anticipated in Fukuoka City and the surrounding region in the near future.

Furthermore, in April this year, the Kyushu Center for the Promotion of Academia-Industry Cooperation opened in the city with the initiative of the national government and the National Institute of Advanced Industrial Science and Technology (AIST). The center offers services in 1) gathering and providing related data, 2) matching academic research seeds and industrial development needs, 3) coordination in wide area

and 4) assisting relevant organizations, with a view to realizing a broad-based partnership among academia, business and the municipality in Kyushu.

### **Closing**

With the opening of these facilities adding to the momentum, ties between academia and businesses in Fukuoka will grow even closer. The municipal government will seek to promote the relevant measures and policies while working in concert with these facilities. Such undertakings will lead to the creation of new technologies and industries, and, in turn, stimulate the economy of the city.

Thank you for your kind attention.

# Nagasaki

Aiming at city development through joint cooperation between academia,  
local government, industry, and local citizens.

During Japan's period of isolation, Nagasaki City flourished in the unique position of being an international trading port and currently aims to be a prominent city of overseas exchange. The city developed through personal interaction and the exchange of goods, information and culture with the port acting as the medium.

The growth of the city's industries was due to the port. With a unique history and culture accompanied by an abundance of nature, Nagasaki's industries have developed around the main industries that are fishing, shipbuilding, heavy machinery, tourism, commerce and trade.

However, the changes in the conditions affecting business such as a developed society, borderless economies and constructive corporate reform are remarkable. In order to reinvigorate the city's economy, it is necessary to utilize the local resources such as an abundance of marine resources, hitherto accumulated top quality technology and knowledge, and a unique history and atmosphere which has excellent tourist potential. Through consulting with consumers and various sections of industry in addition to developing cooperation between academia, commerce and local government, we should endeavor to increase the wealth of the economy and to push for both the establishment of new industries and development of those that currently exist.

Within this framework, there are plans to develop networks exchanging skills and to encourage exchange between various industries, academia and local government within the new fields of welfare, environment, health, information and communications. In addition, there is the continued development of the 'Nagasaki technology network promotional activities' that are aimed at supporting the research and development, production, and promotion of new goods and technology.

There has always been continued support for research and development plans put forward by universities or corporations. However, since April 2000, under a new framework, the city introduced a new system of subsidies under the title of 'Administration Proposals' that support the development of technologies developed by small to medium sized companies that contribute to the development of the city.

The shape of Nagasaki City is like a basin with over seventy per cent of the city built on inclined planes. On the other hand, Nagasaki City is called the 'City of Slopes' which is filled with beauty and friendliness. However, this creates a harsh living environment for those who are less mobile such as the elderly and disabled. It is, therefore, necessary to develop a new form of transport that can be adjusted for use on inclined planes.

In order to overcome this problem, subsidies were allocated for the development of a vehicle (A simple monorail-based lift for 2 people) for moving along inclined planes. Various proposals were put forward by local, small to medium sized companies, three groups were chosen and subsidies were granted for two years from April 2000 until 2002.

As a result of cooperation between academia, industry and local government, the vehicle for moving along inclined planes was completed by the three groups during 2001. The machine was placed at Glover Garden, Tenjin-machi in the city, and at Mt.Inasa Park where it has been met by widespread favor.

The vehicle for moving along inclined planes placed in Tenjin-machi was especially aimed at those who have trouble in moving such as the elderly and disabled. The line rises 60 meters from Tenjin-machi civic hall and its commencement in April 2002 became the first of its kind in Japan.

The construction of the vehicle for moving along an inclined slope only commenced after receiving consent from local residents such as residents living alongside the track, homeowners, tenants, in addition to receiving positive cooperation from Tenjin-machi residents' association. Management of the vehicle including everyday cleaning, test runs, guarding of the construction, and the distribution of users' cards is the responsibility of the local residents' association. Inspection of the vehicle and track, maintenance and the payment of electricity are managed through the local associations, and administrative powers. On average, there are currently 70 people per day using the service.

In areas affected by an exodus of elderly people due to the inconvenience of hills and steps that are a hinderence to mobility, a vehicle for moving along inclined planes will ensure easier mobility in order for the elderly to go out or visit hospital. Through both the management and use of such a vehicle, local ties should grow stronger and it is hoped that it will make a huge contribution to the development of the city.

Hereafter in addition to careful monitoring, there will be precision checks on the use, safety and maintenance of the equipment. We want to instigate further transport projects of high convenience and comfort according to citizens' demands.

Also, there will be further examinations of other suitable locations within the city for building the vehicle for inclined planes. Once this has been achieved, we intend to develop a plan whilst working in cooperation with local residents' associations, police and other related organizations.

This development of a vehicle for moving along inclined planes is a excellent example of overcoming city development issues using the technology created by locally based small to medium sized companies. It is hoped that the eventual outcome will be that the use of this locally developed technology in other areas of Japan will contribute to stimulating the local economy.

With regards to universities, through successful restoration of the city due to successful research by the universities, the aim is that the number of new enterprises started by universities will increase. From April 2002 a new network between sixteen universities within Nagasaki Prefecture, in cooperation with academia, industry and local government, will aim to stimulate the region.

This city wants to promote industries and to undertake agreeable city development using the local resources, and increasing the value of the cooperation with citizens, universities, industry and local government.



# Vladivostok

## Collaboration among Industry, Academia and Local Government: From Innovation Projects to Science Intensive Production

### **Science and Technology Progress and City Environment**

It is commonly recognized nowadays that prosperity of an industrialized country as well as its citizens' welfare depends mostly on science and technology progress. The efficiency and profitability of science intensive manufacturing, as estimated by municipal government, is determined by a number of objective factors. First, the science intensive industries are the most effective ones in terms of employment provision because they require a developed infrastructure. That is why provision of one workplace in this field brings in a number of additional places of work in the service sector. Frequently, science intensive enterprises consume little raw material and they are not attached geographically to mineral deposits. At the same time, the science intensive commodities are usually easily transportable due to their small size and light weight. Generally, science intensive production provides favorable conditions for small-and medium-scale business. It is impossible to produce metal, automobiles, aircraft, etc. at these enterprises, while they are particularly suitable for manufacturing of electronic computer boards, off-the-shelf chip devices, software, and other commodities because these small-scale businesses are capable to quickly rearrange themselves, adapting to changes in market demand pattern.

The science intensive restructuring of economy is based on innovation process, implying new discoveries and inventions as well as their immediate manufacturing application. Thus, the present-day industry cannot exist without universities and vice-versa. The process of innovation is decentralized because it represents the result of creative work and business activities of particular scientists, engineers and businessmen.

So, the question arises as to who are organizers and participants of the regional programs. The main participants are regional and local authorities. They are followed by private capital holders, such as industrial enterprises, banks, building and service companies. Next to them are higher education institutions, laboratories and other scientific research organizations. Finally, among them there are non-profit organizations, support groups, various funds, associations, leagues, performing both as stimulants of activity and a kind social inspectors.

Vladivostok City Administration devotes much attention to science and production integration policy. It is especially important at the time of transitional period in Russia's economy. Nowadays, the previous schemes of academic science and practical research funding are not effective anymore, and the new ones are unable to solve the existing problems, besides, the entire city production base needs modernization.

### **Vladivostok City as an Economic Subject of the Russian Far East**

Vladivostok is an important industrial center of the Russian Far East; the major city industries are machine building, including shipbuilding and ship repair, production of construction materials, and food industry.

Vladivostok has also a large fishery base. Besides, the city hosts a number of large enterprises that had once belonged to soviet military complex. Due to reduction of military programs, these enterprises have lately began to switch to non-military goods, such as home appliances, consumer electronics, etc. Currently, some of these enterprises do not fully use their production potential, in spite of their up-to-date technical base and skilled staff. Vladivostok has a considerable scientific and education potential as well; the Far Eastern Division of Russian Academy of Science with 14 academic institutes is situated here along with 9 more largest Far Eastern institutes and universities.

**Now, I'd like to describe the main objectives in city administration's working with academic, educational and industrial enterprises**

With regard to everything stated above, Vladivostok City Administration aims at the following objectives in its collaboration with industrial enterprises and academic institutions. The performance of these tasks directly or indirectly contributes to developing collaboration between scientific institutions and industrial organizations, which, in effect, influences science intensive economy restructuring and promotes full-scale usage of companies' production potential.

1. The first objective is establishment or advancement of educational potential by efforts of municipal organizations. It implies foundation of educational facilities and introduction of various training courses for skilled technical executives, as well as advancing school education quality, including special professional training courses for schoolchildren. For example, due to permanent development of computing devices, communication network, and Internet in all the fields of human day life, the City Administration finances the purchases of the most advanced computer hardware for municipal public schools. Another example is constant advancing of professional orientation program for senior students of secondary schools due to the growing demand in skilled staff of certain professions, caused by Vladivostok industry base restructuring and former military enterprises conversion to non-defense goods. One more example is the fact that in recent years the most successful senior students of Vladivostok secondary schools have been awarded with special grants to provide further educational incentives. So, the City Administration implements an intensive policy aimed at increasing the quality of secondary education. On the one hand, it contributes to economic growth and, on the other hand, it assists students in their receiving high education and, in the long term, supplies scientific centers with skilled personnel.
2. The second objective is strengthening of scientific potential, establishing new and expanding already existing higher education institutions and research centers as well as promoting collaboration with large scientific centers in other regions of the country. This line of development is especially important both for Vladivostok and the whole Russia because of insufficient federal funding of fundamental science and higher education. The City Administration exercises the policy of offering Vladivostok higher educational institutions financial support, assistance in various large-scale Russian and international programs and events, establishing relations with educational institutions in foreign countries, giving priority to all sister-countries and cities to conduct scientific exchanges. For instance, foreign scientists and experts take part in most scientific conferences on shipbuilding, power engineering, etc., held at Vladivostok universities.

3. Promoting entrepreneurship of all types, especially in science intensive, high-tech industries either by launching new enterprises or by attracting companies from other regions or from abroad. In the present situation of high technology progress rate and intense competition at the open market, success largely depends on dynamism, flexibility, and ability to adapt to changes quickly. All these properties have never been characteristic of national authorities, while, on the contrary, medium and small-scale enterprises are much more adaptable in this market situation. Among other tasks is improvement of work coordination system for enterprises and feedback system, including IT and E-governance, as well as constant reviewing of the municipal legislation and proposing necessary changes to the regional legislation. After all, local taxation is the most important object for regulation because it provides to the authorities a wide scope of strategic opportunities for business activity stimulation, attraction of investments by means of various discounts, tax credits, exemption from payments, thus, being rather a flexible tool of economic, science and technology policy. For instance, the enterprises, which are of great importance for city development, such as tourism and communal service companies, can at times have taxation privileges. The City Administration assists them in selection of office and production sites, gives them consultations, and so on. Special assistance is offered to scientific institutes which establish science intensive, high-tech manufacturing based on their own projects.
4. Establishment of modern infrastructure capable to support the sectors of production and customer service, communication, living facilities, environmental safety-i.e. the "highest quality of life" in its full scope of meaning.

### **Practical Aspects of Scientific Research Implementation**

Besides the above-mentioned strategic objectives, the City Administration devotes much attention to practical aspects of collaboration among representatives of academic science and industry. The most effective way of achieving this aim is various investment fairs and special-purpose symposiums of both local and international levels, where these institutions can present their advanced projects and developments to potential investors. In order to attract investors, the City Administration has several times published records of scientific projects, developed in the Far Eastern Division of Russian Academy of Sciences. The City Administration directly collaborates with researchers from the Far Eastern Division of Russian Academy of Sciences and city higher educational institutions in order to put into practice already existing innovation projects. The priority is given to developments, aiming to improve the city environment, quality of life, and public health. Among these projects there are those on seaweed agriculture, pharmaceuticals, food industry, power engineering, production and construction.

Presently, a harbor water treatment plant of a new type is being designed, as well as a new premises heating system is being introduced. An original method of flouroplastic waste recycling into antirust material has been developed at the Institute of Chemical Processes. Municipal companies have been established to put these advanced projects into practice.

As mentioned, presently, Vladivostok City possesses an extensive free production basis and skilled labor resources. In this situation, it is very important to ensure their proper implementation, beneficial to all parties:

both to research institutes, and to producing companies, and of course, to the city budget. In order to develop new projects and to bring together prospective scientific projects and production workers the City Administration has set up an Innovation Projects Department. This department specializes in investigation of scientific projects availability. The main object of this department is to reduce the time period between a scientific discovery and its practical production application. Upon a closer view to the projects, it appeared that many innovations of great prospective importance for the city, region, and country for a long time had been taken no notice of. To work effectively with prospective projects, the City Administration employs not only municipal government executives, but also researchers, who have a practical experience in solving academic science problems.

Thank you for your attention.

# Special Participation; Prof. Sumio Nagata, Faculty of Engineering, Fukuoka University

## Tasks for Collaboration among Industry, Academy and Administration in the 21<sup>st</sup> Century

### 1. Introduction

I remember hearing the Japanese term “Collaboration among Industry, Academy and Administration” around the time I graduated from a university. This means that such a joint arrangement has been considered important for over 40 years. If I remember correctly, the first term in use was “Industry and Academy Exchange.” Later on, it was called “Industry and Academy Cooperation,” and then it became the current “Collaboration among Industry, Academy and Administration”. This is a little outside today’s topic, but there is some misunderstanding among young people, who seem to think (because of its broad meaning in the Japanese language) that “administration” in this case means public research institutes or their researchers other than those of universities. In retrospect, we can see that administration has become the third player, with its role being to coordinate industry and academy. In English, of course, the phrase is “industry, academy and administration,” and there should be no confusion that “administration” refers to government. Since the start of the Heisei era in 1989, collaboration among industry, academy and administration has been strongly advocated. This may have been caused by youth shying away from science and technology as well as the prolonged economic slump. The Basic Law on Science and Technology was enacted in 1998 as an attempt to break out of the slump. This law extends as well to the role of local areas in contributing to the promotion of science and technology. A sum of 17 trillion yen was invested in the five-year first phase of this plan, and 24 trillion yen is earmarked for appropriation in the second phase. The science and technology sector is the only field for which an increasing amount of budget has been allocated under the austere fiscal policy.

### 2. For effective implementation of science and technology policies

We often see environmentally motivated opposition movements reacting to the construction of dams, nuclear related facilities, and incineration factories, etc. Policies in line with science and technology are more often the subject of praise than criticism, and often are considered the crowning jewel of government policy. Why is this? The answer is that, for a country with few natural resources, science technology is the only boundless resource. Thus, there is general agreement on the value of these policies. But does this mean that everyone is in agreement with every detail of these policies? No. There is persistent opposition from academia circles. I have also heard criticism first-hand from a Nobel Prize winner.

- (1) If industry and academia are coordinated, Japanese science and education will be crushed
- (2) Academia should not be reduced to a servant of industry.

Regarding these two misunderstanding (and there is room for such misunderstandings within the general consensus), one can put forward the following opposing arguments:

- (1) University is fundamentally an educational institution. It must provide the highest standard of education. But faculty ought not to simply impart second-hand knowledge. They must be involved in their own research and experience industry-academia coordination first-hand in order to offer students cutting-edge knowledge. In other words, we must not think of education, research, and industry-academia coordination are not separate pillars, but instead use research and industry-academia coordination as means of educating.
- (2) The entire budget of national universities is appropriated from taxes. Industry is the taxpayer. If industry thrives, faculty salaries will rise and research positions will increase. Academia and industry are by no means unrelated.

### **3. Proposing a new system for industrial, academic, and administrative coordination**

Industry-academia coordination has been praised for several decades and remains a national task. I think that these are still some things to do. The friction between governmental policies and university faculties on the two points I mentioned earlier can certainly be solved through mutual discussions. We should expect that their efforts would come to fruition.

At this point I would like to highlight that methods for industry-academia coordination have almost all originated in academia, or what I call "seeds-dissemination." The Basic law on Science and Technology, the TLO, projects proposed by the general public, and policies of local governments are all fundamentally similar in this respect. Now, in order to overcome the limits of the seeds-dissemination type of industry-academia coordination, I propose a new system of "needs-dissemination." In other words, industry must present academia with its needs, and try to match "seeds" with "needs." For the following reasons, it seems reasonable to believe that with these systems, the probability of success will increase dramatically.

#### **(1) Academy is inherently suited to coping with needs**

The essential role of universities is to establish a system of learning. By developing this kind of nature, universities provide young people with education in every discipline. This means that universities are institutions whose role is to respond to the needs of inquisitive young people. In recent years, universities have been actively approaching high school students through open campuses. If we think of high school students as being replaced by industry, universities are uniquely capable of dealing with the various needs of industry in various technological fields. Even though universities do not have the mission to educate industry, such a capacity definitely exists within universities, and could be used as social infrastructure. I believe that the "third role of universities" stated in the Basic law on Science and Technology actually refers to this fact.

#### **(2) Seeds aimed based on needs will hit the mark**

Taking the process of new drug development as an example, it generally takes 10 to 15 years and costs several billion to tens of billion yen to develop a new drug. And that is if the project succeeds; the majority of projects end in failure. The difficulty of starting a new industry or a new business from seeds is comparable to trying to throw a strike from center field. However, aiming seeds from needs is very much like a catcher throwing a ball to the backstop. Even a small child can hit some part of the backstop (system of learning) with a ball (needs).

### (3) Role of the coordinator

If we compare seeds-disseminated type needs-matching to throwing a ball from center field to home plate, the coordinator is like a relay runner. The relay runner will determine if it is best to find another relay or to throw the ball directly to the catcher depending on the situation. For industry-academia coordination industry, a relay is necessary for 99.9% of cases.

Needs-disseminated type seeds matching (a catcher throwing a ball to the backstop) do not call for a relay. Instead, the role of a coordinator in this case is coaching the team, telling the first and the third base players as well as the catcher why they should throw to the backstop. Of course, there is no such rule in real baseball. This is just a figure of speech for industry throwing needs (a ball) towards the broad system of learning (the backstop).

### **4. In Closing**

Industrial-academic coordination is a proposition supported both in general and in its particulars. Therefore, similar results will be derived from similar methods no matter what the region. However, when a new proposal is introduced in a region, voices of opposition to its details will arise. If one avoids such problems, no new business can be created. When faced with a problem, face it with confidence, and progress will follow. Necessity is the mother of invention; problems are the fathers of progress.

## DISCUSSION

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### **Chairperson Mr. Koji Ebata, Deputy Mayor of City of Kitakyushu**

Thank you very much, Prof. Nagata. Now we have completed all the presentations. I promised that we would have time for free discussion at the end of the Sub session. However, I now have to conclude the session, as we are very much behind schedule. I apologize for not being able to have time for this. I am going to report on the summary of this Sub session at the plenary session starting at 2:00 pm today. I will be pleased if you entrust me with the task of reporting on today's Sub session.

(Applause)

Thank you for your approval. I will do my best to represent all of you in reporting the summary of this Sub session. In closing, let me thank all of you for your cooperation and for making this meeting fruitful. Thank you.

(Applause)