論説 Commentary

Why we need to enhance scientific and technological research and development

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Introduction

In answering the above question, it would be overly dogmatic to say, "Because Japan lacks enough natural resources, and the source of our international competitiveness is strong scientific technology." There are several foreign countries dealing with this same issue. In his inaugural speech, President Obama said that science and technology would be applied in reforming the US economy which is facing its toughest challenge of the past hundred years. In February the president signed the American Recovery and Reinvestment Act, and over the next two years the equivalent of approximately 1 trillion yen will be allocated to NIH, and 300 billion yen to NSF. As part of this economic "New Deal" approximately 15 trillion yen will be invested to introduce "green energy" over the next 10 years.

Primary concerns

What is needed most of all is a drastic change in public awareness. It is fitting that this year is the 200th anniversary of the birth of Darwin. Since his time we have learned that many living things have disappeared from the face of the Earth. It is now clear that it is not the strong that survive, but those which evolve and adapt to new environments. Mutation is the condition for "survival of the fittest", and the current economic crisis has brought about an irreversible social mutation which will prevent the previous economic environment from returning. This highlights the point that the key to economic survival of countries and corporations lies in how well they can adapt. Simply downsizing in order to survive is meaningless; the situation itself should be considered as an opportunity for creating social value.

The societal new order is on its way, and in order to make way for solid scientific and technologically based national development we must create a National Innovation Ecosystem (NIES) throughout society immediately. Additionally, adequate and proactive official government spending is needed. As Japan is a nation surrounded by the sea, with many forests and densely populated cities, the conditions under which it survives differ from western and even other Asian countries. Because of this we require an umbrella-type comprehensive and imaginative strategy that encompasses an honest view of the nation and the world. With the Council for Science and Technology Policies as its control tower, the Cabinet Office should establish policies by selection and concentration based on the analysis and gathering of accurate scientific and technological data which reinforce the lifeline of the country. We must be sure that the direction in which we are headed is the correct one. We need a governing body which oversees role-sharing between all government offices and ministries, and works for the benefit of Japan as a whole. Under such an initiative, individual government offices would be able to responsibly organize a variety of research and development projects. Moreover, this would enable affiliated universities and research institutions to proceed with research and development relevant to each project. And by working together with industry we will strive toward value-creating economic and social innovations. Industry should not only be concerned with the pursuit of profit. It also has a responsibility to contribute to the vitality of the nation for future generations.

Innovation is the result of choice; it never arrives by accident. There are, however, no guidelines by which to coordinate the uncertainty and transparency which distinguish scientific research; the goal management and protection of intellectual property rights, which are vital to innovation; and the procurement of private funds. We must do away with closed independent systems, as we openly seek any and every possibility, starting with the establishment of a "baton zone"[1]. Innovation requires a strong leader with a global point of view and the decisive ability to act. Therefore, it is essential that we train our young people to become "hybrid" researcher-engineers integrating various fields, rather than becoming traditional researcher "clones".

The development of human resources in Japan

While Japan is in need of reform, the human resources needed to do the job are seriously lacking. What is required to maintain basic human resources? In order to address this question honestly, educational reform must be seen as the greatest political issue. According to the OECD's PISA survey in 2006, the academic ability of a 15 year-old in Japan dropped from 6th to 15th. In 2008, the results of the International Chemistry Olympiad for high schoolers were also quite pitiful, with Japan ranking 33rd among 66 countries.

Japanese industry, which is supported by people with a bachelor's degree or higher, has begun looking overseas not only for inexpensive production resources, but also for superior researchers who cannot be found within Japan. Additionally, most foreign pharmaceutical laboratories have left Japan.

Graduate schools which produce our

scientific and technological leaders have a duty to train human resources which meet international standards of excellence. Unfortunately, when considering the educational systems, content and financial support systems of western or other Asian countries, Japanese schools remain comparatively unattractive. An emphasis on research conducted by university professors, the diminishing importance placed on skilled training, and the vertical split between departments all stand in the way of educational effectiveness. Moreover, the tendency of universities to rein in their own undergraduate students and for students to shut themselves indoors are major concerns. The fact that many post-doctoral researchers remain within the country rather than traveling abroad to hone their skills is also unfortunate. In contrast, China has a proactive and successful educational policy, and surpasses Japan in terms of the volume and quality of chemistry papers.

When looking at educational trends and societal demand, the current limitations of higher education in Japan are clear to see. There are many things we need to learn from the higher education systems of other countries, and I emphasize the importance and urgency of this fact because the world is changing rapidly.

Japan's national vision for the 21st century

What is the point of internationalization when, as Thomas Friedman put it, "The World is Flat"? While there are many points of view, what is most important is to transmit a correct understanding of Japanese values and ideas to globalized and knowledge-based societies. In the over 60 years that have passed since the end of WWII, the internationalization of Japan has provided the Japanese with an understanding of democracy, human rights, freedom and the importance of other cultures. On the other hand, what has Japan taught the world in return? In terms of ideology, perhaps nothing. This is because we have not presented a clear national vision. In the midst of a dramatically changing world stage, now is the time to present an accurate national vision of high ideals. It is our destiny to survive in this fiercely competitive world. A leading country may claim supremacy in economic competitiveness, but while this may encourage its citizens, it will stir up a sense of uneasiness and caution in neighboring countries striving for mutual cohesion. We must move past narrow-minded nationalism to gain mutual understanding with the rest of the world. Japan has no future without strategic internationalization.

My personal national vision is for Japan to become a country that contributes to the material and spiritual enrichment of human society within the limitations of this world. I would like nothing more than for the children who are our future to say with pride, "Japan is a country that contributes to maintaining humanity's existence." Peaceful diplomacy, industrial economics, culture, high-caliber education, and a strong command of science and technology as well as the Constitution of Japan not only make us internationally competitive, but make Japan a confident and dignified, independent nation. This is my reply to the title question.

Conclusion

At the Johannesburg summit in 2002, Mr. Kofi Annan, the Secretary-General of the United Nations at the time, said that WEHAB + P—water, energy, health, agriculture, biodiversity and poverty—are humankind's priority issues in the present and the near future. Today the word "environment" encompasses all of these things. In order to lead in the reduction and resolution of these serious issues, we must strengthen science and technology. These concerns differ from economic issues which change rapidly in a short period of time. The significance of this crisis concerns the security of all humankind and this will not change in the next half century. I hope that this issue will become the focal point of the Fourth Science and Technology Basic Policy which is now under government consideration. It is to be hoped that this plan will help to bring about economic reform, and also gain Japan the trust of the world even as national interests are served.

1) Supervised by Eiichi Maruyama, Edited by RIKEN Center for Intellectual Property Strategies, "The Challenge of RIKEN—New model of University Technology Passing a Baton Zone, Nikkan Kogyosha, **2009**.

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