

## A 32% increase in Grants-in-Aid for scientific research! The importance of basic research has been recognized!?

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### Introduction

The fiscal 2011 budget was announced at the end of last year. In KAN-FULL BLOG, the Prime Minister's Office website that is said to be written by Prime Minister Kan himself, it is cited, "I consider science and technology to be one of the policy areas of paramount importance. In particular, in this field I would like to cultivate the dreams of today's youth. I hope that these dreams also come to be shared by people nationwide." (December 27, 2010) Accordingly, the budget for science and technology was increased despite the current fiscal austerity. The Grants-in-Aid for Scientific Research sponsored by the Ministry of Education, Culture, Sports, Science and Technology (hereinafter "MEXT"), which is a matter of great interest especially to us researchers, "was expanded with the greatest increase ever since its foundation (in 1965) of 63.3 billion yen (roughly 32%) to 263.3 billion yen" (MEXT Press Release). This is the first piece of encouraging news for many years. I would say it is the fruit of continuous lobbying of the government by various bodies, including the Science Council of Japan, various academic societies, and individual researchers. I sincerely appreciate their efforts.

Now, should we be simply pleased with the fact that the Grants-in-Aid for Scientific Research has been significantly increased in the proposed budget because politicians and the public have at last recognized the importance of basic science? To put it bluntly, should we believe that the budget for basic science must continue to increase in the future despite possible hardships in gaining understanding about the importance of basic science?

Over recent years, I have had many opportunities to participate in the policy discussions on how our country's future science and technology research system and budget should be handled at council and committee meetings of the Cabinet Office and related ministries. I also have had not a few opportunities to glimpse the process of framing new competitive funding and setting new themes. From these experiences, I regret to say that the future is by no means bright or rather extremely severe. If we look directly at the current situation, it is clear that the mere raising of a voice that says "basic research is Japan's lifeline" is not sufficient.

### You cannot give what you do not have

In the very near future (probably at the end of this year or the end of next year at the latest), the following two viewpoints will become important in considering the national budget for science and technology. The first is the undeniable fact that "you cannot give what you do not have." The serious condition of the national budget has been often taken up by the mass media recently, and may not be required to mention again here. However, we researchers must once again face squarely the undeniable fact

that more than half of the entire budget consists of borrowings (government bonds), social security costs increase automatically every year by 1 trillion yen, and if the trend continues, the amount of government bonds issued will surpass total national savings in four to five years. Under such circumstances, could it be possible that only the budget for science and technology will continue to be treated separately as has been in the past? When issues of social security, agriculture, an aging population and falling birthrate, and diplomacy and defense all need additional budgets, could it be possible for only the budget for science and technology to be given continuous special treatment because "science and technology is important for the country's future?" In the first place, the reality is that the fiscal 2011 increase in the Grants-in-Aid for Scientific Research has been financed by breaking down the reserve fund. How will the increase be treated in and after the next fiscal year?

The second point is the difference in the perception of time. When we researchers think about basic research, we generally think of a time span of thirty to fifty years or, in the long term, a hundred years. On the other hand, political authorities and the general public expect results within five years, or at the most ten years, even if it is about basic research. Of course, they do not consider research that directly contributes to industry to be the only findings, but highly welcome those that satisfy man's intellectual curiosity even if they do not contribute to economic activities at all. But we must not misunderstand that the special treatment given to the budget for science and technology under severe financial conditions is in no way just to satisfy the intellectual curiosity. It is greatly owed to the aspect that science and technology are the means for our country, a country without natural resources, to survive. This concept has probably been applied to the Grants-in-Aid for Scientific Research as well. Some think that the period when the Grants-in-Aid for Scientific Research was made as an investment purely to satisfy intellectual curiosity ended about fifteen years ago, before the Science and Technology Basic Plan was laid down. If this is the case, the increases made afterwards stand as investments to form the basis of our country's economic activities building on researchers' free thinking. By the way, the total amount of the Grants-in-Aid for Scientific Research in 1995 stood at 92.4 billion yen. At the end of last year, the Council for Science and Technology Policy explicitly stated at its plenary meeting that "1% of GDP will be secured as the budget for science and technology" in view of the Fourth Science and Technology Basic Plan. But considering the above circumstances, this is no time for us to wait idly for the target to be achieved. If we take a look outside our country, China is vigorously speeding up its investment in research and development, and emerging countries are becoming increasingly enthusiastic in promoting science and technology as typified by Singapore. We researchers must not just sit and pray for good fortune but must now take positive action to realize our goals ourselves.

## Towards a new research system

While our nation's economy remains stagnant, what researchers must first do is to manage research and development funds efficiently and effectively. Needless to say, it is important that individual researchers do not waste money, but I would like to discuss here the point of how a research and development system should be run to make efficient use of the limited research and development resources at the national level and produce results more effectively. What researchers must pursue is both the research findings that promote basic research to provide an intellectual foundation for our country and mankind from a long-term perspective and those that lead to creating new economic values.

As the core of the system reform, I would like to propose a transfer from the individual unit to the organizational unit in allocating resources. In other words, the adoption of a system wherein not only large equipment and expensive equipment and facilities but also medium-sized equipment and multipurpose facilities are not possessed independently by each research laboratory but concentrated in particular places (hereinafter "concentrated lab") and shared commonly by researchers. I am aware that many researchers think that it is more convenient to have equipment at their side, and managing the equipment themselves enables increased research freedom and fosters idea-rich research; however, it is undeniable that the concentrated lab system is superior in light of the necessity for effective use of resources. Furthermore, the concentrated lab system may help open up new academic fields. This opinion is based on my experience when I belonged to the Institute for Molecular Science in Okazaki some 30 years ago. At the time, picosecond lasers had just come onto the market and were very expensive. Since the budget for the Grants-in-Aid for Scientific Research at the time was far less than today's budget, only a limited number of organizations such as the Institute for Molecular Science possessed high performance lasers. Consequently, highly active researchers from all over the country gathered in Okazaki (there were also a significantly large number of researchers from abroad in those days), and joint research projects by researchers from various fields started spontaneously. The knowledge of different fields acquired at Okazaki and the acquaintance with other researchers have become highly valuable assets for me. Integration of different fields is an important keyword for both basic and exit-oriented research. To promote such integration, now is the time to seek opportunities (creation of a place) for researchers to interact with each other. Regarding the establishment of the concentrated lab, it would probably be necessary to have the organization dispersed throughout each region. Research centers such as those of local public entities would become an important consideration in addition to collaborative laboratories of universities and research laboratories of national independent administrative institutions. Also, it would be necessary to have researchers think collectively and direct considerable thought to and start serious discussions on the number of concentrated labs necessary and the form of organization and operation that would be appropriate.

Let me present several proposals that I believe will make the concentrated lab system function well. The first is to provide substantial soft money such as travelling and accommodation expenses. It is necessary to establish an environment in which not only researchers but postgraduates can also frequently visit the concentrated labs and stay long-term. In this regard, the competitive funding system, which grants individuals with the neces-

sary expenses, would need to be improved. Furthermore, it is necessary to secure adequate technical staff to maintain and manage the equipment and facilities and assist with experiments. One measure to achieve this without increasing the total personnel cost would be to have postdocs play the role. If an employment system in which postdocs allocate 50% of their effort to technical operation and the remaining 50% to their own research with complete freedom (of course free to engage in joint research) could be realized, it would be more effective in fostering young researchers than having them affiliated to research laboratories, since it provides the opportunity to broaden perspectives and knowledge.

## Conclusion

I am one of those who strongly believe that the promotion of science and technology is the only driving force that will open up a future of hope for our country. For this, investment in basic research and cultivation of human resources over the next hundred years are lifelines. Therefore, we ourselves must create and protect an environment that will enable high-level research. As a plan, I proposed in this paper the concentration of material research resources such as equipment and facilities at particular places. I assume there are criticisms of my proposal, stressing the point that "the strong becomes much stronger." But under severe fiscal conditions, the amount of competitive funding per research theme is bound to decrease. The reality is that we cannot expect funds to be allocated to all excellent researchers according to research themes and individual self merit. Instead, by allocating the funds saved from the efficient positioning of hardware through to the preparation of a structure in which researchers can stimulate each other via face-to-face communication, we can expect to expand and diversify research frontiers and accelerate the discovery of and solution to problems. The important thing is to realize a system that guarantees the open use of research infrastructure possessed by organizations with strong research abilities to capable and highly motivated researchers outside the organizations.

The concentrated lab system is one idea. There may be various other measures to manage research resources effectively and efficiently. Also, in the fields where joint ownership of equipment is difficult, it may be necessary to design another system. What must be done now is to have each researcher belonging to the academic scientist community think for himself and propose a system that will enable the effective use of research and development resources, discuss it, and put it into practice. I draw courage to make this proposal, understanding that success is 99 percent failure, which is in a sense the truth of research. Our logic is not the only one that holds. Reform is necessary to also protect basic research. Why not have the Chemical Society of Japan take the initiative and lead the way to this reform?

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