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Evaluating Outcome over Output

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There is no research funding more important than Grants-in-Aid. Owing to them, over my career I have been able to carry out my research in a steady and composed manner. Currently, I am serving as the representative of projects on basic research in photocatalytic reaction and its advancement funded under the Grant-in-Aid categories Scientific Research (B) and Challenging Exploratory Research. I obtained my first Grant-in-Aid nearly 40 years ago: It was in 1973 under the category Encouragement of Scientists (A). As an associate professor in the Faculty of Engineering at Kanagawa University, I was very grateful to receive that grant for ¥300,000. At the time, virtually no one at Kanagawa University had ever received a Grant-in-Aid. The university's administrators didn't know how the grant was to be handled, so they had to go to the Ministry of Education and Science to inquire directly about the procedure. Nowadays, I sometimes have occasion to meet those administrators, and we enjoy reminiscing about that episode.

Over the past several years, the Ministry and JSPS have been publishing a handbook on the Grants-in-Aid program, which is distributed to researchers throughout Japan. I feel honored that on page eight of that handbook, my abovementioned research, conducted under Encouragement of Scientists (A), is highlighted along with my mentor Kenichi Honda's research. These projects, titled "Reaction Mechanism on Photoexcited $Ti0_2$ Semiconductors" and "Creation of Novel Reactions by Irradiating with Light in the Course of Electrochemical Reactions" respectively, led to the discovery of electrochemical photolysis of water and the development of photocatalysts for environmental purification, which, as noted in the handbook, are now used widely around the world.

About ten years ago, I was asked to be the representative of a large-scale project under the Grant-in-Aid category Scientific Research on Priority Areas, which was at the time in its preparatory stage. In that process, a series of earnest discussions were held among leading researchers in the fields of photochemistry and electrochemistry, and we attended several hearings in a basement room of the Ministry of Education and Science before being selected for the grant.

Under the theme “Science and Application of Photo-Function Interfaces,” this large-scale project continued to receive grant support for the relatively long period of six years, over the span of which I served as its representative. The project ended three years ago having achieved several unplanned results in areas related to photocatalysts, artificial photosynthesis, and new solar batteries, thanks to the cooperation of many colleagues and affiliates.

Following the project, a general conference was held with the participation of more than 100 project team members and affiliate researchers. Various innovations built into its design made for very impressive presentations of the project’s research achievements. For example, before displaying their posters, each member took three minutes to give a short oral presentation. Even within this short period, these presentations were sufficiently informative to allow accurate appraisal of the respective research activities. Witnessing this, I came away with a new sense of how important it is to hold conferences that assemble and engage in discussion researchers doing work related to a centralized theme.

Three years ago while I was president of the Chemical Society of Japan, I invited myself into the office of Mr. Iwao Matsuda, the Minister of State for Science and Technology Policy, and expressed my opinion to him regarding the state of Grants-in-Aid. There were two points I wished to stress. The first was what I considered to be a need to launch each year 100 10-year, large-scale (¥15-20 million) Grant-in-Aid projects. The second was my desire to see established a new grant category under which researchers at regional, public and private universities could receive a Grant-in-Aid in an amount of about ¥2 million to carry out their activities. My first recommendation sought to remedy an impediment to gifted young researchers being able to settle down into their work—as large-scale project grants were only awarded for 3-5 years, researchers had to interrupt their work to secure funding from multiple sources. After that, whenever I met with the minister I reiterated these two proposals; apparently, however, to no avail as implementing them was said to be “difficult.”

In any case, steady, uninterrupted advancement of basic research is the only path to achieving major scientific breakthroughs. Rather than evaluating the results of research projects every year, wouldn’t it be better to evaluate the actual impact of those results over a horizon of 10 or even 20-30 years. That is, I believe that evaluating “outcome” rather than “output” would be more effective as the basic concept driving the system for Grants-in-Aid project assessment.