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Emergence of Japan Society for the Promotion of Science with a Focus on Overseas Influence

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Full Paper

1. Introduction

1.1. Background and Research Question

Academic research needs funding. The amount of required funding varies depending on the field and topic, but there is no such thing as free research. For this reason, various funding systems have been set up in each country.

The earliest research grants in modern Japan included the Imperial Academy's Academic Research Grants, the Ministry of Education's Natural Science Encouragement Grants, and the Academic Research Grants offered by private foundations. The Japan Society for the Promotion of Science (JSPS)[1] or *Gaku-Shin*, established in 1932, is said to have initiated the system of full-scale public allocation of research funds The organization is now a major academic funding agency in Japan, which is renowned for Grants-in-Aid for Scientific Research (or *Kaken-hi*).

Why, then, was it so successful in forming the organization and developing its business? The author attributes this success in part to the influence of foreign countries. This paper discusses the developmental process of JSPS from the perspective of foreign influence.

1.2. Previous Studies and Scope of the Paper

Regarding wartime academia, previous studies have depicted the emphasis on military research in the JSPS, while the Ministry of Education strengthens the basic research funds. However, there has been no focus on the origins of the JSPS itself or its foreign influence. The author believes it essential to be aware of the whole academic trends that shaped the formation of scientific networks and funding systems. The common context was the movement towards academic promotion throughout the modern era in Japan (1860s–1930s). Specifically, the underlying trend during this period can be summarized as being an attempt at solving the chronic shortage of academic research funding. The background to this was the case of Europe and the United States. Therefore, it is necessary to clarify the development of science promotion in modern Japan from the angle of foreign influence on the formation of the JSPS.

Considering the contributions of individual studies, Furukawa's major work shows the global trend of science in society over many years and compares Japan's trends to those worldwide. However, it does not address the JSPS.[2] Bartholomew describes chronologically the development

of modern science in Japan from a Western perspective. His work also concerns the formation of academic-related organizations. It is sufficient to understand his interpretation. However, as with the above, it is not a work on the formation of individual institutions, and there are limits to the materials on which he bases his argument.[3] Kikuchi focuses on the movement of international networks and the effects on Japan, indicating Japan's position in academic internationalization since 1918, the end of the First World War. He also explores the peculiarities of both micro-politics in the international networks and monolingualism in Japan based on the correspondence between Japanese chemist Sakurai Joji[4] and British scholar Marie C. Stopes.[5]

As science has no national borders, it is natural to look at the social history of science from the perspective of Japan and other countries. In addition, considering that most Japanese institutions owe much of their basic research to JSPS programs, it would be meaningful to address the origins of the JSPS and its interactions with foreign countries. Thus, in this paper, the author discusses three dimensions of the topic: 1) Sakurai Joji as a key person, 2) the Institute of Physical and Chemical Research (RIKEN) and National Research Council (NRC) as pilot cases, and 3) the formation and expansion of JSPS.

2. Sakurai Joji as a key person

2.1. International Experience as Representative of Japan

First, the author reviews the life of Sakurai Joji, who is a key person in the establishment of JSPS. Sakurai was born in 1858, 10 years before the Meiji Restoration, in Kanazawa in northwestern Japan. During his childhood, he received a Western education at a local private school. In 1871, Joji's mother took him to Tokyo, where he entered the University of Tokyo's predecessor. He studied under the English chemist Robert W. Atkinson (1850–1929) and attended chemistry lectures as well as participated in experiments.

In 1876, Sakurai was selected as a government scholarship student and entered the University College of London for the new semester. He received instruction mainly from Alexander W. Williamson (1824–1904), a chemist known for his ether synthesis. The educational philosophy of the University of London was to explore the laws of nature or elucidate the cause-and-effect relationships of natural phenomena and to teach the knowledge thereof. In short, their emphasis was on pure science.

Sakurai majored in chemistry but also studied physics, excelling in both. In 1879, he was inducted as a member of the Chemical Society of London. After completing his studies in 1881, Sakurai returned to Japan and was appointed as a lecturer in the Faculty of Science at the University of Tokyo. In the following year, he was made a professor, and he was responsible for the education of students for many years to come.

2.2. First Generation of Japanese Professors and Personal Regret as a Researcher

Sakurai continued his research after returning to Japan, but unlike his experience in the UK, the research environment was not suitable. In his later years, he confessed that he had been unable to conduct chemistry research due to a shortage of research funds and paucity of time.[6] This was unavoidable because the national policy on education prioritized the production of

excellent bureaucrats from the Imperial University (later on, Universities).

Sakurai was a big admirer of the UK, but his model for nation building was Germany. He made it clear that he regarded Germany as superior to the UK in his lecture "Nation and Science”[7] in 1898. Sakurai praised Germany for its “national strength because of the great protection of the government and encouragement of society.”

Around 1918, the impact of World War I led to calls for universities to strengthen their research capabilities. As part of this, a retirement system was introduced at the universities, and professors over the age of 60 were forced to retire. Sakurai was part of that age group and was involved in this decision as a member of the executive committee at the University. Upon his retirement, he was a member of the Imperial Academy and Deputy Director of RIKEN. Thus, he was no longer a researcher but retained strong authority. This situation supports the assumption that Sakurai and other retired Japanese academics shifted their regret and passion to create an academic system to maintain their place and pride.

3. RIKEN and National Research Council as Prehistory

3.1. RIKEN as a preliminary project for research funding[8]

Two initiatives for new institutions emerged as the preliminary stages of the JSPS. After World War I, Japan shifted its emphasis from the mere transfer of technologies and theories invented in the West to creativity and independence. The establishment of RIKEN in 1917 epitomized this trend, although it had similar context and functions as organizations in the UK, Germany, and the United States.

Previous studies state that RIKEN was originally proposed by Takamine Jokichi, a doctor of pharmacy, in 1913 as a national science research institute; entrepreneur Shibusawa Eiichi and a group of scientists were also involved in the establishment. However, Sakurai had made the most frequent appearances in the records of the establishment of RIKEN. He had also published several articles on the establishment of RIKEN, while others had not.

In the preparatory stages, Sakurai was responsible for project planning, and Shibusawa for donations and subsidies. The two men visited the prime minister's residence and traveled extensively to ask for financial support from conglomerates (or *zaibatsu*) and other influential people.

Sakurai asserted that the RIKEN would be an effective solution to domestic problems: to provide a fundamental solution to the deteriorating domestic economy, to provide for the self-sufficiency of military and industrial materials, and to create an environment in which researchers could concentrate on research, which was inadequate at the Imperial University (or Universities).[9]

In terms of finance, RIKEN had difficulty in obtaining funds from the beginning, while expenses for the construction of the institute increased. RIKEN had to start its operations with about one-third of the 7 million JPY budgeted for the basic fund.

Regarding the structure of the organization, RIKEN finally consisted of a Chemistry Department and a Physics Department. Initially, Shibusawa was appointed as Vice President, mathematician Kikuchi Dairoku (1855–1917) as Director, and Sakurai as Deputy Director. Although Sakurai thought two directors were unnecessary, the government made that decision.

Although RIKEN was established with great effort in 4 years, its operation did not go smoothly. There was a confrontation between the two departments. The Chemistry Department, led by Ikeda Kikunae, was trying to build a research institute on a par with those overseas, while the Physics Department, was led by physicist Nagaoka Hantaro, who believed that human resources were more important than money. Nagaoka, who had studied in Germany, attributed Germany’s superiority over other countries to its efforts to train researchers and claimed that fostering researchers was more important than facilities.

In 1921, however, Sakurai and the second director, Furuichi Koi (1854–1934), resigned from RIKEN due to intensifying conflicts within the institute that were caused by budget shortfalls. Sakurai himself felt fortunate to have been able to contribute in some small way to the promotion of academic research through his "Labor like the Dog and Horse.”[10] In reality, however, he had lost one of the fields of academic promotion.

Here is a parallel story. Chemist Tamaru Setsuro (1879–1944), one of Sakurai’s students, had also joined RIKEN as a researcher who was equipped with a laboratory.[11] He worked with Fritz Haber (1868–1934), who was instrumental in establishing KWG in Germany. Thus, he followed the model of German research institutions. Tamaru also quit RIKEN in 1921. Perhaps, he took the responsibility for designing an expensive laboratory. He later worked with Sakurai to establish JSPS.

3.2. National Research Council (NRC) as the Domestic Liaison of International Research Council (IRC) [12]

As is well known, World War I led to the creation of a new international academic organization as a result of withdrawal from the International Association of Academies. This was the International Research Council (IRC), an academic organization for the natural sciences. The NRC was created at the suggestion of the United States as a liaison organization within each IRC country. It could be replaced by an organization such as the Academy, which already existed in each country. In 1906, Japan already had reorganized its Academy from the Tokyo Academy to the Imperial Academy, in line with world trends. Nonetheless, the decision to create a new organization was probably attributable to the need for a more flexible organization than the existing authority in Japan.

Sakurai, as the Secretary of the Imperial Academy, and Tanakadate Aikutsu, a member of the Imperial Academy, participated in the 1918 preliminary committee to the IRC. Physicist Nakamura Seiji accompanied them and reported that the two representatives had differing opinions over the main purpose of German exclusion.[13] Sakurai supported the British original plan, while Tanakadate opposed the idea of German exclusion. Eventually, Sakurai returned to Japan first, and discussed within the Imperial Academy joining the IRC and establishing the NRC in Japan. Tanakadate, who had been told to remain in Europe, attended the first IRC meeting in July 1919.[14]

The NRC was established in 1920, with 91 members appointed. Its main external functions were information gathering and international collaboration, and its domestic function was improving the efficiency of research through liaison and coordination among research institutions.

If we refer to the initial budget plan written by Sakurai, seemingly, he did not plan for a large-scale organization such as a research group, given the amount of money and expenses.[15]

While the preparation of the NRC was underway within the Imperial Academy, there were criticisms from outside, such as over the exclusion of Germany and the issue of tenure for NRC members. In addition, there was a gradual movement to enhance the research function within the NRC. Nevertheless, Sakurai's engagement continued. He was one of four people to go to the second IRC meeting in 1922—he was nominated and dispatched in the midst of the furor over his resignation from RIKEN in 1921. Regarding that meeting, some letters exist between Sakurai and two foreign dignitaries in which they discuss the establishment of an academic research institute in the Pacific region and regular academic meetings.[16]

In 1921, the NRC made numerous budget requests as well as 15 proposals for the establishment of research institutes to the government. Despite these efforts, not enough money was allocated to the NRC. In 1926, however, the NRC had its first opportunity to show its value domestically. It held a large-scale international conference in Japan called the “third Pan-Pacific Science Congress” (PSC). The congress, located in Tokyo, lasted for a month, with academic sessions and excursions to major sightseeing places in Japan.[17]

As the President of NRC, Sakurai chaired the congress. By holding the PSC in Japan, the NRC was able to showcasel not only to its role in Japan, but also to Europe and the United States, because the NRC placed importance on international academic exchange. The PSC brought overseas academics to Japan, though Japanese delegates had been sent abroad by then. At that time, several languages were used in academic papers, but the PSC decided to use English as the official language instead of Japanese to enhance its ability to communicate with an overseas audience.[18] The NRC also prepared a booklet to introduce Japanese research.[19] It was science diplomacy, as some pointed out.[20]

4. Formation of JSPS[21]

4.1. Movement for Establishment

The movement to establish JSPS began in January 1931, approximately 10 years after Sakurai’s resignation from RIKEN. Sakurai had been named the President of the Imperial Academy in 1926 as well as the President of NRC in 1925. He was at the top of the academic world. Sakurai held a meeting of 101 volunteers to advocate the importance of academic promotion. In the same month, he indicated Belgium case that King Albert I drove the national policy for the promotion of science as a good example to follow..[22] In March 1931, the Imperial Diet voted in favor of the establishment of JSPS, and Sakurai and the other core members proceeded with preparations. There were similarities between the founding members of RIKEN and JSPS; one difference was that JSPS involved humanities scholars. Tamaru, who had resigned from RIKEN with Sakurai, played an active role behind the scenes in the formation of JSPS.[23]

Sakurai gave a lecture to the Emperor Showa in April 1931, thanking the Emperor’s father (former Emperor) for the endowment that launched RIKEN in 1917. Sakurai then introduced examples of academic promotion overseas, stating that Japan still lagged behind. Regarding Germany in particular, he indicated the share and amount of the academic budget to the national

budget and stated that the same could be done in Japan. Sakurai knew that the Emperor had made a tour of Europe in 1921 when he was the Crown Prince. This lecture is thought to have been an endowment request to the young Emperor (at the age of 30) to form the new institution.

Japan in 1929–30 was facing a serious economic slump due to the Depression. Sakurai, however, attributed the root cause to the shortage of national research capabilities. He might have made up the logic on purpose; he said that the economic downturn was the reason why it was necessary to invest in research. In July 1931, Sakurai and others submitted a budget request to the government for fiscal year 1932 (starting in April).

Concurrently, in October 1931, Navy Admiral Takarabe Takeshi, former Minister of the Navy, was paying particular attention to the functions of the NRC in the United States. At that point, Japan’s NRC was already established, but he was highly interested in the US NRC and sought to install it in Japan as well.[24] In late 1931, Takarabe and other military officers joined the JSPS initiative stressing the advancement of industry as well as science. Sakurai and Takarabe formed a partnership as promoters of science.

In December 1931, notification was given that 30,000 JPY, only 1/40th of the requested budget amount, would be provided for FY1932. This meant that their project could not be carried out as originally planned. Sakurai and the other core members were disappointed by “the government's incomprehension” and found they could no nothing more for subsidies.

Suddenly and unexpectedly, good news came. In August 1932, the Emperor decided to provide a grant for the promotion of science. This accelerated the movement to establish the JSPS. The Minister of Education, Hatoyama Ichiro, took swift action on his own to hold an assembly in September. Sakurai and other core members accelerated all the necessary procedures for the foundation. At the end of that year, the JSPS was officially established with Prime Minister Saito Makoto as its Chairman. The number of founders rose to 406. Sakurai was appointed as Executive Director, the de facto leader of JSPS.

4.2. Plan and Projects in the Early Stage

As mentioned above, there was a common context in the formation of JSPS as RIKEN and NRC. Thus, it would have been unreasonable to plan equivalent organizations in such close succession. It is possible that the JSPS looked different because it focused on the broad concept on fund allocation and expanded its scope to all the fields. Neither RIKEN nor the NRC covered humanities and social sciences or researchers across the country. The framework of the new organization was clearly defined to distribute research funds nationwide, just as with developed countries. In addition, although the idea of setting up JSPS overseas offices had been proposed, international exchange programs had not been targeted at all. When Sakurai was asked about joint research partnerships in January 1931, he replied that he assumed that they would be within the country. Even in his address to the Emperor, he said nothing about collaborating with foreign countries. It is unlikely that Sakurai, an international man, insisted on a domestic focus. This was partly due to the political and financial situation, but it may also have been intended to create plausibility compared to the existing NRC.

As mentioned earlier, the Prime Minister, Saito Makoto, was the chairman of the JSPS. He

had served as Minister of the Navy, and became Prime Minister in May 1931. Having served in the Navy, he was well versed in international relations, and thus, he was perhaps a good match for Sakurai’s ideas. The JSPS began its operations in spring 1933. Research funds were given upon careful review of proposals. In its early years, JSPS was superior to RIKEN in terms of its operations, management, budget size, and social impact, and it took a page from the German system, which was considered as the ideal style. Sakurai had created a niche and succeeded in overcoming the limitations at RIKEN.

How, then, did they focus on the project, which initially was intended to be done in a comprehensive manner? They first assumed that the total number of awarded research proposals would be 200, but the number of projects adopted far exceeded that. Thus, more than 90% of the budget was allocated for research costs. Due to the remaining budget constraints, the provision of research grants became the main focus.

Of their 12 categories of research grants, chemistry-related research received the largest grants in terms of both number and amounts. Considering the affiliations of the applicants, one-quarter were from the Imperial University of Tokyo, while the remainder were from other research institutions such as local universities, military research institutes, private companies, and RIKEN. Regarding the job titles of the applicants, they were split almost 50-50 between university professors and others, and it could be said that considerable numbers were allocated to young (or early-stage) researchers.

In conjunction with the research grants, the formation of internal research groups gradually progressed. Although these groups did not have a physical base at JSPS, their presence and budget increased year-by-year. This transformed them into the "main projects" of JSPS, as commonly labeled.

Why did they face financial difficulties? The irony is that it was because the funding system was successful; the research expenses gradually increased; however, the financial resources could not keep up. The initial financial plan of JSPS was to use governmental subsidies and private donations as the basic fund and raise their interest to fully cover research expenses. The amount of basic funds collected was less than expected. Furthermore, large donations from conglomerates (or *zaibatsu*) were to be paid in 5-year installments and would cease to be available after FY1938. They had to use government subsidies and donations as the main source of expenditure. Sakurai and Takarabe put significant effort into the donation campaign, but it did not have much effect in terms of monetary value.

In contrast, the examples of the other countries that they referred to were at two extremes: Germany and Belgium were mostly government funded (in the case of Germany, more than 90% government funded, and in the case of Belgium, 20–30% of the national budget), while in the United States, both the Rockefeller Foundation and Carnegie Foundation were privately funded. Therefore, as an initial condition, Japan was at a disadvantage because the initiators of the movement were not equal to investors and the scholars were motivated but did not have the necessary financial resources. As Sakurai and other scholars recognized, the understanding of academic promotion among Japan's government and wealthy people was much less than in the West. This was an impediment to establishing and sustaining foundations in Japan and a major

issue that could not be eradicated merely by referring to other countries.

5. Conclusion

This paper has discussed the influence of foreign countries in the formation of the JSPS. To summarize, foreign influences undoubtedly played a role in the establishment of the JSPS. These influences were primarily from Germany, but the founders were highly aware of developments in the United States, the UK, and Belgium. Each country established domestic research institutes based on nationalism; for Japan, these overseas models were intended for the realization of Japan's own nationalism. There was a double standard in terms of boosting national prestige, despite the pursuit of science without borders.

Sakurai had no specific personal connection to Germany, but as discussed, he originally considered the German system outstanding.[25] It is possible that Tamaru encouraged Sakurai; Tamaru invited Haber to Japan and had transcribed a collection of Haber's lectures and a book on the academic system in Germany.[26] Nevertheless, Sakurai had always emphasized the importance of research funding and had experienced a series of frustrations. The JSPS was the result of his dream; his internationalism as well as the stature in academia facilitated it.

Then, why was JSPS influenced by foreign countries? One reason is the personal experience of the promoters. Sakurai's generation was unable to continue research due to lack of funds. Many problems can be solved with funds: buying materials and samples, hiring people, and going on research trips. This was the case in the field of pure chemistry; the engineering field was in even more trouble. In physics, Nagaoka Hantaro gave up experimental research and turned to theory because he had no research funds. The other reason is, as previously shown, that both RIKEN and NRC were one-half of the effort toward full-scale operation. Especially in the case of RIKEN, Sakurai had worked hard but had run into conflict owing to lack of funding and ended up resigning. Thus, Sakurai pursued the JSPS as an alternative to RIKEN, partly for his own self-realization.

Establishing an academic system is a big challenge. Modern Japan faced many issues such as human resource development, government awareness, and research efficiency. Sakurai and his colleagues tried to solve them with the financial resources available, referring to overseas institutions as good examples of how to persuade the government as a potential sponsor. The author assumes that Sakurai was not concerned about the rationale or logic; he just sought to promote science to the standard of Western countries. It was a simple notion that research should be fully funded just as Western countries. Research funding was not the solution to every problem, but it was one crucial aspect that was lacking in Japan in those days.

In this study, the author provides empirical evidence regarding foreign influence in the establishment of the JSPS. To supplement the above discussion, future studies will need to conduct a direct comparison with overseas institutions and further quantitative analysis will be necessary.

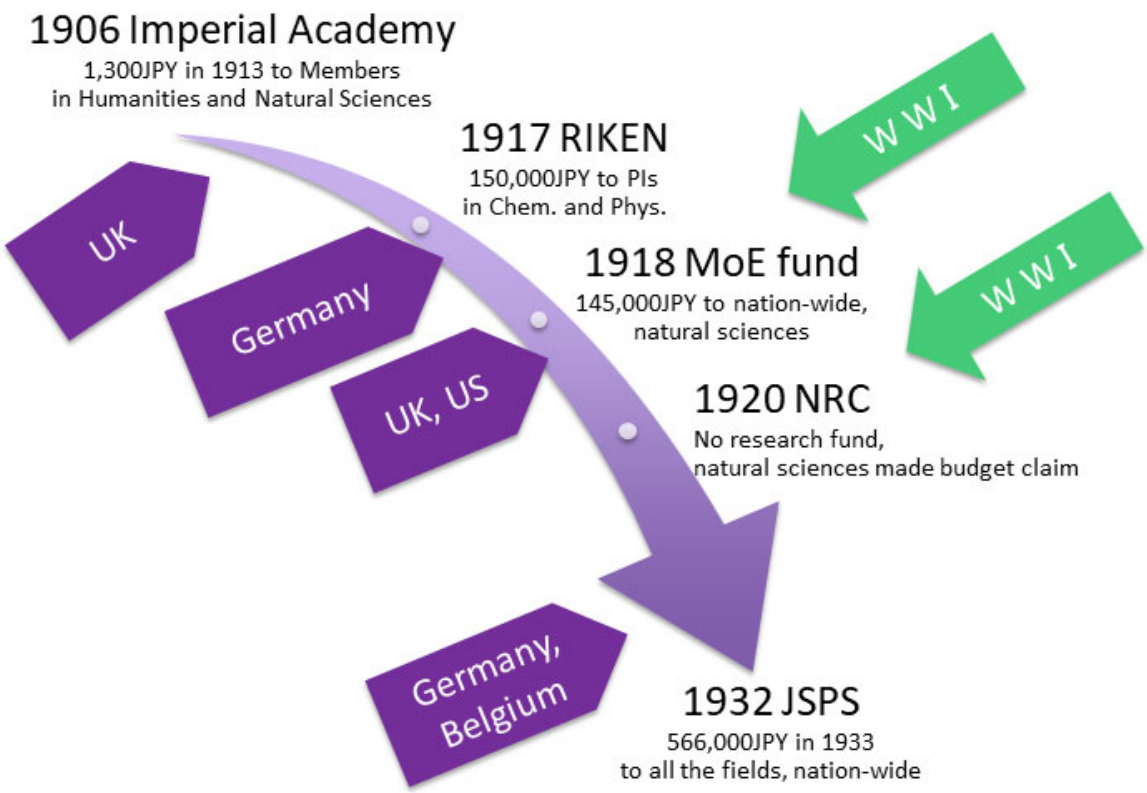

Figure 1: Formation of Research Organizations in Japan Influenced by Overseas

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[1] The original English name was Foundation for the Promotion of Scientific and Industrial Research of Japan, and in 1936, it had been changed to Japan Society for the Promotion of Scientific Research. In this paper, we use the latest name of JSPS (Japan Society for the Promotion of Science) as widely known.
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