

NII Today

National Institute of Informatics News

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— The indicators developed on
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To gain an extensive understanding of
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Information Linkage Project :
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Researchmap
— A new-generation research infrastructure that
transcends the boundaries of various disciplines





Masamitsu Negishi

Professor, Information and Society Research Division, NII

NII Interview: Masamitsu Negishi+Kyoko Takita

Evaluating research activities

The indicators developed on scientific information databases

Takita: What inspired you to carry out the research and development of scientific information databases?

Negishi: When I studied corporate databases at a graduate school of business administration in 1975, I took part in the development of the Japan's first practical online information retrieval system, which was launched by the Computer Center at the University of Tokyo. We imported a U.S. database of chemical document information in the form of magnetic tapes and made it accessible throughout the country via telephone lines. Before that, researchers used to search bulky paper abstract journals for papers of their interests. The system that supported computer-based keyword searches was revolutionary.

Takita: Nowadays, not only abstracts but also full texts of papers have been digitized. It is possible to search them using Google and the other search engines.

Negishi: Some may hesitate to use fee-based database services when it is possible to search information on the Internet free of charge. However, scientific information databases cover a vast number of papers in a well-organized and edited form. This marks a major difference from search engines. The databases are tools for professionals that enables them to efficiently search suitable papers and collect data. I believe they are still indispensable for research activities.

NII SPECIAL

Seeking to measure research activities

(*1) Institute for Scientific Information (ISI): An institution set up by Dr. Eugene Garfield in 1958. It initially published a contents journal, and later developed the citation index database for searching scientific information across disciplines with citation relationships among papers. In 2008, it became part of Thomson Reuters Corporation.

(*2) Scopus: One of the world's largest scientific databases, launched in 2004 by Dutch academic publisher Elsevier. It is also used for reference to evaluate research activities.

(*3) NII Scholarly Information Navigator (CiNii): A database service operated by the National Institute of Informatics (NII) with 12 million records of academic paper information, of which 3.2 million provide users with access to the full texts. It also supports the tracing of citation relationships.

Takita: I have heard that some databases help with tracing the flow of citations to find out how research has developed.

Negishi: The idea of citation indexing was proposed by U.S. scientist, Dr. Eugene Garfield. About half a century ago, the Institute for Scientific Information (ISI), currently part of Thomson Reuters Corporation (*1), was established by him. ISI digitized the lists of cited references at the end of papers to make it possible to trace what a paper is cited to produce what the later papers. Its database covers the citation relationships of papers published in around 8,000 leading scientific journals around the world. It has also established an index for evaluating the level of importance and influence of journals.

Recently, major academic publisher Elsevier launched its Scopus (*2) database of bibliographic data and citations covering 18,000 journals. Google has a website called Google Scholar. It automatically gathers scientific papers available on the Internet to help us analyze citation relationships. Papers covered by the NII database, called CiNii (*3), can also be searched through Google Scholar. It is generally said that high-rated papers attract a large number of citations in the ISI database that covers leading journals. However, take the NII's specialized discipline, informatics, for example. In this area, the ISI covers a limited number of journals.

Kyoko Takita

Staff Writer, Science News Department,
The Yomiuri Shimbun



This means that it may be better to analyze the data from Google Scholar rather than from the ISI to evaluate the activities of our organization. In this way, the circumstances vary from discipline to discipline.

Takita: You are working to develop indicators for rating research activities on the basis of citation statistics.

Negishi: We consult the ISI database to evaluate the activities of universities and research institutions based on the number of papers and citations. The amount of literature cited and the number of co-authors vary considerably with the domains. So does the period of citations. It will be necessary to take some statistical measures such as the calculation of weighted average and normalized deviation scores on a discipline-by-discipline basis.

Generally, papers in biology and medical sciences have long lists of references. In a simple comparison, the number of citations per paper in medicine is three times as great as it is in engineering. However, research activities are by no means lower in engineering than they are in medicine. Papers in biology attract many citations in the first couple of years after publication, but the number of citations declines thereafter. Their lifespan is short. In mathematics, the number of citations is limited but the citations occur over a long period of time. A lack of understanding of the situation in different areas could lead you to the mistaken evaluations.

Takita: You carried out a trial calculation of universities' capabilities to

obtain citations and research fund allocations.

Negishi: I estimated an allocation of the total sum of budgets for national universities and subsidies for private universities according to the number of citations attracted by the papers produced at each university. The findings have confirmed that there is not much difference in ranking of fund allocation, but that high-ranked universities will enjoy more fundings.



It is possible to understand that more spending leads to greater results, but if the merit-based budget system is actually maintained, financial resources will be concentrated in some universities, while those in a negative spiral will lose further vitality. This is not desirable in terms of academic diversity.

Takita: As a developer, do you have any concern that the indexes and rankings on research activities may develop lives of their own?

Negishi: It is true that universities and research institutes may not be positive about understanding and making full use of those indexes. The indexes are essentially intended to help them to find their strengths and weaknesses and determine their directions, not to make universities feel contented or dissatisfied with their ranking positions. For example, they may be strong in a specific area even

though they have not produced a significant number of papers or obtained an outstanding number of citations. I believe that persuasive indicators should be created by each university itself.

In Europe, bibliometrics, or the study of citation relationships among papers, has developed as a social science. In Japan, however, it is descended from the library and information science, and there are

few experts. Indicator development is time-consuming as well as money-consuming. However, universities are today focusing energy on evaluation, and I hope that competent human resources will be

developed in the future.

A Word from the Interviewer

A number of attempts are underway to quantify universities' research activities, including the number of papers, citations and patents. They are aimed at clearly demonstrating what is created from the governmental science and technology budget, which amounts to four trillion yen or more per annum. However, we may overlook reality if we uniformly apply a single yardstick with disregard to the diversity in the scale of the university and disciplines. There is a reason for his suggestion that universities should invent indicators suited to demonstrate their strengths by themselves. They will be able to draw up their long-term strategies by departing from their passive stance and working to create a yardstick of its own for measuring research activities.

Seeking to measure research activities

To gain an extensive understanding of scientific efforts

A new academic discipline called scientometrics has been in the spotlight in recent years. It investigates scientific activities in a quantitative and empirical manner on the basis of a large variety of data. One of the areas it studies is the evaluation of research. Efforts to develop quantitative methods with a high level of impartiality and transparency are in progress, with the aim of evaluating the research results achieved by research institutions and individual researchers. Attention is also focused on studies of the Triple Helix model for analyzing university-industry-government relationships.



Sumio Kakinuma
Professor, Information and
Society Research Division, NII

Compared to history of science, sociology of science and philosophy of science, scientometrics, which undertakes quantitative analyses of academic activities, has a short history. It is close to statistics in terms of collecting and processing data. Research in this discipline has become active after U.S. scientist Dr. Eugene Garfield published the Science Citation Index (SCI) in 1964, which was a citation index for papers in the field of natural sciences. Many different analytical approaches using the SCI and other data on academic papers have since been developed.

Why is it in the spotlight?

"There are two answers to the question of why this area is attracting significant attention. First, there are high hopes for it as a quantitative analysis approach in the world of science, where academic disciplines have been so finely segmented and specialized that it is now difficult to understand the significance of research in other fields. Second, expertise in scientometrics and other domains is believed to help increase the efficiency of the Grants-in-Aid for Scientific Research and other research grants funded by taxes. The first explanation reflects the academic aspect of the discipline for gaining insight into the world of science, while the second focuses on the practical aspect of its being beneficial for science and technology policies," says Professor Sumio Kakinuma of the Information and Society Research Division, outlining the background.

The measurement of academic activities illuminates the quality, productivity and trend of research as well as the network of researchers. The culture

of evaluation is taking root in universities now that state-run universities and research institutions have been restructured into corporations and are required to produce a high level of research quality and productivity. This is why scientometrics is attracting attention as a tool of quantitative measurement.

How are the quality and productivity of research measured?

"I analyze the Grants-in-Aid for Scientific Research. For example, a chronological review of the research grant amounts received by particular renowned award-winning researchers and how many research papers they have produced reveals that the level of productivity varies from discipline to discipline, and that the research results are not in proportion to the grant amounts. I explore the relationship between various factors involved in the circumstances surrounding researchers and the productivity of their papers. I am working toward clarifying the relationship between input and output in the hope that the findings will help with policymaking in the field of science and with the enhancement of the environment for researchers, and that they will consequently assist researchers," says Dr. Masaki Nishizawa, an associate professor in the Information and Society Research Division, detailing his objectives.

"Until recently, particularly in Japan, there was antipathy toward measuring the quality and productivity level of research activities based on the number of papers and citations. Studies on this subject faced strong opposition. We paid a lot of attention when we first published a list of universi-



Masaki Nishizawa
Associate Professor, Informa-
tion and Society Research
Division, NII

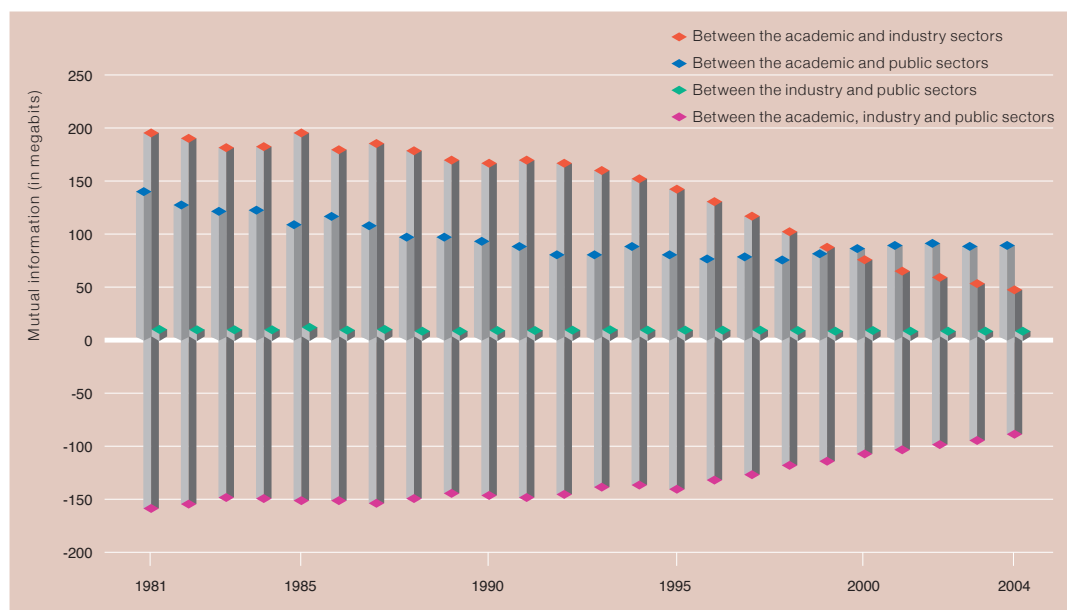


Fig. 1 Chronological trend in mutual information between the academic, industry and public sectors in Japan based on co-authorship relationships (values closer to zero indicate weaker relationships).

ties and research institutions ranked by the number of papers based on the SCI and other databases in 1998. Later, the situation changed dramatically. Nowadays, we even see many abuses of benchmarking attributable to excessive expectations. In some cases, the university ranking and evaluation of the research results achieved by individual researchers are presented inaccurately, without giving consideration to the essential definition and characteristics of the benchmark. The objective of using evaluation benchmarks is not to stimulate competition, but to facilitate the understanding of the research characteristics of individual institutions,” explains Dr. Yuan Sun, an associate professor at the NII. Her comment suggests that there are still a number of problems inherent in this new discipline, while demand is growing for objective benchmarks for research evaluation.

Information on papers, patents, publications and research grants including the Grants-in-Aid for Scientific Research is used for measuring research activities. Among others, papers are most often used for gauging research performance. Many different facts can be seen from a comparison of the number of papers by discipline, by country and by institution with the use of the aforementioned SCI and the Citation Database for Japanese Papers (CJP), a citation index for papers written in the Japanese language.

“For instance, chronological comparison between different countries clarifies how the center of science has shifted and what country leads in which areas. A comparison of the number of papers by discipline in different countries gives a quick insight into Japan’s strengths and weaknesses. In addition, there is a method of using the citation fre-

quency to measure the significance of a paper, in accordance with the hypothesis that a paper is of greater value if it is cited by more papers. To date, more than half of the papers in natural sciences have been co-authored. The trend of trans-institutional research, including joint studies between universities and industry, or international research, can be explored by an analysis of co-authorship,” adds Professor Kakinuma.

Rapid change and progress in the university-industry-government network

These days, many hope that scientometrics will assist in the analysis of collaboration between the academic, industry and public sectors. Dr. Sun says: “I am involved in research into Japan’s network of collaboration between the academic, industry and public sectors from a scientometric perspective. Today, a shift is taking place from heavy dependency on tangible industry resources, including humans, money and goods, to a knowledge-based economy supported by intellectual property, the majority of which takes intangible forms. In the future, knowledge will be more important than ever before. It is vital to build a knowledge infrastructure and stimulate innovation through mutual collaboration between the academic, industry and public sectors, where universities play an important role as centers of intellectual production. Under these circumstances, we now face the question of how to measure and evaluate knowledge production systems based on collaborative operations between the academic, industry and public sectors.”

As the Japanese economy slows, the industry



Yuan Sun

Associate Professor, Information and Society Research Division, NII

Seeking to measure research activities

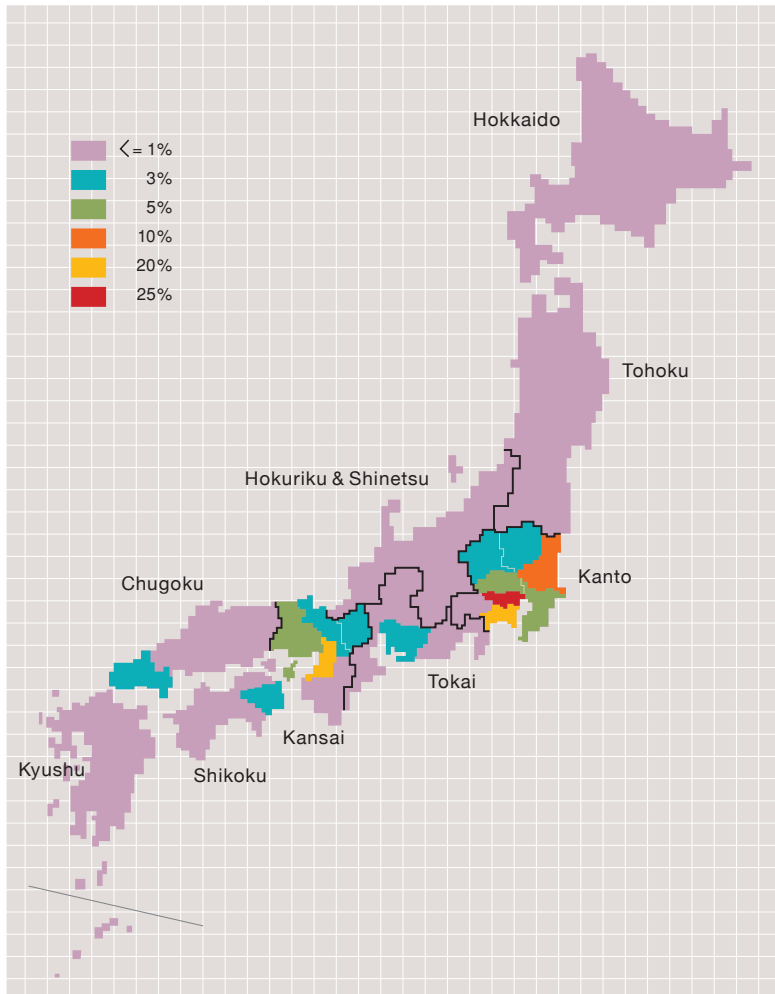


Fig. 2 Regional disparities in joint research between the academic and industry sectors in Japan

sector is now voicing its strong demand for collaboration with the academic sector. In response, universities are taking action to develop internal organizations for implementing collaboration with industry.

“However, our study has confirmed that universi-

ties and industry are generally not on equal terms with regard to their research cooperation. Industry is less important to universities than universities are to industry. We have studied the relationships between the academic, industry and public sectors with a focus on paper co-authorship using information statistics. As a result, we have learned that universities have rather been moving away from joint research with industry since around 1995 (Fig. 1). The actual state of collaboration between the three sectors in Japan is so different from how it is in the West that it cannot be explained using the Triple Helix model of university-industry-government relationships advocated by overseas researchers. We presented these research findings at an international academic conference, to great interest. Our presentation sparked a debate as to why a deviation from the traditional model takes place in developed countries with established domestic academic systems like Japan,” comments Dr. Sun.

The Triple Helix model of university-industry-government relationships was proposed by Dr. Loet Leydesdorff and Dr. Henry Etzkowitz. It compares the relationships between university, industry and government in the knowledge production process to a triple helix. According to this model, it is important to ensure that the three sectors interact with one another in a well-balanced manner, rather than for any one of the sectors to dominate. It stresses the significance of the roles that universities have to play in stimulating the economy and achieving success in innovation.

Toward building a more effective model

Dr. Sun and other researchers are working to

According to the undirected independent diagrams created by graphical modeling based on co-author relationships, universities played a central role in collaboration between the academic, industry and public sectors, and acted as intermediaries in research alliances with the overseas sector in the 1980s. Since the year 2000, overseas institutions have been acting as key agents in Japan’s academic research system.

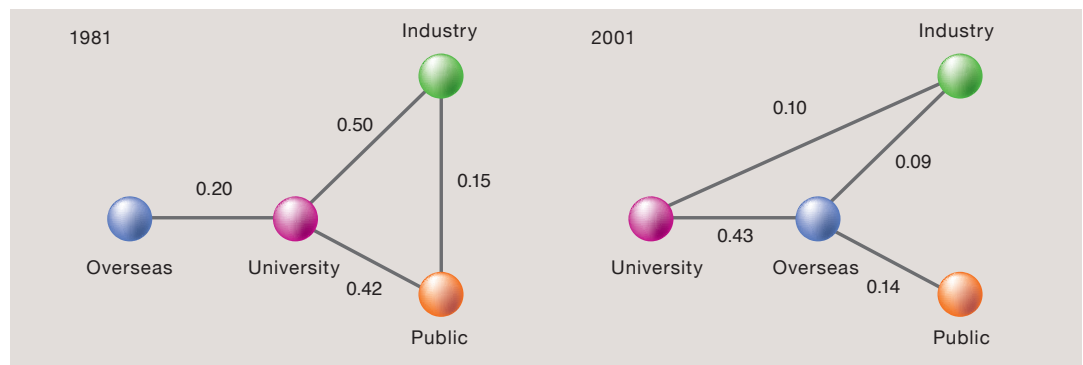


Fig. 3 Change in inter-sector relationships (the figures in the diagram represent partial correlation coefficients between sectors)

develop this model into a better form. In a joint study project with Dr. Leydesdorff, she identified a remarkable increase in papers co-authored by Japanese universities and overseas research institutions, and proposed adding the international sector as a fourth sector in addition to the academic, industry and public sectors. Dr. Leydesdorff apparently suggested that this expansion could boost the persuasiveness and robustness of the model.

“In the future, I will work with scientometric researchers in different countries to examine the extended Triple Helix model using data from various countries to help develop the model,” she says.

As can be seen above, scientometrics has significant potential. It is expected that it will continue to develop for the accurate analysis of scientific activities by introducing research results in statistics and other relevant disciplines.

(Written by Madoka Tainaka)

Column

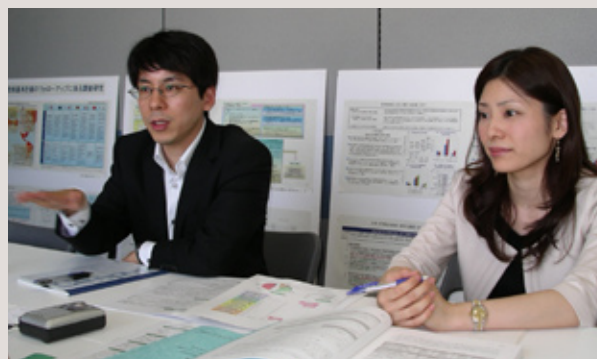
Relationship between Science and Technology Policies and Scientometrics

Research in scientometrics is closely associated with science and technology policies. NII Today visited the National Institute of Science and Technology Policy (NISTEP) within the Ministry of Education, Culture, Sports, Science and Technology. Deeply involved in the development and formulation of science and technology policies, this organization is closely associated with the NII, as Dr. Sun also serves as a visiting research fellow for this institute.

“We carry out the publication of Science and Technology Indicators, which is a material that comprehensively covers data on science and technology, and conduct fundamental research and studies. Apart from this, we produce reports at the individual request of governmental offices and ministries responsible for science and technology. Just recently, we submitted a report on the follow-up of the third Science and Technology Basic Plan. (Professor Negishi and Associate Professor Sun of NII are members of this project.) It provides information that helps policymakers to make decisions on how well the basic plan has been progressing,” explains Dr. Masatsura Igami, a NISTEP senior researcher. He adds that the expectations of such reports have been increasing in recent years.

Dr. Ayaka Saka, a research fellow for NISTEP, reviews recent developments, saying: “It is possibly because accountability regarding tax-funded scientific research is now requested under the current economic circumstances. Among others, the number of papers is a plain benchmark. It has attracted significant attention in the past few years.”

The organization is working to visualize the benchmarks. It



Dr. Masatsura Igami, Senior Researcher (left) and Dr. Ayaka Saka, Research Fellow (right). The interviewees are both part of the Research Unit for Science and Technology Analysis and Indicators at the National Institute of Science and Technology Policy within the Ministry of Education, Culture, Sports, Science and Technology.

has created a Science Map that provides an overall picture of the situation in science. It helps impart an understanding of the trend in the world of science.

“In the future, we hope to contribute to the planning of systems for efficient research activities and the development of new models for research structures by offering policymakers the essential data on an almost real-time basis. For this objective, we will be building closer ties with the NII and researchers in scientometrics and pushing ahead with data sharing to enhance research quality,” notes Dr. Igami in an explanation of their goals. It is hoped that the NISTEP will produce great results in the future.

Information Linkage Project : Pursuing Quality and Quantity

Academic information explosively expands and becomes segmentalized. To use it more effectively, we need a mechanism for linking and consolidating scattered information using linkage data that represents citations or other types of linkage. To meet this demand, a study of large-scale linkage has been carried out as a transdisciplinary research project with the cooperation of researchers from different fields and organizations.

Under a transdisciplinary research project of the Transdisciplinary Research Integration Center, the study of large-scale linkage headed by Akiko Aizawa, a professor in the NII's Digital Content and Media Sciences Research Division, was launched in 2004 with the objective of increasing the ease of use of the vast amount of academic information scattered across many different organizations and databases. As five years have passed, the project is now in its final year and there is a plan to liaise with other projects and determine its future direction.

Computer-based identification technology backed by statistics

Academic information is distributed in many different locations, including academic institutions and the NII. The basic approach to linking information is to gather the information in a single location. For instance, to ensure a system displays the information relevant to the researcher whose name is entered in the search box, it is necessary to analyze the collected information to identify data items that refer to the same researchers, and reorganize the data in accordance with them. In the past, this process could only be performed by humans. Consequently, it was costly and regarded as a behind-the-scenes process. The objective of this project is to apply computer-aided information processing technology to this area.

Information processing technology to this area.

Taking part in this project, Yuan Sun, an associate professor in the NII Information and Society Research Division, is working in the field of scientometrics to quantitatively ana-

lyze researchers' activities using the number of papers and citations according to the scholarly paper database as basic benchmarks. "These statistical findings cannot be disclosed to the public without securing a high level of credibility. We need to edit the data on the basis of name identification and verify it," she says.

It is often the case that the names of organizations and countries are not uniform in the information collected from various databases. For example, the University of Tokyo may be represented as "Univ. Tokyo" and "Tokyo Univ.," among others. The name identification must also take into account the integration and reorganization of universities and research institutions. It would take a huge amount of time if it was undertaken by humans.

If an expert in informatics introduces computer-aided identification technology to the data processing, the hurdle of quantity will be cleared. Next, if an expert in statistics guarantees the quality, it will be possible to build a high-efficiency system. The project therefore invites researchers from the Institute of Statistical Mathematics and other organizations to conduct collaborative research.

Two different services developed and implemented

After the project combined different technologies to perform data restructuring with the help of participating researchers, the data was reconstructed into services by a group supervised by Kei Kurakawa, an associate research professor at the NII Research and Development Center for Scientific Information Resources, which engages in the development of information services indispensable to the academic community. These services have been open to the public since April 2009.

One is the Database of Grants-in-Aid for Scientific Research, also known as KAKEN. It supports project and researcher search func-



A workshop of the project members on the initiative of Professor Akiko Aizawa and Associate Professor Yuan Sun

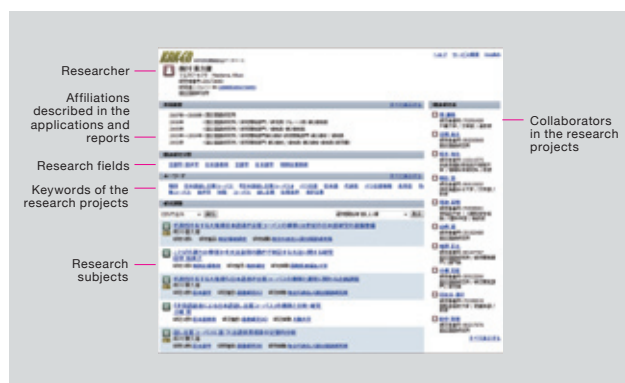


Fig. 1 A researcher search result view on the Database of Grants-in-Aid for Scientific Research (KAKEN)



Fig. 2 NII Researcher Name Resolver α2.0

tions which aggregate and display a record of research projects conducted by a specific researcher. The information is collected from the database of the annual reports of grants-in-aid for scientific research projects (Fig. 1). It is extremely convenient, as it provides links from the project reports to the CiNii (*) and other scientific paper websites.

The other service is NII Researcher Name Resolver α2.0. Gathering information on individual researchers from different websites, this service serves as a unified entry point of researchers and offers easy access to the original websites (Fig. 2).

Serving as a prototype of these services, the researcher name identification base was created by Professor Akiko Aizawa and Dr. Masao Takaku, who was a project researcher for the NII until fiscal 2008 and has been a lead engineer for the Scientific Information Office at the National Institute for Materials Science (NIMS) since September 2008. Information about books and journals is collected from CiNii, other databases of scientific papers in Japan and abroad, websites run by organizations that the authors are affiliated with and authors' personal websites, along with researcher information from researcher databases, websites providing document information services, websites of organizations that researchers are affiliated with and researchers' personal websites. It examines data identity with a high degree of accuracy to handle the problem of persons with identical names.

Since leaving the NII, Dr. Takaku has remained involved in the project. Working with Dr. Kurakawa, he is continuing with research aimed at achieving central control of the KAKEN database and other databases owned by different research institutions by combining them and assigning unique numbers to individual researchers. "We will ask each institution to soundly manage its data entry and join the data together to create a system with a higher degree of accuracy," says Dr. Kurakawa.

Stimulating research by applying it to co-authorship relationships

The application of this technology paves the way for the automatic creation of a network of co-authorship relationships, to a certain extent. This will allow us to trace the relationships between researchers and interdisciplinary networks, as well as the way they change with the times. It will serve the purposes of energizing research communities and creating science maps. Apart from that, the project envisions offering the restructured data to the Science 2.0 infrastructure service for researchers that is being developed by NII Professor Noriko Arai under the name of Researchmap (see pages 10-11). Also, the members of the project hold one or two workshops per year where they are joined by outside researchers to exchange their findings.

Dr. Yasumasa Baba, adjunct professor at the Center for Engineering and Technical Support of the Institute of Statistical Mathematics and a research professor at the Transdisciplinary Research Integration Center since April 2008, is one of the key members of the project. "The NII has strength in linking and reorganizing a data for easy access, while the statisticians have many different approaches to analyzing the data. In the future, we will apply the results of the collaboration to an analysis of the cost-effectiveness of research projects," he says, indicating his aspirations.

"In the past, the data had poor utility value. Today, the linkage of data has increased its value. What we have gained so far is versatile technologies. In the future, I will work with the rest of the project team to proceed with the research with the aim of establishing linkages with database information on the Web," says the project leader, Professor Aizawa, reviewing the developments of the past five years and unveiling the future direction of the project.

(Written by Asako Tsukasaki)

(*) See Note (*3) on page 2.

Researchmap – A new-generation research infrastructure that transcends the boundaries of various disciplines

Researchmap is an information infrastructure designed exclusively for researchers, which the NII will provide free of charge. Even before going into full service, it is already creating new communities of researchers, as it has been joined by more than 800 researchers. As a developer and one of the users of the service, Professor Noriko Arai of the Information and Society Research Division was interviewed about what is behind its success.



Fig. 1 Researcher profile view on Researchmap

The service is designed to reflect researchers' intentions regarding how to showcase themselves on the front pages of their websites.

When we want to find out about something, it is common practice nowadays to consult a search engine first of all. The same may go for researchers. These days, researchers' personal websites are increasing, but not every researcher is capable of creating a website. The NII will be providing an infrastructure service for researchers, branded as Researchmap. It helps researchers with website production and their daily operations. First, a researcher enters his or her name and profile to create his or her front page (Fig.1). "This page provides an overall picture of the researcher. It is designed to reflect users' wishes regarding how they portray themselves," says Professor Noriko Arai, the developer of the service. It allows researchers to add data about their research results, works and materials and customize the style, layout and other details of the screen at their discretion. There are many researchers who wish to make themselves and their activities known to the public. More than 800 researchers from 129 different disciplines in the humanities, social sciences and natural

sciences have already signed up.

Keys to acceptance

Why did Researchmap gain the support of so many researchers in such a short period of time? It would not have been accepted if it was cumbersome to create a web page, no matter how attractive the resulting page was. Many researchers want to advertise their own papers and books, but it is arduous to manually enter these deliverables on a one-by-one basis, and it becomes more onerous over time. Researchmap supports the use of existing databases. There are many large databases of academic papers, including the CiNii (*1) service run and managed by the NII. With respect to books, a sufficient amount of information is stored on Amazon.com and elsewhere. Users may set the system to automatically and exclusively retrieve information relating to themselves. It embodies the concept of information recycling. It helps prevent any data or entry omissions, thereby creating a web page that is highly accurate.

This visualization of researchers is a key role for Researchmap to play, but the service is by no means restricted to that. It also helps to streamline operations. In addition to the public access mode for web pages, Researchmap supports two other access levels. Accessible solely to the users, My Room is a useful space for schedule management and the creation of important documents. The schedule can also be viewed using mobile phones. Document creation is a process that is indispensable to applications for research grants and the reporting of research findings. It is a huge burden to create multiple documents. Researchmap offers a function that automatically converts papers into document format. Shared with a limited number of members such as co-working researchers, the Research Com-

(*1) See Note (*3) on page 2.



Noriko Arai
Professor, Information and Society Research Division, NII

munity will assist in the efficient operation of joint research. With these researcher-friendly features, the service has attracted many researchers.

Seeking encounters with different fields

However, Researchmap is not open to all researchers. Those who are eligible to join must either be invited by a registered researcher or submit proof of their researcher status. This restriction is aimed at maintaining the quality of the researchers participating in Researchmap. On the other hand, it is open to students and science communicators who are supporting research activities, even though they are technically not researchers.

There is a reason why the service attracts outstanding researchers from many different areas. Scholarly studies are becoming increasingly complex, and it is now necessary to conduct research that spans many different disciplines. For this purpose, researchers must meet other researchers beyond their disciplinary boundaries.

The NII is in partnership with the National Institute of Polar Research, the Institute of Statistical Mathematics and the National Institute of Genetics in the framework of the Research Organization of Information and Systems. The alliance of these four bodies, which specialize in totally different fields, is aimed at attaining interdisciplinary integration. Professor Arai has been working to build an information infrastructure for this purpose. She initially offered the NetCommons^(*) system. Enabling anyone to easily create web pages, it opened a way of making academic societies, schools and other institutions known to the public. It was a significant achievement, but she stresses the necessity of taking further steps forward, saying: “Our goal is interdisciplinary

integration, so it is necessary to create new encounters and communities. I realize that we need a more considerate system.”

What she means by “considerate” is building loose linkages between researchers who are not acquainted with each other. Researchmap is designed to automatically display other researchers who share the same research keyword with a specific researcher, irrespective of their disciplines (see the left-hand column of the screenshot in Fig. 1). This feature is gradually having an impact. A young researcher was contacted by a senior researcher interested in his research. Another researcher received an invitation to join a project. Many different encounters like these are taking place. Today, there are 26 research communities that extend beyond generational and disciplinary boundaries, including the Social Acoustics Discussion Group and a community entitled Reading Basic Mathematical Theories.

Cravings as the starting point

The creator of Researchmap, Professor Arai, conducts various activities on this platform herself. For instance, she sends emails to researchers that interest her and engages in the activities of a community for female researchers called Research Girls. She launched a page shared with co-authors to address the challenge of maximizing the efficiency of the paper-writing process and minimizing the time required for the process. “Society would never accept any system that its creator found difficult to use or unnecessary. System developers therefore need to be demanding,” she says.

Embodying the developer’s strong cravings for different features, this system is expected to help create new communities of researchers and nurture the seeds of new research after it goes into full service.

(Written by Akiko Ikeda)



Fig. 2: Schematic of Researchmap
The visualization of researchers will be sped up by actively capitalizing on different databases. This process will help create new linkages between researchers and trigger completely new research activities.

(*) An open-source information sharing infrastructure system developed by the NII. It is used by many schools and other public institutions for producing their own websites.

Imagination: the heart of verbal communication

Imari Sato

Associate Professor, Digital Content and Media Sciences Research Division, NII

The one-hour session seemed very short, and a feeling of exhilaration came over me as it finished. That is how I felt the first time I attended a live performance of Rakugo, a traditional storytelling entertainment. After a casual anecdote drew mild laughter during the introductory part, the storyteller began the main story at a good pace. I was drawn deep into the story.



concludes the story and brings us back to the world of reality.

I was extremely impressed by the storytelling technique that controls the audience, and by the expressiveness of the words and gestures. The storyteller expresses the personalities and emotions of the characters with subtle gestures, language, speech and voice tones, and acts out their relationships with

one another by skillfully moving his eyes horizontally and vertically. He includes humorous episodes from time to time to generate laughter, and inserts pauses at appropriate moments to boost our understanding.

A world of imagination extended by the art of storytelling

A Rakugo story consists of descriptions of the background and dialogs. Dialogs make up a large part of the performance, while few descriptions of the background and characters are provided. Only very simple small props are used, such as a fan or a towel. There is only one performer sitting on a flat cushion. Despite these meager conditions, the story develops at tremendous speed.

The audience is flustered, at a loss about what is being discussed, where the setting is and which character is talking. They use their visual, auditory and all other senses to keep up with the story. They are desperate not to miss the interesting-sounding story. Before we know it, the scene appears in our minds. We personally understand the situation, including the personal traits of the individual characters, and enjoy the development of the story. When the world of imagination reaches its climax, there is a punch line that instantaneously

Use your imagination

The art of Rakugo, which offers few descriptions and cannot be enjoyed without making full use of the brain, seems very original to me, possibly because we live in a rich and convenient society where information from all around the world is available at any time and any place. It also sounds an alarm about our disregard for imagination, despite the convenience provided by information and telecommunications technology.

Imagination is at the heart of verbal communication, which marks the major difference between humans and other animals. If you find that your communication abilities are weak, how about building up your skills of expression and imagination before you lose your sensitivity to language?