Broadening “Academic” Research:  
Adapting to University Reforms in Japan

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1. Introduction

Spurred by the economic doldrums of the post-Bubble economy, policymakers in Japan have instituted measures designed to encourage universities to contribute more directly to industrial innovation [sangaku-renkei], and, hopefully, economic development. Based on interview and archival data, we describe the responses that the University of Tokyo, especially the Research Center for Advanced Science and Technology (RCAST), have made to the new environment. By focusing on University of Tokyo, and in particular, on RCAST, we are not looking at the modal case. However, while RCAST has many characteristics that make it atypical, it can also be viewed as leading edge in many respects, and so it provides a good locus for observing the early response to the new environment for sangaku-renkei.

Our results suggest that professors have responded by broadening their role set. In particular, many have taken advantage of the new institutional environment to form start-up firms based on their inventions, as well as doing more contract research and paid consulting. And yet, more traditional forms of sharing information with firms through “gift exchange” [1] and public science [2] are still prevalent. Finally, this new role set spans a greater range of the public/proprietary dimension.

2. The Japanese University System, Pre-Reform

In Japan, most of the major research universities are national universities 1). Professors at national universities are civil service employees and were,
until recently, severely restricted in their ability to engage in outside commercial activity [4]. While the national government was, nominally, the institution with ownership rights in university inventions, the professors could often become the owners of their own inventions, depending on the source of funding for the research that generated the invention [5],[6]. The major sources of funding are the standard research allowance allocated to each "chair" [kouza] and the competitive “Grants-in-Aid” [kakenhi] project funding, which together account for about three fourths of total research funding [5].

Private firms also fund university research. One method is through contract research [jutaku-kenkyu] or joint research for specific projects, which account for a growing, but minor share of the total (about 2%). Another is through donations [shogaku-kifukin/inin-keirikin]. These donations, which account for about 15% of the total, are often given to support a particular professor’s lab, but are not linked to specific projects. These donations form a key component of the system of informal exchanges that link particular firms with particular professors [7], [8], [9].

Inventions coming from projects that are supported by Grants-in-Aid are owned by the national government, but those supported by the standard allotment or by donations are owned by the professor individually. Those supported by firms for commissioned research may be co-owned by the state and the firm, with the exact distribution of ownership negotiated among the parties involved [5]. In practice, about 90% of invention disclosures end up being assigned to the individual professor [6]. Kneller [7] estimated the rate of informal transfers in Japan was about equal to the rate of formal transfers in the U.S., suggesting the system was reasonably successful in moving university inventions into firms.

3. Formalizing University-Industry Linkages: The Sangaku-Renkei Reforms

Recent university reforms have relaxed some restrictions on commercial activity by national universities and their professors and attempted to formalize some of the transactions between universities and firms. The Science and Technology Basic Law (1995) set the stage for these reforms by committing to a major increase in public research funding and encouraging university, industry and government cooperation [10]. The Technology Transfer Law (1998) allowed the establishment of Technology Licensing Offices (TLOs), independent of, but affiliated with, particular universities. There are currently over 30 TLOs, representing nearly all research universities. University-owned inventions can be licensed through the affiliated TLO. And, professors can voluntarily assign their individually-owned inventions to the TLO, although they are not required to do so. Patent fees for universities were also reduced. There has also been a relaxing of the restrictions on professors engaging in commercial activities. Other policy initiatives include the Japanese Bayh-Dole Act (1999) (which made it easier for firms to get licenses to national inventions); METI’s “Hiranuma Plan”, (2001) (which set a goal of establishing 1000 university start-ups in three years and provided subsidies designed to foster that goal) and a variety of funding initiatives that provide large scale grants contingent on university-industry collaboration. Finally, on April 1, 2004, the national universities will become independent legal entities (so-called “agencification” [dokuritsugyosei-houjinka]). This agencification may result

2) A kouza consists of a professor and one or more associate professors and research assistants and is allocated funding based on a standard formula.

3) When firms make a donation, it is called shogaku-kifukin. When it is credited to the professor’s research account, it is called inin-keirikin. Respondents used both terms when referring to what we call “donations”.

4) In addition, MEXT has authorized several other new administrative offices within national universities to facilitate university-industry linkages (see footnote 8).
in significant changes in funding, personnel systems and research priorities. For this discussion, one of the most significant changes will be that agencification will give the universities ownership of faculty inventions, which will make the system of intellectual property (IP) ownership closer to that in the U.S.

4. Technology Transfer in the Transition Era

Based on 23 interviews, conducted in 2002-03, with professors, representatives from TLOs, and industry, as well as archival data, we discuss how universities are responding to this new environment. We highlight four main types of university-industry activity: start-ups, other formal ties, “gift exchange” and public science.

4.1 Technology Transfer Institutions

University of Tokyo has two TLOs. CASTI (Center for Advanced Science and Technology Incubation) covers all of the departments except the Institute of Industrial Science, which is the responsibility of Shoreikai. Founded by a group of University of Tokyo professors who pooled their funds, CASTI was the first Japanese TLO after the new law. In addition to memos, brochures and web pages advertising their services, CASTI staff members regularly visit professors’ labs to ask them about ongoing research, and find if they have any commercializable ideas. This approach has proven quite fruitful. Since 1998 CASTI has filed over 400 patents, generated 88 licenses, and helped establish several start-up firms.

The technology transfer process begins when a professor makes a discovery, and one of the CASTI staff interviews the professor to get the details of the invention and get leads on potential licensees. Based on discussions with the professor, the staff member makes a determination of the novelty of the invention, and also investigates rival technologies and potential licensees, in order to make a judgment about patentability and about the potential for licensing the invention.

We contact several firms, and if they seem to have interest, we go back to the professor and say, “this is worth pursuing.” There is also feedback from the companies to the professors. For example, a firm may say, “If the professor changes this, it might be useful.” Then, we go back to the professor and ask if he can, and wants, to do such a change. Professors really like this aspect because they can get feedback on their research theme. We make contact with people whom the professor knows and people we know, and also do make cold calls. Cold calls are not so bad, since the University of Tokyo name lowers the barriers. People are willing to talk to us.

Thus, CASTI serves as one mechanism for providing professors feedback from industry, allowing industry concerns to shape the research process. CASTI applies for patents on about 30% of the inventions it considers. In addition to processing patents and negotiating licenses, CASTI also helps arrange other formalized linkages, such as joint research or consulting. Thus, CASTI serves as a catalyst for generating disclosures, a screening mechanism for evaluating the commercial potential of inventions, and an advocate for promoting the development of the technology, not only through patenting and licensing, but also by facilitating other forms of university-industry linkages.

In 2001, to help overcome the technology transfer “valley of death”, CASTI spun off a venture capital firm, ASTEC, to provide early stage venture capital to support these fledgling businesses while they developed their ideas into commercially viable enterprises. ASTEC has a fund of about 1 billion yen, and has funded seven firms (three from University

5) CASTI had negotiated 46 consulting agreements as of July, 2003.
6) One U.S. dollar equals approximately 110 yen (October, 2003, average).
of Tokyo) so far. Together, CASTI, ASTEC, and related institutions, provide a framework for supporting start-ups based on university inventions.

4.2 University Start-ups

One of the most dramatic changes in the post-reform era in Japanese national universities is the growth of university-based start-ups. The combination of the Technology Transfer Law and the Hiranuma Plan have set the stage for a significant growth in university-based start-ups in the last 5 years. Five of the 15 professors we interviewed have start-up companies. Several of the others have establishing such start-ups as a goal. The following case descriptions illustrate several somewhat distinct roles that start-ups play in the process of moving university technology out into the world.

The first case begins with a serendipitous discovery in a professor’s lab. A graduate student discovered a new phenomenon. It turns out this phenomenon could form the basis for very sensitive monitoring devices. The professor considered how best to exploit this new technology. Transferring it to one of the large firms he knew was one possibility. In fact, to market the invention, the professor alerted his industry contacts, and over 20 industry people attended the M.A. presentation disclosing the invention. The professor also contacted CASTI. CASTI investigated potential licensees but found this technology was widely applicable and convinced the professor that, rather than aligning with any one company, they would be better off setting up a start-up instead. However, they would only establish the start-up if the professor would agree that, for this technology at least, he would discontinue his gift-exchange relationship with the large firms. The start-up firm’s strategy depended on having exclusive control over the new technology. One motivation for the start-up was that both CASTI and the professor were concerned that large firms would not seriously try to develop the invention. In contrast, the start-up firm has to try to make the technology work, as it has committed the firm to that one technology.

CASTI immediately introduced the professor to ASTEC and to a potential CEO (a college teammate of someone from CASTI). The CEO had left a large firm and was looking for a new business that he could have more direct control over. Thus, in addition to getting patents, funding, and licensees, CASTI also used its network ties to recruit managerial talent for the new venture, a key step in the success of start-up firms. ASTEC’s investment was supplemented by three years of matching funds from METI. The invention was licensed to the start-up through CASTI. One of the professor’s students became the CTO for the first year. The professor holds a position on the scientific advisory board and frequently gives technical advice to the start-up. The start-up maintains co-development agreements with several leading Japanese companies in the power plant, aircraft and railroad industries.

In the second case, a professor had a long-standing relation with a group of researchers from a large firm. When those researchers decided to start their own firm, they invited the professor to work with them to develop a start-up based on their joint work. In this case, the technology had been advancing from fundamental physics to the point where the goal was...
applying these fundamental discoveries to complex, integrated systems (for example, to use in communications equipment). Two of the professor’s students have joined the new venture, and the professor is a member of the board. The start-up funds research in the professor’s lab. The professor provides research services: testing the new devices and developing theories to guide future development. In sales promotions, the CEO also emphasize that the firm is a university-based venture firm.

In the third case, a professor and his industry collaborators had developed a new technology that was useful as a research tool. They found themselves swamped with requests for customized versions of this technology. In order to fulfill the demand, they developed, based on personal contacts with venture capitalists, a start-up whose goal was primarily serving the market for these research tools. In this case, the university-based technology had largely reached the commercial stage, and the start-up served as a means to directly commercialize the innovation. An additional reason for doing this as a start-up, rather than licensing to an existing firm, is that the know-how associated with this innovation can be kept “in-house” in this case. In contrast, if they partnered with an existing firm, they would have to share the technical knowledge.

Thus, we see several types of start-ups coming out of the university: some are developing university discoveries; some grow out of long term collaborations with industry; and some are established to commercialize a market-ready product created in the lab. One important aspect of the development of many start-ups is continuing the relationship between the professor and the technology after the establishment of the start-up [13]. These relationships highlight the feedback model of innovation, with university research and industrial development each driving the other [14], [15]. At least some of the start-ups have been located very close to the professor’s lab, in order to allow for regular contact between the university-based activity and the company’s research. Another key reason for start-ups (as opposed to licensing to established firms) is to keep control of the technology while still commercializing it (i.e., to not disclose know-how). A third reason is the desire to stay non-affiliated with any particular firm, in order to allow the technology to be developed by a variety of industrial partners. Similarly, startups allow segregating the commercial and non-commercial aspects of the research, so that the non-commercial research can proceed relatively unencumbered by restraints on commercial activity.

4.3 Knowledge for Sale or Rent: Other Formal Technology Transfer Activities

Start-ups are not the only formalized mechanism for technology transfer. The new institutional environment encourages other forms of contract-based technology flows, including licensing, consulting and contract research.

For example, one professor developed a number of “barrier free” devices. These are stand alone, mass produced devices for the consumer market. Once the professor was able to solve the technical problems that allowed significant improvements in these devices over existing, competing technologies, he then licensed to a small manufacturing firm to do product testing and development, in order to move the technology out into the market. Another professor has collaborated with a number of firms and has jointly developed various products from his chemicals-based technology [16]. He has applied for patents with about 30 firms. This technology is found in a large number of commercial products.

Professors are also engaging in contract research for firms. In the past, firms frequently supported a professor’s research by donations. In the post-reform era, firms are increasingly tending toward using contract research as a way of sponsoring research of interest to the company (see Figure 1). For example, one industry respondent noted that they might provide donation funding to support the general work
of a professor. If, after that, the professor’s research results begin to look promising, they may contract for more specific projects, where the outcome of the project would belong to the firm. The advantage of the contract research model is that the relation between the firm’s support and the outcomes of the research, especially IP rights, is much clearer.

Another example of the shift from informal to formal is the use of kengyo (“outside work”). In the past, the kengyo system was commonly to allow professors at national universities to teach at private schools, for example. Increasingly, however, after the personnel law reforms, professors are using the kengyo system to do formal, paid consulting for firms, as well as be CEOs or a board members in their start-ups. One advantage of the kengyo system is that it clarifies what was a somewhat ambiguous relationship under the old donations-based system. For example, instead of firm researchers coming to a professor’s lab to learn new technology, now the professor might instead go to the firm to teach the firm’s researchers. In the former case, the firm often gave the professor a donation. In the latter case, the professor was temporary hired by the firm, using the kengyo system. An industry respondent describes this change as follows:

It was a problem of patents. In the Japanese system, when an invention is born, we should share the right of the patent (with the government). But in some cases, it is not appropriate for our industrial company. We should negotiate with the government. But in kengyo system, the decision is based on one-on-one relation with university professor as individual, so it is more flexible to decide the right of the patent.

Thus, we see an increased use of formalized university-industry linkages, such as contract research, licensing through the university’s TLO and paid consulting. Our respondents suggest that one important reason for the growth of these formalized exchanges is that they allow firms to clearly specify their property rights in the outcomes of the research, unlike the more ambiguous forms of informal gift exchange. While such gift exchanges were common and had several advantages, the new sangaku-renkei environment allows, in certain cases, the firms and professors choose the formalized option, which seems especially attractive when the firm wants to ensure that it controls the IP that the project will pro-

![Figure 1. Contract Research and Donations from Firms (¥ Million)](image-url)
duce. There were some concerns raised that the cost of this increased formalization was more paperwork.

4.4 “Gift-Exchange”: Informal Technology Transfer

As noted above, in the pre-reform era, much technology transfer between universities and industry took the form of a “gift exchange” [1]. Firms provided money to professors in the form of donations. When professors found a potentially commercially useful technology, they would teach their findings to firms that they had personal ties with, who would then develop the technology, often applying for patents in the professor’s name, but with the firm as owner [5],[6]. As Figure 1 shows, even in the post reform era, donations are vastly greater than contract research. In 2002, donations totaled about 50 billion yen, while contract research accounted for only 2 billion yen. In general, firms donate to professors’ labs in order to maintain personal ties (ningen-kankei), and professors note the importance of such ties for receiving donations.

Professor A: I think the main reason that firms are interested in university is “ningen-kankei.” One is recruitment and the other is establishing/maintaining research community. These ties serve to support research the firm finds potentially interesting, and to keep lines of communication open, in order to gain access to technical expertise that the firm may want to tap and/or to assist in recruiting good students [9]. The “gift-exchange” in this case is that the firm provides donations, and the professor provides technical advice, hosts firm researchers, and discloses to firms potentially patentable ideas [5],[8],[9] [10].

The following quote describes the use of donations as “thank you gifts” for providing technical advice (consulting).

We receive requests for consultation from firms maybe once a month. In most cases, I cannot deal with it so I introduce other professors. Yes, there are many consultations from firms. For example, a firm asked me, “We want to design like this, but we are concerned about this part.” and then I told them “Professor A’s program might work for your case.” In this case, the firm pays a few million yen as inin-keirikin, for the purpose of using the program.

Our respondents emphasized the flexibility of donations, in contrast to the rigidity of contract or kakenhi funding. For example, donation accounts can be rolled over from one fiscal year to the next and can be allocated to various budget categories [5],[6]. Donation funding also has the advantage of not strictly requiring research results.

Before [under the donation system], responsibility is fuzzy. Basically, professors like things where responsibility is fuzzy. Our job is research. Research work mostly consists of many errors. Making errors is my research job.

Given a choice, professors would often arrange for donation rather than contract funding. Several respondents said that donations had been decreasing (see Figure 1), due in part to the economic difficulties of firms in the post-bubble economy, and in part because of a shift to more formal ties. However, recently, we have seen a renewed growth in donation funding. While some of this increase may be due to new forms of donations (such as endowed chairs), the continued importance of donations relative to contracts suggests that firms and professors

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9) R&D Manager: “What we have to do is to have continuous good relations with a particular professor and ask him to introduce us to “excellent students”, in his opinion. So, the purpose to have relations with university is that we can have freedom to select excellent students.” Some respondents suggested that while recruitment may have been an important motivation in the past, these days, due to the economic recession, firms do not need to use donations as a recruiting tool.

10) According to Aoki [17], secondments to professors’ labs may be an important mechanism for information flows between universities and firms, as well as among firms.
still recognize the advantages of gift exchange for maintaining ties, and the flow of information through those ties, as well as the importance of flexible, discretionary budgets for maintaining a research program.

Generally, these gift exchanges take the form of a continuous flow of gifts in each direction, designed to sustain the relationship, although occasionally they have a more explicit, transactional character. Caplow [1] suggests such gift exchange is most common when the relation is both important and uncertain. The importance of gift exchange relative to formalized exchange (see Figure 1) suggests that R&D managers view such ties as important, and that the donations help maintain access to the information professors possess. There is an expectation that, because they are public servants, professors at national universities like University of Tokyo be accessible. However, these professors have many demands on their time and a lot of discretion as to which requests will get their attention. This discretion contributes to the uncertainty of the relationship. Thus, through the gift exchange, the professors gain from having flexible research funds, and the firms gain from a steady flow of new, and perhaps serendipitous, information, including, but not limited to, potentially patentable ideas.

4.5 Public Science: The Intellectual Commons

While much of the attention is focused on patenting, licensing and startups as the means of technology transfer, we should not lose sight of the most central forms of technology transfer: publishing and meetings, i.e., “public science” [2]. For example, using data from the pre-reform period in Japan (1994), Walsh and Cohen [18] show that the most important channels for accessing university research is publications and public meetings. This was also the case in the U.S. in this period (even though this was after America’s major university-industry promotion reforms). Professors noted that academic research and publishing are still their main objectives. One professor, with active commercial links and products in development, said, “Science is about finding rules, principles, not finding new things, but principles. That is what I do.” Another professor with strong commercial ties said, “My concern is publishing good papers or presentations at conferences [rather than start-ups or licensing].”

A professor doing biomedical research emphasizes the importance of protecting public domain research, even if the final goal is a commercial product.

Q: If the bio lab became a venture firm, went to the other side of the wall, what would be different?

Professor: It would be impossible because, for example, there are a large number of receptors we are interested in. A reason why we can get the all receptors is because we belong to the public sector. ... So, the bio lab should belong to the public sector. No private companies have succeeded in acquiring all these receptors.

Thus, one advantage of public research is that it can become a free space [19] where the tools of research can be collected and fundamental science can proceed unencumbered. Of course, the rise in commercial activity around university research has, in the U.S., raised concerns that such free spaces may be at risk of disappearing [20], [21].

Respondents engaged in a variety of academically oriented “public science” projects, including collaborations with industry to explore fundamental technologies [3]. While the firm’s long term goal in such projects is access to technologies that might be commercializable in the future, that future may be in another 5 years, 10 years or even longer. A professor in one of the physics-based fields distinguishes two different collaborations depending on the goal.

Professor: There are two categories. One is very basic, even in engineering, so it takes time, maybe 10 years or 20 years. In such a
field, we have collaborations with relatively big companies like [several big electronics firms]. In a more practical field, I have good collaborations with venture companies. Presently, I am a board member of a venture company. There is a very strong collaborations between us. So, these are two types of collaboration.

This quote shows how professors discriminate among their projects in terms of how fundamental they are and apply different models of sangaku-renkei to each (with the more fundamental ones generally being more public and the more applied projects being more proprietary). One important reason for university-industry collaboration is that firms and universities often have complementary skills and equipment to bring to a project, creating an innovation division of labor. These complementarities are one important source of feedback between the two sectors.

4.6 Kenkyukai

An important means for transmitting public knowledge to private firms is the study group [kenkyukai] [8], [22]. Such study groups, which often include both industry and academic members, form around a particular research topic, and last from one to several years. Firms generally pay a membership fee (on the order of ¥100,000 a year) to support the work of the kenkyukai. While some groups have a specific goal, such as developing a new type of high pressure vessel or finding a new process for extracting a raw material, they also have the more general goal of providing industry engineers with access to the latest information on a particular field. These kenkyukai can evolve into more focused collaborations, as the following quote illustrates.

From this study group, I made another study group. The problem of the original study group is that we have a very small amount of money. We first expected that private companies would pay some money to develop [product], but now the economy is not so good so they can’t pay much money. We can make some prototype, but the prototype was very poor, not so good one. So, when the program ended, I made another group by using that. During the process of the first study group, several companies personally contacted me and asked me to collaborate. In Japan, there are several funds which support collaboration between private firms and university. One company asked me to collaborate by using the knowledge of the study group.

He also has another reason to make his own kenkyukai. The large kenkyukai was established by a public institute. Therefore, all information from the kenkyukai must be public, and private, exclusive collaboration is hard to do within that framework. Here we see the gradient of more or less public research, even within the category of university-industry collaborations. The “public” nature of the institute’s kenkyukai is emphasized by the contrast with collaborative research, where the parties are more proprietary about the process and outcome. The quote above notes that, while the kenkyukai is useful for sharing results broadly, and exploring the issues around a particular technology, when it comes to developing a commercial application of the technology, the professor and one or two firms will take that aspect of the project “off-line” and develop it as a joint, proprietary project.

5. Broadening the Range of “Academic” Activities

Our results suggest that universities are adapting to the new institutional environment by adding more formalized forms of technology transfer, while maintaining informal ties that are the core of university-industry linkages. In addition to engaging in public science and gift-exchange, professors also do paid consulting, contract research, license technology and form startups. Thus, professors are
choosing among a broader set of options for integrating industry linkages with their public research. For example, formerly, donations covered a variety of research, from the ongoing, high-uncertainty work of a lab, to training post-graduate engineers on secondment from their firms, to consulting or contract R&D. Now, there is easier access to the categories of kengyo and contract R&D that allow professors and firms to assign some of their joint activity to these categories, allowing both clearer control of any intellectual property, and a more explicit declaration of the tie’s existence and purpose \[11\). We see professors making strategic distinctions among their multiple research projects in terms of how they should be categorized, i.e. what form of university-industry linkage is most appropriate for the task at hand, at its current stage.

Similarly, professors are covering a broader range of the public/proprietary dimension. Before the reforms, much of what professors did was public and some of it was quasi-proprietary, such as teaching firms patentable inventions in return for donations. These activities still exist. But, in addition, professors now do contract R&D for firms with the results being the exclusive property of the funding firm. And, professors engage in start-ups, which allow for commercialization while maintaining proprietary control over the professor’s tacit knowledge as well as the patented technology. There is also some evidence of leasing out the prestige of the university, particularly for university-based startups. Start-ups can use their association with a famous professor or institution to gain access to potential business partners, thereby privatizing the social capital of the university. While these several forms of proprietary activity play important roles in the technology transfer process, we should take care that such proprietary tendencies do not damage the public science activity, for example, by causing publication delays or other forms of increased secrecy.

Government programs play a key role in facilitating university-industry cooperation by providing funding that is generous enough to be enticing and that requires “formal” university-industry cooperation as a condition of funding. As Japanese firms in the post-Bubble economy have shifted away from basic and applied research, and toward development, in their R&D spending \[23\], such bridges become increasingly critical for funding technology development to the point of concretization (e.g., in the form of a prototype). At that point, the commercial applicability of the idea is much easier to evaluate. As one professor said, “When we only had an idea, firms did not believe us. In order to get firms’ interest, we need to make a sample.”

Overall, we are seeing a deepening integration of university and industry research. Professors are more open to the idea of working with industry, and are increasing taking industry needs into account. At the same time, faculty recognizes the importance of maintaining fundamental research programs. We may be seeing a growth of research in what Stokes \[24\] refers to as Pasteur’s Quadrant, the intersection of advancing fundamental knowledge and considering the potential uses for the new knowledge. In addition, the new environment allows firms and professors to take advantages of complementary capabilities and equipment to create a more fruitful innovation division of labor, which includes feedback between the two sectors, with professors sometimes providing special services or equipment for firms, and sometimes firms providing special services or equipment for universities \[14\], \[15\].

Because components of a university, in particular, professors’ labs, are not tightly linked in their daily activities \[25\], it was possible for the university to add new sangaku-renkei activities without fundamentally changing the core of the university, illustrating the flexibility of a loosely coupled organization in the face of a changing institutional envi-

\[11\) One example of this greater explicitness is that individual kengyo (including amounts received) are now published on the MEXT web page (http://mext.go.jp/a_menu/shinkou/sangaku/index.htm).
environment \[26\], \[27\]. The new system can accommodate a diversity of faculty interests. The fact that RCAST is both geographically and organizationally separate made this even easier. Thus, we do not expect these reforms to lead to a fundamental restructuring of the university, for example, a significant shift away from fundamental research and toward contract, commercially focused development work \[28\] \[12\]. Rather, we see the university taking advantage of the new opportunities to expand its role in Japan’s innovation system. Because there are often synergies between fundamental and commercial research, this broadening may be fruitful \[24\]. However, the coming agencification is a garbage can into which many problems and solutions can be thrown \[29\]. We should be careful that the changes proposed do not undermine either the flexibility of the current system or the role of open science and personal ties as the foundation of university-industry linkages.

Further research is needed to more systematically document these changes and to evaluate their impact on overall information flows between universities and firms, including the feedbacks between firms and universities. For example, one effect of formalization may be broader access to university research results, particularly for new firms and small firms. Also, we are observing a moving target. As these changes become more institutionalized, and as they are combined with other changes in the university organization as a result of agencification (in particular, changes in the system for evaluating and compensating professors), we should continue to monitor the impact of these changes on both public and proprietary innovative activity.

Further reading


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12) Even before the reforms, much research in Japanese universities was already on the applied rather than the basic end of the spectrum \[18\].


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要旨

日本の大学は,大学における研究成果の事業化を促進するため,大学内の研究機能の変更を目指した制度環境に直面している。本稿では,大学教官, TLO関係者および企業の研究開発担当者,合計23名に行ったインタビュー結果をもとに, 東京大学, とくに先端科学技術研究センターにおける新環境への取り組みを考察した。考察結果から,大学教官は近年の産学連携の高まりに対して,自分たちの役割を拡大しており, とくに自分たちの発明をもとにベンチャー企業を創設するなど, 新しい制度環境を巧みに利用していることが指摘できる。加えて, 受託研究や有料コンサルティングなどが以前に比べより多く見られる一方で, これは大学が行われているような企業との情報共有の形態も依然として普及している。大学教官は自分たちの役割についての認識を拡大させており, 基礎研究に加えて, 商業化を目指した応用研究をも自分たちの役割の一つと見なしている。大学教官はある時には情報の公的な普及を望み, また場合によっては技術開発の独占的なチャンネルを望んでおり, もし新しい役割の形成は, 公的/私的独占的な側面における大学教官の選択肢の幅を広げていると言える。