EXPLORING ORGANIZATIONAL SCIENCE COMMUNICATION: A CASE OF A NATIONAL GOVERNMENTAL ICT RESEARCH INSTITUTE OF JAPAN

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Abstract

This case study investigates why and how researchers of public research institutes practice their organizational communication with the public, "organizational science communication". While existing literatures show little interest in science communication as an organizational matter, the study focuses on its increasing importance. The study found science communication is a crucial factor not only in communicating science, but also in reflectively constructing research activities and strategies for research organizations. Due to the recent new mode of science-driven R&D and innovation, scientists are constantly involved in multi-disciplinary collaborative and strategically organized research projects driven by publicly contextual concepts rather than individual excellence. There has been a simultaneous increase in the importance of public accountability of scientific research. Such a situation directly requires scientists, not the PR staff, to reinforce communication with the public in various ways. In conclusion, the model of organizational science communication as a "social co-creation system of reflective science" is proposed.

Keywords: organizational science communication, embedded communication in research activities, dialogic public relations, social co-creation, public knowledge of science, reflective science

1. Introduction

In Japan, the national government started to emphasize a new concept of "organizational outreach:" science communication activities organizationally carried out by universities and research institutes. This was made clear in the new policy guidelines on public understanding of science and technology (PUST) promotion programs launched in 2005 (MEXT, 2005). This trend has appeared not only in Japan but globally, making it compulsory for scientists to participate in public outreach activities (Irwin and Michael, 2003; Stocklmayer, et.al., 2001). However, reported practices purporting to be pioneering, such as science cafes and informal education programs typically, seem to be expanded publicity events completely arranged by the PR staff and so-called science communicators. Although many programs succeeded in involving selected scientists in their institutes, their role in programs seem to be that of guest speaker or tutor rather than host.

One of the most important problems of such a trend may be the absence of scientists' engagement, a debatable problem in the field of PCST (public communication of science and technology). The importance of scientists' engagement has been recognized and discussed in recent years, nevertheless the focus remains on scientists as individuals or informal groups, not as "organizational" members. There are presumed complicated reasons: one is the underlying myth of scientists' independency and autonomy, strongly conceptualized as a "republic of science" (Polanyi, 1969) or "invisible college" (originated in the Royal Society in the UK), and the other is a lack of empirical data caused by the difficulty of investigating the inside of research institutes systematically.

Attempting to make up for such a lack of research, this case study investigates why and how researchers of public research institutes practice their organizational communication with the public, "organizational science communication" [1)]. The study explores this neglected area and proposes a model of organizational science communication as a social process. Data was mainly collected through participatory observation in a governmental ICT research institute of Japan, ITRI-AIST (Information Technology Research Institute, National Institute of Advanced Industrial Science and Technology), consisting of field notes, records of meetings, official documents, and interviews with key persons [2)]. The case includes two different types of sub cases occurring in succession between 2004 and 2007 in the unit: (1) exhibitions and demonstrations of ubiquitous information systems for EXPO 2005 Aichi Japan; (2) a series of "science cafes" for dialogic discussion between scientists and a small group of the public, and "tutorial workshops" for collaborative practice using advanced ICT groupware.

[1] This paper is based on the author's doctoral thesis (Tayanagi, 2008).

[2] The author was working as a journalist-in-residence at the institute from 2003 to 2008.

The findings show science communication is a crucial factor not only in communicating science, but also in reflectively constructing research activities and strategies for research organizations. In conclusion, the model of organizational science communication as a "social co-creation system of reflective science" is proposed.

2. Literature review

2.1 Embedded science communication in research activities

Diffusion of scientific knowledge was originally led by scientists themselves until the 1950s. After the 1960s, research institutes and academic societies started to establish their own PR divisions and to strongly manage and control the information flow (Nelkin, 1955). Thus science PR and science mass communication have dominated the channel of scientific knowledge to the public, the so-called "gatekeeper model" (Weigold, 2006; Rensberger, 1997; Cohn, 1989). Such domination has formed a top-down, one-way and asymmetrical information flow, a "deficit model" of scientific knowledge (Wynne, 1991; Gross, 1994; Irwin and Wynne, 1996; Durant, Evans and Thomas, 1989; Logan, 2001).

However, there have been scholars who have focused on spillover models of scientific knowledge while the gatekeeper model has been predominant in communication studies. Lieverouw (1990) proposed a model of scientific communication that consists of three stages: conceptualization, documentation and popularization (Fig-1). This model recognizes research activities of scientists as a series of communication processes not completely closed but frequently open to the public. Typical examples can be seen in the phenomena of rivalry in the media when covering research competitions of Cold Fusion and High-temperature superconductivity. This communication fever emerged from scientists' collective desire to diffuse their research results, and from spontaneously organized public promotions within research institutes and academic societies (Lieverouw, 1990; 1992). The same kind of phenomena was also seen in Japan (Wakamatsu, 1994; 1999).

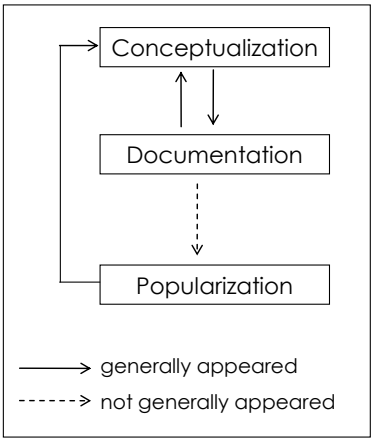


Fig-1. Three stages model of scientific communication (Lieverouw, 1990)

This model indicates that autonomous and organizational science communication processes as a seamless extension of research activities have existed, although they have not been constantly open to the public and dependent on channels of mass communication. It suggests that famous figures in the mass media such as "visible scientists" (Goodell, 1977) have been not only scientists, but science communicators.

2.2 From established scientific knowledge to ongoing research

Nowadays, science communication needs to communicate "research" as an uncertain and ongoing activity as well as "science" as established and systematized knowledge. Field and Powell (2001) introduced and analyzed one old and one new program, ISE (Informal Science Education) and PUR (Public Understanding of Research), initiated by NSF (National Science Foundation-US). ISE is an orthodox program of PUS (Public Understanding of Science) introducing established scientific knowledge by limited experiences, only once or a few times, through simple mono-media such as exhibitions, lectures and experimentation theaters. In contrast, PUR aims to communicate obscure knowledge of ongoing research.

The reason for the development of this new PUR program is a serious mismatch between the public desire for knowledge and the knowledge distributed by existing programs. The new PUR program aims to continuously organize dialogic communication and relationship building with the public through coordinated mixed-media (e.g. TV, internet, books, exhibitions, books and printings), and involve ordinary scientists from various fields rather than charismatic star scientists. This is a typical example of a trend in science communication, communicating not only "knowing what" of scientific knowledge but rather "knowing how and why" of the scientific process (Durant, Evans and Thomas, 1989; Gregory and Miller, 1998; Tayanagi, 2008), and also of a trend of PUS to PAS (Public Awareness of Science) (British Council, 2001).

2.3 Dialogic approach and reflective paradigm

Theories of communication between organizations and their surrounding environment, particularly with the public, have mainly developed in the field of PR studies (Sutcliffe, 2000). Grunig and Hunt (1984) proposed a model of four types of PR, including a dialogic one, as early as the mid-1980s. However, the dialogic PR model has stayed an ideal model for a long time in that almost all organizations have never truly succeeded in practicing it (Grunig and Grunig, 1992). Grunig and Hunt (1984) stated that the dialogic PR approach would succeed only when an organization is not strongly vertical-structured and each unit can act autonomously [3)].

Kent and Taylor (2002) tried to develop this dialogic PR theory, and suggested five characteristics (Fig-2) as practical targets that organizations should overcome.

Five characteristics of dialogic PR	
1. Mutual relationship	Collaboration beyond different interests; mutual equality
2. Immediacy	Considering contexts of events; engagement of all stakeholders
3. Sympathy	Support of opposite positions for each other; sharing directions; identification of intentions
4. Risk	Fragileness; unexpected results; incomprehensible to others
5. Commitment	Truthfulness; commitment to conversations; commitment to interpretations

Fig-2. Five characteristics of dialogic PR; based on Kent and Taylor (2002)

On the other hand, Holmström (2004) claimed that a multi-contextual approach towards PR is needed instead of the existing mono-contextual approach, emphasizing such things as organization vs. the public, sender vs. receiver and speaker vs. audience, from the aspect of European PR and public communication studies. A new public communication method of "multi stakeholder dialogue" has emerged, in which each member should recognize each position in society and build multi relationships with various members. Holmström (2004) emphasized that "reflective" aspects and attitudes, originated in open system theories such as "autopoiesis" (Maturana and Varela, 1980; Luhmann, 1984), are crucial factors in making a new PR approach sublimate into public communication. The reflective paradigm requires organizations to be self-referential and self-reproductive through open communication with wider society.

3. Case analysis

This study conducted long-term fieldwork using the method of participatory observation, dealing with two different types of sub cases in a national governmental ICT institute in Japan, Information Technology Research Institute (ITRI), which is one of the research units of the Institute of Advanced Industrial Science and Technology (AIST). The subject is a R&D task force consisting of 3-5 senior researchers and a few younger researchers from each senior researcher's laboratory. Although two different task forces were formally organized for two cases, the study regards them as the same task force because almost the same members were involved in both task forces in succession.

3.1 EXPO 2005 project (2003-2006)

World Expos have been irreplaceable opportunities to display and apply advanced results of science and technology. The world EXPO 2005 was held in Aichi prefecture in Japan, in which academia-industry-government collaborations were especially emphasized in the promotion policy for this event.

One leader, who organized a mission-driven research center, "Cyber Assist Center[4)]," in AIST, visited the promotion office in the early summer of 2003, making a presentation and demonstration of the research results of a ubiquitous navigation system to forestall the other competitors. The leader desired to have these results installed as part of the information infrastructure for the EXPO, in order to promote their research to wider society through one of the biggest national events.

One year after the first contact, a formal request from the promotion office arrived through the head office of AIST. While the center had to compete with a few other teams over the contract, they finally won. They then started the R&D task force for a ubiquitous sound information system for a Japanese Governmental pavilion and an opening event produced by a world famous performance artist, Laurie Anderson. Selected task force members were strongly motivated, not only concentrating on R&D, but also taking the initiative for special PR promotion. They involved a PR and communication specialist and organized a press conference, not at the ordinary headquarters site, but at their own research site, overcoming the opposition of the PR staff of the headquarters. They directly contacted a few TV news teams and negotiated beforehand so the news would be presented precisely. They were successful in this..

The task force also collaborated with two professionals from different fields, a famous Japanese industrial designer, Shunji Yamanaka, and Laurie Anderson. Such collaborations improved the social value of the R&D results: Laurie Anderson got ideas for sound installations from discussions with the researchers and she contributed by drawing an illustration on the very small and thin card-type PDA made of bamboo. The design and policy of system received an Ecological Design Prize of the Good Design Award 2006 in Japan.

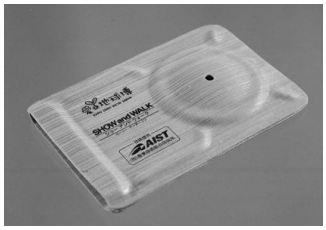
[3] In that sense, professional organizations such as universities and research institutes ought to have the advantage of a particular flat structure and autonomy (Mintzberg, 1983).

[4] Cyber Assist Center was reorganized to ITRI in September 2004.

Thorough the EXPO 2005, an audience of around six million experienced the system, the mass media reported the results and the scenes in various programs, and the researchers got large-scale empirical data that enabled them to write journal papers which could provide funds for further research projects.



System for a national government's pavilion



System for an opening event produced by Laurie Anderson

3.2 Research outreach project (2005-2007)

Since 2005, the Japanese government started to promote the organizational outreach of research activities through some programs. One of the trial programs obligated a particular national strategic research fund to spend 3% of its total fund for the outreach of research results to the public.

In ITRI, another leader received funding for organizing a strategic research project on "semantic computing." Although they had to carry out outreach activities, no one had such experience and know-how, so the leader involved two specialists in PR and communication, organized a task force and started biweekly meetings. Through brainstorming for over a half year, they developed their own policy and plans for outreach: why, how and what to communicate. To solve the most difficult problem, how to define "who is the public", they decided to use a concept of "user participation in R&D," popularized in the ICT field. Around 40-50 participants gathered and a series of three science cafes and two workshops were held in three months.

The task force decided that science cafes should involve participatory discussion rather than a simple lecture and Q&A discussion style as the researchers truly needed general user's opinions on future visions of computing. They tried to begin discussion among two or three researchers at first, showing differences and conflicts in the views among researchers themselves to encourage the audience to participate. Points of the discussion were focused on appropriate reasons for ongoing research directions and their expected impact and applications for society. In parallel with the cafes, collaborative workshops were also held, where 6-8 interested people from the audience were gathered and invited to try to use an advanced groupware still in progress to generate ontological contents. Some participants co-created good examples with researchers, which could be used in the next science cafe as materials for discussion. Participants showed stronger engagement in the discussion each time, and researchers obtained more and more findings. Besides, one senior researcher finally changed his mind about research policy although he had never accepted advice from colleagues before. The task force members were surprised at the great influence of the participants, the public that is.


Science cafe


Collaborative workshop

4. Findings

Important findings from the two cases are shown on a comparative table in fig-3. Methods of communication are quite different: the EXPO project shows one-way but dynamic communication, and the outreach project shows advanced two-way interactive but local communication. The study also finds it important to focus on the nature of scientists' autonomy in the process of science communication. It shows that scientists are capable of promoting their research to the public and organizing a borderless community against a generally accepted view that scientists are unsociable. The key factor in activities is not individuals but organizations.

Crucial common conditions behind the contrastive characteristics of the two cases can be seen. Under the change of macro environmental conditions, public research institutes have been required to communicate with the public in various ways. In the final analysis, a common aim of legitimatization of public research is suggested.

	EXPO project	Outreach project
Conditions	**Change of institutional environment**	
	Contribution to science-based innovation Pressure for enlargement of research outcome	Liquidity of scientific knowledge Difficulty of advanced research for non-experts
Organization and network	Mission-oriented and quasi-firm type taskforce Alliance with professionals of different fields	Joint task force involving communication professionals Community building though public involvement
Motivation and Incentive	**Engagement of researchers**	
	Autonomous decision making Seeking relations between science communication and research activities	
	Acknowledgment, applause, validation	Learning social contexts from local knowledge
Method of Knowledge communication	**Organizational integration of knowledge**	**Social integration of knowledge**
	Highly integrated messages into artifacts High probability of interpretation	Loosely integrated knowledge Impromptu modification of messages in local contexts
Method of public communication	**Legitimatization of public research and science**	
	Science communication embedded in research strategy Dynamic approach to the whole social system Positive deficit model	Science communication for public engagement in scientific research Local approach of community building Denseness of social interaction

Fig-3.Comparative characteristics of two cases

5. Theoretical model construction

The study confirmed "embedded" science communication processes within research activities, forming a borderless transit between science communication and scientific communication. Being supported by evidence, the model of organizational science communication as a "social co-creation process of reflective science" is proposed (Fig-4).

First, dialogic communication between scientific knowledge and other local knowledge creates public knowledge of science. Second, this public knowledge provides reflective science knowledge for reflective science. Third, public knowledge also provides public contexts for research strategies. Fourth, the research organizations produce an ideal outcome in terms of both contributing innovation and in making reflective science substantial. Fifth, reflective science provides policy implications for public policy, supporting public engagement in policy process.

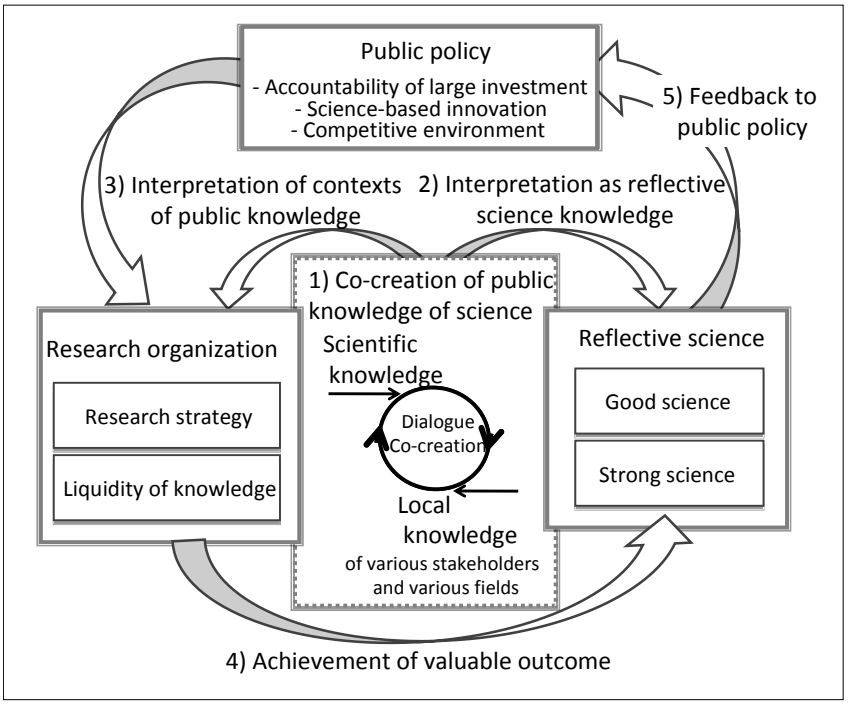


Fig-4.Social co-creation process of reflective science

6. Conclusion

Exploring the phenomena of organizational science communication, the study found that science communication is a crucial factor not only in communicating science, but also in reflectively constructing research activities and strategies for research organizations. Due to the recent new mode of science-driven R&D and innovation, scientists are constantly involved in multi-disciplinary collaborative and strategically organized research projects driven by publicly contextual concepts rather than individual excellence. There has been a simultaneous increase in the importance of public accountability of scientific research. Such a situation directly requires scientists, not the PR staff, to reinforce communication with the public in various ways, from multi-channel strategic PR to local collaborative dialogue, to survive this mode change. The study conducted an empirical investigation to consider this crucial problem, and constructed a theoretical model of organizational science communication as a social process in which research activities are made more reflective by being open to the public.

In the future, more case studies especially in the other fields of ICT should be conducted to refine the model. Investigating in detail what reflective science really is and the nature of its creation process is suggested.

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