M. Strano, H. Hrachovec, F. Sudweeks and C. Ess (eds). Proceedings Cultural Attitudes Towards Technology and Communication 2012, Murdoch University, Australia, 244-258.

COLLECTIVISM AS POTLATCH IN THE NETWORK AGE

TOSHIKAZU IITAKA
Faculty of Economics, Kumamoto Gakuen University
Oe 2-5-1, Chuo-Ku, Kumamoto 862-8680, Japan

Abstract. This paper is about collectivism in the network age. Many previous studies about network society consider collectivism to be an important factor for innovation in the network age. However, a few studies about *seken* focus on the negative effects of collectivism. Both approaches focus on the tradition of exchanging or giving gifts, called potlatch or gift culture, often observed in pre-modern communities. This tradition is considered a significant aspect for frequent networking, including innovative action on the web. This paper works to confirm this function of potlatch.

1. Introduction

Many studies on the information society indicate that collectivism is becoming more prominent than individualism, and this paper adds to this research by exploring the influence of collectivism.

Studies have referred to flexible network systems in Japanese society and open source communities as good examples of innovative collectivism (Fukuyama 1995). However, we must also analyze the negative side of collectivism, because such analysis can predict future problems in a network society and may help us effectively deal with such problems. Iitaka (2010a), for example, provides such an analysis. Iitaka's study critically focused on the Japanese collectivism named *seken*, and focused on the positive role of individualism for the progress of science. The data analyzed by Iitaka (2008) suggest that individualism is necessary for network innovation and that *seken* has a negative impact on this innovation. Iitaka's (2010a) analysis provides the background for the relationship between *seken* and innovation using networks (participation in open source projects). The data showed us that *seken* relates to the frequent use of networks, so we can guess that such frequent use mediates the relation between *seken* and network innovation.

Iitaka (2010a) estimated that Naoki Sato's *seken* analysis is helpful in examining the relationship between *seken* and use of networks. Sato (2008) pointed out that *seken* contains what we call "potlatch," a trait that makes the exchange of gifts in Japan have some magical significance, and potlatch thus motivates frequent networking among the Japanese. This paper presents the results of the surveys and gives evidence of potlatch's effect. Section 2 will briefly discuss previous studies on collectivism. Section 3 will present the research questions created about potlatch, and Section 4 will detail the surveys employed. Finally, Section 5 will analyze the research questions. This analysis may give us insight into how a better system can be created for Internet communication.

2. Previous Studies

2.1. CONTRAST OF *SEKEN* STUDY AND POSITIVE EVALUATION OF COLLECTIVISM

Bell (1960), the pioneer in information society research highlighted the importance of collectivism. Collectivism in local communities is considered an important foundation of American democracy. In addition to the political influence, collectivism, according to Fukuyama (1995), has economic and technological influence. According to Fukuyama, inflexible regulation is a major barrier to innovation, which needs to use networks that enable the free flow of information. Mutual trust is a significant characteristic of collectivism and helps us avoid relying on inflexible regulations. The lack of mutual trust often results in an inflexible bureaucratic system. Despite technology that realizes flexible networks and innovation, we cannot make use of it while under the influence of an inflexible system.

Fukuyama (1995) also refers to examples of such collectivism in modern society. This paper focuses on two of those examples: one is based on the communities of the Open Source Software (OSS) movement, and the other, on Japanese collectivism. Fukuyama indicates that people can make use of a networking system in these organizations. Lessig (2004) provides details the OSS movement and copyrights in the network age. Like Bell and Fukuyama, Lessig (2004; 2008) focuses on the role of collectivism in supporting the democratic system in a network society. According to Lessig, strict regulation of the web can be a threat not only to democracy but also to innovation. Lessig (2004) also evaluates attitudes of Japanese creators toward copyright. He deals with the example of *doujinshi*-a comic in which authors often borrow characters or stories of other major comics. Lessig refers to a major Japanese event, the comic market in which many *doujinshi* authors come together twice a year. In addition, world famous comic authors like Akira Toriyama often describe comical characters that are parodies of other famous comics or movies. Even when there is little regulation on using another creator's content, many Japanese manga authors are modest enough to not pirate the content. In other words, a mutual trust, or collectivism allows the creators to share useful content. In fact, the success of manga artists in Japan is a product of this cultural background. A literature review will show that previous studies on the information society have focused on the positive side of collectivism. Moreover, they often refer to Japanese culture and the OSS community's culture as proper examples of such collectivism.

In spite of the positive evaluation of collectivism, a few Japanese researchers like Abe (1995) and Sato (2004; 2008) point out that the modern social system is based on Western individualism and the negative side of collectivism. Abe (1995) calls the negative collectivism *seken*. *Seken* is used here to mean the concrete relationships between people that we find in pre-modern communities.

Iitaka (2009) asserts that the concept of *seken* in previous studies is too vague and Iitaka (2009) tries to find a concrete trait of *seken* that clearly has a substantial influence on innovation. The trait that Iitaka (2009) focuses on is the decision-making process within Japanese organizations. According to Sato (2004), people influenced by *seken* tend to make important decisions based on *seken*. Japanese people often make a

decision based on the general feeling among other people and not on the will of the individual. When trying to analyze the Japanese decision making process for serious matters, there is often no rationally understandable reason because the decision is not based on the will of individuals.

According to Sato and Abe, the tradition of confessing is an important aspect of modern individualism. Confession compels people to prepare for explaining the basis of their decisions to a priest who lies outside of the concrete relationship (*seken*). Therefore, Iitaka (2010a) states that it is natural that Western people tend to prepare a rationally understandable motive for the important things they do. He named this the *confession model*. The *confession model* encourages people to explain to others the reason behind an important decision and the Western trait of being responsible for decision making is supposed to be based on this model.

Iitaka (2009) first pointed out the significance of the *confession model* for scientific progress and innovation. He compared *seken*'s trait with the *confession model* from the viewpoint of the philosophy of science. According to this line of thinking, scientific progress takes place when open critical discussion replaces an older false theory with a newer, more comprehensive one(this is called *open model*). In this case, the new theory has to comprehend the accurate parts of the old theory and explain more aspects than the old one. This means that the new theory has to explain why the old false theory appeared to be true. Hence, researchers must explain the reasons behind their decisions to support the old false theory from the viewpoint of the new theory when they change their opinions and support the new one. In the absence of this decision-making process, progress is theoretically impossible if we define scientific progress as the increased comprehensiveness of shared systematic information. This assures us of a strong bond between individualism and modern science, which can progress rationally.

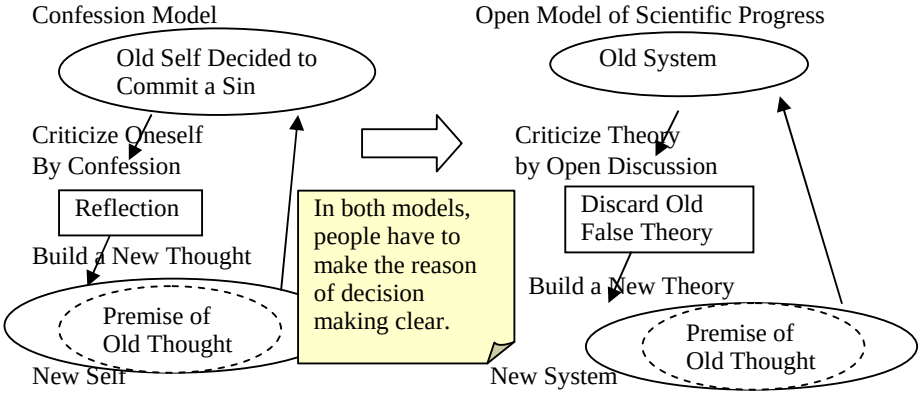

Figure 1. Open Model of Scientific Progress and Confession Model.

People influenced by *seken* do not make their decisions according to the *confession model*. Their decisions are often made based on the mood of *seken*, so we can easily estimate that the lack of individualism and the strong influence of *seken* have

an adverse effect on scientific progress and innovation. Though many studies on information societies emphasize the importance of collectivism, the problem with individualism, and the necessity of sharing information, individualism is theoretically necessary for the progress of science and innovation because of the need to share information.

2.2. SURVEYS ON COLLECTIVISM AND NETWORKING

Iitaka (2008; 2009; 2010a) has tried to investigate the effects of individualism and *seken* on innovative action within network. This research considers the sharing of information and participation in OSS communities as innovative actions as do the other studies on information societies. These papers refer to a questionnaire survey administrated to software researchers and developers. They examine the influences of individualism and collectivism on the sharing of information and participation in OSS projects.

Many questions about collectivism are intended to measure attitudes towards decision making and concern for others to facilitate smooth discussions. Iitaka (2008) and others have defined two different collectivisms. One is named "criticism and politeness" and is the trait in which people try to be polite in order to realize smooth scientific communication, though they try to make the reason for their decision clear at the same time. The other is named "seken," whereby people tend to not be responsible for their decision making and instead follow the general mood of *seken*. This variable is also composed of others-oriented attitudes and tendency to neglect the importance of explaining one's own opinions and decisions. Furthermore, a factor analysis indicated that there is a common background factor behind these attitudes and tendencies. This variable is used in the analysis discussed in Section 3. Therefore components of this variable are similar to what is shown in Table 2 in Section 3. We also measure what is defined as the positive side of individualism in *seken* studies. This is called "independent" and is distinguished from "egoism."

Iitaka (2008) investigates the relationship between individualism and collectivism, their influences on information sharing, and participation in the OSS project. Three different types of participation (starting up an OSS project, modifying documents or source codes and reporting bags) are measured in the surveys.

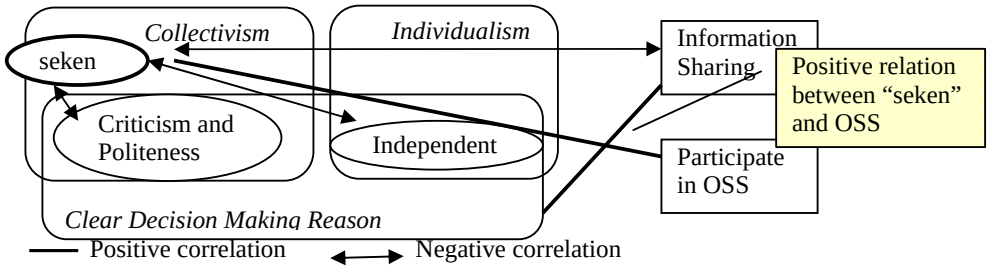

Figure 2. Relationship between Variables.

Figure 2 shows us that the relationships between the variables of collectivism and individualism were just what the theoretical studies expected. "Seken" related

negatively to “criticism and politeness” and “independent,” which were expected to measure the trait of clear decision making. Variables of clear decision making related positively to information sharing, which is considered to be a major foundation for innovation in the network age. However, counter-intuitive results were also received: “seken” related positively to participation in OSS projects. There is little difference between the three different kinds of participations. Figure 2 shows the three kinds of participations using single item “Participate in OSS.” *Seken* is expected to have a negative effect on innovation, so we have to be wary of its negative influence on innovative actions using networks such as OSS.

We investigate the background of this counter intuitive relationship. When the partial correlation coefficient between “seken” and participation in OSS is controlled by the frequency of network use, there is little correlation between the two, and is thus not direct. “Seken” relates to the frequent use of the network as does participation in OSS and they seem to relate to each other. Despite this, based on the results of a multiple regression analysis, we estimated that the trait of hiding the reason of decision making itself does not have a direct influence on participation in OSS. This result shows us that we can try to avoid the negative effects of *seken*, because the relationship between *seken*’s poor decision making and innovation on the web is not direct. Though the relationship between *seken* and participation in OSS is indirect, this relationship may cause serious problems because the data shows that the *seken*’s way of decision making actually tends to be found in network development, this indirect relation therefore must be analyzed and a way to avoid negative effects needs to be identified.

Iitaka (2010a) implied that Sato’s (2008) study helps in analyzing this indirect relationship. People in Japan tend to greet each other by exchanging letters or gifts, even if they have nothing to talk about. Gifts or letters have a magical meaning. Sato (2008) pointed out that Japanese people are compelled to do it because they are excluded from *seken* if they do not. This practice is defined as a component of the culture of *seken.* Iitaka called this practice potlatch. A typical example is when, on Valentine’s Day, Japanese women often distribute chocolates to each of their male coworkers including those with whom they seldom interact. Sato (2008) says this tendency leads to Japanese heavy net users exchanging many meaningless messages.

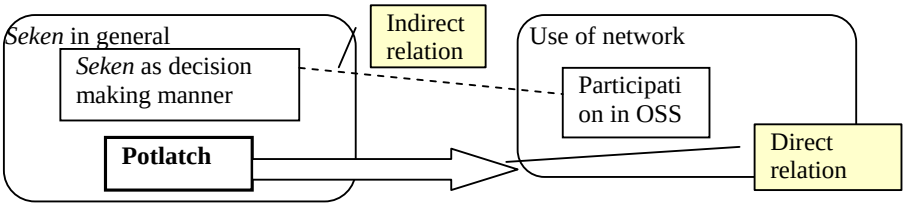

Figure 3. Relationship between *Seken*’s Components and Innovation on Web.

Hence, the relationship illustrated in Figure 3 is to be expected and analyzing this relation will give us further insight into avoiding *seken*’s negative influence.

3. Research Questions

As the last section indicated, the effect of potlatch on networking has to be examined. Before this can be done, the influence of *seken* on general net users also has to be shown because potlatch seems to affect frequency of Japanese networking generally, though Iitaka (2010a) only showed data from engineers and researchers. Next, the correlation between potlatch and *seken* must be analyzed to confirm the validity of the variable "potlatch."

Two surveys were conducted. The first targeted software engineers and researchers, and the second targeted general Japanese net users. The results of the surveys were briefly introduced in Iitaka (2010b; 2011), but this paper will focus on the influence of potlatch in detail. Before we began analyzing the survey results, the following two research questions were prepared:

RQ1 *How does seken correlate to general net use?*

RQ2 *How does potlatch correlate to networking?*

First, we develop hypotheses related to RQ1. To investigate *seken*'s overall effect, we need to check the influence of *seken* on general net users. Therefore, we need to verify the following hypothesis in order to confirm *seken*'s effect.

H1 *"Seken" relates positively to the frequency of general net users use such as exchanging messages on a web site.*

Second, we develop hypotheses related to RQ2. According to Sato (2008), potlatch is a component of *seken*. Thus, *seken* must include both potlatch and *seken*'s manner of decision making defined as a variable, "seken," in this paper. If this assumption is correct, "potlatch" must positively relate to "seken." If Sato's (2008) argument is correct, the main background for a positive correlation between "seken" and networking is "potlatch." Thus, the following hypotheses must be verified.

H2 *"Potlatch" relates positively to frequency of network use.*

H3 *If correlation between "seken (seken's way of decision making)" and frequent use of network is controlled by "potlatch," there would be little correlation. (the partial correlation coefficient would be under 0.2).*

Frequency of networking in H2 and H3 will be measured from multiple perspectives using the same questions as in the surveys of Iitaka (2009). In addition, new questions have been added in order to measure the frequency of participation in innovative actions described by Lessig (2008), among other.

4. Description of Surveys

Before analyzing the results, this paper describes the survey process and presents the survey results. These surveys were performed twice. The first survey targeted engineers and researchers and was performed on July 22- 24, 2010. The second survey targeted general net users and was performed on September 14-15, 2011. The distribution of the surveys is as follows:

Table 1. Gender Distribution and Age Distribution.

	Survey 1	Survey 2
Female	67 (13.4%)	219 (43.8%)
Male	433 (86.6%)	281 (56.2%)

	Survey 1	Survey 2
10-19	4 (0.8%)	2 (0.4%)
20-29	52 (10.4%)	58 (11.6%)
30-39	210 (42%)	155 (31%)
40-49	188 (37.6%)	169 (33.8%)
50-59	44 (8.8%)	75 (15%)
60+	2 (0.4%)	41 (8.2%)

From Table 1, we can see that the distribution for Survey 1 is similar to that of the surveys conducted by Iitaka (2009; 2010a); for example, there are many more men than women and more people in their 30s than any other age group. The distribution of Survey 2 is slightly different. Among the sample of Survey 2, there are also more men at (56%) and more respondents were in their 40s than in any other age group.

Table 2 shows the questions used in the surveys. However, this paper uses the same groups of questions as that in Iitaka (2010a). Hence, we omit descriptions of these groups (the components of "seken" in Survey 1). However, Survey 2 tries to measure "seken" among Japanese net users in general, so Survey 2 asked two groups of questions not related to software development, but which corresponded to the questions in Survey 1 about attitudes toward software development (the questions are for measuring "seken"). The first group is "about attitudes toward criticisms and arguments" and the second group is "about attitudes toward work."

In addition, the surveys also include new questions that examine the research questions for both surveys. We first need to measure the frequency of net use by general users. We asked questions about the frequency of exchanging messages on forums and other types of communication. We categorize this group of questions as the third group. Among the questions of the third group, Q10 and Q11 are what Lessig (2008) refers to as typical innovative actions on the web. Second, we asked questions for examining potlatch; we categorize them as the fourth group "questions about everyday life."

Table 2. Questions.

	Text	Abbreviation	Group
Q 1	Not to ask anything and to pretend to agree is a good way to avoid trouble.*	Not to ask.	1st
Q 2	It is burdensome to answer the question about my work (a project).*	Burdensome.	1st
Q 3	If I do not work hard, other members will cover for me.*	Cover for me.	1st
Q 4	I think explaining my work to a nonprofessional is unproductive.*	Unproductive to explain.	1st
Q 5	When nonprofessionals ask me many questions, it is because they do not trust me.*	Distorted professionalism.	2nd
Q 6	To explain the reason for failure in detail is irresponsible.*	Explaining is irresponsible.	2nd

Q 7	The damage to my reputation because of failure is more important than damage to the project.*	Too much regard for reputation.	2nd
Q 8	Provide information in forum or mailing list about business.	Provide business information.	3rd
Q 9	Ask questions in forum or mailing list about business.	Business question.	3rd
Q 10	Create original image file and distribute it on web.	Original image.	3rd
Q 11	Create original audio file and distribute it on web.	Original audio.	3rd
Q 12	Start up OSS project**	Start up OSS	3rd
Q 13	Write or modify document and source code of OSS**	Modify OSS	3rd
Q 14	Report on the bugs etc to the OSS forum or mailing list**	OSS bugs	3rd
Q 15	Agreeing to the idea that to distribute chocolates on Valentine's day is common sense for women.	Distribution of chocolates.	4th
Q 16	Send many new year's greeting cards with little content.	Little content greeting.	4th
Q 17	Being worried about alienation because of not sending new year's greeting cards.	Worries about not sending .	4th
Q 18	Sending meaningless emails or letters because of worries about alienation.	Meaningless messages.	4th
Q 19	Being worried about making others feel uncomfortable by not responding to letters or emails immediately.	Respond immediately.	4th
Q 20	Agreeing to the idea that users have to send some response to messages on the web immediately, even when they have nothing to write.	Respond to online message immediately.	4th
Q 21	Agreeing that the idea to not respond some person's message means criticizing or denying them.	No response means denial.	4th

*Asked only in Survey 2, but similar correspondent questions are asked in Survey 1.
**Asked only in Survey 1.

The responses to questions in Table 2 and in Iitaka (2010a) were measured on a 4 or 5-point scale. The data are presented on an interval scale and analyzed using SPSS.

5. Examine Research Questions

5.1. VALIDITY AND RELIABILITY

To ensure that potlatch really exists as a component of *seken*, we need to test the validity and reliability of "potlatch" variables, and factor analysis is the best way to achieve this. After the analysis, the reliabilities of each factor are measured. The correlation between "potlatch" and "seken," which is created the same way as Iitaka

(2010a), described. Here, “Seken” refers to the tendency to make decisions in an irresponsible manner by following the mood of the community and not necessarily having rationally understandable reasons.

Before we check the validity and reliability of “potlatch,” we have to verify that the same tendency of “seken” that Iitaka (2010a) confirmed. The reliabilities of “seken” in both surveys are measured and confirmed to be sufficient (Survey 1: α = 7.61, Survey 2: α = 7.16). The components of “seken” in Survey 1 are identical to those in Iitaka (2010a), but the latter only targeted software engineers and researchers. Survey 2 includes general net users, so the questions in Survey 2 are slightly different from that of Survey 1, even though the former is similar to the latter and measures the same traits. The variable “seken” in Survey 2 is the average of the answers to Q1 -Q7. Because these questions are slightly different from those in Survey 1, we have to check the validity of “seken” in Survey 2.

The validity of “seken” in Survey 2 is confirmed the same way as in Iitaka (2009), by measuring the correlation of individualism and responsibility for decision making (see Figure 2). The correlation coefficients between “seken” and these variables are negative. Though there were no clear negative correlations ($-0.2 < r < -0.1$), the results were statistically significant ($p < .05$).

In addition, the software engineers and researchers who were the targets of Survey 2 are extracted and compared with the targets of Survey 1. We cannot find any statistically significant difference between “seken” in Survey 1 and that in Survey 2 ($F(1,547) = 0.318$, n.s.). Therefore, this paper considers the variable “seken” to be valid in Survey 2.

Now we can try to describe “potlatch.” We try to examine the factors from the fourth group. As the first step, we perform a factor analysis on the fourth group, and we identify two different factors. One factor is estimated to be the basis for the “distribution of chocolates,”“little content greeting,”“worries about not sending,” and “sending meaningless messages.” The other is the basis for the “worries about not sending,” “meaningless messages,”“responding immediately,” “responding immediately to online messages,” and “no response means denial.” The two factors are similar to each other, but the second seems to be more influential in online communications. Thus, we call the first factor “potlatch offline,” and the second, “potlatch online.”

We thus determine the reliabilities of “potlatch offline” and “potlatch online.” The reliability of “potlatch offline” is considered to be sufficient (Survey 1: α = 0.797, Survey 2: α = 0.722). The reliability of “potlatch online” is also sufficient (Survey 1: α = 0.85, Survey 2: α = 0.845).

We then create two different variables. The first variable is the average of the answers to “distribute chocolates,” “little content greeting,” “worries about not sending” and “meaningless messages.” The second variable is the average of the answers to “worries about not sending,” “meaningless messages,” “respond immediately”, “immediate online response” and “no response means denial.”

We have to check the validity of these two variables and the best way to examine the validity is to verify the positive correlation between “seken” and both the online and offline “potlatches” because both “seken” (*seken*'s manner of decision making) and potlatch are components of *seken* in its most complete meaning.

Table 3. Correlations between potlatch and *seken*.

	Survey 1				Survey 2			
	Mean	SD	Potlatch online	Seken	Mean	SD	Potlatch online	Seken
Potlatch offline	2.465	0.571	0.740***	0.524***	2.448	0.448	0.758***	0.335***
Potlatch online	2.615	0.558	-	0.433***	2.548	0.485	-	0.351***
Seken	2.714	0.352	-	-	2.715	0.242	-	-

*** p <.001

Table 3 shows that "potlatch" correlates positively to "seken," and thus, we verify the validity of the "potlatch" variables. In addition, skewness and kurtosis of the variables ("seken,", "potlatch online," and "potlatch offline") were all between -2.0 and 2.0.

5.2. RESEARCH QUESTION 1

In order to check RQ1, we have to analyze the relationship between "seken" and general net use. The result of the analysis in Survey 1 is similar to the results found by Iitaka (2010a) and other researchers, because the targets and contents are the same (see Table 4 and Figure 3). The results of Survey 2 are more important for RQ1, because the targets of Survey 2 are actually general net users.

When we analyzed the data from Survey 1, the result was as expected. We got almost the same result as that of Iitaka (2008; 2009; 2010a). There are weak but clear positive correlations between "seken" and the frequency of participation in open source movements and networking in general.

Table 4. Correlations between "seken" and networking.

	Start up OSS	Modify OSS	OSS bugs	Provide business information
Seken(Survey1)	0.292***	0.325***	0.266***	0.268***
Seken(Survey2)	-	-	-	0.113*

	Business question	Original Image	Original Audio
Seken(Survey1)	0.238***	0.273***	0.307***
Seken(Survey2)	0.122**	0.134**	0.163***

* p < .05, ** p < .01, *** p < .001

We have to analyze the results of Survey 2 in order to verify H1. From Table 4, we can see that the tendency is similar to that of the analysis of Survey 1. There is no clear positive relationship between "seken" and the frequency of networking, but there are statistically significant positive correlations. The results show that the tendency of positive relations between "seken" and networking is not particular to software developers. It is a tendency of Japanese net users in general. Even when the correlation is controlled by " whether the respondents are software developers, the positive

correlation between "seken" and the frequency of networking is still statistically significant. H1 is not perfectly verified, but we can get the result that may support H1.

5.3. RESEARCH QUESTION 2

As Iitaka (2010a) mentioned, "potlatch" is expected to mediate the relationship between "seken" and the frequency of networking. This will be verified by examining RQ2. H3 is especially adequate for verifying the effect of "potlatch." We have to check if "potlatch" itself really has the effect that Sato (2008) mentioned by verifying H2.

According to H2, "potlatch" must relate positively to the frequency of networking.

Table 5. Correlations between "potlatch" and networking in Survey 1.

		Start up OSS	Modify OSS	OSS bugs	Provide business information
Survey1	Potlatch off line	0.392***	0.361***	0.309***	0.271***
	Potlatch on line	0.304***	0.305***	0.245***	0.247***
Survey2	Potlatch off line	-	-	-	0.267***
	Potlatch on line	-	-	-	0.265***

		Business question	Original Image	Original Audio
Survey1	Potlatch off line	0.244***	0.312***	0.393***
	Potlatch on line	0.219***	0.260***	0.329***
Survey2	Potlatch off line	0.291***	0.170***	0.268***
	Potlatch on line	0.230***	0.230***	0.264***

*** p < .001

As Table 7 details, both "potlatch online" and "potlatch offline" relate positively to the frequency of networking in both surveys. Therefore, we can say that H2 is verified.

Next, we precisely check the influences of "potlatch online" and "potlatch offline" on the frequency of networking by using the multiple regression analysis.

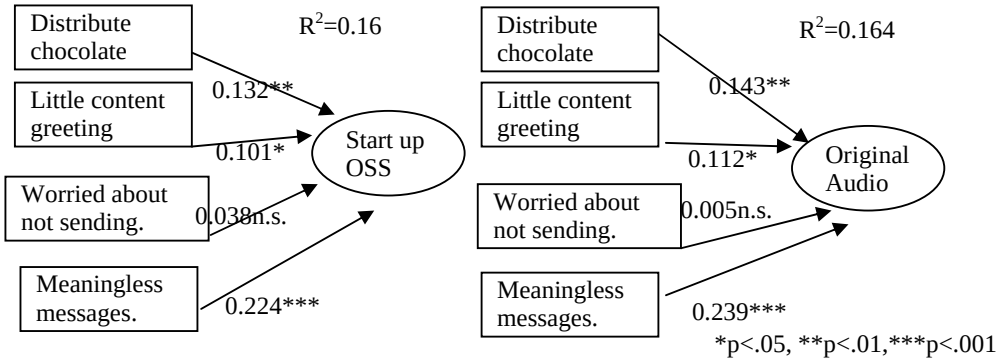

Figure 4. Influence of "potlatch offline" on action on web in Survey 1.

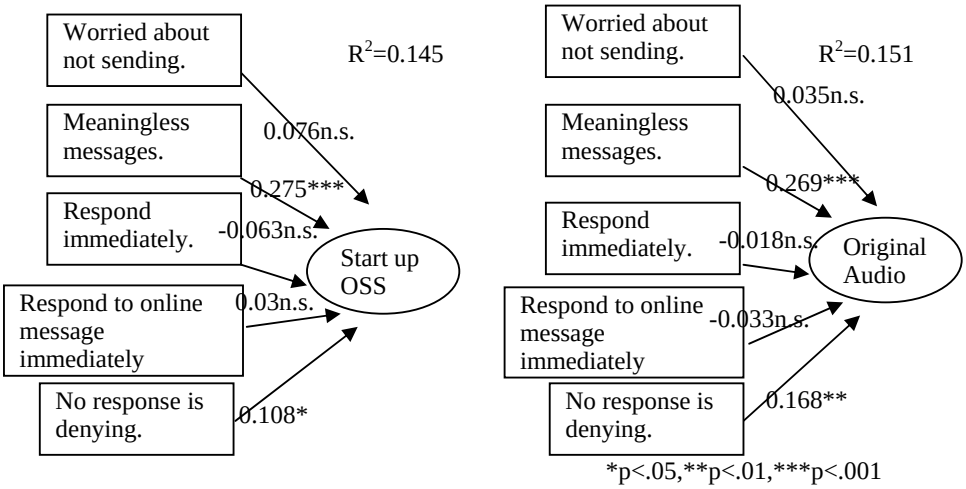

Figure 5. Influence of "potlatch online" on action on web in Survey 1.

Though this paper does not have enough space to describe the full analysis, typical cases are shown in Figures 4 and 5. When we review the results of the analysis, we can estimate that both "potlatch online" and "potlatch offline" have positive influences on the frequency of networking in general including innovative actions such as working with OSS and distributing original audio files because the regression functions are statistically significant($p < .001$).

Though R^2 tends to be higher in Survey 1, the outcome of Survey 2's results are similar to those of Survey 1 and so we can guess that potlatch has a general influence on networking. Among the components of "potlatch online" and "potlatch offline," "meaningless messages" consistently has a positive influence on networking.

Now we verify H3. According to H3, the relationship between "seken" and networking must be mediated by "potlatch." In order to check H3, we have to control the correlation between "seken" and the frequency of networking by potlatch.

Table 6. Correlations between "seken" and networking controlled by "potlatch online" and "potlatch offline."

	Start up OSS	Modify OSS	OSS bugs	Provide business information
Seken (Survey1)	0.109*	0.167***	0.126**	0.149**
Seken (Survey2)	-	-	-	0.010n.s.

	Business question	Original Image	Original Audio
Seken (Survey1)	0.129**	0.132**	0.103*
Seken (Survey2)	0.013n.s.	0.060n.s.	0.067n.s.

*p<.05, **p<.01, ***p<.001

When Table 6 is compared with Table 4, we can easily see that potlatch mediates the positive correlations between "seken" and networking because the correlations get weaker when they are controlled by potlatch. All controlled correlations are all under 0.2 (no relation), so we can say that H3 is verified.

After we check RQ2, we can estimate that Sato's (2008) argument was correct. Potlatch is an essential basis for networking in Japan; therefore, we need to investigate how to deal with potlatch if we wish to promote innovative actions on the web.

5.4. ADDITIONAL ANALYSIS

From Tables 4 and 6, we can see that the correlation between collectivism and networking in Survey 1 tends to be stronger than that in Survey2. We can thus estimate that people who are proficient in networking are influenced more by collectivism in terms of innovative action using networks. This section tries to show the probability of this estimation by briefly checking the interaction between proficiency (when the respondent is a software engineer or researcher, he or she is defined as "high proficiency") and collectivism. Therefore, we perform a two-factor ANOVA on the data from Survey 2.

Before we perform an ANOVA, the independent variables of collectivism need to be modified to simplify the analysis. Three variables of collectivism, "potlatch online," "potlatch offline," and "seken," are all averages of answers to 5 point scale questions in Table 2. Therefore, scores between 1.0 and 2.5 are defined as a low score; scores between 2.5 and 3.5 are defined as a middle score; and scores over 3.5 are called high score. This analysis considers "Original Audio" in Table 2 as a typical innovative action on the web, because Lessig sometimes referred to sharing MP3 files as an example of this kind of action.

The effect of the interaction between collectivism and proficiency on innovative action using networks is then checked by an ANOVA. The analysis shows no statistically significant interaction between proficiency and "seken" ($F(2,494) = 1.931$, n.s.). On the contrary, significant interaction between "potlatch online" and proficiency is confirmed ($F(2,494) = 3.383$, $p < .05$) and also significant interaction between "potlatch offline" and proficiency is confirmed ($F(2,494) = 3.333$, $p < .05$).

Finally, we analyze how the interactions affect "Original Audio."

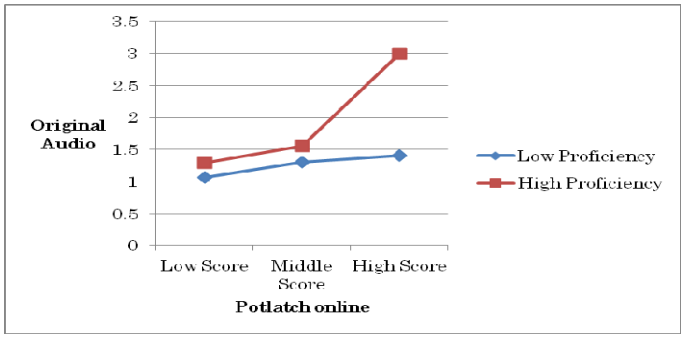

Figure 6. Interaction between "potlatch online" and proficiency.

We first check the "potlatch online." Respondents with a middle score for "potlatch online" tend to create and distribute original audio, when they are in the high proficiency group ($F(1,494) = 8.029$, $p < .01$). Furthermore, respondents with high scores tend to create and distribute original audio when they are from the high proficiency group ($F(1,494) = 9.590$, $p < .01$). Among respondents with low proficiency, people with a middle score for "potlatch online" tend to create and distribute original audio more often than people with a low score for "potlatch online" ($F(2,494) = 12.962$, $p < .001$). Among respondents with high proficiency, people with a high score for "potlatch online" tend to create and distribute original audio more often than people with any other score of "potlatch online" ($F(2,494) = 6.192$, $p < .01$). The last result must be the most important, because the effect is very significant, as shown in Figure 6. Therefore, "potlatch online" may reinforce the innovative action on the web for people with high proficiency.

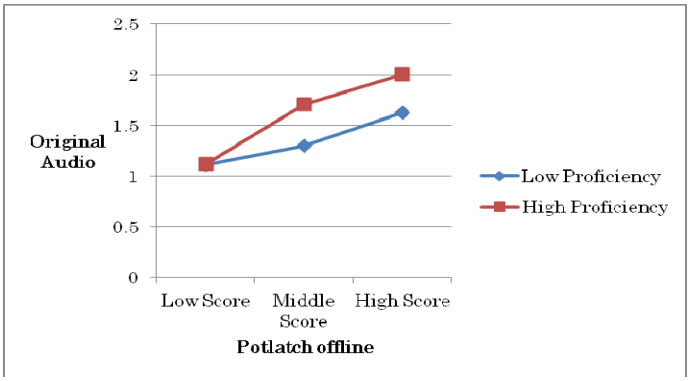

Figure 7. Interaction between "potlatch online" and proficiency.

We then check the "potlatch offline." Respondents with a middle score for "potlatch offline" tend to create and distribute original audio, when they have a high proficiency ($F(1,494) = 19.285$, $p < .01$). Respondents with low proficiency tend not to create and distribute original audio, when their score for "potlatch offline" is low ($F(2,494)$, $p < .001$). Further, among respondents with low proficiency, people with a low score for "potlatch offline" tend to create and distribute original audio less often than people with a middle score for "potlatch offline" ($F(2,494) = 8.433$, $p < .001$).

In my opinion, people with a high proficiency can potentially contribute more to innovation using networks than people with low proficiency. The results of this analysis may indicate that "potlatch online" in particular reinforces the effect of proficiency on innovative actions on the web. However, the analysis of the interaction may not be convincing enough, because Survey 1 is not designed to examine this kind of interaction. Therefore, a new survey that can determine the interaction between potlatch and proficiency is needed. The new survey will check the relation between proficiency and contribution to innovative actions on the web from various perspectives. I hope that the analysis in this section will help create a new and more adequate survey in order to determine this interaction.

6. Conclusion: Influence of Potlatch

This paper attempted to provide convincing data on the influence of potlatch on innovative actions using the web. The data provided supports the arguments of Sato (2008), who implied that the trait that makes people feel a magical significance in the exchange of gifts or messages is an important motive for the use of networking and for innovation on the web. We call this trait "potlatch," and it is proven to mediate the positive correlation between *seken* and networking. Previous studies have indicated a negative influence of *seken* on innovation, so the result of this paper was important in order to identify a way to avoid such negative effects. Further research on potlatch and networking will help us find a good way of promoting innovation on the web.

References

Abe, Kinya (1995).*"Seken" Towa Nanika*, Tokyo:Koudansha Publisher.

Bell, Daniel (1960). *The End of Ideology*, Illinois: The Free Press of Glencoe.

Fukuyama, Francis (1995). *Trust*, New York: The Free Press.

Iitaka, Toshikazu, (2008). On influence of Japanese interdependencies to open source software, Journal of Information and Media Studies, 6(1), 1-17.

Iitaka, Toshikazu (2009). Network Jidainiokeru "Kojinsyugi" to "Syuudansyugi", doctoral dissertation, University of Tsukuba.

Iitaka, Toshikazu (2010a). Open Source, Collectivism and Japanese Society, The Conference Proceedings for CATaC2010, Murdoch University, pp. 357-371.

Iitaka, Toshikazu (2010b). On Japanese Interdependency and Innovation Using Network, The 31st Conference of JSIM.

Iitaka, Toshikazu (2011). Research and Analysis on the "Potlatch" in the Open Source Community, The 28th Conference of the Japan Society of Information and Communication Research.

Lessig, Lawrence (2004). *Free Culture*, New York: The Penguin Press.

Lessig, Lawrence (2008). *Remix*, New York: The Penguin Press.

Lih, Andrew (2009). *The Wikipedia Revolution*, New York: Aurum Press.

Popper, Karl R. & Nagao, R. (Eds) (1994). *HirakaretaSyakaiNoTetsugaku*: Tokyo, MiraiSha.

Raymond, Eric S. (1999). The Cathedral and the Bazaar, Raymond, Eric S., *The Cathedral and the Bazaar*, O'Reilly, pp. 19-63.

Sato, Naoki (2008). *Bousou Suru "Seken"*, Tokyo: Basilico Publisher.