
Information networks of Open Data promotion in Local Governments of Japan

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Local Governments, Open Data, Information Network, Scale-free network, Regional bond

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Abstract:

Public data collected or possessed by administrative agencies and subsequently released as Open Data is expected to bring about positive economic effects. The purpose of this study is to obtain findings contributing to the Open Data promotion in Japanese local governments. We conducted WEB questionnaire survey and obtained information networks of Open Data promotion in local governments. The network in the open data personnel had different characteristics from those of the WEB reference relationship network in the degree distribution. It shows those two networks have different structures. This result can be indicative that the regional binding plays an important role in the information network.

Introduction

Open Data, publishing public data which governmental agencies collect and hold in the form easy-to-secondary-use, are expected to have a significant economic effect. On 22th Dec 2016, the council of industrial structure in the Ministry of Economy, Trade and Industry of Japan (which is discussing the strategy of growth) has decided to consider making new mechanisms for companies to utilize big data that the central government and local governments obtain in the traffic and medical fields etc (NHK, 2016). On 20th Jan 2017, Saitama prefecture has created a common format of Open Data in cooperation with 58 municipalities in the prefecture (Nikkei Shimbun, 2017). The common format is important for both promotion and utility of Open Data (Noda et al, 2017). Japan is on the way of Open Data promotion.

In the view of network effect (Katz et al, 1985), the more local governments provide these public data, the values and utilities of each data sets will increase. Open Data initiatives in advanced municipalities bring about certain economic effects, and Open Data can spread to various places throughout the network. In this process, the following local governments get information from advanced ones. Both the estimation of economic effects and findings in the way of spread can help to promote Open Data.

With respect to economic effects by using Open Data, some estimates have been carried out by the governments including the EU Commission and private research institutions, there are also the estimates made in Japan (Jitsuzumi et al, 2013). Noda (2015) carried out a study of the relevant prior research. Subsequently, on the basis of the study results, a questionnaire survey for local governments of Japan was conducted (Yoshida et al, 2016). A comparison of the major previous studies and this study are shown in Table 1. First, this survey aims to estimate the economic effect in line with the current situation of Open Data in Japan. Second, the investigation object is the local government which is a provider of data. Third, the estimation process of the economic effects becomes clear by using a uniform question of WEB questionnaire.

The purpose of this study in the project is to obtain the knowledge how Open Data spread in municipalities of Japan by considering through the network analysis of the answers in the questionnaire how the local governments refer information of each other. Honda et al (2016) have already pointed out the role of advanced cities in Open Data promotion. Especially Sabae city in Fukui Prefecture was referred by other municipalities. In this study, total structures of information networks are analyzed. Municipalities can learn the ways of Open Data on websites by others. They can also get information about Open

Table 1 Comparison with previous researches

	Tasman(2008)	Vickery(2011)	Jitsuzumi(2013)	This Study(2016)
Area:	Oceania	EU	Japan	Japan
Investigation Object:	Use Operators	Use Operators	Use Operators	Data Provider
Data Provider:	All	Public Agencies	Public Agencies	Local Governments
Kind of Data:	Spatial Information	All	All	All
Method:	Interview	applying parameters from Tasman	applying parameters from Tasman	questionnaire(WEB)

(Noda et al, 2017)

Data from personnel in other municipalities. Therefore, this study is going to clarify the difference. It will help us to know how to promote Open Data efficiently.

Method

WEB questionnaire were requested to the persons in charge of Open Data at local governments of Japan which have already implemented Open Data. WEB site for answer were constructed and e-mails of the request for answer were delivered Using the SPIRAL of Piped Bits Co., Ltd. Period was up to 22nd February from 9th February, 2016. The investigation objects correspond with Open Data municipality list of Fukuno (2013) at the time of survey added Atsugi city, 182 local governments of Japan (Table 2). Response rate is at 57.1%, up to 63.5% excluding the administrative districts of major cities.

The main questions in this survey were, percentages and progress degrees of Open Data, the cost at the time of implementation of Open Data, the reduction cost of the past business, and the feeling of personnel. In addition, the use of the data, the possibility of private use, and the network of information propagation about Open

Data in the inter-local government were asked. In the question of the information network, the 182 local governments made up of all subjects presented to the respondent by pull-down menu, to select the appropriate other local government in the order. Specific questions are as follows. If we asked them to answer all informants, it would be too much a load for respondents. It might decrease response rate. Therefore five municipalities were selected in this survey, based on the name generator method in 1985 GGS (Smith et al, 2015).

- “Do you access the following other municipalities’ WEB sites, in the reference of the state of Open Data? Please select five in the order you refer the most.” ... (A)
- “Do you get information about Open Data from personnel of public information at the following other municipalities? Please select five in the order you get the most, including the case you attended a seminar.” ... (B)

Information networks obtained from the two questions¹ of the respondents were compared by degree distributions.

Table 2 Investigation object

	All	Prefecture	City	Major City	Administrative district
All	1963	47	1721	20	175
Request for survey	182	23	115	18	26
Rate of LG with OD	9.3%	48.9%	6.7%	90.0%	14.9%
Number of respondents	104	14	75	10	5
Rate of recovery	57.1%	60.9%	65.2%	55.6%	19.2%

*Included major city in city, Number of City is 1741 (Yoshida et al, 2016)

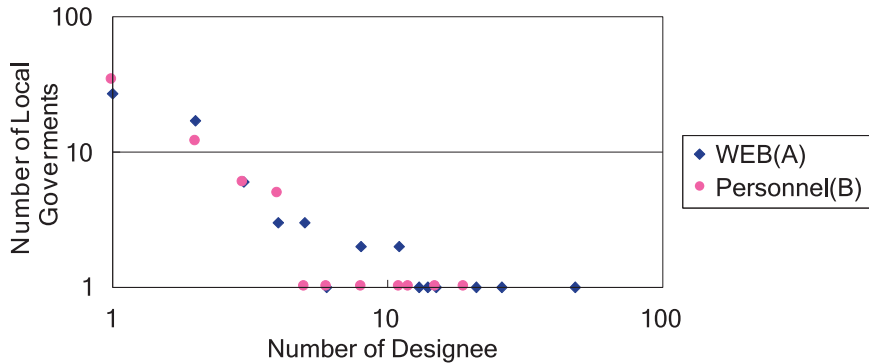


Figure 1 Degree distributions for two information networks

Results

Information networks in the WEB site (A), and in the persons in charge of public information (B) are shown as piled degree distributions (Figure 1). The horizontal axis is the number of nomination (designee) from the personnel at other local government which is incoming degree in the sense that it was chosen by others as the option of the answer, but also is outgoing degree in the sense that it originated the information. Here, it is referred to as the designee number. The vertical axis is the number of local governments. Both of the horizontal axis and the vertical axis are displayed in common logarithm to distinguish the features of distributions.

In the information network of the WEB site, the degree distribution to power approximation is $y=1.5129x^{-0.9128}$ $R^2=0.9748$ (the local governments with no designee² included in the calculation of the approximate curve as designee number 0.1). On the other hand, the information network of the persons in charge of Open Data is calculated

$y=1.898x^{-1.0794}$ $R^2=0.6727$. The coefficient of determination is approximately 0.3 lower than that of WEB network. This also can be seen in Figure 1. The number of local governments with the 5 designees is only 1. The cut-off of normal distribution seems to occur. It is also reflected in the point that the long tail becomes shorter, designee number Sabae city in Fukui Prefecture remains 19 in spite goes up to 48 in the WEB network.

Discussion

Degree distribution of the WEB site of the information network, which fit very well in power approximation with the coefficient of determination 0.9748, can be said to have the characteristics of the so-called scale-free network by Barabási et al. (1999). However, the information network of the persons in charge of public information, the coefficient of determination 0.6727 is approximately 0.3 lower, is presumed to have different properties from the scale-free network.

1 It can also be considered to use WEB reference network in their sites. But they may not link up others even if they referred to them. These ways of asking realize the comparison of the two networks.

2 Those municipalities also constitute networks by nominating others. Nomination has significance when compared with non-nomination.

What are in this back ground? As one of them, there exists a regional binding in the Open Data of the municipalities (Honda et al, 2016). Sabae city in Fukui Prefecture which won the large number of nomination in this study is a pioneering municipality in Open Data and has also grabbed nationwide attention. When other local governments are going to implement the open data, it is a very natural flow to check the WEB site of Sabae city trying to refer to the their efforts. There also would be many local governments that participated in lectures and trying to listen to the person in charge directly. Such reference relationship like scale-free network is considered to exist.

On the other hand, 17 other municipalities in Fukui Prefecture has conducted Open Data at the time of this survey. Municipalities which has already implemented Open Data are at most 182, of the nationwide 1963 local governments as seen in Table 2. Municipalities with Open Data in Fukui Prefecture are 18. This number is the first in Japan except the administrative district of Osaka City. On the flip side, it does not mean that the impact of Sabae city uniformly delivered across the country. It can be said the regional influence has appeared heavily.

Conclusion

Analysis of the details of the regional bond yield to another draft, but in this study, compared the information network of WEB site with the low cost of reference, that of the persons in charge of public information had a less tendency of over-concentration.

This study only showed the difference of distributions in information networks between online and offline, and pointed out the possibility

that regional bonds work well. But aiming to further promotion of Open Data, we should also remember that the regional peer pressure plays one of the important roles, and not limit ourselves by following the success stories of some pioneering local governments.

In the formation of the social network, considering human constraints of time and money, it is also necessary to focus on familiar and homogeneous relationship. Findings of this study may not stay only in the range of Open Data promotion. Future task is to generate them considering peculiarity of Open Data.

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