

# **Empirical Study on the “Social Effects” of Community Currencies<sup>1</sup>**

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## **Abstract**

Since 1980s, Community/local currency systems have drawn attention due to their social effectiveness, and they have been employed in communities worldwide. However, unlike the economic effects measurable to a certain degree by indicators such as the volume of currency circulation, the social effects brought to the region by community currencies do not have a clear measure for assessment. This paper introduces the concept of social support as one such social effect and explores the ways of measuring it. We used questionnaire survey and social network analysis of transactional records to conduct a comparative case study of two community currency organizations (“Ichi-Muraoka” in Japan and “Bytesring Stockholm (BYTS)” in Sweden).

From the analysis, we find the following with respect to social support provided by community currencies; (1) while the transfer of social support by community currencies are not something that affect the quality of lives of all users in a significant way, it is something that makes users aware that it is surely related to their lives if they become conscious; (2) community currencies are peripheral and supplementary support sources for many local residents and so forth; and this paper asserts that community currencies are effective as a system to provide social support to local residents.

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# 1 Introduction

Community currency is a currency that can be used only in a community or specific region. By limiting the range of circulation, effects such as stimulated consumption, establishment of economic circulation, creation of jobs, and reciprocal network building in the local community are expected, and the number of such organizations operating in Japan is said to be over several hundreds. This does not mean all of them are successful, however, the number of community currencies introduced in Japan surged around the year 2000 at the height of the “Eco-Money” boom<sup>1)</sup>, but among those, only a limited number of organizations were able to set the wheels moving. Currently, many organizations suffer a sluggish or slow growth in the volume of transactions and the high cost of maintenance, and these organizations are forced to suspend or stop their operations after a few years since their inception<sup>2)</sup>. For example, Izumi (2006) found that about 40% of the newly launched organizations out of the 121 organizations in Japan surveyed have halted their activities within one or two years. Based on the current situation of these community currencies, this paper asserts that community currencies are effective as a system to provide social support to local residents through comparative analysis of “Eco Money” organization in Muraoka-town (currently Kami-town), Hyogo prefecture, with the LETS<sup>3)</sup> organization in Stockholm, Sweden, after it discusses the importance of assessing the “social effects” brought by community currencies to the regions and proposes assessment of social support provided to organization members by community currency activities as one of the “social effects.”

There are several systems of community currencies, and this paper focuses on the consumer-to-consumer (C2C) model, which uses a system of exchanging goods and services among organization members. While community currencies using more complex forms, such as the one using the business-to-consumer (B2C) system or those used as a payment for the value of volunteer activities for an unspecified large number of people, are being developed, the most widely used community currency system is presently a C2C model, which is also used in many community currency organizations with problems as we mentioned above.

Now, community currency studies in Japan have rather been concentrated in economics, naturally, as the fact it is called a “currency” suggests. Such examples include the economic anthropologist Makoto Maruyama, who introduced community currencies to Japan through his writings between the latter half of the 1980s through 1990s, and scholars who tried to promote community currencies with Maruyama such as Rui Izumi and Eiichi Morino, who were based on environmental economics. Makoto Nishibe is an evolutionary economist who is advancing theoretical research and conducting social survey of experimental circulation while engaging in the practice of LETS. When we look at the current situation of community currencies, however, the process in which certain effects are brought to the region as a result of transactions is profoundly related to the “social” elements, which obviously cannot be dealt within economics. Of course, these economists have not been ignorant of the “social” aspects of community currencies. Economic

anthropology and environmental economics are positioned in the current of “political economy” and “regionalism” which aim to balance economy and ecology as Yoshiro Tamanoi asserted. This tendency is strongly influenced in its roots by the idea of K. Polanyi who pointed out the presence of value exchange activities in non-market economy based on the principles of reciprocity and redistribution. Makoto Nishibe also stated that community currencies are communication media that have aspects of both “economic media” as a currency and “socio-cultural media” as a language (Nishibe, 2000) and placed this concept at the core of his own community currency studies. However, such theories and approaches advocated by their statements are different in nature from the community currency activities ongoing in parallel in Japan, which empirically explains the “social” behaviors as the realities of community currency activities face various problems.

In sum, researchers of community currencies must establish a “social” approach toward community currencies. An analysis capable of empirically explaining the “social” realities of the process and manner of transactions as well as the nature of effects brought to the region as a result needs to be conducted. As for the former, an employment of new economic-sociology approach can be cited as a candidate (Nakazato, 2007), which analyzes economic activities conducted in current and ongoing social structures, particularly from the viewpoint of “embeddedness” into a social network structure surrounding the actor. This paper addresses the issue of the latter, or the effects brought to the region. The need of assessing social effects is urgent in two senses. First, the boom of community currency introduction in Japan has subsided after the period from 2003 to 2004, and organizations, which were operating under the name of “experimental” circulation, are entering a stage where clarifying the realities of what are actually brought to local communities by using community currencies need to be addressed. Second, visualization of “effects” of their activities has practical meanings for organizations currently under operation as a guideline toward their future activities or a scheme to sustain motivation of operators. However, unlike the economic effects measurable to a certain degree by indicators such as the volume of currency circulation and the speed of circulation, the social effects brought to the region by community currencies do not have a clear measure for assessment. In recent years, an effort to assess social effects of community currencies using the concept of social capital to address this problem is underway (Jacob et al., 2002; Richey, 2007; Kichiji and Nishibe, 2007). This paper, supporting this endeavor, considers the width of the scope handled by the social capital concept and proposes an assessment of social support by limiting the scope covered.

## **2 Community Currencies and Social Support**

Social support is defined as “various aids, tangible and intangible, obtained by a specific individual at a specific point of time from others with whom he/she has a relationship” (Minami et al., 1988). In this case, others are not limited to those engaged in providing support publicly or systematically, such as social workers and medical professionals. This means one ego is receiving

aids in connection with one's physical and mental health from various others with whom they have relationships in their daily lives such as family, neighbors, and friends. Sociological ideas in social support studies can be seen in social integration approach as well as social support network studies. The former consider as important the ego's affiliation and participation in social groups and activities, while the latter emphasizes on the social network structures with multiple others in receiving support. Granovetter's discovery of "the Strength of Weak Ties" (1973) as well as Wellman's introduction of urban-sociological personal network analysis (1979) represent the latter group, and their use of the social network approach (or approach from social network analysis) achieved several important contributions to social support studies from the viewpoint of sociology.

In the past, social support was occasionally cited as a social effect of community currency activities. Community currencies, especially those which focus on social welfare, such as "Eco Money", state that "reciprocal network" building among community residents is their purpose of their activities, and Williams et al. (2001) explicitly use the term of social support network as an effect of community currency activities. However, such terms were not used in a strictly academic sense, and therefore, neither the specific meaning and the way of measurement of "reciprocal network" and "social support network" building nor with what to measure them was clear. In that sense, the field of social support already has accumulated research results both theoretically and empirically, and the theoretical refinement and assessment of "reciprocal network building" and "social support network" become possible by using these results.

Moreover, the introduction of the concept of social support is significant in reconsidering not only "for what it will be effective" but also "to which range of people it will be effective" with respect to community currencies. The results of previous studies reveal that the effect brought to regional economy by community currency activities in modern societies are insignificant, and the area of beneficiaries are to be individual members participating in the activities rather than the local community as a whole with respect to the social effects. Williams (1996), for example, surveyed the LETS organizations in the United Kingdom in his studies and stated that LETS serves as a system for individual participants in making transactions to help improve the Quality of Life (QOL) after he acknowledged that the function and influence of these organizations are small. This paper, supporting this position, is of the opinion that the area of beneficiaries of community currency activities is limited to the members of community currency organizations rather than the local community as a whole, and that community currencies are effective in helping members support their lives psychologically and materially.

### **3 Viewpoint and Hypothesis**

We organized social support network studies theoretically and empirically regarding social effects brought to the regions by community currencies, concerning Nakazato (2006). The brief summary is stated in four points: (1) Classified social support using five types as emotional support

(providing psychological stability and healing), instrumental support (providing goods and services), informational support (providing information such as advice), appraisal support (providing interpersonal appraisal leading to self-verification), social companionship support (providing social affiliations and human connections); (2) employed social network approach; (3) focused on “the strength of weak ties” (Granovetter, 1973); and (4) conducted a questionnaire survey concurrently.

First, as for (1), Nakazato (2006) pointed out, based on the previous studies, that a total of five types of social support could be received as benefits by participation in community currency activities, namely, the four types as classified by House (1981): emotional support, instrumental support, informational support, and appraisal support, plus social companionship support as studied by Rook (1987). This paper adds economic support to this list in order to enable a comparison with economic effects. Table 1 summarizes the opportunities brought by these support.

**Table 1 Types of social support which can be provided by community currency system and the opportunities of providing them**

Types of Support	Opportunity to Provide
Emotional Support	Sympathetic interaction at the time of transactions, effects on emotion brought by goods and services, “insurance-” like effects on emotion brought by affiliation to community currency organizations, effects on emotion by “human relationship” created by transaction activities
Instrumental Support	Receipt of goods and services, goods and services generated by goods and services, receipt of goods and services brought by “human relationship”
Informational Support	Information exchange at the time of transactions, information generated by goods and services, information brought by “human relationship”
Appraisal Support	Appraisal at the time of transactions, appraisal brought by goods and services, appraisal brought by “human relationship”
Economic Support	Saving with legal currency by transactions, economic effects by goods and services generated by goods and services, economic effects brought by “human relationship”
(Social) Companionship Support	Interaction at the time of transactions, creation of “human relationship” by transactions, interaction brought by goods and services, creation of new human relationship by “human relationship,” sense of affiliation to community currency organizations

Next, as for (2), studies on social support networks introduce an analytical concept of a “network,” while they tend to simplify functions of a “network,” e.g., by stating, “the more there are ties, the higher amount of support the ego receives” (Wellman, 1981). “A network is more than the sum of its ties,” a phrase stated by Wellman & Guilia (1999) succinctly expresses the importance of the social network approach in social support network studies. First, the presence of ties does not always bring positive effects to a person's mental and physical health. Ties could bring an impact in a negative sense or a negative support depending on their nature and relational structures. Therefore, the statement “the more there are ties, the higher amount of support the ego receives” is not warranted. Second, multiple ties assume new characters depending on the mutual relationship. Accordingly, the effects of indirect ties not limiting to direct acquaintanceship as well as those of mutual relationship need to be considered. Fortunately, many community currencies are recorded in the form of endorsement on a check, currency, or records of transaction content between a person and another in electronic accounts. An application of social network approach is possible by

depicting the transactional relationship from these transactional records.

“The strength of weak ties” in (3) is a theory proposed by Granovetter (1973) who states that various interpersonal and social resources as well as information resources in particular, held by external groups are brought by “weak” ties, which are otherwise not easily obtainable from a primary group brought together by “strong” ties. In short, “weak” ties are assumed to be bound by “strong” ties, connecting each other among cohesive groups, which retain homogeneous resources while playing a role of circulating heterogeneous resources among the groups. The “strength” of ties are defined in various ways, but Wellman & Wortley (1990) particularly criticized the mainstream definition that measures the “strength” of ties by the frequency of interpersonal contacts because social relationships exist “with high frequency of contacts regardless of individuals’ will as seen in workplace relationship with colleagues” and instead measured its “strength” by three elements of “intimacy” (the degree of being intimate), “voluntary” (the degree of making spontaneous contacts), and “multiplicity” (the degree of contacts made over multiple social contexts) in order to remove such a bias. Interpersonal relationships brought together by community currency transactions lack the “intimacy” and “multiplicity” out of the three elements unless specific conditions are met. A tie of a community currency transaction is therefore a “weak” tie as a basic value, and focusing on the strength of “weak” ties are considered appropriate. This also leads us to the assumption that social support provided by community currencies are, at least in its early stage, not assuming to provide all the social support received by one person in one’s daily life. That is to say that support provided by “weak” ties in community currencies is considered to play a peripheral role, supplementing the support each person receives from one’s primary group.

Finally, as for (4), since social network analysis of transactional relationships alone cannot assess the types of support other than that received from activities outside of transaction activities, instrumental support and economic support, a combined use of questionnaire survey is desirable. In addition, the measurement generally used in the assessment of social support are SSQ (Social Support Questionnaire) by Sarason et al. (1983) measuring the number of ties for receiving support as well as the degree of satisfaction for the support received, ISSB (Inventory of Socially Supportive Behavior) of Barrera et al. (1981) measuring support activities received from the general public, ISEL (Interpersonal Support Evaluation List) by Cohen et al. (1985) measuring the availability of various support for use, and QRI (Quality of Relationships Inventory) by Pierce et al. (1991) measuring social support received from specific people, but this study deals with the issue of social support provided by the systems of community currencies and has set its own question items.

Based on the above consideration, this paper presents the following four hypotheses for the analysis.

**Hypothesis 1: Community currencies can be a means of providing social support.**

**Hypothesis 2: Community currencies are a source of peripheral and supplementary support provided to their members.**

**Hypothesis 3: The advantage of community currencies as the source of social support is in their ability to utilize the strength of “weak” ties.**

**Hypothesis 4: The way the social support is provided by community currencies is influenced by the social network structure among the members.**

## **4 Outline of Survey**

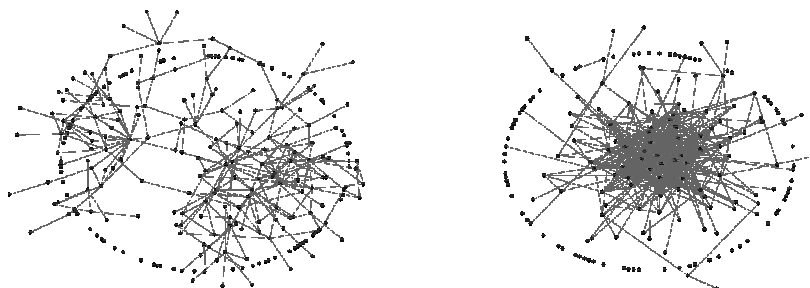
This paper selects the “Eco Money” organization “Ichi-Muraoka” of Muraoka-town, Hyogo, and an LETS organization “Bytesring<sup>4)</sup> Stockholm (hereafter “BYTS”) in Stockholm as case study organizations for survey. “Ichi-Muraoka” and “BYTS” each employs the typical system of “Eco Money” and LETS<sup>5)</sup>. We chose “Ichi-Muraoka” as an example in Japan because, first, “Eco Money” best demonstrates the mainstream way of usage in community currency activities in Japan, which means there is an emphasis on social welfare aspects in comparison with economic aspects while it is a general system, and second, we can examine whether or not the community currency activities can contribute to solving issues of social welfare in modern Japanese society by choosing the aging community as a subject for study. On the other hand, we selected “BYTS” as the subject for comparison for the following two reasons. First, we can verify the responsiveness to socio-cultural environment as well as the generality of the nature of community currency system as a source of social support by selecting a subject location whose socio-cultural environment is widely different from that of Muraoka-town, Hyogo. Second, the LETS with a similar system is an appropriate subject in order to control the conditions of transaction systems in conducting a comparative analysis.

Muraoka-town is a mountain village undergoing depopulation with an area of 165.66 km<sup>2</sup> and population of 6,117 (according to the 2005 census) where there is only one to two daily bus services every hour, and “Ichi-Muraoka” has been operated there by Muraoka-town Council of Social Welfare (currently the Kami-cho Council of Social Welfare, Muraoka Branch) since 2002<sup>6)</sup>. “BYTS” is a community currency organization with the oldest history in Sweden, which was established in 1992 by importing the LETS to Europe what was developed in Canada in 1983. Stockholm is a metropolitan area with an area of 6,519.30 km<sup>2</sup> and population of 1,918,104 (as of December 31, 2006 according to Statistiska centralbyrån) with a developed subway network, and “BYTS” is operated there in the form of a non-profit organization<sup>7)</sup>.

First, we collected the transactional records for transaction network analysis from December 2002 to March 2006 for “Ichi-Muraoka” and from January 2002 to December 2005 for “BYTS.” The transaction records show that the average annual circulation volume of “Ichi-Muraoka” to be 283.43 (times) and circulation volume of “BYTS” to be 256.25 (times) with the annual circulation amount of 32,360.25 byts (approximately 500,000 yen).

These figures demonstrate that the contributions to the regional economy by “Ichi-Muraoka”

and “BYTS” are small when we limit the analysis to the economic aspect. We also draw transactional network graph by making user by user’s transactional matrix based on the records (Figure 1). In this graph, a vertex indicates a member and a line indicates a trading relationship.



**Figure 1 Transactional network graphs of the two organizations**  
(Left: “Ichi-Muraoka”; Right: “BYTS”)

Furthermore, we conducted questionnaire surveys for “Ichi-Muraoka” during March–April, 2006, and for “BYTS” during July–August, 2006, and obtained 119 responses (54%) from 220 members of “Ichi-Muraoka” and 65 responses (80.2%) from 81 members of “BYTS.” Table 2 shows the membership structures of both organizations.

**Table 2 Composition of two organizations**

		N	%			N	%
“Ichi-Muraoka”	Sex	Male	42	35.3	Occupation	Full-Time	23
		Female	75	63.0		Housewife (Husband)	33
	Age	25-44	3	2.5		Both Housewife (Husband) and Part-Time	5
		45-64	24	20.2		Retiree	22
		65-74	45	37.8		Others	22
		75-	43	36.1			
			N	%		N	%
	Sex	Male	16	24.6		Full-Time	11
		Female	49	75.4		Part-Time	13
“BYTS”	Age	25-44	16	25.8	Occupation	Self-employed	6
		45-64	26	41.9		Unemployed	2
		65-74	18	29.0		Pensioner	25
		75-	2	3.2		Receiving Sickness Benefits	3
						Students	1

The ratio of female users is high in both organizations, and the elderly are the main users in “Ichi-Muraoka,” which suggests that there are many latter-stage users.

## 5 Results

### 5.1 Possibility of community currencies in becoming the means of providing social support

First, we investigate whether or not the use of community currencies generates transfers of social support. The following two question items are used in conducting this analysis: (1) “How



satisfied are you overall about the following support you presently receive from others?” (On the scale of one to five from “not satisfied at all” to “very satisfied” toward “the degree of satisfaction for the support received in daily lives”) and (2) “How helpful is the support of < the name of the community currency > to you?” (On the scale of one to five from “not helpful at all” to “very helpful” toward “the degree of support received through participation in community currencies”). And, these two questions asked about the six types of support, which we mentioned above. The terms used in questions are as follows. “Emotional support such as giving affection, a sense of security, entertainment” (emotional support), “active and instrumental support doing something or transferring something for the recipient “ (instrumental support), “informational support giving a piece of advice or teaching something” (informational support), “appraisal support by praising or showing appreciation” (appraisal support), “economic support giving money or helping cost saving” (economic support) or “connection support increasing the number of acquaintance or spending time together” (companionship support).

The results of the factor analysis (Principal Factor Method and Varimax Rotation) conducted with members of “Ichi-Muraoka” and “BYTS” in response to items (1) and (2) are shown in Table 3. We can confirm in “Ichi-Muraoka” the single-factor structure, which includes all six types of support with respect to both “the degree of satisfaction toward the support received in daily lives” and “the degree of support received through participation in community currencies,” and in “BYTS,” the dual-factor structure, consisting of the first factor (named “support received from exchanges with people” that include “emotional support,” “appraisal support,” “informational support,” “companionship support” and the second factor (named “support received from materials”) that include “instrumental support” and “economic support” with respect to both the “degree of satisfaction toward the support received in daily lives” and “the degree of support received through participation in community currencies.”

**Table 3 Social support scores and result of factor analysis in the two organizations**

"Ichi-Muraoka"						"BYTS"							
Degree of Satisfaction toward Support Received in Daily Lives			Degree of Support Received through Participation in Community Currencies			Degree of Satisfaction toward Support Received in Daily Lives				Degree of Support Received through Participation in Community Currencies			
Items		$\alpha$	Items		$\alpha$	Items			$\alpha$	Items			$\alpha$
Informational Support	.859	.884	Emotional Support	.843	.904	Emotional Support	.965	.058	.805	Emotional Support	.966	-.036	.847
Companionship Support	.812		Appraisal Support	.830		Appraisal Support	.660	.391		Companionship Support	.706	.196	
Instrumental Support	.768		Instrumental Support	.810		Informational Support	.543	.422		Appraisal Support	.701	.178	
Appraisal Support	.737		Informational Support	.788		Companionship Support	.530	.417		Informational Support	.562	.367	
Emotional Support	.686		Companionship Support	.748		Instrumental Support	.198	.872	.558	Economic Support	.014	.901	.638
Economic Support	.653		Economic Support	.692		Economic Support	.146	.469		Instrumental Support	.395	.499	
Eigenvalue	4.087			3.839			3.159	1.020			3.073	1.214	
Contribution Ratio	68.119			63.976			52.650	17.001			51.216	20.226	
Cumulative Contribution Rat	68.119			63.976			52.650	69.650			51.216	71.442	

We verify whether there is any relationship between factor scores and the frequency of use of community currencies by the members. The correlation coefficients between each factor score and “the number received” and “the number offered” of goods and services using community currencies are shown in Table 4. (The “Spearman’s rank-correlation coefficient” was used because “the number received” and “the number offered” were not normally distributed.) This reveals that in both

“Ichi-Muraoka” and “BYTS,” there is almost no relationship between the frequency of use of community currencies and “the degree of satisfaction toward the support received in daily lives” (although only factor score from “support received from interaction with others” in “BYTS” tends to be positively influenced by “the number received” of goods and services.)

On the other hand, “the degree of support received through participation in community currencies” has a positive correlation in many items with the frequency of use of community currencies. However, “the number received” and support scores have a relationship with factor scores from “support received from interaction with people” in “BYTS” only, which reveals that community currencies are not something that give us more material and instrumental support if we simply receive more goods and services.

In sum, the transfers of social support by community currencies are not something that affect the quality of lives of all users in a significant way but something that makes users aware that this is surely related to their lives if they become conscious.

**Table 4 Correlation between social support factor scores and the numbers received and offered of community currencies in the two organizations**

		Number Received	Number Offered
"Ichi-Muraoka"	Satisfaction factor score toward support received in daily lives	-.053	.026
	Factor score toward support received through participation in community currencies	.187	.329(**)
"BYTS"	Degree of satisfaction toward support received in daily lives – Factor score for “support received from interaction with others” –	.244 (†)	.121
	Degree of satisfaction toward support received in daily lives –Factor score for “support received from goods”	-.026	-.061
	Degree of support received through participation in community currencies – Factor score for “support received from interaction with others”	.446(**)	.469(**)
	Degree of support received through participation in community currencies – Factor points for “support received from goods”	.132	.309(†)

† is  $p < 0.1$  and significant, \* is  $p < 0.05$  and significant, and \*\* is  $p < 0.01$  and significant

## 5.2 Positioning of Social Support Offered by Community Currencies in Each Individual’s Life

Next, we explore where the support received by using community currencies can be positioned among social support sources received by each individual. One question concerned choosing five categories out of seven that consist of “friends,” “family,” “neighbors,” “colleagues,” “community currencies,” “employees of public organizations,” “others,” and ranking them in the order of the frequency of opportunities in receiving support, and allotted points to each category in the reverse order (calculation done with 0 point given to the category not chosen.)

Tables 5 and 6 below show the mean(with standard deviation within parentheses) of each category for “Ichi-Muraoka” and “BYTS.” In both “Ichi-Muraoka” and “BYTS,” community currencies ranked fifth out of seven support sources, which indicate they have become a source of providing peripheral support to various members.

**Table 5 Ranking of the counterparts from whom the users of “Ichi-Muraoka” receive support in daily lives**

Ranking	1	2	3	4	5	6	7
Counterparts	Family	Neighbors	Friends	Employees of Public Organizations	Community Currencies	Others	Colleagues
Score	4.37 (1.49)	3.41 (1.25)	2.82 (1.30)	1.18 (1.39)	0.54 (0.92)	0.51 (1.07)	0.40 (1.01)

**Table 6 Ranking of the counterparts from whom the users of “BYTS” receive support in daily lives**

Ranking	1	2	3	4	5	6	7
Counterparts	Friends	Family	Neighbors	Colleagues	Community Currencies	Employees of Public Organizations	Others
Score	3.79 (1.35)	3.33 (2.08)	1.40 (1.66)	1.31 (1.57)	0.98 (1.48)	0.67 (1.55)	0.60(1.26)

### 5.3 Functions of Community Currencies as a Source of Social Support

This section analyzes the types of advantages community currencies have compared with other support sources. For each of “family,” “neighbors,” “friends,” “colleagues,” “employees of public organizations,” and “community currencies,” we asked questions about the benefits one received from the support and have them choose from among the following answers: “it saves time,” “it saves money,” “it enables close mutual support,” “it doesn’t feel awkward,” “it enables light mutual support,” “it is not bothersome,” and “we can request various things.” (Multiple answers, we excluded from our analysis the item “others.”) As for this question, we conducted Hayashi’s quantification method III analysis to determine the trend in responses.

Figures 2 and 3 are a combination of category scores in the first and second axes of each support sources for “BYTS” and “Ichi-Muraoka,” respectively. In the charts, “time,” “money,” “empathy,” “awkwardness,” “superficiality,” “bothersome,” and “variety” correspond to the aforementioned seven choices in the order given.

First, we shall verify the benefits of support to see from which axis they can be evaluated. “family,” “friends,” “colleagues,” “employees of public organizations,” in “Ichi-Muraoka” and “colleagues” in “BYTS” place “empathy” in one extreme and “superficiality” of support in the other extreme of the axis, which reveals that an axis to evaluate the *<depth>* of support exists. And, “family,” “neighbors,” “friends,” “community currencies” in “Ichi-Muraoka” as well as “family” and “community currencies” in “BYTS” place “bothersome” in one extreme and “empathy,”

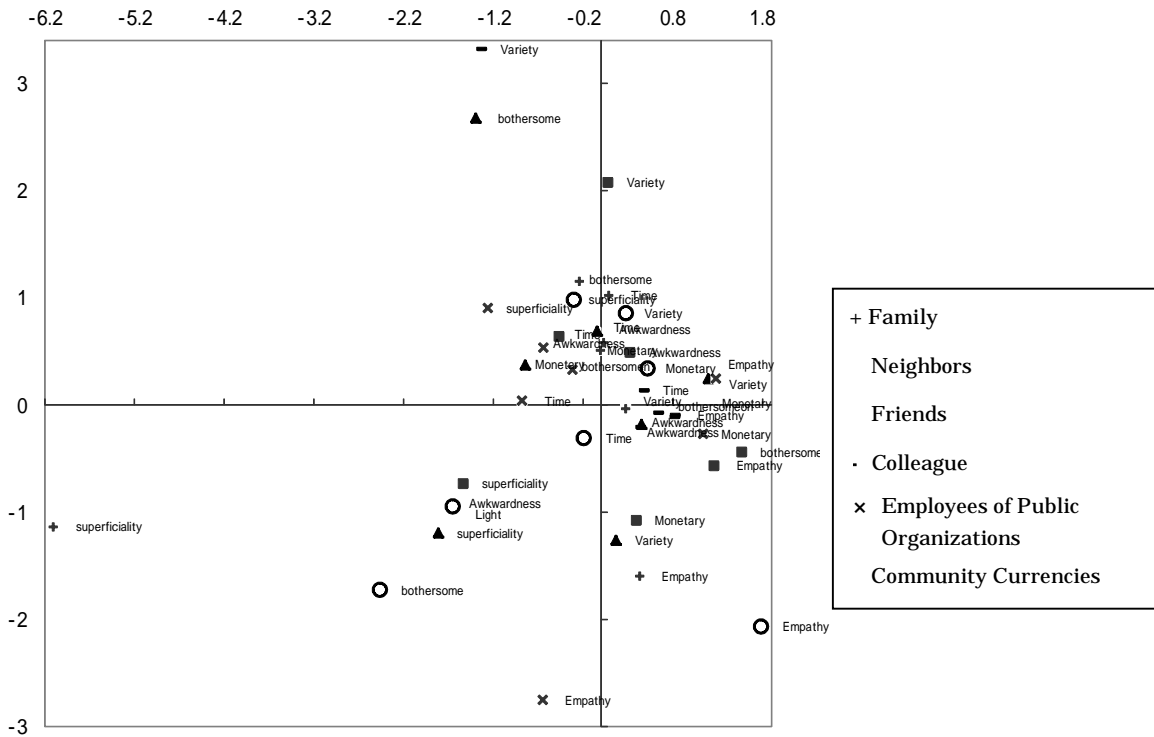
“superficiality,” and “variety” of support in the other extreme of the axis, which reveals that an axis to evaluate the *< complication >* in receiving support exists.

In addition, in “neighbors,” “colleagues,” and “employees of public organizations” in “Ichi-Muraoka” and “neighbors,” “colleagues,” and “community currencies” in “BYTS,” there is “variety” on one extreme and “money,” “empathy,” and “superficiality” on the other axis, which reveals that an axis to evaluate the *< diversity >* of the content of support exists. Further, in “neighbors,” “friends,” and “employees of public organizations” in “BYTS,” there is an axis, which places “money” and “awkwardness” on both extremes, which reveals that an axis exists to evaluate the psychological *< hesitation >* in receiving support.

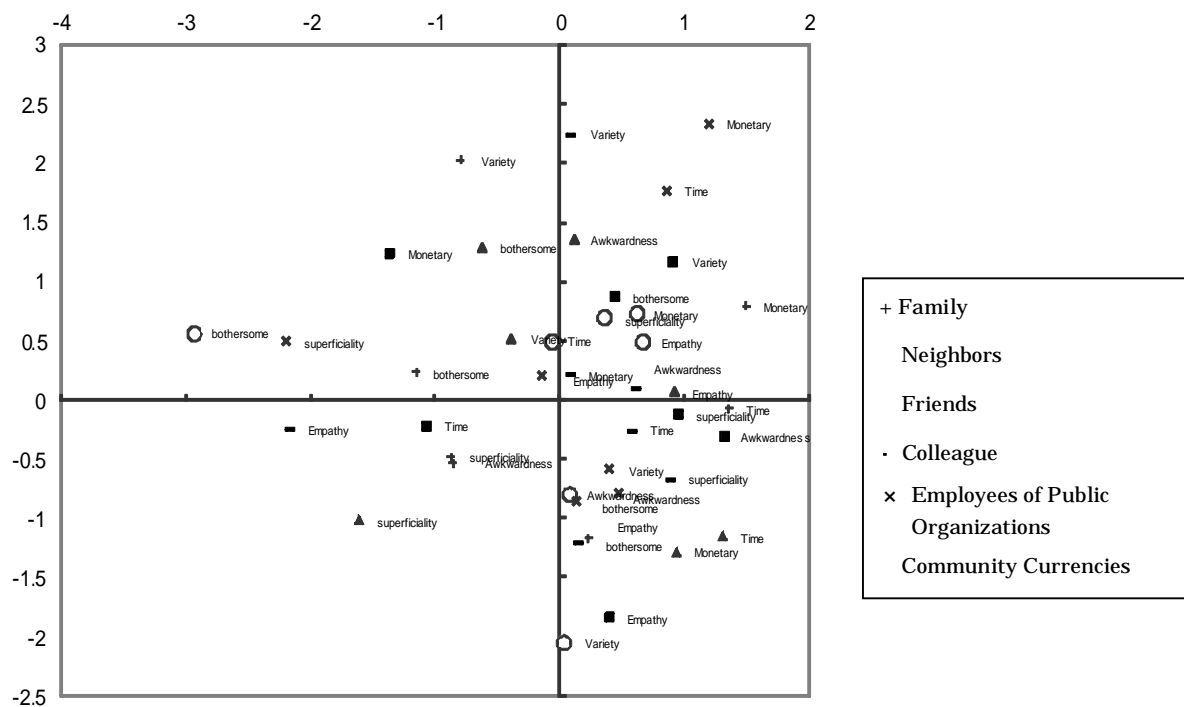
As shown above, if we are to evaluate community currencies from the aspects of *< depth >* and *< diversity >* of support and *< complication >* and *< hesitation >* in receiving support, “time,” “money,” “superficiality,” and “variety” gather near the original point in “Ichi-Muraoka,”<sup>8)</sup> which can be interpreted that while one can receive *< superficial >* and *< diverse >* support some *< complication >* and *< hesitation >* accompany. On the one hand, “time,” “money,” “empathy,” “superficiality,” and “awkwardness” gather near the original point in “BYTS,” which is interpreted that while one can receive both *< superficial >* and *< deep >* support at the same time, the types of support are *< limited >* and accompany not so much the *< hesitation >* but the *< complication >* in receiving support.

“Ichi-Muraoka” attracts attention in that community currencies are regarded as capable of giving *< superficial >* and *< diverse >* support. On the other hand, “BYTS” draws attention in that community currencies are thought of as capable of giving *< superficial >* and *< deep >* support at the same time. The combination of these two advantages is something no other support sources have, and is therefore assumed to be the feature of community currencies.

That is to say that while the two organizations are thought of as slightly differing in the benefits as support sources of community currencies, “Ichi-Muraoka” enables one to receive *< superficial >* and *< diverse >* support in relationships, which means support can be received on “weak ties” and “BYTS” enables one to receive not only *< superficial >* but also *< deep >* relationship, which means support can be received on “strong ties.” On the one hand, what is common in the two organizations is that both are thought of as accompanying *< complication >* in order to receive, which suggests that may be one of the potential general problems C2C-model community currencies share in the function to offer social support.



**Figure 2 Advantages of support received by the use of community currencies  
("BYTS")**



**Figure 3 Advantages of support received by the use of community currencies  
( "Ichi-Muraoka")**

Next, we examine which of the six types support are appropriate for community currencies to offer by comparing the mean of various support. Figures 7 and 8 show the mean differences among six types of support in “Ichi-Muraoka” and “BYTS.”

In “Ichi-Muraoka,” the mean of “economic support” and “companionship support” are significantly lower than those of the other four types. This is due to system conditions of “Ichi-Muraoka” as well as the socio-cultural environment in which Muraoka-town exists, rather than the general nature of community currency itself. While “BYTS” uses LETS system and the transactions of goods and services circulating in the markets are not prohibited, “Ichi-Muraoka” uses the Eco Money system and the transactions of services sold and purchased in the markets are impossible. Therefore, “economic support” is difficult to be received in “Ichi-Muraoka.” In addition, Muraoka-town retains strong regional and family ties from old times and human relationships within the village have already been established. Therefore, there is a low likelihood that community currencies are linked to the providing of “companionship support.” On the other hand, regarding “emotional support” and “appraisal support” in “BYTS,” we can confirm that the two means are significantly lower than those of the other four types. That is to say, “BYTS” is relatively more suitable for providing tangible and easy-to-confirm support such as “instrumental support,” “informational support,” “economic support,” and “companionship support” rather than psychological and intangible support such as “emotional support” and “appraisal support.”

**Table 7 The mean difference among various support scores received by community currency activities in “Ichi-Muraoka”**

	Emotional Support	Instrumental Support	Emotional Support	Appraisal Support	Economic Support
Emotional Support (n = 74, mean = 3.27, SD = .98)					
Instrumental Support (n = 71, mean = 3.17, SD = .97)	-.06				
Informational Support (n = 70, mean = 3.20, SD = 1.00)	.01	.03			
Appraisal Support (n = 70, mean = 3.09, SD = 1.00)	-.09	-.04	-.09		
Economic Support (n = 69, mean = 2.64, SD = 1.08)	-.52(**)	-.50(**)	-.54(**)	-.43(**)	
Companionship Support (n = 70, mean = 2.99, SD = 9.4)	-.20(*)	-.16(*)	-.22(*)	-.13(*)	-.32(*)

† is p < 0.1 and significant, \* is p < 0.05 and significant, \*\* is p < 0.01 and significant

**Table 8 The mean difference among various support scores received by community currency activities in “BYTS”**

	Emotional Support	Instrumental Support	Emotional Support	Appraisal Support	Economic Support
Emotional Support (n = 57, mean = 3.02, SD = 1.25)					
Instrumental Support (n=59, mean =3.56, SD = 1.01)	.59(**)				
Informational Support (n=60, mean =3.48, SD = 1.00)	.47(**)	-.10			
Appraisal Support (n = 59, mean = 2.98, SD = 1.21)	-.04	-.60(**)	-.49(**)		
Economic Support (n = 59, mean = 3.54, SD = 1.07)	.55(*)	-.05	.11	.59(**)	
Companionship Support (n = 60, mean = 3.47, SD = 1.13)	.47(**)	-.12	-.02	.47(**)	-.11

† is p < 0.1 and significant, \* is p < 0.05 and significant, \*\* is p < 0.01 and significant

#### 5.4 Social Relationship and Structural factors that Affect Offering of Social Support

Transaction activities of community currencies are “embedded” in specific social relationships among members (Nakazato, 2007) and social support brought directly and indirectly by such transaction activities are also assumed to be connected to specific social relationships among members. In order to study social relationship and structural factors that affect providing of social support, we conducted an exploratory path analysis with six types of support scores as dependent variables by selecting indegree (the number received), outdegree (the number offered), the sum of indegree and outdegree, the value of indegree per a tie, the value of outdegree per a tie, the sum of indegree and outdegree per a tie<sup>9)</sup>, reciprocity<sup>10)</sup>, effectiveness<sup>11)</sup>, structural constraint<sup>12)</sup>, density<sup>13)</sup>, cluster coefficient<sup>14)</sup>, betweenness centrality<sup>15)</sup>, flow centrality<sup>16)</sup>, indegree distance centrality and outdegree distance centrality<sup>17)</sup> out of ego network indexes which can be obtained about each node (member) within the transaction network and overall network indexes, and further used sex and age as other attribute variables.

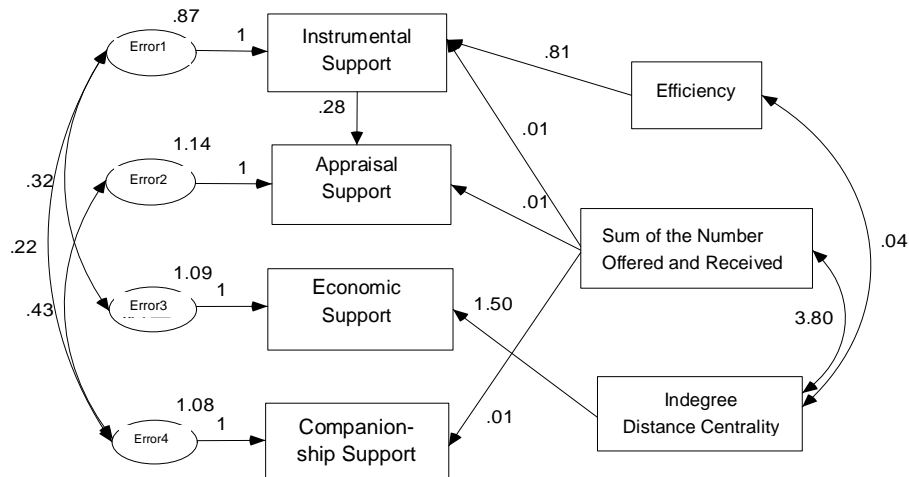
The results of path analysis for “Ichi-Muraoka” and “BYTS” are presented below. Furthermore, all the coefficients in the figures are found to be significant from 1% to 5% level or have significant tendency at 10% level and the degree of suitability of the models shown at the lower part of the figures in both “Ichi-Muraoka” and “BYTS” has reached acceptable levels.

“Ichi-Muraoka” attracts attention, first, because “the sum offered and received” gives positive influence on the providing of “appraisal support,” “companionship support,” and “instrumental support (although the degree of influence in each case is small). Both “appraisal support” and “companionship support” can express sympathetic support with others and are capable of generating sympathetic connections by receiving more goods and services. On the other hand, “the sum offered and received” gives positive influence on providing “instrumental support” because the main use for community currencies in “Ichi-Muraoka” was to provide a means of transportation when an elderly goes to a hospital or shopping. In other words, frequent users of community currencies in “Ichi-Muraoka” frequently use transportation services by vehicles, which means “instrumental support” is offered.

Further, the fact “indegree distance centrality” has positive coefficients to “economic support” and that the same is true in “effectiveness” to providing “instrumental support” shows that the position in an effective location within the network and the efficiency of network structure help improve access to various resources held by others. That is to say, various resources existing scattered inside the social network become accessible by shortening the distance and the accessibility improves by decreasing redundancy in network structure.

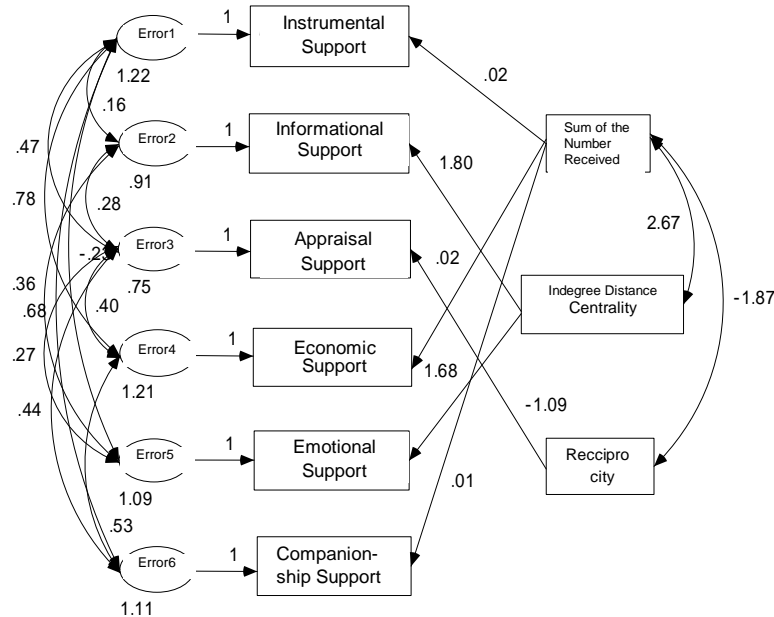
Next, we can point out that in “BYTS,” as was seen in “Ichi-Muraoka,” the frequent use of community currencies generates sympathetic support as the “number received” of goods and services positively influences “emotional support,” “appraisal support,” and “companionship support.” Also, we can point out that the closer the distance is with others in social network, the easier it is to obtain

various resources as in “Ichi-Muraoka” because the “indegree distance centrality” has a positive coefficient to “economic support” and “instrumental support.” In addition, the values of “reciprocity” negatively impact “informational support.” This is considered to be because those who make reciprocal transactions in “BTYS” tend to build a fixed relationship with specific individuals<sup>18)</sup>, making it difficult to receive support that requires “weak” ties such as “informational support.”



Degree of Freedom=10,  $\chi^2=7.855$ , p-Value=. 643  
GFI = .955, AGFI = .875, RMSEA = .000, AIC = 43.855

**Figure 4 Structural factors on various support scores received by participating in community currency activities in “Ichi-Muraoka.”**



Degree of Freedom=17,  $\chi^2=12.359$ , p-Value=. 778  
GFI = .952, AGFI = .874, RMSEA = .000, AIC = 68.359

**Figure 5 Structural factors on various support scores received by participating in community currency activities in “BYTS”**



## 6 Conclusion

From the results of analysis, we can point out the following with respect to social support provided by community currencies.

While the transfer of social support by community currencies are not something that affect the quality of lives of all users in a significant way, it is something that makes users aware that it is surely related to their lives if they become conscious.

Community currencies are peripheral and supplementary support sources for many local residents.

The type of advantage a community currency has when compared with other support sources, and the suitable types of support community currencies provide out of the six types depend upon the system of the community currency itself as well as the socio-cultural environment of the region where such community currency system is used. The community currency in “Ichi-Muraoka” is considered to provide support “rich in diversity” in a “superficial” relationship, which matches the theory regarding the strength of “weak” ties. The community currency in “BYTS” is considered to build support transfer relationship, which is not only “superficial” but also “deep,” or, in another word, a “strong” ties.

Generally, when the frequency of use of community currencies is higher, more sympathetic and psychological support is obtained rather than tangible support such as instrumental support.

On the one hand, in order to use various resources scattered among local residents, it is better that the network structure is efficient or one is positioned in an efficient location within the network.

While the four hypotheses are mostly supported, community currencies proved to be capable of giving support within the degrees of free relations (=burden on users) with “strong” ties for those local residents who participate with various purposes and seek “strong” ties while giving support with “weak” ties for those who seek various social, human, and/or materialistic resources.

Community currencies today are at least not a “magic stick” that solves regional economic, environmental, and/or social problems at once. Rather, many community currencies show their strengths only in serving as something like “coupons” that local residents hand to each other. Those who forget about the existence of coupons may not use them. Those who remember they have some inside their wallets will prudently use them with a little gain. The homemaker service coupons or shoulder massage coupons that children give to the parents and grandparents are invaluable sources of psychological and sympathetic support for parents and grandparents even if the content of services bought by them are slight.

Yet, community currencies function only in the limited instances where the system is introduced to the community appropriately and the local residents use them in an appropriate manner. In above, the collection of historical information about ethnography in a region and questionnaire surveys as well as analysis on social support transfers<sup>19)</sup> using social network analysis

such as the ones we conducted in “Ichi-Muraoka” and “BYTS” are found to be potentially helpful as guidelines to consider socio-cultural characteristics of the region in order to successfully introduce community currencies or to improve performance of the existing community currency organization.

Various tasks remain in order to advance this research. The main challenge is to refine the methodology of the survey. For example, this analysis may indicate that various network indexes in transaction network represent original pseudo-personal network that residents have (for transactions are likely conducted within existing human relationships) and that support are embedded into existing personal network to be provided, as community currencies communicate as a media, rather than that such support are brought by community currencies themselves as the impact of the frequency of community currency use on the social support receipt was generally smaller than that of network indexes in both “BYTS” and “Ichi-Muraoka.” To verify this point, an analysis of the overlap between transaction network of community currencies and personal network of community residents as well as the mechanism of the causal relationship between the two. Further, this paper focuses on conducting an analysis of general functions of community currencies related to providing social support and did not touch upon the analysis of the specific relationship of social support transfers among users. Further surveys are to be conducted about these issues, which shall be discussed in another paper.

## Notes

- 1) A community currency system unique to Japan, which was developed by Toshiharu Kato of then MITI (the current METI). The issuance of coupons and frequent limiting of the types of goods and services for transactions to those not circulated in the market are its features. There is a general emphasis on the purpose related to social welfare such as invigoration of volunteer activities.
- 2) As for the current situation of community currencies in Japan, see Izumi (2006).
- 3) LETS (Local Exchange Trading Scheme/System) is a system prevalent in North American and European countries and is said to have the most general system among the C2C-model community currencies. No coupons are issued, accounts opened for each member for transactions are, in many cases, managed by the increase or decrease of the balance and usually the types of goods and services for transactions are not limited.
- 4) Bytesring means LETS in Swedish.
- 5) The transactions of “BYTS” using the LETS system are conducted according to the following procedure. First, participants (1) open accounts and post on a catalog (which is called directory (list) in other LETS organizations) goods and services each can provide as well as goods and services each wishes are provided. (2) Make a transaction based on the catalog information. (3) The result of the transaction is reported to the Secretariat, and the balance based on the transaction in each account is recorded. Moreover, the transactions in “Ichi-Muraoka” are basically the same as those in LETS, but some of the features of “Ichi-Muraoka” include the use of coupons in transactions where priceless transactions of which “1 service” equals “One(1) Muraoka,” and no consideration of the content of goods and services are given, and reset and restart of activities after six months have passed. In addition, specific services which members of both organizations make using community currencies include many and a variety of services such as care of children, transportation services by vehicles, conversation partners, shopping accompaniment and snow shoveling.
- 6) The purpose of activity for “Ichi-Muraoka” is “to form a 'mutual help system' within the entire village” (21st Century Research Organization for Human Care Foundation, 2004) for the situation “with difficulties in solving life-related challenges among families and small regions due to depopulating and aging of society.”
- 7) The founding purposes of “BYTS” include (1) promotion of reuse, (2) building relationship (network) among members and local residents, and (3) providing alternatives for the existing socio-economic system, and the aspect as a component establishing alternative socio-economic system is emphasized when compared with LETS in Canada whose main purpose is to invigorate the regional economy.

- 8) In Hayashi's quantification method III, generally selected items equal items with high frequency of response are plotted near the original point.
- 9) All "the value per a tie" are calculated by  $\left[ \text{degree centrality in valued network (simply the sum of the number received and offered)} \right] \div \left[ \text{degree centrality of dual-value network (the number of counterparts who conducted receipt and offer)} \right]$ .
- 10) The degree of mutuality of each person's tie is presented by the reciprocal of the absolute value of the difference between the indegree and outdegree.
- 11) An ego's "effective size" of a network is obtained by subtracting the degree of connections among neighborhoods (by which ego should be able to reach the other node without direct ties through the ties of the neighborhoods) from the network size of the ego. "Effectiveness" is obtained by "effective size"  $\div$  "size" and represents the degree of effectiveness of the ego's network.
- 12) An ego connected with another, namely A, has few counterparts to connect with other than A, and is "constrained" by A because taking an action without A's influence becomes difficult when the neighbors other than A are connected with A. By adding such bilateral "constraints" with all others, the "structural constraint" one ego receives from the entire network is calculated.
- 13) The degree of density of ego's network. It is obtained by  $\left[ \text{the number of actually existing ties} \right] \div \left[ \text{the number of ties which can exist within a network (the number of combination among nodes)} \right]$ .
- 14) A cluster means three pieces of clusters made by three ties. The cluster coefficient of an ego is obtained by the ratio of A-B connections (the ratio of triangular relationships among the ego-A-B) out of the pairs of a couple between the ego and its neighbors (e.g., ego-A, ego-B, etc.).
- 15) The degree of an ego mediating among others. It is calculated by obtaining the degree of geodesic line from one node to another node (the shortest distance) going through the ego concerning every geodesic line among all nodes.
- 16) One type of betweenness centrality suitable for valued network analysis. It is calculated by obtaining the ratio of flows going through the ego among all nodes out of the flows (values), which can flow from one node to another node.
- 17) It is an index for evaluating the centrality of one ego within a network based on the distance of the ego to others. Specifically, it is obtained by adding the shortest distances from an ego to other nodes concerning all nodes and dividing it by the number of others.
- 18) The definition of "reciprocity" here is not reciprocity towards a specific individual but the reciprocity for the overall network or indirect reciprocity. However, in reality, those with high "reciprocity" had a tendency to conduct transactions within the unit of specific relationship.
- 19) This is close to the idea of "regional dock" Nishibe (2006) named with the connotation of "diagnosis" of the region by combined use of field work, questionnaire survey, social network analysis, etc.

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