IJCCR

www.ijccr.org · ISSN: 1325-9547

Nakazato, H. & Hiramoto, T. (2012). An Empirical Study of the Social Effects of Community Currencies. *International Journal of Community Currency Research 16*(D), 124-135. https://doi.org/10.15133/j.ijccr.2012.019

International Journal of Community Currency Research

Volume 16 (2012) Section D 124-135

AN EMPIRICAL STUDY OF THE SOCIAL EFFECTS OF COMMUNITY CURRENCIES

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ABSTRACT

This paper introduces the concept of social support as a social effect of community currencies and explores different ways of measuring it. We used a 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. Our analysis yielded the following results with respect to social support provided by community currencies: (1) while the transfer of social support by community currencies does not affect the quality of life of all users in a significant way, it makes users aware that social support can be part of their lives if they become conscious of it; and (2) community currencies are peripheral and supplementary support sources for many local residents. These results show that community currencies are effective as a system to provide social support to local residents.

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To cite this article: Nakazato, H. and Hiramoto, T. (2012) 'An Empirical Study of the Social Effects of Community Currencies' *International Journal of Community Currency Research* 16 (D) 124-135 <www.ijccr.net> ISSN 1325-9547

1 INTRODUCTION

In this paper, we assert that community currency is an effective system of social support for local residents. We do so through a comparative analysis of "Eco Money[1]" organizations in Muraoka-town (currently Kami-town), Japan, with the Local Exchange Trading Scheme/System (LETS) organization in Stockholm, Sweden. We also discuss the importance of assessing the "social effects" brought to communities by community currencies and propose to assess social support as one such social effect. There are several systems of community currencies, but this paper focuses on the consumer-to-consumer (C2C) type, in which members exchange their goods and services mutually.

Community currency studies in Japan have been rather concentrated on economics, as the word "currency" suggests. Examples of this include the economic anthropologist Makoto Maruyama, who introduced community currency to Japan through his writings from the latter half of the 1980s through the 1990s, as well as scholars who tried to promote community currencies with Maruyama, such as Rui Izumi and Eiichi Morino, whose work is based on environmental economics. When we look at the current situation of community currencies, however, the process in which certain effects are brought to communities as a result of transactions is related to "social" elements, which obviously cannot be dealt with in the field of economics. Of course, these economists have not been ignorant of the "social" aspects of community currencies. Economic anthropology and ecological economics are positioned in Yoshiro Tamanoi's (1978) thought, which aims to balance economy and ecology and is strongly influenced by K. Polanyi, who pointed out the existence of value exchange activities in non-market economies 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, these theories and approaches do not explain the "social" aspect of community currency activities empirically.

In sum, researchers of community currency must establish a "social" approach towards it. An analysis capable of empirically explaining the "social" realities of transactions as well as the nature of effects brought to communities needs to be conducted. As for the former, the employment of a new economic-sociology approach can be cited as a candidate (Nakazato, 2007). This approach analyzes economic actions conducted in social structures, particularly from the viewpoint of "embeddedness" into a social network structure surrounding the actor. The present paper addresses the latter: the effects brought to communities.

The need to assess social effects is urgent in two ways. First, the community currency movement in Japan subsided after the period of 2003 to 2004, and organizations are entering a stage in which it is necessary to clarify what is actually brought to local communities through community currency activities. Second, assessing the "effects" of organizations' activities has practical meanings for organizations that are currently under operation, as a guideline for their future activities or a scheme to sustain the motivation of members. 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 do not have clear criteria for assessment. In recent years, an effort has begun to assess the social effects of community currencies by using the concept of social capital to address this problem (Jacob et al., 2004; Richey, 2007; Kichiji et al., 2007). In this paper, we propose an assessment of social support to limit the scope covered by the concept of social capital.

2 METHOD

2.1 Community currency and social support

Social support is defined as "various aids, tangible and intangible, which an individual obtained at a specific point of time from others with whom he/she has a relationship" (Minami et al., 1988). Note that "others" in this definition are not limited to those engaged in providing support publicly or systematically, such as social workers and medical professionals. This means an ego receives aids from various others with whom he/she has relationships in daily life, such as family, neighbors, and friends. Sociological ideas in social support studies can be seen in the social integration approach as well as social support network studies. The former focuses on the ego's affiliation and participation in social groups and activities, while the latter emphasizes social network structures in receiving support. Granovetter's discovery of "the strength of weak ties" (1973) as well as Wellman's development of an urban-sociological personal network analysis (1979) represent the latter group, and their use of the social network approach has achieved several important contributions to social support studies from the viewpoint of sociology.

Previous community currency studies occasionally cited social support as a social effect of community currency activities. Community currencies, especially those that focus on social welfare, such as "Eco Money," state that "reciprocal network" building among community residents is the purpose of their activities, and Williams et al. (2001) explicitly use the term "social support network" as an effect of community currency activities. However, such terms were not used in a strictly academic sense; therefore, neither the concrete meaning of "reciprocal network" and "social support network" building, nor the way to measure

1 A community currency system unique to Japan, which was developed by Toshiharu Kato. Its characteristics consist of the issuance of coupons and the limiting of the types of goods and services for transactions to those not circulated in the market. There is a general emphasis on purposes related to social welfare, such as the invigoration of volunteer activities.

them, was clear. Social support studies, at this point, have already accumulated research results both theoretically and empirically; thus, theoretical elaboration and assessment of "reciprocal network building" and "social support network" are possible.

Moreover, the introduction of the concept of social support is significant in reconsidering not only "for what it will be effective" but also "for what range of people it will be effective." The results of previous studies reveal that the effect brought to regional economies by community currency activities is insignificant and that the beneficiaries are individual members participating in the activities, rather than the local community as a whole with respect to social effects. Williams (1996), for example, surveyed the LETS organizations in the United Kingdom and concluded that LETS serves as a system for individual members to help improve their quality of life. In line with his observation, we presuppose that the beneficiaries of community currency activities are 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.

2.2 Viewpoint and hypothesis

Before turning to the analysis, we will consider some theoretical and methodological points.

First, we assume that six types of social support can be received as benefits of participation in community currency activities[2]: 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-assurance) (House, 1981), social companionship support (providing social affiliations and human connections) (Rook, 1987), and economic support.

Second, studies of social support networks often use the analytical concept of a "network," while they tend to simplify the functions of a "network" and suggest that the more ties there are, the greater amount of support the ego receives (Wellman, 1981). In this respect, the statement, "A network is more than the sum of its ties," made by Wellman & Guilia (1999), succinctly expresses the importance of the social network approach in social support network studies. The presence of ties does not always have positive effects on a person's mental and physical health. Ties could have a negative impact or cause negative support, depending on their nature and network structures. Therefore, the proposition that "the more ties there are, the greater amount of support the ego receives" is not true. In addition, a multiplicity of ties assumes new characteristics depending on the mutual relationship between them. Accordingly, the effects of indirect ties not limited to direct acquaintanceship need to be considered. Fortunately, many community currency transactions are recorded in the form of checks or endorsements on currency, or records in electronic accounts. The application of the social network approach is made possible by depicting the transactional relationship based on these records.

Third, the importance of "the strength of weak ties" (Granovetter, 1973) should be considered in this study. Granovetter claimed that various interpersonal and social resources, which are hardly obtained from a primary group connected by "strong" ties, are brought about by "weak" ties with external groups. "Weak" ties are assumed to be "bridges" that join separate cohesive groups, such as family and intimate friends, and play the role of circulating heterogeneous resources among the groups.

While the "strength" of ties is defined in various ways, Wellman & Wortley (1990) criticized the mainstream definition, which measures the "strength" of ties by the frequency of interpersonal contacts, because social relationships exist with a high frequency of contacts regardless of individuals' will, as seen in workplace relationships with colleagues. Instead, they measured its "strength" on the basis of three criteria: "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 "intimacy" and "multiplicity" unless specific conditions are met. The tie of a community currency transaction is therefore a "weak" tie as a default state, and focusing on the strength of "weak" ties is considered appropriate. This also leads us to the assumption that the social support provided by community currency activities is, at least in its early stage, not assumed to serve as all of the social support received by one person in his or her daily life. In other words, the support provided by "weak" ties in community currencies is considered to play a peripheral role, supplementing the support that each person receives from his or her primary group.

Finally, since a social network analysis of transactional relationships alone cannot assess types of support received from activities outside of transaction activities—with the exception of instrumental support and economic support—conducting a questionnaire survey in addition is desirable.

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

2 For a more theoretical discussion, methodological consideration from the perspective of social network analysis, and information regarding the relationship between social support provision and community currency transaction, see Nakazato (2006).

- 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 in which social support is provided by community currencies is influenced by the social network structure of the members.

2.3 Outline of the Survey

We selected the "Eco Money" organization Ichi-Muraoka in Muraoka-town, Hyogo Prefecture, Japan and the LETS organization Bytesring[3] Stockholm (BYTS) in Stockholm, Sweden as subjects. Since "Eco Money" and LETS share the basic scheme of transaction, we can conduct a comparative analysis of them.

Muraoka-town is a mountain village currently undergoing depopulation; it has an area of 165.66 km^2 and a population of 6,117 (Japan census 2005), and there are only one or two daily bus services that serve the area every hour. Ichi-Muraoka[4]—which has adopted "Eco Money"—was founded in December 2002 and was operated by the Muraoka-town Council of Social Welfare (currently the Kami-town Council of Social Welfare, Muraoka Branch) from 2002 to 2007. The mean number of participants during these periods was 91.4. To my best knowledge, BYTS, established in 1992, is the oldest and largest LETS organization to date in Sweden. Greater Stockholm has an area of 6,519.30 km^2 and a population of 2,054,343 (Statistiska Centralbyrån 2010) with a developed subway network that facilitates trade even in the winter season during heavy snowfall. The mean number of participants is 113.5 people per year and BYTS operates there in the form of a nonprofit organization[5].

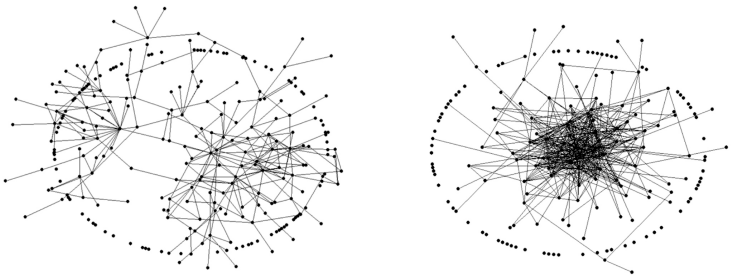


Figure 1. Transactional network graphs of the two organizations (Left: Ichi-Muraoka; Right: BYTS)

To start with, we collected transactional records for a transaction network analysis[6]. This was done from December 2002 to March 2006 for Ichi-Muraoka and from January 2002 to December 2005 for BYTS. The transaction records

Table 1. Composition of Ichi-Muraoka and BYTS

			N	%			N	%
Ichi-Muraoka	Sex	Male	42	35.3	Occupation	Full-time Job	23	19.3
		Female	75	63.0		Housewife (Husband)	33	27.7
	Age	25-44	3	2.5		Housewife (Husband) and Part-time Job	5	4.2
		45-64	24	20.2		Retiree	22	18.5
		65-74	45	37.8		Others	22	18.5
		75-	43	36.1				
			N	%			N	%
BYTS	Sex	Male	16	24.6	Occupation	Full-time Job	11	18.0
		Female	49	75.4		Part-time Job	13	21.3
	Age	25-44	16	25.8		Self-employed	6	9.2
		45-64	26	41.9		Unemployed	2	3.3
		65-74	18	29.0		Pensioner	25	38.5
		75-	2	3.2		Receiving Sickness Benefits	3	4.9
						Student	1	1.5

3 The word bytesring means "LETS" in Swedish in this context.

4 The purpose of Ichi-Muraoka is "to form a 'mutual help system' within the entire village" for the purpose of dealing "with difficulties in solving life-related challenges among families and small regions due to depopulating and aging of society" (21st Century Research Organization for Human Care, 2004). It operated for seven half-year periods, and ceased its activities in 2007.

5 The purposes of "BYTS" include (1) promotion of reuse, (2) building relationships (networks) among members and local residents, and (3) providing alternatives for the existing socio-economic system. The idea of establishing an alternative socio-economic system is emphasized when BYTS is compared with LETS in Canada, whose main purpose is to invigorate the regional economy. For more information about BYTS, see Nakazato and Hiramoto (2007).

6 In order to investigate the transactional records, we adopted a social network analysis because we needed to quantitatively analyze transactional relationships. Social network analysis is a research method that calculates the properties of social networks (e.g., e-mail exchanges, trading partners, and interpersonal relationships). For instance, each member of a social network has a degree of centrality in the network, and the social network itself has density. We can measure these indexes by calculating the relationships of vertices and lines. In the graph (Figure 1), a vertex indicates a member and a line indicates a trading relationship.

show that the average annual circulation volume was 283.43 transactions for Ichi-Muraoka, while BYTS has a mean annual circulation amount of 32,360.25 byts (1 byts = 1 Swedish krona), which corresponds to 256.25 transactions. 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 drew a transactional network graph based on these records (Figure 1).

In addition, we conducted mail surveys for Ichi-Muraoka from March to April 2006 and for BYTS from July to August 2006. All of the members of Ichi-Muraoka and BYTS completed a six-page questionnaire on paper, which was written in Swedish, and returned it via mail. We received 119 responses (54%) from 220 members of Ichi-Muraoka and 65 responses (80.2%) from 81 members of BYTS. Table 1 shows the membership composition of both organizations. The proportion of female users is high in both organizations, and the elderly are the main users of Ichi-Muraoka.

3. RESULTS

3.1 community currency as a means of providing social support

First, we investigate whether or not the use of community currencies generates transfers of social support. Two question items are used in conducting this analysis:

(1) "How satisfied are you overall with the following support that you presently receive from others?" (hereafter, "the degree of satisfaction with the support received in daily life"). This is rated on a five-point scale, from "not satisfied at all" to "very satisfied."

(2) "How helpful is the support of <name of community currency> to you?" (hereafter, "the degree of support received through participation in community currencies"). This is rated on a five-point scale, from "not helpful at all" to "very helpful."

These two questions were asked regarding the six types of support mentioned above. The terms used in the questions are "emotional support, such as giving affection, a sense of security, entertainment" (emotional support); "behavioral and instrumental support, such as doing something or transferring something for the recipient" (instrumental support); "informational support, such as giving a piece of advice or teaching something" (informational support); "appraisal support, such as praising or showing appreciation" (appraisal support); "economic support, such as giving money or helping with cost saving" (economic support); and "connection support, such as increasing the number of acquaintance or spending time together" (social companionship support).

The results of a principal factor analysis with a varimax rotation conducted with members of Ichi-Muraoka and BYTS in response to items (1) and (2) are shown in Tables

Table 2. Social support scores and results of factor analysis for Ichi-Muraoka

	The degree of satisfaction with the support received in daily life		The degree of support received through participation in community currencies	
Items	Factor Ⅰ	α	Factor Ⅰ	α
Informational Support	.859	.884	.788	.904
Social Companionship Support	.812		.748	
Instrumental Support	.768		.810	
Appraisal Support	.737		.830	
Emotional Support	.686		.843	
Economic Support	.653		.692	
Eigenvalue	4.09		3.84	
Contribution Ratio	68.1		64.0	
Cumulative Contribution Ratio	68.1		64.0	

Table 3. Social support scores and results of factor analysis for BYTS

	The degree of satisfaction with the support received in daily life			The degree of support received through participation in community currencies		
Items	Factor Ⅰ	Factor Ⅱ	α	Factor Ⅰ	Factor Ⅱ	α
Emotional Support	.965	.058	.805	.966	-.036	.847
Appraisal Support	.660	.391		.701	.178	
Informational Support	.543	.422		.562	.367	
Social Companionship Support	.530	.417		.706	.196	
Instrumental Support	.198	.872	.558	.395	.499	.638
Economic Support	.146	.469		.014	.901	
Eigenvalue	3.16	1.02		3.07	1.21	
Contribution Ratio	52.7	17.0		51.2	20.2	
Cumulative Contribution Ratio	52.7	69.7		51.2	71.4	

2 and 3. We find a single-factor structure in Ichi-Muraoka, which includes all six types of support with respect to both "the degree of satisfaction with the support received in daily life" and "the degree of support received through participation in community currencies." As for BYTS, we find a dual-factor structure, consisting of the first factor ("support received from interaction with people," including "emotional support," "appraisal support," "informational support," and "social companionship support") and the second factor ("support received from materials," which includes "instrumental support" and "economic support") with respect to both "the degree of satisfaction with the support received in daily life" and "the degree of support received through participation in community currencies."

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 amount of goods and services received or provided through community currencies are shown in Table 4. Spearman's rank-correlation coefficient was used because "the amount received" and "the amount provided" 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 with the support received in daily life," although "support received from interaction with people" in BYTS tends to be positively correlated with "the amount received" of goods and services. However, "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.

In sum, the transfer of social support by community currencies does not affect the quality of life of all members in a significant way, but makes members aware that this is something that could be related to their lives if they become conscious of it.

3.2 The position of social support provided 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 out of seven categories—"friends," "family," "neighbors," "colleagues," "community currencies," "employees of public organizations," and "others"—and ranking them in order of the frequency of opportunities to receive support. We also allotted points to each category in reverse order (zero points given to the categories that were not chosen).

Tables 5 and 6 show the mean score and standard deviation (in parentheses) of each category for Ichi-Muraoka and BYTS. In both organizations, community currencies ranked fifth out of the seven support sources, which indicate that they have become a source of peripheral support for members.

Table 4. Correlation between social support factor scores and received and provided community currencies

		Correlation Coefficients	
		The amount received	The amount provided
Ichi-Muraoka	Factor score of "the degree of satisfaction with the support received in daily life"	-.053	.026
	Factor score of "the degree of support received through participation in community currencies"	.187	.329(**)
BYTS	Factor score of "the degree of satisfaction with support received in daily life" —"support received from interaction with people"	.244 (†)	.121
	Factor score of "the degree of satisfaction with support received in daily life" —"support received from materials"	-.026	-.061
	Factor score of "the degree of support received through participation in community currencies" —"support received from interaction with people"	.446(**)	.469(**)
	Factor score of "the degree of support received through participation in community currencies" —"support received from materials"	.132	.309(*)

† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Table 5. Ranking of support received by members of Ichi-Muraoka in daily life

Ranking	1	2	3	4	5	6	7
Support Sources	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 support received by members of BYTS in daily life

Ranking	1	2	3	4	5	6	7
Support Sources	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)

Table 7. The differences between the mean support scores in Ichi-Muraoka

	Emotional Support	Instrumental Support	Informational 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(**)	
Social Companionship Support (n = 70, mean = 2.99, SD = 9.4)	-.20(*)	-.16	-.22(*)	-.13	.32(*)

† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Table 8. The differences between the mean support scores in BYTS

	Emotional Support	Instrumental Support	Informational 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(**)	
Social Companionship Support (n =60, mean = 3.47, SD = 1.13)	.47(**)	-.12	-.02	.47(**)	-.11

† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

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

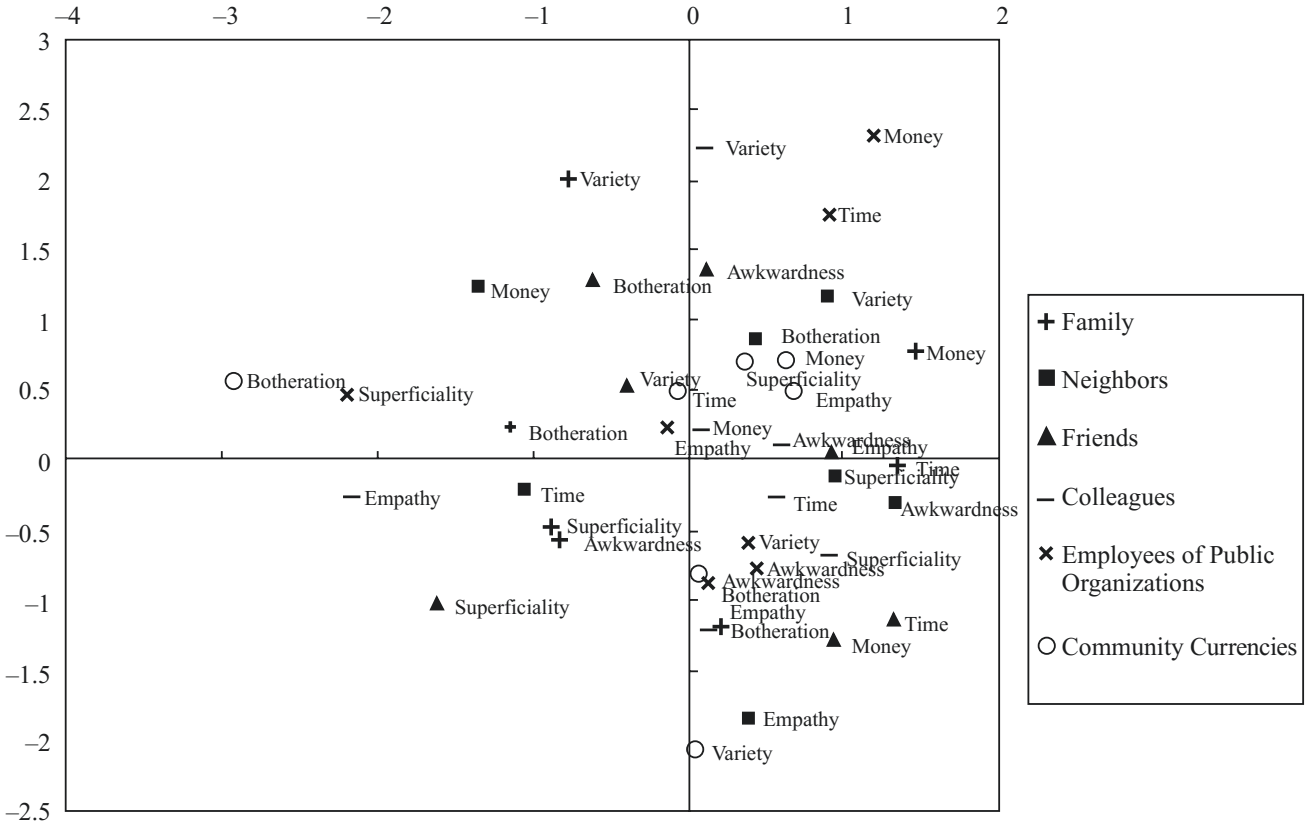
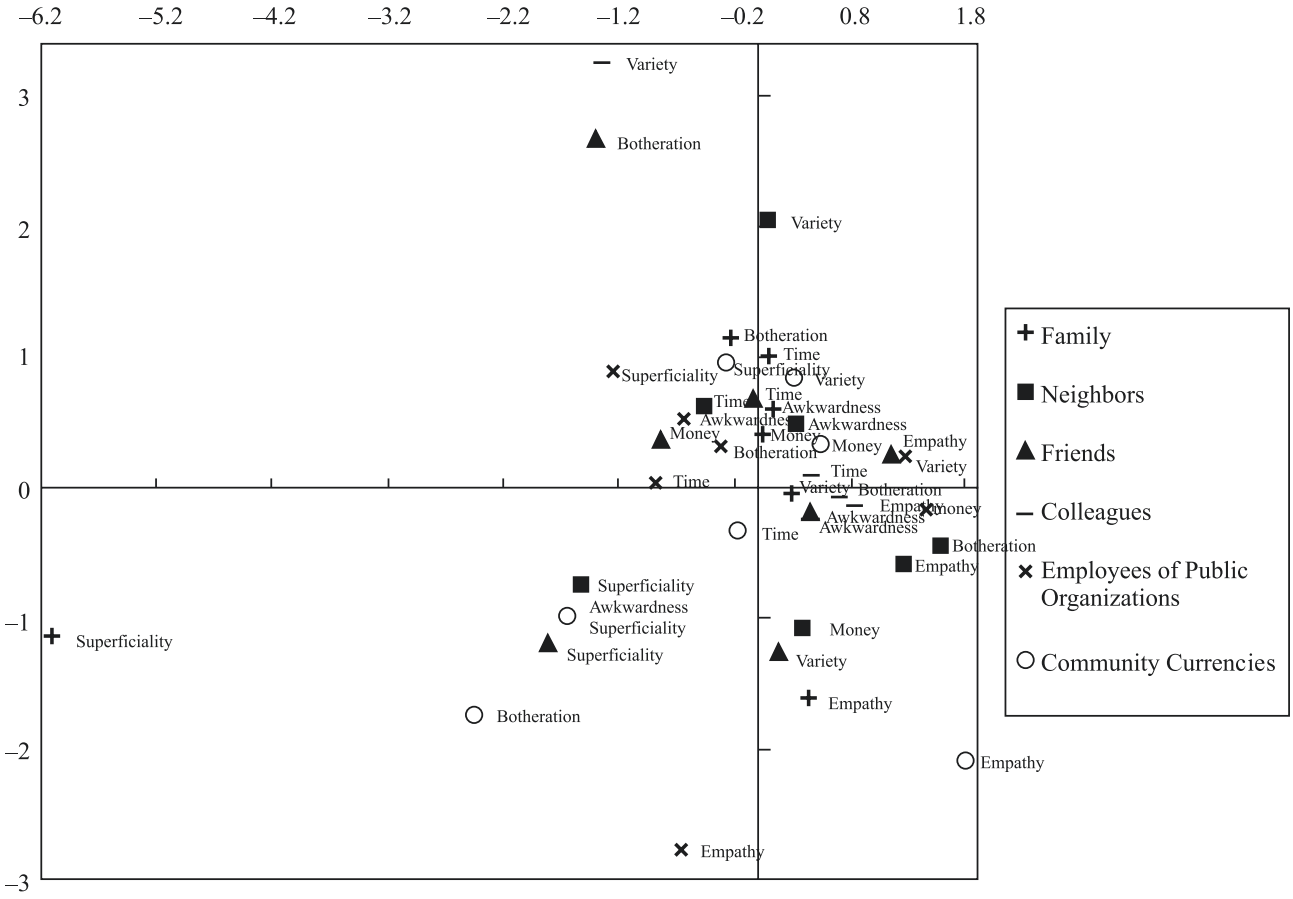


Figure 3. Advantages of support received by the use of community currencies (Ichi-Muraoka)



3.3 Functions of Community Currencies as a Source of Social Support

This section analyzes the types of advantages that community currencies have compared with other support sources. For each of the seven categories, except "others," we asked questions about the advantages of community currencies as a source of social support with regard to the following seven answers: "it saves time," "it saves money," "it enables close mutual support," "it doesn't feel awkward," "it enables superficial mutual support," "it is not bothersome," and "we can request various things" (multiple answers allowed). As for this question, we used Hayashi's quantification method type III (lso known as correspondence analysis)[7].

Figures 2 and 3 show a combination of category scores in the first and second axes of each support source for BYTS and Ichi-Muraoka, respectively. In the charts, "time," "money," "empathy," "awkwardness," "superficiality," "botheration," and "variety" correspond to the aforementioned seven answers respectively.

First, we verify the benefits of support to see from which axis they can be evaluated. "Family," "friends," "colleagues," "employees of public organizations," and "community currencies" in Ichi-Muraoka and "colleagues" in BYTS place "empathy" at one extreme and "superficiality" of support at the other extreme of the axis, which reveals that an axis to evaluate the <depth> of support exists. Additionally, "family," "neighbors," "friends," and "community currencies" in Ichi-Muraoka, as well as "family" and "community currencies" in BYTS, place "botheration" at one extreme and "empathy," "superficiality" and "variety" of support at the other extreme of the axis, which reveals that an axis to evaluate the <troublesomeness> of receiving support exists.

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

As shown above, if we are to evaluate community currencies from the aspects of <depth>and <diversity> of support and of <troublesomeness> and <hesitation> in receiving support, "time," "money," "superficiality," and "variety" gather near the original point in Ichi-Muraoka. This can be interpreted as indicating that while one can receive <superficial> and <diverse> support, some <troublesomeness> and <hesitation> accompany it. "Time," "money," "empathy," "superficiality," and "awkwardness" gather near the original point in BYTS, which indicates 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 <troublesomeness> of receiving support.

On one hand, Ichi-Muraoka attracts attention in that community currencies are regarded as capable of giving <superficial> and <diverse> support, which means that support can be received with "weak ties." On the other hand, BYTS draws attention in that community currencies are thought of as capable of giving <superficial> and <deep> support, which means that support can be received with "strong ties" at the same time[8].

While the two organizations are thought of as slightly different regarding the benefits of support sources in community currencies, what is common in the two organizations is that both are thought of as involving <troublesomeness> in the receipt of support, which suggests that this may be one of the potential general problems that C2C-model community currencies share in the effort to provide social support.

Next, we examine which of the six types of support are appropriate for community currencies to provide. Tables 7 and 8 show the differences between the mean support scores in Ichi-Muraoka and BYTS.

In Ichi-Muraoka, the means of "economic support" and "social companionship support" are significantly lower than those of the other four types. This is due to the system conditions of Ichi-Muraoka as well as the sociocultural environment in Muraoka-town, rather than the nature of community currency itself. While BYTS uses a LETS system and transactions of goods and services circulating in the markets are not prohibited, Ichi-Muraoka uses the "Eco Money" system and transactions of goods and services sold and purchased in the markets are impossible. Therefore, "economic support" is difficult to receive in Ichi-Muraoka. In addition, Muraoka-town retains strong regional and family ties from olden times and human relationships within the village have already been established. Thus, there is a low likelihood that community currency activities provide "social companionship support." As for BYTS, the means of "emotional support" and "appraisal support" are significantly lower than those of the other four types. This indicates that BYTS is relatively more suitable for providing tangible support, such as "instrumental support," "informational support," "economic support," and "social companionship support," rather than psychological and intangible support, such as "emotional support" and "appraisal support."

7 In Hayashi's quantification method type III, the frequently selected items are plotted around the origin.

8 The combination of these two advantages is something no other support sources have and is therefore assumed to be a feature of community currencies.

3.4 Social relationship and structural factors that affect the provision of social support

Community currency transactions are "embedded" in social relationships and structures (Nakazato, 2007) and it is assumed that the social support brought about directly and indirectly by such transactions is influenced by social relationships and structures. In order to study the social relationship and structural factors that affect the provision of social support, we conducted an exploratory path analysis with six types of support scores as dependent variables and indegree (the amount of received goods and services), outdegree (the amount of provided goods and services), the sum of indegree and outdegree, the value of indegree per tie, the value of outdegree per tie, the sum of indegree and outdegree per tie[9], reciprocity[10], effectiveness[11], structural constraint[12], density[13], cluster coefficient[14], betweenness centrality[15], flow centrality[16], indegree closeness centrality, outdegree closeness centrality[17], sex, and age as independent variables.

The results of a path analysis for Ichi-Muraoka and BYTS are presented below. All coefficients in the figures are statistically significant at the 1% or 5% level, or have a significant tendency at the 10% level. The goodness of fit (GFI) shown in the lower part of the figures for both Ichi-Muraoka and BYTS reached an acceptable level.

As for Ichi-Muraoka, first, "the amount provided and received" has a positive influence on the provision of "appraisal support," "social companionship support," and "instrumental support,"although the degree of influence in each item is small. Both "appraisal support" and "social companionship support" can express sympathetic support with others and are capable of generating sympathetic connections by the frequent use of community currencies. On the other hand, "the amount provided and received" has a positive influence on the provision of "instrumental support" because the main use for community currencies in Ichi-Muraoka was to provide a means of transportation when elderly people go shopping or to the hospital. In other words, frequent users of community currencies in Ichi-Muraoka often use transportation services, so "instrumental support" is provided.

Furthermore, the fact that "indegree closeness centrality" has positive coefficients for "economic support" and that the same is true in the "effectiveness" of 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. This means that various resources that exist in the social network become accessible by shortening the distance and that accessibility improves by decreasing redundancy in network structure (Figure 4).

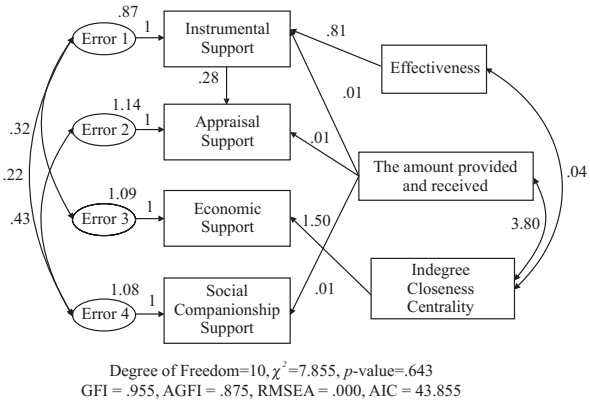


Figure 4. Structural factors of various support scores received by participating in community currency activities (Ichi-Muraoka)

9 All of the "values per tie" are calculated by [degree centrality in weighted network (the amount of goods and services received and provided)]/[degree centrality of binary network (the number of others from whom an ego received and to whom it provided goods and services)].

10 The degree of mutuality of ties, calculated by the reciprocal of the absolute value of the difference between the indegree and outdegree.

11 The "effective size" of an ego's network is obtained by subtracting the degree of connections among neighborhoods from the network size of the ego. "Effectiveness" is obtained by "effective size"/"network size."

12 When an ego is connected with neighborhood A and has few neighborhoods other than A, and the neighborhoods other than A are connected with A, the ego is "constrained" by A because doing something without A's influence becomes difficult. By summing bilateral "constraints," the "structural constraint" an ego receives from the entire network is calculated.

13 The density of an ego's network is obtained by [the number of actually present ties]/[the number of possible ties within the network].

14 A cluster is a triangle connected by three nodes. The clustering coefficient represents the degree to which a network contains clusters.

15 The measure of the degree to which an ego mediates among others in a network.

16 A kind of betweenness centrality measure suitable for analyzing weighted networks.

17 Closeness centrality is one type of centrality measure based on distance. It is obtained by summing the shortest distances from an ego to other nodes.

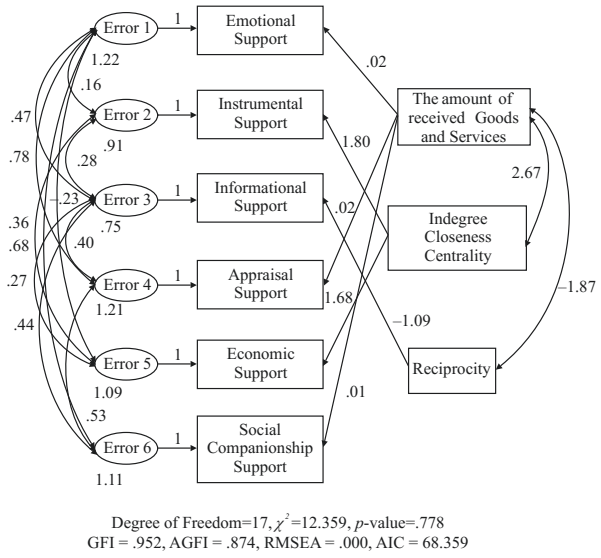


Figure 5. Structural factors of various support scores received by participating in community currency activities (BYTS)

Regarding BYTS, as was seen in Ichi-Muraoka, the frequent use of community currencies generates sympathetic support, as "the amount of received goods and services" positively influences "emotional support," "appraisal support," and "social companionship support." We can also point out that the closer the distance is with others in a social network, the easier it is to obtain various resources, as in Ichi-Muraoka, because the "indegree closeness centrality" has positive coefficients for "economic support" and "instrumental support." In addition, the values of "reciprocity" negatively impact "informational support." This seems to occur because those who make reciprocal transactions in BYTS tend to build a fixed relationship with specific individuals[18], making it difficult to receive support that requires "weak" ties, such as "informational support" (Figure 5).

4. DISCUSSION AND CONCLUSION

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

1. While the transfer of social support by community currencies does not affect the quality of life of all members in a significant way, it makes members aware that it could be related to their lives if they become conscious of it.

2. Community currencies are peripheral and supplementary support sources for members.

3. The types of advantages that a community currency has when compared with other support sources, and the suitable types of support that community currencies provide, depend upon the system of the community currency itself as well as the socio-cultural environment of the community in which the system is used. Ichi-Muraoka is considered to provide support "rich in diversity" in a "superficial" relationship, which matches the theory regarding the strength of "weak" ties. BYTS is considered to build relationships, which are not only "superficial" but also "deep" or, in other words, "strong" ties.

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

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

Our four hypotheses are mostly supported and community currencies proved to be capable of giving support with "strong" ties for 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.

However, 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. As shown in point 3 of the analysis above, the collection of ethnographic information in a given region, accompanied by questionnaire surveys, as well as the social network analysis of social support transfers, such as the ones that we conducted, are found to be potentially helpful as guidelines in considering the socio-cultural characteristics of a region in order to successfully introduce community currencies or to improve the performance of existing community currency organizations.

This paper focuses on an analysis of the general functions of community currencies as they relate to providing social support and does not touch upon the specific relationship of social support transfers to members. Further surveys are to be conducted about these issues and will be discussed in another paper.

18 The "reciprocity" here is not reciprocity between two individuals but reciprocity among the overall network members. However, in reality, those with high "reciprocity" had a tendency to conduct transactions within the fixed relationship.

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