

# 5th Biennial RAMICS International Congress in Japan

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Hida-Takayama, Japan

## **Relationship between community currency issuance organization's philosophy and its issuance form: A Japanese case study**

Masayuki Yoshida\*, Shigeto Kobayashi\*\*, Yoshihisa Miyazaki\*\*\*

*\*Graduate School of Education, Joetsu University of Education, Joetsu, Japan,*

*yoshida@juen.ac.jp*

*\*\*School of Knowledge Science, Japan Advanced Institute of Science and Technology, Nomi, Japan,*

*s-kobaya@jaist.ac.jp*

*\*\*\* National Institute of Technology, Sendai College, Natori, Japan,*

*frontier-spirit-21-y.m@nifty.com*

### **Abstract (no longer than 200 words)**

What kind of values and ethics do analog or digital community currency (CC) issuance organizations focus on? We conducted a questionnaire survey on a total of 117 CC issuance organizations in Japan. In this survey, we categorized the target organizations into four groups based on their issuance philosophy. Then, we found three major factors related to the self-evaluation regarding the impact of CC issuance on society. Under such classification, we found the relationship between issuance philosophy and their CC evaluation, and the relationship between issuance philosophy and their issuance form. From these results, we observed that the issuance philosophy does not uniquely decide the issuance form, but an organization issuing digital CC emphasizes economic value as a philosophy. In addition, we considered that organizations emphasizing on economic value when issuing digital CCs may provide positive feedback; they will emphasize on economic value based on self-evaluation that results in fair and efficient trade using digital CCs.

Our survey provides some explanations for issuance organizations that use CC as a medium for conveying certain values and ethics.

### **Keywords (3-5 keywords)**

currency issuance philosophy, currency issuance form, community currency as a medium, questionnaire survey

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## 1. Introduction

In Japan, 792 community currencies (CCs) were issued by 2016 (Kobayashi, Miyazaki and Yoshida, 2017). Kobayashi, Miyazaki and Yoshida (2017) point out that the combinations of issuance purposes have changed in line with the Japanese economy and society<sup>1</sup>. For example, the number of CC issuances peaked in Japan around 2002. During this time, the CCs aimed at forming people's connections and regional economic revitalization were overwhelmingly large. However, after 2012, the CCs aimed at the revitalization of forestry and regional economies were the largest issuance type. According to them, one of the main reasons behind the change in combinations of issuance purposes is the propagation mechanism of a CC issuance organization's circulation model to other organizations. It is important that such propagation mechanism includes not only the issuance form of CC but also the values to be emphasized in CC issuance.

In addition, digital CC issuance has been rapidly increasing in Japan. Although such digital currency has initial implementation costs and security issues, it has many advantages too, such as ease of management, reduction of operation cost, and acquisition of more accurate transaction data<sup>2</sup>. Tanabe and Niitsu (2016) point to the potential of digital currency technology to further enhance the economic functions of CC in Japan. In addition to the advantages for the issuer, the users are also evaluated differently for digital and analog CCs. Using a game simulation, Yoshida and Kobayashi (2019) observe that participants evaluated digital CC to have economic effects, while analog CC strengthened community ties. Based on these studies, digital CC seems to have an advantage over analog CC in economic function. It is necessary to verify not only the convenience but also the effects of digital CC that has appeared in recent years, in comparison to analog CC.

In this study, we position CC as a socio-economic system that builds on its own values and ethics; CC is positioned as a medium for instilling the emphasized values and ethics in the system<sup>3</sup>. Therefore, we first consider the philosophy emphasized by local currency issuing organizations. This philosophy implies the

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<sup>1</sup> Kobayashi, Miyazaki and Yoshida (2017) classify CCs in Japan into five clusters in terms of environment and regional activities: revitalization of regional economies based on environmental protection and resource circulation multipurpose CCs; revitalization of forestry and regional economies; formation of people's connections and regional economic revitalization; and promotion of regional activities and community welfare based on people's connections.

<sup>2</sup> Bank for International Settlements (2015) points out that digital currency has three aspects. The first aspect is the assets featured in many digital currency schemes. The second aspect is the way in which digital currencies are transferred, typically via a built-in distributed ledger. The third aspect is the variety of third-party institutions, almost exclusively non-banks. Digital CC, which is the subject of this study, is a kind of digital currency with these three features.

<sup>3</sup> Nishibe (2013) points to the feature of CC as a communication medium. According to this, people use multiple currencies to maintain interest, values and ethics, and uniqueness of the region, organization, and group.

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combination of values and ethics that the CC issuance organization emphasizes. We will analyze whether CC issuance purposes and forms are different according to such differences in philosophy, and what kind of self-evaluation is being performed by such organizations. Through these analyses, we explore how the properties of CC as a medium differ depending on issuance philosophy.

## 2. Questionnaire survey design

This study must clarify the following four points: the issuance organizations philosophy, the issuance purpose, self-evaluation of their CC, and the issuance form of CC. For this reason, this study uses a questionnaire survey for CC issuance organizations in Japan. We conduct the questionnaire survey on a total of 117 CC issuance organizations. The targets of the survey are the CC issuance organizations currently in operation from the survey list by Kobayashi, Miyazaki and Yoshida (2017), along with digital CC issuance organizations that have been newly established since 2016<sup>4</sup>. In this survey, we clarify how the philosophy (values and ethics) of each CC issuance organization influences its issuance form and evaluation. The questionnaire responses were collected from the representatives of each CC organization.

Regarding the philosophy emphasized by the organization, we ask the following 10 questions (Table 1). We asked each organization to give a five-point rating for each of these questions (5: very important, 1: not important at all).

**Table 1 Ten questions about the philosophy of CC issuance organization**

- |  |
|--|
| <ol style="list-style-type: none"><li>1. Revitalization of the regional economy</li><li>2. Reconstruction of the relationship between local residents</li><li>3. Support for the socially vulnerable</li><li>4. Promotion of regional environmental conservation activities</li><li>5. Improving the local living environment</li><li>6. Activation and continuation of local culture and tradition</li><li>7. Robustness of the financial system</li><li>8. Efficient financial system</li><li>9. Creation of new assets</li><li>10. Diversification of payment methods</li></ol> |
|--|

In order to know the issuance purposes, we prepared ten categories and asked the respondents to select

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<sup>4</sup> Digital CCs issued before 2016 are included in the list of Kobayashi, Miyazaki, and Yoshida (2017).

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all that apply (Table 2).

**Table 2 Ten categories of issuance purpose**

1. Supply of local activity funds
2. Enrichment of local communication
3. Promotion of consumption within the region
4. Promotion of welfare and medical care
5. Promotion of resource recycling
6. Conservation and restoration of the natural environment
7. Securing public facilities' management and operating expenses
8. Activation of festivals and events in the region
9. Activation of exchanges outside the region
10. Others

In order to understand how the CC issuance organization evaluates the issuance CC, we asked for responses to the following 15 questions on a five-point rating scale (5: I think so very much, 1: I do not think so at all) (Table 3)<sup>5</sup>. By analyzing these responses, we will clarify how CC issuing organizations consider their CC to affect society.

**Table 3 Fifteen questions for issuance CC self-evaluation**

1. It is desirable to use the currency issued by your organization as a reward if you want others to do something
2. The currency issued by your organization leads to efficient trading
3. The currency issued by your organization brings about fair trade
4. You can increase social diversity using the currency issued by your organization
5. You can create new products and services using the currency issued by your organization
6. By using the currency issued by your organization, you can support socially vulnerable people as members of society
7. Enrich the culture using the currency issued by your organization
8. Become more compliant with rules and laws using the currency issued by your organization
9. You can control the use of materials and resources by the currency issued by your organization
10. If you have a currency issued by your organization, people's actions and thoughts will be more free

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<sup>5</sup> We referred to Corrons (2017) for developing these questions.

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11. As you use the currency issued by your organization in various aspects of society, the norms for determining good and evil change
12. You can achieve personal success using the currency issued by your organization
13. You can achieve social stability by trading with the currency issued by your organization
14. Trade with the currency issued by your organization respects individual dignity
15. You can bring trust to others using the currency issued by your organization

For the CC issuance form, we prepared eight categories and asked the respondents to select all that apply. We classify these forms into the analog- and digital-types (Table 4). Contact type makes a transaction with a reader like a credit card. Non-contact type makes a transaction by holding the card over the reader, although a reader is similarly used. In code reading type, a QR (Quick Response) code or bar code is displayed using an application on a smartphone and read by an application on the other side to complete a transaction. Online settlement type makes a payment using a transaction site on the Internet.

**Table 4 Issuance form of CC**

Category	Question items	
Analog-type	1. Banknote, 2. Passbook, 3. Bill	8. etc.
Digital-type	4. Contact type (plastic card), 5. Non-contact type (NFC (Near Field Communication), Felica), 6. Code reading type (QR code, bar code), 7. Online settlement	

The following procedure is used to analyze the relationship between these three elements. First, we conduct the factor analysis of the questions related to the issuance philosophy, and cluster the issuance organizations based on the subscale factor scores. Then, we examine the issuance philosophy of each cluster. Second, we conduct the factor analysis on the self-evaluation of the CC's influence on the society, and the subscale factor score is compared by cluster based on the issuance philosophy. When conducting these analyses, it is possible to examine the characteristics of the CC as a medium connecting the issuance philosophy with its results by focusing on the differences in the issuance purposes and the ratios of the issuance forms for each cluster.

## 3. Results

### 3.1 Questionnaire response

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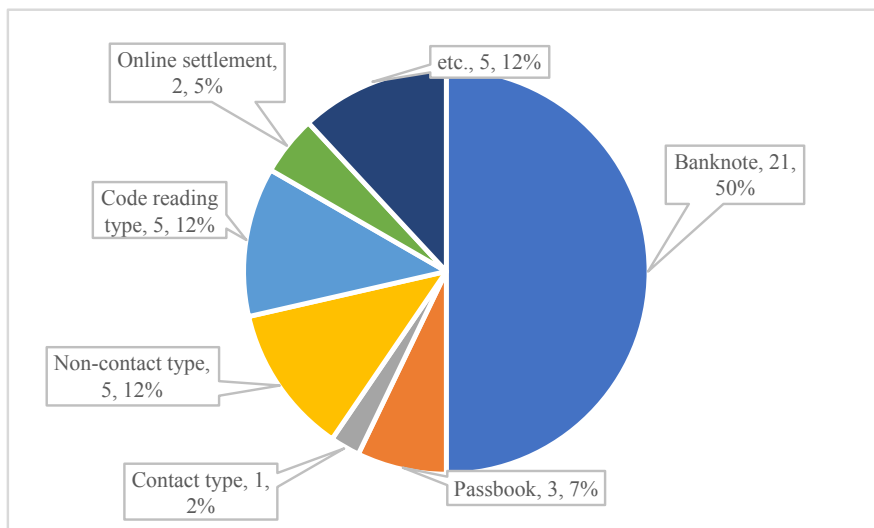
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We sent the questionnaire to 117 CC issuance organizations (104 for analog CC, 13 for digital CC) in Japan. We prepared two questionnaire formats: paper and web. The respondents could choose to either mail their responses to the paper questionnaire or enter their responses in the web-questionnaire. Responses were collected from March 22, 2019 to April 5, 2019. We received 39 responses, and 38 responses were valid. The effective response rate was 32.5% on total, 25% on analog CC, and 76.9% on digital CC (Table 5).

Figure 1 shows the issuance forms from the organizations' questionnaire responses. Some organizations are shown as taking multiple issuance forms. This figure shows that banknote is the most common type of analog issuance, while the digital type takes various forms, including mailing lists, shards of glass, stickers, and coins.

**Table 5 Questionnaire response**

	Survey target	Response	Response rate
Analog CC	104	26	25%
Digital CC	13	10	76.9%
Combined Analog and Digital CC	---	2	---
Total	117	38	32.5%



**Figure 1 The issuance form of CC organization**

### 3.2 Cluster analysis based on the currency issuance philosophy

First, we conducted factor analysis based on the main factor method for 10 items of the currency issuance philosophy (Table 6).

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**Table 6 Factor analysis for 10 items of the currency issuance philosophy (n=37)**

	I	II
F1: enrichment of economic environment $\alpha = 0.891$		
efficient financial system	1.002	-0.074
robust financial system	0.963	0.007
diversification of payment methods	0.886	0.017
creation of new asset	0.594	0.268
revitalization of local economy	0.489	-0.199
F2: fulfillment of the social environment $\alpha = 0.706$		
improvement of local living environment	0.02	0.761
promotion of global environmental protection activities	-0.148	0.707
reconstruction of the relationship between local residents	-0.169	0.481
support for the socially vulnerable	0.101	0.457
revitalization and continuation of local culture and tradition	0.116	0.419
Factor correlation matrix	I	II
	I	0.428

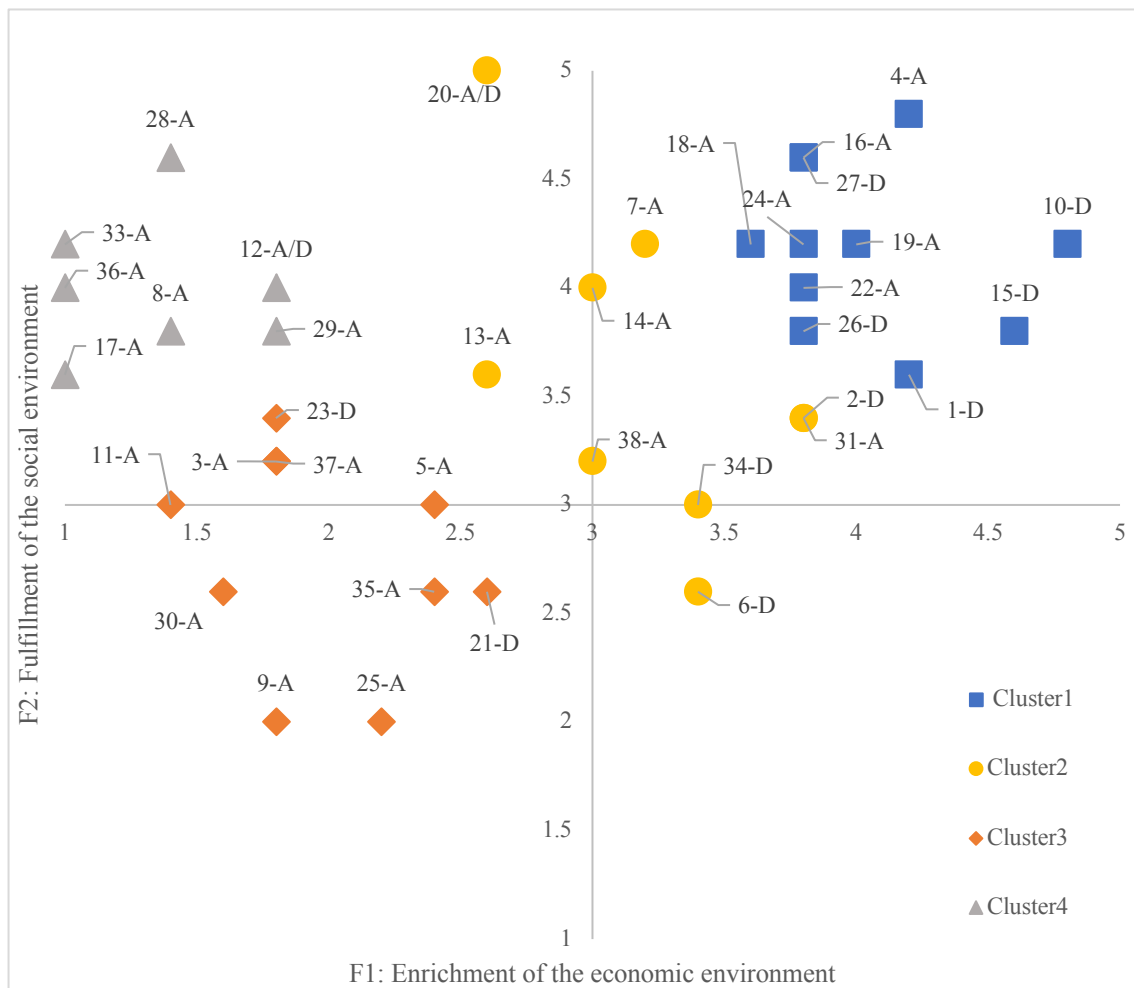
Two factors are adopted from the results of the analysis. We performed factor analysis with maximum likelihood method and Promax rotation for these factors. The factor loadings of all 10 items were 0.4 or more; these values were not observed for the two adopted factors. We named the enrichment of the economic environment as the first factor (F1), and the fulfillment of the social environment as the second factor (F2). The Cronbach's alpha coefficient was 0.891 for F1 and 0.706 for F2.

Then, we conducted a hierarchical cluster analysis of 37 CCs based on the subscale scores of the two factors (Figure 2). The ward method was used for clustering, and the square Euclidean distance was used as the measurement method. In Figure 2, the first number on the label indicates the ID of CC, and the alphabet after the hyphen indicates the form of currency. A indicates analog currency, D indicates digital currency, and A/D indicates a combination of analog and digital currencies. The horizontal axis shows the F1 score and the vertical axis shows the F2 score. The scores range from 1 to 5 (5: very important, 1: not important at all). The correlation coefficient of F1 and F2 was 0.287.

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**Figure 2 Four clusters of the currency issuance philosophy**

First, we observe that a few issuance organizations emphasize the enrichment of economic environment by neglecting the fulfillment of social environment. Table 6 shows the average subscale scores of F1 and F2 to be 2.7676 and 3.6216 in total, respectively. This means that these CCs prioritize social environment fulfillment over economic environment enrichment as a whole<sup>6</sup>. Kobayashi et al. (2018) show that CC officials emphasize the publicity rules over financial officials; our study has a lot in common with this study.

<sup>6</sup> The case 6-D is an electronic version of a gift certificate used by tourists to purchase accommodation, meals, and souvenirs, and is not designed for use by local residents. See Shimatoku Tuka (2019).



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**Table 7 Cluster comparison of subscale scores on the currency issuance philosophy**

	Cluster	n	Ave.	SD		
Factor1: Enrichment of the economic environment	1	11	4.04	0.38	F(3,33)=84.22	p=.000
	2	9	3.2	0.45		
	3	10	1.98	0.39		
	4	7	1.34	0.36		
	Total	37	2.77	1.12		
Factor2: fulfillment of the social environment	1	11	4.18	0.37	F(3,33)=15.823	p=.000
	2	9	3.6	0.71		
	3	10	2.76	0.49		
	4	7	4	0.33		
	Total	37	3.62	0.75		

Second, when compared to the average, the four clusters show the following features (Table 7). Cluster 1 emphasizes both factors. Cluster 2 emphasizes the enrichment of economic environment and the fulfillment of social environment at the same level as the overall average. Cluster 3 is below average for both factors. Cluster 4 does not emphasize the enrichment of the economic environment more than the overall average but emphasizes the fulfillment of the social environment. Comparing the mean of the subscale scores, we find significant differences among all clusters for F1, while cluster 3 has a significantly lower score than the other three clusters for F2. Concerning the issuance philosophy, it means that while clear differences exist among the four clusters on the enrichment of the economic environment (from emphasis to no emphasis), all clusters except cluster 3 emphasize on the fulfillment of the social environment.

Third, it shows that there are analog and digital currencies in every cluster (Table 8). There was no significant difference in the issuance form because of the difference in the issuance philosophy.

**Table 8 Issuance form of each cluster**

Cluster	AC	DC	AC/DC	total
1	6	5	0	11
2	5	3	1	9
3	8	2	0	10
4	6	0	1	7
Total	25	10	2	37

Because each factor consists of five items, the issuance organizations of cluster 1 emphasize on all the

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items while other clusters emphasize on some items while not emphasizing on others; therefore, the average factor score may be low. Figure 3 shows the subscale scores of issuance philosophy for each item by cluster. The solid line shows the average of each cluster, and the broken line shows the overall average. Cluster 1 exceeds the average value for all items, indicating that it emphasizes on all items. Cluster 2 is close to the average except for new asset creation. Cluster 3 is lower than average, except for local economic revitalization. In addition, economic revitalization and local relationship reconstruction are not given much importance. In cluster 4, the part related to F2 is close to the average value, and the support for the socially vulnerable and restructuring of local residents' relationships is the highest. On the other hand, the items related to F1 are lower than the average, which indicates that these items are not important for the issuance organizations in cluster 4.

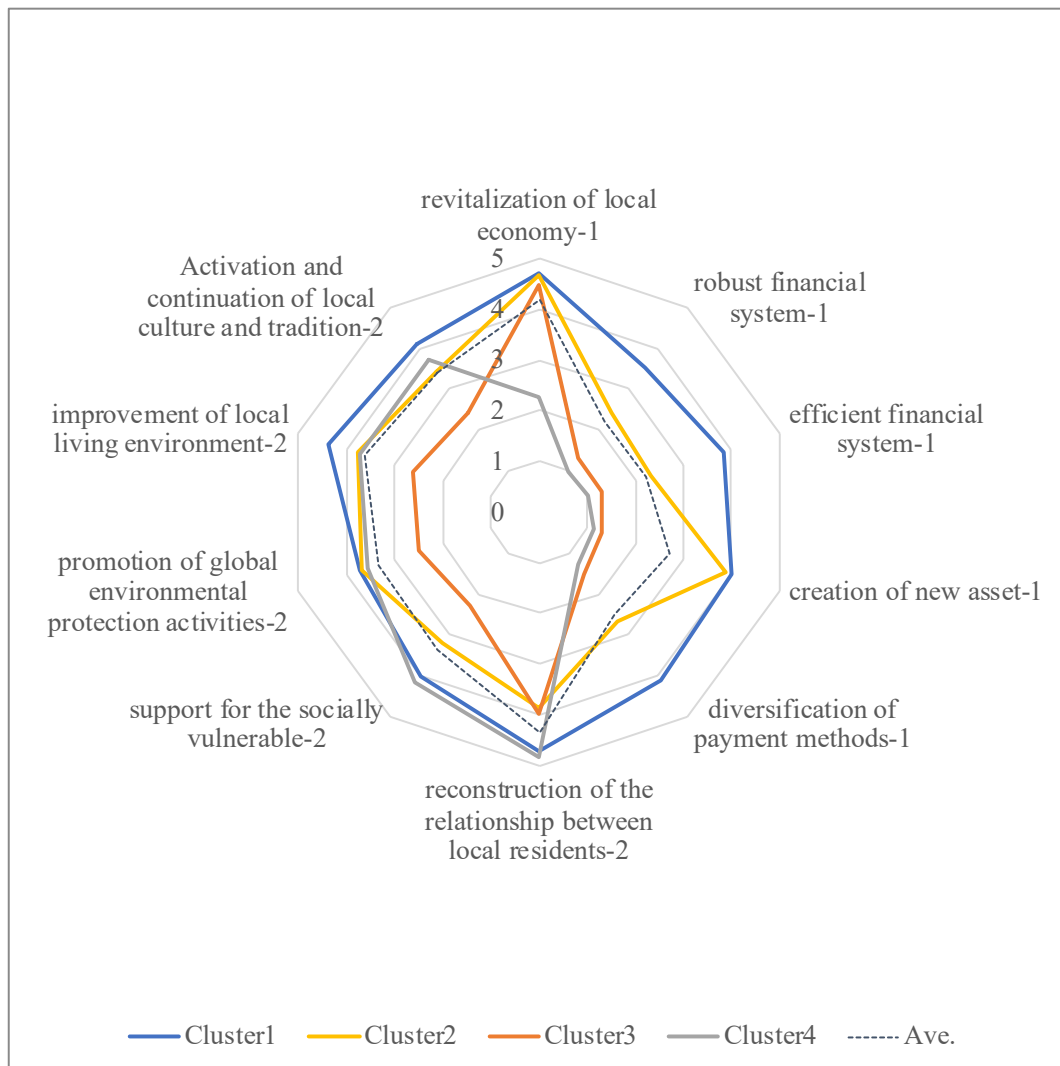


Figure 3 The subscale score of issuance philosophy for each item by cluster

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### 3.3 The self-evaluation of the CC: impacts on society

Next, we look at the results of the self-evaluation of CC. Factor analysis based on the main factor method was performed on 14 of the 15 questions asked about the impacts of issued CC on society by each organization<sup>7</sup> (Table 9).

**Table 9 Factor analysis of the impact of issued CC on society (n=38)**

	I	II	III
F1: Formation of connections to accept various individuals $\alpha=.854$			
Personal dignity	1.016	-0.107	-0.05
Social inclusion	0.813	-0.117	-0.041
Trust in others	0.726	0.162	0.04
Cultural enrichment	0.464	0.242	0.167
Social stability	0.439	0.109	0.407
F2: Realization of a free and diverse society $\alpha=.868$			
Control how to use supplies and resources	-0.285	0.909	0.071
Transformation of norms	0.185	0.787	-0.197
Create new products and services	0.062	0.634	-0.056
Freedom of action and thought	0.394	0.602	-0.086
Personal success	0.089	0.599	0.057
Compliance with laws and regulations	0.048	0.521	0.188
Social diversity	0.344	0.396	0.012
F3: Realization of fair and efficient trade $\alpha=.804$			
Fair trade	0.069	-0.138	1.071
Efficient trade	-0.286	0.475	0.491
Factor correlation matrix			
I	1	0.494	0.184
II		1	0.567

We adopted three factors from the results of this analysis. We performed factor analysis with unweighted least squares method and Promax rotation for these factors. We named the formation of connections to accept various individuals as the first factor (F1), the realization of a free and diverse society as the second factor (F2), and the realization of a fair and efficient trade as the third factor (F3). The Cronbach's alpha coefficients are 0.854 for F1, 0.868 for F2, and 0.804 for F3.

The F1 component measures the fulfillment of the social environment, and the F3 is an index for

<sup>7</sup> The question "It is desirable to use the currency issued by your organization as a reward if you want others to do something" was excluded from the analysis as the score for commonality was low.

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measuring the enrichment of the economic environment, while F2 is an index for measuring both social and economic environment.

**Table 10 The correlation coefficient of three factors of the self-evaluation of the issue CC**

	F1: Formation of connections to accept various individuals	F2: Realization of a free and diverse society	F3: Realization of fair and efficient trade
F1	1	.634**	.287
F2		1	.536**

\*\* p<.01

The correlation coefficients are in table 10. There is a positive correlation between F1 and F2, and F2 and F3. It means that CC is evaluated as realizing a free and diverse society, as being able to form various individual connections, and realizing fair and efficient trade. This is derived from the fact that the factor that realizes a free and diverse society consists of indicators related to both economy and society.

Figures 4 and 5 are the scatter diagrams showing the self-evaluation of CC issued for each of the four clusters of the issuance philosophy. In Figure 4, the horizontal axis represents the subscale score for F1 and the vertical axis represents the subscale score for F2. In Figure 5, the horizontal axis represents the subscale score for F3 and the vertical axis represents the subscale score for F2. The scores range from 1 to 5 (5: I think so very much, 1: I do not think so at all).

Figure 4 shows how well the social functions of the issued CC have been demonstrated. Most CCs are located in the first and third quadrants. The four CCs positioned in the 4th quadrant emphasize the connection within and outside the region, and realizing social diversity is not included as an issuance purpose<sup>8</sup>. The CC with the lowest evaluation, (30-A)—evaluated as paying a reward—which was excluded in this analysis, was fully realized, but not realized at all for others. On the other hand, the CC with the highest evaluation (16-A) has generally been realized, except for items such as fair trade and compliance with rules and regulations. In addition, many CCs in cluster 3 are located in the 3rd and 4th quadrants, and it can be seen that these CCs have not been evaluated as realizing free and diverse societies.

Figure 5 shows the relationship between the realization of a free and diverse society and the realization of a fair and efficient trade. This implies evaluating the extent to which a CC realizes not only social

<sup>8</sup> These four CCs emphasize the formation of connections, such as those that support agriculture and industry in the region, those that support post-earthquake reconstruction, and those that support parenting.

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functions but also economic functions for the society. Unlike Figure 4, most CCs are located in the 1st and 4th quadrants. This indicates that many CCs value fair and efficient trade. Figure 5 also shows that the majority of CCs that have been evaluated as not resulting in fair and efficient trade are in cluster 4. This is the result of the relationship with the issuance philosophy that Cluster 4 emphasizes.

In addition, there are many CCs on the vertical line. This is because realizing a free and diverse society include economic factors such as controlling how to use supplies and resources and creation of new products and services, and social factors such as freedom of action and thought and social diversity. CCs in the 4th quadrant (3-A, 12-A/D, 6-D, 5-A, 9-A, 21-D, 25-A) have a lower reputation for these economic functions than CCs in the 1st quadrant.

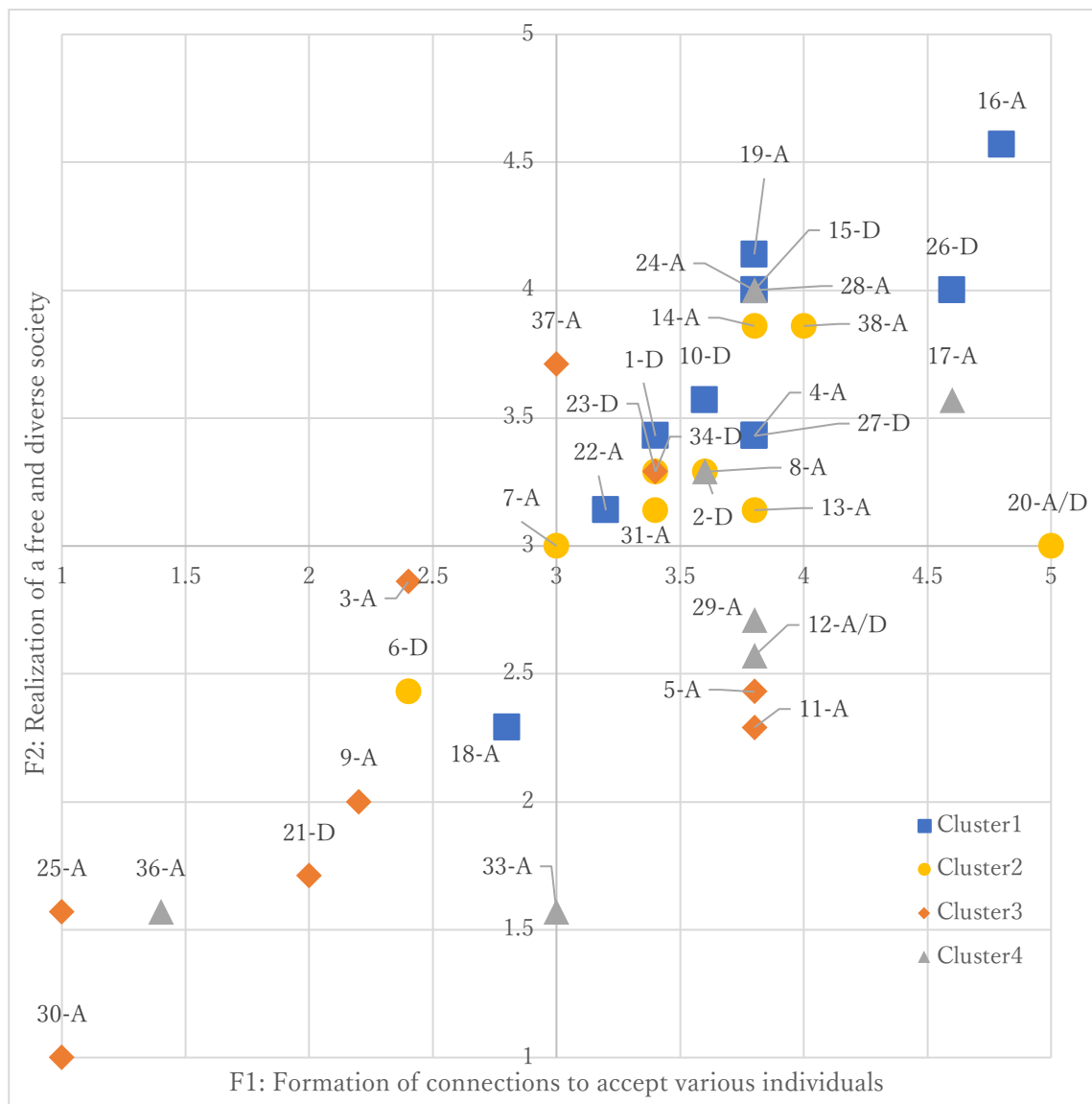
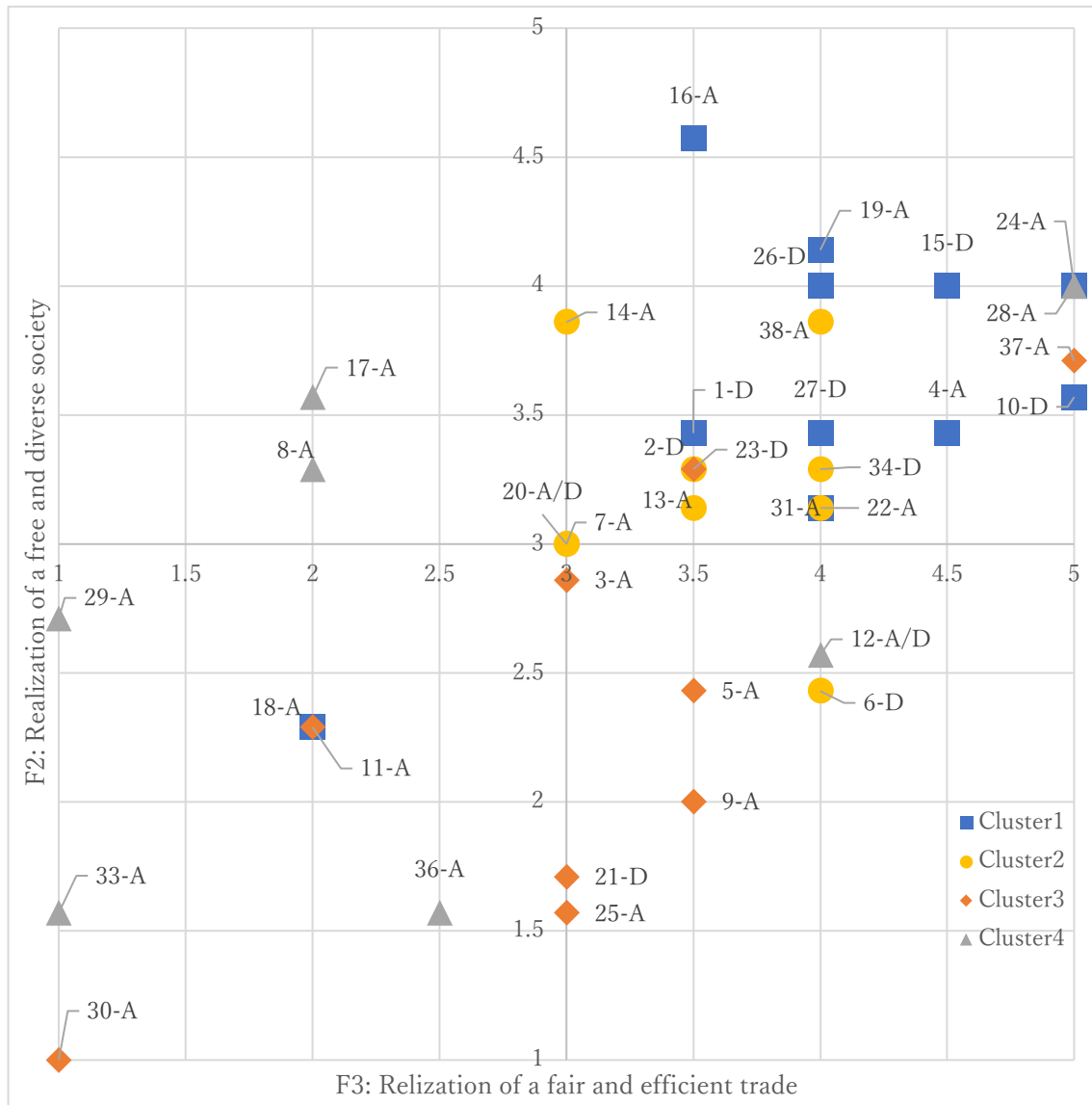


Figure 4 The self-evaluation of CC by four clusters (F1 and F2)

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**Figure 5 The self-evaluation of CC by four clusters (F2 and F3)**

Table 11 compares the average of the subscale scores for the three adopted factors by cluster of the issuance philosophy. Cluster 1 is higher than the average for all three factors and it can be seen that the issuance organizations from this cluster give higher evaluations for their CCs. Although cluster 2 is lower than cluster 1, it can be seen that they give higher evaluations for their CCs too. Conversely, it can be seen that the organizations belonging to cluster 3 rated their own CCs lower than average across all three factors. Lastly, the organizations belonging to cluster 4 evaluate F1 higher than the average only, and the other two factors are evaluated lower than the average. The evaluation of CC in cluster 3 for F1 and F2 is significantly lower than in cluster 1. For F3, the CC evaluation of cluster 4 is significantly lower than cluster 1. Cluster

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3 does not emphasize social fulfillment on the issuance philosophy, and it appears as a low evaluation of the influence that the CC issued by itself has on society. On the other hand, the fact that cluster 4 does not view CC issued by itself as bringing about fair and efficient trade is clearly influenced by an issuance philosophy that emphasizes social value over economic value.

**Table 11 Cluster comparison of subscale score on the evaluation of CC**

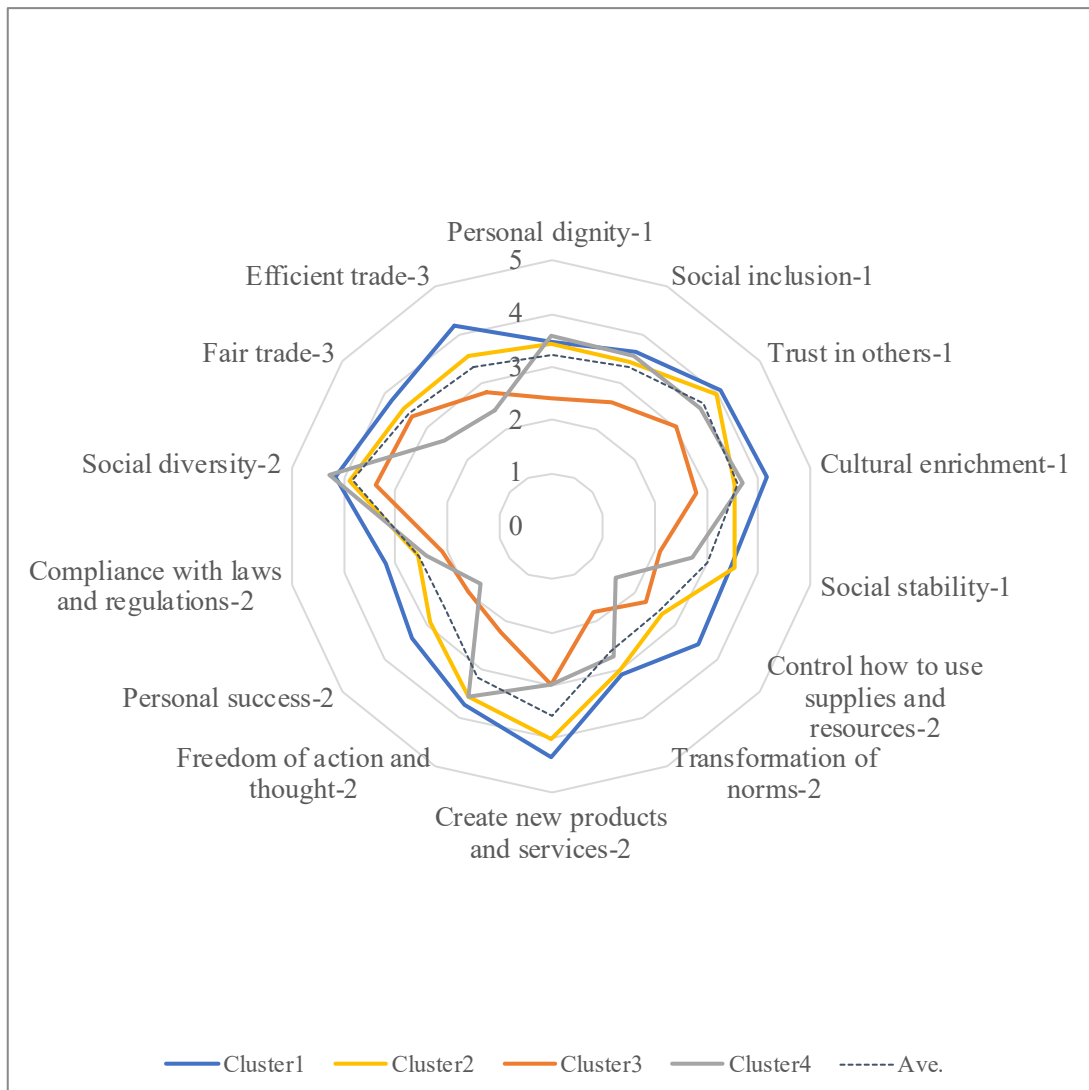
	Cluster	n	Ave.	SD		
Factor 1: Formation of connections to accept various individuals	1	11	3.76	0.56	F(3,33)=4.007	p=.015
	2	9	3.6	0.71		
	3	10	2.58	1.04		
	4	7	3.43	1.01		
	Total	37	3.34	0.94		
Factor 2: Realization of a free and diverse society	1	11	3.64	0.61	F(3,33)=5.681	p=.003
	2	9	3.22	0.44		
	3	10	2.4	0.85		
	4	7	2.76	0.94		
	Total	37	3.03	0.85		
Factor3: Realization of fair and efficient trade	1	11	4	0.84	F(3,32)=3.627	p=.023
	2	9	3.56	0.46		
	3	9	3.06	1.10		
	4	7	2.5	1.5		
	Total	36	3.36	1.11		

Figure 6 shows the subscale score for each item from these three factors. The solid line shows the average of each cluster, and the broken line shows the overall average. Cluster 1 is rated higher than average for all items. Among them, items such as efficient trade and creation of new products and services are high. Cluster 2 gives a rating close to the average for all items. Cluster 3 is below average for all items, and the self-evaluation is the lowest than the other three clusters. In particular, items such as personal dignity, social inclusion, social stability, freedom of action and thought are low. In cluster 4, items related to F1 are close to the average, while items related to F2 are lower than the average for economic function, and higher than the average for social diversity. F3 is rated lower than the other three clusters.

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**Figure 6** The subscale score of the self-evaluation of CC for each item by cluster

### 3.4 Analysis of CC as a medium

When analyzing the results of this survey, we consider the CC as a medium. The perspective of CC as a medium is based on three points. First, the CC issuance organization has a philosophy of emphasis. Second, issuance organization decides the issuance form according to the philosophy to be emphasized. Third, the philosophy emphasized by the issuance organization is realized by the user using the CC issuance form. In this analysis, we position CC as a medium for building a socio-economic zone based on specific values and ethics. One of the factors forming the medium is the issuance form, and the other is the distribution channel for using them.

As we have already seen, the issuance form was not determined from the issuance philosophy, but there is room to consider the influence of the issuance form (such as analog and digital) on the issuance



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philosophy and the self-evaluation of the issued CC. We compare analog and digital currency types, except for the combination of analog and digital currency types, with a small number of samples among these three forms.

First, we compare the CC issuance philosophy (Table 12). The table shows that digital CC emphasizes F1 more than analog CC. Although the currency issuance philosophy does not uniquely determine the issuance form, digital CC issuance organizations emphasize more on economic value than analog CC issuance organizations.

**Table 12 Comparison of issuance form of subscale score on the currency issuance philosophy**

	Cluster	n	Ave.	SD	t	DF	p
Factor1: Enrichment of the economic environment	Analog	25	2.47	1.07	-2.997	33	.005
	Digital	10	3.62	0.90			
Factor2: fulfillment of the social environment	Analog	25	3.6	0.77	0.362	33	.719
	Digital	10	3.5	0.65			

Next, we compare the self-evaluation of CCs. Table 13 compares the average of the subscale scores by issuance form. This table shows that self-evaluation of digital CCs rather than analog CCs brings about fair and efficient trade in society.

**Table 13 Comparison of the subscale score on the evaluation of CC**

	Cluster	n	Ave.	SD	t	DF	p
Factor 1: Formation of connections to accept various individuals	Analog	26	3.28	0.99	-0.355	34	.725
	Digital	10	3.4	0.73			
Factor 2: Realization of a free and diverse society	Analog	26	2.90	0.99	-1.01	34	.32
	Digital	10	3.24	0.69			
Factor3: Realization of fair and efficient trade	Analog	25	3.16	1.22	-2.44	32.029	.02
	Digital	10	3.9	0.57			

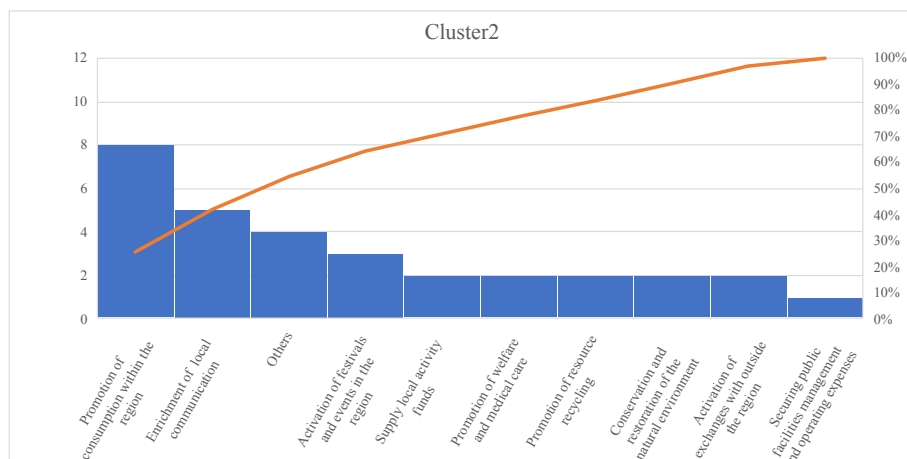
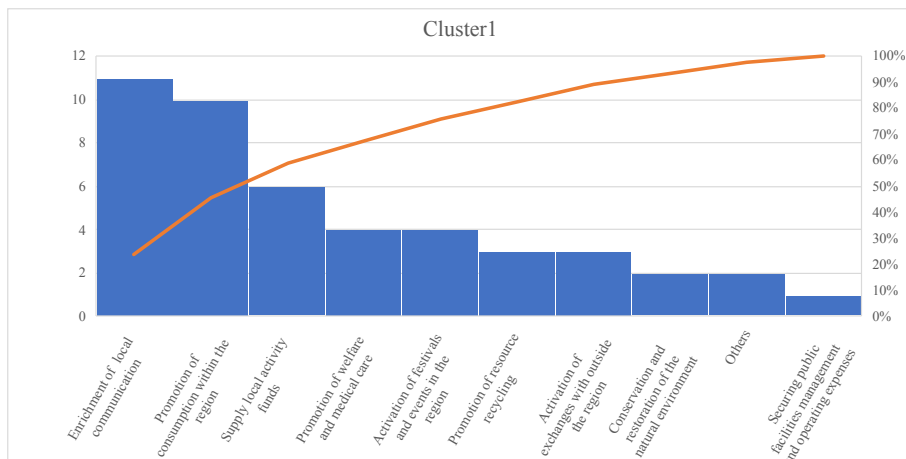
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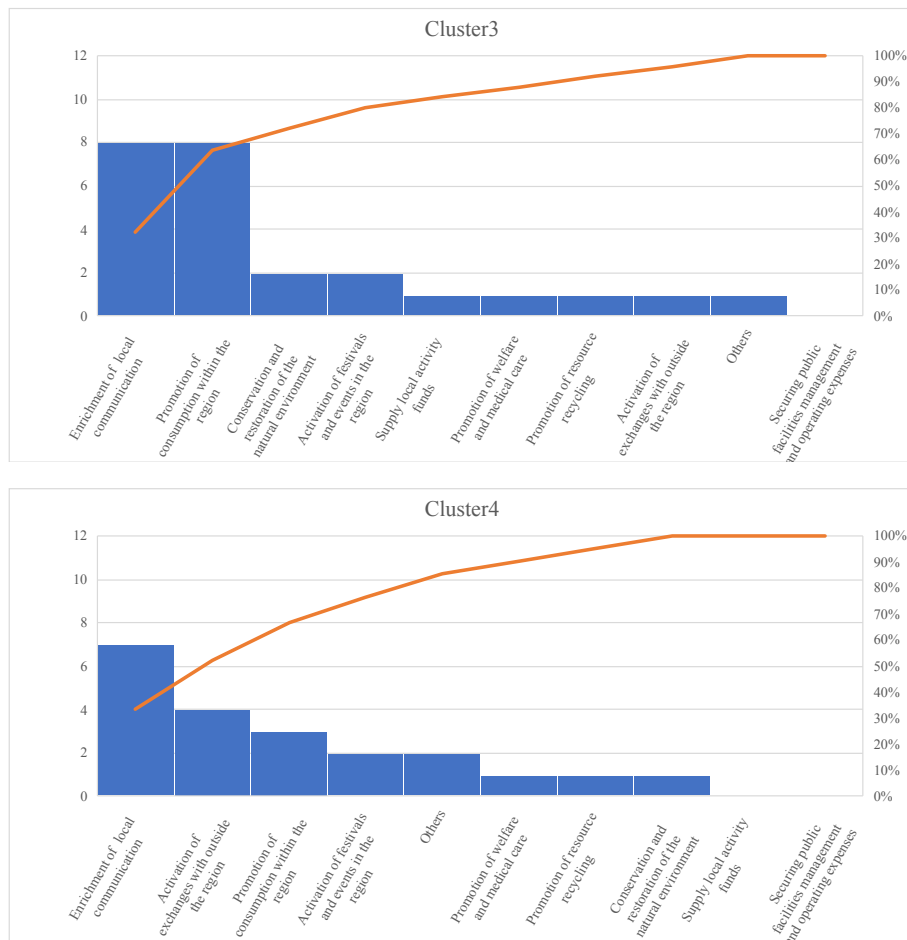
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From these results, it can be seen that the value of digital CC is more important, and the economic function is more important for the CC's social impact. This means that even though the emphasized philosophy does not determine the issuance form, differences in important aspects can be observed by selecting an issuance form.

Another factor that forms the characteristics of CC as a medium is the distribution channel. This factor strongly characterizes CC as a medium, and must be specifically designed by the issuance organization on how to use a particular form of CC. Since it is not possible to investigate specific distribution channels in this survey, we focus instead on the purpose of issuance in forming distribution channels. Figure 7 shows the purpose of issuance for each cluster based on the issuance philosophy. The histogram shows the frequency for each issuance purpose, and the line graph shows the cumulative percentage.



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**Figure 7 the issuance purposes by each cluster**

The purpose of enriching local communication is within the top two for all clusters. In addition, promotion of local consumption is at the top, except for cluster 4. Clusters 1 and 2 are similar in terms of types of issuance purposes, but a feature of cluster 1 is that funding for local activities is one of the top three purposes. Cluster 3 occupies about 64% of the whole for the purpose of enriching local communication and promoting consumption within the region, and there are few variations in issuance purposes than other clusters. Cluster 4 is characterized by activation of exchanges outside the region at the top. When these results are combined with the issuance purpose of each cluster (Figure 3), it can be seen that the issuance purpose corresponds to the philosophy to be emphasized.

#### 4. Discussion

The findings of this analysis are as follows: First, regarding the issuance philosophy, we categorized the target organizations into four groups based on the evaluation axes of the enrichment of the economic environment and the fulfillment of the social environment. Clusters 1, 2, and 3 emphasize the revitalization

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of the regional economy and the reconstruction of the relationship between local residents, but the importance of the two factors—the enrichment of the economic environment and the fulfillment of the social environment—decreases from cluster 1 to cluster 3. Cluster 4 is characterized by the emphasis on the fulfillment of the social environment rather than the enrichment of the economic environment. No difference in the form of issuance was observed among the four clusters.

Second, three major factors related to the self-evaluation regarding the impact of the CC issued on society were found: formation of connections to accept various individuals, realization of a free and diverse society, and realization of fair and efficient trade. When comparing the subscale scores of these three elements in four clusters classified according to the issuance philosophy, cluster 3 is significantly lower than cluster 1 for formation of connections to accept various individuals and realization of a free and diverse society, and cluster 4 is significantly lower than cluster 1 for realization of fair and efficient trade.

Third, when focusing on the difference between the analog and digital issue forms, digital CCs emphasize the enrichment of the economic environment as an issuance philosophy more than analog CCs and are evaluated to bring about fair and efficient trade. Finally, the issuance purpose corresponds to the philosophy to be emphasized.

In this study, we investigate the issuance philosophy of Japanese CC issuance organizations and point out that there is a certain relationship between the purpose of issuance and self-evaluation of issued CCs, and that there are differences in the emphasized philosophies depending on the issuance forms. The results of this survey have a limitation in the number of samples, and although it cannot necessarily be said that they represent the characteristics of the CCs in Japan, we will refer to these results for further research on this subject.

In this study, we have positioned the CC system as a socio-economic system that builds on its own values and ethics. CC is positioned as a medium for instilling the emphasized values and ethics into the system. As shown in Figure 3, 6, and 7, the issuance philosophy, issuance purpose, and impact on society are not uniform across the clusters. What is (are) the reason(s) behind the difference in the characteristics of CC as a medium in each cluster?

This survey cannot provide a clear answer to this, but there are several reasons why Cluster 1 places greater emphasis on both economic and social values, and has a higher self-evaluation for its own CC. We believe issuance funds to be the key for explaining this. Table 14 shows CC issuance funds by cluster. Although there is no statistically significant difference, it can be observed that cluster 1 has a high percentage of business revenue as a source. Unlike subsidies, the issuance purpose is not constrained, and the ability to freely determine the purpose results in increased commitment to projects, which may have led to higher self-evaluation.

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**Table 14 The issuance funds by cluster**

Cluster	Subsidy	Donation	Membership fee	Business revenue	Other	Total
1	1	0	0	5	5	11
2	1	1	0	2	4	8
3	3	0	0	1	6	10
4	2	1	1	0	3	7
<b>Total</b>	<b>7</b>	<b>2</b>	<b>1</b>	<b>8</b>	<b>18</b>	<b>36</b>

Another key is the issuance organization. Table 15 shows the issuance organizations by cluster. Although there is no statistically significant difference, it can be observed that the proportion of NPO (Nonprofit Organization) increases and the proportion of company decreases from cluster 1 to 3. The company aims to be profitable even though it emphasizes on both economic and social values. Therefore, the evaluation of activities may be determined by the profitability of the business. A business tends to be highly rated as long as it can continue. On the other hand, NPO is not profitable, even if the businesses are. Therefore, the evaluation of activities is based on actual events. If the changes brought about by the CC are very small, it is difficult to get a high rating for it.

**Table 15 The issuance organizations by cluster**

Cluster	Voluntary organization	NPO	Administration	Company	Union	Others	Total
1	4	1	1	2	1	2	11
2	3	2	1	1	1	1	9
3	2	3	1	0	2	2	10
4	5	1	0	0	0	1	7
<b>Total</b>	<b>14</b>	<b>7</b>	<b>3</b>	<b>3</b>	<b>4</b>	<b>6</b>	<b>37</b>

The last key is the number of years of issuance. Table 16 shows the average issuance period by cluster. Although there is no statistically significant difference, it can be observed that the issuance period of cluster 1 is shorter than other clusters. In addition, only cluster 1 includes CCs issued for less than a year. This is because Cluster 1 places importance on all items, has various issuance purposes, and has high self-evaluation for issued CCs that can be attributed to the shorter issuing period. As the issuing period becomes longer, various feedbacks are received, and the philosophy and self-evaluation to be emphasized may be

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more limited.

**Table 16 The issuing period by clusters**

Cluster	n	Ave. (year)	SD		
1	10	6	4.57		
2	8	10	6.803	F(3,31)=.531	p=.226
3	10	10.9	5.259		
4	7	9.71	5.282		
Total	35	9.06	5.599		

These discussions can be the basis of future research. When dealing with the evolution of CC, it is important to focus on the emphasized philosophy of the issuing organization and the differences between the CC forms to be adopted. On the evolution of CC system, Blanc (2011) argues that CC systems have transformed from community-type to regional economic-type and complementary currency-type. Such classification can describe how CC has transformed but cannot describe its transformation mechanism. In addition, since a CC system complements and substitutes various functions of regional socio-economics, its transformation should also be diverse according to the regional socio-economic diversity. In this study, we have approached this problem by focusing on the emphasized philosophy of the issuance organization.

Our research was limited to the CC issuers; however, the CC users also influence the evolution of the CC system. Yoshida and Kobayashi (2019) used a game simulation to investigate participant behavior and consciousness of analog and digital CCs. Consequently, participants feel that digital CC has more economic value than analog CC, and analog CC is more likely to help form social connections. Another problem is that the use of a new technology such as digital CC cannot be expanded by “the non-users who wait for other non-users to start using the technology” (Presthuis and O’Malley 2017, pp. 95). Interrelationships among these users and issuers can also be a topic for future research. Finally, in this study, we investigated the use of digital currency as CC, but its use is not limited to CC. In future research, we can investigate various applications of digital currency when considering its evolution as a CC.

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