



On the Relationality Assets and Gift-and-Circulation Model in Community Problem

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Abstract. Japan is a state-of-the-art aging society of the world from the viewpoint of average life expectancy, the number of elderly people, and the speed of aging. And accompanied by a declining population, the society in Japan is facing a turning point. In Japanese society, the connection of local communities has played a very important role. However, the concentration of the population in the urban area that began in the high economic growth period has changed to the concentration in the Tokyo metropolitan area in the 2000s, and as the declining birthrate and aging population advances, regional relationships have been diluted there. In this paper, we introduce the relational assets and Gift-and-Circulation model, which are key concepts of our approach to constructing a methodology as a solution to the above problem. And from a macro-perspective, how relational assets works will be examined.

Keywords: Relationality assets · Community design ·
Gift-and-Circulation model system dynamics

1 Introduction

Japan is a state-of-the-art aging society of the world from the viewpoint of average life expectancy, the number of elderly people, and the speed of aging. And accompanied by a declining population, the society in Japan is facing a turning point. In 2014, a report on the Japan Policy Council “A Stop Declining Fertility: Local Revitalization Strategy” was published. It is the concept of “municipalities at risk of vanishing” that was picked up in this report. It is predicted that 896 towns and villages across Japan will no longer be viable by 2040. Furthermore, such problems are progressing not only in rural areas but also in urban areas, and it is pointed out that regional relations in the community are diluted.

In Japanese society, the connection of local communities has played a very important role. However, the concentration of the population in the urban area that began in the high economic growth period has changed to the concentration in the Tokyo metropolitan area in the 2000s, and as the declining birthrate and aging population advances, regional relationships have been diluted there. But it is not that Japanese do not want to engage in relationships and connections with the community.

As new opportunities, various policy and events are being done, but we have not gotten the answer yet.

In this paper, we introduce the relational assets and Gift-and-Circulation model, which are key concepts of our approach to constructing a methodology as a solution to the above problem. And from a macro-perspective, how relationality assets works will be examined. This paper is organized as follows: Sect. 2, we discuss our concept for view of community. We first presented the model of relationality asset: then we discuss the Gift and Circulation model and introduce the system dynamics analysis. In Sect. 4, we presented the result of the analysis. Finally, Sect. 5 is conclusion.

2 Concept: Community as a System

We are targeting “community” as a system that does not function unless residential people are voluntarily involved. In other words, a community as a system is composed of “Hito”, “Mono” and “Koto” and their relationality which residents naturally generate through making their daily lives. We are aiming to quantify and visualize relationality between “Hito”, “Mono” and “Koto” in a community. Original ideas are to postulate relationality as assets the community people individually earn, and to elicit their awareness of relationality assets as trust.

We focus on the following issues: whether or not the introduction of relationality assets in a community influence the increase of acquaintance, the total amount of relationality assets, and some change in their behavior. In order to investigate those issues, we built simulation models using system dynamics (SD) to investigate how the proposed mechanisms work and influence the behaviors of the community as a system. Now, we are building a simulation model through which community people themselves are positively involved in managing and sustaining relationality assets in a community.

3 Model

In this section, we introduce the framework of Relationality asset model, and the influence of the Gift-and-Circulation model analyze from a macro perspective.

3.1 Relationality Asset Model

The relationship asset model is defined as follows. B_i is the benefit of individuals obtained from the community. i is a symbol representing an individual. This benefit B_i consists of three elements ($B_i = \{X, Y, Z\}$), which are the gain X obtained directly from the community and the gains Y, Z indirectly obtained. Here, we assume that the gains indirectly obtained from the community are relationality assets.

More specifically, the benefit of an individual is expressed as $B_i = X + Y + Z$. The direct gain X is $X = D - C$. D is a benefit directly obtained from activities in the community. In this case, expenses will be incurred for the activity, and the cost is C . Y is a gain indirectly obtained in the community. And Z expresses the interaction with the community members of the indirectly obtained gain. Z is as follows.

$$Z = \sum G_{-i} - G_i + R \quad (1)$$

G represents the amount of gift. G_i is a gift of i and $\sum G_{-i}$ represents the total amount of gifts other than i . R is the public account effect, representing redistribution. Therefore, the benefits from individual community activities are as follows.

$$\begin{aligned} B &= X + Y + Z \\ &= D - C + Y - G_i + \sum G_{-i} + R. \end{aligned} \quad (2)$$

To summarize the conclusion derived from the above formula, if the benefit B obtained from the community is positive ($B > 0$), there is incentive to conduct community activities and if the benefit is negative ($B < 0$), there is no incentive to conduct community activities. If we categorize the formula, we get $C + G_i = D + Y + \sum G_{-i} + R$, which is the threshold for participation in community activities. And, when comparing the benefits and costs directly obtained from community activities, even if they are negative, there is a possibility of conducting community activities if the indirectly obtained benefit is large ($C + G_i - D < Y + \sum G_{-i} + R$).

3.2 Gift and Circulation

Concept. As one of possible approaches for revitalizing a local community, we could think of introducing LETS (Local Exchange Trading System) or local currency. The local currency plays a role of connecting person to person, activates intercommunications of them, and works as media for people to share and transmit a sense of value. The sense of value shared in a community can be regarded as sort of trust, and can work to make relationality within a community strong. Some of local currency have no interest or even minus interest so as not to be accumulated and continue to increase but to promote and activate its exchange between people. Relationality assets we proposed in this research should have the similarity with the local currency. That is, the mechanism we introduce here is for people to get some dividend by investing their assets to others, while the amount of assets is automatically decreased if people keep them, as shown in Fig. 1.

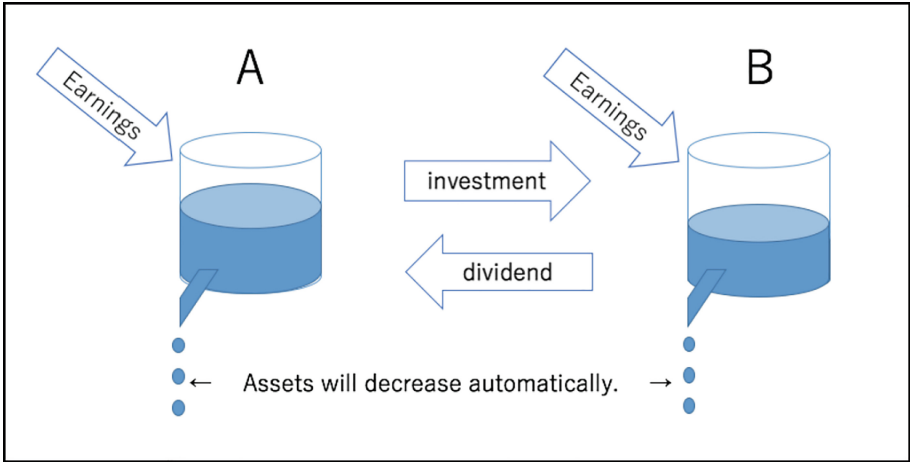


Fig. 1. A model of investment and dividends

On the other hand, there should be a big difference between relationality assets and the local currency. Relationally assets are sort of assets but not currency for equivalently exchanging something and something. Here we propose a model of gift and circulation instead of a model of investment and dividend, as shown in Fig. 2.

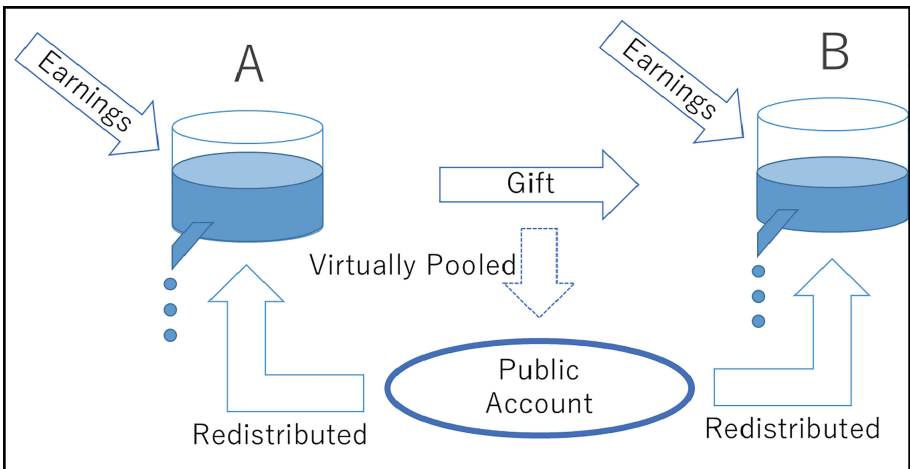


Fig. 2. A model of Gift-and-Circulation

What we want to promote is not equivalent exchange based on one-time pay-it-back relationship but gift and circulation that activate successive pay-it-forward relationship within people. For that purpose, we introduce a public account to accumulate the same amount of assets gifted from someone to someone. People could express, for

example, a sort of goodwill, smile, thank, feeling of empathy or sympathy, and/or a sense of linkage to others by gifting their assets to the others. At that time, the same amount of assets gifted is automatically accumulated in the account. The accumulated amount of assets indicates how active pay-it-forward activities are among people, and people get to know and monitor it. Also, some amount of assets is redistributed to people in a given time such as a week, a month or a few months from the public account. It seems to be the same as dividend to investment, and should work to make people have incentive to such movement. What we want to emphasize, however, is that such movement is driven not by pay-it-back activities but by pay-it-forward activities among people. A person who can earn a lot of relationality assets should be active in the community in a sense that he/she can gift his/her earned assets to others as a big supporter to the community as well. A person who has a lot of assets gifted from others might be regarded as a person of virtue. Subsequently, we are building a platform through which community members are positively involved in managing and sustaining relationality assets in a community.

System Dynamics. We are building a simulation model through which community people themselves are positively involved in managing and sustaining relationality assets in a community. System Dynamics (SD) is a method to explore dynamic characteristic of a target system by modeling the internal structure of a system that fluctuates within changes over time and simulating the behavior of system. We investigated the optimal combination of the rate of redistribution and damping for Gift-and-Circulation model. We use STELLA 9.1.4 to build the stock and flow diagram of Gift-and-Circulation model. The followings are description of the diagram in Fig. 3;

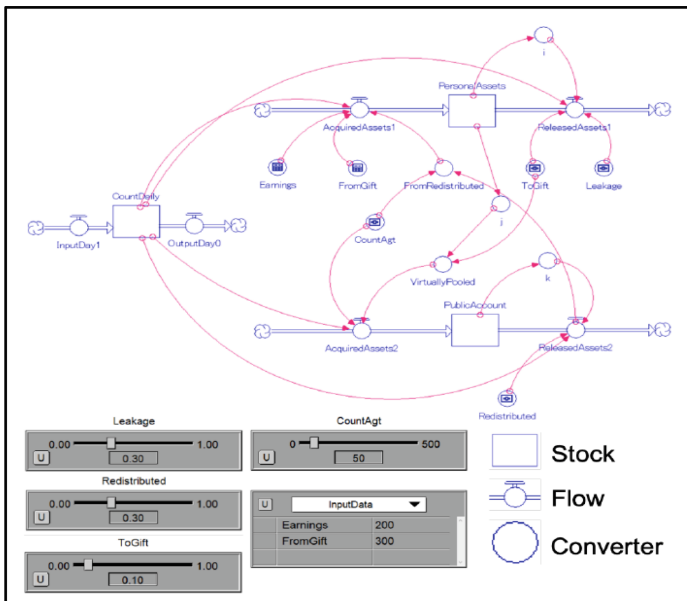


Fig. 3. Relationship between characteristics and attributes of a person agent

- Gift: People could express linkage to others by gifting their assets to the others.
- Public Account: People can monitor changes.
- Redistributed: Some amount of assets is redistributed to people in a given it every week.
- Earnings: The amount of assets that people earn individually.
- Leakage: The value of the asset falls automatically.
- Virtually Pooled: The same amount of assets gifted is automatically accumulated in the account.

In this model, relationality assets are distributed with one week as one unit (see Table 1). We set up to saturate the total amount of relationality assets for the following reasons;

- Divergence: relationality assets continue to increase = over interference World.
- Converging to 0: In a world where leakage is large and redistribution is small, no one thinks that it wants to maintain a connection.

Therefore, we assume a “saturate” that converges on somewhere other than 0, because it is not over-interference, but a relationship that can be maintained as it is.

Table 1. Distribution of relationality assets: each week as one unit

	Personal assets	Public account
Monday	FromGift	
Tuesday		
Wednesday	Redistributed (2)	Released assets (2)
Thursday		
Friday	ToGift	Virtually Pooled
Saturday		
Sunday	Leakage	

4 Results and Discussions

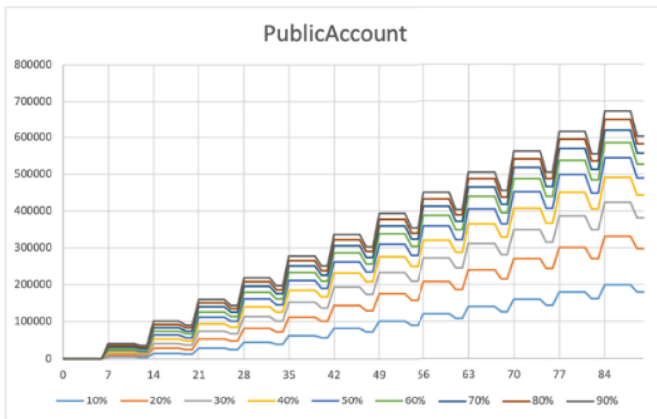
We discuss the results of the simulation by System Dynamics using the model of Fig. 3.

4.1 Task 1: Suitable Parameter as Dynamically Changing

If all parameters are made static, the relationality assets increase indefinitely. Therefore, one parameter is set to change dynamically. Figure 4 show simulation results of the value of personal assets and public account with gift, leakage, redistributed parameters, respectively. Here, the redistributed with a small amount of change of personal assets was set as a dynamic parameter.

Figure 4 Simulation Results of the value of personal assets and public account with gift, leakage, redistributed parameters.

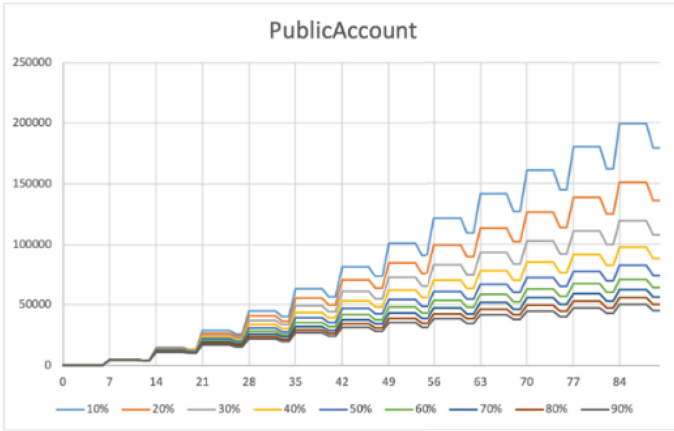
4.1 Dynamic parameter : Gift



4.2 Dynamic parameter : Leakage



Fig. 4. Simulation Results



4.3 Dynamic parameter :Redistributed

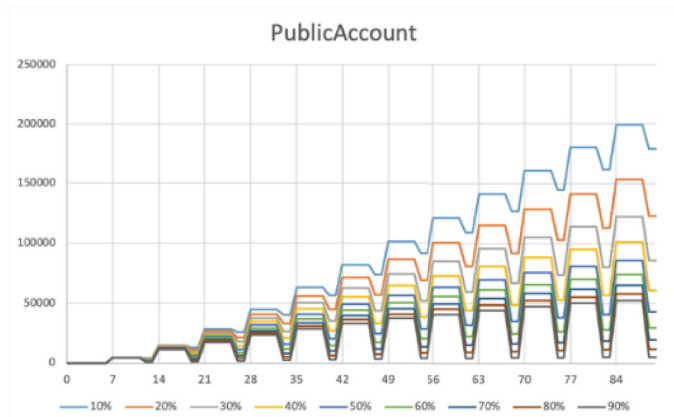
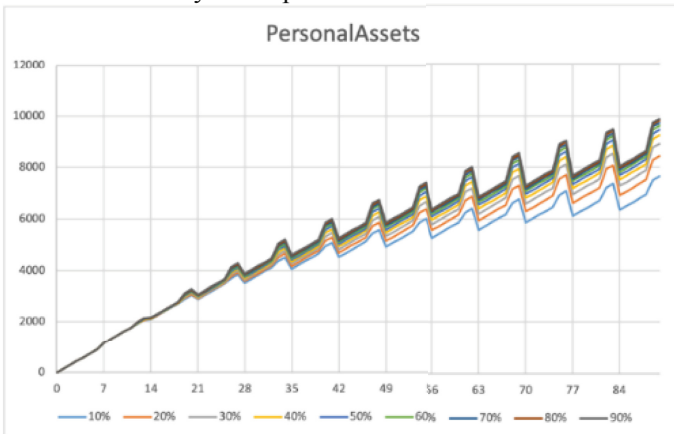


Fig. 4. (continued)

4.2 Task 2: Formula for Dynamic Parameter

Following the previous section, we considered the dynamic value of redistributed such that the value of public account is saturated as a mathematical expression. Here, we decided that public account is saturated with a fixed value using the following formula;

$$\text{Redistributed}(x) = 0.4(1 - e^{-0.000015x}) \tag{3}$$

Figure 5 shows the simulation result of the value of personal assets and public account using the formula (3). We confirmed that the value of personal assets and public account was saturated with a fixed value.

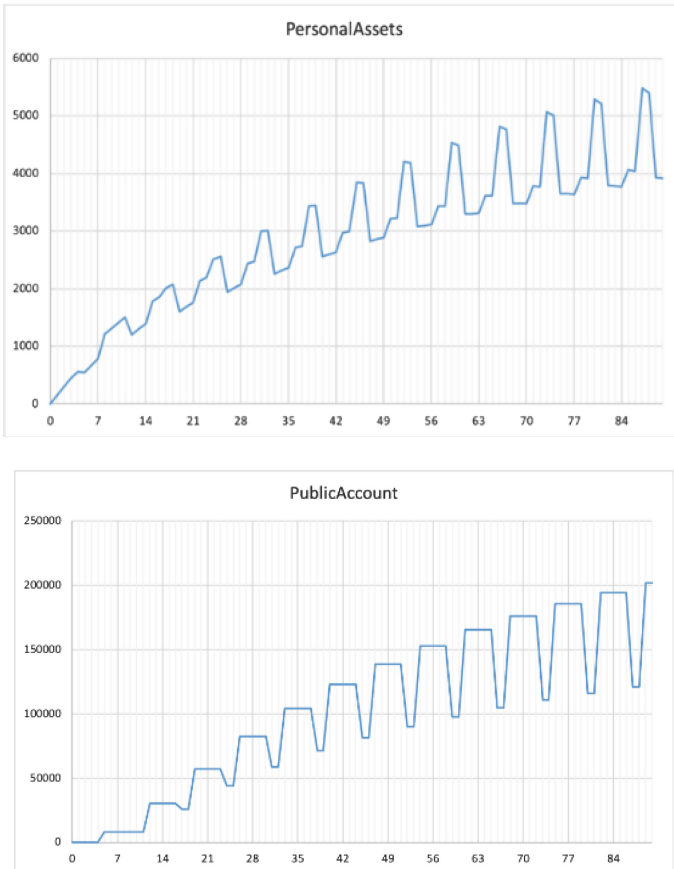


Fig. 5. Redistribute with formula (3)

5 Conclusion

A community is a system that cannot exist without community people's self-motivated involvement in itself, and that is composed of "Hito", "Mono", "Koto" and their relationality which community people naturally generate through making their daily lives. Relationality among "Hito", "Mono" and "Koto" that community people daily generate in a community should be regarded as assets in a sense that relationality should be social and economic value expected to provide some benefit to a community in the future.

Towards rebuilding of a community, we have proposed a system model to quantify and visualize relationality between Hito, Mono and Koto in a community as relationality assets that residents individually earn, and to elicit their awareness of relationality assets as trust. In order for relationality to function as assets, in addition, we have proposed a mechanism through which community people gift their assets to others and they can share a sort of common assets virtually pooled by their gifting activities among people. For modeling, we built simulation models using system dynamics (SD) to investigate how the proposed mechanisms work and influence the behaviors of the community as a system. These models were then refined by proof-of-concept in the field.

References

- The Japan Policy Council.: A Stop Declining Fertility: Local Revitalization Strategy (2014)
- The Ministry of Internal Affairs and Communications, Japan.: Kongo no toshibu ni okeru komyuniti no arikatani kansuru kennkyuukai houkokusyo (2014). (in Japanese)
- Ogita, K., Kimura, K., Shiozu, Y., Yonezaki, K., Tanev, I., Shimohara, K.: Simulation for visualizing relationality assets in local community toward re-building of communities. In: 45th SICE Symposium on Intelligent Systems (2018)
- Kimura, K.: Design of Relationality to Enable the Vitalization of Resident-centered Communities. Doctoral dissertation (2019)