

## STUDY ON THE POSSIBILITY OF THE “EXTENDED COMMUNITY” AND THE SUSTAINABILITY OF THE DISASTER AREA

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**Keywords:** Extended Community, Rikuzentakata, Gandai E\_code, Rikuzentakata Global Campus, associated citizen

### 1. INTRODUCTION

The huge tsunami that occurred after the Great East Japan Earthquake caused extreme damage to the Tohoku coastal area. The coastal municipalities in Iwate prefecture were also seriously affected, where the number of deceased, missing persons and disaster-related deaths in Rikuzentakata City, the southernmost tip in the prefecture, totaled 1,805, more than 7% of the population (as of March 31, 2017). The city center was devastated. And many of the residents were forced to live in temporary housing for a long period of time as evacuees. Many people also took refuge outside of the city.

In response to the extensive damage to the prefecture, large-scale restoration and reconstruction processes are underway such as the removal of rubble, construction of storm surge barriers, creation of elevated land and raising flood areas, construction of municipal disaster housing, in addition to a land readjustment project, and a disaster prevention group relocation project. However, even though more than seven years has passed since the disaster, the process is still only half way through. A large shopping center finally opened in April 2017, in an inflated area planned to become the central urban district. However, it will take some time for planned main stores and offices to be opened in the vicinity.

There is much publicized anxiety about the declining population and the sustainability of towns throughout the country, and the sense of crisis is strongly felt in the earthquake disaster area including Rikuzentakata City, which is still in a serious situation.

On the other hand, after the earthquake, a great many people realized for the first time the presence of the disaster municipality in Tohoku. And there were people who took various actions, such as interested people, worried people, people who actually visited, and people who volunteered. Some of them are still actively involved even after more than 7 years has passed. The existence and behavior of such people are considered to be a constant strength for the municipality.

In this paper, we will introduce the practical deployment in Rikuzentakata City as an example, especially the idea of taking "extended community" as a mechanism to support the disaster-affected area for a relatively long term, and the efforts of Iwate University related to this concept. Then we examine the institutions and issues to realize the "extended community". Below, in chapter 2 we will try to define the term extended community. In chapters 3 and 4, we will introduce Iwate University's work related to extended community after a disaster. In Chapter 5, we will

touch on policies based on the concept of "associated citizen", which is developing in Rikuzentakata City. This is a measure closely related to the idea of extended community. We also discuss issues to be considered in order to fully introduce the "associated people system". This paper is a revised edition of the research presentation given at the 6th Conference of the Association of Design about Strategy for Zone Industry and Zone Brand held in September 2017[1], and at Rikuzentakata Global Campus University Symposiums in 2017[2] and in 2018[3].

### 2. DEFINITION OF EXTENDED COMMUNITY

In this paper we will define extended community as “wide area community consisting of residents of a certain area and people who do not necessarily live there but have a strong interest and motivation to engage in the area”(Fig. 1). Both of the authors have tried to disperse this concept. Formation of an extended community will lead to increased social capital, and enhanced vitality and sustainability, of the area. Even if this designation is not used, extended community groups and organizations can virtually be found throughout Japan.

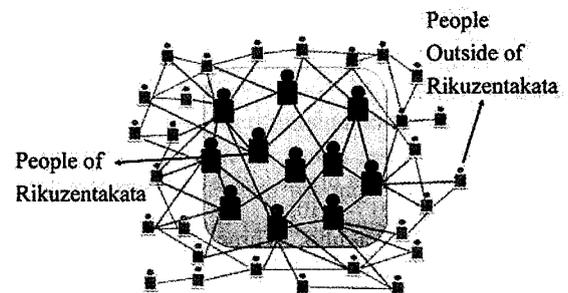


Figure 1. Extended Community (See Ref. [1])

### 3. The “GANDAI E\_CODE” PROJECT

#### 3-1 Gandai E\_code

One of the authors, Gomi, has been continuously working on activities in Rikuzentakata City since the end of 2011. A group called "Gandai E\_code" were formed by Gomi and several students in April 2012. In this chapter, we will introduce their activity and discuss its significance.

The activities of Gandai E\_code began with the fumbling around of what we can do based on meetings and conversations with various Takata citizens. Thinking of what we could do from a relatively early stage of activities was information dissemination, so we aimed to create an information magazine about Rikuzentakata.

In fiscal 2012, we published the information magazine "Good Things Map" Vol.1 - Vol.4. "Good Thing Map" is a brochure that highlights the charm of Rikuzentakata according to E\_code members, with the desire to give people visiting Rikuzentakata a deeper experience while visiting. 6,000 to 7,000 copies were published and were widely distributed outside the prefecture and city. "Good Things Map" was primarily produced for people outside Takata city but it was noticed by many people from the city, and we received various comments.

Working on these activities, the mission of E\_code was set as "contribution to the formation, maintenance and expansion of an extended community composed of people who are interested in Takata, centered on Rikuzentakata citizens"<sup>1</sup>. We aimed to become a link between Rikuzentakata citizens and people outside the city.

At the beginning of FY2013, we set a target of 500 people to come to Rikuzentakata to work through E\_code. At this time in the city there was a movement to explore the establishment of a committee for a temporary shopping district, "although there are many people who come to see "Ipponmatsu" from outside the city, there are few people who will visit temporary stores that are working so hard," "we need media to comprehensively introduce the stores and set up signboards". On the E\_code side, there was discussion to create a different guidebook than before. Therefore, the E\_code raised its hand and a project to create the information magazine "Takatabi" to introduce city stores was started. This project was developed with the cooperation of five temporary shopping districts in Rikuzentakata City, and Rikuzentakata City Commerce and Tourism Division. In the creation process, in consideration of the above work goal, not only members of E\_code gathered the material but we asked various people outside the city to visit Takata asking them for data, photos and text, offering opportunities for data and text writing. Ultimately "Takatabi" became a volumetric booklet of about 100 pages, 10,000 of which were issued in February 2014 and were distributed in Rikuzentakata City, Iwate Prefecture, Miyagi, Tokyo and elsewhere throughout the country.

In FY 2014, we issued the "Good Things Map" Vol 5 and Vol 6 and the booklet "Takatabi +" that introduces restaurants and accommodation that opened after "Takatabi" was published. In addition to these activities, more versatile activities, such as events, were carried out based on the relationship to the area and the people.

In FY 2015, it was decided that a more targeted pamphlet should be made. As a result, it was assumed that the main readers would be residents of Iwate Prefecture and young people such as university students. A spring issue of an information magazine called "Daibu Sokomade(The city distant from but close to you)" was published. During this fiscal year, we also made a large display called "Pedometer" bulletin board to try to visualize the steps after the earthquake using the wall of the temporary stores in Tochigasawa. We also involved in the "VISIT TAKATA Project" of the Rikuzentakata City Commerce and Tourism Division to improve the environment for

foreigners (translation of signs and menus of restaurants / accommodation).

In FY 2016, we published an autumn issue of "Daibu Sokomade" in September that continued the concept and target and we also improved the size. Also, E\_code called upon the regional supportive groups that have increased within the campus, and held a joint event in November, in collaboration with 7 groups at the commercial facility in Morioka City. In fiscal 2017, events related to the creation of a place of exchange between citizens and university students were continuously planned and executed in the Rikuzentakata Global Campus, introduced in the next chapter.

During the six years, a considerable number of students participated in the activities of E\_code, among those 18 formal members graduated. Even now, active student members are continuing their activities. Besides this, many students support their activities as associate members, including students from other universities.

### **3-2. Significance and Problems of Gandai E\_code Activities**

When looking back over the past 6 years, it is assumed that the activities of E\_code had the following significance:

#### **1) The value of the Information Magazine**

First of all, it can be said that there was reasonable significance in the information magazine itself. Especially the early publications such as "Good Things Map" and "Takatabi", were picked up by more local people than expected, and it was often felt from the feedback that they were interesting. Also, people from outside the city often commented on SNS for example. However, these evaluations are decreasing with the passage of time after the earthquake. Generally, it is difficult to grasp who and how they read it with paper media. The degree of achievement of the purpose and intention of the production side should be examined more firmly. On the other hand, as time has passed since issuance, it is thought that its value as an archive to record the situation of Rikuzentakata City after the earthquake and the activities of the university is starting to emerge.

#### **2) Students Continue to Attend Rikuzentakata**

Because of the activities of Gandai E\_code, or more specifically, activities derived therefrom, hundreds of students continue to go to Rikuzentakata for more than six years after the disaster. Many students have built a close intimate relationship with local people who remember their names and faces. The effect of creating a situation where young people continue to come to a devastated area, where the aging and declining birthrate progresses may be indirect but must have some impact on the city.

#### **3) Contribution of Graduates**

After retiring from E\_code, there are several graduates who are living, working in the Kesen region, including Rikuzentakata. They are precious young workers. Many other graduates continue to visit Rikuzentakata City after graduation. While doing activities, members deepened their relationships to Rikuzentakata City and they

themselves became members of the extended community.

#### 4) Formation of Relationship between Citizens and the University

The implementation of the process of making information magazines and disseminating information that E\_code has been involved with, has led directly to the creation of many acquaintance relationships with various citizens. The effect of this accumulation is great, and has also deepened the understanding of the situation surrounding Rikuzentakata, the way people feel and think, and the culture and history of this city. By repeatedly collecting data for the process of information dissemination, exchanges with residents of the city definitely expanded and deepened. In other words, it was possible to disseminate information by connecting with people. And by transmitting such information, it became possible to connect with different people. And through the exchange nurtured by the series of processes, various developments later came to life, such as Rikuzentakata Global Campus shown below.

#### 5) In Light of the Mission to Form an Extended Community

Regarding contribution to the mission of the group "form, maintain and develop an extended community", we could build more relationships with people outside the city. Also, efforts to network and form communities among people outside the city were weak. But student members formed a moderate network with young people in their twenties and thirties. In the future, there is a possibility that such connections will have some meaning.

#### 6) Students Learning

The activities of E\_code was classed, in principle, as an extracurricular activity, excluding early years. As extracurricular activities, E\_code required considerable energy and time, and some students may have experienced a time when it was difficult to balance it with their main work. However, even though - this is resolutely a merit from the standpoint of the university - it is thought that the learning that the students gained from the experience of continuing to go to Rikuzentakata was invaluable.

### 3-3 Fourth way of involvement that is not a volunteer, supporter or researcher

One time, One of the authors, Gomi, had the opportunity to discuss topics with a E\_code student and asked them "what do you call what you are doing?". He said not a "volunteer", but it did not necessarily mean "supporter" either. The word "volunteer" has the nuance of "activity based on the needs and request of a site". Although volunteers are also a kind of support in a broad sense, generally when the word "support" is used, it has a more limited meaning and is often used to mean 'external people offering some kind of awareness and motivator towards a restoration based on specialized technology, knowledge or skill'.

Both are important, but have difficult aspects. Volunteers sometimes continue their activities as routine work after the acute period, so there is a possibility that the volunteer may become passive. On the other hand, in order to offer

"support" in the true sense, it is necessary to have a deep understanding of the field and be trusted, and there is a possibility that one mistake can be an "imposition" and disregard the site. In the case of university officials, sometimes they say things in a condescending tone.

Besides these, it can be said that of course "research study" is also an important way of interacting for a university, while sometimes imposing a burden on disaster areas. It is often the case when and how the results of a research is returned to citizens is not clear. In extreme cases, criticism is made. Also, subjective and full-scale participation of undergraduate students in research studies is not easy.

The dialogue with the student mentioned above settled on the conclusion that we have been doing something similar to the activity of a local small NPO as an outsider. As an alternative way of walking with the post-disaster area, not volunteers, support, or research studies, it would be good to have such option as "attending (or accompanying) agent". As we walk together, we will gradually deepen our understanding of local people and build relationships both inside and outside. We can link that understanding to later development. Tackling information dissemination can be said to be one way of attending in the sense that it can be a means to spin such understanding and relationship while securing the value of the activity itself. And it also leads to the formation of an extended community. We might express such a way of activities as "Attending". It may make sense to advocate this fourth option as a way of involving for local universities in areas where disasters occurred.

In the process of developing the activities of Gandai E\_code, we constantly reflected and asked ourselves on the significance of the activity. There was always a semi-threatening feeling, information dissemination like that conducted by E\_code is not indispensable in the reconstruction process. Not limited to the activities of Gandai E\_code, it might be said that among the various activities taken after a disaster, there are relatively few that can be said to be "indispensable" or "absolutely correct" from all perspectives and positions. Anyway, the question "how can universities and students get involved in disaster areas" is considered to be a very general question that university officials have after a disaster.

## 4. "RIKUZENTAKA GLOBAL CAMPUS"

### 4-1 Rikuzentakata Global Campus

The "Rikuzentakata Global Campus" jointly operated by Iwate University and Rikkyo University, was opened in April 2017, utilizing the vacant school building of the former East Takata Junior High School, as part of Rikuzentakata City's Town / People / Work Comprehensive Strategy. The aim of this facility is as follows. University students and people involved with universities from not only Japan but also abroad, continue to visit the city as a base to learn about earthquakes, while fostering exchanges with citizens.

Since its establishment, the number of users of the facility in 2017 exceeded 5,000 people. It may be said that

it has made a smooth start. Events related to the Rikuzentakata Global Campus held in 2017 include the joint philosophy café held by Rikkyo University and Iwate University, "Rikuzentakata Global Seminar 2017"(a joint program between Harvard University and Iwate University graduate students), Gandai E\_code project, Rikkyo University "Rikuzentakata project" (Rikkyo University and Stanford University joint field work), "International Joint PBL Program" conducted by Kansai University under the coordination of Marugoto Rikuzentakata (Kansai University, Mexico, Vietnam, Kansai University student field work), "Rikuzentakata art project" (joint art activities between users of the employment support facility and students studying special support education at Iwate University), Symposium organized by Rikkyo University "Thinking of the world from Takata ~ We who live in an era of refugees ~", "Rikuzentakata Global Campus University Symposium 2018", etc.. Regular use of local organizations is also increasing.

However, the potential of this facility is considered to be not fully developed. We will consider what kind of existence the Rikuzentakata Global Campus should be in the future. The content of this chapter is mainly inspired by discussions with Hiroataka Koeto, a graduate of Iwate University, and with many people of both Iwate and Rikkyo Universities.

#### **4-2 Rikuzentakata Global Campus Stakeholders**

In the vicinity of Rikuzentakata City, there are several facilities that citizens and groups can borrow, and this number is increasing with the progress of town development. It is necessary to maximize the value for each stakeholder (or potential user / beneficiary) involved in this campus in order to adequately demonstrate its full potential so that it becomes indispensable and increases sustainability. First of all, we would like to list up the stakeholders of the campus.

The main stakeholders are 1) the residents and organizations of Rikuzentakata and surrounding municipalities, 2) Rikuzentakata City (government), 3) university officials from Japan and abroad who visit Rikuzentakata or the Kesen area, 4) people who want to learn about their fellows' experiences after the disaster and disaster prevention / town planning, and 5) Iwate and Rikkyo Universities as administrators, and so on.

In order to operate with limited resources and increase the significance of its existence, it is important that values for various stakeholders are harmoniously provided. In other words, interaction created between users, and situations that provide value to each other, are considered to be ideal and effective situations that can be offered by this campus. Each user's activity in this space is not done quietly but rather it affects the activities of other users, and vice versa. This is expected to add value to their mutual activities.

Although the some stakeholders have already been aware to some extent of added value due to the interaction among users, for such developments to occur more

frequently, organically, and in some cases inevitably, management should 1) provide opportunities to make the relationship between stakeholders closer, 2) visualize the activities of each stakeholder, and 3) the campus should have a consultation function that allows stakeholders to consult on the possibility of joining with other entities. Although such efforts have already begun, there is still room for expansion in every case.

#### **4-3 Value of the Rikuzentakata Global Campus**

It would be meaningful to have the image below as how Rikuzentakata Global Campus should look like in the future. When a user belonging to a university outside the city goes through a global campus door, a different world beyond imagination is 'sure' to be in front of them. The different worlds may be university students who learn in a completely different environment from themselves, a foreign life and culture, regional community of Rikuzentakata, a rich regional area, with people full of humaneness, and a culture that inhabits the region. Every time you open the door, you'll find a different world. And that different world makes visiting experiences to Takata, or experiences of learning, extremely prosperous. If this happens, university officials will find great significance in visiting Rikuzentakata frequently. For local citizens, urban youth and young foreigners and researchers will come through the door. If you go to the campus you can touch young breath. This may also be said to be an encounter experience with another world. Such circumstances occasionally bring about the possibility of intrinsic solutions to regional problems and the possibility of access to necessary intellectual resources. It is obvious that such a positive cycle would also be valuable to Rikuzentakata government. It should be noticed that the formation of such a virtuous cycle can be generalized as a mechanism for forming an extended community.

### **5. "ASSOCIATED CITIZEN"**

#### **5-1 Rikuzentakata City's Town / People / Work Comprehensive Strategy**

Following the regional creation policy promoted by the country, a comprehensive strategy to suppress population decline in all municipalities throughout the country and "population vision" to predict future population trends and effects of the comprehensive strategy, were formulated in 2015. Rikuzentakata City also formulated "Rikuzentakata City Population Vision and Town / People / Work Comprehensive Strategy" in March 2016. One of the authors, Gomi, was a member of the formulation meeting.

There are 4 basic objectives of this comprehensive strategy. Among those we pay the particular attention to the first objective, namely: "create new flow of people to Rikuzentakata, creating a city where "associated citizens" gather. Here the concept of "Associated citizen" is presented, the same strategy states that it is people "who continue to have a connection with citizens, with an interest in and affection for the town, not limited to residents". It is hoped that it will be established as a symbolically expressed term, especially for out-of-town

residents among the members of the Rikuzentakata extended community.

In line with the comprehensive strategy formulated, policies related to "associated citizen" have begun to be developed in the city. Regarding the "establishment of exchange bases for citizens and students using vacant elementary and junior high school buildings" included in basic policy, Rikuzentakata Global Campus was established as introduced in the previous chapter.

Meanwhile, the 'establishment of the "Rikuzentakata associated citizen" system', also stated in measures, has also begun to be concretely developed. Issuing members' cards and association with hometown tax payment, have been carried out. It is hoped that it will develop into more drastic measures.

Outside of Rikuzentakata City, there are many places in Iwate Prefecture that have taken a policy to emphasize the relationship of people with connections. For example, an idea similar to the extended community and related measures are included in the comprehensive strategy of Otsuchi Town, where one of the authors, Hirota, has been deeply concerned with.

## 5-2 Associated Citizen System Development Consideration

Imai, a scholar of public administration in Fukushima University, has touched on the possibility and necessity of "dual (multiple) resident card registration" or "two (multiple) regional residences", while taking into account serious circumstances such as the evacuation of all towns in Fukushima prefecture [5]. Yamashita, a sociologist, while referring to Imai, is developing the debate that such a system could be a drastic solution to Japanese society with its declining population [6]. However, in order to enable citizens to have multiple citizenship and resident cards, major system reform is necessary with many issues to be cleared including tax and voting rights. Even though it is not impossible, it is thought that it will take a considerable amount of time for it to settle and function effectively.

To develop a system based on the idea of an extended community or "associated citizen", it will not change the definition of "residents" and "citizens", and it is thought that it can produce the same effect as the multiple registration system of the resident card. Moreover, it can be implemented in basic municipality units. However, in addition to supplementary and short-term measures, it is necessary to deeply consider it from all angles in order to establish it as a long term system and to make it function effectively. The content of this section below is the arguments about the associated citizen system and is not implemented in the municipality policy yet.

### 1) Main candidate of associated citizen

It is clear that blindly trying to increase the number of people will not work, it is necessary to narrow down the target as an objective of the approach. For example, it is possible to categorize the people who once lived in the area into category 1, friends and relatives of residents, people who have experienced visiting the area, and people

who have cooperation or exchanges with work into category 2, residents in neighboring areas, friends and acquaintances of associated citizens, and people who have an interest in the area through the media etc. into category 3. An approach method should be devised for each and the targets in each category should be understood. There are strong candidates, especially among people in category 2, in areas that experienced immense disaster.

### 2) Conditions (rules) to become an associated citizen

It is necessary to establish some constraints to become an associated citizen for security reasons. For example, you should receive several name recommendations from citizens or people who already have "associated citizen rights"<sup>2</sup>, or you should fulfil the obligations of associated citizens shown below. It is desirable to consider measures such as losing the citizenship if one deviates greatly from these rules.

### 3) Rights of associated citizen

The issue of rights is extremely important in the institutional design. In addition to the information dissemination for associated citizens, preferential treatment system (accommodation, eating and drinking establishments, tourist facilities), various directions are conceivable such as positive assurance of participation on city policy and projects (establishment of associated citizen's Conference', etc.), setting up of the information platform for communication using the Internet, and preferential treatment at the time of migration from outside the city, etc.

### 4) Associated citizen duties

First, it is easy to think of duties as tax obligations. For example it is easy to use the hometown tax system. As another example of effort obligation, it may be good to think about participating in a vote on some decision making, joining an event, actively interacting with citizens, or visiting the area at least once a year. Although obligation sounds strong, it also means to offer a "role", in short, and it is important for fostering the civic pride of associated citizens.

### 5) Structuring of associated citizens

First of all, there is the point of whether or not to classify the associated citizens into some category or group. The easiest thing is to consider grouping according to residential areas (eg, Rikuzentakata associated citizen Tokyo branch). However, this is not the only grouping method. Some of the associated citizens may have close relationship with only a certain village in the area. In this case, it is also effective to group associated citizens per their close relationship with the village. We can also introduce the concept of "address" to associated citizens, i.e., a single citizen may have an address in the area. We believe that such institutional design leads to strengthened networks of fellow associated citizens, and citizens with associated citizens.

### 6) Principals and organization that support the associated citizen system

In regional cities and inter-mountainous areas, which tend to be short of manpower, it is not realistic for municipal governments to manage the entire associate

citizen system. However, it is entirely possible if it is a private organization. One possibility is to recruit people from among associated citizens to run it, and form an organization that operates in cooperation with local administrations and organizations. Tasks that must be technically overcome, such as dealing with personal information etc., will come up in operation.

By the way, what significance does the associated citizen system have in the first place? Even if this system is well managed, it will not immediately lead to the resolution of regional issues including population decline and aging population. However, from certain economic effects (associated citizen taxes, economic benefits from visits) connections to external resources (information, know-how, human networks, etc.), relaxation of human relationship that tend to be fixed in the area, and secondary ripple effects (improvement of awareness and interest in the area) to people surrounding the associated citizens, can be expected. It can be said that this effect will be of sufficient value if it leads to a deceleration of the decline of the area, and enhancement of local activities and residents' vitality. However, in order to produce the above effect to the extent that it can be realized, an associated citizen population of a certain size is needed.

Second, how long is the associated citizen system (or more generally the extended community) sustainable? It would relatively be easy to form an extended community in areas that suffered from huge disasters due to the heightened interest from outside the area. However, succession of the interest beyond the generation of human is not easy. Rather, another way of thinking is to put a time limit on the institutional design, several decades for example, as a mechanism to support a crisis situation after a disaster.

## 6. CONCLUSION

In this paper, after introducing part of Iwate University's efforts on extended community in Rikuzentakata City and policy development concerning "associated citizen" in the same city, we examined the important points for preparing the associated citizen system. A proposal of the overall picture of the system at a more specific level, practice and verification based on this, and improvements, are future tasks. It is thought that it is important to consider a system with universality that can be applied not only to areas after disasters but also to local cities and small scale areas in Japan and abroad.

## ACKNOWLEDGEMENTS

The efforts of Iwate University introduced in this paper are from the Ministry of Education, Culture, Sports, Science and Technology "Program for Enhancing Lead Functions of Universities for Local Reconstruction" (Project to Promote the Rehabilitation and Reconstruction of 'livelihood' in Sanriku Coastal Areas), Iwate Prefecture's "Regional Community Revitalization Support Project of Disaster Areas Through Learning" (Community Revitalization Support Project in Kesen Area), Cabinet Office Regional Creation Accelerated

Grant Issuing Project "Project to Create an Exchange Activity Base using the Experience and Reconstruction Process of the East Japan Great Earthquake Disaster", Iwate University Faculty of Humanities and Social Sciences "Education and Research Improvement Project", and expenses have been supported by donations from the music group "Stardust ☆ Review" and their fans etc. I would like to take this opportunity to express my deepest gratitude. The authors also thank Crimson Interactive Pvt. Ltd. (Ulatas) – [www.ulatus.jp](http://www.ulatus.jp) for their assistance in manuscript translation and editing.

## NOTE

1 At the beginning of Gandai E\_code activities, Gomi used the term "wide area community", and then changed following the term "extended community" proposed by Dr. Hirota which had been used to express almost the same way of thinking.

2 There was a similar rule adopted by regional SNSs which were built in many cities in Japan [7].

## REFERENCES

- [1] S. Gomi, Proceedings of the 6th Conference of the Association of Design about Strategy for Zone Industry and Zone Brand, 2017, 64-67 (*In Japanese*).
- [2] S. Gomi, H.Koeto et al., Proceedings of University Symposium 2017 in Rikuzentakata Global Campus, 2017, 79-82 (*In Japanese*).  
[https://rtgc.jp/wp-content/uploads/2017/04/Symposium2017\\_5.pdf](https://rtgc.jp/wp-content/uploads/2017/04/Symposium2017_5.pdf)
- [3] S.Gomi, Abstracts of University Symposium 2018 in Rikuzentakata Global Campus, 2018, 111-113 (*In Japanese*).  
<https://rtgc.jp/wp-content/uploads/2018/03/c7d5497549649af22aba7de7ea216ca.pdf>
- [4] M. Makiyama, M. Watanabe, R. Yamashita, T.Hattori, and S. Suzuki, Rural Planning Society Journal, Vol. 31, No. 4, 2013, 602-605 (*In Japanese*).
- [5] A. Imai, Reconstruction of municipality, Chikuma Shobo, 2014 (*In Japanese*).
- [6] Y.Yamashita, Trap of Regional Annihilation, Chikuma Shobo, 2015 (*In Japanese*).
- [7] H.Wasaki, doctoral dissertation, 2010 (*in Japanese*).