Use of Social Innovation to Solve Problems at the Community Level and Create New Businesses in the Social Domain

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"Social innovation" at Fujitsu Laboratories centers on designing a system for solving social problems through Human-Centered Design (HCD) and on creating new businesses for Fujitsu in the social domain. It involves entering a community and establishing a collaborative relationship with its residents to create a vision and to formulate specific measures for solving social problems. Fujitsu Laboratories has put this process into practice at various places in Japan with a focus on key social themes: disaster reconstruction, the aging society, local agriculture revitalization, etc. These activities have revealed that many existing measures are problematic in terms of economic sustainability and that the integration of multiple measures and the participation of elderly residents are essential to solving social problems. This paper describes the social innovation process, presents four case studies, and introduces the concepts of a "community-based value chain" for achieving the new relationships needed for solving social problems and of a "participatory smart community" for achieving new forms of mutual assistance among residents through information and communications technology (ICT).

1. Introduction

Against the background of a growing population and increasing urbanization on a global scale, companies and enterprises of various types are focusing on the social domain, deeming it to be a huge, untapped business opportunity. In Japan, the Great East Japan Earthquake that struck on March 11, 2011, has prompted the government and academia to foster innovation in the social domain to deal with a variety of pressing issues including the aging society, regional revitalization, disaster reconstruction, and a shift from nuclear power to renewable energy. Similarly, from the viewpoint of sound business strategy, new ideas that reconsider the merits of a conventional profit-oriented economy and that treat social contributions not as a means of achieving corporate targets but as the purpose of corporate activities have been advanced.[1, 2]

Amid these trends, with an eye toward achieving a Human Centric Intelligent Society as Fujitsu's medium- and long-term vision, researchers at Fujitsu Laboratories have been researching and developing the concept of an "Intelligent Society"[3] since 2010 with the objective of creating new value and developing new businesses in the social domain (**Figure 1**). These R&D efforts have included the development of elemental technologies for data analysis, projection, optimization, etc. in relation to "big data" obtained from sensors, social networking services, and other sources. They have also included the R&D of an "intelligent platform" to facilitate the application of those technologies and the R&D of "social solutions" that use that platform to create new value in the social domain in relation to energy, transportation, disaster prevention, and education. In addition, Fujitsu Laboratories has been promoting "social innovation" by using information and communications technology (ICT) in the field to identify social problems and formulate solutions for them.

Social innovation takes the concept of "field innovation,"[4] which Fujitsu has been applying on-site within companies and organizations, and expands it to the social domain. The goals are to obtain a good understanding of the current state of a region or community and the social problems that need to be solved there through diverse on-site activities including fieldwork and workshops with those concerned (stakeholders) and to derive a vision and formulate specific
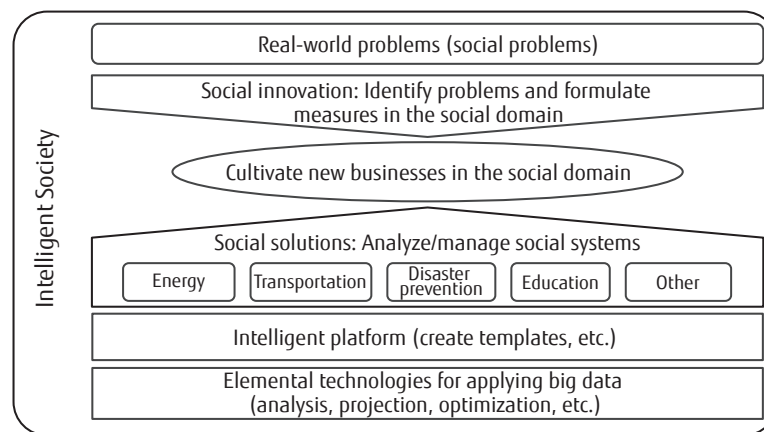
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Figure 1
Overview of Intelligent Society research.

measures for solving those problems. Through these activities, Fujitsu aims to cultivate new business opportunities while generating new value for the community.

To achieve these objectives, we have applied Human-Centered Design (HCD) and participatory design[5] methodologies to hands-on activities in a variety of regions and communities centered about key themes, including improving the lives of the elderly, revitalizing local agriculture, and reconstructing disaster-hit areas.

At present, we are still in an intermediate stage as far as solving social problems and developing new business goals, but we have made real gains in terms of clarifying problems in a local community, deriving a future vision, and formulating specific measures in collaboration with stakeholders in that community. Additionally, using the practices that we have so far applied, we have developed the concepts of a "participatory smart community" as a target community and a "community-based value chain" as a foundation of that community.

In this paper, we focus on social innovation with the aim of solving social problems and creating new businesses in the social domain. Specifically, we introduce the knowledge gained and problems uncovered by our activities to date and the concepts of a community-based value chain and participatory smart community for achieving a sustainable local social system.

2. Creation of new businesses in the social domain

The business domains where ICT can be applied are expanding from the domains of corporations, organizations, and homes to the entire social domain in parallel with the spread of smartphones, progress in cloud technologies, and expansion of high-speed communication networks such as Long Term Evolution (LTE). In the advanced economies of Japan, the United States, and Europe, the application of ICT in existing business domains is starting to peak, and a need is being felt to expand ICT businesses to developing countries or to develop it in areas where ICT has yet to be used.

In this regard, efforts continue to develop ICT businesses in the fields of education, agriculture, medical care, and care giving, where the application of ICT has lagged behind. Furthermore, the "smart city" concept has become a target of ICT applications though it has only recently attracted attention. In general, the idea behind a smart city is to control and optimize the diverse types of information generated in an urban environment with an eye to making efficient use of limited resources like energy and water, eliminating traffic jams, mounting prompt and appropriate responses to disasters, etc.

A variety of approaches to developing smart cities are being taken around the world with the aim of achieving a stable supply of energy and a low-carbon environment, especially in developing counties. Such efforts are also underway in Japan as exemplified by

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trials on the forecasting of electric-power supply and demand and on demand control by using demand response (peak power reduction) that have been underway since 2010 in four locations: Yokohama City, Toyota City, the Kyoto-Osaka-Nara area, and Kitakyushu City.

From a global perspective, issues such as an increasing population, urbanization, fossil fuel depletion, and global warming provide the background to the development of smart cities. In Japan, a decreasing population due to a declining birth rate and an aging society with the highest ratio of elderly people in the world have generated demands for regional revitalization and measures for dealing with an aging society. In particular, the effects of the Great East Japan Earthquake in 2011 have increased demands for sustainable community development including denuclearization and appropriate handling of large-scale disasters. There is consequently a need to consider the use of ICT as a means of meeting these demands.

Simply making the existing social system more efficient is not going to solve these diverse social problems or achieve sustainable community development. We thus came to the conclusion that solving social problems requires new relationships, ones that go above and beyond the traditional division of social roles, and that these relationships (i.e., the social system) need to be designed.

We believe that ICT is needed to achieve these new relationships for building and managing a society effectively, which suggests that there are new business opportunities for Fujitsu.

3. Design of a new social system

A blueprint of a new social system for solving social problems and achieving a "sustainable community" does not yet exist. Rather than waiting for someone to create such a blueprint, Fujitsu is designing actual systems in collaboration with a variety of stakeholders, including local residents, relevant government entities, local enterprises, nonprofit organizations (NPOs), and corporate partners.

Since the viewpoints of the local residents are the most important, we are using HCD-based approaches, including design thinking,[6] the Persona Method,[7] and design based on an experience strategy.[8] Using these approaches, we are deriving solutions through on-site surveys, interviews, and questionnaires that target the local residents, government officials, and/or other stakeholders in the community from both qualitative and quantitative viewpoints. We share the results with the stakeholders, Fujitsu personnel, and our corporate partners in order to promote empathy among the stakeholders and to reveal the actual problems and structure behind the apparent problems. The objective is not simply to design attractive products or services—it is to build a consensus among the stakeholders and create a sustainable "business model" for use in achieving such products and services.

Activities that embrace a new social system for solving social problems and that formulate specific measures and policies as described above can be treated as an extension to the social domain of Fujitsu's "field innovation" method, which seeks ongoing, on-site improvements within companies or organizations. Such activities can therefore be referred to as "social innovation."

Social innovation can also be thought of as activities that seek to build new types of relationships and create businesses with the aim of achieving "business-model innovation"[9] in the social domain.

4. Social innovation process

The social innovation process that we have been putting into practice is outlined in **Figure 2**.

The first step is to "create a hub" for the purpose of conducting surveys and studies. In this step, we form a relationship with the target community based on trust and create a hub for use in diverse activities such as conducting surveys and holding workshops or taking part in an existing "community development hub."

There are times, however, when creating or taking part in such a hub solely on the basis of relationships with the local government is difficult, and this makes it necessary to build trusting relationships with local stakeholders such as residents and NPOs from a corporate social responsibility (CSR) perspective. To this end, we have developed a free Web service called Machibata.net[10] that facilitates cooperation among organizations and individuals involved in community development with the aim of building trusting relationships between Fujitsu and the community including local residents and parties on the private side such as NPOs. To create a useful hub, we are providing a
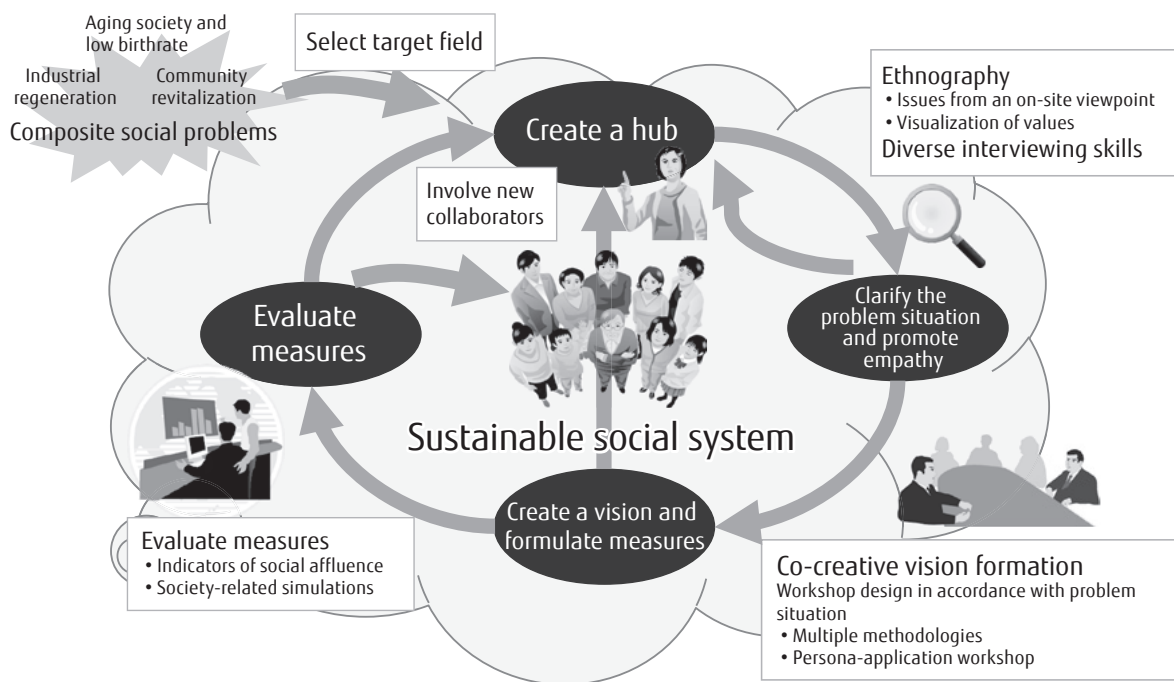
Figure 2
Social innovation process.

"citizen-reporter training course" that can be taken by signing up through Matchibata.net.[11]

The second step is to "clarify the problem situation and promote empathy." In this step, we conduct surveys in the field and interview local residents and other stakeholders. We do this on the basis of surveys previously conducted by the local government and/or NPOs involved in community development as well as on the basis of local medium- and long-term plans. Our aim is not only to determine the desires and opinions of local residents and other stakeholders but also to clarify the background circumstances and local culture and values.

It is important to share the results of the surveys and interviews with local stakeholders in order to promote empathy. To this end, we have been expressing and sharing the ideas of the various types of stakeholders by using the concept of "persona." The Persona Method was originally developed for representing a virtual user by using simple statements and/or images so that a group of product developers could achieve a coherent design from a common viewpoint. We applied this concept to the design of social services and have been putting it into practice in various ways such as by holding "persona workshops."[12] In addition to expressing and sharing stakeholder ideas in the form of

personas, we get participants to engage in role-playing not from their own viewpoints but from the viewpoints of persona to promote empathy among stakeholders.

The third step is to "create a vision and formulate measures." In this step, we organize workshops and/or forums for local stakeholders and specialists inside and outside Fujitsu during which the participants create a vision and formulate specific measures.

The fourth and last step is to "evaluate measures." In this step, we test the suitability and feasibility of the formulated measures through various levels of prototyping.

5. Case studies

We have put social innovation into practice in various localities in Japan. Here we present four example case studies.

1) Local agriculture revitalization (City A, Nagano Prefecture)
2) Social welfare enhancement (City B, Saitama Prefecture)
3) Tourism-based community development (City C, Nagano Prefecture)
4) Fishing-village earthquake disaster reconstruction (City D, Miyagi Prefecture)

We start by presenting an overview of the first one as a representative case study and then summarize the features of the others.

1) Local agriculture revitalization

This was our initial attempt at social innovation. Our objective was to revitalize local agriculture by making use of renewable energy.

After a kickoff meeting with the deputy city mayor, we were introduced to a local study group investigating the possibility of year-round cultivation of greenhouse grapes using locally generated solar power. This marked the starting point of our activities ("create a hub" in the social innovation process).

We then interviewed the study group participants: greenhouse farmers, representatives of local enterprises, relevant government officials, members of agricultural cooperatives, etc. Following these interviews, we expressed the ideas of each type of stakeholder in the form of a persona. We then held several workshops to share these ideas, to promote a discussion of the present state of local agriculture ("clarify the problem situation and promote empathy").

We found that building a consensus within the community was difficult as only a limited number of people would directly benefit from year-round cultivation of greenhouse grapes using locally generated solar power. We therefore returned to our starting point, that is, the revitalization of local agriculture, and held discussions from a wide range of viewpoints. In particular, we came to realize the importance of "achieving sustainable local agriculture" in the face of an aging agricultural workforce and an acute shortage of new, incoming farmers. We thus expanded our surveys and interviews to include professional farmers who could train young, aspiring farmers and tour operators who could entice city folk to visit the area ("involve new collaborators").

Through this process, we came up with the idea of a "Wellness Eco Farm"[12] as a means of achieving sustainable local agriculture. As shown in **Figure 3**, the Wellness Eco Farm is based on four levels of supporters. Professional farmers are at the top, followed first by aspiring farmers, next by agrarian-life enthusiasts such as retired people who enjoy farming as a hobby or worthwhile activity, and finally by general consumers supporting the higher levels. Measures are implemented at each level to meet the objective of that level

and to promote an understanding of those in the upper levels ("create a vision").

2) Features of other case studies

As part of our efforts to enhance social welfare for the elderly (Case 2), we have been applying the participatory design method through joint research with the University of Copenhagen.[13] In our efforts to develop a tourism-based community (Case 3), we have enlisted college students engaged in joint research to perform surveys. For fishing-village disaster reconstruction (Case 4), we have centered our activities about a volunteer group working in the stricken area. We found that having college students and volunteer groups conduct the field surveys resulted in more trustworthy relationships with local residents and other stakeholders. In fact, creating collaborative relationships with universities and NPOs has turned out to be a very effective approach.

6. Identified social problems and guidelines for solving them

As described above, we have been putting social innovation into practice. We have completed the process of clarifying the problem situation in a variety of communities and are now at the stage of formulating specific measures. Although we are just halfway to our objective of solving social problems and creating new businesses, we have succeeded in identifying several social problems needing to be solved and in formulating guidelines for solving them.

6.1 Problems

1) A variety of trials conducted by government agencies, NPOs, and other organizations are underway in communities around Japan with the aim of solving regional social problems. Many of these trials are taking excellent approaches that could be used as models for other communities, but most suffer from inadequate funding and a lack of human resources.

2) Most efforts depend on government expenditures and subsidies, and their operations cannot continue if such subsidies are lost.

3) When implemented on an individual basis, most measures for solving specific social problems are economically unsound and difficult to justify.
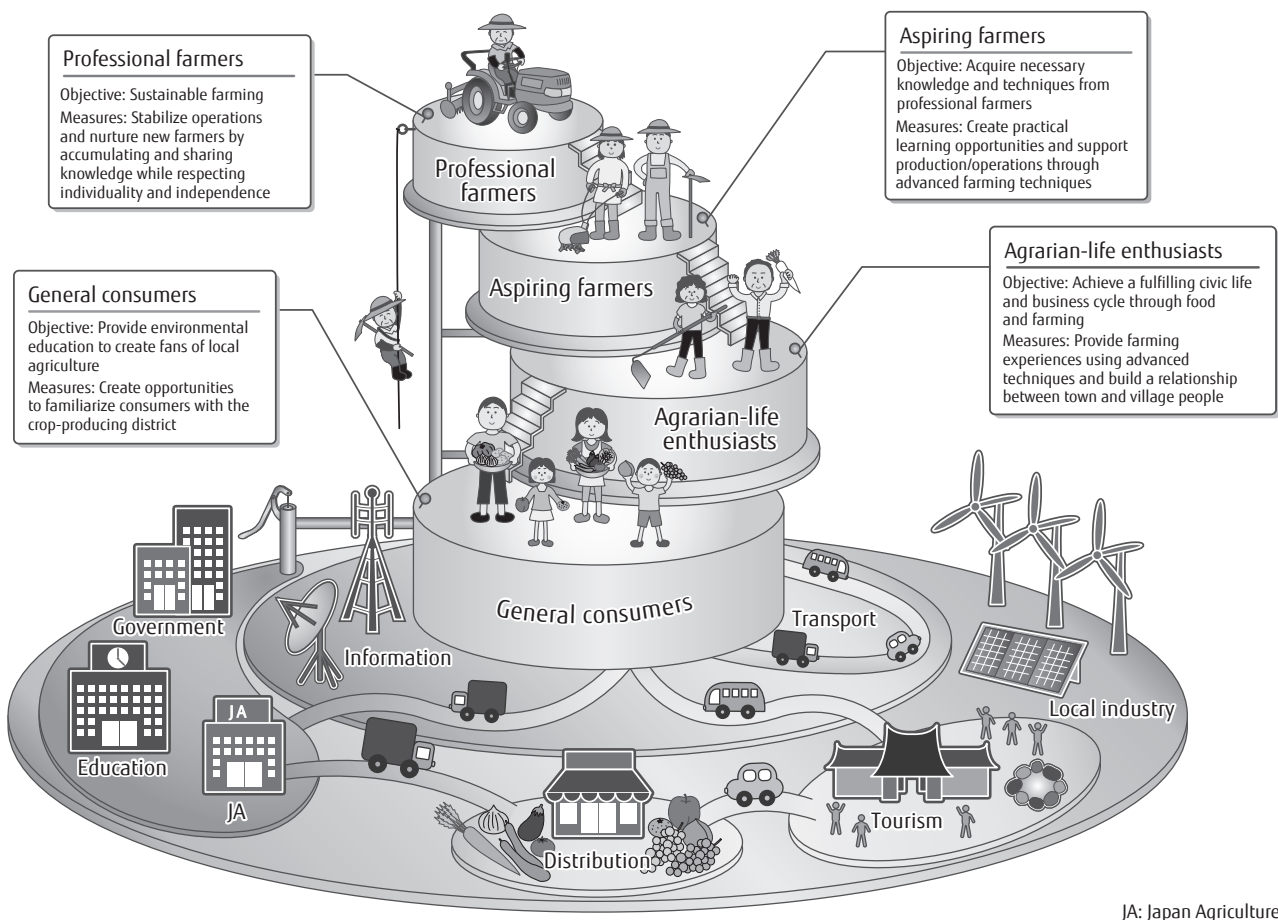
Professional farmers

Objective: Sustainable farming

Measures: Stabilize operations and nurture new farmers by accumulating and sharing knowledge while respecting individuality and independence

Aspiring farmers

Objective: Acquire necessary knowledge and techniques from professional farmers

Measures: Create practical learning opportunities and support production/operations through advanced farming techniques

General consumers

Objective: Provide environmental education to create fans of local agriculture

Measures: Create opportunities to familiarize consumers with the crop-producing district

Agrarian-life enthusiasts

Objective: Achieve a fulfilling civic life and business cycle through food and farming

Measures: Provide farming experiences using advanced techniques and build a relationship between town and village people

Professional farmers

Aspiring farmers

Agrarian-life enthusiasts

General consumers

Government

Information

Transport

Education

JA

Distribution

Tourism

Local industry

JA: Japan Agriculture

Figure 3
Wellness Eco Farm concept.

6.2 Guidelines

Coming up with a new system for solving social problems is not an easy task. However, looking at the identified problems from a different angle revealed guidelines for solving them. On the basis of our activities so far, we have identified three guidelines for solving social problems.

1) Get residents[14] (particularly elderly residents) to participate

The first guideline calls for the participation of local residents, particularly the elderly ones, in the formulation of new measures (creation of a social system). As the aging society progresses, the provision of diverse social services through public expenditures is approaching its limit. The only solution to this problem is a scenario in which residents, especially the elderly ones, proactively participate in the provision of services in contrast to simply being the beneficiaries. In

an aging society, having "active seniors" who are still in good health and able to work is vitally important to achieving economic sustainability.

Having the elderly participate in the social system has other positive effects as well. For example, it helps preserve the physical and psychological health of the elderly and helps reduce social expenditures related to medical care, social welfare, etc. The gathering and selling of leaves by elderly residents of Kamikatsu Town in Tokushima Prefecture is one example of this approach.

2) Clarify benefits to residents

The benefits to local residents (especially elderly ones) of participating in the new social system must be clarified. Sustaining such activities will no doubt require subsidized wages and/or community currency, and a design approach that is based on the local culture and values of the elderly residents is essential.

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The benefits to the participants include leading a worthwhile life, maintaining one's place in society, and making a contribution to the community.

3) Integrate multiple measures

Applying only a single measure to a specific problem is usually not an economically sound approach as it is difficult to cover the costs needed to achieve that solution on the basis of only business revenue. Consideration has therefore been given to an approach that integrates multiple measures such as ones targeting disaster prevention and transport and ones aimed at supporting the elderly. This approach enables the mutual use of data and resources, which can keep total costs down and produce a synergistic effect. Achieving such a system, however, requires collaboration among stakeholders (government organizations, local retailers, farmers, local enterprises, etc.) connected in some way to such measures. This means that the role of each stakeholder and the benefit to each must be clarified.

7. Community-based value chain

As described above, achieving new measures (a social system) for solving the problems of a community requires the participation of residents centered about the elderly and other local stakeholders and the integration of multiple measures. Furthermore, the roles of the participants (players) in the social system including residents, the resources that they can provide, and the benefits coming to them must be clarified, which can be expressed by a model called the "community-based value chain." A diagram of this model is shown in **Figure 4**.

A community-based value chain can be thought of as an extension of the "business model" concept to a social system. According to Koichi Tonegawa,[15] a business model can be defined as an "expression of business features in the form of a model." It can be expressed in terms of a process model, value provision model, revenue-structure model, operations flow model, cash flow model, etc. Among these, our
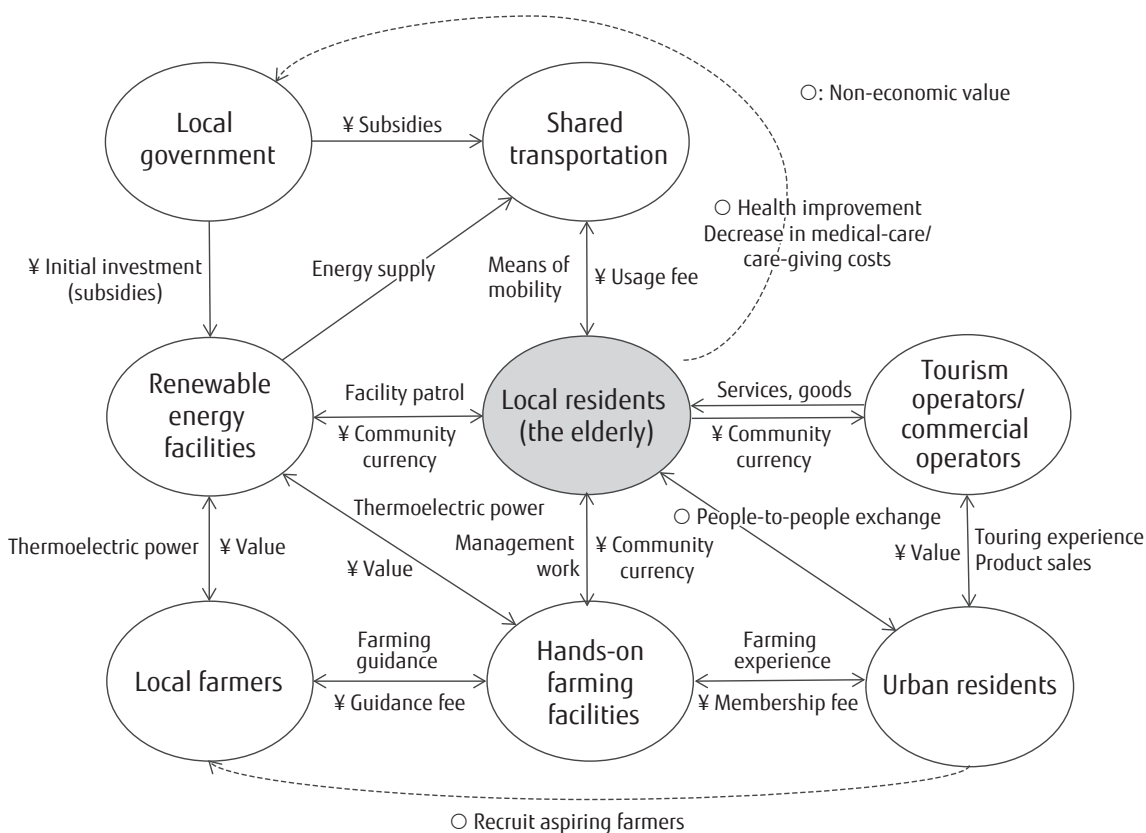

Figure 4
Community-based value chain.

community-based value chain is closest to the value-provision model, but it differs in that target customers are unclear and that it includes the exchange of non-economic values such as experiential value or inherent value (**Table 1**).

In light of the above, we can think of social innovation activities as a process of entering a community or society, formulating a community-based value chain to solve social problems in collaboration with stakeholders, and building a consensus.

8. Participatory smart community

Prior to the Pacific War (WWII), mutual assistance (in which local residents help each other) played a major role in Japanese society, but changes in the social system after the war reduced the ratio of mutual assistance while increasing the ratio of dependency on self-assistance (self-help or commercial services) and on public assistance (services provided by the government). Now, the declining birthrate and a growing proportion of elderly people is putting public assistance in jeopardy while dependency on self-assistance has its limits. To achieve a sustainable society, we need to take another look at the role of mutual assistance and aim for a social system that achieves a balance among self-assistance, mutual assistance, and public assistance.

We consider that new forms of mutual assistance are possible through the adept use of ICT. The participation of residents in the social system is practically synonymous with achieving new forms of mutual assistance. We also consider that ICT will play a major role in achieving a new model for a community-based value chain and making it function efficiently.

We propose a participatory smart community

(**Figure 5**) that uses ICT to form new relationships (new types of involvement) in the local community (residents, local enterprises, etc.) and achieve value for people (convenience, hope), value for the earth (countermeasures to global warming, biodiversity), and value for society (safety and security, community revitalization). In other words, the goal is to achieve not simply a pleasant and convenient community but a sustainable 21st-century society by strengthening the bonds between people and thereby creating a strong community.

A model of a community-based value chain can be used to make such a participatory smart community possible, and ICT can be used to integrate various measures (solutions) for implementing that model and support associated activities.

9. Conclusion

This paper described Fujitsu's approach to social innovation, an approach aimed at solving social problems and creating new businesses in the social domain. The social innovation process applies the concept of HCD to the design of social systems. It means entering the target community to help create a vision for a new social system and to help formulate measures to realize that vision in collaboration with local stakeholders.

By putting this process into practice, we have so far found that applying only a single measure to solve a social problem is problematic in terms of economic sustainability and that an approach that engages local residents centered about the elderly and combines multiple measures is essential. Achieving this requires a "community-based value chain" that clarifies the roles and values of the diverse stakeholders in the community, that clarifies the resources they can provide, and

Table 1
Comparison of business model and community-based value chain.

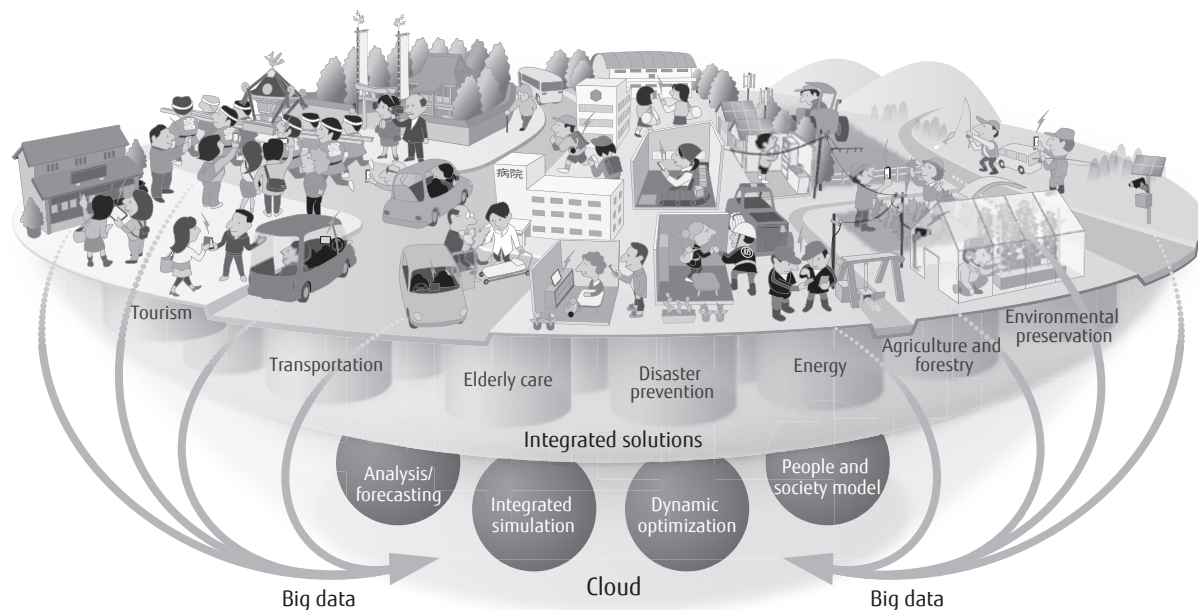|	Business Model	Community-based Value Chain
Objective	Business (revenues = sound economics)	Solution of social problems (sound society + sound economics)
Customers	Clear vision of customers	Unclear vision of customers
Value	Things (products, services), money	Things, money, experiential value, inherent value
Stakeholders	Enterprises, customers (residents, enterprises)	Local governments, institutions, private enterprises, residents, NPOs
No. of stakeholders	2 or more	3 or more
Operating principles	Market principles	Market principles + values, philosophical values, degree of satisfaction
Standards	Profitability	Sustainability, social values

Figure 5
Participatory smart community.

that clarifies the benefits they will receive.

We are putting social innovation into practice in various communities, creating community-based value chains tailored to the conditions of each community, and using those value chains as a basis for formulating specific measures. Looking forward, we plan to implement specific measures in collaboration with specialists and technical teams inside and outside Fujitsu, to build a consensus among stakeholders in target communities, and to conduct verification experiments with funds from national projects or other sources.

Through activities such as these and new forms of resident participation using ICT, we aim to achieve a "participatory smart community" that creates a strong community, solves social problems, and realizes a sustainable society.

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