Featured Articles

Design Approach based on Social Science for Social Innovation Business

Kaori Kashimura
Yujin Tsukada
Takafumi Kawasaki
Hiroki Kitagawa
Yukinobu Maruyama

OVERVIEW: As for contributing to the further development of Hitachi's Social Innovation Business, the Design Division of Hitachi, Ltd. has been developing and utilizing a human-centered design approach based on social science. This approach offers three mechanisms: "ethnographic research" for clarifying the fundamental and hidden needs on-site, an experience-oriented approach for revealing issues with customers and co-creating the ideal image by visualizing experience value, and "vision design" for capturing trends in social issues and people's values with an illustration of the ideal image of the future. In this article, the method of applying these mechanisms and their impacts will be explained in detail using case studies.

INTRODUCTION

Hitachi is committed to a Social Innovation Business in which all of its employees currently engage in related activities enthusiastically. Hitachi's Social Innovation Business "integrates cutting-edge information technology (IT) and infrastructure technologies that have been developed over many years (at Hitachi) to improve safety and security throughout society[1]."

The following three considerations are essential for research and development in Hitachi's Social Innovation Business[2]. The first is that providing equipment and systems by the traditional method is not adequate for solving social issues. Every problem of energy, traffic congestion, water treatment, and healthcare involves a variety of stakeholders that naturally complicate its trend of subjects and values. Engagement should not be limited to resolving local issues, but should be able to optimize the entire condition. The second consideration is that accurately identifying the real circumstances from an intense examination of the issues is crucial for solving complicated problems. The reason is that clients themselves actually have a hard time recognizing existing problems due to the complexity of issues. The last essential consideration is that exploring the solution of issues collaboratively with clients who are in charge of the infrastructure business is expected. To be able to research and agree on an effective solution collaboratively requires an active involvement in conventional business objectives such as enhancing the efficiency of indirect operations and shortening the lead time, and a careful analysis of how, when, and why the problems occurred in people's everyday lives and daily business operations. The results of these two tasks must be fully transparent to clients and business partners.

From such a background, the Design Division at Hitachi, Ltd. has developed and utilized a human-centered research design approach based on social science.

DESIGN APPROACHES BASED ON SOCIAL SCIENCE

Typically, most of Hitachi's local business activities are to provide technologies that fulfill the customer's specifications. In Hitachi's Social Innovation Business, it is required to capture the demands of the end users and employees that are to collaborate with customers in the upstream phase of development and to propose specifications that satisfy customers' needs instead of waiting for specifications from customers. And there are many cases when customers ask for a proposed vision of what society should be prior to technological considerations.

Ethnographic Research

Ethnographic research is an approach to social science that performs detailed observation of people's actual behavior with a product or service, which is then

analyzed qualitatively[3]. This method is capable of capturing the relationship between people and the environment or man-made objects, and of clarifying an overall image of people's behavior, their underlying values, and their unfulfilled needs and desires. Oftentimes, what users desire is different from how users behave. Actually, there are many users who merely accept a product or a service and are not able to express their disappointment in a survey that asks about any unsatisfactory performance in systems. Ethnographic research is an effective research method for acquiring clues to a solution from clarified hidden needs and fundamental problems that are difficult to obtain in a questionnaire or group interview.

Experience-oriented Approach

The experience-oriented approach is a super-upstream process in system development, which was systematized by Hitachi in 2009[4], [5], [6]. The unique feature of the experience-oriented approach is that in addition to designers, both system engineers and business consultants can engage the discussion in the super-upstream process. By utilizing the experience design technologies that have been cultivated from Hitachi's original design projects over the years, it is possible to visualize the fundamental issues and the hidden needs in a new system image, and to co-create the ideal image while discovering objectives with customers in a collaborative way.

Vision Design

In Social Innovation Business, it is very common that developed products and services will not be implemented five or ten years later. In this case, the ideal image (future vision) of how prosperous life would be and how happiness would be shared in the future needs to be illustrated by capturing the trends in people's values and social issues. Hitachi defines this as vision design[7], [8]. In a society that can achieve the future vision, a highly profitable service can be developed by anticipating how service value would be evaluated and how people would assess the issues.

ETHNOGRAPHIC RESEARCH OF THE PIPE MANUFACTURING MANAGEMENT SYSTEM FOR A POWER PLANT

In this section, the features and effects of ethnographic research will be explained through a case study that was conducted of a pipe manufacturing management system for a power plant.

Purpose

The construction of a power plant is a large-scale project covering 150 km of pipes, 6,000 valves, and 2,100 km of cable. In order to execute the construction without any delays, it is necessary to deliver components such as pipes to the construction site according to a schedule. The situation in this case was that the delivery of 150 km of pipes had been regularly delayed, and it was affecting the progress of construction. This research was conducted for the purpose of extracting the fundamental causes for the occurrence of late deliveries.

Research Subjects

In the pipe manufacturing factory, there are eight processes for different unit workers (see Fig. 1). This research investigated all eight of these processes.

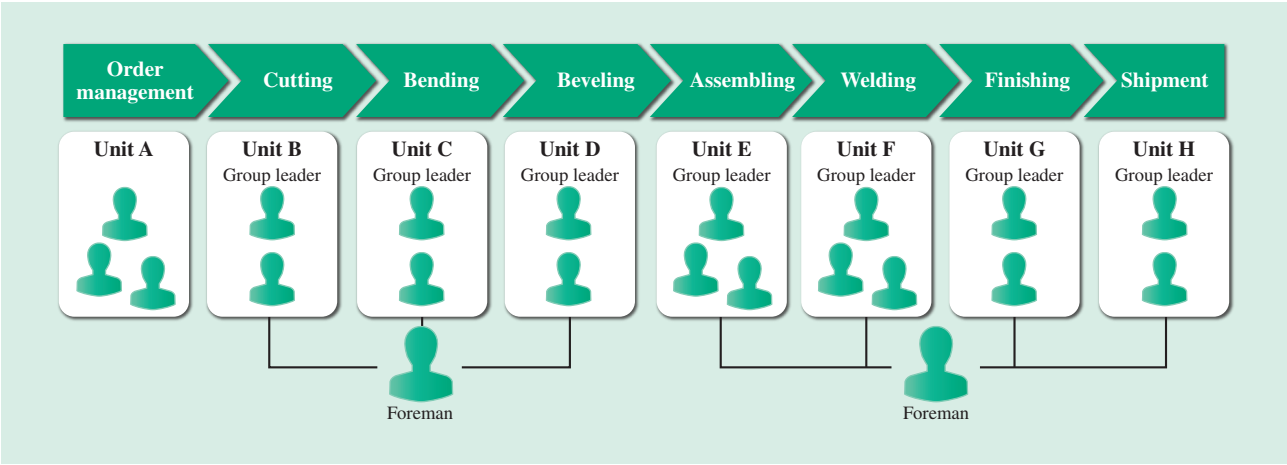


Fig. 1—Overall Image and System of Pipe Manufacturing Processes.
Each unit consists of one unit leader and several unit staff members for different processes.

Fig. 2—On-site Observation.
Capturing the actual operation in detail by working with the on-site worker side-by-side (the ethnographers are on the left and the right).

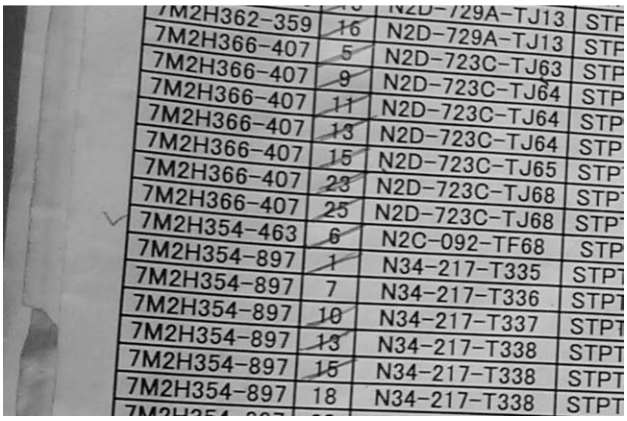


Fig. 3—Self-generated Work Flow in Each Group.
Marking with red pen and highlighters on the work flow that was generated on personal computer (PC); the work flow was printed from and updated on PC once every two weeks.

Research and Analysis Methods

Three company ethnographers visited the factory and conducted 2-3 hours of observation for each unit and 90 minutes of interviews for four days in order to obtain the data. During observation, the ethnographers dressed and equipped themselves the same as the on-site workers. The purpose of this was to differentiate ethnographers from regular visitors and governmental inspectors and to effectively build trust with the participants (see Fig. 2).

Conducting observations while building trust with the participants allows ethnographers to obtain deeper insights into how workers arrange and perceive their daily tasks. By not focusing on one worker, the information is acquired through observing overall task handling including other workers and engagements with other units. This enabled the ethnographer to identify the hidden needs of workers and the fundamental issues in the organization.

Summary of Research Results

Through this research, the conditions of various handling methods used independently on the workers' own discretion and the reality of unavoidable on-site circumstances were identified. In this section, two of the research results will be explained.

Each Unit Manages its Own Project Schedule

It was discovered that each unit generates its own project schedule for each process as a means of avoiding delays. The schedule for handling each pipe is calculated according to the delivery schedule of pipes (see Fig. 3). This was considered to help smooth collaboration among units because the content was used for making adjustments with other units.

This schedule was generated by the unit leader on a personal computer (PC) and was printed out for the daily on-site tasks, but was only updated once every two weeks instead of daily. It did not reflect the situations of the other units in real time.

Units Carry Out Schedule Differently and Change Processes

The schedule was prepared with a series of process steps; however, there were many cases where the tasks were not performed as planned.

For example, unit B, which handles cutting in Fig.1, determines which pipes to work with for that day from the schedule. Their tasks begin after confirming the daily work schedule; however, finding the pipes to be processed in storage occasionally takes more than one hour. Frequently, the drawings also were not prepared sufficiently due to printing delays. From these reasons, the problem of not being able to carry out the task on the original pipes planned for that day occurred.

Each time the pipes were not found or the drawings were not ready, the schedule was changed in order to work on a different task that could be executed immediately because the workers did not wait.

Specify the Mechanism Causing Delays through Analysis

In each observation, it seems like the immediate change was preventing the delivery delay; however, one change of a unit definitely affects the tasks of other units in a collaborative labor of eight units.

When unit B, which was in charge of cutting, worked on other pipes as described above, pipes of a different diameter would be delivered to the next unit, C, unpredictably. During the bending process, it is more efficient to carry out one task on the same diameter of pipe at once due to the time-consuming process of adjusting the diameter of the machine. If different diameter pipes were delivered from unit B, then unit C would not be able to carry out one task for the same diameter pipes and spent an enormous amount of time on adjusting the diameter of the machine.

Why would unit B change the schedule and deliver different pipes the next time? And why did not unit C stop the task for the moment? It was determined that the workers felt strong pressure from a lack of tolerance for any delays due to chronic delivery delays that were happening all over the pipe manufacturing factory.

With a schedule that is only updated once every two weeks, it is difficult to grasp the status of other units and to arrange procedures with a long-term perspective. As a result, the workers could only focus on the tasks of their own unit.

Thus, a situation in which it was easy to make short-sighted decisions from the schedule without an overall view of it, and the strong pressure of "preventing delivery delays" that caused each unit to make decisions that were best for its part of the process, instead of what was best for the whole process.

Improvement Proposal

A specific IT system that is capable of capturing the status of work flow in real time was implemented to solve the difficulty of inspecting every detail at the work site. The situation where workers were spontaneously changing the process flow in order to optimize their work actually intensified the delays. This key finding was explained fully to the on-site workers. Through these two improvement features, the on-site workers changed their attitudes towards daily tasks and were able to engage in the improvement plan independently so as not to repeat the same mistakes with the newly installed IT system.

As a result, the delay rate was successfully reduced from 17% to 1% in the piping manufacturing process.

Impact of Ethnographic Research

As described above, ethnographic research is a method that is capable of obtaining data that is difficult to reveal through other research methods. That data can consist of the background and the mechanisim of problems occurring on-site. An enormous impact can be achieved by resolving the fundamental problems.

Furthermore, ethnographic research is not only capable of transforming workers' attitudes towards their own daily work routines and of smoothing the implementation of new systems by sharing the research results, but is also capable of leading to the improvement of operation processes.

Hitachi will utilize ethnographic research in various industrial fields starting with its Social Innovation Business as one of the methods for capturing fundamental objectives on-site.

APPLICATION OF EXPERIENCE-ORIENTED APPROACH TO RESEARCH OF ACTUAL CONDITIONS IN EVACUATION CENTERS OF SENDAI CITY AND TO DEVELOPMENT OF A DISASTER MANGEMENT PLAN

After the Great East Japan Earthquake, the City of Sendai and Hitachi, Ltd. initiated a disaster management solution, known as the "Sendai Model," for the purpose of sharing experience that has been learned worldwide. They cooperated in conducting research at the evacuation centers, which was the main concern for citizens, and in developing an effective solution model.

In this activity, the evacuation center's actual conditions, which were relatively unknown, were carefully examined with a consideration of the various stakeholders' perspectives. In addition, solutions that were required by the evacuation center were structured with the perspective of optimizing operations, facilities, systems, and so on.

Investigation/Research Methods

The following four challenges were encountered while conducting the research.

(1) All evacuation centers in Sendai City were closed at the beginning of this research.

(2) Problems of the evacuation centers were different in different disaster-stricken areas.

(3) Management officials at each evacuation center have different views due to their positions.

(4) Five months had passed since the earthquake, so the memories of the local officials and the community directors were fading.

With these challenges in mind, the experience-oriented approach was applied as the investigation approach for conducting research and developing a solution. The experience-oriented approach is

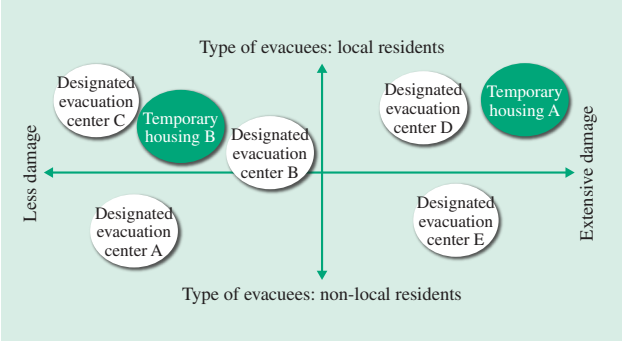


Fig. 4—Characteristics of Researched Evacuation Centers.
Seven evacuation centers are selected that are basically different from the perspectives of the size of disaster and the composition of evacuees (ratio of local residents and non-local residents).

Hitachi's own original method for developing opitimized requirements while emphasizing "user experience (the value of experience)."

Research Subjects

Seven locations were chosen for this research. These locations included the coastal region where the damage was severe and the inland region where the problem was residents who were unable to return home (see Fig. 4).

Interview Subjects and Methods

The evacuation center directors, the community directors, and the local officials were the interview subjects for a total of 17 rounds of interviews (27 people in total). The interview method used was an in-depth interview that was designed and conducted by the researchers of Design Division, Hitachi, Ltd. Taking the possibly ambiguous memories of the stakeholders into consideration, a "time series chart" was constructed for each evacuation center. From this chart, the actual conditions on-site were extracted from the experiences that were recovered by the interviewees.

This time series chart is a table that allows all the events that occurred from the opening of an evacuation center to its closing to be plotted. The main content included the number of evacuees that were accommodated, the status of lifeline infrastructure such as electricity, water, gas, and public transportation in the area, the activities of the facility directors who operate the evacuation centers, the community directors, the evacuees, and the local government officials, and the daily reports that were provided by Sendai City (see Fig. 5 and Fig. 6).

After each interview was conducted, the new findings would be added to the chart. If the original content was different from the findings, the chart would be revised carefully. With the support of the Sendai City officials, the findings were reconstructed and the actual conditions of the evacuation centers were shared utilizing these time series charts.

Actual Conditions and Issues in the Evacuation Centers

Due to the fact that the degress of damage was different in each of these seven evacuation centers, the period of operation from opening to closing and the problems that occurred were unquestionably different. This research was able to extract the fundamental issues at each evacuation center by examining three phrases: coming to the evacuation center (Coming), living in the evacuation center (Living), and leaving the evacuation center (Leaving) (see Fig. 7).

In terms of the policy for responding to these issues, it was possible to identify two essential areas in which disaster relief resourses should be concentrated.

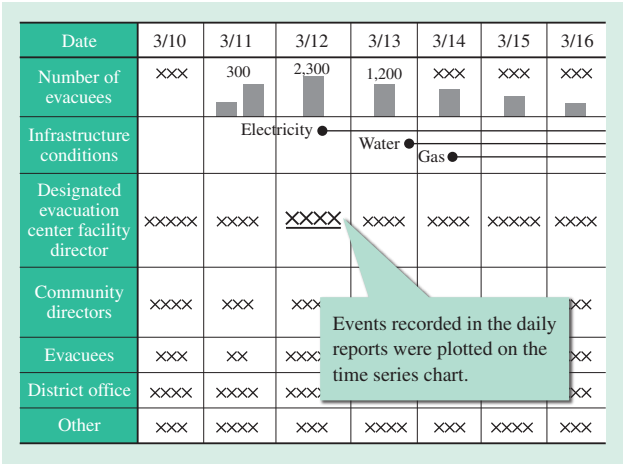


Fig. 5—Image of Time Series Chart.
The stakeholders of the evacuation centers are listed vertically, the time frame is listed horizontally, and then the information from the daily reports of the evacuation centers are plotted accordingly.

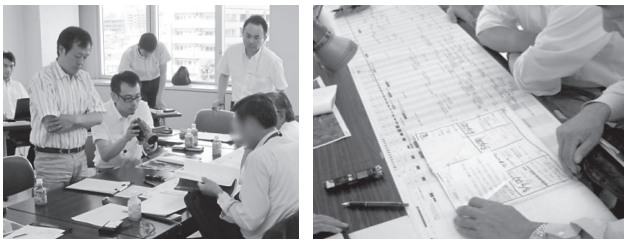


Fig. 6—Interview Research Using Time Series Chart.
The actual conditions that are not described in the daily reports of the evacuation centers are obtained in interviews by asking the stakeholders to recall the event from the disaster training prior the Great East Japan Earthquake to opening/closing the evacuation centers after the disaster.

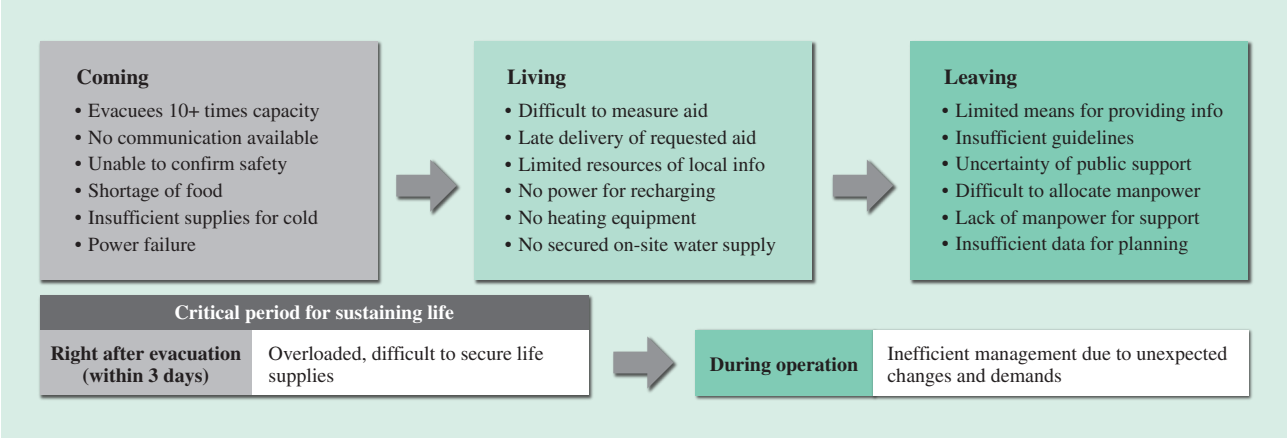


Fig. 7—Changes in Issues from Opening to Closing the Evacuation Centers Obtained from the Research Results.
The three phases of an evacuation center, with its distinctive conditions and concerns, are identified for further analysis. Responding to evacuees' changing needs during the several months of evacuation life is required for operation.

One is in maintaining the lives of the numerous evacuees who were evacuated temporarily due to not being able to return home in the first three days right after the disaster. The other is in operating evacuation centers safely and efficiently while responding to the evacuees' needs, which vary as time passes in the middle period of an evacuation.

Re-examining Disaster Management Plans

The findings listed above were analyzed, disaster management plans were developed, and the following recommendations were concluded.

Considering the Grouping of Evacuation Centers

In Sendai City, there was a "centralized" management system for evacuation centers. The city office managed each district office, which handled the evacuation centers within the district. In addition, the "lateral connections" between the district offices and between the evacuation centers were weak.

Capturing the reality of the disaster status was difficult because the coordination with the disaster management officials did not proceed smoothly because the local government was also damaged by the disaster. One method of solving this issue of "centralization" is to develop a management/coordination system that is a "self-governed spreading" style.

The "self-governed spreading" system will allow the nearby evacuation centers to create an "evacuation-center group" that is centered around a disaster management base. This group will allow the evacuation centers to support each other during a disaster. If the local government is damaged by a disaster like this time, the evacuation centers can help each other within the group before public aid can be put into place. After public aid is functioning, the representative of the evacuation-centers group can report and request the local government to provide support and make adjustments accordingly (see Fig. 8).

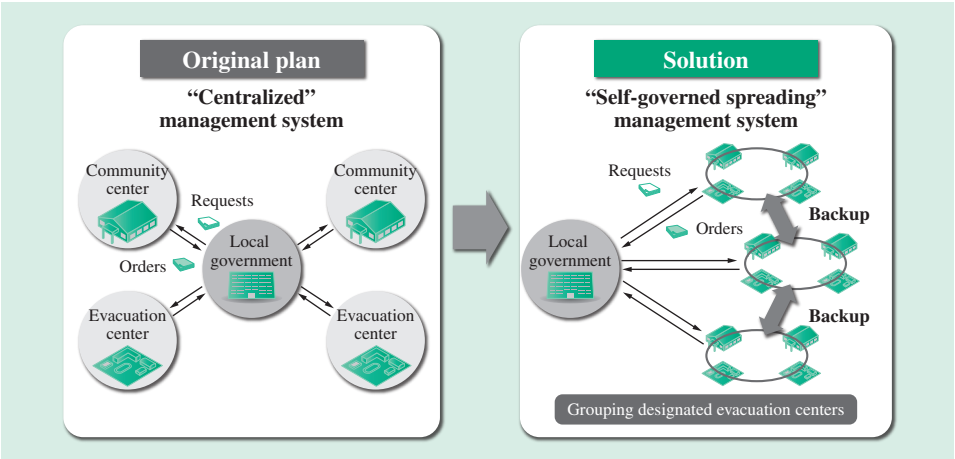


Fig. 8—Concept of "Evacuation-center Group" by Using "Self-governed Spreading" System.
A grouping system that allows nearby evacuation centers to support each other in case local government is unable to function after disaster.

The conclusion was that it is possible to efficiently manage and coordinate evacuations by balancing the "utilization and control of self-governance" where local government is in control of multiple "evacuation-center groups" while each "evacuation-center group" is proficient at operating its own disaster relief activities. Like the Great East Japan Earthquake, it is possible that an entire "evacuation-center group" could be damaged totally based on the scale of the disaster. To prepare for this kind of catastrophic case, a mutual support framework (a "sister evacuation centers" concept) of the coordinated "evacuation-center groups" that connects evacuation centers with different geographical features (e.g., coastal or mountainous regions) would be effective.

Classification of Management Plans for Evacuation Centers

Evacuation center planning was established uniformly for all the local governments regardless of their geographical differences. However, in reality, the types of regions of evacuation centers can be largely defined as "urban" and "suburban." The type of disaster victims who were in each evacuation center can vary depending on the factors of the surrounding environment (whether it is in a business district or near a major station) and the population during the day or night (e.g., having fewer people but mainly elderly during the daytime).

It would be ideal to conduct a test for the features and the needs of the disaster victims in each evacuation center. However, in reality such testing is impractical. Therefore, the evacuation centers' operations were classified into four types depending on their regional characteristics. It was proposed that evacuation center management should be planned and prepared for according to each regional type (see Fig. 9).

For example, the "urban" type requires communication methods and creation of strategies for evacuees who come in other than local residents, such as the effective utilization of office buildings or commercial facilities and the investigation of information transmission methods for massive numbers of evacuees.

On the other hand, the "suburban" type of evacuation center requires the support of self-governed evacuation and recovery activities of the local community, such as allocation of user-friendly equipment for women and children with the assumption of managing the evacuation during the day time and acquiring telecomunication methods to avoid creating any isolated areas.

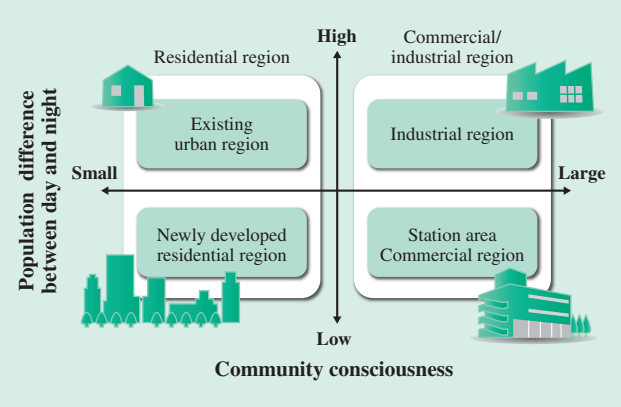


Fig. 9—Categorization of Evacuation Operations for Responding to Regional Features.
The regional types are categorized from the perspective of local community awareness and population gap between day and night.

Solution Development

A conceptual image of installing the IT systems, the electricity sources, and the sanitation equipment for a typical designated evacuation center that is in a commercial area near a station is shown in Fig. 10. This is based on the result of categorizing evacuation management depending on regional characteristics, as described above.

This type of evacuation center is established for evacuees who are unable to return home in excess of the number in the conventional estimate based on the results of this research. The evacuation center will have access control from the beginning and be equipped with a system for managing and utilizing evacuee information for distributing relief to support the needs of evacuees such as stockpiling food, water, and electricity to last the first three days after a disaster.

Currently, several systems have been developed from the proposed solution that was clarified by this research. The aim is to provide a comprehensive and effective disaster management proposal not only for Sendai City but also for any other local government.

APPLYING VISION DESIGN FOR THE HEALTHCARE SERVICES OF A UK NATIONAL HEALTHCARE SERVICE PROVIDER

Vision design is a research methodology developed by the Design Division since 2010 as a technology for thoroughly sharing the purposes and strategies of business development among the stakeholders in the Social Innovation Business. This methodology

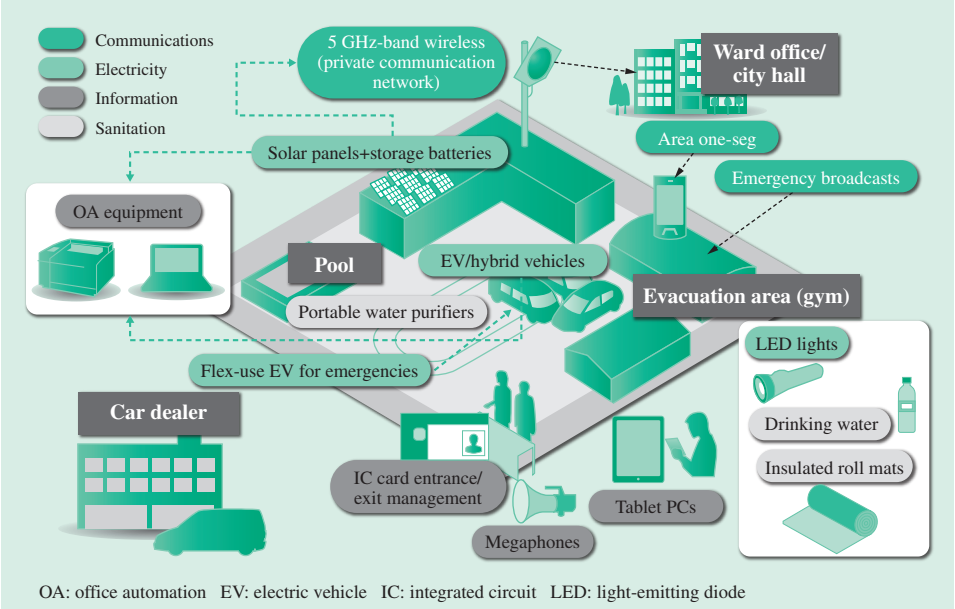


Fig. 10—Solution for Evacuation in Commercial Area near Station.
Due to estimated large numbers of evacuees who are unable to return home after a disaster, the evacuation center should have an IT system for providing access control, and for managing/utilizing evacuees' data efficiently.

is capable of illustrating a future vision of society in which the captured social issues are solved, while grasping the future trends through analyzing the environmental variants from a citizens' perspective (see Fig. 11). The following will describe a case study of an application of vision design to issues for which the burden of social responsibility over healthcare has grown significantly due to an increased number of lifestyle-related diseases from an aging society.

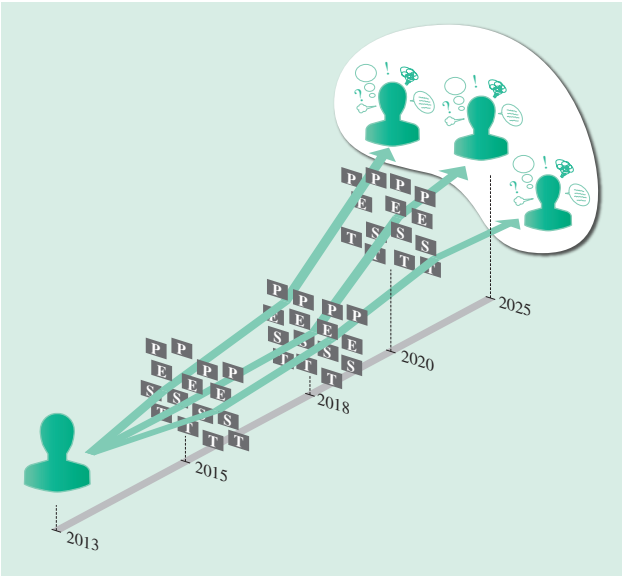


Fig. 11—Concept of Vision Design.
The methodolgy is for sharing development goals and strategies among stakeholders based on an illustrated vision of future society where the captured social issues have been solved, while grasping future trends.

Background of Research

Hitachi considers healthcare to be one of the essential infrastructures for supporting a 21st-century society and would like to contribute to realizing a society where everyone can live safer and more healthy lives by developing various innovative technologies, and the related systems, solutions, and services while utilizing Hitachi's total technology. This project was chosen as a research case in 2012 to accelerate healthcare-related business developments. In 2013, a vision video from one of the deliverables was employed and presented as part of a proposal for implementing a digital medical IT platform in the UK in collaboration with a business entity. This was evaluated by the National Health Service (NHS) England (Greater Manchester) ("NHS GM") and led to the execution of a validation project aimed at improving healthcare through the use of informatics.

Research Challenges

For developing a vision design of healthcare, the year 2025 has been determined as the target for realizing all of the hypothesized innovations. The following three challenges were encountered while conducting the research.

(1) Investigating the challenges of a super-aging society

(2) Comparing and contrasting healthcare systems worldwide

(3) Proposing a service solution that is capable of providing affordable healthcare that covers the entire society

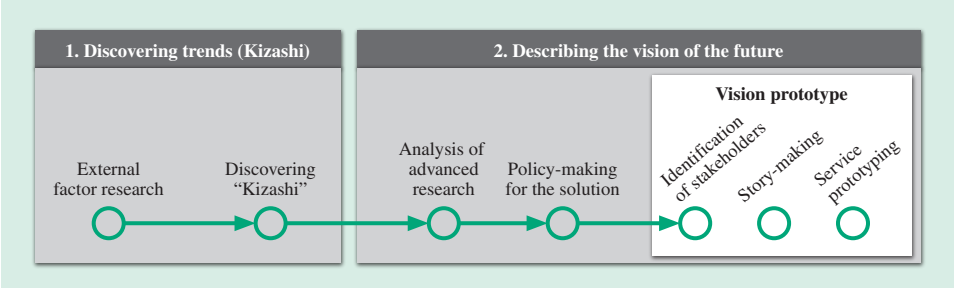


Fig. 12—Process of Vision Design Methodology.
Vision design methodology consists of a Kizashi approach that identifies the changing values in lifestyle and social trends, and a prototype approach that offers a simulated images of the future society.

Research Methods

Vision design methodology consists of a "Kizashi" approach that identifies the changing values in lifestyle and social trends, and a prototype approach that offers a visual simulation of future society (see Fig. 12).

The Kizashi approach is not a future prediction approach that makes predictions based on an evaluation of the continuously shifting past, present, and future, but extracts multiple values from the perspectives of people, and discovers the possible changes from the multi-dimensionally and intuitively analyzed variants. In this case, (1) the challenges of a super-aging society have been investigated through "generating Kizashi," which analyzes the changing values of people in the future who will face the problems. Next, overseas innovation projects have been researched and analyzed as precedents of the healthcare field. (2) The solution strategy has been structured based on a comparison of healthcare systems globally. Finally, (3) an "extraction of a future vision" was executed as a total service solution for realizing efficient healthcare that covers the entire society. Furthermore, the ideal specifications for users such as attractive usability, functionality, and control methods were clarified in the generated "vision prototype" of the healthcare field. In terms of the technology, a specification of proposal was developed with the research laboratories. Any technology that exceeds the current level of technology will be registered as Hitachi's intellectual property. Interviews were conducted with the stakeholders of business entities, public administrations, and medical organizations to verify the validity of solutions to challenges including system, regulation, and business challenges. Feedback was obtained from researchers of aging society and external experts with regard to the acceptibility of the solutions.

Results

Observation of Challenges in a Super-aging Society

(1) Increasing numbers of elderly people receiving care

In a super-aging society, it is important to understand the difficulties and the means of coping of elderly people who are taking care of their own health based on a limited income. Home visit research was conducted of the single-occupant households of elderly people living in cities and underpopulated areas where there is increasing concerns about the future. One of the Kizashis, called "singleship (single person safety net)," was identified as an essential feature. Through this "singleship" kizashi it was understood that policy making needs to respect the independence and the problem-solving capabilities of elderly people, and to build a society that is capable of protecting the single lifestyle with safety, security, and wellbeing.

(2) Problems of comprehensive medical service due to distributed health records

Currently, health records in Japan are managed separately at each hospital. This is considered to be the cause that is preventing proper diagnosis and early treatment for elderly people whose illnesses are easily triggered from the complex factors of everyday life. Thus, the participatory research was conducted in the form of a home visit from a doctor. While elderly people were being examined by the doctor, the nurses from the medical team were able to identify unsanitary household tools and the lack of sanitation associated with a poor health condition. This has helped in terms of treatment. A Kizashi, called "borderless medical (eliminating barriers to medical services)," was identified as an essential feature. Through this "borderless medical" kizashi it was understood that a multifaceted understanding is not only needed for diagnosing illnesses but also for daily care.

(3) Lack of community support education for responding to the shortage of care workers

Most likely, it will be difficult to rely only on a human resources collaboration of care workers from foreign countries in the midst of a shortage of care workers due to a decreasing labor force, so interviews and research were conducted on the organizations

promoting community care support and supporting pediatric patients. A kizashi called "community education (promoting education to improve regional power)" was identified as an essential feature. Through this "community education" kizashi it was understood that it is necessary to promote mutual cooperation and understanding of the elderly within the local community by encouraging volunteers, and so on.

Comprehending Merits/demerits of Health Systems through Global Comparisons

(1) Europe

One-stop examinations, including family members, by a general practitioner (GP) are attractive, but there is a long wait time to see a professional doctor.

(2) USA

A variety of new healthcare services provided by private organizations emerge dynamically; however, the options are limited depending on individual income. Recently, it is moving toward being corrected.

(3) Japan

The health system allows all citizens to enroll in any sort of medical insurance. Patients are able to access any hospital freely; however, medical records are managed separately at each hospital, which prevents patients from receiving comprehensive healthcare service.

Proposing a Service Solution that is Capable of Providing Affordable Healthcare Covering the Entire Society

The hard-working employees who support economic growth are also the core that support healthcare costs and knowledge for parents, children, and spouses in a super-aging society. In the current social system, this concentrated burden urgently requires improvement, which is not very different globally. Therefore, a service scheme was proposed that can achieve the three pillars of "life," "policy," and "finance" based on supporting each other by sharing medical records focusing on the three stakeholders, including insurance companies, hospitals, and patients. This will achieve an "environment that does not sacrifice health" with reduced personal effort and burden, and an "environment with no lack of healthcare functions in nearby towns" with minimal social burden. To realize broad services that cover everything from prevention and treatment to care with cooperation of the whole society, a future vision was illustrated of "realizing a society that supports patients and their families reasonably" and promoting redistribution of the roles of the public, industries, and individuals utilizing IT.

Effects

The following effects were obtained from the results of this research.

The activity of Hitachi's proposal to NHS GM based on "healthcare vision" was validated, its Proof of Concept (POC) projects were initiated for using informatics to improve healthcare services. The reason that NHS GM agreed with this activity was because Hitachi presented a vision that was capable of comprehending the conditions of NHS. NHS explained that they confidently believe that "only Hitachi is capable of recognizing our problems." In these POC projects, IT utilization was determined for constructing an integrated platform for secure healthcare and a lifestyle improvement program for realizing a model that provides broad services from prevention and treatment to care. The people and systems in the proposal have been illustrated in detail in a vision video that was effective for sharing the development goals and strategies with stakeholders (see Fig. 13).

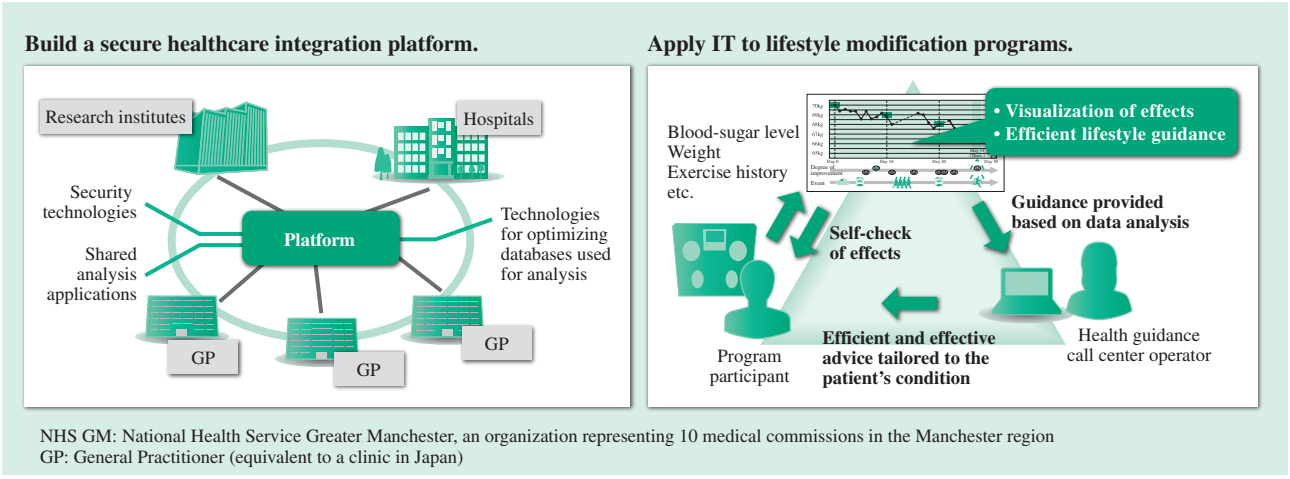
Future Steps

Expanding Application Range

Through vision design, the POC projects led to successful results through conducting the proposal activities collaboratively by sharing the long-term goals and strategies of development with the stakeholders in the informatics field; mainly from the healthcare business. From here on, the aim is to further promote the sharing and exchanging of information with both internal and external stakeholders involved in the internal medical equipment business, smart cities, and local authorities regarding the "healthcare vision." At the same time, another aim is to contribute to social business development and a wide range of healthcare products based on a service cycle linked to illness prevention, care, and welfare, as well as conventional diagnosis and treatment. The application of social innovation businesses such as mobility and energy will continue to be investigated while collaborating with research and development and business entities.

Challenges for Global Expansion

In the beginning, this research was launched as a methodology development based on case studies of Social Innovation Business for developed economies in which a super-aging society is developing dynamically. Following Hitachi's corporate strategy in recent years, it has been necessary to contribute to supporting infrastructure development in emerging markets.



NHS GM: National Health Service Greater Manchester, an organization representing 10 medical commissions in the Manchester region
GP: General Practitioner (equivalent to a clinic in Japan)

Fig. 13—POC project with NHS GM.
Case study of a POC project performed with NHS GM providing services from prevention to treatment linked by region.

However, these emerging markets are different from developed economies where information for conducting business planning is easy to access. Eliminating preconceptions, understanding local values and lifestyles, including the religious and historical background, and tackling public information in the local language are so essential that collaborating with local outstanding partners is eventually the key to creating opportunities in operating infrastructure developments. As part of this activity, the "Brazil Kizashi project" has been conducted with the University of Campinas since February, 2013. This project is a collaborative research project between an academic research team led by a social science professor at the university and Hitachi. As a partner who is going to co-develop Brazilian society, the vision design will be utilized to distinguish and analyze the needs of future social trends in Brazil.

CONCLUSIONS

In this article, we have introduced three social science design approaches for the Social Innovation Business.

These approaches can not only be applied independently, but they can also be linked collaboratively with each other in accomplishing a goal. For example, the experience-oriented approach is used for ethnographic research in order to understand customer issues in the early phase. Vision design is used for anticipating and investigating the values of future users while creating ideal images of business operation and uncovering current issues through ethnographic research. Depending on the case, higher effects can be received by combining these approaches.

Currently, the need for these approaches in Social Innovation Business are increasing and the capability of responding to this is an urgent matter. Also, effective methods of utilizing these approaches to create high-value services when developing a new service business will be in great demand in the future.

ACKNOWLEDGMENTS

The authors would like to take this opportunity to express their gratitude for the considerable effort and cooperation received from Sendai City Office, each ward office, community directors, etc. in the investigation and conducting of interviews at evacuation centers during the development of the "Sendai Model" disaster management solution. And in the application of vision design to the healthcare field, for which the authors received great assistance from everyone involved, beginning with Dr. Mike Burrows (Director of NHS GM).

REFERENCES

(1) Hitachi's Social Innovation Business (English website), http://www.hitachi.com/businesses/innovation/about/index.html
(2) Hitachi CSR Message Top Commitment (English website), http://www.hitachi.com/csr/message/top.html
(3) T. Kawasaki et al., "Applications and Benefits of Ethnographic Research—Case Study of Management System Upgrade for Power Plant Construction Site—," Hitachi Review **62**, pp. 317–323 (Sep. 2013).
(4) Y. Banno et al., "System Development by Applying the Experience Oriented Approach for Collaborating with Customers," Hitachi Hyoron **91**, pp. 604–606 (Jul. 2009) in Japanese.

(5) K. Watanabe et al., "Deployment of 'Experience Oriented Approach' for Business Analysis," Hitachi Hyoron **92**, pp. 507–510 (Jul. 2010) in Japanese.
(6) H. Kitagawa et al., "Development of Experience-oriented Approach to Information and Telecommunication Systems Business," Hitachi Review **62**, pp. 329–336 (Sep. 2013).
(7) K. Watanabe et al., "Experience Design to Realize Value for Life in Smart Cities," Hitachi Review **62**, pp. 337–343 (Sep. 2013).
(8) Y. Maruyama et al., "Methodology Research and Development for Designing Future Experience," Hitachi Review **62**, pp. 344–351 (Sep. 2013).

ABOUT THE AUTHORS

Kaori Kashimura
Design Division, Hitachi, Ltd. She is currently engaged in research into improving user experiences of products and services through user research. Ms. Kashimura is a member of The Japanese Psychological Association, Japanese Cognitive Science Society, and The Japanese Society for Cognitive Psychology.

Takafumi Kawasaki
User Experience Research Department, Design Division, Hitachi, Ltd. He is currently engaged in human-centered design practices, including ethnographic research, interview-based research, and usability evaluations.

Yukinobu Maruyama
Hitachi Design Center Europe, Hitachi Europe Ltd. He is currently engaged in the design of services for the social infrastructure services business, and the development of those design methodologies.

Yujin Tsukada
Planning Office, Design Division, Hitachi, Ltd. He is currently engaged in planning and public relations work in the Design Division through the design of services and user interfaces for railway information systems.

Hiroki Kitagawa
Planning Office, Design Division, Hitachi, Ltd. He is currently engaged in the management of survey and design research into social infrastructure business. Mr. Kitagawa is a member of the Japanese Society for the Science of Design (JSSD).