

Methodology Research and Development for Designing Future Experience

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OVERVIEW: To pursue smart city and other Social Innovation Business projects with the understanding and support of stakeholders, it is important to create an image of the ideal society of the future, not only by making predictions about the near future but also by looking ahead 10 or 20 years. As experience design techniques able to assess changes both in the social environment and in people's values will be essential for constructing this image of how society will cope with important lifestyle issues in the future, such as the super-aging and urbanization of the population, Hitachi has applied the concept of experience design, and is using it to capture transitions in the social environment and people's values. Hitachi intends to continue contributing to society by conducting research into the construction of the ideal-lifestyle-image in the future.

INTRODUCTION

IN terms of the social issues facing Japan, background factors include growing demand both for the reconstruction and updating of domestic social systems, and for collaboration with developing and developed economies. These social issues include the environment, the declining birthrate and aging population, and the recovery from the 2011 Great East Japan Earthquake. Given the growing concern about the safety and reliability of infrastructure, there is a need to determine what form future environmentally sustainable urban planning should take.

This image of future urban development includes factors such as energy conservation and traffic management. An important part of this future will be the adoption of measures in which the small contributions made by individuals come to be recognized not as a burden but as both a source of satisfaction and a motivator (see Fig. 1). This requires an approach to design based on "value reinforcement," whereby residents have a positive attitude toward the available services and rules and therefore act on their own initiative to help create the sort of society in which they want to live. Hitachi has been undertaking research into methodologies that incorporate these experience values into the design of ideal future cities.

Fig. 2 shows how the overall framework for this research is split into three major parts. The first part is called the "kizashi method" and studies signs (*kizashi*) of changes in people's values by forecasting changes in external factors. The second is the "constructive

approach to experience values," whereby specific cases are analyzed to establish archetypes of experience values. The third is the process whereby field research in the area being considered is used as a basis for constructing an image of future lifestyles that draws on the "kizashi" and "experience value archetypes." Finally, the image of the future is developed in the designers' imaginations by taking an understanding of reality as it currently exists as a starting point and then applying prediction and intuition.

This article describes how this research constructs an image of ideal future lifestyles by extracting insights from social and technological trends, understanding how these will lead to changes in

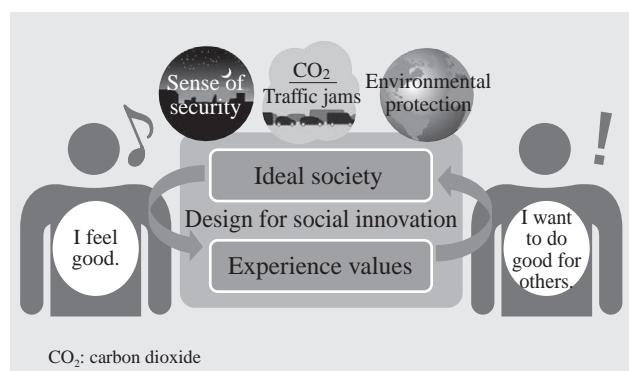


Fig. 1—Social Innovation and Experience Value. By encouraging people to feel good about what they receive from society and what they can do in return, experience values facilitate the creation of a better society through value reinforcement.

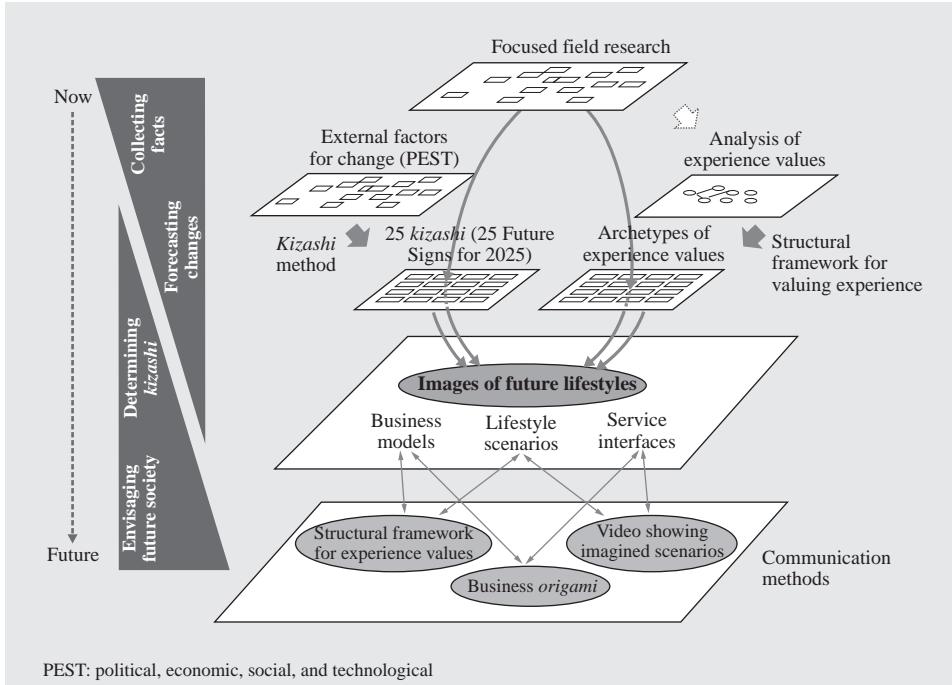


Fig. 2—Overall Framework of Study.

The ideal forms that society could take in the future are envisaged through techniques for considering future social change and techniques for analyzing the value people place on experience.

people's values, and then generating ideas about how to enrich people's way of life.

PREDICTING FUTURE SOCIAL CHANGE

To determine how consumer values will change in the future and consider what attractive experiences will suit this future world, the approach taken by this research was to analyze the social changes that have a significant influence on people's values, and then to utilize techniques from cognitive engineering and social science to assess and categorize these in order to design, from a consumer's perspective, what form should be taken by social systems and services.

Development of *Kizashi* Method to Identifying Changes in People's Values

Desktop research drawing on published studies and web-based sources and using political, economic, social, and technological (PEST) analysis was undertaken to produce a chart representing the relevant factors and their interrelationships from 2005 to 2030 (see Fig. 3). The vertical axis represents the PEST categorization and the horizontal represents time.

The detailed procedure is explained in Fig. 4. After the factors were classified, the next step was to generate hypothesized scenarios by forcibly generating ideas from combinations of topics. The *kizashi* signs that provide valuable insights into the future were then identified from the results of these scenarios.

The hypothesized scenarios were also examined with the help of the gerontologists to determine the factors, such as aging and generational changes, that influence people's values. This identified 25 *kizashi* (25 Future Signs for 2025) that are likely to have an influence on society over the next 15 years.

25 *Kizashi* (25 Future Signs for 2025)

The most crucial factors for a sustainable and sound society are people's safety and security, social participation, and self-reliance. The following section describes those *kizashi* that relate to these factors.

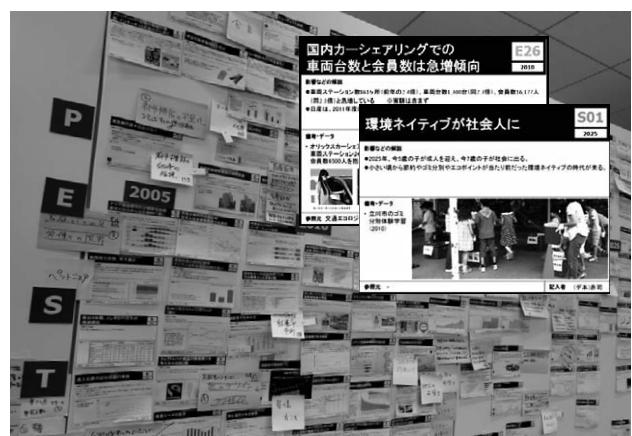


Fig. 3—PEST-based Approach to Forecasting Future Trends. This process is accomplished by classifying and combining collected information on a matrix. The vertical axis represents the PEST classification and the horizontal axis represents time.

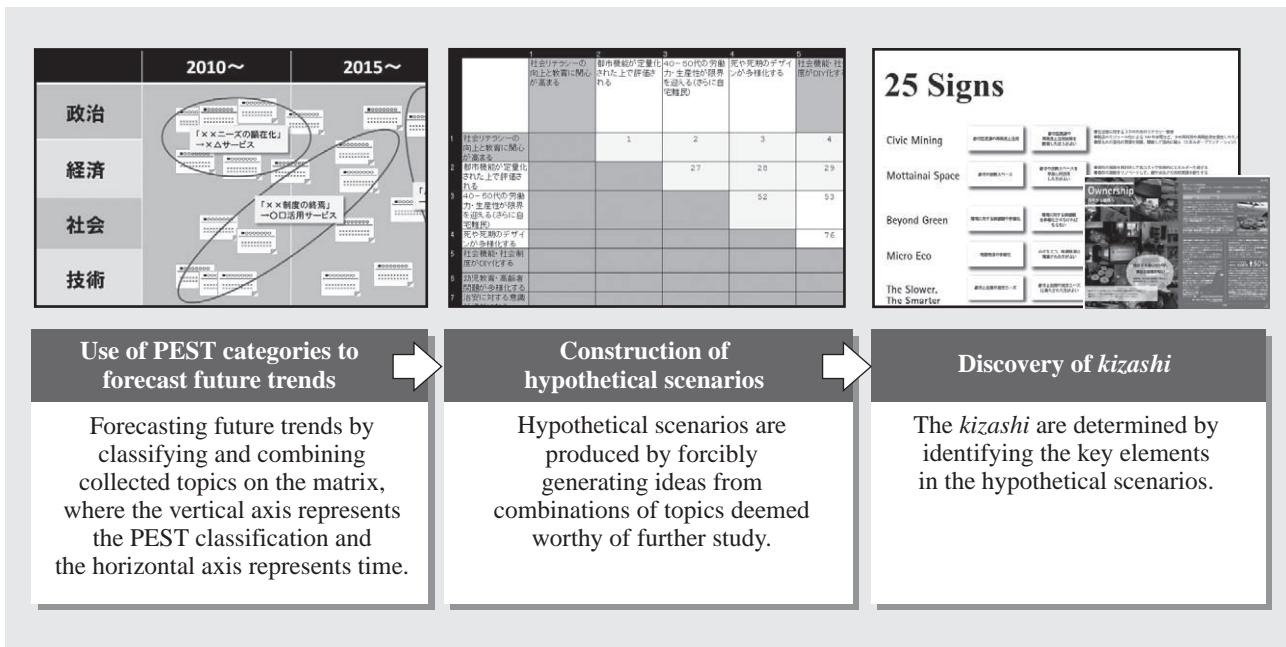


Fig. 4—Procedure for Kizashi Method.

Predictions of the future are created through the forcible generation of ideas based on consideration of social trends by arranging the PEST analysis against the time axis.

Ensuring safety and security for people living alone – singlenesship

In addition to those people who live alone as a result of separation from their partners, there are also an increasing number of people who choose this lifestyle for their own reasons, including the elderly who choose not to live with their adult children. Because such households are at greater risk of crime, they will rely on social systems to protect them from this and other social risks, and will create a growing demand for training in social literacy to achieve a balance between freedom and security.

Encouraging social participation—from ownership to usage

As our consumer society becomes more mature, people are less concerned with personal ownership of goods. Instead, they start attaching greater importance to the experiences these goods and services deliver, the formation of human relationships, their personal beliefs, and their role in society. This new awareness encourages a sense of shared responsibility for public services that will help make these services more sustainable.

Supporting independent living—the right to mobility (demand for new forms of mobility that provide freedom of movement)

The right to mobility should be guaranteed for the elderly and the disabled, and society should not leave them disadvantaged in this respect. This view

has come to prominence recently in relation to issues such as people giving up their driver's license and in debate about public transportation policy. In the future, it is anticipated that this line of thinking will lead to the view that public transportation should respond to people's personal circumstances and objectives while also meeting society's circumstances and objectives. It will also mean that the existing transportation infrastructure will need to be upgraded so that mobility can be provided even during emergencies such as pandemics or natural disasters.

DEVELOPMENT OF METHODS FOR ANALYSIS OF FUTURE EXPERIENCE VALUES

When considering the experiences of future users, it is reasonable to assume that changes in the external factors described above will influence the cause and effect relationships between those things that determine the value people place on experiences. The following section explains how to categorize and visualize the cause and effect relationships through which goods and services influence the value of experience.

Fig. 5 shows a structural framework for valuing experience. The underlying idea is that the way people value experiences is not based on the goods or services themselves but on the feelings of pleasure or other favorable outcomes that result from the activities or opportunities that the goods or services make possible.

Based on this approach, the framework consists of three layers: the goods or services, the activities or opportunities, and the experience value.

Structural Framework for Valuing Experience

Fig. 6 shows the procedure for putting the value of experience into a structural framework. The first step is to analyze the cause and effect relationships between the elements that determine the value of the experience. This is done by conducting interviews and making field observations of the activity being studied. The second step is to generate a pair comparison matrix that is used to identify whether cause and effect relationships exist and to assess their strength. Records of this work are kept so as to be available for later review. The third step uses an algorithm developed specifically for the purpose (based on graph theory) to provide a visual representation of the degree of importance of each element and the sequence of the cause and effect relationships. The resulting graph indicates which points to focus on and evaluate. A software program was written to perform this step automatically.

The validity of this method was verified by using it to produce a structural framework of the

experience values for a widely used railway smart card (see Fig. 5). The ability of the system to calculate fares automatically at the ticket gate has delivered improvements in three aspects of user behavior: (1) it has eliminated the time and effort associated with buying tickets, (2) cash handling is no longer required, and (3) it is not necessary to decide on where to get off the train before purchasing a ticket. In other words, the experience value delivered by the system is that it reduces the stress of train travel. In Fig. 5, the circle sizes symbolize the degree of importance of each element, while the vertical axis and the thickness of lines together indicate the sequence of the cause and effect relationships.

Application of Structural Framework for Valuing Experience

In analyzing the causal relations between the elements that determine how experiences are valued, this method can also be used to identify the causes of unfavorable user experiences. This has included its use to determine what obstacles exist to mobility by the elderly and to study how best to make improvements.

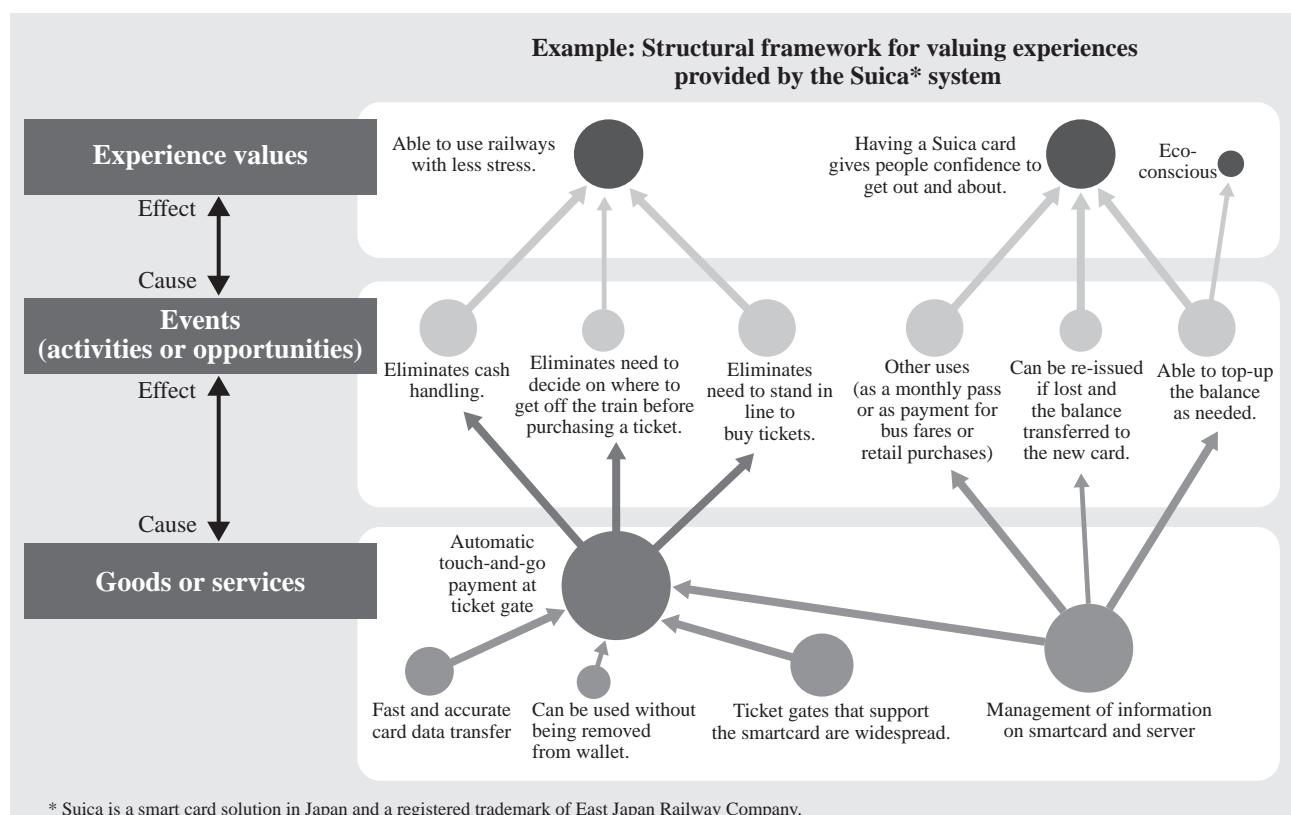


Fig. 5—Structural Framework for Valuing Experience.

The framework provides a visual representation of the values placed on experience by analyzing the causal factors and arranging them into three layers, namely goods or services, activities or opportunities, and experience values.

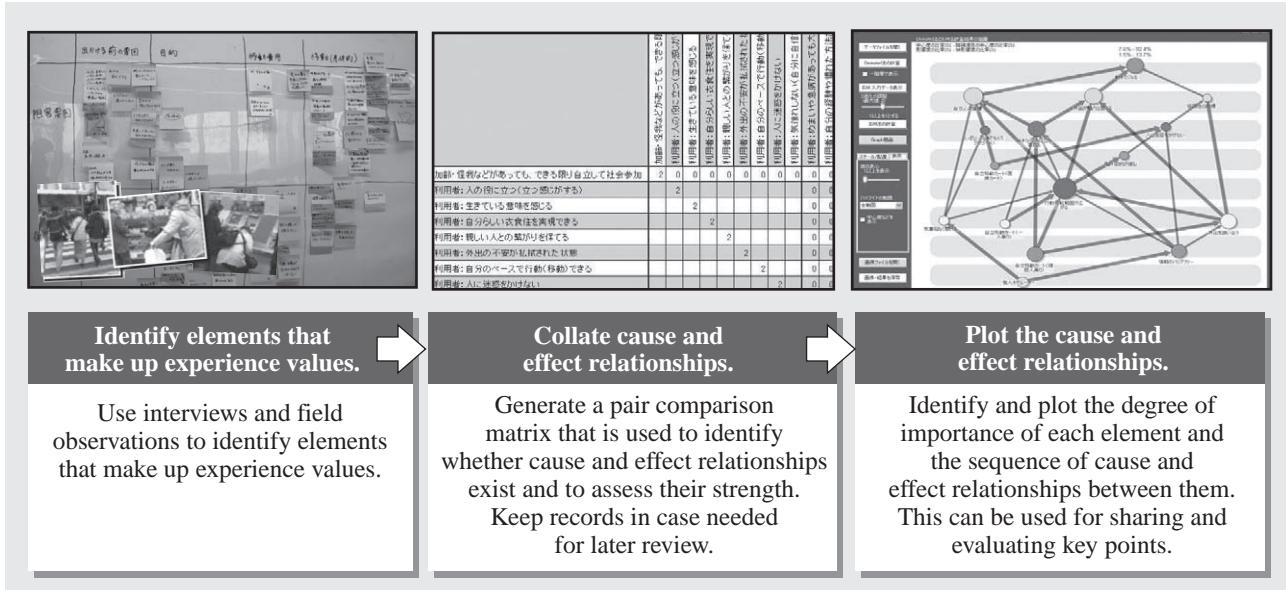


Fig. 6—Procedure for Putting Experience Values into Structural Framework.

First the elements that make up experience values are identified, and then pair comparisons are performed to create a visual representation of the overall structure of cause and effect relationships and the importance of individual elements.

The method also has the potential for use in the visualization of future experiences and their values. There are three factors that can influence value: (1) the effects of aging on the individual, (2) progressive changes over time, and (3) generational change. Hitachi has already collected knowledge about these factors, some of which is currently used in the study of mobility, and intends to continue this work to build up knowledge about the various elements and their expected impacts.

The overall framework for this study shown in Fig. 2 includes the identification of archetypes for experience values that can be used in formulating a vision of the future. Unfortunately, the current extent of collected knowledge remains insufficient to provide what could be described as archetypes. Instead, the elements that have been identified to date are used independently within the scope of their respective studies. Therefore, the objectives for the future will be to accumulate more knowledge and expand its scope of application.

EXAMPLE VISUALIZATION OF FUTURE LIFESTYLE

This section describes an example of service design from a consumer perspective for a social system that combines people, society, and technology.

This example envisions the “society in the year of 2025” where people of all ages can live a healthy and active life with a shared sense of security, including

how to reduce the load on the environment, the declining birthrate and aging population, and the growth of the urban population.

Society in which Everyone Can Live Healthy and Comfortable Lives

A primary concern of society in the future will be to provide mobility and a quality healthcare system for all members, with both hard and soft infrastructure providing the crucial technological base. The following section uses the example of mobility to describe the process of developing a vision for a future lifestyle.

The subject selected for this case study was the redevelopment of an area around a station. In order to enable stakeholders to vividly imagine the future and to enliven their discussions, a video was produced that presented the proposed redevelopment and its business model. The following sections describe four concepts associated with providing solutions that enhance people’s mobility (see Fig. 7).

Concept 1: Pedestrian-friendly urban environment

The pedestrians of the future are likely to include people with different levels of knowledge and physical capabilities, including the elderly and people from other countries. The numbers of senior carts and shared bicycles are also predicted to increase. Given such requirements, the current situation in which streets are split between car and pedestrian traffic will no longer be suitable.



Fig. 7—Mobility Concept Example.

Four concepts were identified as relevant to this example of a society in which everyone can live a healthy and active life.

The main focus for this example was on how to create a vibrant urban space in the neighborhood around a railway station by turning the area within a 250-m radius into a pedestrian mall (based on the assumption that 500 m is the limit to how far the elderly can walk). The idea was that the mall would be able to accommodate both pedestrians and small vehicles fitted with safety features, thereby creating a retail precinct in which people can move at their own pace and maintain a comfortable distance from each other.

The services proposed for this project included mobility scooters, a dynamic pricing system for railway fares, and digital signage units.

Concept 2: Active communities

Providing an environment that facilitates mobility and gives people the freedom to move about at their own discretion encourages the elderly and others to participate in social activities and gives them an incentive to get out and about. This includes consideration for those without driving licenses or the elderly who may be concerned about their ability to find their way back home after visiting an unfamiliar location. One of the proposals in this example is to provide auto-driving vehicles that are shared by the community. The aim is to provide the elderly with an alternative means of transportation that offers a similar level of convenience to owning their own car.

The main service proposed here is an on-demand car sharing service that uses self-driving vehicles and is accessed from mobile devices.

Concept 3: Communities that make sense

As is the case with environmental problems, it is anticipated that urban life will face an increasing number of complex interrelated social issues. Whereas in the past matters proceeded in accordance with rules set by local government without requiring the active involvement of the general public, in the future individuals will need to make their own decisions, and to acquire the knowledge they needed to do so under their own initiative. In this context, the visualization of social systems will enable people to clearly see how their actions and behaviors influence society, and this will enhance their problem-solving abilities. The proposal in this example is to provide systems that allow individuals to contribute through their decisions and actions to achieving the best outcomes in fields such as recycling or emergency services.

The main services proposed here are an ambulance system that takes patients straight to the appropriate hospital based on their symptoms and a trash-collection vehicle system in which the vehicles are designed to facilitate resource recycling, the idea behind the latter is to shift from an emphasis on disposal to emphasis on recycling.

Concept 4: Supportive communities

As the population continues to age, civic participation will play a vital role in maintaining social security systems. The proposal in this case is to provide systems in which the benefits of voluntary work or financial contributions by individuals are immediately visible, thereby motivating people to do

more for their community. Systems such as these can also provide the more accommodating management basis for the cross-community support during large-scale disasters.

The main proposal here is a community bus service financed from public funds and individual contributions that will contribute to make the challenging business sustainable.

Structural Framework for Experience Value of Mobility for Elderly

This section describes how the structural framework for valuing experience was utilized in developing the concepts described above.

First, the interviews were conducted with 12 elderly people to identify obstacles to their mobility. Some were able to walk on their own, whereas others used a wheelchair or needed assistance. These obstacles and their interrelationships were then examined in light of the aging, changes over time, and generational changes expected over the next 15 years. A graphical representation of these obstacle relationships forecast for 15 years into the future was created from a pair-comparison matrix and compared with a similar graphic representing the current obstacle relationships. The results of this work found

that, while improvements would be made in terms of providing attractive places to visit and the removal of mobility constraints, psychological barriers would remain, including anxiety about unexpected events and a desire not to trouble other people. In other words, obstacles to encouraging the elderly to get out into the community would still be present.

This finding was utilized in the study of the “active communities” concept described above to design services that could eliminate these psychological barriers. Examples included mobility scooters able to carry more than one person or designed specifically for hospital use. Fig. 8 shows the structural framework for experience values that was utilized in the proposals associated with this concept. It demonstrates the effectiveness of taking account of future experience in service designs and comparing the benefits under different scenarios.

CONCLUSIONS

This article has described how this research constructs an image of ideal future lifestyles by extracting insights from social and technological trends, understanding how these will lead to changes in people’s values, and then generating ideas about how to enrich people’s way of life.

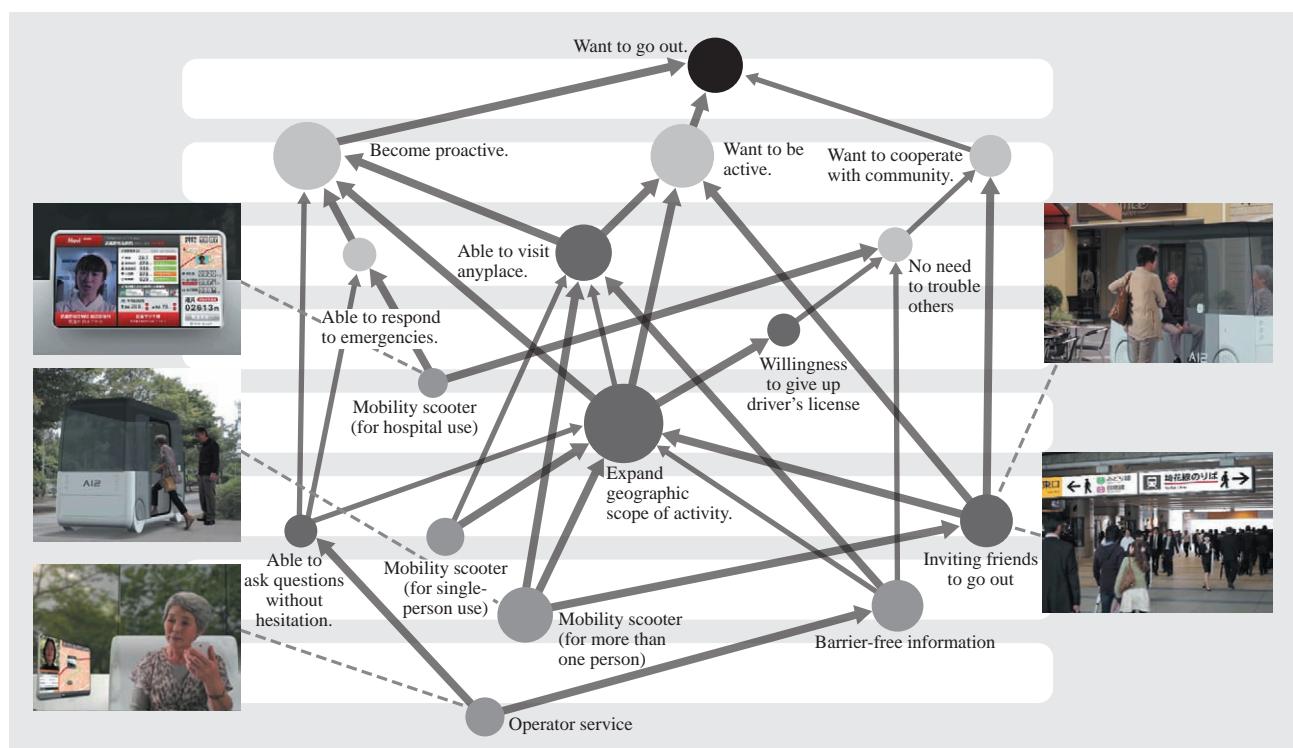


Fig. 8—Example Use of Experience Values in Design.

The design classifies the factors involved in proposals for creating an environment that encourages the elderly to be active in the community.

Further research aimed at predicting future experiences will need to accumulate more knowledge through actual business projects in order to refine the methodology. It will also be ideal for the research to be extended beyond studies of the elderly in developed nations to include the collection of knowledge on the

best lifestyle options for people in newly industrialized and emerging nations. To this end, Hitachi intends to continue pursuing this social science based approach to accumulating knowledge and to researching the make-up of values held by people in different countries.

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