

Technotalk

Contributing to Lifestyle Innovation by Creating New Value in Home Appliances

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As remarkable economic development continues, particularly in emerging economies, the question of how to resolve environmental problems while providing an enriching way of life is a challenge of global scale. Hitachi's Social Innovation Business seeks to provide safe and reliable infrastructure together with better regional societies. As part of Hitachi, Hitachi Appliances, Inc., which produces Smart Life and Ecofriendly Systems, is aiming to take up this challenge in the field of home appliances. In addition to helping overcome energy and environmental problems by supplying products with excellent energy efficiency, Hitachi is contributing to the creation of enriched and comfortable societies and ways of life by creating new value in home appliances to deliver lifestyle innovation.

Contributing to Society through Energy Efficiency in Home Appliances

Urushihara: Hitachi operates its Social Innovation Business globally, supplying safe and reliable social infrastructure that has been enhanced by information technology (IT). Home appliances, a familiar form of “infrastructure” that supports our way of life, also plays an important role in this business. With environmental problems having become a challenge for all of humanity, “eco” (meaning environmental consciousness such as energy efficiency) is among the first to be emphasized when it comes to contributing to society.

Fukuyama: Electricity statistics in Japan indicate that households account for approximately 30% of

consumption. Factories and other industrial users are individually large, but collectively they make up only about 30% of consumption*1. Because there are so many more home appliances in use, overall energy consumption is large even if individual appliances do not consume much energy on their own. In this respect, improving the energy efficiency of home appliances is likely to be very effective in terms of the overall situation.

Urushihara: Sales figures for the Japanese market in FY2013 were approximately 4.8 million refrigerators*2

*1: Calculated from FY2012 energy use statistics published by the Agency for Natural Resources and Energy.

*2: From shipment statistics published by The Japan Electrical Manufacturers' Association.

*3: From shipment statistics published by The Japan Refrigeration and Air Conditioning Industry Association.



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and 9.4 million air conditioners*³. So if new technology could reduce the energy consumption of each refrigerator by about 5%, equivalent to about 10 kWh over a year, it would provide annual savings of approximately 48 million kWh nationally. This means that the energy efficiency of each appliance is very important.

Uruma: Our Lifestyle Research Center conducts a variety of consumer surveys. In one of these, a regular survey of the factors purchasers consider most important in new appliances, energy efficiency is always among the most important for all types of appliances. From a consumer's perspective, electricity bills impact directly on household budgets and this creates a high level of awareness. It is anticipated that this trend will intensify in the future.

Urushihara: Energy efficiency is an area of expertise for Hitachi, not just in home appliances, and we receive a variety of technical support from our research laboratories. Thanks to that, we once again won energy efficiency awards in the 2013 Grand Prize for Excellence in Energy Efficiency and Conservation for a heat pump water heater, light emitting diode (LED) lighting, and a refrigerator. This was the second year in a row that we received an award for our refrigerators. Our other products also achieve levels of energy efficiency that are top class in the industry, and this is underpinned by Hitachi's own innovation and technical capabilities.

Fukuyama: Technical innovation is one of the judging criteria for the Grand Prize for Excellence in Energy Efficiency and Conservation. For example, Hitachi's unique Frost Recycling Cooling would likely have been one of the points in our favor when judging the refrigerators. The frost formed during cooling operation is conventionally simply eliminated by melting it with a heater. Frost Recycling Cooling

works by utilizing the cooling potential of this frost while driving an air circulation fan. Along with reducing the use of the heater, this reduces the thermal load on the compressor and the moisture keeps the refrigerator interior moist. This technology was developed with the aim of optimizing the entire refrigerator system as well as improving the efficiency of its various components, such as the compressor, heat exchanger, and insulation material. In addition to home appliances and air conditioning, the Hitachi Research Laboratory also works with a wide range of technologies for improving efficiency in a variety of other fields such as electric power and industry. In the future, we intend to continue working in ways that can contribute to society by developing energy efficiency technologies that emphasize this approach of optimizing entire systems.

Complementing “Eco” Features with Unique Functions

Urushihara: Since home appliances are products that we use every day, energy efficiency is important, but so is how they can enrich our lives. Motivated by this, since FY2010, we have adopted a slogan for our product development that could be translated into English as “eco + unique value”. We are offering things that are valuable from the consumer's perspective by complementing “eco” features with attractive unique functions, such as, in the case of washing machines, automatic tub-cleaning and the wind iron function that blows air through clothes during drying to remove wrinkles, the vacuum compartment function for refrigerators that uses a decompression environment to keep food fresh, and the multi-monitoring system function that achieves comfortable air conditioning by using sensors to



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monitor rooms, people, furniture, and other objects.

Uruma: These can be thought of as providing value by alleviating consumer dissatisfaction and were developed in response to surveys of actual consumer needs and concerns.

Fukuyama: Wrinkles are clearly a cause for dissatisfaction with washer-dryers, and they present a difficult challenge. Blowing air at high speed to simultaneously stretch and dry the fabric represented a major shift in thinking. I understand that the researcher who developed it got the idea from seeing someone using a leaf blower on dead leaves in a park. The development involved the use of simulation technologies available at the research laboratory for things like developing the fan that produces the high-speed air flow or designing the flow passage, and also included a lot of experimental verification. It also required various attentive enhancements such as fitting a silencer to minimize the problem of the noise produced by the high-speed air.

Kashimura: Resolving consumer dissatisfaction involves not only physical factors but also resolving problems relating to how a product feels in practice or the impression it creates when handled. Concerns about the head of a vacuum cleaner feeling heavy, for example, naturally require it to be made physically lighter, but it is also important to work on things like shape and balance to make it feel light to users. Although reviewing the impressions that products make on consumers during the design process requires spending a lot of time and effort on a repeated cycle of coming up with suggestions on changes that might make it feel lighter and then producing prototypes to check these in practice, the easy-to-use grip we developed by this process has received favorable feedback for how it feels when used.

Continuous Creation of New Value

Urushihara: Along with the development of new functions to resolve dissatisfaction, we are also constantly thinking about how to create new value by using home appliances to enrich people's lives. In creating value for consumers, it is important that we are sensitive to people's lifestyle and other values.

Uruma: Over many years of conducting consumer surveys, we have found that living practices and other lifestyle factors have changed significantly. Up until 20 years ago, there was no problem with treating the standard family of husband, wife, and two children as the benchmark. Nowadays, on the other hand, there

has been a notable increase in the number of smaller and elderly households, something that is reflected in how rice is cooked. A 2013 survey found that the majority of homes only cooked 2 cups or less of rice at a time despite having rice cookers with a 5.5-cup capacity, leading us to develop new products for low-volume rice cooking.

Kashimura: The Design Division and Hitachi Appliances, Inc. conducted a joint survey of living practices in 2012 in which designers and product planners visited people's homes to observe how they used home appliances and other aspects of their living environments. This provided numerous insights. While designers believe they know all there is to know about products that they use themselves, needs or other concerns that neither they nor the consumer were aware of became evident when they observed these products being used in practice. What designers noticed in this survey was that the washing machines that were intended to get clothes clean were themselves dirty. The result of this observation was a top-loading washer-dryer with a glass top design that was released in June. This overturned the fixed idea that consumers had that the washing machine becoming dirty was something they couldn't do anything about. Rather than just resolving a dissatisfaction, adopting a design aimed at keeping the washing machine itself clean can be thought of as creating a new sense of value that was prompted by an insight.

Urushihara: Ethnography is a very useful methodology for obtaining insights like this.

Kashimura: The Design Division undertakes activities aimed at developing new products or services that involve conducting ethnographic research at workplaces such as railway maintenance depots, factories, and construction sites. These activities have their origin in the lifestyle surveys conducted for home appliances. Compared to interview surveys, in which researchers can find out about only those problems that can be put into words, techniques that allow the researcher to act as a third party and observe the product being used in practice can identify latent needs and other underlying issues and has applications in the field of social infrastructure and other businesses. In developing home appliances, conducting field surveys of actual use and testing products while they are in use are things we have been doing for many years. Clearly, though, it is also essential that developers have a good understanding of things like the consumers who use their products and the places where they use them.

How to Contribute to Lifestyle Innovation

Urushihara: In pursuing its Social Innovation Business, Hitachi seeks to contribute to lifestyle innovation. For providing new value that leads to lifestyle innovations such as market-leading convenience or comfort on an ongoing basis, I believe the key lies in features that have attracted attention in recent times, such as integration with smartphones and the use of robotics or IT.

Fukuyama: Home appliances are already seen as precursors to the use of robotics. It is sectors like home appliances and automobiles that have driven the development of robotics and made the technology familiar to consumers, such as functions that are fully automatic or that use cameras and other sensors for sensing and control. We need to remind ourselves of this and use it to create new value from the consumer's perspective.

Uruma: A survey of smart home appliances (meaning appliances that can communicate with smart phones, tablets, and others) involving about a thousand participants found that people's current impressions of these products are not good. While functions such as using a smartphone to check remotely what is in the fridge, or to check the oven settings from the living room appear useful at first sight, many people see them as only creating more fuss. Even functions that seem useful are unlikely to be adopted unless they take detailed account of what users actually want and the rules of thumb that they use.

Kashimura: Am I correct in thinking that home appliances offering simple one-touch operation do not sell well?

Uruma: While features such as single-button or other simple button-based operation receive good feedback in questionnaire surveys, when models are built and compared, it is the products with more functions, in other words those with lots of buttons, that tend to be regarded more highly.

Urushihara: Simple operation is not the same thing as simple functionality. Products need to be simple to operate, but rather than cutting down on the available functions, what is needed, I believe, are simple ways to use many different functions.

Kashimura: Graphical user interfaces (GUIs) are one aspect of product operation. The more functions that are added, the more necessary are techniques for designing the operation display in a way that enables users to quickly select the function they want to use. In this respect, the use of IT is crucial, and this is an

area where we at the Design Division want to make a contribution.

Fukuyama: Innovation is achieved only if the end result is genuinely useful in our lives. At the research laboratory, we are well aware of the importance of closely aligning our thinking with consumers as we go about our research.

Urushihara: When it comes to innovation, what matters most of all in the case of home appliances, which are closely associated with daily life, is to adopt a consumer's perspective. Along with maintaining our emphasis on basic performance factors such as energy efficiency, we intend to take the changing social structure of Japan into account, such as its low birth rate and aging population, and create new value based on such objectives as being simple, trouble-free, and healthy. Overseas, although characteristics such as the degree of maturity in markets and products and people's values vary from country to country and from region to region, I see our mission as being to identify latent consumer needs from a global perspective and deliver not only superficial novelty but also value that is of genuine use in consumer's lives. Taking advantage of the Design Division's methods for discovering value and its design capabilities, and the knowledge possessed by the research center, we will continue to strive to create lifestyle innovations that will help consumers enjoy an enriched future.