

Hitachi Digital Smart Cities Featuring Continuous Value Creation by People and Digital Technology

Hitachi is seeking to create digital smart cities that offer an enhanced QoL such that residents can enjoy lives that are safe, secure, comfortable, and healthy. The deployment of digital technologies is essential to the co-creation of people-centric services that add value to the places where they live in addition to the existing concept of smart cities including energy efficiency and effective operation. Continuous value enhancement is achieved by analyzing data collected from such places, including data generated by people as well as IoT data from infrastructure, and updating it longitudinally. Hitachi is currently working on the development of IaaS to provide a platform for this activity, also on a variety of digital services that reflect people's intentions and diverse sense of values, to be supplied on this basis.

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1. Introduction

Hitachi has built up a record of achievement around the world in its Social Innovation Business that creates new value by addressing the challenges facing different cities.

As discussed in relation to Society 5.0, there is a need for a people-centric society that delivers both economic development and the resolution of societal challenges through the creation of unprecedented forms of new value by consolidating various information via the Internet of Things (IoT) and utilizing technologies such as artificial intelligence (AI)⁽¹⁾. Meanwhile, situation such as the current COVID-19 pandemic are increasing the need for a resilient society.

This article describes services and infrastructure essential to digital smart cities with which Hitachi aspires to improve people's quality of life (QoL).

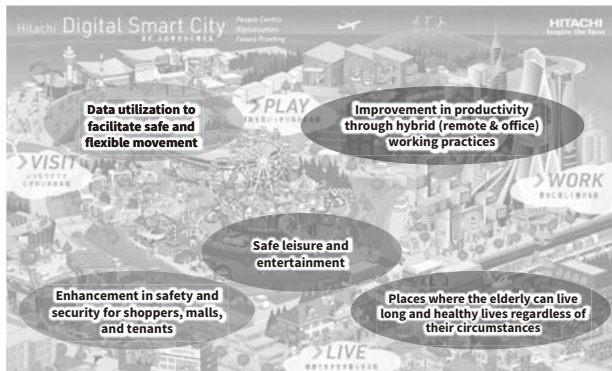
2. Digital Services that Improve People's QoL

In Lumada⁽²⁾, Hitachi consolidates data on people and things and the various forms of know-how that it has acquired through its Social Innovation Business, covering IT and operational technology (OT) for products and social infrastructure. It can be provided as infrastructure as a service (IaaS): a platform that enables open innovation.

This IaaS platform serves as a base for working with stakeholders on the collaborative creation (co-creation) of digital services that reflect people's intentions and diverse sense of values, and this transforms urban functions to be in step with people's sense of value, thereby to create attractive smart cities in which people can live healthy and vibrant lives, cities that are lively and bustling all the time, where work is enriching and enjoyable, and where people can experience the full range of emotions (see **Figure 1**). These

Figure 1 — Hitachi's Vision of a Resilient Digital Smart City

This entails the use of digital technologies to create a people-centric society that integrates the real and cyber worlds and maintains a stable economy and way of life.



digital services that enhance and enrich people's QoL also raise real estate values and support sustainable progress in the smart city.

The following sections present IaaS and examples of digital services for supporting seniors in living active lives, for shopping malls where many people come and go, and for working environments that are changing dramatically due to the effects of infectious diseases, as important elements that make up smart cities.

2. 1

IaaS

Urgent need for area management practices that provide comprehensive coverage of multiple sites is increasing due to the higher complexity of urban infrastructure and its maintenance, and the shortage of human resources with equipment maintenance skills.

Hitachi supplies the expertise in IT and OT (including elevators and escalators, surveillance cameras, and air conditioning systems) through global businesses in the form of IaaS. IaaS provides for continuous enhancements to attractiveness and value, allowing for retrofitting or upgrading with new equipment or applications and the updating of cities by software.

Along with the use of IaaS for objectives such as making information visible on things like energy and equipment operation in the city, optimization by AI, higher productivity through reduced downtime, and energy efficiency, it can also create new value by combining this with other data. One example would be to utilize data on the activities of the people who work in an office for the optimal control of its air conditioning. IaaS serves as a platform for digital services that provide people with places where they can live and work in comfort while maintaining economic viability and taking account of the environment, creating attractive cities in the ways described below.

2. 2

Lengthening Healthy Life Expectancy by Preventing Frailty (Elderly Care)

The rapid aging process in Japan is striking, with median projections putting the number of people age 65 or older at nearly 40% of the population by 2060⁽³⁾. China and other countries in Asia as well as Europe and America are experiencing a similar aging trend, with Asia in particular predicted to outpace even Japan's rate of aging.

Aging, together with the relative shrinking of the working-age population that comes with it, brings numerous problems through a shrinking economy and rising social security costs. This is garnering global attention on Japan as the nation at the forefront of confronting these changes⁽⁴⁾.

Hitachi has been researching measures for preventing frailty and working on service development with the aims of lengthening healthy life expectancy and contributing to the development of vibrant cities populated by large numbers of the active elderly while also resolving the societal challenges that accompany aging. Examples include the development of a technique for identifying early signs of frailty utilizing usage data from connected home appliances⁽⁵⁾ and AI research that supports evidence-based and personalized frailty prevention techniques⁽⁶⁾.

By linking data from people with that from cities, Hitachi is creating cities where the elderly can live long and healthy lives regardless of their circumstances.

2. 3

New Shopping Experiences that are Safe and Secure (Retail)

The growth of e-commerce has diversified the channels for recognizing and purchasing products for consumers and has prompted a reassessment of the role of real shops in the retail business, including as a way to maintain and expand contact with customers. The arrival of COVID-19 has only reinforced this trend, creating an urgent need for restructuring as a combined online and offline operation to build a resilient business. This means that the purpose of offline real shops is to provide customers with experiences that they can only get at a physical store. To provide the experience of a fun day out shopping with friends or family, for example, the first priority is to ensure a safe environment. This can be achieved by combining sensors at the shopping mall with a geographic information system to provide information and options for ensuring the safety and security of customers.

Hitachi also supplies the businesses responsible for these sites with pop-up spaces that they can deploy rapidly thanks to the associated sensors and fittings being bundled together as a package, thereby helping to keep retail spaces fresh by encouraging their continuous renewal.

The aim is to create vibrant urban spaces by supporting shoppers, malls, and tenants and offering new shopping

experiences that are safe and secure, achieving this by creating new customer experiences through the fusion of real stores with e-commerce in ways that also include support for merchandising and presentation based on an in-depth appreciation of the needs of these businesses and mall visitors.

2. 4

Creating Pleasant Working Environments through Hybrid Work (Workplace/Work Style)

In the transition to a “new normal” where working practices are significantly different from what they were in the past, there is a need to maintain and improve productivity while at the same time keeping staff safe and secure through a high-level combination of existing forms of value that are worth preserving even with new working practices that acknowledge the presence of various threats, not the least of which is COVID-19.

While there are differences in how various companies deal with their respective industries and work practices, it is evident that the spread of COVID-19 has tended to normalize the practice of organizations and individuals going about their work in the locations that are best suited to their respective tasks. In terms of communication, on the other hand, the consequences have included these changes impacting on innovation and productivity at the organizational level by inhibiting opportunities that in the past would arise naturally for people to make casual inquiries or talk to each other.

Hitachi is using digital technologies to establish appropriate internal communications alongside hybrid working practices (where staff work both remotely and at the office), combining work and private life and overcoming the new challenges faced by people working in this “new normal,” including updating pre-existing procedures.

Accordingly, Hitachi is accelerating co-creation with stakeholders such as real estate developers and shared office providers to provide highly resilient work environments that can cope with the virus and other emergencies. This ensures that productivity is maintained and improved while also providing a pleasant working environment that combines appropriate communication with safety and security for staff.

3. Digital Smart Cities as Part of Social Infrastructure

For digital smart cities to form part of the social infrastructure, they require services that are optimized using data from people, the community, and the environment, especially the local environment in the form of social infrastructure maintenance and anti-crime and civil defense measures for urban management. They also require those

areas that underpin life in the community, which in addition to those already mentioned also include medical and nursing care, transportation, education, and tourism, so as to improve people's QoL.

To create digital smart cities, Hitachi collects, analyzes, and utilizes the various forms of data held by cities to provide services for improving people's QoL and the services for urban management that underpin this way of life.

As we approach an era in which 100-year lifespans are common and where problems such as the low birthrate, declining and aging population, and rising social security costs are even more severe than they are now, Japan is ahead of the rest of the world in confronting these serious challenges for society. In response, local and central government agencies see smart cities as providing one of the pathways to Society 5.0. The actions taken by Japan in this role at the forefront of addressing these issues will in the future provide the basis for resolving them at a global level.

Urban operating systems (OSs), an initiative of Japan's Cabinet Office, will be important for putting these various forms of data to use. This is because of their potential for the creation and deployment of new services for overcoming societal challenges from cross-industry data by improving operational compatibility through measures such as system interconnectivity and the exchange of data held by government agencies and private-sector businesses across different sectors and industries. Hitachi has been involved in this through its participation in a study of smart city architectures undertaken by the Cross-ministerial Strategic Innovation Promotion Program.

When using data on people, there is a need for mechanisms such as those for managing personal information and obtaining consent for its disclosure and exchange. Recognizing that the public institutions charged with managing information about city residents will have an important role to play, Hitachi is looking at providing services such as the secure exchange of data held by these institutions and linking it with Japan's My Number identification system.

The way Hitachi envisages digital smart cities forming part of the infrastructure of society involves establishing both urban management and an urban OS for the appropriate handling and use of personal information, the aim being to create a sustainable and people-centric society whose people can go on enjoying healthy lives that are safe, secure, and comfortable. To this end, Hitachi is trial-ing smart city initiatives that give shape to this vision and deploying them in practice through co-creation with city stakeholders, which include local and central government, private-sector businesses, and academic institutions.

4. Promotion through Co-Creation

Hitachi works with stakeholders to reach a common understanding and to address highly complex social problems and the challenges they are facing promoting the co-creation of new businesses. This section gives examples of such co-creation in the field of digital smart cities.

4. 1

Co-Creation with Real Estate Companies

Hitachi Asia and Frasers Property are conducting a study on the use of technology for enhancing real estate value across multiple generations and an IaaS for enhancing people's happiness and providing a superior customer experience. This co-creation project entails the two companies contributing their respective strengths and resources to ensure that real estate owned by Frasers Property will continue to maintain and increase its value over time.

4. 2

Co-Creation with Local Government

National, state and municipal governments in New South Wales, Australia are working together to plan and deliver major transformative infrastructure, including the Western Sydney International Airport, the Western Sydney Aerotropolis and new transport networks for the Western Parkland City: a region of Greater Sydney that is expected to reach a population of more than 1.5 million people over the next 20 years, from approximately 900,000 now.

At the Kyōsō Centre for open co-creation that will be established by Hitachi within the Western Sydney Aerotropolis, we will work with the NSW Government to deliver opportunities to enhance social, environmental, and economic value in the Western Parkland City. The Kyōsō Centre will support the growth of start-ups and other small and medium-sized businesses and contribute to regional development and employment.

5. Conclusions

This article has described services and infrastructure based on digital technologies that are needed to realize people-centric digital smart cities. If these are to improve people's QoL, they will require not only reliability, but also consideration of economics and the environment.

Hitachi intends to persevere with business developments that seek to create people-centric digital smart cities, engaging in co-creation with stakeholders from a variety of different fields to resolve societal challenges and sustainably combine economic development with healthy lives that are safe, secure, and comfortable.

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