

CONCEPT

Driving Global Growth by Overcoming Societal Challenges

Strategies and Future Plans of Hitachi Group's Mobility Business

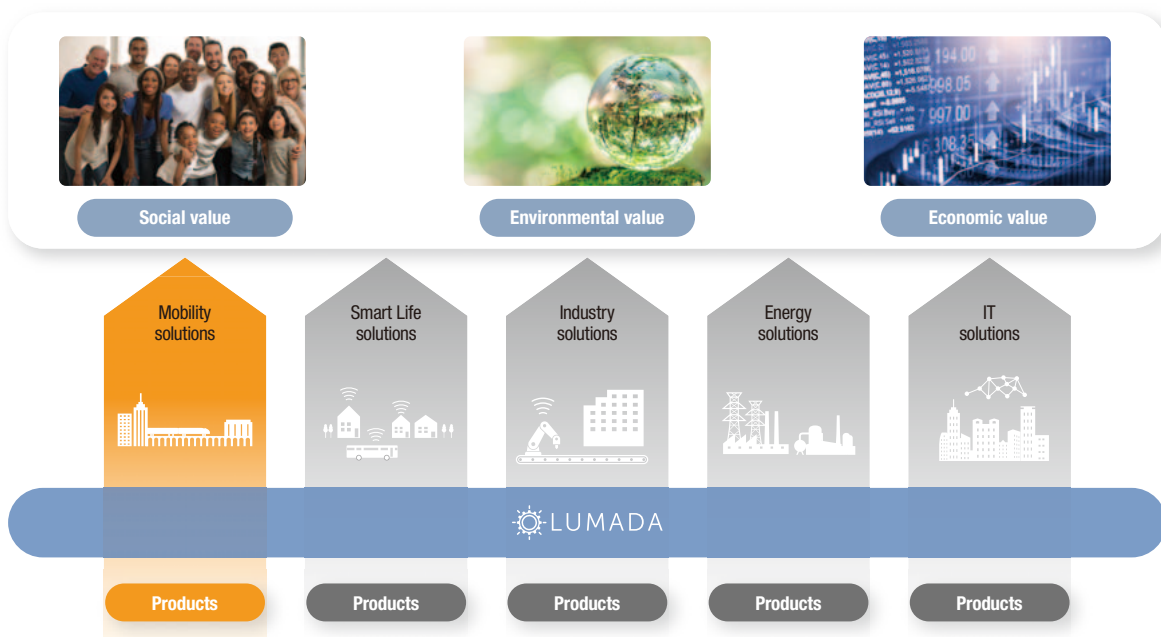
Business Trend Focusing on Societal Challenges

Global business trends have been in a state of flux. Factors such as the global financial crisis of 2008 are behind widespread acceptance of the idea that, if growth in global markets is to be sustainable, it is vital that companies play their part in resolving societal challenges and delivering social value. Published in 2015, the United Nations' Sustainable Development Goals (SDGs) called for company managers and business leaders in particular to be more actively committed to addressing the common challenges facing all of global society. With 2030 now less than 10 years

away, achieving the numeric targets set by the SDGs will require tangible contributions from companies, and in fact many global corporations have already made fundamental changes to their business strategies, placing the goals at the heart of their corporate management.

In choosing to pursue its Social Innovation Business, Hitachi was at the forefront of this business trend and has been active in areas like the application of IT to provide better social infrastructure and the resolution of societal challenges through open partnerships and collaborative creation (co-creation). To address the acceleration of measures like the SDGs and Society 5.0 that seek to use innovation to overcome the challenges facing society, Hitachi has restructured its business into the five sectors of Mobility,

Figure 1 | Enhancement of Social, Environmental, and Economic Value



Smart Life, Industry, Energy, and IT, as laid out in its Mid-term Management Plan, and has set out to enhance social, environmental, and economic value in partnership with customers and through the use of digital technology (see [Figure 1](#)).

Supporting Healthy Development in Cities while Targeting Global Growth

The Mobility sector of Hitachi's business combines its railway and building systems operations. It is a sector where Hitachi is looking forward to global growth, with 69.3% of sales already coming from outside Japan. In these uncertain times of rapid globalization and digitalization, the forms of value that mobility is expected to deliver are also undergoing major changes as society itself evolves. While low birthrates and an aging population have become an issue for developed societies such as Japan, the global population continues to rise, being predicted to increase from 7.6 billion in 2018 to 9.7 billion in 2050. The percentage of this population that lives in cities is also forecast to increase from 55% in 2018 to 68% in 2050. The warming and climate change effects of all these people going about their lives are expected to have a variety of consequences for the environment, economy and society.

Given this accumulation of challenges, what sort of mobility solutions will support the healthy development of cities?

Reducing greenhouse gas emissions will require that urban areas reduce their reliance on automobiles, meaning there is a need for railways and other forms of public transportation to deliver inter-city travel that is faster and more conscious of the environment. Nor should the ability to move from place to place inside buildings be overlooked, these being the basic blocks from which cities are composed. This has led to high expectations for smart buildings that utilize operational data from facilities like elevators and escalators to manage the movement of people around high-rise buildings. Meanwhile, the concept of mobility as a service (MaaS) is now reaching the stage of genuine viability. This involves the integration and coordination of information and data about all of the different forms of mobility, ranging from trains and other

public transportation to automobiles and the elevators and escalators inside buildings. The aim is both to optimize their operation and to deliver new user services with high added value. Having considerable past experience with smart cities, Hitachi intends to play its part in all of this and is participating in proof-of-concept (PoC) projects around the world.

The ultimate outcome of addressing these new requirements will be to achieve the targets set out for the various areas covered by the SDGs. In the Mobility sector, Hitachi recognizes the importance of contributing to the SDGs and is prioritizing such activities. In the case of building systems, for example, Hitachi is helping to achieve the SDGs for climate change and energy by targeting a reduction of 45% in carbon dioxide (CO₂) emissions by 2021 through the replacement of half of the approximately 30,000 elevators in Japan that are due for renewal. Likewise with adaptation to the aging of society, by making escalators that adjust their speed based on the walking speed of their users, Hitachi is helping to create cities where people can keep living in the community even as they get older. Hitachi is also helping to reduce the load on the environment and achieve a circular economy in the railway industry by utilizing 95% recyclable materials in its next-generation rolling stock platform (see [Figure 2](#)).

World Leader in Railways through Global Co-creation

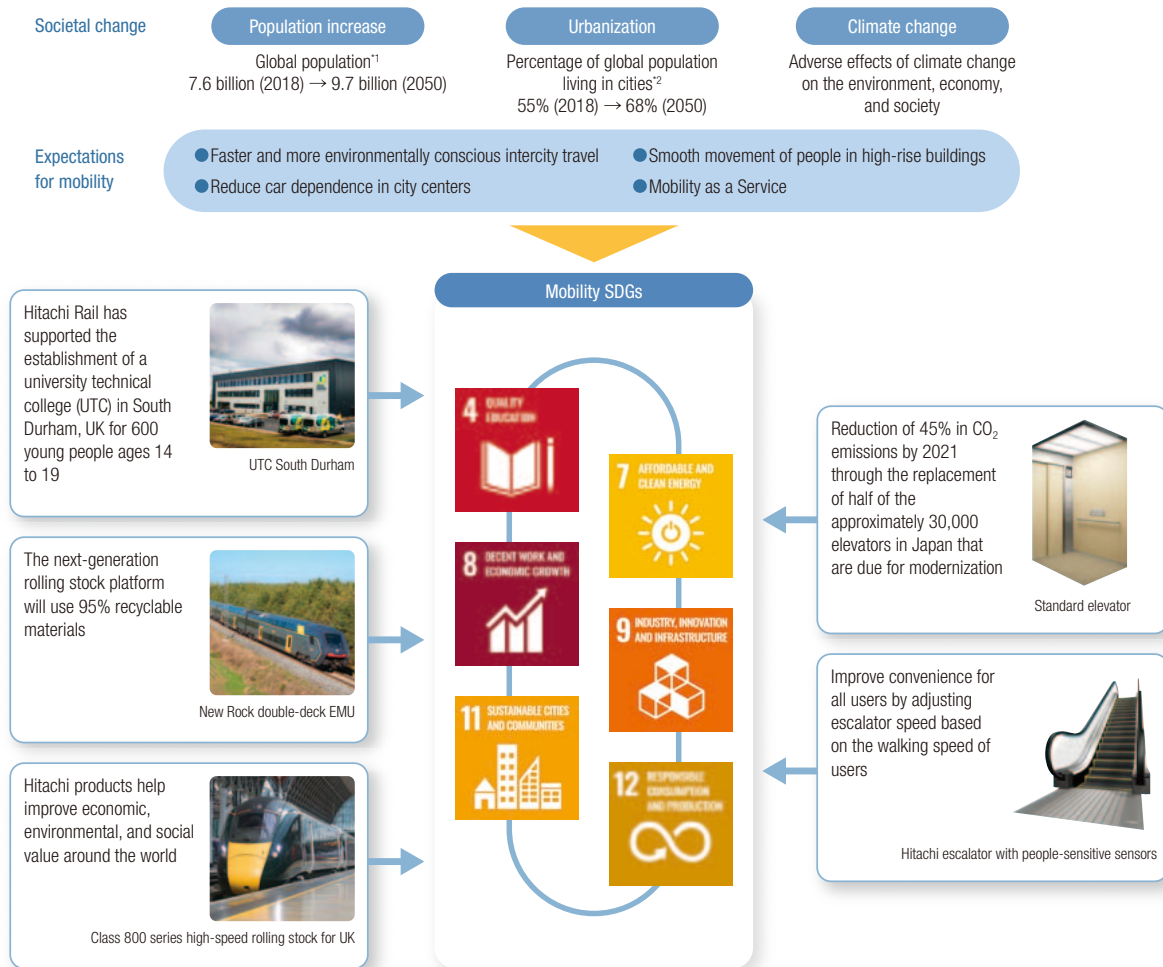
[Hitachi's Globe-spanning Railway Business](#)

Hitachi's railway business, which currently employs about 12,000 people around the world, has a long history, with



Andrew Barr
Vice President, Executive Officer, and
CEO of Railway Systems Business
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Figure 2 | How Hitachi's Mobility Businesses are Helping Achieve the SDGs



SDGs: Sustainable Development Goals EMU: electric multiple unit
 *1 Based on World Bank data
 *2 From 2018 Revision of United Nations World Population Prospects

its origins in Japan dating back to its first steam locomotive manufactured 100 years ago in 1920, and to the ED15, Japan's first large electric locomotive completed in 1924. The history of Hitachi Rail S.p.A. (previously Ansaldo Breda S.p.A.), which became part of Hitachi in 2015, goes back even farther, having its roots in Gio. Ansaldo & C. S.A.S., a company founded by Giovanni Ansaldo in Genoa, Italy in 1853. The company was set up with the aim of starting local production in Italy of steam locomotives that previously had been imported from Britain, with the first being supplied in the late 1850s.

Breda Costruzioni Ferroviarie, the company that merged with Ansaldo in 2001, was established by Ernesto Breda

in 1886 and was a major Italian manufacturer that turned its hand not only to rolling stock, but also subsequently to aircraft. Along with the manufacture of locomotives and other conventional rolling stock, the two companies were also involved in the production of high-speed trains, including the ETR200 and ETR400 (Frecciarossa 1000).

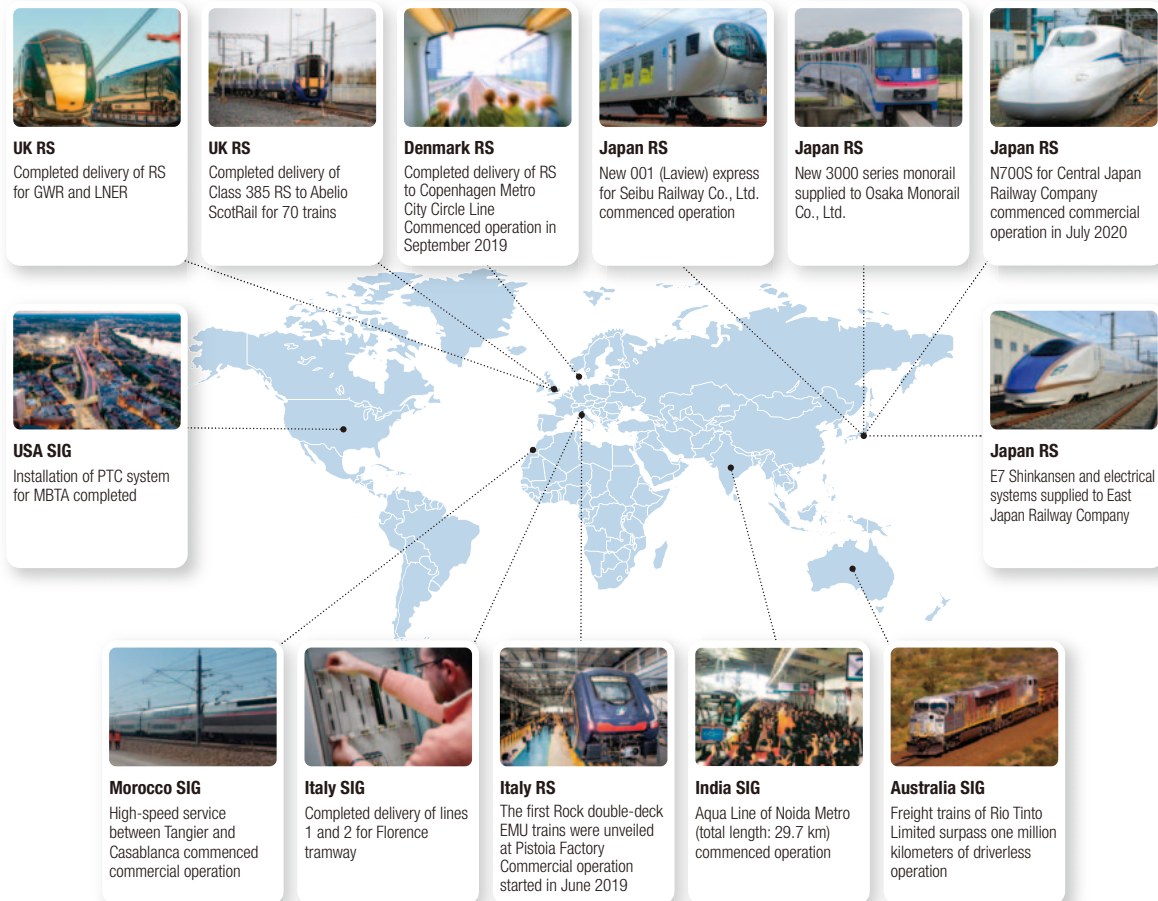
The signals company Ansaldo STS S.p.A. meanwhile, although it was only formed in 2006, built a global business in signalling systems and turnkey solutions by integrating a number of telecommunication and signals companies with long histories, among them Union Switch & Signal Company (US&S), which was founded by George Westinghouse in 1881; the Standard Radio & Telefon AB

from Sweden; and Compagnie de Signaux et d'Entreprises Electriques (CSEE), a railway signals company from France. The company has an extensive business that covers the development, manufacture, installation, upgrading, and maintenance of signals and maintenance equipment for both freight and passenger trains, with expertise in automatic control systems in particular. A traffic management system based on this automatic control technology was selected by Copenhagen, Denmark in 2002, with further systems being supplied subsequently, including for Milan Metro Line 5 in Italy. Ansaldo STS S.p.A. became part of Hitachi in 2015 along with Hitachi Rail S.p.A., making a fresh start under its new name of Hitachi Rail STS S.p.A.

Andrew Barr, Vice President, Executive Officer, and CEO of the Railway Systems Business Unit at Hitachi, Ltd.,

commented that, "At a time when numerous challenges such as climate change and urbanization are making their presence felt more than ever, there are rising expectations being placed on the railways that play a central role in the functioning of cities. At the same time, there are few companies anywhere in the world that have the ability to build these large and complex infrastructure systems and to operate them safely and securely. Now, in 2020, Hitachi's railway business, which draws on its heritage in Japan, UK, and Italy, boasts 11 production sites located around the world, supplying signalling systems to such countries as USA, Italy, India, Australia; rolling stock such as the Class 800 series in the UK; and Shinkansen trains and monorail systems in Japan (see Figure 3). We are also looking ahead to further growth as a leading supplier of total solutions for railway systems."

Figure 3 | Progress of Key Railway Business Projects



RS: rolling stock GWR: Great Western Railway LNER: London North Eastern Railway IEP: Intercity Express Programme
 SIG: signalling PTC: positive train control MBTA: Massachusetts Bay Transportation Authority

Taking on the World with a Full Complement of Railway Products

Hitachi's railway business extends worldwide and is strengthening its competitiveness to meet diverse needs from all over the world by organizing its activities into three "business lines": rolling stock, signalling and turnkey solutions, and operation, service and maintenance. The aim is to enhance added value for customers by investing in core products and technologies in each of these sectors.

The rolling stock business covers inverter control systems, hybrid drive systems, autonomous decentralized train integrated systems (ATIs), and other onboard equipment as well as products such as high-speed trains, commuter trains, monorails, air conditioning and ventilation systems, and bogies. The business is also developing a new platform with the primary aim of boosting efficiency and balancing workloads across its global manufacturing processes. Through the provision of digital and Internet of Things (IoT) solutions in particular, it intends to accelerate technical innovations that are based on customer needs.

The signalling and turnkey solutions business deals with network signalling control systems, Digital Automatic Train Control (D-ATC) traffic management systems, passenger information systems, and railway electricity distribution systems. It is also boosting its global project management capabilities, pushing ahead with integrating the operations of Hitachi, Ltd. and Hitachi Rail STS under the banner of "One Hitachi Rail." The key will be to strengthen efforts on the European Rail Traffic Management System (ERTMS), open up new markets for communication-based train control (CBTC) system, and develop related digital technologies.

The operation, service, and maintenance business deals with railway system engineering, maintenance, operation, and other related matters. Offering a greater depth of digital and IoT solutions for preventive maintenance represents a challenge for the business and it is strengthening its supply chain management with the aim of reducing the lifecycle cost of rolling stock. Through these measures, Hitachi aims to achieve continuous improvement in the service quality and reliability of its rolling stock.

In the words of Andrew Barr, "Hitachi's strength lies

in it being a 'full system provider' able to integrate the three main aspects of railway systems: rolling stock, signalling and turnkey solutions, and operation, service and maintenance. We are putting the capabilities in place to offer distinctive solutions to the challenges of the future, where system-wide optimization of mobility will be in greater demand than ever. By having our three business lines work together on development, we intend to strive wholeheartedly to build a better society by meeting the needs of society with new innovation-driven value delivered through our business-to-business (B2B) and business-to-customer (B2C) operations as a system integrator for the mobility sector."

Next-generation Railway Systems Made Possible by Lumada

The core competencies critical to putting this strategy into action lie in the digital solution technologies made available through Hitachi's Lumada.

Along with its objective of creating digital factories featuring the interoperation of advanced robotics, artificial intelligence (AI), and production machinery, Hitachi also aims to expand throughput in its manufacturing processes through measures that include the rationalization of component counts, plant maintenance, and quality management through seamless supply chain management.

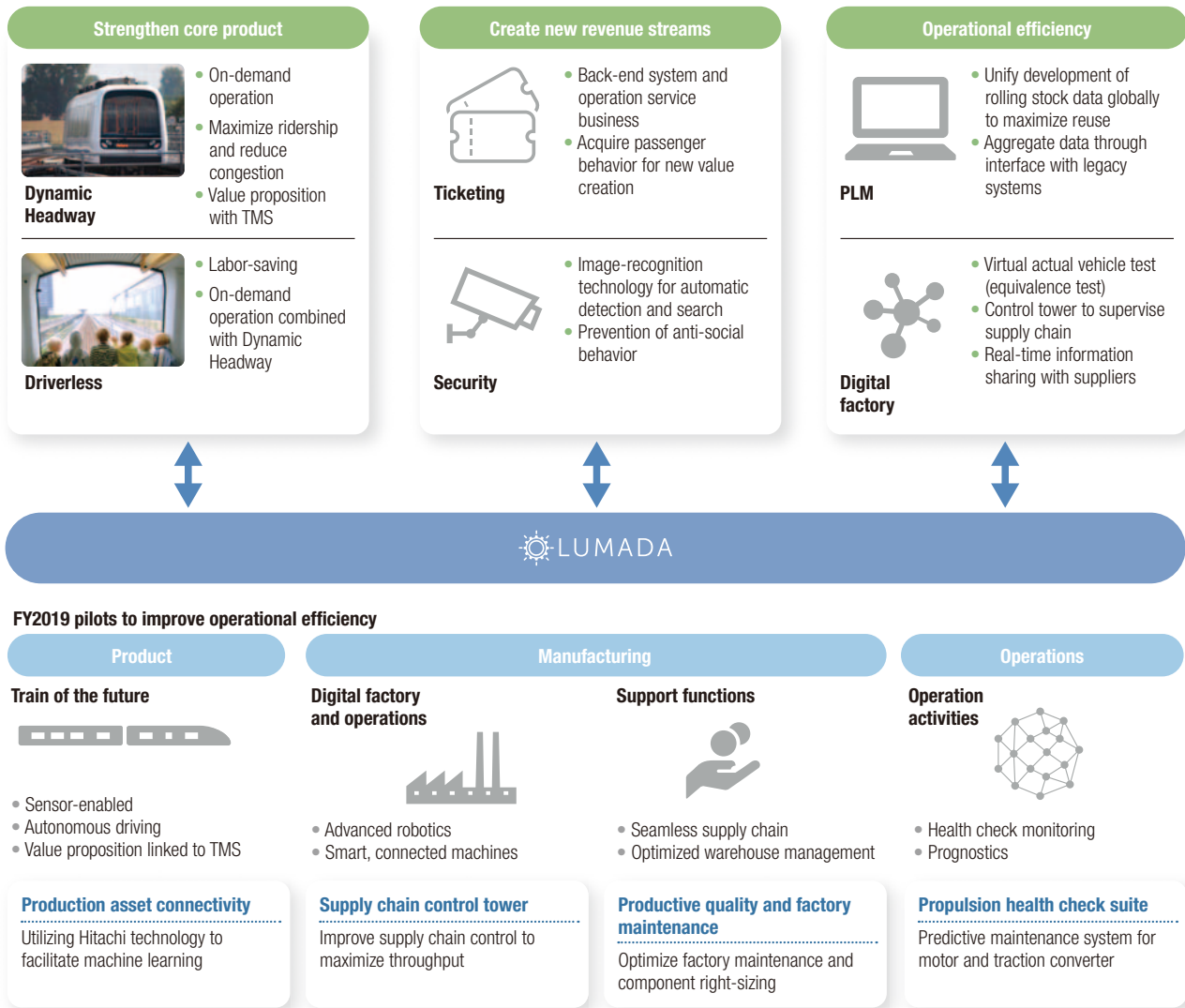
Plans for future traffic control system include dynamic headway to alleviate crowding by adjusting services based on demand, and driverless operation to save labor. On the operational side, Hitachi plans to pursue optimization and efficiency improvements that utilize techniques such as fault prediction or the monitoring and evaluation of train service status, and to make use of data to deliver new added value (see [Figure 4](#)).

Aspiring to World Leadership in the Core Business of Social Innovation

Expansion of Hitachi's Building Systems Business from China and Pacific to the World

Hitachi's building systems business has primarily involved the elevators and escalators that allow people to move in

Figure 4 | Hitachi Group Digital Solution Technologies



PLM: product lifecycle management TMS: traffic management system

comfort around railway stations and other buildings. The business got its start when research and development of elevators at Kameido Works commenced in the 1920s, with the first elevator being delivered to the Kawasaki Complex of Tokyo Electric Company in 1932 and the first escalator to Daitetsu Department Store in 1936. Prompted by rising demand for elevators and escalators in the post-war period, production was shifted from Kokubu to Mito Works in 1961. Development of high-speed elevators proceeded in anticipation of the era of high-rise buildings, with a 300 m/min system (the fastest in Japan at the time) being

supplied to the Kasumigaseki Building, which was completed in 1968 and was Japan's first ultra-high-rise. As building heights continued to increase along with rising numbers of multi-story residential and office buildings, the business also started developing remote monitoring from the 1970s and set about expanding its maintenance services.

Further advances followed, including the adoption of inverter control, with Hitachi elevators and escalators being installed in large numbers of high-rise and ultra-high-rise buildings, including office, residential, and commercial facilities. To meet the demand for faster speeds and greater user

throughput as building heights became taller still, Hitachi constructed an elevator research tower at Mito works in 2010. It was 213 m tall, then the world's tallest elevator test facility. Meanwhile, initiatives aimed at elevator and escalator maintenance included the remote intelligent diagnostic system and the establishment of the global control center.

The expansion of the building systems business outside Japan began in 1980 with the launch of an elevator and escalator business supplying the Chinese market, and an affiliate being set up in Guangzhou in 1995 to serve as a base for manufacturing, sales, and services. Since then, the business has continued to pursue growth in new markets as a core part of Hitachi's Social Innovation Business, pursuing relentless innovation to keep pace with an expanding market. Hitachi has accelerated the rate at which it is expanding its sales and service center presence in Asia and the Middle East in particular, while in China it is among the market leaders in terms of the number of new installations. Emblematic of this success over recent years were the world's fastest* (1,260 m/min) elevators it supplied to the Guangzhou CTF Finance Centre (see [Figure 5](#)).

* According to Hitachi's research in July 2020

Figure 5 | Guangzhou CTF Finance Centre where Hitachi Supplied World's Fastest* (1,260 m/min) Elevators



Shinya Mitsudomi, Vice President, Executive Officer, and CEO of the Building Systems Business Unit of Hitachi, Ltd., commented that, "Along with maintaining our leading share of the Chinese market for elevators and escalators, the world's largest, we are also boosting the efficiency of volume production to expand exports to Asia and the Middle East. In a rapidly aging China, meanwhile, we recognize the need to address societal challenges on the basis of providing a good quality of life (QoL) for all. The building systems business has been involved in the retrofitting of elevators to older housing complexes that lack such infrastructure. It also boasts a wide customer base encompassing office, residential, commercial, public sector, and accommodation properties and can be seen as one of the areas driving Hitachi's Social Innovation Business with the expansive scope of a smart city."

Global Delivery of New Value through Use of Data

Along with using digital technology to enhance its elevator and escalator business that primarily deals with the installation, modernization, and maintenance of these systems, Hitachi is also taking steps to boost its competitiveness in the global market by making use of existing business channels to expand into new building services utilizing data from building facilities and a wide variety of other sources.

To accelerate the global expansion of its building services business, Hitachi is expanding the functions of its global control center that coordinates a network of 1,500 service and maintenance sites supporting more than 600,000 elevators and escalators or other building facilities located around the world, using this as a platform for the supply of advanced services (see [Figure 6](#)).



Shinya Mitsudomi

Vice President, Executive Officer, and CEO of Building Systems Business Unit, Hitachi, Ltd.

Together with this, Hitachi is offering new value through digitalization based on its core competencies as represented by Lumada. Hitachi is marketing services for users and for facility optimization, collecting and analyzing a variety of IoT data covering things like traffic conditions and associated information as well as building facilities.

Shinya Mitsudomi commented that, “Along with strengthening our global control center and enhancing services by introducing things like AI-based fault recovery support systems, we are also proceeding with the global rollout of remote monitoring services and dashboards for building owners and managers. To realize smart buildings and smart cities, we are accelerating the development of digital solutions that combine elevators and escalators and other building facilities with technologies such as service robots. By condensing the experience we have built up in Japan in particular into Lumada customer cases, our aim is to contribute to overcoming challenges globally.”

Overcoming a Time of Crisis

The global spread of COVID-19 since the beginning of 2020 has prompted lockdowns and other such measures around the world aimed at preventing medical institutions from being overwhelmed. This has led to people advocating social distancing, which advocates minimizing contacts between people and between people and things. Even if the spread of infection slows, there will still be a need to stay alert for a possible second or third wave of the virus, and to adopt new living practices accordingly.

Hitachi has responded to the crisis of the COVID-19 pandemic both by striving to maintain social infrastructure and supply chains and to keep customers’ businesses running, and by directing efforts toward the development of technology and the provision of products and services tailored to these new living practices and the new social order. In the Mobility sector, this involves looking at solutions that provide total support, enabling people to access transportation or otherwise move around cities in safety, security and comfort in ways that make allowance for social distancing, one example being to offer non-touch solutions

Figure 6 | Global Control Center



that provide non-contact means for people to go about their business in buildings and other properties.

Shinya Mitsudomi also commented that, “The COVID-19 pandemic has thrust the world into a new era of uncertainty. Nevertheless, the very fact of this crisis can also be seen as an opportunity for us to draw on the experience and knowledge we have acquired from around the world through our Social Innovation Business and engage in the collaborative creation of new value for society, the environment, and the economy. Meanwhile, Hitachi’s activities in the Mobility sector have honed our technologies for the movement of people, including railways, elevators, and escalators. In the future, we hope to contribute to the ‘new normal’ of urban living by developing solutions that are quick to pick up on customer needs and by supplying these together with our core products.”