

Overview

Building Systems that Satisfy the Diverse Spatial Requirements of Global Markets

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CONTINUOUSLY EXPANDING GLOBAL MARKETS

PRODUCTS and services for the elevators and escalators that serve as infrastructure for transporting people in buildings are essential to the steady development of cities. They are continually evolving to be faster, more comfortable, and more able to proactively anticipate unconscious human behavior. This article gives an overview of the global state of the market for building systems and describes Hitachi's range of elevators and escalators and its building system products and services.

The Building Systems Business Unit⁽¹⁾ (BU) was established in April 2016 as part of Hitachi, Ltd.'s organizational reshuffling. In its previous incarnation as the Urban Planning and Development Systems Company, its consolidated revenue for FY2015 was 650.9 billion yen (see Fig. 1). The elevator and escalator business, which provides support for

these systems throughout their entire life cycle, from sales, manufacturing, and installation to after-sales maintenance and renewal (modernization), accounts for 91% of these sales. The remaining 9% comes from the building solutions and services business, which is primarily engaged in comprehensive building management, facility maintenance, and security management. The urban solutions and service business, which accounted for 5% of revenue sales in FY2012, was transferred to Hitachi's Industry & Distribution BU in April 2014, where its sales have continued to grow.

Globally, the market for the elevators and escalators that are the driving force behind business expansion is continuing to grow at an average annual rate of 6.1%, with China, Asia, the Middle East, and India accounting for approximately 75% of the total global demand for new elevators and escalators (see Fig. 2). Hitachi is shifting its focus away from Japan, where the market for new elevators and escalators is stagnant due to an expected decline in total population, and

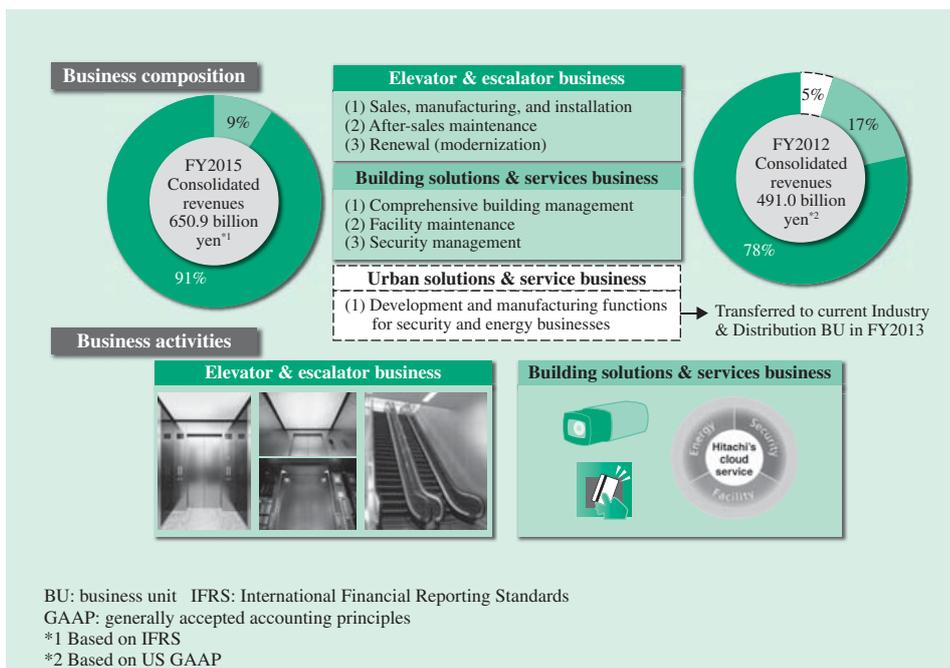


Fig. 1—Business Profile of the Building Systems BU. Established in April 2016, the Building Systems BU focuses on the elevator and escalator business (91% of sales) and the building solutions and services business (9% of sales). Consolidated revenues in FY2015 were 650.9 billion yen.

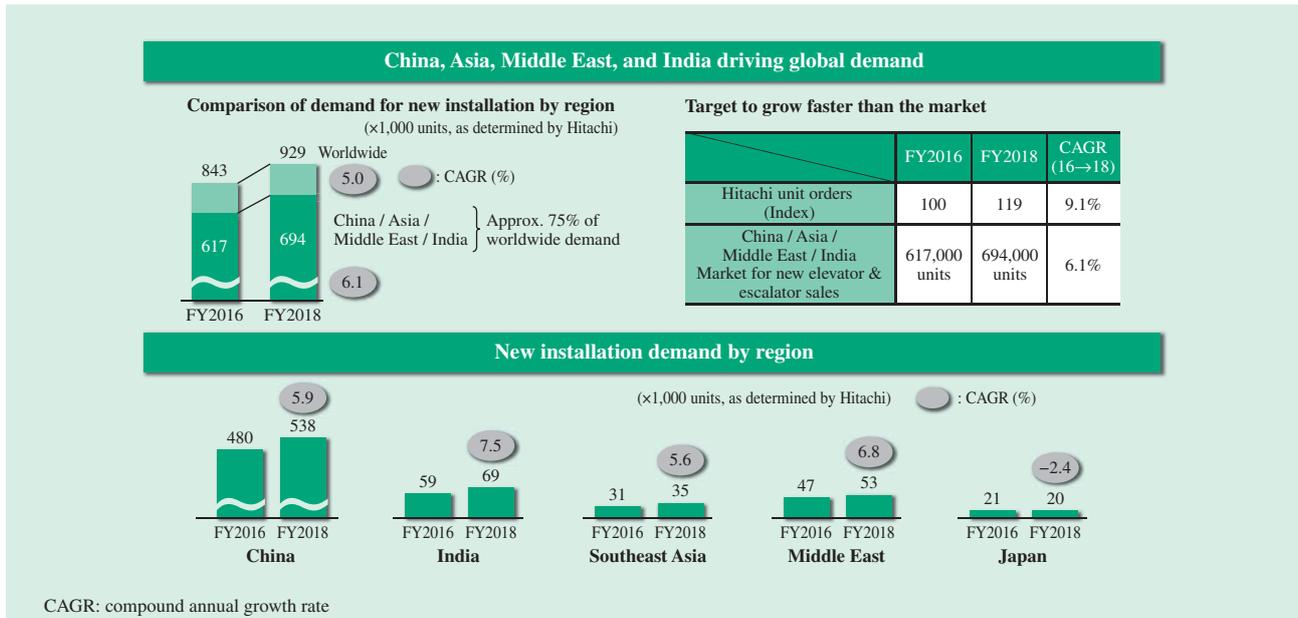


Fig. 2—Global Elevator and Escalator Market Trends.

China, Asia, the Middle East, and India account for approximately 75% of global demand, and the market has an average annual growth rate of 6.1% (as determined by Hitachi).

toward global markets. While this has been happening, Hitachi has maintained above-market growth in terms of the number of units ordered.

OUTLOOK FOR ELEVATOR AND ESCALATOR PRODUCTS AND SERVICES

Successful Completion of World’s Fastest Elevator Demonstrates Latest Technologies to the World

The research and development of elevators and escalators at Hitachi commenced in 1920, not long

after the company was founded, in 1910. The first elevator was delivered to the Kawasaki Complex of Tokyo Denki (Tokyo Electric Company) (see Fig. 3) in 1932 and the first escalator to the Daitetsu Department Store in 1936 (see Fig. 4). A research tower for elevator testing that was the world’s tallest at the time (90 m) was completed in 1967 and the 300-m/min speed of the ultra-high-speed elevator supplied to the Kasumigaseki Building in the following year of 1968 was the fastest in Japan at that time. In May of 2016, about five decades later, Hitachi achieved the world’s fastest speed for an elevator of 1,200 m/min (as of May



Fig. 3—Hitachi’s First Elevator.
The freight elevator did not have a door and was supplied to the Kawasaki Complex of Tokyo Denki (Tokyo Electric Company) in 1932. It had a load of 2,000 kg and a speed of 18 m/min.



Fig. 4—Hitachi’s First Escalator.
Two 600-mm escalators were supplied to the Daitetsu Department Store in 1936. Narrower than modern escalators, the balustrades were made of teak and the steps of bakelite.

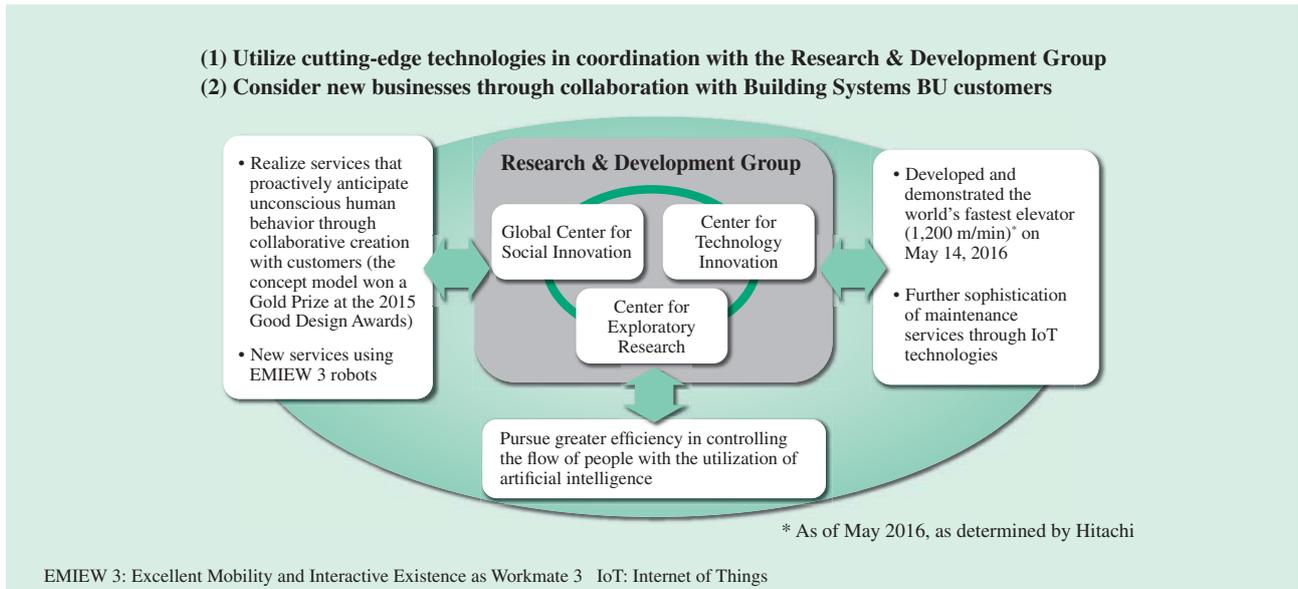


Fig. 5—Develop and Provide the World’s Latest Products and Services that Proactively Anticipate Unconscious Human Behavior. The Building Systems BU works with the Research & Development Group to deploy the latest technologies and supplies products and services that implement the core concept of systems that proactively anticipate unconscious human behavior through developing new businesses by collaborative creation with customers.

2016, as determined by Hitachi), in the Guangzhou Chow Tai Fook (CTF) Finance Centre in China⁽²⁾.

Increasing the maximum speed of an elevator involves more than just increasing the capacity of its motor and control panel, rather it involves the culmination of work on making major upgrades to almost all aspects of elevator function and performance. This includes ensuring ride comfort, improving installation techniques, reducing vibration and noise, enhancing stopping control so that the elevator arrives at its destination floor with the floor level correctly aligned, modifying safety systems and equipment to handle very high speeds and higher capacity, and techniques for the large-scale management of multiple elevators. In this issue of *Hitachi Review*, the article, “Development of Ultra-High-Speed Elevator that Achieved the World’s Fastest Elevator with a Speed of 1,200 m/min” (p. 45) provides details of the latest technologies, and another, “R&D of Elevator for Large Skyscrapers” (p. 69) describes the research and development that went into creating them.

By making greater use of the technologies acquired through this work in Hitachi products intended for markets around the world, the differing needs of these markets can be satisfied. In response to continually rising demand from China, the world’s largest market, Hitachi developed a full lineup of elevators that are manufactured there. It established a product range that extends from medium- and low-speed machine-room-

less^(a) models for the volume segment of the market, to high- and ultra-high-speed models. Details are provided in “Development of Elevators for the Chinese Market” (p. 58). Hitachi has also introduced machine-room-less elevators with standardized specifications to suit a wide range of customer needs in the Asian and Middle Eastern markets⁽³⁾. The details are described in “New Globally Standardized Machine-room-less Elevator—Satisfying Customer Needs in the Asian and Middle Eastern Markets—” (p. 64).

More Comfortable Elevators and Escalators

The following two points are the main axes around which the Building Systems BU bases its development and supply of products and services (see Fig. 5).

- (1) Utilize cutting-edge technologies in coordination with the Hitachi’s Research & Development Group
- (2) Develop new business through collaboration with Building Systems BU customers

One example of that is the core concept for new products and services that proactively anticipate

(a) Machine-room-less
 Machine rooms are built such that they protrude out of the top of the building, for example, and are located at the top of rope-driven elevators where they provide space for installing the control panels, traction machines (winches), and other equipment. Elevators that do not require a machine room use control panels and traction machines of compact design, and are installed in the hoistway (elevator shaft). Their advantages include providing greater flexibility in terms of where the elevator is located because they do not protrude out of the top of the building and therefore do not raise issues with regulations on north-side oblique lines or shadow casting.

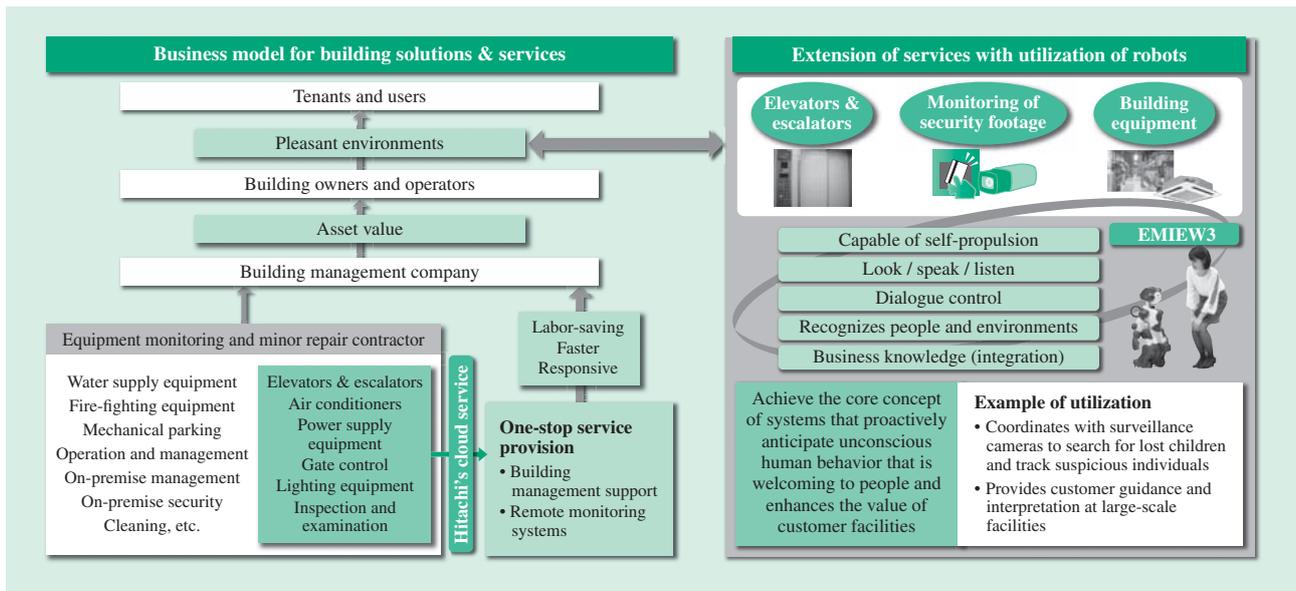


Fig. 6—Development of Services that Maximize Synergy with the Elevator and Escalator Business.

Hitachi offers one-stop building solutions and services that enhance asset value and provide a pleasant environment for all building customers, including tenants, users, building owners and managers, and building management companies. This will also extend to services that use robots in the future.

unconscious human behavior and seek to advance not only the technology and functions of elevators and escalators, but also how comfortable and inviting they are for users. This concept arose out of collaborative creation with Mr. Naoto Fukasawa, the product designer who contributed this issue's Expert Insights⁽⁴⁾.

Examples of how this concept has been realized can be found in this issue in the articles, "Hitachi's Core Concept for Elevator and Escalator Products and Services, and Concept Model—Core Concept for Hitachi Elevators and Escalators that Aims to Supply Systems that Proactively Anticipate Unconscious Human Behavior—" (p. 22) and "Group Control^(b) Elevator with Destination Floor Reservation System for Easier Movement in Buildings⁽⁵⁾" (p. 28).

Ongoing Reassurance

Given that elevators and escalators are part of the infrastructure for moving around in buildings, the requirements go beyond the installation stage to include providing ongoing reassurance throughout the product lifecycle, which also includes maintenance services over the long life of the product until it is replaced by a new model.

(b) Group control

A control technique for the efficient operation of multiple elevators that considers factors such as user waiting times and power consumption. Group control is being enhanced to provide greater user comfort by including functions such as shortening waiting times further by using a learning function to predict the future path of an elevator.

It is important that maintenance services for elevators and escalators are available 24 hours a day and 365 days a year, with further enhancements to past remote monitoring systems through the implementation of new service platforms based on the Internet of Things (IoT). The details are described in the article, "Remote Maintenance System and New Maintenance Service for Elevators Enabled by New IoT Service Platform" (p. 74).

It is valuable to have a business continuity plan (BCP) in place and to conduct ongoing drills to be able to minimize damage and either maintain operation or recover quickly if operation is halted in the event of a disaster such as a large earthquake that affects a wide area. This work is described in "Responding to Widespread Disasters in Japan" (p. 38).

Even when properly maintained, elevators and escalators typically come due for refurbishment after 20 to 25 years. Along with an increased risk of faults as the equipment ages, elevators and escalators that are 20 or more years old do not comply with current safety and earthquake standards and, for reasons that include parts availability, whether they maintain a modern standard of safety is a cause for public concern. "Rapid, Low-cost Elevator Modernization Services that Ensure Safety and Security" (p. 33) describes a solution for aging elevators and escalators used by Hitachi for elevator modernization work^{(6), (7)}.

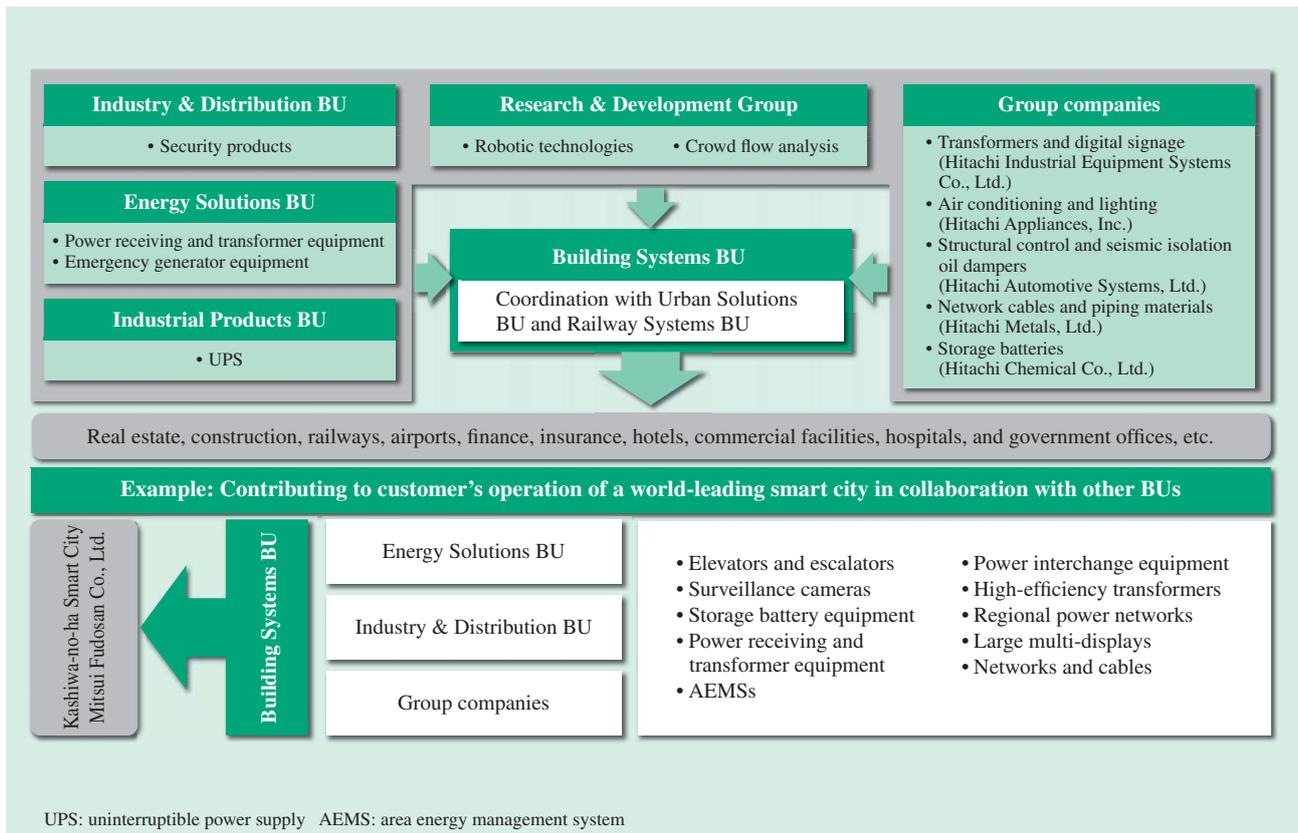


Fig. 7—Total Solutions from the Building Systems BU. The Building Systems BU helps enhance customer value by working in collaboration with other Hitachi BUs and group companies. The Kashiwa-no-ha Smart City of Mitsui Fudosan Co., Ltd. is one such example.

OUTLOOK FOR BUILDING SYSTEM PRODUCTS AND SERVICES

Comfort for all Building Customers

The other major activity of the Building Systems BU is its building solutions and services business. This business maximizes its synergy with the elevator and escalator business by offering one-stop services that enhance asset value and provide a comfortable environment for all building customers, including tenants, users, building owners and managers, and building management companies (see Fig. 6). As a customer-facing organization that deals with a wide range of customers in areas such as real estate, construction, railways, airports, finance and insurance, hotels, shopping centers, hospitals, and government agencies, the Building Systems BU supplies total solutions in collaboration with other Hitachi BUs and group companies (see Fig. 7).

A good example is provided by the Kashiwa-no-ha Smart City of Mitsui Fudosan Co., Ltd., as described in “Customer Collaborative Creation Activities in Front-line Sales Work —From Buildings to Cities—” (p. 80).

CREATION OF TECHNOLOGIES AND SERVICES TO ENHANCE URBAN ENVIRONMENTS

This issue of *Hitachi Review* describes the activities of Hitachi’s elevator and escalator and building solutions and services businesses, focusing on the recent work of the Building Systems BU.

To implement its core concept of systems that proactively anticipate unconscious human behavior to enhance the value of customer facilities that people find attractive, Hitachi intends to continue using collaborative creation with customers to investigate new businesses. The most recent example is the commencement of customer trials of services that use the Excellent Mobility and Interactive Existence as Workmate (EMIEW) 3 humanoid robot in collaboration with the Research & Development Group and others⁽⁸⁾ (p. 86).

Through these activities, Hitachi will continue to create new technologies and services to enhance urban environments.

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