

Creating New Value and Solving Social Issues



Network cameras for transportation hubs (Sweden)

Management Approach

Contribute to a better future, a sustainable society through innovation

Why It Matters

GRI103-1

Multiple challenges remain as people in many countries work to realize a more sustainable future. We will need to harness our collective abilities as humans to solve such problems as supporting the aging population in developed countries, improving the quality of life in developing countries, or tackling security issues linked to the growth of IT.

Following its corporate philosophy of *kyosei*, Canon is committed to creating new value through diversified products and services based on advanced technologies and platforms while creating good relationships with customers, business partners, communities and the global environment. Under Phase V of our Excellent Global Corporation Plan initiated in 2016, an important

strategy we are implementing is to “reinforce/expand new businesses while creating future businesses.” We have also defined “Creating New Value and Solving Social Issues” as a key materiality theme. This approach involves contributing to efforts to solve issues that face the global community by reinforcing and expanding businesses with high societal demand, such as healthcare, security and industrial robots with a focus on diagnostic equipment that enables advanced medical treatments, network cameras supporting safe, efficient social infrastructure, and industrial equipment underpinning the IT used in advanced technologies for daily life.

Canon's Approach

GRI102-11 GRI102-15 GRI103-2

To realize the materiality topic of "Creating New Value and Solving Social Issues," Canon is moving ahead with major strategic changes aimed at sustainable growth, based on the three key challenges of "Creating a Safe and Secure Society," "Expanding Our Medical Business," and "Supporting Industrial Innovation."

We are building Canon's new business foundation around our traditional mainstays of office equipment and digital cameras plus our four new businesses: commercial printing, network cameras, healthcare, and industrial equipment. Utilizing the storehouse of technologies and expertise we have cultivated, we are also leveraging our collaboration in these new business fields with newly acquired Group companies Canon Tokki, Canon ANELVA, Canon Machinery, Océ, Axis, Milestone Systems (Milestone) and Canon Medical Systems (Canon Medical) to create new value. We also continue to promote joint development and open innovation with top research institutions, such as universities, and other companies in Japan and overseas, while seeking to supply products and services tailored to various needs.

Continuous Risk/Opportunity Appraisal

With urbanization advancing rapidly around the world, threats to the safety and security of homes and businesses continue to diversify, ranging from various types of urban crime to terrorism and cyber-attacks. Aging demographic trends and increasingly obsolete infrastructure are also widely recognized as social issues on a global scale, especially in developed countries. These issues pose a significant risk to Canon's business from such perspectives as information security enhancement, HR management, and infrastructure protection from natural disasters.

At the same time, companies are starting to recognize the business opportunities inherent in helping to address such social issues as part of building a sustainable

society. For a company with global operations such as Canon, staying in touch with social issues in each region and contributing to solutions through business not only helps us to fulfill social responsibilities, but also enhances the sustainability of Canon's operations and of society.

Relationship with SDGs

Through our wide-ranging business activities, technologies, products, solutions and services, Canon, along with our customers and business partners, contributes to the achievement of the Sustainable Development Goals (SDGs) promoted by the United Nations listed below.



Creating a Safe and Secure Society



In collaboration with Axis and Milestone Systems, we will respond to diverse needs for "security and safety" with network visual solutions including video analysis technology based on network cameras.

Expanding Our Medical Business



In collaboration with Group company Canon Medical, we are focusing on the fields of diagnostic imaging, healthcare IT and in vitro diagnostics to develop our business by providing solutions closely attuned to the needs of medical institutions and patients.

Supporting Industrial Innovation



We are supporting constant innovation to adapt to changing social conditions by applying proprietary optical and image-processing technologies to the development of industrial equipment.

Overview of Material Issues and Activities in 2018

GRI103-3

Creating a Safe and Secure Society

As part of our focus on network visual solutions, we welcomed the Israel-based leading provider of video analytics solutions BriefCam to the Canon Group.

Expanding Our Medical Business

Canon Medical Systems entered the cancer genomic testing sector by making ActMed a subsidiary. The Company also completed development of the

deep-learning technology AiCE for CT image reconstruction. This promises to improve diagnostic accuracy while reducing patient exposure to radiation.

Supporting Industrial Innovation

Canon worked to increase productivity in the manufacturing sector through accelerated collaborative efforts to develop system-based solutions in the field of factory automation.

Creating a Safe and Secure Society

Canon contributes to the creation of a safe and secure society through network visual solutions that integrate cameras and video technology with advanced IT.

Addressing and Solving Important Social Issues

With urbanization advancing rapidly around the world, it is predicted that as much as about 70% of the total global population will live in cities by 2050, up from 50% today. We also face an increasingly diverse range of threats to the safety and security of our personal and business lives due to rising urban crime, terrorism, cyber-attacks coinciding with the rapid evolution of IT, and large-scale natural disasters caused by climate change. In order to take measures against these growing risks, new urban infrastructure is needed to promote safety and security in cities. We must rethink the creation and management of urban spaces to ensure the everyday safety of residents.

In Japan, various cities are undergoing extensive redevelopment to prepare for large-scale sporting events such as the Rugby World Cup 2019™, Japan and the Olympic and Paralympic Games Tokyo 2020. At the same time, the number of people visiting Japan from overseas is expected to rise. Besides ensuring that such events are a success, investment in infrastructure to maintain law and order while ensuring people's safety and security is a critical issue.

Network cameras help to maintain law and order and protect infrastructure, both by anticipating safety or security threats and supporting appropriate responses, and by helping to address issues based on accurate recordings. Having positioned network cameras as a new business under Phase V of its Excellent Global Corporation Plan, Canon is working to upgrade its product lineup and to reinforce their solutions and development capabilities. This involves the integration of core camera technologies developed over many years, including optical, sensor and imaging engine technologies as well as video analysis software, with the network control and cloud services that have been cultivated in MFP development.

Amid increasing adoption of various big data applications in the IoT era, video data from network cameras is increasingly being used not only for security, but also in manufacturing and marketing. Besides crime prevention and surveillance, Canon is developing network camera-based innovative video analytics solutions for other applications.

Development in this area has accelerated since Axis, a major player in the network camera industry from Sweden, and top global video management software supplier Milestone joined the Canon Group. In 2018, we also welcomed BriefCam, a leading company in video analytics software based in Israel, into the Canon Group. Going forward, we will pursue development of network visual solutions to extract the necessary data from video content for use in a variety of fields, including health, nursing care, education, transport, and urban infrastructure.

With these initiatives, we believe that we can contribute to the realization of SDG 11, "make cities and human settlements inclusive, safe, resilient and sustainable." Moreover, by developing optimized solutions for such customers as governments and commercial facilities, Canon seeks to satisfy societal demand for advanced, resilient and sustainable urban infrastructure.

Related SDGs



Examples of Value Creation

Network Cameras Support the Maintenance of Law and Order and Contribute to the Safety and Security of Society

The AXIS Q1659, the first product developed jointly by Axis and Canon, combines Canon's superlative optical and imaging technologies with the advanced network video processing technology of Axis to deliver high resolution video surveillance capabilities. Full compatibility with eight interchangeable lenses (from wide-angle to telephoto) used in Canon's EOS-series digital SLR cameras enables a wide range of potential applications.

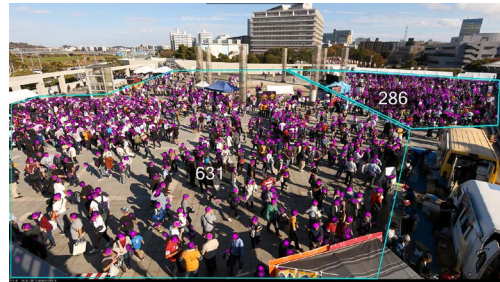
Another example is the ME20F-SHN, an ultra-high-sensitivity network camera equipped with Canon's proprietary 35mm full-frame CMOS sensor, making color image capture possible in low-light environments that had been difficult for conventional network cameras. Its ultra-high sensitivity enables image capture even when there is little to no light and a subject

would not be visible to the naked eye, allowing it to effectively monitor critical facilities, waterways or border crossings, as well as disaster sites during the night. Standard features include intelligent functions for automatic detection of unusual or abnormal events to counter illegal trespassing or camera-related vandalism. With a range of potential applications from national defense to prevention of crime, this network camera can help to protect people day and night.



An image captured by the ME20F-SHN (left) compared with the image as seen by the naked eye (right)

Canon has also conducted field trials of software for analyzing crowd congestion by time period in the large spaces or in front of the shops in the stadium, based on real-time people counts. Tests demonstrated the software can apply AI-based technology to count crowds accurately, even in congested areas where people are facing different directions. This can be applied to support smooth event management or marketing purposes.



A screenshot showing people being counted

Video Analytics Software to Meet Safety and Security Needs

In the network camera market, there is a demand for solutions including recording and analysis of captured video. Canon is adding value to network camera video to promote the development of video analysis software products for security, customer service and marketing sectors.

At an international rugby match held last year in Japan, Canon conducted a field trial for a wide-area security system utilizing face recognition technology for real-time detection and tracking technology via network camera imaging of pre-registered individuals*. This technology is expected to contribute to more efficient security, support the reception of VIPs and help locate lost children.

While the use of network camera video is expanding, privacy concerns exist around their use. Canon has commercialized “Moving Object Mask” video analysis software that can render a person as a moving silhouette within a video feed to enable monitoring and congestion management in public spaces such as restaurants or in meeting rooms while helping to allay such privacy concerns.

In providing video analytics solutions combining software for video analysis with video from high quality and high definition cameras, Canon is contributing to the creation of a safe and secure society.

* Subjects registered for the field trial are employees of Canon.

Applying Video Synopsis® Technology for Efficient Video Analysis

Rapid adoption of network cameras necessitates ways for efficiently extracting necessary data from the vast quantity of video images generated. BriefCam’s video content analysis (VCA) software utilizing its proprietary Video Synopsis technology enables images taken at different times to be displayed at the same time without overlapping thus shortening the video stream to roughly 3–5% of its original length. It gives the user instant access to images of interest by enabling video images to be filtered by object size, color or various other characteristics.

Functions such as simultaneous searching of multiple videos, automatic charting of filter results, and listing of people and vehicles within images further boost video analysis efficiency.



Original 30-minute video is compressed to review in 53 seconds

Expanding Our Medical Business

Canon is contributing to better medical care by developing new diagnostic technology and utilizing healthcare IT.

Addressing and Solving Important Social Issues

With the global population continuing to grow and age, the number of people aged 65 and over is expected to double to more than 1.4 billion by 2050. In Japan, which has one of the most aged populations within the developed world, around 40% of the population is predicted to be over the age of 65 by 2050. Demand is increasing for a broad range of healthcare services to deliver advanced testing, diagnosis and treatment, including promotion of better health and disease prevention. As aging accelerates in Japan, the challenge will be to try to shorten the gap between average and healthy life expectancy that is presently estimated at 5-10 years. Prevention and early detection of disease are the keys to living healthily into old age and can help curtail healthcare cost inflation in an aged society, an issue that must be tackled to realize a more sustainable society.

Diagnostic accuracy is also a prerequisite for supplying high-quality medical services. To this end, there is a great need to make effective use of vast volumes of medical data and cumulative information on patients. Simplifying the challenges faced by health professionals will become a major issue in realizing a sustainable society.

Canon's founder and first president, Takeshi Mitarai, who was also a doctor, was strongly committed to "contributing to society through medicine." In 1940, not long after the company was established, Canon developed the first radiographic camera made in Japan to help detect pulmonary tuberculosis. Ever since, Canon has contributed to the early detection and treatment of disease by supplying ophthalmological instruments and diagnostic equipment using digital radiography and other technologies. In Phase V of the Excellent Global Corporation Plan, Canon is reinforcing medical operations as one of its new core businesses. The Canon Group expanded in December 2016 to include Canon Medical, a leading manufacturer of diagnostic imaging systems. Canon Medical has been developing medical

systems operations for around a century, building up technical expertise in diagnostic equipment such as CT, MRI and ultrasound systems that reduce the burden on patients while providing highly detailed images for diagnostic purposes. Our aim is to supply solutions for patients and health professionals by combining artificial intelligence (AI) with our proprietary image-processing technologies to support better medical diagnoses and improve patient outcomes. In 2018, in a move to further strengthen and expand Canon's healthcare business, Canon Medical entered the cancer genomic testing sector by making ACTMed Co., Ltd. a subsidiary.

Canon's U.S.-based Healthcare Optics Research Laboratory in Boston conducts research targeting technical advances in medical robotics, cardiovascular imaging and other fields. The lab works in partnership with both Massachusetts General Hospital and Brigham and Women's Hospital, which are affiliated with Harvard Medical School.

Going forward, partnering with leading medical institutions in Japan and abroad, we plan to focus resources on further development of diagnostic imaging systems centered on Canon Medical. We will also focus on the fields of healthcare IT – supplying advanced diagnostic support systems and network solutions, based on the latest IT – and in vitro diagnostic systems for the rapid and precise analysis of blood and other patient samples.

Canon believes that the expansion of its medical business can contribute to the realization of SDG 3, "ensure healthy lives and promote well-being for all at all ages." By further widening open innovation programs with advanced medical institutions in Japan and other countries, we hope to contribute to solutions in the healthcare field while also creating value for Canon.

Related SDGs



Examples of Value Creation

Patient-Friendly and Cutting-Edge Diagnostic Imaging Systems

Canon Medical's CT scanners are recognized for their advanced diagnostic capabilities, high analytical efficiency, patient friendliness, and lower lifetime operating costs. Launched in 2007 as the world's first CT scanner to reproduce organs or blood flow using sequenced images, the 320-slice dynamic volume CT scanner Aquilion ONE has made diagnostic procedures more patient-friendly due to less radiation exposure from quicker imaging and reduced usage of contrast agents. This has contributed substantially to the utility of CT scanners with geriatric and pediatric patients, and in intensive care situations as well. In 2017, we introduced the Aquilion Precision, an ultra-high-resolution CT scanner that enables clear visualization of microstructures in the body.

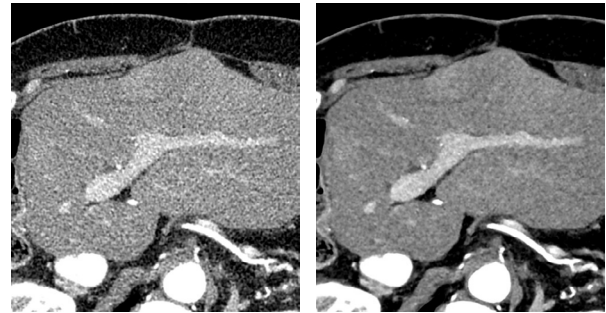
In MRI scanners, responding to patient feedback about noise and compartment tightness, we have developed proprietary "Pianissimo" noise-reduction technology and redesigned the scanner so patients do not feel so enclosed. In other sectors, we are contributing to the early detection of disease with patient-oriented diagnostic equipment, including high-resolution ultrasound systems and a mammography system developed by an all-female team to minimize patient discomfort during the machine's operation.



CT scanner Aquilion ONE that can produce 4D

Deep-Learning Technology for CT Image Reconstruction

The challenge with X-ray diagnostic scanners is to expose patients to as little radiation as possible while ensuring sufficiently high image resolution to allow accurate diagnosis. Canon Medical has developed a new technology called AiCE for CT image reconstruction. Employing a type of AI technology called deep learning to reduce noise in CT images, AiCE makes possible high-quality images while exposing patients to a lower dose of radiation.



Images showing the superiority of new AiCE technology (left) compared with conventional technology (right)

In Vitro Diagnostic Systems for Rapid, Patient-Friendly Diagnoses

Applying its know-how in sensitive detection technology, Canon Medical supplies in vitro diagnostic systems that detect the tiny quantities of virus present in the early stages of infection. Detecting viruses such as influenza accurately at an early stage is extremely useful to medical practitioners. The rapid detection system only requires the patient to sneeze into a paper tissue, making it ideal for testing even small children. Faster detection will make it possible to treat infections earlier, reducing the incidence of serious cases and limiting the spread of disease.

Canon Medical's wide range of in vitro diagnostic systems for testing blood and other samples provide a range of clinical tests. With tropical viruses such as Ebola and Zika posing a growing global threat, we are also developing new DNA testing kits to help early detection of infections. In 2018, we began selling the first RNA reagents in Japan for Zika virus detection. Looking ahead, we will continue to work to make diagnostic tests less invasive for patients and more efficient by developing quicker tests requiring smaller samples.

Supporting Industrial Innovation

Canon is promoting sustainable economic growth by applying proprietary optical and image-processing technologies to manufacturing.

Addressing and Solving Important Social Issues

Supporting constant innovation to adapt to changing conditions is essential to the realization of a sustainable society. Amid growing adoption of IoT, big data, AI and robot technologies as part of the so-called Fourth Industrial Revolution of broad technical change, there are increasing possibilities for personalized, made-to-order or customized products and services.

Advancing the expansion of B-to-B operations as part of Phase V of its Excellent Global Corporation Plan, Canon aims to create new value by using proprietary optical and image-processing technologies developed over many years in the industrial machinery field.

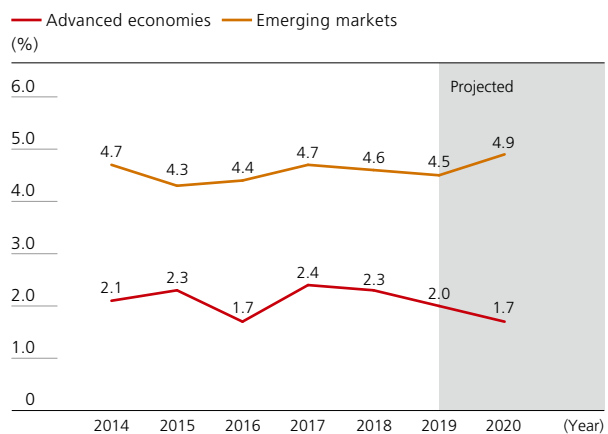
In semiconductor manufacturing, building on conventional lithographic approaches as high-end device manufacturing moves into the IoT era, Canon is aiming to establish nanoimprint technology to achieve semiconductor-device miniaturization at lower cost. Semiconductor chips, which are often likened to the heart of electronic equipment, are an essential part of modern life due to their presence in everyday equipment ranging from smartphones and PCs to televisions, air conditioners and automobiles. In line with the Society 5.0* vision promoted by the Japanese government, the key to a future sustainable society will be the use of data through innovative science and technology such as AI, IoT and robots. By enabling the manufacture of high-performance semiconductor chips for large-scale processing of big data, nanoimprint lithography technology can make a significant contribution.

In other sectors, OLED Panel Manufacturing Equipment (Canon Tokki) and sputtering equipment (Canon ANELVA) are essential elements in supporting enriched consumer lifestyles. In addition, in the field of factory automation, we are accelerating collaborative efforts to develop system solutions in a bid to help increase industrial manufacturing productivity.

Canon believes expanding business within this sector can contribute to the realization of SDG 9 to “build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.” Besides promoting increased efficiency for existing industries, we also hope to foster sustainable economic growth by actively contributing to development of new industries.

* Society 5.0 is the Japanese government’s vision for a new super-smart society in which economic and social development issues are addressed via the utilization of various data based on scientific and technical innovations such as AI, IoT and robots.

Economic Growth Rates for Advanced Economies and Emerging Markets



Source: IMF “World Economic Outlook, January 2019”

Related SDGs



Examples of Value Creation

Technology Supporting Enriched Lifestyles

As the brains of electronic equipment, semiconductor devices are essential parts in the IoT era when everything is linked to the Internet. This trend is driving the growth in demand for flash memory used in mobile devices and such applications for semiconductors as automobiles. Canon supplies semiconductor lithography equipment for semiconductor high-volume manufacturing. The functionality and memory capacity of semiconductor devices continue to rise as chip manufacturers adopt more complex circuit patterns and large-scale integration. Our focus is on the use of nanoimprint lithography, a ground-breaking technology for stamping circuit patterns onto wafers at high resolution rather than following the conventional lithographic approach. This will support process migration while also achieving significant reductions in manufacturing costs. Our semiconductor lithography equipment using nanoimprint technology is currently installed at leading chip manufacturer Toshiba Memory Corporation, where its suitability for mass-production purposes is being assessed.



Nanoimprint semiconductor lithography equipment in use at Toshiba Memory

Elsewhere, CANON ANELVA manufactures sputtering equipment for use in semiconductor production, based on high-vacuum thin-film process technology. The firm is also the world's sole supplier of sputtering equipment for hard disk drive (HDD) head production. Moreover, equipment supplied by Canon ANELVA is helping to boost performance while dramatically reducing the cost of production for communications devices used in high-speed 4G and 5G networks.

With demand for OLED displays on the rise, the OLED Panel Manufacturing Equipment developed and manufactured by Canon Tokki has become a critical component in production processes. Thinner than LCDs and capable of delivering brighter color, OLED displays are also expected to offer new functional possibilities, including curved or roll-up forms. Based on overwhelming technical superiority compared to rivals in the OLED Panel manufacturing field, Canon is working to create original value to respond to rising demand for OLED displays for use in smartphones, televisions and other products.



OLED Panel Manufacturing Equipment developed and manufactured by Canon Tokki

Technology Supporting Innovation in Manufacturing

Canon is focusing efforts on the field of factory automation (FA), where demand has grown in recent years due to rising labor costs combined with labor shortages. Responding to these market trends, we are developing the Canon Industrial Imaging Platform as a system solution for shop floor visualization. By combining imaging technologies used in network cameras and industrial cameras with image-processing technology, we aim to support greater automation of production while helping to boost productivity. In 2018, we began collaborating with Siemens, a leader in factory floor digitalization and automation, and Toshiba Digital Solutions Corporation, an IT solutions developer for the manufacturing sector. Going forward, we plan to collaborate with varied partners to help automate production facilities and increase productivity.