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# Priority Issue 2 Challenging toward Innovation



## Reason for Priority

While technical innovation is making life convenient and comfortable, social issues have become more complex and profound. In this environment, companies are expected to innovate in order to create innovative products and services that lead to solutions for social issues. Also integrating diverse technologies and ideas to create new products and services is essential for companies to survive and develop amid accelerating development of technology.

## Commitment

Under our corporate philosophy of “Trustworthiness and Creativity,” the Nikon Group will address a variety of social issues and needs, leveraging opto-electronics and precision technologies, our core technologies. Under our Medium-Term Management Plan announced in May 2019, we set out “digital manufacturing,” “vision systems/robotics,” and “healthcare” as the areas of long-term growth for the Nikon Group, and we identified the material processing business within the digital manufacturing area as a central theme during the period of the Medium-Term Management Plan. In recent years, the environment surrounding the manufacturing industry has changed significantly, including the transformation of manufacturing due to AI and IoT and labor shortages and the accompanying increasing need for automation due to the return of production to developed countries. In this environment, the Nikon Group will further enhance the value of the technology that we have cultivated in the past through research and development. We will also actively embrace technologies and ideas from inside and outside the company through such means as open innovation to bring about innovation that creates new value.

Toshikazu Umatate

Representative Director, President and CEO, Chairperson of the Technology Strategy Committee

## System

- Technology Strategy Committee

What We Intend to Achieve in 3 to 5 Years	Targets for the Fiscal Year Ended March 31, 2019	Results	Scope
Promotion of open innovation	Create business plans and support for start-ups through the Nikon Intrapreneur Program	Creating three themes from Nikon Intrapreneur Program and supporting start-ups. Also identifying areas for improvement from the issues with the recently implemented program and continually promoting framework for new business creation activities.	Nikon
	Screening of venture companies with synergies with Nikon, review of business plans and investment from funds	Newly invested in 3 companies and made additional investment in 1 company. In addition to making preparations for the future, results also appeared, including completion of joint development with one company we invested in.	
Creating new business	Creating a business to address new needs for optical and precision instrument components	Taking advantage of alliances, etc. and gradually expanding business areas from semiconductor lithography systems peripherals into all optical and precision equipment components (e.g.: Optical processing machines).	Nikon
Creation of a framework to develop core technologies and to utilize them across all businesses (effective research and development)	Create a technical information management system that can be used throughout the entire Nikon Group	Created the platform for a technology information management system.	Nikon Group

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# Nikon's Approach to Innovation, and our Innovation Framework

The Nikon Group is putting in place the framework needed to stimulate innovation so that it can serve as a driver for providing new value for society and enhancing our corporate value.

## Our Basic Approach to Innovation

For the Nikon Group, generating continued innovation by making effective use of our core technologies – opto-electronics and precision technologies – enables us to contribute towards the resolution of social issues, while also being an important strategy for enhancing corporate value.

The Nikon Group views R&D and open innovation as key foundations for stimulating innovation on an ongoing basis.

### Foundations for Fostering Innovation

- **Using our core technologies as the basis for undertaking R&D across a wide range of fields**

Taking our long-term technology strategy as the foundation for promoting R&D on technologies that we have cultivated in the past and technologies related to these, as well as necessary new technologies

- **Using open innovation to explore new ideas and concepts**

Framework which promotes collaboration with partners including those both inside and outside the company to provide a wide range of new products and services, and which accelerates new product development and new business establishment

## Our Framework for Driving Innovation

Within the Nikon Group, individual business units and individual Group companies coordinate their efforts to undertake innovation.

In the area of R&D, Nikon has established a Research & Development Division, which undertakes the development of technologies that can be shared across business units, as well as future technologies. The Business Development Division promotes the seamless utilization of technologies and human talent within the Nikon Group, and also works to create and cultivate new business areas.

Our framework for driving open innovation includes not only corporate venture capital (CVC) investment, but also direct investment in start-up firms through the establishment of a private fund. We are continuing to put in place new arrangements for providing support and incubation for start-ups and employees that have developed technologies or ideas that have potential.

# Effective Research and Development

Since its founding Nikon has been advancing its research and development with a focus on opto-electronics and precision technologies. The technologies that we have cultivated over the years have been a wellspring of innovation, and by developing them and applying them in new areas, we are creating new value.

## Basic Approach to Research and Development

With our core technologies — opto-electronics and precision — as a foundation, Nikon is conducting R&D in wide-ranging areas of technologies, such as optical, precision measurement and manufacturing, image processing, materials, and software and systems. At the same time, Nikon also undertakes research and development in new fields, such as the latest artificial intelligence (AI) technology and work to develop new technologies that are needed in fields offering long-term growth potential, as defined in our Medium-Term Management Plan.

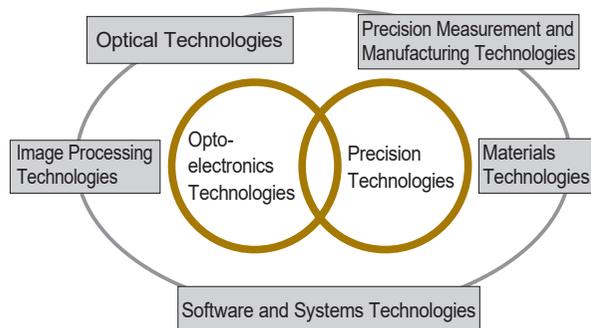
## Our Framework for Research and Development

At Nikon, research and development is carried out within relevant Divisions (such as Research and Development Division) and Business Units (such as Imaging Business Unit). In the relevant Divisions, research and development is carried out on technologies common to multiple business units and future technologies. For example, in regard to opto-electronics technologies, which is one of Nikon’s core technologies, research and development is conducted on a series of technologies from theory, design to production by the R&D-related Divisions. On the other hand, the Business Units are engaged in specialized types of research and development on projects to achieve specific product specifications. Furthermore, Nikon is actively conducting research through joint research projects with universities and partnerships with venture companies as well as within the company.

## Creating a Platform for Sharing Technology

Nikon is putting in place the foundations needed for sharing technology horizontally across the R&D-related Divisions and Business Units, throughout the company. Besides helping to strengthen our overall technology capability, these foundations also have an important role to play in linking customer needs with innovation “seeds.” In the fiscal year ended March 31, 2019, we established new system architecture with the aim of realizing effective management of technology information within the Nikon Group. By adopting new tools that provide first-class Big Data processing, we derive new perspectives from a wide variety of data and ensure effective utilization of innovation “seeds.” We are currently proceeding with optimization work to create a technology information management system that is best-suited to our corporate environment.

### Nikon Group’s Core Technologies



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## Research and Development Initiatives

### R&D with a Focus on Information Processing Technology

Nikon's research and development activity is focused on information technology, including AI which has developed rapidly, especially in recent years. Nikon is promoting research and development so that AI can be used not only in products but also within the production process.

In the fiscal year ended March 31, 2019, Nikon began operation of shared AI servers, to enable the efficient, effective utilization of AI. We are also continuing to improve our IT environment to facilitate the use of open-source software in addition to software developed in-house.

Nikon's cutting-edge research has led to the publication of research papers on topics such as high-resolution imaging, some of which have won awards from external organizations.

## Technology Strategy Committee

Nikon's Technology Strategy Committee formulates technology strategy for the company's Medium-Term Management Plan.

Based on examination of social and market trends, the Technology Strategy Committee draws up technology strategy for developing new technology fields that Nikon should be focusing on, and for enhancing Nikon's competitiveness in existing business areas, and formulates R&D plans tailored towards the realization of this strategy. The Technology Strategy formulated by the Technology Strategy Committee in the fiscal year ended March 31, 2019 was reflected in Nikon's Medium-Term Management Plan for FY2019 – FY2021.

# Promotion of Open Innovation

Nikon is actively seeking to innovate and to respond to new needs by utilizing opto-electronics and precision technologies cultivated over many years in combination with ideas and knowledge from both inside and outside the company.

## The Open Innovation Approach

In today's world of rapidly diversifying needs and technological innovation, companies need to strategically find a way to bring about innovation. In the Open Innovation initiative advocated by Nikon, each business unit collaborates with various partners with the aim of creating new businesses and expanding existing business areas.

Furthermore, Nikon will formulate medium- and long-term technology strategies for the entire Group, and through strategic alliances and M&A with suitable partners Nikon will endeavor to branch out into new business areas.

Additionally, innovation is often born from a strong will to solve social problems.

By operating an effective program to support start-up firms and employees who have a strong commitment of this kind and have the ideas needed to develop firm business plans, Nikon will continually achieve innovation while solving and addressing issues in society.

## CVC(Corporate Venture Capital)

Nikon has built an extensive network through investment in several global venture capital firms. As a result, every year Nikon is able to examine opportunities for collaboration with over 300 promising start-up firms from all over the world that possess cutting-edge technology or unique business models. In addition, when evaluating start-up firms, Nikon benefits from the different perspectives of venture capitalists and other experts, which facilitates speedy assessment and reduces the time needed to complete related business processes from initial investigation through to evaluation.

## Nikon-SBI Innovation Fund

In collaboration with SBI Investment, Nikon has established a private fund, the Nikon-SBI Innovation Fund. The fund aims to invest directly in Nikon's existing business fields and in start-up firms involved in the latest technologies and services such as IoT, AI and robotics. The maximum size of the fund is expected to be 10 billion yen, with investment targets spanning the full range from seed-stage businesses (companies in the preparation stage) and early-stage businesses (start-ups) through to later-stage businesses (prior to exit).

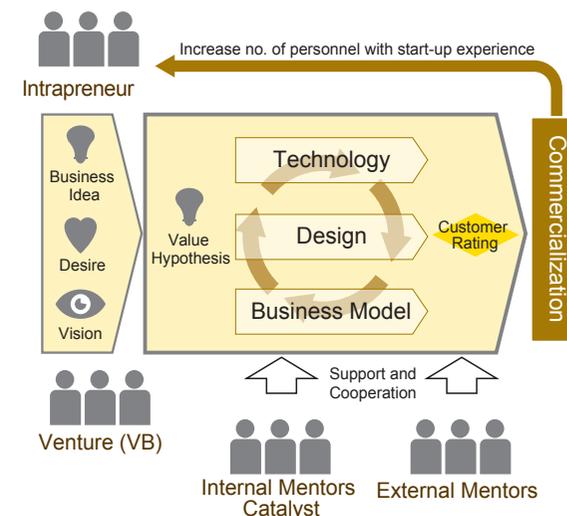
Through the Nikon-SBI Innovation Fund, Nikon is able to invest directly in start-up firms, making it possible to realize alliances for collaborative development, etc., as well as facilitating the provision of business support for invested companies, and accelerating the development of new Nikon products and the creation of new businesses by Nikon.

## CAP(Corporate Accelerator Program)

Nikon runs a Corporate Accelerator Program (CAP) that provides funds for, and assists and fosters venture companies with technological strength and promising business plans, as well as teams inside the company who are still in the R&D phase.

Nikon's CAP comprises two elements: the Venture Support Program and the Nikon Intrapreneur Program.

### How CAP Works



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## Venture Support Program

By making it possible for Nikon to work together with venture companies, this initiative leads to the creation of contact points with markets and customers that previously didn't exist, and helps to support innovative employees within the company. For those companies that were awarded CAP Best Awards and Excellence Awards in 2017, Nikon personnel accompanied the venture companies on their visits to customers and discussed commercialization ideas with them for a period of about six months.

Nikon will continue to promote innovation in the commercialization process and the creation of new businesses through the Venture Support Program.

## The Nikon Intrapreneur Program

In the fiscal year ended March 31, 2018, Nikon launched a new program for employees called the Nikon Intrapreneur Program (NIP). This program for cultivating intrapreneurs provides motivated employees with opportunities for learning and growth.

The first round of the NIP was launched in January 2018, with more than 130 ideas being submitted from within Nikon. Of these, three business plans were ultimately adopted for implementation through to the exit stage, and these projects are now being commercialized.

It is anticipated that a second round of the NIP will be launched in the fiscal year ending March 31, 2020, with the aim of achieving a level of project commercialization that matches that of the first round. To this end, we are making effective use of social media within the company, and providing opportunities for the discussion and exchange of ideas on an ongoing basis. In addition, besides using the results achieved in the first round to enhance an educational program that includes training for intrapreneurial talent and related workshops, we are also arranging internal and external mentors for the intrapreneurs, with the aim of building an environment conducive to the generation of even more ideas.



The NIP Awards Ceremony



Panel discussion by NIP participants who passed the review process

## Collaboration with Start-up Firms

Nikon is working to invigorate communication and exchange with venture company start-ups, with the aim of further promoting collaboration with external partners on new business creation. In concrete terms, this involves investment in start-up firms, implementation of joint R&D, and the building of linkages between start-up firms and individual Nikon business units.

While expanding activity in the fast-growing healthcare sector, we are also speeding up research in areas related to our existing business areas such as imaging and industrial equipment businesses, through collaborative R&D with a number of invested firms.

In the fiscal year ended March 31, 2019, we collaborated with Accuthera Co., Ltd. on the joint development of a high-energy X-ray source for use in non-destructive testing; this new technology was showcased at the 2019 Conference on industrial Computed Tomography (ICT 2019) in Italy. By miniaturizing the focal spot size, this X-ray source makes it possible to view the inside of engines and jet engine turbines with high resolution. In the future, experiments with this technology will continue at the National Institute of Advanced Industrial Science and Technology (AIST), with the aim of expanding the scope of device applications. Nikon has also invested in collaborative robot firm Veo Robotics, Inc., to expand the scope of new technology fields. At the same time, we have also begun to undertake collaborative R&D with Exvission Corporation, a firm that possess high-speed image processing technology. By collaborating with multiple firms, Nikon is able to accelerate the pace of new product development and new business establishment.

## Column

### A Programming Class for Primary School Children that Uses a Communication Robot

Collaborating with Unirobot Corporation, Nikon has launched a new kind of programming class for primary school children. Unirobot, which has received investment from Nikon through the Nikon-SBI Innovation Fund, has developed a communication robot (social robot) business.

Responding to the move to make programming classes for primary school children in Japan compulsory starting from 2020, the aim is for Unirobot to put this project on a commercial footing using technology that has already had its effectiveness proven through verification testing.

In the fiscal year ended March 31, 2019, this programming class was held twice. A total of 22 primary school children and pre-school children took part; the children enjoyed learning programming in a way that involved robots, and enjoyed chatting with the robots.

In the future, Nikon will continue to work together with Unirobot Corporation to explore new kinds of value that communication robots can provide and new usage fields, with the aim of providing products and services that stimulate children's curiosity and strengthen their interest in technology.



Communication robot "Unibo"



Programming class for primary school children

### Collaboration with Universities, Companies and Other External Organizations

Nikon is actively working with outside parties with the CVC, cooperation with private funds and venture capital firms, as well as with the Corporate Accelerator Program and the Nikon Intrapreneur Program.

For example, Nikon is carrying out a joint research project on iPS cell quality and culture processes in relation to cell culture, with the Center for iPS Cell Research and Application, Kyoto University. Nikon is also engaged in a business and capital tie-up with Healios K.K., a world leader in regenerative medicine development utilizing iPS cells, etc.

## Creating New Businesses

In order to respond to new markets and to customer's needs, we are working to further strengthen the Nikon Group's core technologies, while also putting in place the systems needed to generate new businesses efficiently.

### Optimizing the Processes for New Business Evaluation and Cultivation

It is generally held that the probability of a new business concept being successfully commercialized is very low. Successful realization of new business development requires timely, precise concept selection and resource inputs.

In the past, the Nikon Group has undertaken new business development based on a variety of different concepts. However, it would be fair to say that, when seeking to commercialize concepts, we have not always been able to achieve appropriate evaluation and cultivation, with the decision to withdraw from unpromising projects often being delayed until too late a stage, and with project management that has been too heavily focused on the technology side, etc.

With this in mind, the Nikon Group is currently putting in place new processes for new business evaluation and cultivation, centered on the adoption of customer-focused evaluation criteria and a more open project review mechanism; we are creating a new framework for realizing the timely commercialization of concepts with real appeal.

### A Strengthened System for the Development of New Businesses that has Opto-electronics Technologies as the Core Element

The Nikon Group is focusing on opto-electronics technologies, which constitutes our core technologies and putting in place the systems needed to accelerate the commercialization of new businesses. More specifically, the various design functions relating to optical solutions are being consolidated with the Optical Engineering Division while the optical devices production function is being consolidated into Tochigi Nikon Corporation, thus creating a framework that will enable us to respond precisely to the needs of different customers and realize more efficient production.

Under the system, we have also established the Precision Components & Modules Business Unit to realize a solution provider business that makes effective use of opto-electronics technologies. By coordinating the activities of individual business units, with the Precision Components & Modules Business Unit playing a central role, besides developing new optical component related markets and customers, we are also aiming to achieve technology integration and enhancement of overall technology levels throughout the Nikon Group. It will also be possible to make flexible adjustments in our production system from a company-wide perspective, taking into account the busy season and slack season for individual products, thereby enhancing overall monozukuri (manufacturing) efficiency. We are currently implementing measures to expand the scope of our component business beyond optical

engineering by making effective use of alliances. In the future, while aiming to integrate related technologies both within and outside the company, we will be working to further strengthen our component business and meet a wide range of needs on a global scale.

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