

Research and Development

Basic Approach

Approach

In the more than 120 years since our foundation, TOPPAN has evolved our original specialization of printing techniques into the art of printing. Technical advances in printing, coupled with the fusion of varied knowledge and expertise with processing technologies, have enabled us to systemize “printing technologies” of our own. Five core technologies now drive our business: Information Processing, Microfabrication, Surface Treatment, Material Forming, and Marketing Solutions. These five technologies and the distinct benefits they offer are combined into the new solutions we offer.

By strengthening core technologies to maximize synergies within the Group, we continue to generate new value for society through co-creation with clients, universities, and startups. We will continue deepening and expanding our unique technologies to develop new businesses that provide solutions to global social challenges and transform our business portfolio.

Research and Development Structure

Promotion framework

We advance research and development activities centered on our core technologies from a market-oriented perspective. The R&D Strategy Office and Business Development Division work together with technology development departments at business divisions across the Group. The R&D Strategy Office seeks to build a cross-departmental technical administration infrastructure, while the Business Development Division engages in research, new business development, and strategic investment to create new businesses as a disruptive innovator.

We also strategically build and use intellectual property, generate R&D synergies within the Group, and collaborate creatively with clients and external research institutions to advance our R&D activities. In these ways, we deliver new value to address today’s shifting society and global environment.

TOPPAN Technical Research Institute

Promotion framework

Our central research facility, the TOPPAN Technical Research Institute (est. in 1986 in Sugito, Saitama Prefecture, Japan) promotes research integration, interdisciplinary research exchanges and technological development, and cross-border Groupwide research collaborations. Its primary focuses are fundamental research to usher in next-generation technologies and the development of highly original, competitive products. The institute also utilizes its advanced expertise to provide technical support to TOPPAN business divisions.

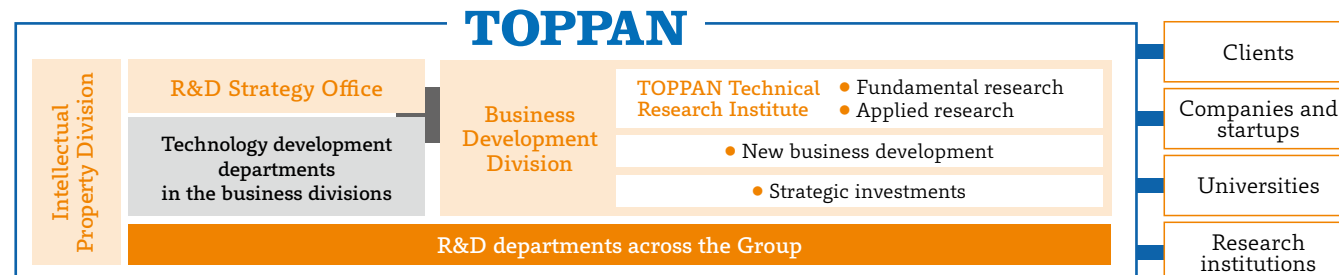
In a move into R&D frontiers, the institute has developed invivoid®, a 3D cell culture technology applying proprietary biomaterials, in a joint venture with Professor Michiya Matsusaki from the Graduate School of Engineering at Osaka University. In March 2023, Osaka University joined with Toppan Inc. and three other companies to form the “Consortium for Future Innovation by Cultured Meat,” an alliance to promote the social adoption of cultured meat through three approaches: the application of 3D bioprinting technology, the formation of an integrated value chain from production to distribution, and contributions to the development of laws and regulations in cooperation with government agencies and businesses. The consortium seeks to pioneer edible cultured meat by enhancing consumer understanding of cultured meat through informative events such as the upcoming exhibition at Expo 2025 Osaka, Kansai, Japan.

Consortium logo



培養肉未来創造
コンソーシアム
Consortium for Future Innovation by Cultured Meat

Research and Development Structure



New Business Creation Themes

Policy

We have been creating new businesses that address social and industrial issues by leveraging business models and technologies that give us a competitive edge. Healthcare and energy solutions are examples of our frontier businesses pursued on a priority basis.

One notable venture we are committed to is the capital and business alliance formed in 2019 with ICI Inc., a certified enterprise that can be trusted to handle anonymized medical data under the Next Generation Medical Infrastructure Act (“Act”) of Japan. The core aim of this alliance is the distribution of medical big data collected from hospitals, clinics, local governments, nursing care facilities, and other medical

institutions across Japan for use in research and development in healthcare, medicine, and welfare fields. The alliance also pursues the realization of long healthy life spans and inclusive communities. We made ICI a consolidated subsidiary in January 2023 to further strengthen the allied initiatives.

DATuM IDEA, a medical-information delivery service, is the latest achievement stemming from our efforts focused on the use of medical big data. DATuM IDEA has been developed in collaboration with the Japan Medical Association Medical Information Management Organization (J-MIMO), a certified organization under the Act.

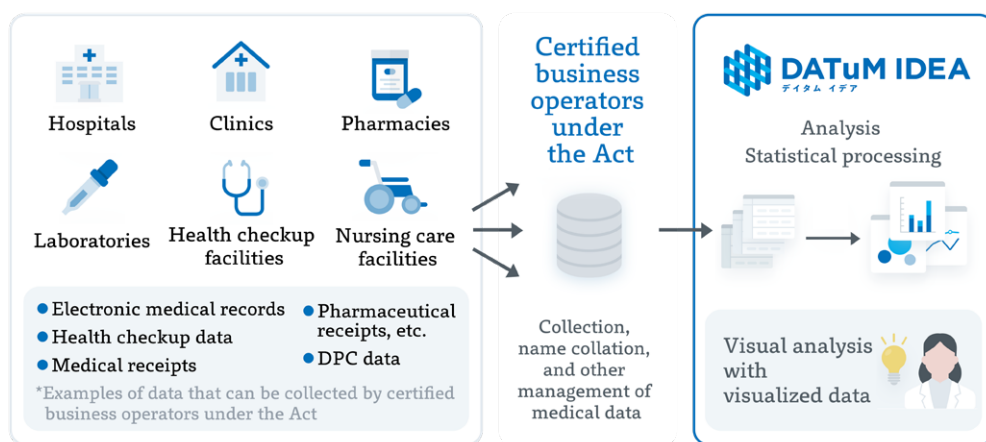
In March 2023 we held a seminar on the usage of medical information on the DATuM IDEA platform to promote the broad use of real-world data originating from medical institutions.

Strategic Investments

Policy Activity results, performance data

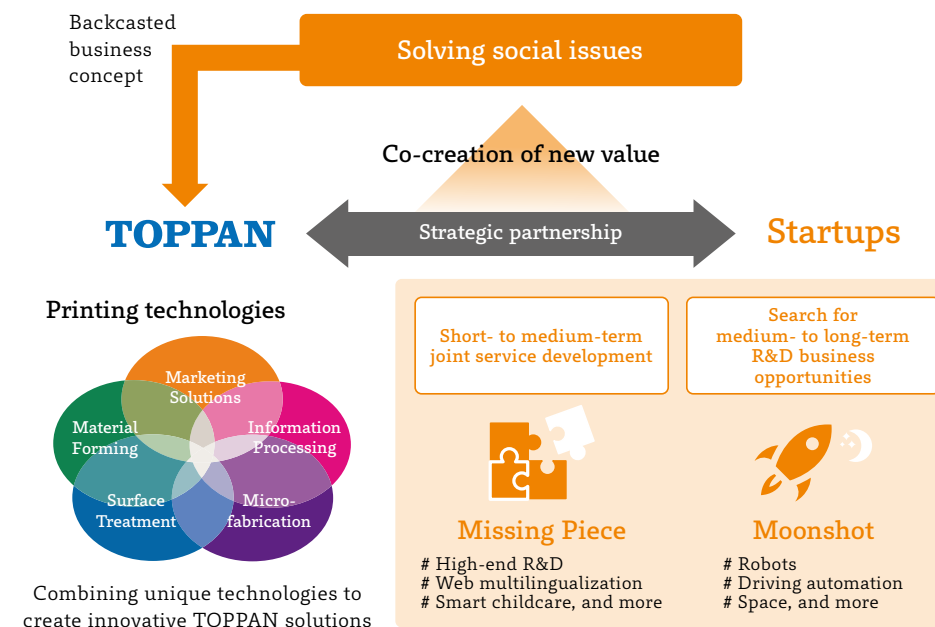
The creation of new businesses and markets has been identified as one of our main challenges for medium-term management. We have been developing new businesses for the dynamic growth of the Group by making small-scale investments in growth fields such as digital transformation (DX) business, cutting-edge technologies, and ESG initiatives. We have formed capital and business alliances with some 60 startups around the world since July of 2016. We are generating new value for society by combining the advanced technologies and business models of startups with the planning and technical capabilities throughout the Group, from both short-term and medium- to long-term perspectives.

Overview of the DATuM IDEA Service



Taken from <https://datumidea.jp/> (in Japanese)

Collaboration with Startups



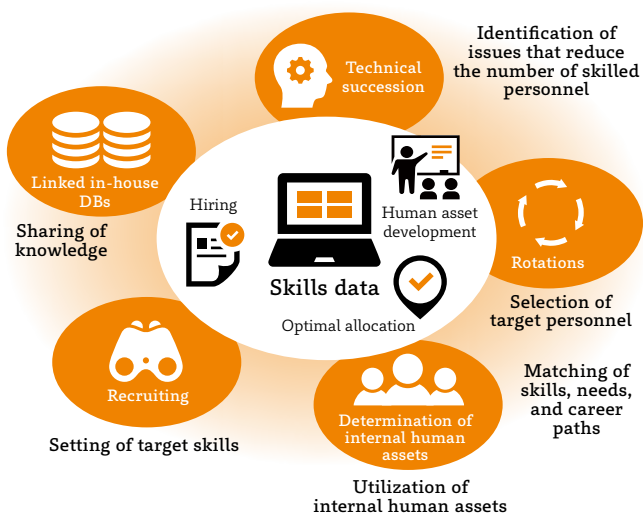
Visualizing Technical Skills

Policy

We strive for technological enhancements through the strategic utilization of our human capital. From fiscal 2020 onward, for example, we have been surveying human assets in technology departments across the Group to rate their technical skills.

The surveys are structured by subdividing our five core technologies into elemental technologies of several types, from currently trending technologies to practical technologies applied to our products and services. The experience and skills of individual employees in each of these elemental technologies are consolidated into a skill map that can be used to formulate policies for strengthening technical capabilities through the training, hiring, and optimal allocation of human assets.

Overview of Skill Map Utilization



R&D Investments

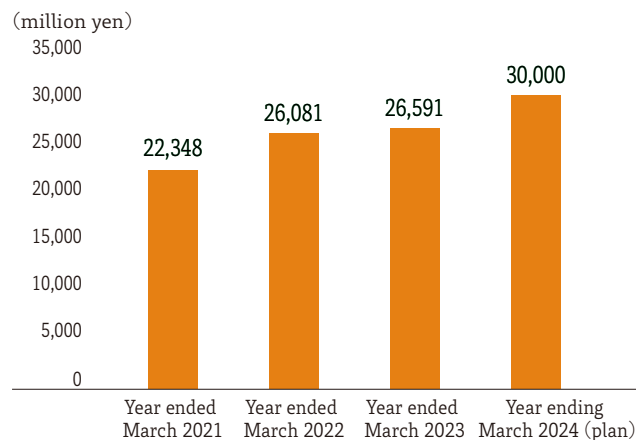
Policy | Activity results, performance data

We advance research and development to create new businesses with a view to transforming our business portfolio. We have defined key fields in which to invest R&D resources on a priority basis, starting from fiscal 2021. Fiscal 2021-2022 and fiscal 2023-2025 are positioned as the “foundation building phase” and “result delivery phase,” respectively.

We have been planting seeds to achieve results in fiscal 2023 and beyond by increasing our R&D budgets to fund technological enhancements and the faster creation of new businesses. The bulk of the R&D funding is spent in key investment fields to address social issues and follow technological trends (shown in the table on the right), and the establishment of foundations such as technological platforms that support our efforts in the key fields.

Key Investment Fields	
Sustainability	Mono-material compositions, switch to paper materials, recycling/upcycling technologies, biodegradable materials, etc.
5G	Next-generation FC-BGA substrates, 5G antennas, electromagnetic wave control/absorption sheets, molds for AR glasses, sensor technology, etc.
DX	Communication business, solutions for local government administration, digital platform business, BPO, IoT technology, smart city initiatives & community planning, etc.
Frontier	Metaverse-related business, healthcare business, fuel cell components, energy business, genome editing, robotics, agribusiness, etc.
Fundamental technologies	Materials/analysis technologies, strengthened foundation for service quality improvement, converting technology, microfabrication technology, etching technology, intellectual properties, AI/data analysis platforms, etc.

R&D Expenditure



Fiscal 2023 Breakdown of R&D Investment Fields

