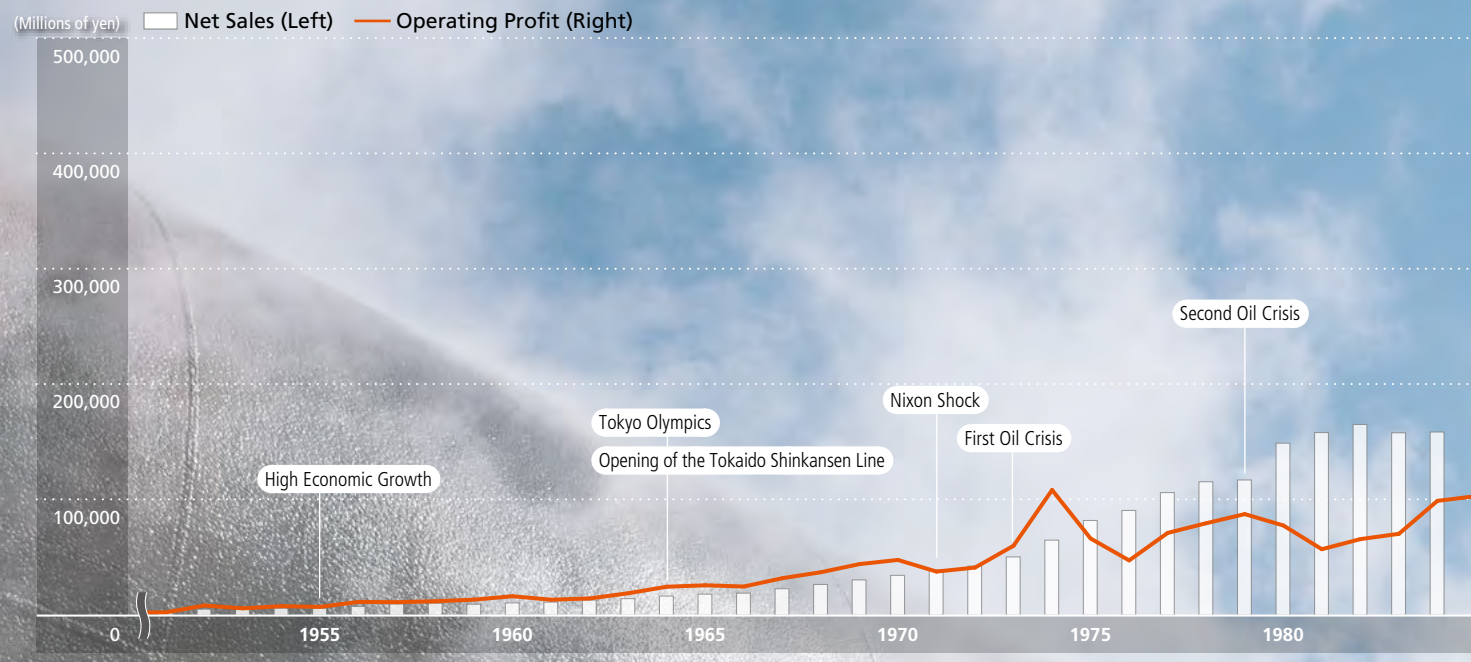
Value Creation Story 1

The Path Together with Society



1918 - 1974

■ Foundation toward the expansion of the inorganic chemicals business and entry into the petrochemical business

Established domestic production of soda ash to resolve difficulty in securing imports during WWI. Entered the cement business and the petrochemical business in response to expanding demand in a period of high economic growth. Contributed to increasing people's quality of life and infrastructure development. Strengthened environmental measures to meet social expectations in response to serious pollution problems.

1918	Established Nihon Soda Kogyo Co., Ltd. to produce soda ash in Tokuyama, Yamaguchi Prefecture (currently Shunan City)
1919	Started to produce soda ash
1936	The company name is changed to Tokuyama Soda Co., Ltd.

1938	Started to produce cement in the wet process from waste mud produced during the production of soda ash
1940	Started to produce calcium chloride using distillery effluent produced during the production of soda ash
1952	Changed the manufacturing method of caustic soda to the electrolytic process
1960	Completed construction of Nanyo Plant to expand cement business
1961	Commenced ready-mixed concrete business in response to expanding construction demand
1964	Commenced production of propylene oxide by employing chloride that makes use of by-products from caustic soda operations

1967	Commenced production of ion exchange membranes that are used for salt production from concentrated seawater (The first commercialization of ion exchange membranes in Japan)
1972	Commenced production of isopropyl alcohol (IPA)

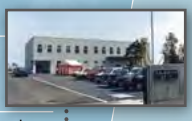
1975 - 1989

■ Expanded specialty and processing businesses

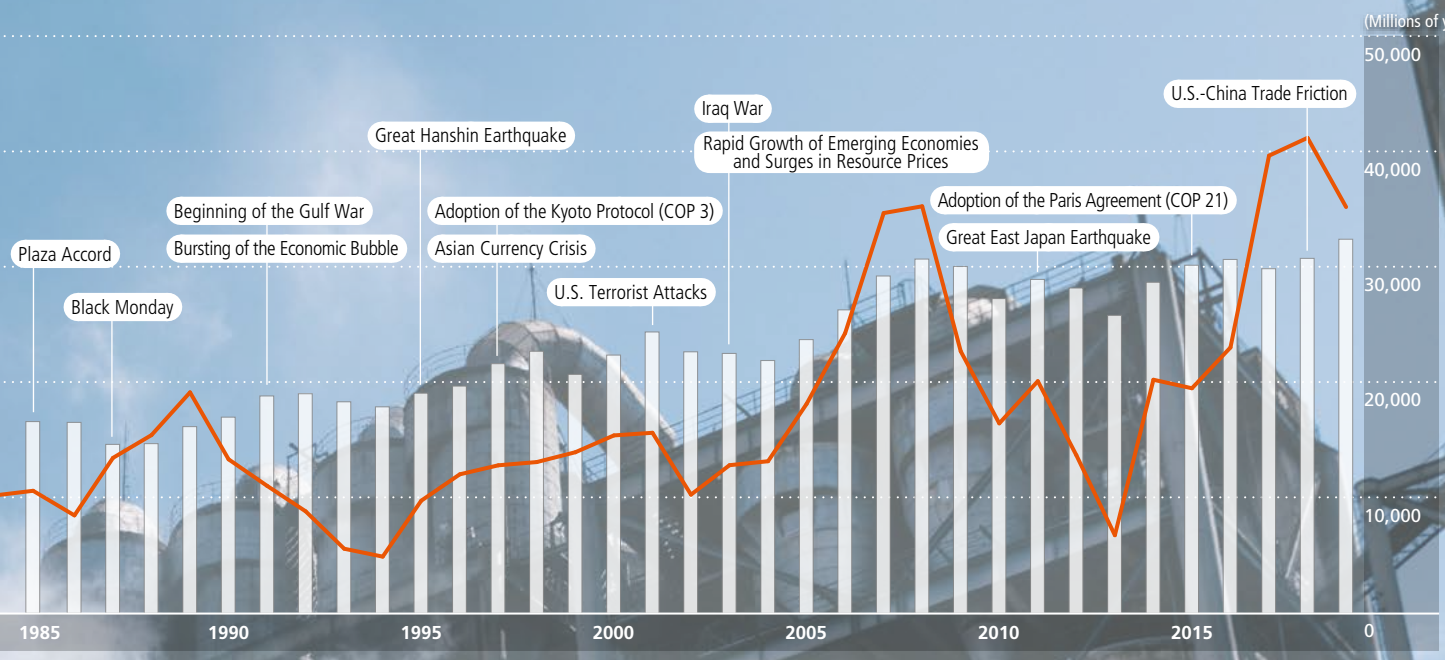
Promoted Company-wide energy conservation in response to global energy crisis. Created many electronics materials and fine chemical products, including semiconductor-grade polycrystalline silicon and high-purity aluminum nitride, which are mainstay products, to meet new social needs.

1976	Commenced production of polyolefin film
1982	Synthesized diallyl carbonate using the sodium carbonate method and commenced sales as a plastic lens-related material
1982	Developed an aluminum nitride sintered body that has a high thermal conductivity and transmits light
1983	Commenced production of high-purity chemicals for electronics manufacturing
1983	Commenced sales of enzyme kits for polyamine tests, which resulted in the Company's entry into the diagnostic reagents and systems business

1983	Switched over from the caustic soda manufacturing method to the ion exchange membrane method
1983	Commenced sales of Palfique, a dental composite resin that applies polymer technology and powder control
1984	Commenced production of semiconductor-grade polycrystalline silicon, from which silicon wafers are made, with the development of the information society



1985	Completed a plant to manufacture high-purity aluminum nitride using a unique nitride reduction process and commenced production
1985	Established the Kashima Factory in Hasaki City (present Kamisu City), Ibaraki Prefecture, to expand fine chemicals business
1987	Commenced production of NF Sheet, a microporous film that repels water but allows air to pass through
1989	Completed construction of the Tsukuba Research Laboratory in Tsukuba, Ibaraki Prefecture



1990 - 2004

■ Strengthened and restructured core businesses

Provided cutting-edge materials to the semiconductor industry and contributed to IT innovation. Responded to market demand from a global perspective by establishing business bases overseas and consolidating operations and spinning off businesses.

1994	The company name is changed to Tokuyama Corporation
1995	Established a joint venture for photoresist developer in South Korea and commenced production in Ulsan, South Korea
1997	Established Tokuyama Electronic Chemicals Pte. Ltd. in Singapore and commenced the refinement and filling of high-purity chemicals for electronics manufacturing
1998	Established Taiwan Tokuyama Corporation in Taiwan and commenced the refinement and filling of high-purity chemicals for electronics manufacturing
1999	Began operating a recycling plant converting waste plastic into alternative of thermal energy for cement
2001	Established Yamaguchi Eco-tech Corporation, a joint venture with Ube Industries, Ltd., and commenced recycling of waste incineration ash
2004	Established Shanghai Tokuyama Plastics Co., Ltd. in Shanghai, China, as a manufacturing and sales company of microporous film

2005 - 2015

■ Focused on raising corporate value

Companies' social contributions, including their contribution to the creation of a recycling society, attracted a great deal of attention, and Tokuyama boosted its presence due to its contributions to zero emissions and resource recycling. Promoted globalization.

2007	Established Tokuyama Chemicals (Zhejiang) Co., Ltd. in Zhejiang, China, and commenced production of fumed silica in China
2008	A GMP-compliant plant to produce drug substances for pharmaceuticals was completed at the Kashima Factory
2008	Established Shunan Bulk Terminal Co., Ltd., a joint venture that stores and ships bulk cargo, such as coal, etc.
2009	Announced the construction of a polycrystalline silicon plant in Malaysia
2013	Tokuyama Chiyoda Gypsum Co., Ltd. established as a joint venture to develop a waste gypsum board recycling business
2013	Commenced production of liquified hydrogen at Yamaguchi Liquid Hydrogen Corporation, a joint venture with Iwatani Corporation
2015	Commenced operation of cement clinker loading facilities for exports

2016 -

■ Building a new foundation

To help achieve the SDGs and solve social issues, Tokuyama prioritizes ICT, healthcare and the environment and promotes initiatives to develop products and technologies that will help solve social issues.

2017	Transferred Tokuyama Malaysia Sdn. Bhd., a polycrystalline silicon manufacturing and sales company in Malaysia, to South Korea-based OCI Company Ltd.

Chemicals | Specialty Products | Cement | Life & Amenity

Value Creation Story 2

Our Strengths and Strategies

We have identified our strengths in each of the six capital categories and have determined strategies for each category to undertake a variety of initiatives.

Manufacturing Capital

- Highly integrated and high-efficiency production structure of Tokuyama Factory
- The capacity of port infrastructure at Tokuyama Factory enabling export and import via large vessels

Strategy

- Expand production bases and build new production bases in a timely manner to meet customer needs
- Continue investment in port infrastructure to strengthen export systems

Natural Capital

- Environmental management in all business processes
- Development of products, technologies and manufacturing processes that take into consideration environmental impact

Strategy

- Make Company-wide efforts to reduce energy-originated CO_2 emissions (by fiscal 2030, reduce emissions by 15% from BAU* emissions in fiscal 2013)
  * BAU refers to Business as Usual. (emissions without specified reduction measures)
- Continue to examine in each process the risks, hazards, regulations of domestic and overseas laws, and risk assessments for chemical substances related to products

Six Capital

Social Capital

- Build sustainable relationships with a diverse range of stakeholders through communication emphasizing disclosure and dialogue

Strategy

- Develop products and technologies to solve social issues and help achieve a sustainable society
- Promote disclosure and dialogue with each type of stakeholder to ensure the deepening of mutual understanding

Categories

Human Capital

- Create a vibrant corporate culture by increasing employees' sincerity and tenacity, traditional characteristics of Tokuyama, as well as their independence and speed

Strategy

- Treat, assign and cultivate employees appropriately and link human resources directly to the growth of the Company
- Hire mid-career employees actively and accelerate human resources innovation
- Thoroughly conduct process safety and disaster prevention activities and activities for industrial safety and health

Financial Capital

- Good, well-balanced relationships with financial institutions
- A credit rating of A
- Improvement of the equity ratio
  12.8% (March 31, 2016) ⇒ 44.0% (March 31, 2020)

Strategy

- Build a financial structure that is highly regarded by investors and markets that enables us to procure funding stably at a low interest rate and in a timely manner
- Examine investment plans not only from a financial perspective but also from the perspective of reducing CO_2 emissions and the reduction of required labor

Intellectual Capital

- Unique technologies based on chemicals developed by Tokuyama

Strategy

- Create new businesses in the fields of ICT, healthcare and the environment by enhancing distinctive technologies and through open innovation
- Improve safety management using IoT and Big Data

Value Creation Story 3

Value Creation Process

Tokuyama provides products that help solve social issues, shifting its focus from quantity to quality using its unique technologies, based on the management resources that it has developed over 100 years, to realize its vision: Centered on the field of chemistry, the Tokuyama Group will continue to create value that enhances people's lives. Tokuyama aims to create social and economic value.

Social Issues

Global issues

- Climate change and global warming mitigation
- Biodiversity conservation
- Stable procurement of energy, resources and food supplies

Safety and security

- Natural disaster mitigation
- Improved labor conditions
- Cybersecurity measures

Low birth rates, aging demographics

- Contribute to health and longevity
- Sustainable infrastructure building
- Improved industrial competitiveness
- Increased regional vitality

Management Resources

Manufacturing Capital

- Highly integrated and high-efficiency production structure of Tokuyama Factory
- Capacity of port infrastructure at Tokuyama Factory enabling export and import via large vessels

Human Capital

- Human resources who possess independence and speed

Number of employees:

5,679 (consolidated)

* As of March 31, 2020

Financial Capital

- A credit rating of A
- JPX400 constituent
- Improvement of the equity ratio

44.0%

* As of March 31, 2020

Intellectual Capital

- Unique technologies based on chemicals developed by Tokuyama

R&D expenses:

¥9,193 million

* Results in fiscal 2019

Social Capital

- Build sustainable relationships with a diverse range of stakeholders

Natural Capital

- Environmental management in all business processes

Waste recycling rate:

93.9%

* Results in fiscal 2019

Vision

Mission

Centered on Tokuyama value that

Traditional Businesses

- Chemicals
- Cement

Tokuyama's Unique Technologies

- High purification
- Powder control
- Photopolymerization
- Crystallization, deposition

Customer-oriented R&D and Business Activities

- Pharmaceutical ingredients / intermediates
- High-purity chemicals for electronics manufacturing
- Semiconductor-grade polycrystalline silicon

Aspirations

Shift from a
Global leader
Leader in its

Considering the SDGs in business activities

The Tokuyama Group is committed to contributing to the achievement of the Sustainable Development Goals (SDGs) adopted by the United Nations General Assembly in September 2015. The Group verifies that its products and business activities are in alignment with the SDGs in the conduct of its business.

the field of chemistry, the Group will continue to create enhances people's lives

Advanced Materials

- Specialty Products
- Life & Amenity

P.26-27

Nitride reduction	Sintering	Sol-gel
Molecular design	Electrode and membrane	Organic synthesis and direct hydration

P.26-27

- Thermal management materials AlN/BN/Si_3N_4
- Materials for dental cavity treatment (composite resin)
- Photochromic dye materials
- Technology for 100% recycling of waste gypsum boards

focus on quantity to quality

in advanced materials traditional businesses in Japan

Business Domains P.2-3

ICT

- Semiconductor materials
- Thermal management materials
- High-purity chemicals for electronics manufacturing

Healthcare

- Pharmaceutical ingredients / intermediates
- Plastic lens-related materials
- Microporous film
- Dental materials and equipment
- Medical diagnosis systems

Environment

- Recycling of industrial waste
- Waste plastic recycled as an alternative fuel
- Waste liquid treatment
- Plastic window sashes (PVC window)

Value Creation

Social value

P.16-17

- **Supporting Innovation**
  By supplying thermal management materials and high-purity chemicals for electronics manufacturing, among other high-quality products, Tokuyama contributes to enhancing the performance of cutting-edge electronic equipment and energy saving while also supporting technological innovation in digital society.
- **Contributing to Health and Longevity**
  In addition to existing businesses, which manufacture pharmaceutical ingredients / intermediates, dental materials and equipment, and other products, Tokuyama is expanding into new business domains, including supplements, cosmetics and disease prevention, to contribute to enhancing the quality of life.
- **Creating a Carbon-free, Recycling-oriented Society**
  Building businesses using unique technologies, including the recycling of waste, Tokuyama pursues both profitability and contribution to a sustainable society.

Economic value

Results in Fiscal 2019

P.42-43

- Net sales ¥ **316** billion
- Operating profit ¥ **34.2** billion
- ROA **9.0** %
- CCC* **64** days

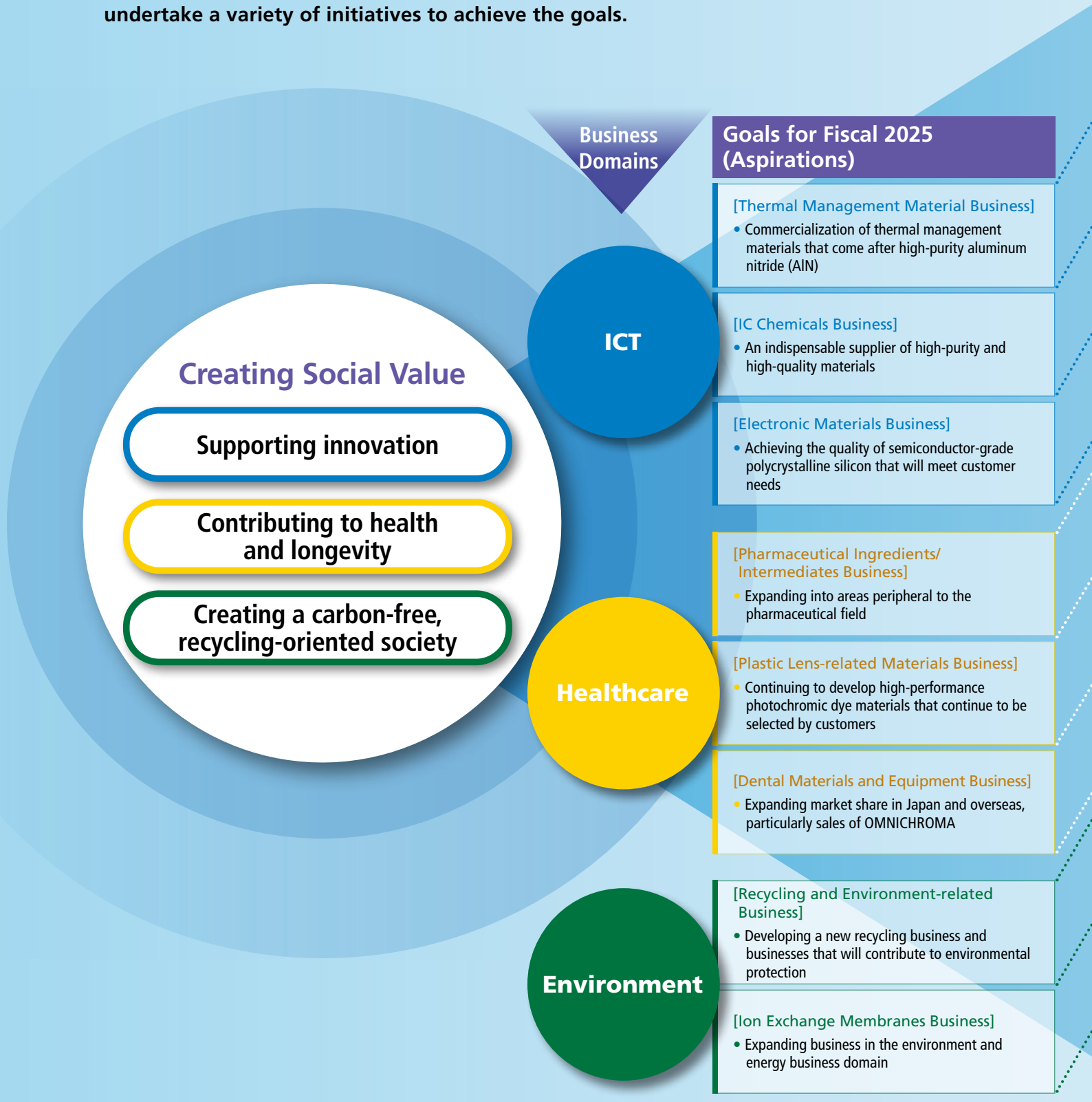
* Cash conversion cycle (CCC): Accounts receivable turnover period + Inventory turnover period – Accounts payable turnover period

- D/E ratio **0.69**

Value Creation Story 4

Roadmap for Sustainable Growth

We have set a vision, and for creating social value, goals for fiscal 2025 in respective target business domains, and have identified current challenges and possibilities to efficiently undertake a variety of initiatives to achieve the goals.



Current Challenges and Possibilities

- Inadequate product lineup
- Expectations of increasing demand for thermal management materials with the penetration of 5G and EV

- Adequately responding in terms of technology, equipment and supply capability to semiconductor manufacturers' quality and supply requirements

- Building a production system to respond to wafer manufacturers' quality requirements, which are becoming more exacting with the miniaturization and lamination of semiconductors

- Building a supply chain, including marketing, contract manufacturing overseas and M&A, in the fields of supplements, cosmetics and animal medical medicine

- Building research and development, sales and manufacture systems to expand business

- Lack of name recognition and sales capability overseas
- Inadequate product lineup

- Selection of themes where the Company can take advantage of its unique technologies and the speed of commercialization

- Building a supply system to meet increasing demand
- Expanding sales in overseas markets

Major Initiatives

- Launch of filler-grade aluminum nitride as well as boron nitride
- Early commercialization of silicon nitride

- Improving purification, analysis, quality management and process improvement technology
- Developing optimal production and supply systems

- Investment in improved quality
- Reducing semiconductor-grade polycrystalline silicon manufacturing costs

Thermal Management Materials

- Strengthening marketing as well as sales and development systems
- Choosing appropriate development themes and ensuring implementation

- Hiring and cultivating human resources
- Building optimum development and manufacturing systems

- Promoting digital marketing, primarily in the United States
- Strengthening the system for developing next-generation businesses

Supplements (application example)

- Early commercialization of the recycling of solar cell modules
- Seeking out and examining original non-kiln themes

- Increasing supply capacity by investing in the expansion of factories
- Introducing initiatives to penetrate the Chinese market

Ion Exchange Membranes