

Pursuing the Ultimate —Becoming a Globally Advanced Enterprise through Management and R&D Working Together with Vision



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Overview

Toray Industries, Inc. has been a long-term leader in the development of Japan's world-class fiber technology. In our first View from the Top interview with an External Board Member of NTT, we sat down with Sadayuki Sakakibara (Chairman of the Board of Toray Industries, Inc.) to learn the secret to creating a succession of advanced, world-first technologies and to hear about management philosophy of looking ahead to next-generation strategies.

Keywords: management, R&D, vision

Fiber technologies for diverse fields,
from underwear to airplanes

—Mr. Sakakibara, we are honored to have you as our first External Board Member of NTT to be interviewed for our View from the Top column. Could you please tell us about the fiber industry in which Toray Industries has such a major role? It is said that the Paris Fashion Week could not be held without Japanese fiber, which suggests that Japanese fiber technology has high standards even from a global perspective.

Yes, I think that most people think about the world of fashion when the subject of fiber comes up. It is certainly said that Japan's fiber industry is globally advanced in terms of its technological strength, sen-

sitivity to human needs, and product lineup. Top designers ask us to develop advanced materials and we provide them with new materials. The support that we give to the top-class fashion business as represented by the Paris Fashion Week is made possible by a partnership between a yarn manufacturer like us and small- and medium-size cloth and dye manufacturers in Japan's Hokuriku region and elsewhere.

Technology development takes time. For example, Toray Industries was awarded the Popularity Award at last year's Mainichi Fashion Grand Prix for the "Sillook" silky polyester material that was developed 50 years ago. The invention of nylon fiber marked the beginning of a great challenge to create artificial materials that could surpass natural fibers such as silk, cotton, and wool.

At the time, the main problem in developing new

synthetic fibers such as nylon, polyester, and acrylic was how to manufacture them with a high level of quality. The last 50 years have also seen the successive creation of textiles with new textures such as suede-like artificial leather.

Most people are probably unaware that technology developed by Toray Industries is being used in their everyday clothes. A recent example is UNIQLO's HEATTECH material. More than 300 million HEATTECH products have been sold. Many technologies originally developed for use in sports-related and other materials went into the development of HEATTECH products. Specifically, HEATTECH technology applies four types of fibers to achieve a material that absorbs sweat and dries quickly while generating heat and retaining warmth without uneven dyeing. We also provide new technologies for use in other UNIQLO products. These technologies are supported by Toray Industries' research and technology development group that has more than 1200 members.

In actuality, textiles and clothes represent just the tip of the iceberg in the application of fiber materials.

More than half of our synthetic fibers are used in fields other than clothing, for example, curtains, umbrellas, carpets, automobile seats, tire cords, and air bags, which are close to our daily life.

We are also developing materials in areas such as films, resins, carbon fibers, water-treatment membranes, medical materials such as for artificial dialysis, pharmaceutical products, and electronic and information materials using core technologies such as high polymer chemistry, synthetic organic chemistry, biotechnology, and nanotechnology. With these technologies in hand, our aim is to maintain our position at the top of the fiber industry and expand our business globally.

A business model centered on stable supplies and research activities that pursue the ultimate

—How does Toray Industries maintain its leading role in fibers?

The production and sales processes in the fiber business have been established over many stages, yet, in some ways, inefficiencies still remain, as in the use of complicated distribution channels. At Toray Industries, however, we have created a unified development-and-supply business model from raw fiber to finished garment by coordinating the activities of our



global production bases. This model enables us to respond promptly to market changes.

Our approach is to seek sustainable growth cycles on a global scale.

To this end, we start in Japan with pioneering and innovative research and technology development with the aim of developing advanced materials and commercializing value-added products. We also endeavor to drastically reduce costs by establishing new production technologies in addition to pursuing innovative process development. Furthermore, in terms of commodities, we provide our customers with a stable supply by having production performed at the most optimal overseas base taking demand and costs into account.

Our global expansion began in Thailand 50 years ago, and we have since expanded our operations to 23 countries and regions including Japan. In managing a business overseas, it is important to adopt a long-term approach over short-term profits with the idea of contributing to the development of industry, the expansion of exports, and the raising of technology standards in that country.

—Your business model centered on stable supplies appears to be the reason for Toray Industries' success.

Well, not completely—it's not this model by itself that keeps Toray Industries at the top. Another key factor here is a spirit of "pursuing the ultimate" in research and development (R&D), what I would call the "DNA" of Toray Industries. Without this DNA, I could not talk about Toray Industries. In our corporate culture, management and R&D activities move together in unison.

To give you an example, let me tell you about the

“fineness” of fiber, which we have been pursuing since the founding of the company. More than 40 years ago, we developed yarn with a fineness under a diameter of 1 μm , which was made possible by using a special spinneret-nozzle technology that enables a single strand of yarn to be made up of about 1000 extra-fine threads.

However, we continued our pursuit of ultimate fineness and recently developed nanofibers with diameters ranging from 10 to 20 nm. You can imagine a fineness of 20 nm as the result of stretching a nylon chip the size of a grain of rice from the earth to the moon (he smiles)!

These technologies were born from a culture that prizes the pursuit of the ultimate. As far as we are concerned, management and R&D are simply inseparable. I take pride in saying that the growth that Toray Industries has so far enjoyed would not have taken place if these two entities had not been working closely together.

People are behind novel technology
made possible by vision and conviction

—Of course, R&D is not always successful. Continuing a certain line of research appears, in a sense, to have an element of gambling.

Whenever we found ourselves in a difficult situa-



tion, we stuck to a management philosophy of protecting jobs instead of laying off people while continuing our R&D efforts.

To give you an example, the R&D department began its research on carbon fibers in the 1960s. This research was supported by a vision and a strong conviction that “an era in which carbon fibers will be needed is definitely coming.”

From that time on, we pursued the ultimate in strength and elasticity in carbon fibers. We entered into a joint development project with the Boeing Company in the United States, and in 1982, they adopted carbon fiber for the first time in the Boeing 737 airplane. At that time, the use of carbon fiber was limited to components such as movable members of the wings and tail assembly, but this has changed over time. In the current Boeing 787, about 30 tons of carbon fiber are used per airplane in all structural members including the fuselage and wings. The era of “all carbon fiber” aircraft has truly arrived. Today, carbon fiber from Toray Industries has a worldwide share of about 40%.

However, in 2002, when I became president of Toray Industries, the information technology bubble had collapsed, and the economy throughout all sectors of society had fallen flat. In this market, our business performance was by no means favorable, and if that situation had continued, we would probably have gone bankrupt in two years. In this sense of crisis, I made an appeal to our employees, saying “I am committed to protecting everyone’s job, but I will also push through drastic reforms with no exceptions. The next two years will be a severe trial for all of you, but I need you to believe in what I plan to do.” It has been said that the era of lifetime employment is over, that such a practice is out of date, but it is exactly people in safe and secure employment that manifest their full potential. I believe that placing importance on people is linked to the development of an enterprise and is the basis for fostering an attitude of contributing to society.

As a result, we have never cut down on expenditures for R&D—the source of our company’s existence—no matter how severe the environment has been.

To continue developing technology in our pursuit of the ultimate, we spend more than 50 billion yen a year on R&D and maintain an R&D workforce of about 3,500 people.

As I touched upon earlier, this R&D effort is carried out with an eye to the society of the future and to global environmental problems too. We are placing

particular importance on three major issues: carbon dioxide emissions and global warming, water shortages caused by the growing population, and the depletion of oil and other natural resources.

As you probably know, securing an inadequate supply of water is becoming an increasingly serious problem in various regions of the world. Of the 7 billion people in the world today, it is said that 800 million do not have ready access to drinking water and that 2.5 billion people do not have access to appropriate sanitation.

This water problem can be solved by deploying water-treatment technology using high polymer membranes, for example, and the problem of global warming can be addressed by reducing the weight of aircraft by about 20% using carbon fiber to improve fuel efficiency. All in all, we want to make a significant contribution to solving these environmental problems through the application of our technologies.

—By the way, Tokyo is hosting a “big event” in 2020. Are you working on the development of any new materials with an eye to the event?

Among our fiber materials, we take great pride in our high-function materials commonly used in sportswear. To date, many of these materials have been adopted in many products. Unfortunately, we won't be able to announce the material that we are developing for the event until after the event is over, so we ask everyone to be patient until then. In the development of this material, we are looking for ways to reduce water resistance and to make the material lighter to provide a better fit over the entire body and reduce the load on the user. Our plan is to move forward with the development of this material in preparation for the next big event.

An opportunity for business expansion in the NTT Group

—Mr. Sakakibara, how do you see the business environment for the NTT Group and what are your expectations for NTT R&D from the viewpoint of an External Board Member?

I believe that the present business environment is providing the NTT Group—the largest telecommunications operator in the world—a great opportunity for expanding business that leverages the awesome R&D capabilities of NTT.



After assuming the position of an External Board Member of NTT, I paid a visit to a number of research laboratories to observe a variety of research activities. Based on my experiences as a member of the Council for Science and Technology Policy, Cabinet Office, and as the chairperson of the Keidanren (Japan Business Federation) Committee of Industrial Technology, I can say without hesitation that the R&D capabilities of NTT are the best in the world.

As the economy becomes increasingly global in nature, I believe that forming tie-ups with top global companies in various fields regardless of a company's past history is the way to long-term success. To roll out services that are closely related to everyday life, as in health-promotion, learning-support, and elderly/child monitoring services, it will be essential to link up with experts in those fields.

Open innovation, while involving the way that an organization is set up, is, in the end, all about people. How do we go about changing the corporate culture of an organization of working people? That is the important question. I believe that the key to solving those problems that our customers and our business departments present to us is to send out researchers and engineers to our customers' sites with the aim of obtaining a good understanding of “on-site conditions,” “actual goods,” and the “real situation.” In an extremely large corporation like NTT, the business departments, research laboratories, and engineering departments tend to be widely dispersed, so there is a real need for the management team to actively encourage and support the people engaged in open innovation in those departments and laboratories.

One of my personal mottos is “survival of the fittest.” As Charles Darwin said in *On the Origin of Species*, it is not necessarily strong and big individuals

that survive, but individuals that can adapt to changes in their environment. This holds true in a corporate environment as well. I have great expectations that NTT researchers and engineers will make a big contribution to the expansion of NTT business by adapting to changes in the telecommunications business environment—which can undergo drastic upheavals—and by actively pursuing open innovation through tie-ups with companies having world-class standards.

Interviewee profile

■ Career highlights

Sadayuki Sakakibara joined Toyo Rayon Co., Ltd (now Toray Industries, Inc.) in 1967. He became President and Representative Member of the Board in 2002 and Chairman of the Board in 2010. He assumed his current position as External Board Member of NTT in June 2012.