Key Management Resources

Intellectual Capital (research and development, intellectual property strategies, etc.)

We promote a wide range of research and development in domains or fields related to tires, sports and industrial and other products businesses. The intellectual capital accumulated through such activities becomes the driving force that generates products with competitive advantages, as well as new growth.

The State of Our Intellectual Capital

	2016	2017	2018	2019	2020
R&D Expenses (millions of yen)	24,257	25,720	25,780	26,198	24,215
Ratio of R&D Expenses to Sales Revenue (%)	3.2	3.8	2.9	2.9	3.1
Number of Japanese and Foreign Patents (Number of patents held)	8,761	9,183	9,199	9,156	10,063

R&D Activities

With the Sumitomo Rubber Industries' R&D organization and facilities at the core of our efforts, we promote R&D activities in a wide range of fields related to the tire, sports, industrial and other products businesses in close cooperation with subsidiaries and affiliates around the world.

Guided by the underlying concept of "What tire technology can do for the global environment," the Tire Business focuses its R&D efforts on developing environmentally friendly products by focusing on three areas: "innovative materials," "fuel efficiency," and "resource conservation." The Tire Technical Center, located near the Kobe Head Office, serves as the core facility for these initiatives, which it pursues in collaboration with the Europe and USA Tire Technical Centers.

In line with our particular focus on developing tires boasting superior safety performance as well as capabilities that help reduce environmental burden, we have been engaged in cutting-edge research initiatives, including an R&D project that has been under way since 2012 in which we perform large-scale simulations using the K computer to create innovative rubber materials.

In the Sports Business, having established R&D sections at both the Sports Business HQ and Roger Cleveland Golf Company, Inc. in the USA, we are developing, evaluating, and testing new technologies and products by employing computer simulations and other technologies.

In the Industrial and Other Products Business, we are actively developing new products aimed at accommodating consumer needs in such fields as vibration control units using high-damping rubber parts for medical applications and precision rubber parts for office equipment.

Topics

Winning an HPCI* Excellent Achievement Award in recognition of large scale molecular dynamics simulations of rubbers for tires

*High Performance Computing Infrastructure

The Company was chosen to receive an HPCI Excellent Achievement Award in recognition of its research effort employing the K computer to perform large scale molecular dynamics simulations of rubbers for tires.

Through this research, we have discovered the mechanism by which the form of cohesion between silica and coupling agents, both acting as rubber additives, affects the strength of the resulting rubber material. These findings, in turn, helped us yield positive results in terms of improvement in abrasion resistance. Looking ahead, we will take advantage of these simulation results in the development of new rubber materials and products.

In addition, as we aim to push ahead with efforts to create tires capable of realizing both a superior safety performance and a lower environmental footprint, we will also employ Fugaku, a supercomputer designed as the successor to the K computer and made available for shared use since 2021, to advance simulation-based tire development.

Joint research involving industry-academia collaboration

The Sumitomo Rubber Groups is engaged in the development of new technologies via participation in industry-academia collaboration involving universities boasting cutting-edge technologies.

Research partners	Key themes of recent research projects
Ibaraki University	Establishment of a method for selectively observing specific materials contained in tire rubber
Gunma University	Development of a system that remotely monitors tire pressure of Level 4 autonomous vehicles
Kansai University	Success in the verification testing of technologies enabling power generation in tires
Tohoku University	Acceleration of X-ray-based CT imaging of tire material (approximately 1,000 times faster than the conventional method) to assess damage status

Intellectual Property Strategies

The Group proactively carries out intellectual property activities that support its businesses.

Specifically, the Group undertakes intellectual property activities focusing on three pillars, namely: 1) "securing intellectual property rights" with regard to such industrial properties as patents, utility models, designs and trademarks; 2) "exercising such rights" against the infringement of Sumitomo Rubber Industries' intellectual properties; and 3) "eliminating risk" by developing a structure to defend against attacks by third parties. In step with the rapid expansion of its overseas operations, the scope of the Group's intellectual property activities is growing worldwide, encompassing not only Japan but also the United States, Europe and such Asian countries as China, as well as Russia and countries in South America, the Middle East and Africa.

Efforts are now under way to nurture human resources and reinforce our structure to conduct intellectual property activities that go along with such globalization. In particular, the Group is providing training sessions not only for Intellectual Property Department members but also for employees at every operational base with the aim of raising awareness of intellectual property and upgrading the competencies of the entire workforce. Such action is facilitating the development of a structure that ensures intellectual property activities are carried out smoothly and seamlessly on a Group-wide basis. In particular, we are focusing on acquiring more effective rights by assigning IP representatives to Europe.

Focusing on the above-mentioned three pillars, the Group will promote the more efficient implementation of intellectual property activities at a global level.