

Intellectual Capital

Outline of Efforts to Strengthen Intellectual Capital

During a history of product development over more than 75 years, DENSO has driven business growth by expanding the scope of R&D from the mechanical parts field to encompass electronics and software, in line with the needs of society. In accordance with its green and peace of mind principles, the Company's intellectual capital accumulated through R&D and technological plans for the future is the source of DENSO's competitiveness.

Through intellectual property-focused management integrated with our business strategies, we will provide value ahead of the times and tackle increasingly complex social issues by advancing R&D with leading-edge technologies in semiconductors, materials, AI and ergonomics, in addition to mass production development, that anticipates long-term changes in social conditions and technology trends.

Characteristics of DENSO's Intellectual Capital (Fiscal 2024 results)

R&D expenditure (ratio to revenue)
¥550.9 billion (7.7%)

Total patent submissions
(Japan and foreign countries)
Approx. 3,600

Total patents owned
(Japan and foreign countries)
Approx. 39,000

Strengthening Intellectual Capital

An era is approaching where software plays a pivotal role in creating new value in mobility with self-driving cars that autonomously make decisions and control the vehicle based on an awareness of the surrounding environment, assisting the human driver. This includes optimal motor control and energy management based on road and driving conditions, as well as updating the vehicle software based on user needs. Amid increasing demand for vehicle electrification and autonomous driving, automotive semiconductors are becoming more important. The automobile industry is also witnessing a significant structural shift, from the traditional vertically integrated model with automakers at the top to a horizontally dispersed model where IT companies involved in software (cloud systems) and semiconductors stand shoulder to shoulder with the automakers.

Amid these changes in the business environment, DENSO is transforming its business model to adapt to medium- and long-term transitions in the business landscape. As we shift our business portfolio toward growth areas such as vehicle electrification and advanced driver assistance systems (ADAS), we will further enhance our competitiveness by creating intangible value through software, in addition to the tangible value through traditional hardware, in tune with the trend toward software-defined vehicles (SDVs).

In the semiconductor domain, which plays an increasingly important role in vehicle electrification and autonomous driving, DENSO is leveraging its strengths developed over more than half a century of semiconductor research. We are enhancing our capabilities in automotive semiconductor development through alliances, strengthening our internal R&D organization in sensor technology, collaborating with highly specialized semiconductor vendors, and applying cutting-edge consumer electronics technologies in the logic semiconductor domain, including microcontrollers and systems-on-chips (SoCs), which are crucial for advanced vehicle control such as ADAS. While visualizing our strengths and unique advantages in each field, we will steadily solidify our foundations of competitiveness and supply capacity.

To put capital-efficient management into practice at the same time, we are working to visualize how activities and KPIs aimed at strengthening intellectual capital at both the departmental and individual levels contribute to improving development efficiency, launching and expanding sales of new products, and ultimately enhancing return on invested capital (ROIC). DENSO is adopting ROIC-based management throughout the Company by implementing an "ROIC tree" internally. In the software development process, which is particularly labor

intensive, we are achieving significant gains in efficiency that far exceed the amounts invested, such as shortening development timeframes by automating the testing process, and we are further enhancing competitiveness through a commitment to these measures. The intellectual property (IP) we create through these efforts is effectively utilized to create world-first products through research in advanced technologies, expand sales in the CASE domain by entering growth areas, and increase the production of patents that can be utilized by other companies. This allows DENSO to carve out competitive advantages both inside and outside the automobile industry.

Moreover, the exchange of knowledge across organizational boundaries, including start-ups and other partners, as well as industry-government-academia collaborations, will translate into new solutions for businesses and industries using advanced and core technologies in academic and scientific settings. DENSO aims to draw out and leverage its inherent strengths that are not readily apparent in its own activities while promoting the flow of knowledge.

As a comprehensive system supplier, DENSO is committed to creating truly valuable products and systems that go beyond mere components, with the aim of enhancing corporate value by solving social issues, creating new value, expanding profits, and reducing capital costs.

Intellectual Property Management Creating Maximum Value through Asset Utilization

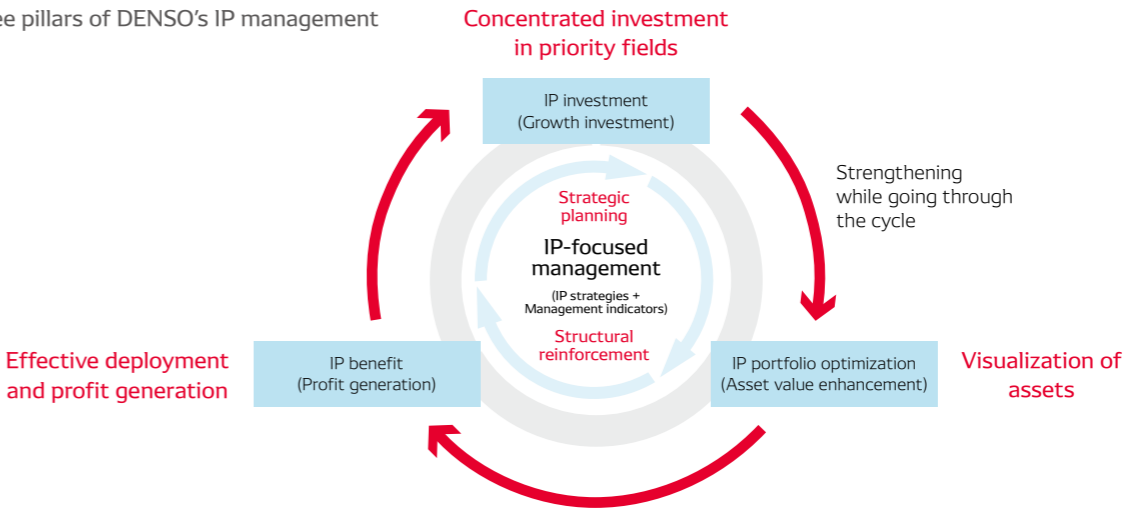
DENSO steadily applies the outcomes of R&D to future businesses and manages this extensive portfolio of intellectual property (patents, trademarks, copyrights, and other intellectual property in its portfolio) as an essential asset for ensuring competitiveness and securing alliances with partners.

On managing its intellectual property portfolio, DENSO aims to elevate the level of IP-focused management that benefits corporate management, leaning into IP strategies for each business and product line while bolstering the cycle of value creation, returns, profit generation, and growth investments through mutual dialogues among management and business, R&D, and IP divisions.

IP Portfolio Design Activities Aimed at Enhancing Corporate Value and Sustaining Growth

DENSO is focusing on R&D in growth fields and new fields. We design our IP portfolio by backcasting from a vision for the future, based on core technologies and a story about value creation that helps solve social issues.

Three pillars of DENSO's IP management



In designing our IP portfolio, we divide the portfolio into three levels—a Companywide level, a business level, and a development theme level—in accordance with our governance aims, and then we shuffle the portfolio based on a target profile for each level. IP indicators are based on the life cycle stage of technologies and products. Specifically, these indicators are a leading indicator, a current indicator, and a lagging indicator. As an indicator that expresses future portfolio trends, the leading indicator emphasizes non-mobility fields such as agriculture, hydrogen-related technology, and the circular economy. The current indicator, which expresses the strength of our current portfolio, emphasizes growth fields in the mobility domain, such as BEVs, ADAS, and self-driving cars. As a picture of our portfolio outcomes, the lagging indicator emphasizes domains that may be de-emphasized or discontinued, such as engine-related products. Based on IP information, we make investments in IP that contribute to the realization of our vision and the strengthening of our IP competitiveness.

Furthermore, we are working to clarify the causal relationship (value creation path) between the value our products provide to customers and the associated technology and IP. By reassessing DENSO's sources of competitiveness from an IP perspective, considering both its own and competitors' situations, DENSO is advancing activities to realize IP investments in this context.

Through these activities, DENSO's Patent Asset Index (PAI) score* in the environmental and safety domains of the automotive business has continued to increase. Compared with 2014, this score has increased approximately two-fold in the environmental domain and 1.5 times in the safety domain. Moreover,

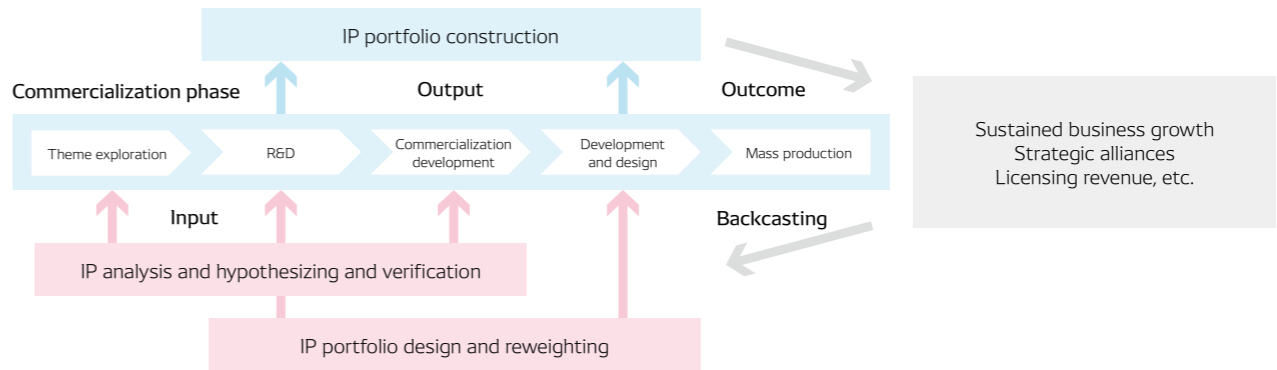
even when compared with major automakers and auto parts suppliers, DENSO maintains a competitive advantage in PAI scores, underscoring its strong IP competitiveness. Looking ahead, we will continue to leverage this high level of IP competitiveness to accelerate sustainable growth.

* The PAI is provided by LexisNexis through its patent analysis tool, PatentSight®. This index scores the quality of patents, rather than just their quantity.

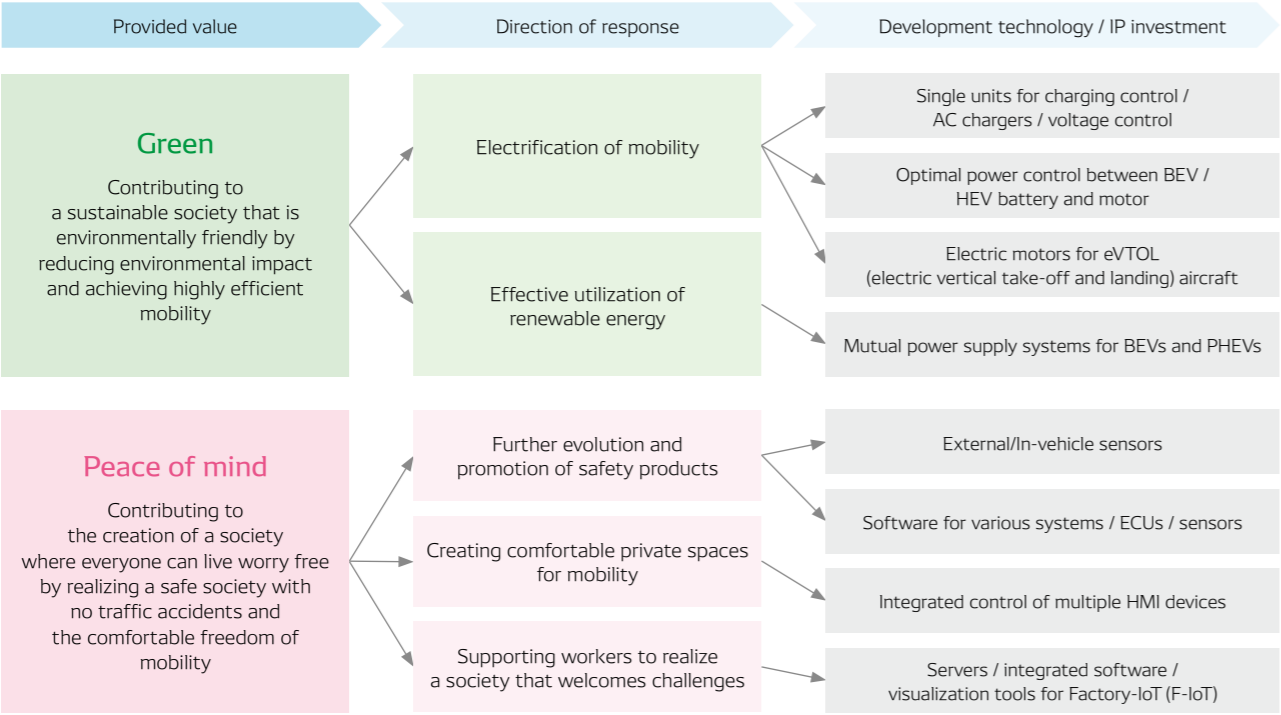
Example Metrics Related to Intellectual Property (IP)

IP investment*	Financial	Investment amount
	People	Number of engineers, etc.
Leading indicators (future trends)	Comparisons to other companies	Number of patent applications by country Number of inventors, etc.
	Internal assessments	Feasibility of implementing patents owned by DENSO or other companies, etc.
Current indicators (current strengths)	Comparisons to other companies	Number of patents owned by country Share of patents owned by technology domain, etc.
	Internal assessments	Implementation status of patents owned by DENSO or other companies, etc.
Lagging indicators (results)	Comparisons to other companies	Number of times patents cited, etc.
	Internal assessments	Patent revenue, etc.

Business Growth and Our IP Portfolio



Value Creation Pathway for Technology and Intellectual Property (Excerpt)



Initiatives to Strengthen and Maximize Use of Intellectual Capital in R&D

Revolutionizing the Mass Production Engineering Process

With the rapid advances and widespread adoption of AI technologies, including large-scale language models, a world is coming into view where generative AI will help automate tasks in the mass production engineering field that only people could do previously, such as interpreting and analyzing requirement specifications, calculating design parameters based on these specifications, and software coding. The output of generative AI depends on the quality and quantity of data it uses to learn. For this reason, the accumulation and possession of intangible intellectual capital, such as technical information, design know-how, and experiences from failures, are key to successful

automation and creating a competitive edge in revolutionizing the engineering process.

Since its founding, DENSO has proactively standardized, accumulated, and digitized its intellectual capital. Between 1957 and 1961, the Company established internal technical standards and research report systems, and in 1997, it digitized all of these technical standards and fully transitioned to a Companywide web-based search system. Currently, all business groups are beginning to leverage these intangible assets and generative AI to streamline and automate the engineering process, aiming to achieve significant efficiency gains in mass production engineering within the next few years.

By incorporating lean production principles to optimize production processes and eliminate wasteful manufacturing, as

well as by standardizing products and parts, enhancing and digitizing the engineering environment, and automating design using AI, DENSO intends to reduce the management resources allocated to mass production engineering and redirect them toward research and advanced development. The aim is to balance near-term business growth with investments in future growth.

Maximizing Intellectual Capital Cultivated in Mature Businesses

To enhance competitiveness in the growth businesses of electrification and automation, DENSO is vigorously advancing R&D in semiconductors & sensors and AI & software. At the same time, the core technologies developed in mature businesses are vital intellectual capital for DENSO. We are keen to further R&D aimed at evolving these core technologies.

These technologies, which involve chemical reactions and ceramic sintering and are honed in the development of internal combustion engines and exhaust gas purification systems, as well as thermal fluid dynamics gained in engine cooling systems, are being utilized as core technologies in solutions for achieving carbon neutrality, such as solid oxide fuel cells (SOFCs) and solid oxide electrolysis cells (SOECs). Additionally, we are reassigning engineers who have been involved in the development of internal combustion engine and exhaust gas purification technology to focus on the carbon neutrality domain (hydrogen business). This reallocation of knowledge and resources ensures that the intellectual capital developed in mature businesses is fully utilized to drive further expansion in growth and priority fields. (Special Feature: Value Creation in Action [P.94-95](#))

Maximizing and Optimizing Companywide Management Resources

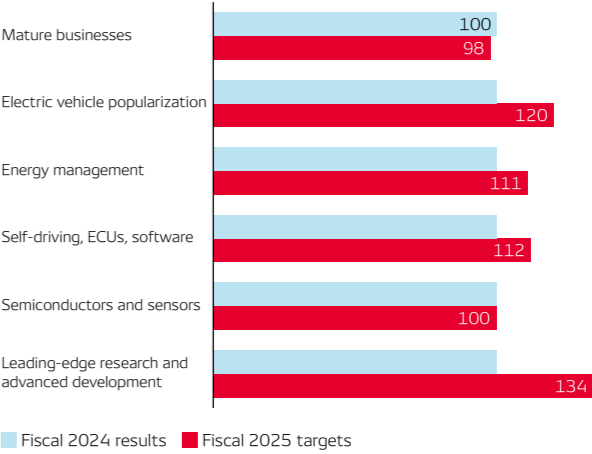
In response to signs of change in the business environment, DENSO launched the Companywide R&D Project System in fiscal 2024 to enable flexible and agile allocation of management resources and the reconfiguration of intellectual capital. The scope of this system includes medium- to long-term R&D projects led by functional departments and short- to medium-term development projects led by business groups. It also encompasses cross-disciplinary projects that span business and technological domains, addressing new areas of development that were out of scope for businesses in the past. All business groups contribute a portion of their profits to these projects, which are then reallocated Companywide and managed by cross-functional teams.

Management of Companywide Projects

- The Companywide Technology Strategy Team plans and proposes new projects through research and dialogues with internal and external stakeholders.
- Project approval is based on technological innovation and potential business impact, with final decisions made by the CTO, head of the R&D Center, and heads of business groups.
- Project outcomes are evaluated annually, with potential for modifications or discontinuation, as well as additions or revisions throughout the fiscal year.

In fiscal 2025, the number of Companywide projects will be doubled along with plans to increase R&D investment directed toward advanced research and preemptive development for the future. Through R&D that anticipates future changes, we will continue to strengthen our intellectual capital for success in the future.

R&D Budget for Fiscal 2025 (Fiscal 2024 = 100)



Key R&D Activities in Environmental and Safety Domains

Green Domain

In the electrification field, DENSO's approach to development centers on offering optimal solutions tailored to the energy situation and markets of various countries, with a focus on the three essential elements of vehicle electrification: motors, inverters, and energy management. Also, as a potential game-changing technology for the future, DENSO is advancing R&D on systems that enable wireless charging while driving. This innovation aims to significantly reduce the size of batteries required in battery electric vehicles (BEVs), lower vehicle costs, and eliminate charging times altogether.

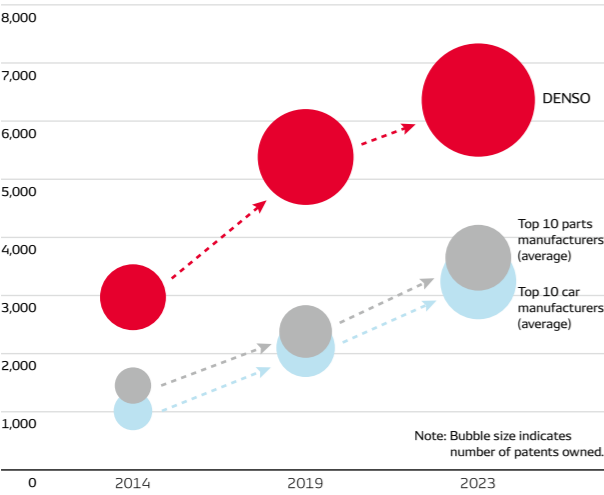
With the aim of establishing a resource-circulating ecosystem for vehicles, DENSO is developing materials suited for disassembly and rejuvenation through reverse engineering techniques that leverage its manufacturing technologies. The Company is also working on technologies to extract high-purity materials from end-of-life vehicles and recycle them into new, environmentally friendly vehicles. (Our Cultivated Strengths [P.23](#))

Peace of Mind Domain

To make self-driving cars a reality, DENSO is developing integrated control computers for multiple domains, such as functions for driving, turning, and stopping, as well as monitoring surroundings, while enhancing the performance of cameras, radar, LiDAR, sonar, and other sensors that serve as the "eyes" of the vehicle. The Company is also looking beyond these incremental advancements in technological development by also advancing research in game-changing technologies, including applications for generative AI that use large language models (LLMs), which could potentially handle the entire process of recognizing objects in the surrounding environment, making decisions, and controlling the vehicle without the need for expensive sensors.

In the field of information management, DENSO is responding to growing social needs for greater visibility in manufacturing and distribution processes. The Company is developing traceability technologies that securely link data through a combination of DENSO-developed QR Codes® with blockchain technology, working toward the construction of a standardized data platform. Additionally, DENSO is focused on developing technologies that securely share data across industries, such as product information on batteries for electric vehicles and Scope 3 CO₂ emissions.

Green Domain: PAI Scores Related to Electric Vehicles (PAI scores)



Source: Created by DENSO using LexisNexis PatentSight®

Peace of Mind Domain: PAI Scores Related to ADAS (PAI scores)

