

Japanese companies drive shift to new CASE era

Japanese auto makers are making large investments in R&D as they look to lead the road towards a new era defined by Connected, Autonomous, Shared and Electric (CASE) vehicles and mobility as a service (MaaS).

Two major global scenarios have prompted the most important transformation in the automotive industry in decades. Firstly, environmental regulations have compelled manufacturers to build more fuel-efficient vehicles. And with many countries aiming to completely ban the sale of fossil fuel-powered cars by 2030, automakers have turned their attention to the development of hybrid and electric vehicles that are set to become more prominent on highways across the world.

Secondly, the advent of Industry 4.0 technologies such as advanced sensor technology, the Internet of Things and automation has spurred the development of fully connected smart cars and autonomous vehicles. With the dawn of this new era of so-called CASE (Connected, Autonomous, Shared and Electric) vehicles, the automotive industry will create automobiles that are much safer and less harmful to the environment.

Japanese car and parts makers aim to position themselves at the forefront of this new CASE era and are making major investments to improve their capabilities in these new technologies. Testament to this is the fact that in fiscal year 2020, the Japanese automotive industry accounted for 26.8% of Japan's total R&D expenditure, close to 13.9 trillion yen (approx. \$105.6 billion).

Among the firms making up this investment is Mazda Motor Corporation. Whereas other car makers pursue total electrification and vehicle autonomy, Mazda believes in maintaining the 'joy of driving' while integrating new technologies. To that end, the company developed a common vehicle architecture to efficiently manufacture various vehicle-types, allowing its clients to choose which car is most suited for their needs. When it comes to autonomous driving, "Mazda aims to assist the driver, not replace him," explains Mr. Akira Marumoto, President of Mazda. This unique vision is embodied by the "Mazda Copilot," an assistive technology that activates only once an anomaly is detected in the driving environment.

"The social value of the automobile will change, evolve and expand," explain Mr. Marumoto. "Our responsibility and duty as an automotive company is to support the sustainable development of society and of earth's resources. Simply put, the sustainability of the automotive industry cannot be separated from the sustainable development of society," he adds.

"Over the next 10 to 15 years, the automotive industry will continue to tackle social and environmental issues. Unique values must be created by each company in order to make a contribution to people. While the timeline for rolling out these technologies is uncertain, the industry will certainly continue to advance in that direction."

Throughout the company's history, Mazda cars have been built around advanced-engineering concepts based on a human-centric philosophy. And that approach will become even more important in the CASE era as Mazda

continues to develop its KODO design philosophy, which is based on "creating cars that embody the dynamic beauty of life".

"Since we consider cars to be a living thing, we find brilliance in instantaneous motion and we seek to capture and integrate that brilliance into the car's design and form. KODO design has evolved and will continue to do so in the years to come, expanding beyond the simple realm of automotive design," adds Mr. Marumoto. "No matter what vehicle we make – ICE, hybrid or EV – we will continue to prioritize this design philosophy, which is a big asset for Mazda."

A core design philosophy also forms the backbone of Phiaro, which is engaged in the research, design and development of concept cars for automotive clients in Japan and abroad. Like Mazda, Phiaro has adapted its philosophy in light of the CASE era, with the company introducing VR and other digital technologies into car design while also planning to shift its focus towards EVs.

"The shape, structure, and interior of the car will change dramatically and I am sure that we will see more different types of cars with much more sophisticated designs," says Phiaro president Teruhiko Iwasaki. "Another tendency we are seeing is structure optimization, which means that fewer parts will be used to achieve the structure of next-generation vehicles. We will see the miniaturization of new technologies with a particular focus on eco-friendliness. Additionally, lightweight materials are another key aspect, and not only are the weight of components going to decrease, but also the weight of the overall vehicle. A lot of things are going to happen. My next target is to develop a new custom EV using the current Phiaro technology."

While big auto-makers like Toyota, Honda and Mazda represent Japan on the international stage, the smaller, tier 2 & 3 manufacturers of automotive parts, components and devices form the backbone of the Japanese automotive industry. Crucial to the supply chain, they too are making major investments in R&D in response to the CASE era.

"We are now addressing the CASE shift, and we have kicked off some projects aligned to this trend," says Shingo Okawa, President of COMTEC, which manufactures drive recorders, engine starters and GPS receivers. "Speaking about the in-vehicle products that we specialize in, communication is getting faster and faster, and these high-speed networks are required for a lot of in-vehicle products and equipment. Most of these products are now shifting to mobile apps, so this trend is really inevitable now. In line with this trend, we released a new type of drive recorder last year, which has communications functionality. We would like to grow the sales of these products and we have launched some other products that are aligned with CASE."

Meanwhile, Press Kogyo – which manufactures frames and axles, as well as cabins for construction machinery – has focused product development on making lighter weight parts for the commercial vehicle segment, which will also shift to EVs and hybrids, albeit at a slower pace. "Although the conversion of commercial vehicles to EVs has lagged behind that of passenger cars, we believe that the switchover will progress gradually," states company president Tetsushi Mino. "We expect commercial vehicles to be converted to BEVs or FCVs depending on their use, and that the switchover will likely progress in full scale from the late 2020s. As a company, we will accurately grasp this major transformation and respond flexibly to the changes in frames and axles accompanying the shift to EVs."

EVs have been lauded for their green credentials. Nevertheless they will inevitably have some negative impact on the environment and as such, as the years go on, the safe disposal of old parts, and particularly the lithium-ion batteries (LiBs) that power them, will be essential. That's where Asaka Riken, whose business focuses on the recycling of LiBs, will come in. "Car LiBs are very important because a substantial part of the price of EVs comes from the batteries, so the point now is how we regenerate these end-of-life car LiBs," says circular economist and advisor to Asaka Riken, Yusaku Yukita. "Theoretically, end-of-life car LiBs don't even exist yet. That's why, at the moment, when we talk about recycling, it doesn't necessarily mean end-of-life car LiBs, it frequently means the waste from processes. The waste from the production of car LiBs comes partly from the large size of the batteries and battery modules."

Due to Japan's aging and shrinking population, the survival of rural areas and smaller towns outside the main cities has come under threat. Initiatives to spur regional revitalization are essential, with MaaS being hailed as one such measure that can help to ensure the survival of rural areas. That is why Kakuichi, a company mainly operating in the agriculture industry, decided to launch its MaaS initiative: CANVAS, a multi-modal public transport service consisting of small-sized EV buses and three and four-wheel electric carts.

"As Japan's population ages, we are focused on finding solutions for regional revitalization through MaaS," says president Riu Tanaka. "Since this service attracts active users, we can gather data about people's behavior to increase tourism and to increase the revenue of local stores, which contributes to the revitalization of the economy."

Looking at the automotive industry's efforts to adapt to the demands of this new era defined by MaaS, Industry 4.0 technologies and stricter environmental regulations to tackle climate change, Japanese companies offer a true 'CASE' in point.

Mazda places human connection at the center of its Value Creation Process

In 2022, Mazda released its first Integrated Report – an opportunity for the company to unveil its vision for 2030 and to remind the world of the unique values the Mazda brand was built on.



Akira Marumoto,
President and CEO,
Mazda Motor Corp.

In summer 2020, in the midst of the COVID-19 pandemic, healthcare workers across the United States could be seen driving their vehicles to Mazda dealerships. Surprisingly, two thirds of the automobiles lined up in front of Mazda's shops had not been made by the Japanese manufacturer – so what exactly were they doing there?

The answer is the Essential Car Care program, an initiative that saw Mazda dealerships offer oil changes and deep-cleaning services free of charge to all healthcare workers, regardless of the cars they drove. Within 60 days of its launch, over 55,000 workers had taken advantage of the program. This anecdote offers a glimpse into one of the core tenets of the company, which celebrated its 100th anniversary that same year.

At Mazda, a focus on people – and the emotions they feel – is central to how the brand operates. "No matter what we do, be it manufacturing, R&D, sales, or distribution, we always prioritize the human aspect of each element of business," says Masahiro Moro, Mazda director and senior managing executive officer. "It's a way of life for us."

This 'way of life' is strongly reflected in Mazda's Value Creation Process, which was outlined last year in the Hiroshima-based car maker's first ever Integrated Report. Through its Value Creation Process, Mazda aims to bring the thrill of movement to its customers' daily lives through exceptional engineering and manufacturing, and by creating human connections with its people-first approach.



The pursuit of this philosophy was the driving force behind the reforming of Mazda's U.S. dealership network. As exemplified by the Car Care Program, the company focused on nurturing a community of trust between the brand and its customers, a strategy that led to improved quality of sales in the U.S., including higher profit per unit.

"We want to provide emotional excitement to the drivers who use our cars," says Akira Marumoto, Mazda's president. "From our engineering expertise to the in-store experiences we offer, we want people to feel that Mazda allows them to live a creative, spirited and enjoyable life through its vehicles."

Safety is fundamental to feeling joy through vehicles, and the company's Value Creation Process seeks to foster a safe automotive society. While this goal has prompted other manufacturers to pursue fully automated cars, Mazda's human-centered philosophy has led it to develop assistive technology based on its Co-Pilot concept, which leaves the driving to the driver unless something goes wrong.

"We don't intend to have people give up on driving and just use their cars to have a coffee or read a book," Mr. Moro says. "Mazda simply isn't that brand."

The Co-Pilot concept is designed to monitor the driving environment and experience. When threats are detected, the technology seamlessly activates in order to protect the driver and those around. "For example, if a driver loses consciousness, the system takes over and navigates the car to a safe place," Mr. Marumoto explains. "Once parked, the system automatically makes an emergency

call, and alerts cars and people in the vicinity of the incident."

With sustainability also integral to the Value Creation Process, Mazda is focused on becoming carbon neutral by 2050. A crucial step towards that objective, Mr. Moro notes, is achieving carbon neutrality at the company's manufacturing plants. "We already know that over 70% of CO₂ emissions are discharged from factories," he says. "Converting our thermal plants is a key challenge for us. The first change will be to switch our usage of oil and coal to alternative sources.

"Secondly, we must reduce the CO₂ emissions of our logistics network. To make the trucks and buses in the factories environmentally friendly, we have partnered with Euglena, a biofuel maker.

"Thirdly, we have made initiatives in renewable and clean energy. We are partnering with five prefectural governments, including Hiroshima, Yamaguchi, and Tottori, and with several other companies to set up a committee for energy transformation. We also collaborate with the Chugoku Electric Company to provide a more horizontal development system," Mr. Moro concludes.

Whereas certain players in the automotive industry have made electrification their only product-development strategy, Mazda believes in adopting a flexible approach. "While energy policy and customer demands vary in each country, the purpose of electrification remains the same: to achieve carbon neutrality," Mr. Marumoto says. "As such, there shouldn't be a single, immutable approach to lowering emissions. Rather, there should be a tailored proposal that



Masahiro Moro, Director & Senior
Managing Executive Officer,
Mazda Motor Corp.

considers the specificities of each region and country."

Based on this reasoning, Mazda has adopted a multi-solution strategy whereby all cars produced after 2030 will have some level of electrification, but the precise technology used – hybrid or full-fledged electric vehicles – will depend on the local energy situation and customer needs. "Although different vehicle types function according to different engineering designs and energy sources, Mazda has successfully created a common vehicle architecture supported by a flexible manufacturing concept," Mr. Marumoto says.

While celebrating a centenary in the midst of a global lockdown is certainly not a pleasure, it provides an opportunity to reflect on the past and the future, and to look back on one's existence. For Mazda, it was a chance to remind the world of what is most important to the company: people. "Mazda's three core values that have been cultivated throughout its 100 years of history are: 'deeper insight into people', 'co-creation with others' and 'never stop challenging,'" Mr. Marumoto says. "By passing on these values to the next generation and bringing more enjoyment to people's everyday life, even as times and as the external environment change, Mazda, as a small player, will overcome a period of major change in the automotive industry."



Press Kogyo: "Beyond manufacturing. Toward creation."

Guided by its newly established corporate slogan – "Beyond manufacturing. Toward creation." – Press Kogyo leverages its 'product development capabilities' and 'production technology capabilities' to contribute to society through manufacturing.

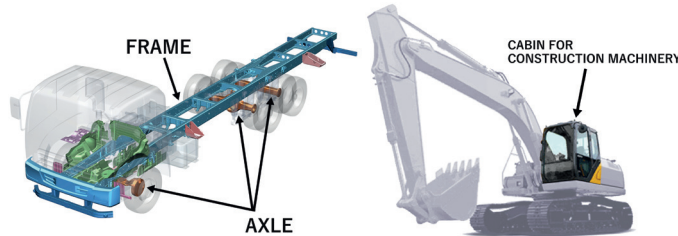


"My goal and dream is that we will continue to be a company that grows alongside its stakeholders and contributes to society through manufacturing."

Tetsushi Mino, President,
Press Kogyo Co., Ltd.

Press Kogyo is a manufacturer of automotive and construction machinery parts that will celebrate its 100th anniversary in 2025. The company supplies three core products: frames, axles, and cabins for construction machinery.

"We produce frames and axles according to the specifications of each commercial vehicle manufacturer, therefore there are hundreds of variations, including in product specifications and component configurations. As such, the products must be produced in high-mix, low-volume, but cost competitiveness, quality, and prompt delivery are



also necessary." says President Tetsushi Mino.

"Solving these conflicting issues is one of our company's strengths, and this strength can be broadly divided into two categories: 'product development capabilities' and 'production technology capabilities.'"

Regarding product development capabilities, Press Kogyo designs and develops products in collaboration with commercial vehicle manufacturers. As for production technology capabilities, not only does the firm have advanced stamping and welding technologies that have been cultivated over many years, but it also possesses the ability to manufacture dies and production lines in-house, enabling the company to build an optimal production system.

When it comes to construction machinery parts, Press Kogyo has been producing high-strength cabins for construction machinery that apply its original variant shaped steel pipe technology, and has been delivering them to many construction machinery manufacturers.

Press Kogyo accurately grasps the shift of commercial vehicles to EVs and responds flexibly to the changes in frames and axles triggered by such a transition. "With the shift to EVs in commercial vehicles, our core products consisting of frames and axles will not disappear, but we expect that their specification will change," explains President Mino.

"Regarding frames, we believe that it will be necessary to devise ways to change what is equipped as well as the method of equipment, such as by incorporating more batteries, as the power source changes from an engine to a motor. In addition, protective parts for batteries and fuel cells will be necessary to ensure safety in the event of a collision. If we talk about axles, we anticipate that there will be various changes in specification, but as the structure of an axle changes according to the layout of the motor and battery, we expect that the specification will vary depending on the customer. Press Kogyo designs and devel-

ops products, and makes proposals to customers based on these changes and customer needs. In addition, since the vehicle weight increases due to the installation of the battery, we are also working to investigate and adopt new materials to reduce weight."

The Japanese firm has five overseas bases (in the U.S., Thailand, Sweden, China, and Indonesia), but these sites were established based on requests from customers who wanted their products to be supplied locally. "At home and abroad, we are always looking for new opportunities and possibilities. In our considerations, we believe that collaborations with other companies, including domestic as well as overseas companies, is a powerful option," adds President Mino.

Two years ago, in April 2021, Press Kogyo established a new corporate vision, mission and values, formulating a new slogan – "Beyond manufacturing. Toward creation." – in preparation for the upcoming 100th anniversary.

"This corporate vision declares that: 'With pride and self-belief, we will continue to grow together with our stakeholders as a positive presence in our society,'" shares President Mino. "My goal and dream is that we will continue to be a company that grows alongside its stakeholders and contributes to society through manufacturing."

Beyond manufacturing. Toward creation.

We manufacture
essential parts for cars and machines.

We create
a new scene of more comfortable and safer
transportation and work.

Our self-belief
gives us confidence and pride.
Beyond manufacturing. Toward creation.

We are Press Kogyo.

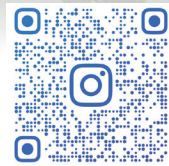
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PRESS KOGYO





Phiaro: breathing new life into automotive design



@PHIARO_GROUP



As a "Mobility Development Platformer", Phiaro is bringing VR and other digital technologies into car design.

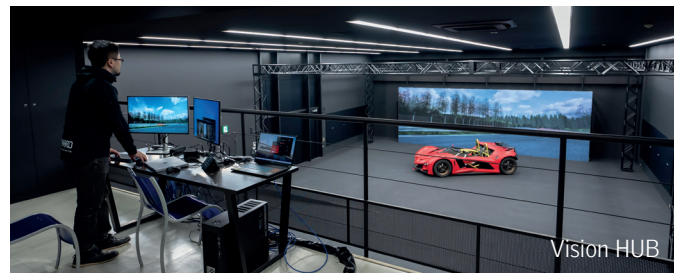
With the emergence of the CASE era of mobility, the marriage of advanced computer technology

with automotive technology has truly commenced. One company leading the charge in this CASE

and Google have done as IT development platformers," says president Teruhiko Iwasaki. "We can provide any core development product. We aim to provide users with better experiences and a greater variety of choices. As we now understand, it is not enough to just have a basic functional car, a car needs to provide a new one and only experience. Many car manufacturers are aiming to go that way. Their aim is to produce and introduce a much wider range of different applications and experiences."

"For future projects, it is very important to find smaller companies with new and interesting technologies."

Teruhiko Iwasaki, President, Phiaro Corporation



Next generation development platform



Creative Hub

With over 80 years of history, Phiaro's business covers a wide net and its activities are broken into two departments: R&D and engineering, with the latter focusing on providing services that are normally too difficult for its clients to operate in-house.

sive experience. "To illustrate the next step for the styling of cars, we combine this visualization with driving simulators in order to create an immersive experience that is the first of its kind. This is a new approach to the industry that aims to better introduce the services that we provide to customers," the president explains.

PHIARO
FASHION
ON THE
MOVE

Phiaro Creator's Night
GEN-Z MOBILITY FASHION
01/05-06/2023 / Doors open at 5:30pm
Piero : 355 Convention Center Dr, Las Vegas

ZOXO
NEXT

era when it comes to the research, design and development of concept cars is Phiaro Corporation, a creative engineering firm aiming to support the advancement of the automotive industry as a "Mobility Development Platformer".

"We apply our innovation to the automotive industry in the same way as Amazon

"This is one of Phiaro's strong points, and in fact, we can provide anything the client needs for development," adds Mr. Iwasaki. "Over the past ten years, Phiaro has put a particular focus on this area, and we have found that not only has our business in this area increased, but we have been quite profitable in this area with the CASE era rapidly approaching. For the past 20 years, we have considered how Phiaro can evolve to reach our current position."

Today the Japanese firm is leveraging the power of VR in order to give clients the chance to test its technology through an immer-

Moving forward, Phiaro hopes to expand its global operations (it already has its subsidiary Phiaro USA), while also finding capable partners and people worldwide who share its vision for the future of mobility. "I would like to make investments in talented and skilled human resources all over the world," says Mr. Iwasaki. "For future projects, it is very important to find smaller companies with new and interesting technologies."

PHIARO
株式会社フィアロコーポレーション
www.phiario.jp/en



Drive recorder ZDR059



"Through our products, we are trying to protect our loved ones, family members and the elderly."

Shingo Okawa,
President, COMTEC

COMTEC makes driving safer with JD1000

Along with its range of high-quality and highly reliable drive recorders, engine starters and GPS receivers, the low-concentration ozone generator becomes yet another product in COMTEC's product portfolio aimed at making driving safer for all.

The COVID-19 pandemic has made us all more aware and vigilant when it comes to hygiene and our exposure to viruses, with measures such as disinfection sprays in the home, the office as well as in public and commercial spaces becoming commonplace.

Another space where many of us spend a significant amount of time each day is inside our cars. As such, Japanese company COMTEC (which is well-known in Japan for the manufacture of drive recorders, engine starters and GPS receivers) is determined to make the inside of our cars a clean zone as well, with the help of its groundbreaking new device JD1000, a low-concentration ozone generator.

A gas formed by molecules made up of three oxygen atoms, ozone is a powerful oxidizing agent which has proven to be highly effective in the removal of bacteria, viruses, etc. Light, compact and silent, the JD1000 generates low concentration ozone and can easily fit inside a vehicle's cup holder. When a vehicle is parked and not in use, the JD1000 runs off its battery unit to generate the necessary ozone, with power being supplied from the battery unit within 30 seconds after the car engine has been switched off.

Drivers can choose for the JD1000 to operate for between

4 and 12 hours while the vehicle is parked. If drivers are concerned about the generation of ozone while driving, then they can use JD1000 only while parked by operating a switch on the battery unit. The amount of ozone generated can be set according to the size of the vehicle. Drivers can select from two settings: continuous operation and intermittent operation. Continuous operation is recommended for ordinary vehicles, while intermittent operation is recommended for sports and light vehicles.

The JD1000 does not feature a fan meaning the device runs silently so as not to disturb drivers. Since it requires just a 5V power supply, it can use any available USB connection, making it low on energy consumption also.

"This is the first generation and it can generate ozone only in a limited area of the car. We are now trying to develop a newer version which can spread ozone throughout the entire vehicle," reveals COMTEC president Shingo Okawa. "I believe our ozone gen-

erator has potential in the overseas market, not just in Japan."

He adds: "It also works to eliminate odors in the car, so the idea that we are trying to develop now is to incorporate this technology into the car so that once you arrive at home and finish driving, when you turn off the engine, ozone is generated automatically within the car. And once you wake up in the morning and start driving again, there will be no smells in the car anymore, it can be sanitized and the smell in the car will be gone. It's an exciting product."

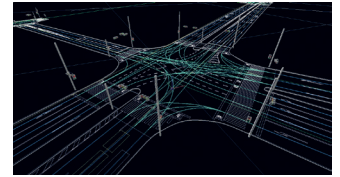
Along with its range of high-quality and highly reliable drive recorders, engine starters and GPS receivers, the JD1000 becomes yet another product in COMTEC's portfolio aimed at making driving safer for all. "Through our products, we are trying to protect our loved ones, family members, the elderly and our employees" concludes Mr. Okawa.



JD1000 vehicle low-density
ozone generator

Mapping the future

With demands in map-making evolving due to the emergence of digital technologies, Zenrin has shifted from being a mapping company to a location information provider.



High-precision 3D map data for autonomous driving

Pioneering development in digital map making and database design, the Fukuoka-based enterprise has begun constructing an Advanced Geospatial Information Database. This will offer high precision and an abundance of semantic information as Zenrin looks to support the advancement of the Digital Twin for realizing a better society through various simulations in virtual space.

Mr. Takayama explains: "In the future, we will gather every type of information from the real world in real time, thus quickly meeting the needs of an ever-changing society, and constructing a business foundation that can contribute to enhancing corporate value, realize a sustainable society, and create new businesses."

ZENRIN

www.zenrin.co.jp



"We're differentiating ourselves from competitors by providing fresher and more accurate data."

Zenshi Takayama, President & CEO, Zenrin Co., Ltd.

Map making has come a long way over the centuries and today digital map making coupled with extensive data collection is essential for the operation of new technolo-

gies such as autonomous driving, MaaS (mobility as a service), and Digital Twin Computing.



One of Zenrin's core products, the "residential map," is an extremely detailed map data containing names of the residents

As a leading company in the map-making field, Zenrin possesses excellent capabilities for collecting and managing map information, and has a wealth of know-how related to the production of maps. Aside from providing map data for residential maps and car navigation systems, the Japanese firm is also engaged in developing high-precision map data for autonomous driving, sky maps for drones, and solutions for MaaS.

"Zenrin is not a company simply providing maps. We are providing location information in the form of a database," says company president Zenshi Takayama.



Point cloud data scanned from the real world, used as a source for high-precision maps

"What is important is the additional value on top of the base map. That's what Zenrin is providing," he adds. "When it comes to maps, they have many uses. One of our competitive advantages is that we own enormous databases with additional value for accommodating those uses. Maintaining diverse and detailed information that can flexibly accommodate various uses makes it possible for Zenrin to create opportunities to explore new businesses."

Sanyo Metal Industries: steering *monozukuri* in the right direction

Since its foundation in 1951, Sanyo Metal Industries has provided critical cold-drawn steel bars to automotive customers around the world.

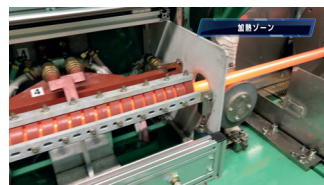


Exclusive plant for rack bars in Aichi

Established in 1951, Sanyo Metal Industries contributes to the automobile and machine industries as a specialist manufacturer of high-quality, highly accurate cold-drawn finished steel bars.

Compared to conventional methods for processing steel bars, the cold drawing method is significantly more efficient and ensures

less waste, thus increasing product yield while reducing costs and energy used. As outlined by Sanyo president Ichiro Kawata: "The cold drawing method contributes to attaining lighter materials in the automotive field because it enhances the strength of the material. If we can strengthen the materials, we can make the parts smaller."



Heat treatment

With the automotive industry transitioning to lightweight materials such as aluminum and carbon, Sanyo Metal is playing its part,

"Our drawn steel bars contribute to the manufacturing industry, including the automobile and machinery industries."

Ichiro Kawata, President, Sanyo Metal Industries Corp.



supplying lighter steel parts to its clients, including JTEKT, a world leader in steering manufacturing.

"The three basic vehicle functions are driving, turning, and stopping. Our product parts contribute to the turning function of the steering," adds Mr. Kawata, who ensures that Sanyo Metal's products will have important applications in autonomous and electric vehicles (EVs). "We supply the rack bar needed for the steering system. Even when cars transition to autonomous vehicles and EVs, the demand for our products will not be affected."

As demands and requirements continue to evolve in the auto-



Products

motive and machine industries due to environmental concerns, Sanyo Metal remains committed to steering *monozukuri* in the right direction by constantly evolving its products and manufacturing methods.

 **SANYO METAL INDUSTRIES CORP.**
www.sanyo-metal.co.jp/en