Semiconductor industry growth presents key opportunity for Japanese manufacturers

Backed by its historical expertise in semiconductor production and a large network of equipment, component and material makers, Japan is set to play a vital role in the future of the semiconductor industry.





In November last year, the Taiwan Semiconductor Manufacturing Company (TSMC), the world's largest manufacturer of semiconductors, announced the construction of its first-ever foundry in Japan. The subsidiary, named Japan Advanced Semiconductor Manufacturing (JASM), a joint venture between majority stakeholder TSMC and Sony Semiconductor Solutions (SSS) Corporation, will begin operation in 2024, churning out 45,000 high-end logic wafers a month in response to increasing global demand.

The project is seen as a huge nod of confidence from TSMC in Japan's semiconductor industry, with automobile parts maker Denso – foreseeing increased demand for semiconductors in the global car industry – also joining as a third investor in 2022, bringing the overall investment in the plant to \$8.5bn.

"As the global semiconductor demand is expected to continue to grow, we expect JASM will contribute to the stable supply of logic wafers," says Terushi Shimizu, president and CEO of SSS. "Also, from the perspective of the Japanese semiconductor industry as a whole, if the establishment of JASM stimulates the activities of partner and service companies that support its production activities, it might lead to the revitalization of the industry, which we highly welcome."

The revitalization of Japan's semiconductor industry may not only be crucial for Japan, but the world as a whole. With the value of the global semiconductor market expected to swell to \$1 trillion by 2030 driven by ever-increasing technological demands, Japan is well positioned to serve as a manufacturing hub, offering foundries access to a large network of companies with long-standing experience in semiconductor manufacturing equipment, materials and components.

While Japan has significantly lost its oncedominant share in semiconductor manufacturing, it continues to hold a leading position when it comes to these supporting segments of the industry. And as new technologies demand ever higher-performing, yet increasingly smaller semiconductors, many companies will turn to Japan's equipment, material and component makers to support their production of high-quality chips. TSMC's JASM venture, therefore, could well be the first of many other such projects looking to take advantage of Japan's well-established semiconductor ecosystem.

"As the pace of digitalization continues to accelerate, semiconductors will play a leading role because they support and enable the creation of new applications," says Toshiki Kawai, president and CEO of semiconductor equipment manufacturer Tokyo Electron (TEL). "As such, innovation in the semiconductor industry will necessarily involve the development of manufacturing techniques that allow for the production of a larger volume of chips, with each chip having higher speed, higher reliability, a larger capacity and lower energy consumption. As a global leader in the production of semiconductor manufacturing equipment and materials, Japan will have an important role to play in turning innovative ideas into realities."

As one of the world's leading providers of semiconductor manufacturing equipment, TEL's role in the advancement of semiconductor processing cannot be understated. "Virtually, every semiconductor or display in the world passes through our semiconductor production equipment," Mr. Kawai proudly highlights. "Simply put, no cutting-edge semiconductor chip can be made without TEL's technology."

Japan's semiconductor ecosystem is also backed up by a robust industrial structure made of up automotives, electronics, logistics and heavy industry, as well as well-developed infrastructure and a talented workforce, as pointed out by Toshio Hiroe, president of SCREEN Holdings, a leading provider of manufacturing equipment for semiconductors, flat-panel displays (FPDs) and printed circuit boards.

"I believe Japan still has an excellent supply chain, with a 40% share in semiconductor materials and a 30% share in equipment for semiconductor manufacturing. Kyushu, where several industries are gathered, is an ideal place for a foundry. I think any overseas company can establish a competitive fab in Japan because it has great infrastructure and a lot of exceptional talent. The Japanese government has already announced its support for such plans, and decided to increase subsidies for this initiative."

While the semiconductor industry is dominated by large companies and corporations, foundries can also take advantage of a range of Japan's agile SME players excelling in niche technologies. Hugle, which manufactures micro-particle and electrostatic removal equipment for semiconductors, FPDs and lithium-ion batteries (LiBs), is one such company.

"Today, two main pillars support and sustain our business. The first is electrostatic removal technology for semiconductor products. The second is the removal of micron-sized particles, including microscopic dust and contaminants," says president Wasaburo Fujimiya. "Our devices support microprocessing. As integrated circuits and semiconductor products become smaller and smaller, advanced removal technologies are required to support miniaturization; and that is precisely what we focus on."

Operating in Kumamoto (a hub for the semiconductor industry which will host the new JASM fab), Iwata Shokai is another company supporting semiconductor manufacturers with its range of high-tech equipment. "We sell machines to many semiconductor and silicon wafer manufacturers, such as the final washing machine for silicon wafers. We have a small factory in Kumamoto, called SEIBU, which we acquired through an M&A. We provide maintenance for small and medium sized machines there," explains president Takuya Iwata, Ph.D. "In recent years, we have also sold cleaning machines to the semiconductor industry in China. It is Chinese government policy that all semiconductors are manufacturered domestically. However, the facility or production equipment is often Japanese. Our role is to maintain the highest quality of semiconductors. This is an important role because semiconductors are very delicate."

Aside from equipment manufacturers, Japan offers access to a host of material makers who also play an important role in the fabrication of highperforming semiconductors. Nippon Micrometal, for instance, has stayed apace with the ever-changing demands of the semiconductor industry over its 35year history, with the company constantly adapting its bonding wire technology to cater to the latest requirements. As is the case for many Japanese companies, the nascent CASE (connected, autonomous, shared, electric) vehicle segment is a new focus area for Nippon Micrometal, whose bonding wires can be found in semiconductor packaging.

"Currently, our copper and gold wire products are focused on silicon-based semiconductors which are used for a more high-density type of semiconductor. In the area of power semiconductors, meanwhile, we are anticipating a switch to new technologies, such as silicon carbide (SiC) technology," states president Dr. Takashi Yamada. "For example, with the transition to EVs (electric vehicles), SiC technology will be essential for a transition from a 400-volt to an 800-volt battery charging system. We are focused on developing new types of wires for power semiconductors and also conducting research into advanced copper wires as copper has much higher electrical conductivity than aluminum."

Maxell, meanwhile, is also focused on the development of battery technology for semiconductorheavy fields such as hybrids and EVs, IoT and medical devices. Currently the well-known battery maker is in the process of establishing the world's first mass production system for small-size all-solidstate batteries, which have been hailed as the next generation of battery innovation.

"I think that the strengths of Japanese companies continue to be in technologies and industries where the delicate alignment of goods and information is the core. This includes hybrid vehicles that involve delicate linkage between engines and batteries, and semiconductor manufacturing equipment," highlights president Keiji Nakamura. "Maxell is also planning to grow by leveraging its analog core technologies of mixing, coating, and forming as the source of its competitiveness. For product development, we are leading the commercialization of smallsized all-solid-state batteries, so we are forming ties with material manufacturers for these batteries."

Like Hugle, AICELLO Corporation, a specialist in plastic films and packaging, is also concerned with the removal of contaminants in semiconductor production, with its focus specifically on transport and packaging. The company's hyper-clean PE film and clean containers, for example, are used in transporting chemicals used in the semiconductor manufacturing process. "In semiconductor production, every step requires a particular chemical packed and transported by our containers. The size of semiconductor products is becoming smaller, thus, there is a higher chance for contamination or impurities during the process that could cause defects to the end product," explains president and CEO Satoshi Morita. "To that end, because chemical manufacturers need to keep their products as clean as possible, they demand the cleanest packaging with high purity. We are the only company that can offer the needed quality for plastic-based bottles used for the storage of semiconductor-related chemical products."

Beyond equipment and materials providers, Japan's semiconductor ecosystem also consists of manufacturers of high-quality components, such as Kyocera, which develops packages and other parts used for chip production. With Kyocera predicting significant growth over the next decade, the ceramics and electronics manufacturer is devoting more efforts and resources towards the semiconductor segment of its business, including the construction of a new factory – set to open in October 2023 – that will enable the company to expand its production capacity for components including organic semiconductor packages and crystal device packages.

"As a global leader in semiconductor manufacturing equipment and materials, Japan will have an important role to play in turning innovative ideas into realities."

Toshiki Kawai, President, Tokyo Electron

"Current-generation semiconductor components are expected to reach maturity; however, we believe there is still room for immense growth regarding the cutting-edge requirements of the most advanced semiconductors. We plan to continue serving this field by supplying our packages and components, and we expect to grow significantly by doing so," says president, Hideo Tanimoto.

Meanwhile, CKD Corporation – whose electric actuators and fluid control components are used in a range of manufacturing sites, including those for semiconductor, automotive and electronic parts – has also constructed a new plant. This new Komatsu-based facility will cater to anticipated greater demand for equipment for the semiconductor industry, explains chairman and CEO Kazunori Kajimoto.

"Equipment spending for these 29 fabs is expected to surpass \$140 billion over the next few years as the industry pushes to address the global chip shortage."

Ajit Manocha, President & CEO, SEMI

A core strength of CKD is its technological capabilities developed over its 70-year-history, with the company holding more than 1,500 patents. "Among our products, there are many with a high market share in the world or in Japan. For example, our chemical liquid valves for semiconductor manufacturing equipment have the number one global market share," says Mr. Kajimoto. "CKD offers products that contribute to reducing the environmental impact of semiconductor manufacturing processes," he adds. "For example, semiconductor plants use hundreds of thousands of solenoid valves, and by using our power-saving products, power consumption can be reduced by 30-50%."

Japan also excels in the field of analog semiconductor technologies through companies like ABLIC and Sony Semiconductor Solutions, the aforementioned TSMC partner in the JASM venture. When it comes to these analog semiconductor technologies, the leaders of both firms highlight that Japan's competitive strengths originate from *monozukuri*, the philosophy behind Japanese craftsmanship long associated with major companies like Toyota.

"ABLIC is an analog semiconductor company, not digital, so this requires a specific type of craftsmanship and a highly detailed design process. The result is a highly valuable and intelligent product that cannot be found in the warehouses of other companies," says president and CEO Nobumasa Ishiai.

With its roots in the development of CMOS (complementary metal-oxide-semiconductor) integrated circuits (ICs), the company has expanded with its entrance into the electronic devices and sensor fields. "Now we have a product portfolio unlike any other semiconductor company in the world, featuring a wide array of analog semiconductor solutions from battery-less sensors, UV cameras for aerospace technology, and components for automotive and medical ICs," adds Mr. Ishiai.

Also engaged in the sensor business, SSS has been at the forefront of innovation in CMOS image sensors as it looks to develop technologies that will power the 'Sensing Society' – an era defined by AI, IoT, edge computing and autonomous and advanced driving systems.

"Our core competencies in monozukuri lie in world-class advanced technology and the ability to integrate these technological capabilities through a series of processes – from design to development and manufacturing - at a high level. All these competencies are supported by our advanced manufacturing technology and quality control system," says SSS president and CEO, Terushi Shimizu. "Our CMOS image sensor is an analog device in which the ability to integrate becomes extremely important in order to realize characteristics such as sensitivity and minimal noise. This is an area where SSS can differentiate itself from competitors. As we combine image sensors and AI for a wide variety of applications, we expect further product and customer diversification to enhance the business."

TSMC and SSS's JASM fab is one of 29 such facilities being built worldwide by semiconductor manufacturers over the 2021-22 period, according to SEMI, an industry association comprising companies involved in the electronics design and manufacturing supply chain. "Equipment spending for these 29 fabs is expected to surpass \$140 billion over the next few years as the industry pushes to address the global chip shortage," said Ajit Manocha, SEMI president and CEO. Such growth in investment bodes well for Japan's semiconductor equipment, material and component makers, who are set to play a major role in addressing the growing demand for high-performing semiconductors in our increasingly digital world.

Tokyo Electron: Japan's biggest semiconductor equipment maker

TEL is a market-leading manufacturer of equipment used to produce the state-of-the-art semiconductors needed for the digital technology we depend on every day.

A company that celebrates six decades of existence in 2023, Tokyo Electron (TEL) is a key player in what has become known as the 'data age'. After all, TEL is a world-leading producer of the equipment used to manufacture semiconductors, which in turn are an essential component in smartphones, computers and a range of other connected digital devices that serve the everyday needs of an increasingly data-dependent society. "Semiconductor products are found everywhere," says TEL's representative director, president & CEO, Toshiki Kawai.

In the semiconductor industry, TEL stands alone in its ability to deliver manufacturing technology that covers four key front-end processes in the production of semiconductors: film deposition, coating/development, etching and cleaning. "We're the only company in the world capable of providing solutions for all of these sequential key processes - we have equipment for each of them," Mr. Kawai says. "What's more, every product in our line-up has either the first or second market share in the world. Virtually every semiconductor in the world passes through our production equipment. Simply put, no cuttingedge semiconductor chip can be made without TEL's technology."

While TEL equipment is used across the globe, the Tokyo-based company places a focus on domestic development and production processes – a policy that helps it to remain at the forefront of its sector, Mr. Kawai declares. "Keeping our production, R&D and design bases in close proximity plays a crucial role both in our capacity to be innovative and in our ability to maintain a world-class workforce." he says.

"We're able to emphasize 'concurrent engineering', in which product development and mass production run in parallel and are ideally located near each other. This geographic proximity allows us to incorporate design, quality control and massproduction ideas at the development stage, enabling us to react swiftly to new ideas and maintain



"Virtually every semiconductor in the world passes through our semiconductor production equipment. Simply put, no cutting-edge semiconductor chip can be made without TEL's technology."

Toshiki Kawai, Representative Director, President & CEO, Tokyo Electron Ltd.



technological leadership. Furthermore, our model creates a working environment where employees feel a higher level of morale and a greater sense of responsibility, motivation and leadership, and this in turn creates pride among employees to produce the best products. This translates into an extremely low staff turnover rate. Within Japan, the percentage of our workers who leave their jobs is less than 1%."

"On the other hand, more than 80% of our sales are overseas, and one of our strengths is the support of local subsidiaries that respond appropriately and promptly to customer issues. In addition, company-wide policies are shared between the CEO and the presidents of our overseas subsidiaries at quarterly meetings."

Ahead of its 60th anniversary, TEL has unveiled a new vision

which, as the firm looks to the future, defines its focus: "A company filled with dreams and vitality that contributes to technological innovation in semiconductors." Mr. Kawai explains: "The famous academic Michael Porter once theorized the necessity to create and abide by a set of 'shared values'; values that are embraced on a global level. When articulating his vision, he believed that the creation of 'shared values' agreed upon by all TEL stakeholders was key to the advancement of humankind. TEL's new vision is based on the idea of 'creating shared value': the concept of creating social and economic value by leveraging corporate expertise to solve social issues, thereby enhancing corporate value and achieving sustainable growth. We'll continue to develop our business activities based on the idea of 'TEL's shared value', which is to contribute to technological innovation in semiconductors."

A company that also follows the mantra 'Technology Enabling Life', TEL embraces the critical role that semiconductors will have in building a sustainable future. "As the shift towards a data-driven society accelerates and efforts to solve global environmental issues progress, 'Digital x Decarbonization' has become a major trend worldwide," Mr. Kawai notes. "The world is currently pushing firmly ahead with implementing ICT and DX as it takes action to realize a carbon-free society. Because of the ubiquity of semiconductors, the industry has a crucial part to play in this process."

Semiconductors' vital role is not only a consequence of their importance to the development of specific technology that can be harnessed to reduce negative environmental impacts, but also comes down to the contribution they can have in making digital systems as a whole more energy efficient, Mr. Kawai says. "I believe the key approaches in 'Digital x Decarbonization' efforts are 'Green x Digital' and 'Green of Digital'," he explains. "Green x Digital' is realizing a green society by leveraging digital power such as leading-edge ICT, while 'Green of Digital' is promoting the reduction of energy consumption in digital infrastructure. The technological evolution of semiconductors is indispensable to realizing both of these."

Increased efficiency is also among the ongoing advances in semiconductor technology that are needed simply to keep pace with humanity's ever-growing data needs, Mr. Kawai says: "In our data-driven society, the volume of data communication is increasing by 26% per year. If data volume continues to increase at an annual rate of 26%, it's expected to be 100 times the current level by 2040. To sustainably achieve this volume, we'll require semiconductors that boast larger capacity, higher speed, more reliability and that consume less energy."



TEL



www.tel.com

Leading the way towards the Sensing Society

With a clear vision for the future, Sony Semiconductor Solutions is developing the image sensors and solutions that will be core technologies to drive a future Sensing Society.

From super-high-definition smartphone cameras and autonomous vehicles, to edge computing, IoT and AI – image sensors are crucial components in the technologies becoming ever-more commonplace in our society. As such, demand for image sensors will continue to grow, with the market expected to expand by 9% (CAGR) between 2022 and 2030.

An independent subsidiary of the Sony Group since 2016, Sony Semiconductor Solutions (SSS) has a long history in the field of image sensor development and previously held a dominant position in the CCD format. The company decided to reorient its focus towards CMOS (complementary metal-oxide-semiconductor) image sensors in the mid 2000s. While the CMOS format had many performance issues, SSS recognized its fascinating development potential and aimed to cultivate "innovative imaging culture", particularly with cellphone users in mind.

Over the past two decades, SSS has been at the forefront of imaging innovation, creating numerous 'world-firsts' in the field of CMOS image sensors, and this has led to its current market share leadership. As a result of such innovation by SSS and other players, CMOS image sensors have surpassed the oncesuperior CCD sensor – boasting high frame rate and high image quality with improved noise performance and low power consumption.

CMOS, therefore, is increasingly the sensor of choice when it comes to the aforementioned applications, and SSS sees an ambitious future ahead. Having increased its customer base and achieved a high market share over the past few years, the company is also leveraging its core competencies in *monozukuri* (Japanese manufacturing craftsmanship) to expand models and services for sensing applications.

"Our core competencies in *monozukuri* lie in world-class advanced technology and the ability to integrate these technological capabilities through a series of processes – from design to development and manufacturing – at a high level. All these competencies are supported by our advanced manufacturing technology and quality control system," says SSS president and CEO, Terushi Shimizu. "In the image sensor business, where we possess many years of experience in development and advanced technology, we aim to maintain our global leadership."

Terushi Shimizu, Representative Director, President & CEO, Sony Semiconductor Solutions Corp.



SSS's image sensors create unprecedented value

"Our CMOS image sensor is an analog device in which the ability to integrate becomes extremely important in order to realize characteristics such as sensitivity and minimal noise. This is an area where SSS can differentiate itself from competitors. As we combine image sensors and AI for a wide variety of applications, we expect further product and customer diversification to enhance the business."

With unstoppable growth in the image sensor market, SSS has significantly ramped up capital expenditure investment, forecasting a 900-billion-yen spend between 2021 and 2023. Part of this money has funded the expansion of its Nagasaki Technology Center's Fab5 as SSS looks to expand production capacity. Moreover, the company has also decided to participate in the establishment of Japan Advanced Semiconductor Manufacturing (JASM), the majority-owned manufacturing subsidiary of TSMC. With this strategic investment in JASM, SSS aims to secure a stable supply of logic semiconductors that are later stacked with pixel chips and contribute to the enhancement of the supply chain in Japan.





Nagasaki Technology Center

"As global semiconductor demand will continue to grow, we expect that JASM, the new TSMC fab, will contribute to the stable supply of logic wafers not just for SSS, but also for the overall industry," explains Mr. Shimizu. "Also, from the perspective of the Japanese semiconductor industry as a whole, if the establishment of JASM stimulates the activities of partner and service companies that support its production activities, it might lead to the revitalization of the industry, which we highly welcome."

Even in the rapidly changing market environment of the semiconductor industry, SSS has always refined its technological capabilities to overcome one challenge after another. In the field of smartphones, SSS anticipates midto-long term technological evolution in the areas of still images and videos. In line with its unwavering commitment to provide new imaging experiences, the company is working on image sensor development that will enable smartphone cameras to offer features such as super HDR (High Dynamic Range) images and high-speed reading at 8K for video. Thanks to its continuous innovation, SSS is leading the way towards a new era of superior smartphone imaging.

In the automotive industry, the focus for the future is on advanced

driver-assistance systems (ADAS) and autonomous vehicles, and SSS expects to be working with 75% of the Top 20 automotive OEMs by FY2025. Industrial applications is another focus area for SSS, while its new challenge is the solutions business, with the image sensor company among the first to tackle the issue of the ever-increasing load on the cloud due to the growing number of IoT devices.

The need for vision sensing using cameras with image sensors is growing significantly in the IoT era. With the increasingly vast amount of data being processed via cloud computing, high electric power consumption; privacy risks; latency in data transmission processing and analysis; service continuity; and security maintenance have become greater concerns. In response, SSS has launched its edge AI sensing platform AITRIOS, a one-stop environment for various solution builders, through which it will be possible to efficiently and reliably develop optimal systems in which the edge and the cloud work together.

All of these developments have been fuelled by SSS's commitment to supporting the creation of the "Sensing Society". "In every aspect and day by day, we are working on the evolution of technology and the improvement of corporate values. To that end, we must enhance our presence in society and evoke a favorable response from various stakeholders as well as the large number of partner companies. This is extremely important for talented personnel all over the world to choose our company," says Mr. Shimizu.

"We expect the 'Sensing Society' is imminent and in such a society, sensing technology will become an important foundation. Sensing is a key element in the development of IoT and DX in all fields such as mobile, automotive, industry, and VR/ AR applications such as the Metaverse. Image sensors can gather a considerable amount of information which makes us believe that their potential and contribution can be particularly profound. Toward an enriched sensing society backed by safety, security and high efficiency, we will continue to pursue image sensor technology."

SONY



Sense the Wonder

Sony Semiconductor Solutions Group



www.sony-semicon.com/en

SCREEN targets sustainable diversification through core technologies

Building on the record-breaking fiscal performance of last year, SCREEN Holdings is steadfast in its commitment to innovative and sustainable solutions.



SCREEN Holdings, headquartered in Kyoto, is a leading semiconductor and electronics company, manufacturing and selling semiconductor production equipment, display production equipment, graphic arts equipment and PCB-related equipment.

The SCREEN Group traces its history back over 150 years to Ishida Kyokuzan Printing Works, a lithographic printing shop founded in Kyoto in 1868, with the company going on to produce Japan's first photographic glass screens, which eventually led to the establishment of an independent venture company, Dainippon Screen. After many decades of growth, Dainippon Screen was finally renamed into SCREEN Holdings alongside a group restructure.

"Since our founding, we have continued to develop various related businesses in the printing industry while also significantly expanding the scope of our operations to include semiconductors," explains Toshio Hiroe, President and





SU-3300 Single Wafer Cleaner

CEO. "Even in the current era of rapid digital transformation (DX) based on the increasing use of artificial intelligence and the Internet of things, we have been able to maintain a strong presence as a leading global manufacturer of cutting-edge production equipment."

Throughout its long history, SCREEN has sought to continuously refine technologies in three core areas: surface processing, direct imaging and image processing. "These technologies are our foundation, and we are now using them in our role as a solution creator to help solve many of the challenges being faced by modern society," says Mr. Hiroe.

In addition, SCREEN is a signatory to the United Nations Global Compact and Sustainable Development Goals (SDGs). The Group is also a participant in Science Based Targets (SBT), a key interna-



Cell3iMager duos2 Imaging and Analysis System

tional environmental initiative. "These are just some of our undertakings as we increasingly focus on ESG criteria in an effort to become a more sustainable corporation,"

says Mr. Hiroe. "Within the company, ideas

and programs that contribute to the environment are solicited, and awards are given for achievements. Through our efforts, we are

trying to raise the interest of everyone in our company to keep working toward solving environmental issues."

SCREEN Holdings is also working to create a more environmentally friendly semiconductor industry in general, the CEO stresses.

"We have to admit the fact that semiconductor plants use a lot of chemical substances, gasses, clean water and heat and generate considerable emissions, which have a significant environmental impact. As a manufacturer of manufacturing equipment, we need to address this issue from both sides. We have to reduce the emissions in the equipment manufacturing process. After supplying our products to our clients, we likewise need to think about how to reduce the emissions in the client's manufacturing process or minimize the use of water or heat.

"One of the reasons for our success is our great and reliable relationship with our



"After over 150 years of history, we would like to continue to diversify and create a complete portfolio, targeting life sciences as well as the energy field."

Toshio Hiroe, President, SCREEN Holdings Co., Ltd..

clients in the semiconductor industry, from whom we receive requests in equipment development," adds Mr. Hiroe. "In addition, based on those orders we receive, we can produce efficiently, as well as being able to reduce unnecessary costs throughout the supply chain. In short, we have successfully achieved smart production."

Going forward, to enhance profitability, SCREEN Holdings is strengthening in-house efforts and investment in R&D to create new solutions for its clients.

In terms of expanding its operations, the energy-related field is an area the company is targeting, alongside life science.

"We want to think about how to invest and what we can do for the next generation of society that will promote a decarbonized "hydrogen society". As a firm that has existed for 150 years, we would like to keep showing the meaning of our existence through corporate activities. We want to move forward and bring about business opportunities for the next generation."



Samco: The key player supporting the semiconductor industry

As the semiconductor industry continues to grow rapidly every year, Samco's manufacturing equipment will become ever more valuable.

Standing out from the crowd requires confidence and uniqueness. Japanese semiconductor expert Samco has managed to distinguish itself from its competitors through its unparalleled commitment to small-batch, high-quality products rather than mass-produced goods.

Founded in 1979 in a leased garage in Kyoto, the company has grown its global reputation for quality in the semiconductor manufacturing fields of deposition, etching and surface treatment. As company Chairman Osamu Tsuji explains, Samco's success is based on three principles: "avoiding mass production, focusing on smaller products, and being environmentally conscious".

For over 40 years, Samco has understood the importance of



minimizing the environmental impact of its products, and its Liquid Source Chemical Vapor Deposition (LSCVD) technology does just that. By using a liquid source, the technology



emits less CO₂ and causes ICP Etching System



Cluster tool system Cluster H™

less harm to the environment than traditional methods.

With American firms being amongst its first ever customers, Samco has always understood the importance of global markets. This has led to the company establishing a base on the West coast of the U.S., and it is in the process of launching another base in India as it seeks to expand further into the Asian market.

Samco's innovative products will be the driving force behind this expansion. As Mr. Tsuji says: "We would like to continue opening ourselves up and being a pioneer in the innovation of new technology."



Sanyu Rec: Resins for industrial development

In the extremely competitive field of epoxy resins, and particularly the liquid epoxy resin bonds market, Sanyu Rec has distinguished itself from competitors to become an industry leader.



"Our firm was selected as one of the top 100 global niche companies operating in Japan."

Koichiro Nagai, President, Sanyu Rec Co., Ltd.

Established in 1958, Sanyu Rec has consistently applied its efforts to the research, development, and manufacture of synthetic resins. Today, the company is one of Japan's foremost resin manufacturers and has established four business areas: electronic products, semiconductors and LEDs, construction and industrial products, and composite materials – developing resins specifically for each field.

"We've made our name thanks to our responsiveness in accommodating rapidly and positively to our customer requirements, develop-



Potting urethane resin for PCB

ing expertise based on know-how accumulated over 50 years, and technical abilities polished through participation in fields at the leadingedge of technology," says Koichiro Nagai, President of Sanyu Rec.

In the extremely competitive field of epoxy resins, and particularly the liquid epoxy resin market, Sanyu Rec has managed to distinguish itself from competitors.

"I think it is because we are always looking to satisfy our customer's needs. I would also say our products and services don't really overlap with our counterparts," explains Mr. Nagai.

Going forward, Sanyu Rec has its eyes set on servicing the automotive industry's transition to electric vehicles, with manufacturers moving away from heavy metals such as iron to more lightweight materials like carbon fiber-reinforced polymers (CFRPs) and compounds.



Formula car

"Our resin products are not only environmentally friendly,



but also focus on economical contributions by improving conventional fuel efficiency. For example, we are working to reduce the weight of automotive structural materials by using foamed epoxy compounds and to secure the rigidity of automobiles."



Unparalleled expertise in plastic films and packaging for the semiconductor and automotive sectors

Since its foundation in 1933, AICELLO Corporation has been an indispensable provider of plastic films and packaging for global industry.



With close to a century of experience, AICELLO Corporation has remained at the forefront of the plastic film and packaging industry, evolving with the times over the decades. After realizing the environmental impact of its cellophane production, the company's core business shifted to polyethylene films and bottles in the 1970s, and that sustainability-led decision has been a driving force of product and business development ever since.

"While the 17 U.N. Sustainable Development Goals (SDGs) are widely known today, AICELLO has long had a similar sense of urgency about the environmental impact of our business," says company president and CEO Satoshi Morita.



In fact, Mr. Morita himself introduced the company-wide business strategy known as 'CBS' (Clean, BOSELON, SOLUBLON) back in 2008 when he was marketing director. "The goal behind this strategy was to present a clear way of demonstrating our core technologies, competitive advantages, and how we add value through our manufacturing activities," he explains, adding that this involved scaling down the company's product portfolio. "I decided we should concentrate on our best and most value-added products: our clean technology (Clean containers, HYPERCLEAN™ Films), anticorrosion film (BOSELON), and water soluble PVA film (SOLUBLON). These three products became the focus of our marketing strategy, and represented a dramatic downsizing of our portfolio."

"Our clean packaging technology is really one of a kind," he stresses, adding that huge value is being created in "supporting the semiconductor industry through the high purity process chemical packaging and manufacturing equipment parts packaging."

Despite a potential early hit to profitability in some areas, the company's clean technology goals and vision for semiconductor manufacturing, along with a continued role in the automotive industry, and overseas growth, made it an astute move, with success and profitability maintained through these three core products.

That constant strive for competitive advantage is also demonstrated through AICELLO's concept of *Dantotsu*, which re-



Quality Control: Cleanliness Measurement

fers to a product or business model that is one of a kind, or impossible to replicate.

"I believe that the level of satisfaction of the customers with the products or business model – which ultimately determines the level of Dantotsu - also sets each company's competitive edge," explains Mr. Morita. "The differences that lead to customer satisfaction indicate not only tangible aspects, such as product quality, price and delivery, but also intangible aspects like business marketing, production know-how and responsibility for the customer needs. It is important for us to strategically design Dantotsu in our business, and I feel that Dantotsu should be a necessary condition for Japanese companies to compete in the global market."

This ability to work on the international stage is seen as a valuable opportunity by Mr. Morita, especially as the Japa-



New SOLUBLON factory

soluble film, which has been widely used in single unit dose detergents across China, the U.S. and Europe.

"Currently, we are focusing our efforts on the existing applications of our water-soluble film," says Mr. Morita. "Through our R&D, we are also pursuing further discoveries for applications of the film, including those related to the manufacturing of electronic materials."

Key to the ongoing success of SOLUBLON is the new factory that is under construction, one that will allow production to increase and provide stability of supply as demand grows.



nese working population, and knock-on spending power, continues to contract.

"The shrinking in the domestic market serves as a catalyst for expanding overseas, so we have been employing our most suitable strategies to expand and introduce our products to an international audience. In contrast to a stagnant domestic market, we are profiting from overseas markets, which account for 45% of our total sales. We are aiming to grow our business even more abroad."

Part of that growing success for the company has been its water

Although North America and Europe play a significant role in the business strategy, especially for the BOSELON business, the needs of loyal customers in the regional Asian market are also being well catered to by the three major locations in Malaysia, Shanghai and Japan.

"The automotive industry growth in Asia and beyond, with just-in-time production as a fundamental requirement, means geographical proximity is essential," states the company president, eyeing a bright and clean future ahead.



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Automation technology supporting the world's key industries

Through a diverse and comprehensive product line-up, CKD Corporation will play a key role in automating the factories of the future.

Established in 1943, CKD Corporation has been engaged in the research and development of automation and fluid control technologies for almost 80 years.

With a commitment to new technology and high-quality products, CKD has been able to differentiate itself from competitors while simultaneously developing and producing a diverse line-up of products, which are widely used within today's society. It is worth noting, of course, that the company is already a major global player, with its chemical valves for semiconductor manufacturing equipment occupying a high market share worldwide. And it is the semiconductor industry, a rapidly-changing sector, on which CKD has pledged to focus its efforts in the future.

Though already manufacturing and selling components which control fluids such as liquid chemicals



Fluid control components for the semiconductor industry

CKD's business is centered on two fields: automated machinery and components. "We have various types of automated machinery such as lithium-ion battery manufacturing equipment, packaging machines for pharmaceuticals and food products, and inspection machines for electronic circuit boards. The company's component products include air and electric actuators and fluid control components, which are used in all types of manufacturand process gases for semiconductor device manufacturing facilities, it is anticipated that the market will continue to grow long-term. With this in mind, CKD has recently completed construction of a new facility in Komatsu, Ishikawa Prefecture. According to Mr. Kajimoto, the aim of the new plant is "to meet the expected increase in demand for components for the semiconductor industry".

Alongside its counterpart in Kasugai, the new Hokuriku Plant



CKD's Hokuriku plant in Japan (scheduled to be operational in 2024)

ing sites, including semiconductor, automotive and electronic parts manufacturing. It is hoped that by integrating technologies from automated machinery and components, CKD corporation will achieve its aim of becoming a global supplier of factory automation (FA) components," says chairman and CEO, Kazunori Kajimoto. in Ishikawa will manufacture valves for chemical solutions, while valves for process gases will be manufactured at the company's Tohoku Plant.

Beyond the semiconductor industry, CKD prides itself on the development and marketing of products that contribute to the reduction of CO2 emissions – with the aim of achieving carbon neutrality by 2050.

In particular, Mr. Kajimoto highlights the company's longlife products, which are used in production lines in all industrial sectors. With a lifespan four times longer than conventional products, customers are no longer required to maintain their machines with such regularity, leading to an overall reduction in waste.

In terms of its international presence, although CKD has traditionally focused on developing its own technologies without input from other companies, this too is changing. There is a growing recognition that increasing partnerships with domestic and foreign entities leads to a more efficient overall service.

"In order to deliver optimal products, technologies and services to our customers quickly and reliably, we have established a global sales network encompassing Europe, North and South America, and Asia," Mr. Kajimoto adds.

That network now totals 170 production sites and bases around the world. In addition to its existing five plants in Japan, CKD boasts plants in China, Thailand, Malaysia, Korea, Indonesia and North America. The last of these, completed in April of this year in Austin, Texas, has recently begun the production of semiconductor manufacturing components.

With CKD's overseas sales ratio currently standing at about 30%, it is hoped that the company's global expansion will see this figure rise to 40% in the next four years. This will involve an increased focus on Europe, where as Mr. Kajimoto ac-



"In the years to come, we are aiming to become a total FA worldwide supplier by integrating automated machinery and component product technologies."

Kazunori Kajimoto, Representative Director, Chairman & CEO, CKD Corporation

knowledges, CKD's sales channels are still underdeveloped.

Not that global expansion is the only thing on Mr. Kajimoto's mind. Indeed, as the Corporation approaches its 80th anniversary, CKD's chairman is anticipating what the future holds.

"As we get older," he says, "we begin to see the whole picture and think about others in the domestic society, the international community, and about the global environment. It is important to accept a little inconvenience, rather than simply pursuing material abundance. In a book of the Chinese philosopher Lao Tzu, there is a phrase about 'knowing what is enough'. It talks about being satisfied with one's lot. If this concept of 'contentment' were to spread throughout the world, I am sure that it would be a better place."



Pharmaceutical packaging machines



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1

A State

Manufacturing (monozukuri) Through its automation and fluid control business domains, CKD is working on technological innovation and value creation to help resolve various social issues. Going forward, we will commit to achieving SDGs and continue to contribute to *building a rich society*, as outlined in our corporate philosophy.

Provident Con M

Environment

Food safety

Medical and healthcare



www.ckd.co.jp/en

Next-generation bonding wires for the semiconductor industry

As a technology-driven manufacturer of bonding wires, Nippon Micrometal is providing new and innovative products to support the ever-changing semiconductor sector.

In the 35 years since it was founded, Japan-based Nippon Micrometal has established itself as a trusted, expert producer of bonding wires for semiconductors, catering for a growing portfolio of industry-leading semiconductor manufacturers. "The majority of our customers are overseas; and these customers are major players globally," explains Nippon Micrometal's president, Dr. Takashi Yamada.

"As a company, we have three key strengths, starting with the quality of our products," Dr. Yamada continues. "Our customers use our wires as the last step in their semiconductor production, so if the wire bonding were to fail, the whole process must be discarded and would be considered a waste. With that in mind, you can understand why reliability and high quality are essential to our business. Secondly, we provide aftercare to customers and should any issues arise when using our products, we are ready and willing to provide solutions for them. Technological support is one very strong advantage that we provide. Lastly, we conduct R&D in advance and consider potential future trends. With our cutting-edge technology, we develop our products tailored to individual companies' needs."

Chief among the next-generation products developed at Nippon Micrometal is the Advanced Copper Wire EX, which allows customers to make major savings. "Copper wire has always had an issue with oxidation, but we overcame this by selecting palladium as a coating material and controlling the palladium metal coating at a nano level." Dr. Yamada explains. "With our unique wire processing technologies, we succeeded in mass-producing palladium-coated copper (PCC) wire. Gold has been used in bonding wires for 50 years now, but with prices surging, replacing gold wire with PCC wire that is robust against oxidation has been very effective and en-



Micrometal Corporation



abled our customers to reduce costs significantly.

"Thirty percent of semiconductor packages still use gold wires, so we continue to work on the further replacement of these gold wires," he adds.

In addition to replacing gold with alternative materials, a continual focus of Nippon Micrometal's R&D efforts is the ever-increasing miniaturization of electronic devices. "Miniaturization is having an impact on our products and we need to continuously improve them to cater to the higher densification of semiconductor packages," the company chief says. "We must make the diameter of the wire smaller and keep improving our wire technology. It is vital that we keep ourselves updated

with all the advancements in the semiconductor field.

"When the transistor was first invented, there was only a single wire on a surface. But now we see a semiconductor package that requires more than 1,500 wires. It is extremely difficult to keep those wires from touching each other and causing a short circuit. Wires are now down to the size of 16 microns and even smaller, which would be less than one-fourth the thickness of a strand of human hair."

Nippon Micrometal is also committed to keeping pace with the evolution of the materials used to make semiconductors. "Currently, our copper, silver, gold and aluminum wire products are focused on silicon-based semiconductors which are used for a more high-density type of semiconductor," Dr. Yamada says. "On the other hand, in the area of power semiconductors, we are anticipating a switch to new technologies, such as silicon carbide (SiC) technology. For example, with the transition to electric vehicles, SiC technology will be essential for a transition from a 400-volt to an 800-volt battery charging system. We are focused on developing new types of wires to meet the new challenges in power semiconductors."

As well as bonding wires, Nippon Micrometal supplies solder balls used in the production of semiconductor packages, with the tin-silver-copper-nickel LF35 Micro Ball a headline product. "We started developing the LF35 when mobile phones became popular – it has high reliability and connectivity," Dr. Yamada says. "What we have invented is a unique composition of metal based on our own technology."

International expansion is a major focus at Nippon Micrometal, which since the turn of the millennium has established subsidiaries in China, Malaysia and the Philippines. "We would like to continue to expand overseas, and ultimately establish a base in each locality that we operate in," Dr. Yamada says. With a number of countries eager to grow their domestic production of semiconductors, he is confident that the company will benefit from this drive: "Currently, the production of semiconductors is centered around Taiwan and China, but by diversifying, we are creating a very advantageous situation in terms of our business continuity plan. We find no negativity in the expansion of local production and hope to find more opportunities for ourselves to grow."



Hugle: From novel ideas to solid solutions for cutting-edge microfabrication

A small company with big ideas, Hugle Electronics is helping to tackle some of the greatest challenges in semiconductor manufacturing with its range of state-of-the-art micro-particle and electrostatic removal equipment.

"My philosophy is the smaller the business, the better it is," says Wasaburo Fujimiya, President of Hugle Electronics. "Now more than ever, we focus on developing new products and novel ideas."

In an industry dominated by "large conglomerates and powerful multinationals", Hugle – a company with less than 100 employees – has built a solid reputation over its 51-year history as an innovative solutions provider in the field of micro-particle and electrostatic removal equipment.

"Our philosophy is to constantly develop new products and I believe that this philosophy will never change."

Wasaburo Fujimiya, President, Hugle Electronics

"Hugle's long-established Static Electricity Remover, Ultrasonic Dry Cleaner and Carrier Cleaning System laid the foundation for today's products, contributing to the development of the semiconductor, FPD (flat panel display), and lithium-ion battery (LiB) industries, and improving yields in cutting-edge microfabrication," adds Mr. Fujimiya.

Firmly committed to innovation, Hugle today has tasked itself with solving some of the main challenges in the semiconductor industry – firstly, the removal of contaminants (including airborne molecular contamination: AMC) as semiconductors and subsequent manufacturing processes get increasingly smaller; and secondly, the reduction of the industry's impact on the environment.

One eco-friendly technology recently developed by Hugle is its latest FOUP Cleaning system "SF-300". Despite being more compact than previous models, the SF-300 boasts improved efficiency while also having a lower environmental footprint. "By replacing older machines with the SF-300, our customers can double or even triple their production efficiency. This in-





Hugle R&D building



Cassette & J-BOX cleaning system

crease in performance will allow our clients to lower the environmental burden of their activities," says the Hugle president.

"When it comes to reducing the utilization of toxic chemicals, our products use as little organic solvents and neutral detergents as possible, and water and

air are the main power sources," he adds. "With the power of our proprietary technologies, we are de-

Multi-cleaning

system SF-300



Ionizer fan-type Ionizer MODEL1900



Ultrasonic dry cleaner

termined to steadily pursue the path of becoming an eco-friendly and environmentally friendly manufacturer."

When it comes to particle and contaminant removal, Hugle has strived to improve its tech-

nologies through R&D in order to cater to ever-evolving industry demands, with the

company opening a brand new R&D center in 2019 to further bolster its development capabilities.

On top of removing dust and contaminants, Hugle's clients have recently requested technologies for the removal of ammonia, HCl and other compounds. This process is focused on AMC removal, an area in which the company is researching technologies, while it also has a joint research project with a Kyushubased university focused on the removal of microscopic contaminants. as demanded by its clients. Such extensive R&D serves as testament to Hugle's commitment to developing innovative solutions, and is sure to bear fruit with the creation of technologies like the company's existing Ultrasonic Dry Cleaner.

Hugle's Ultrasonic Dry Cleaner uses ultrasonic vibrating air to excite particles adhering to the surface of products before collecting them with a suction slit without scattering them, later employing a circulating system that purifies the collected air and reuses it for discharge. Since its launch in 1976, it has been used in production lines in a wide variety of industries, including electronics, semiconductors, FPDs, printed circuit boards, and rechargeable batteries. And it is in the latter field in which Hugle's technology will play an increasingly important role.

"Recently, dust control in the rechargeable battery industry has become an urgent issue," adds Mr. Fujimiya. "Because the separators of high energy density batteries are becoming thinner, small particles on the electrode can penetrate through the separator and cause short circuits. In response, we developed a special cleaner which can remove particles on the electrode effectively."

Moving forward, Hugle will work closely with electric vehicle makers to offer electrostatic and particle removal solutions for LiBs, yet another area in which the company's long-established know-how will help to improve complex manufacturing processes.





It all started for ABLIC back in 1970 when its in-house development of complex components led to the production of the world's first practical quartz watches. Since its 2018 rebranding, the company has transformed under the leadership of its president and CEO, Nobumasa Ishiai.

"The formation of ABLIC in 2018 enabled us to completely turn around the company's stagnant situation," Mr. Ishiai says. "The company has expanded along with its entry into the electronic devices and sensor business fields with new technologies such as our highly sensitive, Bluetooth-linked water detector named CLEAN-Boost."

ABLIC has managed to boost its annual operational profit approximately three-fold and seen significant improvement in its *Cash Conversion Cycle* (CCC) in the last four years – a level of success comparable to major global semiconductor companies.



Clean room at Takatsuka Unit in Chiba

These impressive gains in the company's value can be boiled down to three main measures, which were enacted at ABLIC along with the original company's foundational strength and based on Mr. Ishiai's former management experience of more than 30 years in five global companies.

"First, instead of cost-conscious sales, we presented our

Human development key for ABLIC's analog semiconductor excellence

Since its rebranding in 2018, ABLIC has become a global leader in analog semiconductor technologies and solutions.

Nobumasa Ishiai, Representative Director, President & CEO ABLIC Inc. www.ablic.com

uniqueness throughout the value chain, then successfully obtained our customers' understanding of the optimal price improvement for the total corporate value. We call it 'Value Selling'," Mr. Ishiai says.

"Second, we also strengthened seven criteria comprising strategies and checkpoints for new product introduction, re-boosting our core competence, and reflecting our customer's needs in the process. One of those was what we call 'rising dragon and horizontal development'. This entails the drastic reallocation of investment



CLEAN-Boost's battery-less water leak sensor

and management resources into the best performing fields of an industry, then taking a successful case and developing it horizontally across the world to improve profitability. This is what we call 'Value Products'," he explains. "In addition, by utilizing the strengths of IDM (integrated device manufacturing including both wafer and packaging) to swiftly try out new products in the departments responsible for the development, manufacturing, marketing and sales, including full involvement of branding promotion. we achieve quicker expansion of sales after the initial launch period.

"Our third measure is to improve sales and purchasing forecast accuracy, external fabrication, and inventory controls; create more streamlined supply chains spread across our diversified product portfolio and global locations; and realize global top-class CCC and profitability. It is also known as 'Sales and Operations Planning'. These are executed with elaborated project management methods."

Mr Ishiai continues: "Now we have a product portfolio unlike any other semiconductor company in the world, featuring a wide array of analog semiconductor solutions, from battery-less sensors, UV cameras for aerospace technology, and components for automotive and medical integrated circuits. Targeting these niche markets has allowed us to avoid directly b a t - tling with other big competitors, which

is a leading cause of failure for many companies. Our strategy is to explore the world by seeking out global niches within the market, while continually assessing our specific strengths and understanding our weaknesses."

Digging deeper into his personal background, Mr. Ishiai says: "My diverse leadership experience and lengthy career in manufacturing allow me to bring a



Sign board at Tokyo International Airport

seasoned perspective to the table. I learned a lot from gifted leaders overseas, including Jack Welch [American business executive, chemical engineer, and writer]. While I worked at the Center of Excellence at GE Plastics HQ



ABLIC bus running in Tokyo

in the U.S., he taught me to 'be crazy enough' to have no fear, no concerns, and no hesitation. Just concentrate on the objective and go for it with passion.

"Another important lesson I learned was from my mentor, Nani Beccalli (former CEO at GE International), which was about authenticity and the importance of always being yourself."

Aside from his colleagues, further inspiration came from Mr. Ishiai's father when the two went on an impressive trial run on the then-new Shinkansen (highspeed bullet train) together. "A lot of Japan's technological brilliance from the past is deeply rooted in my memory," he reveals. "Within a short timeframe, I want to see the revival of Japan as the technical innovator of the world. Taking root from the culture of monozukuri, we will push ABLIC forward as a global company, with international employees all working towards the same progressive future, as a part of the MinebeaMitsumi group.

"Here at ABLIC, I will pass down all my experience to my staff, similar to the way a semiconductor works, from input to output."

It is important to remember that ABLIC is an analog semiconductor company, not a digital one.

"Being an analog semiconductor maker requires a specific type of craftsmanship and a highly detailed design process," Mr. Ishiai explains, "but the result is a highly valuable and intelligent product that cannot be found elsewhere. I want more people to know this truth soon, because the current state of our world not only demands our product, but will benefit from it. It will make the world a smaller, smarter and simpler place to live in line with the SDGs (U.N. Sustainable Development Goals).'

"My credo has been shaped by my past experiences; that is, to live life with humility, warmth, and gratitude," adds Mr. Ishiai. "This mindset is born from monozukuri, reflecting the strength of Japanese companies, often defined by their high quality. Product management and speed are crucial embodiments of this culture, but I believe the most important aspect is the people in the company. They are the ones making the changes and pushing the company forward. Even if you have the greatest product in the world, if the people working for the company are unmotivated, the product won't be improved and sales will drop. Inspiring motivation within our employees is on the top of my list, allowing us to innovate and achieve continuous sustainable growth."

"The current state of our world demands our intelligent product, which will make it a safer, smarter and simpler place to live."

ABLIC recognizes that monozukuri is not only important in the manufacturing process but is deeply connected to customer satisfaction.

"In the Japanese language, the attitude of how to fulfill customer satisfaction is called *omotenashi*, a principal goal for us," says Mr. Ishiai. "This is achieved through our strengths stated above; it is a fully interconnected process."

The branding of ABLIC, a name created from ABLE and IC (integrated circuit), expresses that semiconductor technology enables possibilities, and has been key to the company's success across its various operations.



Banner ad in Ginza, Tokyo

Along with its logo, Mr. Ishiai says "it conveys our corporate vision of inspiring customers with 'Small, Smart, and Simple' analog semiconductor solutions. This strong branding strategy is a differentiating factor among other B2B companies, and is a leading reason for why our employees are proud of where they work.

The president makes it clear that the company vision of "Small, Smart, Simple" is reflected across the eight unique product lines of its portfolio, all of which are in line with U.N. SDGs.

"We are always looking for more natural and renewable resources to utilize," he says. "Our portfolio consists entirely of analog semiconductor products, and we have a good eye for quality."

With some exciting products in the pipeline, Mr. Ishiai highlights that the company's R&D focuses mainly on new applications and components for products rather than new products themselves. "We see this as a more direct, immediate and targeted approach to support the customer," he explains. "You could actually call it application development rather than research and development. For example, our CLEAN-Boost technology takes only a few drops of water and turns it into energy. This technology unlocks unlimited possibilities and received an admirable award from IEEE (Institute of Electrical and Electronics Engineers) in the United States following its release in the market. We are exploring new applications for this technology related to water leakage sensors for residential or office buildings. and also within the nursing field. I think application development is a great approach to transform a problem into a solution. It really is a balancing act, because customers do not just demand a suitable price, they also demand a specific function in a sustainable way."

Although we are a Japanese company, ABLIC ventures far beyond its borders. "Our efforts and customers are on a global scale," says Mr. Ishiai, "with sales and design conducted in the United States and Europe, and production measures operating in various locations across Asia."

Maintaining this strong global position in the industry is a priority for ABLIC. "Currently 70% of our sales come from outside to work with new design houses and external professionals both in Japan, and overseas. Furthermore, we are collaborating with a number of renowned university professors to develop new technologies.

"Regarding international business partners, we see no borders," affirms the president. "Wherever there is a need, we are willing to work together with others. We are focusing on current global objectives and trends where we can present our niche product applications to showcase our superior technological strength and quality. Our strategy moving forward is to expand our presence



Monozukuri craftmanship, transitioning over generations

Japan, and we are looking to increase that further. I put the company's impressive ability to accomplish this in such a short period of time down to the work ethic of our employees," says Mr. Ishiai.

"We are organized in such a way as to minimize lost time and bottlenecks, and to identify improvements in each process for the benefit of our customers. By having a geographically diverse operation, we can be sure that all of our customers benefit from our total service solution. Being located all around the world, we are able to provide full support to our clients wherever they are. We pride ourselves on our quick communication that allows us to answer customer inquiries within a 24-hour window, no matter where in the world they are."

Another important aspect is working together with other highlevel global professionals.

"We currently have some new collaborations in our development process. We are looking in Europe and the U.S., where we see the highest potential."

Although the situation is already positive for the company, Mr. Ishiai is still looking towards the future with a sharp eye for improvement.

"Added value, in my opinion, not only comes from manufacturing high-end products, but also from the enthusiastic branding of ABLIC, the continuation of product development, superior sales and support, and employee satisfaction, which in turn deliver the best customer satisfaction. This is our *monozukuri* mentality, to be translated through the generations."



Iwata Shokai president outlines goals for the future

The chemical trading company, established in the early twentieth century and known for its versatility, is targeting three specific sectors and looking to make transformative changes in the construction industry.



"It is our mission to create new products for people all over the world."

Takuya Iwata, Ph.D., President, IWATA & CO., LTD.

Established in 1902 as a chemical trading company, Iwata Shokai has been dealing with acid and alkaline products in Japan and around the world for more than a century.

According to company president, Takuya Iwata, inorganic chemistry is at the heart of the firm's business: "Inorganic chemicals are not only valuable as materials themselves, but play an



ant role in the production

important role in the production process as basic raw materials in all industrial fields."

And, while Iwata Shokai's priority is to provide customers with a stable supply of highquality products, the firm differentiates itself from competitors through the presence of its own chemical manufacturing company, Auto Chemical. "We are not only a trading company; we also produce functional materials," Dr. Iwata explains.

The ability to manufacture new materials and create them in col-

laboration with other companies means that Iwata Shokai supplies products to a wide range of industrial sectors. The company's Auton sealant product, for instance, could lead to important developments in the construction industry, with Southeast Asia serving as a primary target for expansion.

But Iwata Shokai's immediate focus is on three sectors in particular: semiconductors, life sciences and plastics. The company



already caters to Japan's semiconductor ecosystem by selling machines to semiconductor and silicon wafer manufacturers.

The acquisition of a new factory in Kumamoto (a hub for the semiconductor industry) for maintenance purposes, meanwhile, should ensure that Iwata Shokai meets its stated aim of

providing the "highest quality of semiconductors" to customers both domestically and overseas. Issues re-

lated to the coronavirus

pandemic may have caused disruption to supply chains, but they have also obliged Japanese companies, which, according to Dr. Iwata, have been "traditionally focused on expanding outwards", to switch their focus back to Japan. Creating strong domestic relationships is an advantage when it comes to maintaining a stable supply system, while globally the phrase 'Made in Japan' is still a byword for quality.

Semiconductors and sensors are also related to CT scans and are used in diagnosis services, providing a potential access point to the medical or life sciences industry, the second of Dr. Iwata's aforementioned targets. To this end, a subsidiary of Iwata Shokai, TOSC, has recently been selling membranes that bring new pro-



cesses to the food industry as well as the medical industry.

The company's third area of focus is plastics. "Becoming carbon neutral is one of the main challenges that many companies and societies are now facing. As a result, firms are focusing on chemical recyclables," Dr. Iwata

adds. "One example is the development of

technology to produce polymers using carbon dioxide from conventional exhaust gasses as a car-

bon source."

Carbon neutrality, however, doesn't mean the total elimination of petroleum and carbon resources. Rather, it is a question of making effective use of what is already there, to make "good use" of chemical reactions.

As an isolated, mainly mountainous country, Japan may find it difficult to produce a large



New-type sealant for buildings

amount of clean energy. The country's goal, instead, should be "to contribute to the global environment through the power of chemistry".

"We want to develop recycling technologies that can contribute to a recycling-oriented society," Dr. Iwata reveals.

Looking to the future, the company hopes to expand from Thailand to other countries in Southeast Asia and is actively seeking overseas foreign employees from countries such as India, China and Russia. As Dr. Iwata states, "diversity is key".

With Japan facing well-documented demographic issues related to its birth rate, aging population and subsequent shrinking workforce, it may be necessary for Iwata Shokai to replicate its col-



laborative domestic model overseas. Dr. Iwata is adamant that the company needs to research which countries make specific chemicals and build multiple supply chains based on its findings.

More broadly, of course, the priority is still the environment – an issue that has been at the heart of the company's endeavors since it began.

"We have been looking after the environment for 120 years," Dr. Iwata says, "and will continue to do so."



www.iwata-cc.jp/index.php/en



Cell preservation solution