

Japan's SMEs Innovate Amid Global Manufacturing Shifts

In the tapestry of global manufacturing, Japanese small and medium-sized enterprises (SMEs) have emerged as pivotal players, contributing significantly to Japan's thriving semiconductor, electronics, and advanced machinery sectors. These industries have long been synonymous with Japan's technological prowess and commitment to innovation, and SMEs play a crucial role in upholding this reputation on the global stage.

Japan's journey in manufacturing excellence dates back decades, with the post-World War II era witnessing a remarkable resurgence fueled by a relentless focus on quality, precision, and continuous improvement. This era birthed iconic names like Toyota, Sony, and Panasonic, setting the stage for Japan's dominance in various technological domains.

However, the landscape has evolved, with regional competitors emerging and global dynamics shifting. Masayoshi Imoto, President of IIX INC. – a display technology manufacturer – notes this evolution, stating: "There is often an assumption that Japanese high-quality and high-pricing can be considered over-specification, and to some extent, I do agree with this assumption. However, multiple Japanese companies are able to compete in the global market as niche players."

Mr. Imoto emphasizes the unique strengths of Japanese SMEs, particularly their ability to provide bespoke, high-quality solutions. "Japanese companies can provide special unique services that cater to specific needs and things that no one can copy," he says.

Niche Excellence and Global Competition

Ken Kitano, Chairman of Logic & Design Co. – a specialist in enhancing and restoration technology – echoes this sentiment, highlighting Japan's attractiveness in the global market due to supply chain disruptions, favorable exchange rates, and the reliability of Japanese products.

"Japan is at a very interesting time right now, due to the supply chain disruptions caused by COVID-19 and the tensions between China and the U.S.," he says. "Japanese products on the global scene are very attractive once again."

Michihiro Tamenori, President of Seishin Trading – a manufacturer of switchgear and switchboard apparatus – further elaborates on Japan's strengths, especially amidst challenges like the COVID-19 pandemic and geopolitical tensions.

"The yen's depreciation is indeed driving increased business demand," says Mr. Tamenori. "Despite the growing dominance of China and Southeast Asia in the market, Japanese products maintain a reputation for superior quality. And although Japanese companies might not be as quick to act, their longstanding and consistent business practices over the years serve as an advantage for us."

Challenges and Opportunities

Tadashi Naruse, President of Shinhokoku Material, agrees with this sentiment, whilst also highlighting the challenges and opportunities faced by Japanese SMEs in the global market. He notes: "The way the world has unfolded over the past few years has meant that there are plentiful disruptions within supply chains. Additionally, with the depreciation of the yen, Japanese companies have been put in an advantageous position for export."

Masato Tozawa, President of Restar Embedded Solutions – a supplier of electronics, business and office services – stresses the demographic challenges faced by Japan's manufacturing sector, particularly the aging workforce. He states: "There is certainly a decline in the labor force... The aging of the labor force, including the experienced craftsmen who have been the backbone of Japan's manufacturing history, presents a formidable challenge for the sector. While certain aspects of business within manufacturing

companies can be digitized, there remains a substantial part of the process that relies solely on the expertise of human craftsmen. Transferring knowledge and skills from one generation to another can prove to be a challenging endeavor."

Confronting such challenges, Fumiya Kanai, President of KOKUSAI Electric Group – a global leader in batch deposition equipment and single-wafer treatment technology – emphasizes the importance of dialogue (*Tai-wa*) and technological innovation in meeting customer needs, noting:

"We always value *Tai-wa* as our company philosophy, whilst our strategy is to compete in a field where we can leverage our unique technological capabilities. We think that this is critical; not only understanding their needs but also communicating how we can best meet those needs."

Meanwhile, Yasuhiro Hara, President of ULVAC-PHI, Inc. – a company born from a strategic alliance between U.S. company Physical Electronics and ULVAC – sheds light on strategic initiatives aimed at global expansion and supply chain diversification. He says: "We actively utilize the ULVAC Group's supply network. From that perspective, our major business was dealing with the United States, and from that core, we are now steadily starting to expand to other countries. This strategic approach aims to have a significant impact on the business as a whole, and we are expecting to generate a notable impact."

Leading with Innovation and Quality

Japanese SME manufacturers continue to uphold Japan's legacy of innovation, quality, and reliability in the semiconductor, electronics, and advanced machinery industries. As they navigate challenges and seize opportunities in a rapidly evolving global landscape, these SMEs remain at the forefront of technological advancement and economic growth, showcasing Japan's enduring commitment to excellence.

True Image Clarity Through Innovative Technology

Logic & Design's patented technology provides enhanced images for a range of industries.



Ken Kitano, Chairman of the Board, (right); Kimiaki Sato, Representative Director, (left) Logic & Design Co., Ltd.

Japanese firm Logic & Design is at the forefront of providing clear, untampered images with its enhancing and restoration technology. Founded in 2018,

contrast through a histogram. This process does not involve the presumption

the company caters its products and software to various industries; from disaster and crime prevention to the security and medical fields.

The company's patented LISr® technology processes images down to the very minute pixels before optimizing the

used by AI to make images clearer, instead it improves the data that already exists.

As company representative director Kimiaki Sato says: "We take the real image and make it more visible." LISr® can be used in a wide range of settings, from poor weather conditions to night vision monitoring images. It also instantly enhances the clarity of images, enabling them to be more easily processed by AI,

and is currently being used to great success in the field of ophthalmology.



LISr-101



ASIC (LISr-ISP)

The company is working to mass produce its technology in chip form so it can be embedded in cameras working in fields from security to disaster prevention.

KOKUSAI Electric Group: Pioneering Semiconductors with Cutting-Edge Technologies

KOKUSAI Electric Group's batch deposition and single-wafer treatment equipment is highly regarded by semiconductor device manufacturers around the globe and enjoys a world-leading market share.

KOKUSAI Electric Group, a global leader in batch deposition equipment and single-wafer treatment technology, continues to revolutionize the semiconductor industry. Renowned for its sophisticated batch ALD (Atomic Layer Deposition) technology, KOKUSAI Electric Group is addressing the critical challenges faced by semiconductor manufacturers worldwide.

Semiconductors, integral to numerous industries and everyday life, have undergone a significant evolution over the past seven decades. At the forefront of this evolution stands KOKUSAI Electric Group, leveraging its extensive semiconductor expertise since becoming an independent specialty manufacturer of semiconductor manufacturing equipment in 2018.

Focusing primarily on the deposition process, crucial for semiconductor performance, KOKUSAI Electric Group's recent listing on the Tokyo Stock Exchange Prime Market in October 2023 reflects its anticipation of future growth. With semiconductor structures becoming more complex and three-dimensional, productivity challenges in the deposition process have intensified.

Indeed, today decreasing productivity and increasing difficulty in the deposition process are the most important issues for semiconductor device manufacturers. The wafer surface has become more complicated in shape, where an enormous number of narrow and deep holes and grooves are formed. This expands the surface area requiring deposition. In addition, the travel distance of gas required for deposition has become longer, increasing the time required for deposition. This reduces productivity and increases the necessity of deposition with a high degree of difficulty.

KOKUSAI Electric Group addresses these challenges with its strengths in batch ALD technology and treatment technology. Batch ALD technology



"The batch ALD* technology is a very sophisticated technology and can be realized only through the accumulation of many leading-edge technologies. Through the technologies and expertise accumulated over our long history, we solve customers' problems and thereby contribute to society."

Fumiyuki Kanai, President, KOKUSAI Electric Group



Produced in Toyama prefecture, Japan, and South Korea
(Photo: Products and Toyama Technology & Manufacturing Center)

ogy enables high-quality thin-film deposition with excellent step coverage and productivity, making it a logical solution for semiconductor evolution. Recognized for its prowess, KOKUSAI Electric Group's batch ALD

technology is highly sought after in fields like 3D NAND manufacturing.

Moreover, the company's treatment technology offers superior isotropy and step coverage, enhancing film properties across various

temperatures. With the increasing demand for plasma-based film property improvement, KOKUSAI Electric Group's equipment finds applications in NAND, DRAM, and is poised for adoption in Logic.

Looking ahead, KOKUSAI Electric Group is poised to capitalize on the burgeoning SiC (Silicon Carbide) power device market with its ultra-high temperature activation annealing equipment. This technology is expected to drive further growth in SiC power device systems, aligning with industry trends.

As the semiconductor market continues to expand, driven by data center growth and environmental sustainability initiatives, KOKUSAI Electric Group remains committed to innovation. With its corporate slogan "Technology & Tai-wa** for Tomorrow," the company prioritizes understanding customer needs and delivering innovative solutions while upholding the principles of sustainable development. Embracing the KOKUSAI Electric Group Way, a new management concept, the company aims to create value while contributing to the realization of a sustainable society and the fulfillment of SDGs (Sustainable Development Goals).

Through continuous innovation and commitment to ESG (Environmental, Social, and Governance) efforts, KOKUSAI Electric Group is poised to shape the future of the semiconductor industry while fostering sustainability and growth. With its cutting-edge technologies and unwavering commitment to excellence, KOKUSAI Electric Group continues to lead the charge in semiconductor innovation, paving the way for a brighter and more sustainable future. In an ever-evolving technological landscape, KOKUSAI Electric Group's dedication to research and development ensures that it remains at the forefront of semiconductor advancements, driving progress and shaping the industry's trajectory.

* The KOKUSAI Electric Group refers to a technique for thin-film deposition at an atomic layer level involving a process of cyclical supply of multiple gases as "ALD."

** *Tai-wa* is a Japanese word meaning dialogue or conversation between people face-to-face who are willing to understand each other with a sense of empathy. At times, the subject of *Tai-wa* can be things besides people. For us, *Tai-wa* implies respecting everyone, being sincere, and acting wholeheartedly – that is our attitude towards work. This is our group's DNA that we value to last forever.

IIX INC.: Pioneering Sustainable Display Solutions Globally

IIX INC. leads the world in innovative display technology, emphasizing sustainability, global expansion, and strategic partnerships for industry excellence.



Suriawase-DeMura engineering

Founded in 1999, under the visionary leadership of President Masayoshi Imoto, IIX INC. has emerged as a beacon of innovation in the electronics manufacturing industry, with a focus on advanced display technologies. As it celebrates its 25th anniversary, the company is driven by a commitment to "Infinite Harmony and Unity," aiming to make a positive impact on society through delivery of high-quality products and services, while also prioritizing employee well-being and development. At the core

"Dedicated to sustainability, our unique DeMura process exemplifies our global commitment to environmental responsibility and technological innovation."

Masayoshi Imoto,
President, IIX INC.

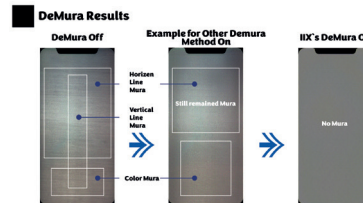


of IIX's success is its pioneering DeMura process, a sophisticated method for correcting unevenness in OLED displays, which is also compatible with next-generation displays such as MiniLED and μ LED.

This proprietary technology not only ensures the highest quality of display products but also significantly reduces waste, thereby contributing to environmental sustainability.

IIX's dedication to excellence is further ex-

emplified by its holistic approach to problem-solving and innovation. By embracing the Japanese concept of *Suriawase*, the company has mastered the art of collaborative solutions, securing its position as a global niche leader. This strategy extends beyond its primary focus on display solutions, incorporating environmental building control systems and development of eco-friendly biodegrad-



DeMura process offers the highest quality



Eco-friendly biodegradable resins

able resins, underscoring its commitment to sustainability.

In pursuit of global expansion, IIX has strategically focused on China, establishing partnerships that leverage synergistic effects and drive innovation, adopting a pay-as-you-go service billing model which eliminates the need for customers' initial investment in equipment with on-site field engineer services.

As IIX marches towards an IPO and further diversification of its business portfolio, its ethos of sustainability, innovation, and global collaboration continues to guide it toward industry leadership and a lasting global impact.



Alloy Evolution Crafted by Shinhokoku Material



"Our approach is to monitor the semiconductor industry, offer solutions to specific issues, and become an R&D-driven company."

Tadashi Naruse, President,
Shinhokoku Material Corp.

Shinhokoku Material, a creative leader in low-thermal-expansion alloys, focuses on semiconductor industries, with eyes on overcoming the challenges in entering established overseas supply chains. The Japanese firm's strategy lies in collaboration with manufacturing equipment companies, offering tailored solutions for specific tasks that other companies do not attempt.

Shinhokoku Material provides only-one invar type low thermal expansion alloys.



Thermal expansion measurement equipment

"Our mission is not just to provide standardized products," says company president, Tadashi Naruse. "Our target at this point is to become an R&D-driven company that can contribute to the development of customers."

The importance of overseas expansion is clear for Shinhokoku Material and the president reveals: "We plan to leverage the network we have built up so far and visit several overseas manufacturers and institutes this year."

The company's competitive edge lies in its ability to control the composition of its alloys

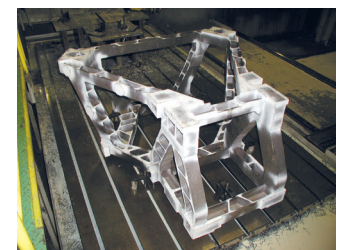
within a narrower range than standard, and manage it in absolute values using chemical titration. Its low thermal expansion alloys boast unrivaled precision at 0.01ppm/K, surpassing conventional methods.



30kg vacuum induction furnace for R&D melting

Shinhokoku Material's relentless commitment to innovation aims to develop new alloys that can withstand use in strong magnetic fields, ultra-high vacuum environments and under high stress and hydrogen environments to become a global niche leader in this field.

Looking ahead, Mr. Naruse envisions sustained growth, in-



An example of low-thermal-expansion cast alloy

vesting in new developments and facility expansions.

"We would like to be recognized as a distinguished manufacturer of additive manufactured alloys that can provide tailored solutions for the customers," he expresses, highlighting 3D printing as a pivotal pillar in their strategic evolution.





"Our multifaceted research and development incorporates cross-country synergies to strengthen the solutions we provide and fortify the impact we have."

Yasuhiro Hara, President, ULVAC-PHI



PHI GENESIS: Fully automated multi-tech XPS

The Power of Surface Analysis Unleashed

At the forefront of surface analysis, ULVAC-PHI sets the stage for global expansion and technological breakthroughs.

Global commerce is a dynamic place, where the strategic positioning of companies is crucial, particularly in the face of evolving economic policies and market demands. ULVAC-PHI, born from a strategic alliance between U.S. company Physical Electronics and ULVAC, epitomizes the convergence of expertise and innovation, and aims to maximize the competitive advantage afforded to Japanese companies.

"Our major business initially focused on dealing with the United States, expanded further in Japan, and from that core, we are now steadily starting to expand to other countries," says Yasuhiro Hara, the company president. This expansion, fueled by a commitment to diversifying supply chains, underscores Japan's growing significance in the global market.

Partnerships have emerged as a cornerstone of ULVAC-PHI's strategy, with a focus on joint research and development. "R&D is a driving force for the market," the president explains, citing trends in the U.S., Europe and even Asia. "We're keen to find companies that can collaborate with us, those that will allow us both to draw forth the best technologies in a mutually beneficial relationship."

The company's legacy of surface analysis innovation, stemming from the symbiotic relationship between PHI and ULVAC technologies, continues to drive its success. This has been credited to the collaboration for propelling ULVAC-PHI to become a global leader in the underlying technology.

"At that time this surface analysis technology was something that was unknown in Japan," reflects Mr. Hara. "It was through ULVAC-PHI's promotion of this tech that it spread widely throughout Japan, not only to industry players, but also to governmental departments, universities, and R&D laboratories.

"This push has really been the key driving force behind the development of

surface analysis technology," the president continues, "and it has since become a technology that is applied to a wide range of fields around the world. Honestly, I think this is the greatest benefit that came from our collaboration."

ULVAC-PHI's surface analysis products find diverse applications across a variety of industries, with batteries and semiconductors emerging as key growth areas, not only on the R&D and quality control front but also in ways where the product outputs can become key indicators in business management. This foresight underscores the company's commitment to anticipating industry trends and meeting evolving customer needs.

"Due to further deepening our research and understanding from the customer's perspective, we understood that their objective at the time of purchase changes as they continue to utilize the device," says Mr. Hara. "Slowly, as they use the device, new needs may emerge. We have a strong corporate purpose to become a company that is always thinking about what will best serve the customers, not what will sell the most."

Then there is the introduction of groundbreaking products like the PHI GENESIS and PHI nanoTOF 3* that reflects ULVAC-PHI's dedication to innovation. The

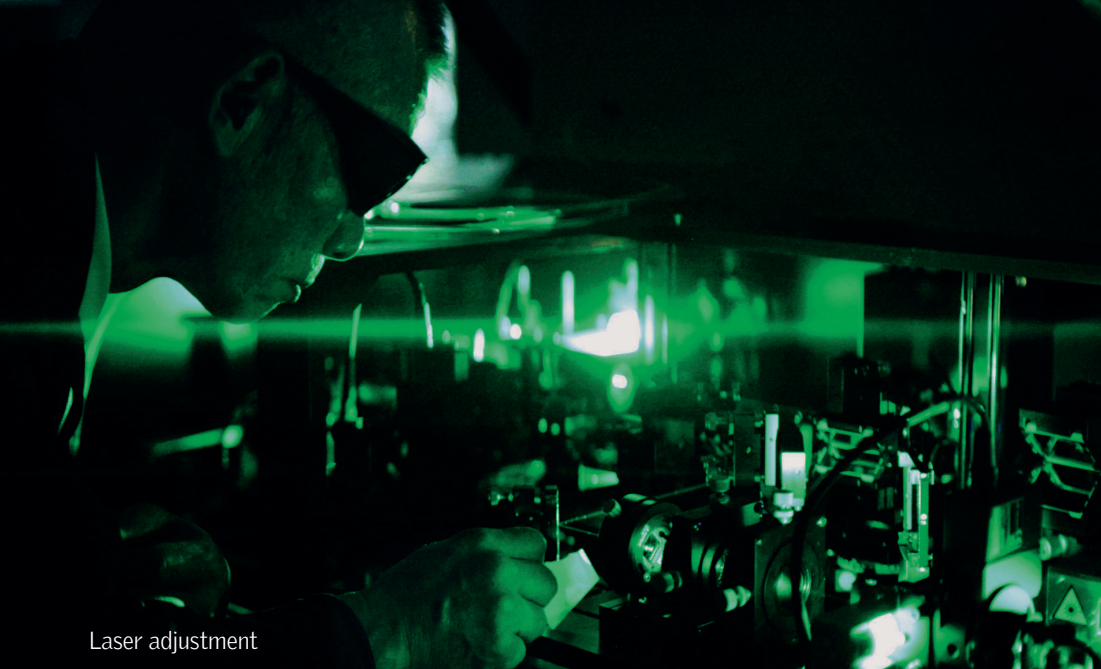
PHI GENESIS is a culmination of customer-centric design, tailored to meet evolving market demands, while the PHI nanoTOF 3* offers cutting-edge capabilities in ion identification and high-resolution imaging, poised to revolutionize the aforementioned industries of batteries and semiconductors. The key benefit is not only the 2D imaging, but the fact that the device can produce 3D images, importantly allowing users to see the depth of a material. Users can analyze when something is broken or faulty and then troubleshoot it.

Looking ahead, ULVAC-PHI sets its sights on expanding its global footprint over the next few years, particularly in emerging markets like Southeast Asia and India.

"We already have a leading share when it comes to the surface analysis instrument market, but we want to get even bigger than that," states the president. "We want to be the unquestionable giant, the unquestionable leader of the global market, blazing open new possibilities for applications of our technology. Towards this end, we are putting huge investments into R&D and therefore are actively seeking R&D partners around the world to grow with us."



PHI nanoTOF3+: Latest generation of TOF-SIMS



Laser adjustment



"Regardless of the changing times, the value of transforming our clients' inconveniences into conveniences remains unchanged."

Michihiro Tamenori, President,
Seishin Trading Co., Ltd.

Seishin Trading: Pioneering Innovation and Global Partnerships in Manufacturing

A journey from trading to cutting-edge technologies, collaborative excellence, and the strategic response to market dynamics in the ever-evolving global landscape.

As global logistics have faced disruptions in recent years, due to the COVID-19 pandemic and the U.S.-China decoupling, for example, Seishin Trading has kept a focus on Japan's unique position in the market.



Seishin headquarters

"Despite the growing dominance of China and Southeast Asia, Japanese products maintain a reputation for superior quality," says Michihiro Tamenori, the company president.

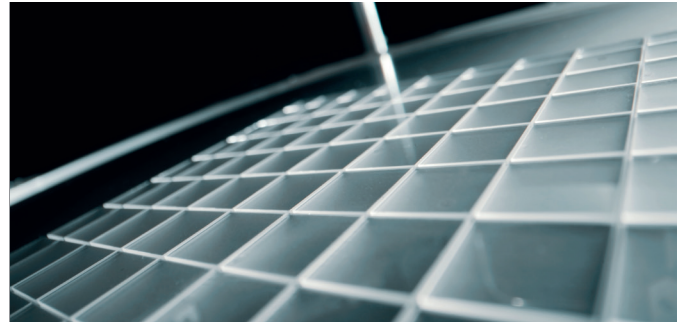
By embracing flexibility and agility, though, Seishin Trading aims to differentiate itself from competitors through strategic investments across various industries and regions. Its wide portfolio spans precision equipment, diverse analysis, safety and environment, and electronic materials, and the company looks to take a proactive approach, anticipating stricter government environmental regulations, particularly in analysis. In the field of precision equipment, the company's laser processing machines, including

the well established Stealth Dicing series, are used by world-leading electronics companies.

Seishin Trading's belief that staying ahead of the curve on the latest technological advancements is essential, has contributed to the development of the world's first vertical ALGaIn-based ultraviolet-B laser diodes. This technology, born out of collaboration with Japanese universities, is aimed at advancing power output in the future, with anticipated applications in the fields of healthcare and industry.

"We are currently working on establishing the manufacturing technology for perovskite solar cells as one of our new products," Mr. Tamenori explains. "The goal of these solar cells is to replace traditional batteries, particularly base cells. Notably, several prominent printing companies in Japan are also intrigued by this product, and we're striving to make this available in a minimum of three years."

One of the obvious success factors for the company has been, as the president says, "transforming our clients' inconveniences into conveniences," which often presents valuable business opportunities. And through innovation and by manufacturing devices that generate customer profits, Seishin Trad-



A sample subdivided by the laser processing machine

ing has established its current lofty status, contributing to the chip resistor market through its craftsmanship and efficient proposals.

With the continued challenges in Japan, however, there is an acknowledgment in the company's business model that a shift towards seeking collaborative partners overseas is required.

"When a partnership or contract is formed, it is based on trust and can ultimately lead to substantial economic benefits," the president says, highlighting a flexibility to target India and further afield. "Our ambitions extend beyond just the ASEAN region."

As the semiconductor industry undergoes predicted fluctuations, cautious optimism remains. While not directly focused on semiconductors, Seishin Trading is closely

tied to chip registering, especially in applications such as electric vehicles. With an eye on technological shifts and potentially transformative ideas, with past experiences of mp3 players, there is an ongoing need for innovation.

And looking ahead, the president envisions Seishin Trading's future revolving around development and a continued customer-centric approach.

"My goal is to reinforce our existing sales team," Mr. Tamenori says, "believing that Seishin will continue to grow and strengthen by remaining steadfast alongside our clients."



www.seishin-syoji.co.jp/en

Restar Embedded Solutions' Ambidextrous Approach as a Business Integrator

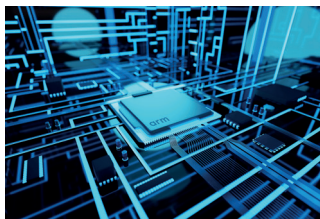
The newest member of the Restar Group, Restar Embedded Solutions aims to support SMEs in their journey towards digitization and digitalization, as a trusted supplier of electronics, business and office services.

Following its acquisition by the Restar Group, Tsuzuki Embedded Solutions became Restar Embedded Solutions Corporation in January this year, a move aimed at supporting the company's sustainable growth and its mission to be a "business integrator," creating value together with its clients as it looks to expand its global operations.

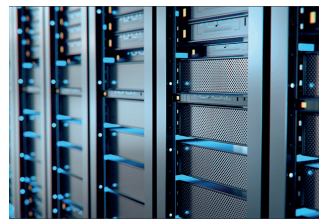
"The Restar Group aims to be an 'Electronics Value Platformer,' and the Group's core business is the sale of semiconductors and electronic components and the provision of solutions," says Restar Embedded Solutions President Hirofumi Yanase. "We believe that the value of the know-how, network and human resources that we have developed over the years will be maximized and lead to further growth in the electronic devices business."

A fully-integrated solutions provider, Restar Embedded Solutions has three main business areas: OEM sales, ARM development, and maintenance support for embedded devices, electronic components and software; business integration services encompassing DX (digital transformation), IoT and collaboration; and office services, including EC services, business support services and ESS (ecology, safety, security) solutions.

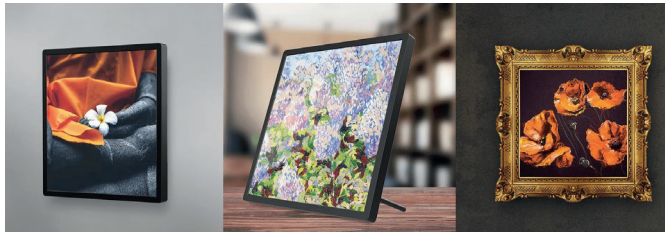
The company has built a diverse portfolio of clients that extends beyond the manufacturing industry, encompassing areas such as office supplies and mid-sized companies, and is deeply involved in collaborative efforts with its clients, engaging in various new projects such as test marketing and collaborative initiatives aimed at enhancing their profitability. Taking a comprehensive and ambidextrous approach, Restar Embedded Solutions combines consulting services with digital tools to identify areas in need



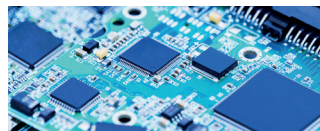
Embedded devices



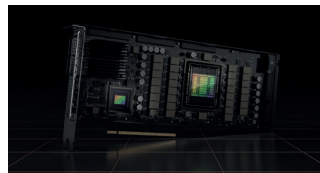
Platform solution



Digital signage



Electronic devices



Human interface

of improvement, subsequently providing services that address these challenges.

One of the issues the company is particularly focused on is supporting Japanese SMEs to adopt new digital technologies and innovations in order to reduce labor shortages.



Supporting DX journey

"Our mission is to support these SMEs in particular on their journey to digitization and digitalization," adds Mr. Yanase. "We aim to strengthen this business by helping them implement and adapt to digital technologies. And what reassures our clients the most

is that the digital technologies are implemented internally at Restar Embedded Solutions. We offer and recommend approaches that have been thoroughly tested internally."

One significant value the company brings to its clients is the capability to integrate analytical tools that allow them to initiate the analysis and digitization of their financial data and operating environment. Through digital technologies, it presents a numerical representation of the client's operating environment, enabling them to clearly visualize areas for cost reduction. "Once we have highlighted areas where costs can be trimmed, we recommend reallocating those resources toward digital transformation initiatives. This shift in resources is aimed at improving profitability and enhancing productivity," says Mr. Yanase.

With operations in Singapore, Shanghai and Hong Kong, Restar Embedded Solutions aims to expand its client portfolio in the regions where it operates, opening itself up to potential partnerships with local electronic trading companies.

Restar Embedded Solutions has witnessed significant growth in operating income over the past two years, and the company's acquisition by Restar Group bodes even better for the company's aspirations for global expansion and sustainable business growth. However, its broader mission centers around ensuring the well-being and prosperity of its employees and their families, the president stresses: "We firmly believe that their thriving is pivotal to our long-term sustainability. To achieve these objectives, we are actively exploring opportunities for upskilling, potentially through collaborations or alliances."