Horizon Insights
弘 则 研 究

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Closer to Chinese Markets: China's Industrial Automation Sector Update

Independent thinking and on-the-ground perspective

China's Industrial Automation Sector Update

Although the primary reason for industrial automation is to increase factory output while reducing costs, Industry 4.0 demands integrating the latest technologies, such as artificial intelligence of things (AIoT), 5G communication networks, and autonomous robots, to usher in the next generation of factory automation. In Factory 4.0, data from sensors and PC-based controllers or Programmable Logic Controllers (PLC) will be used to control drivers and motors and integrated into IoT devices and other IT systems, such as machine learning AI. This integration will allow for the creation of additional value-added services and solutions for manufacturing clients. Smart factories can maximize output while minimizing costs and downtime and ensuring the production of high-quality products with on-time delivery, zero defects, and quick customer service response times.

Sector Updates

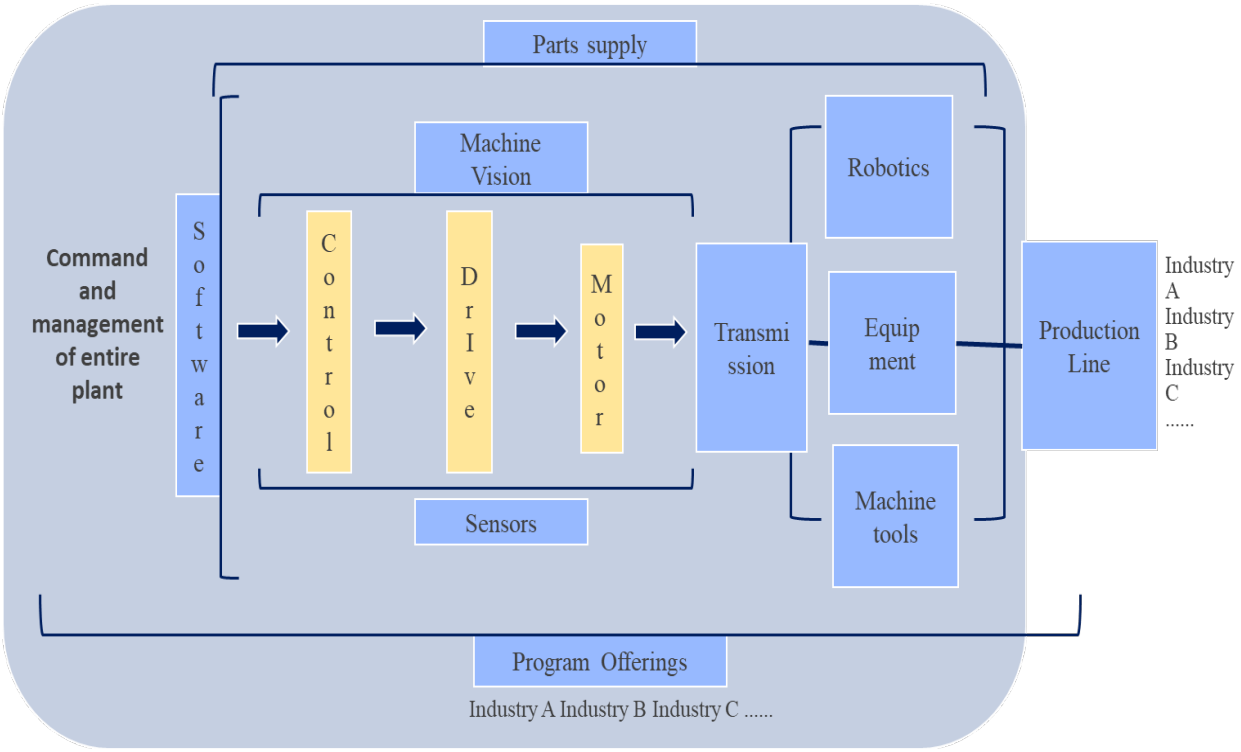
In a mature and slow-growing industry, Industry 4.0 holds the key to the future of industrial automation. However, China's factory automation industry still lags behind in fully integrating the latest technologies to provide high-value solutions and services to clients. This is evident in the sector's single-digit growth in recent years. The challenge lies in China's manufacturing sector, which is based on a low-cost, mass-production model that relies heavily on economies of scale and a clear division of labor between upstream and downstream supply chain vendors. As a result, implementing Factory 4.0 poses a significant challenge for system integrators, as a cost-benefit analysis may not justify drastic changes or upgrades. Nonetheless, a step-by-step approach to system integration towards Factory 4.0 may be necessary to ensure future growth.

China's Companies to Watch in 2023
Gushengtang 2274.HK
Montage Technology 688008.SH
Meituan 3690.HK
Miniso 9896.HK
L K Technology 0558.HK
Sany Excavator 600031.SH

China's Automation Market (RMB100 Mn)

China's Industrial Automation Sector Overview & Update

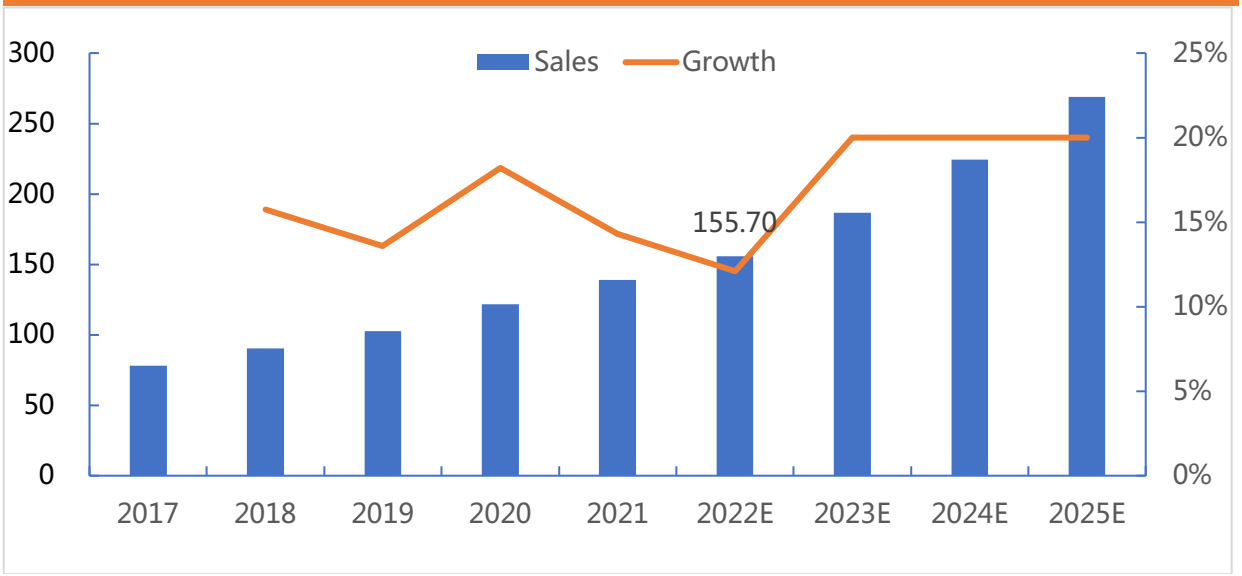
- **In a typical industrial automation control system for factories, three main components are used: 1) a controller, 2) a driver, and 3) a motor.** The controller determines what the motor needs to do, and the driver (also known as a frequency converter-inverter) powers the motor by converting and amplifying the electrical energy it receives from the controller. Essentially, the driver receives a signal from the controller and sends the necessary electrical energy to the motor to make it move as commanded by the controller.



Controller Option: PC-based Industrial Controllers vs Programmable Logic Controllers (PLC)

- An industrial controller for factory automation based on a PC is an industrial computer that can either be a general PC-based controller or a custom-built Programmable Logic Controller (PLC) designed for specific applications and automation requirements. Both controllers are ruggedly built to withstand harsh conditions that desktop PCs or workstations cannot handle. With the advent of Add-On Instruction (AOI) feature in PLC, both PLCs and PCs have evolved and developed similar features. As a result, the latest updated models of both types of controllers have such similar features and benefits that it has become challenging for factory system integrators to decide which product to use.

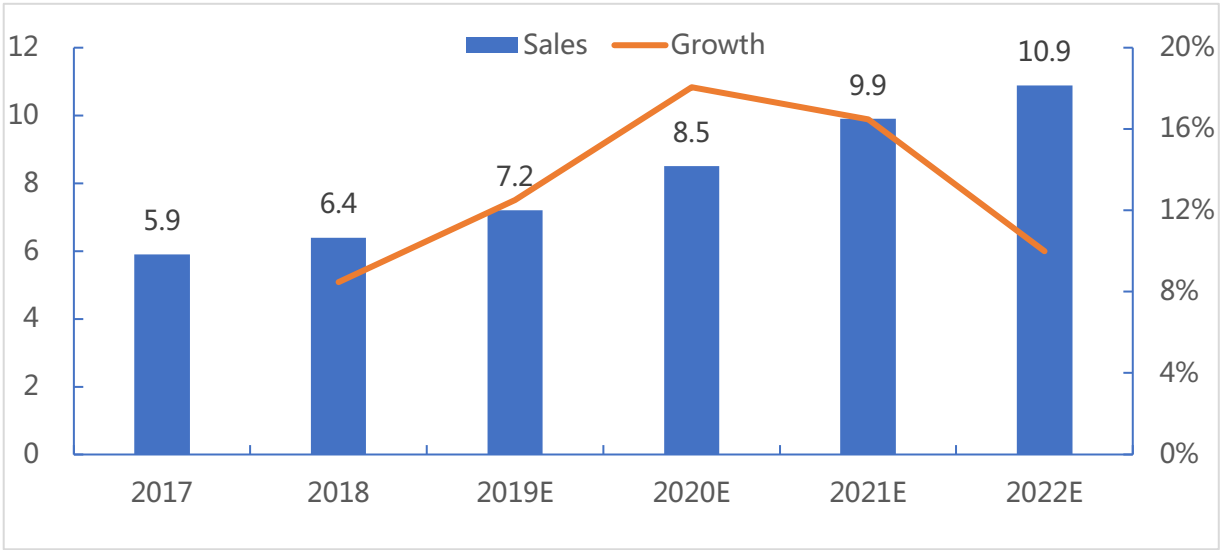
China PLC Market (RMB100 Mn)



Data source: MIR, Common Research Network

- PLCs are customized to perform a strict set of specific functions, while industrial PCs can be mass-produced and are more versatile. Moreover, various industrial PC types can be tailor-made for specific industrial automation applications. As a result, rugged industrial PCs can be a viable alternative to PLCs in harsh industrial environments and conditions. In some cases, factories use both PLCs and industrial PCs in their operations. Ultimately, whether to use a PLC or an industrial PC depends on a factory's needs and what they aim to accomplish, as well as whether they require a custom-built solution for a specific purpose.

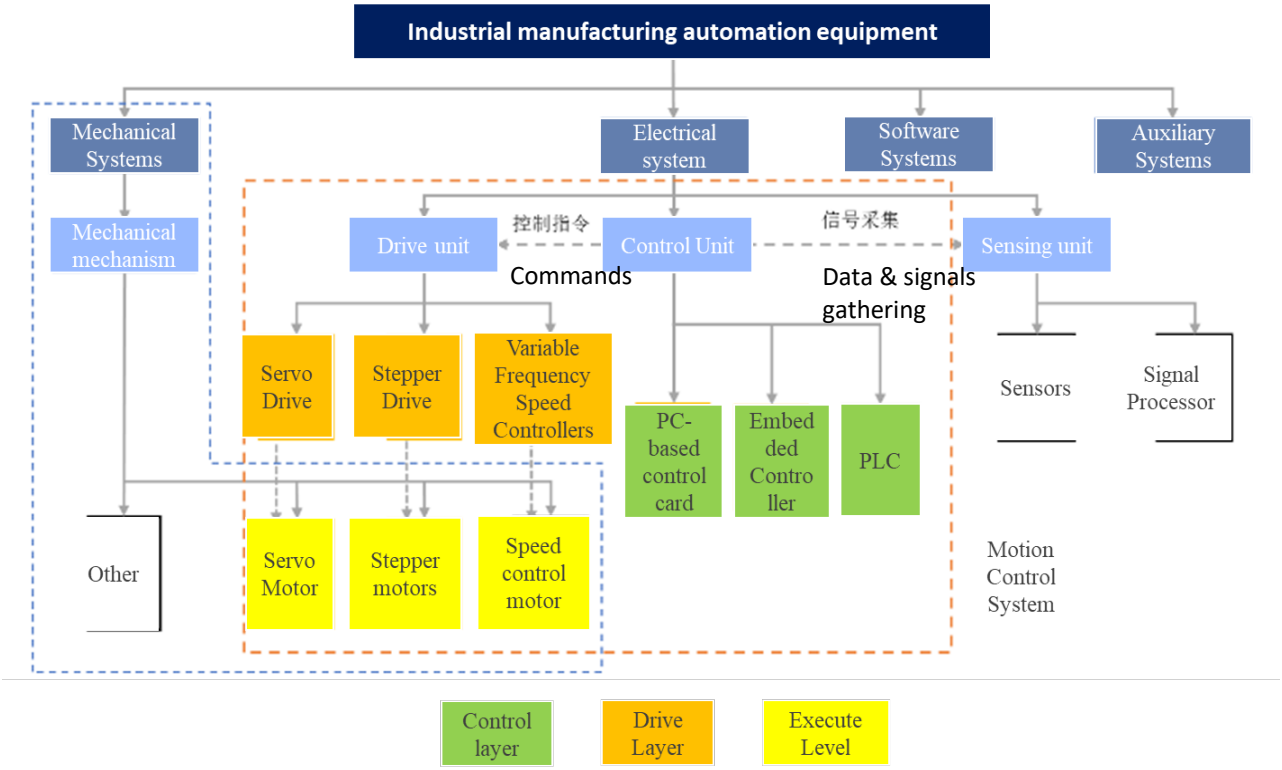
China PC-Based Industrial Controller Market (RMB100 Mn)



Data source: Leisai Prospectus, China Industrial Control Network

- Although industrial PC-based controllers and PLCs have become very similar with matching features, it is worth noting that PLCs are professionally made to order and are more secure because they traditionally do not have built-in wireless connectivity and can be used by hackers unless specifically requested.

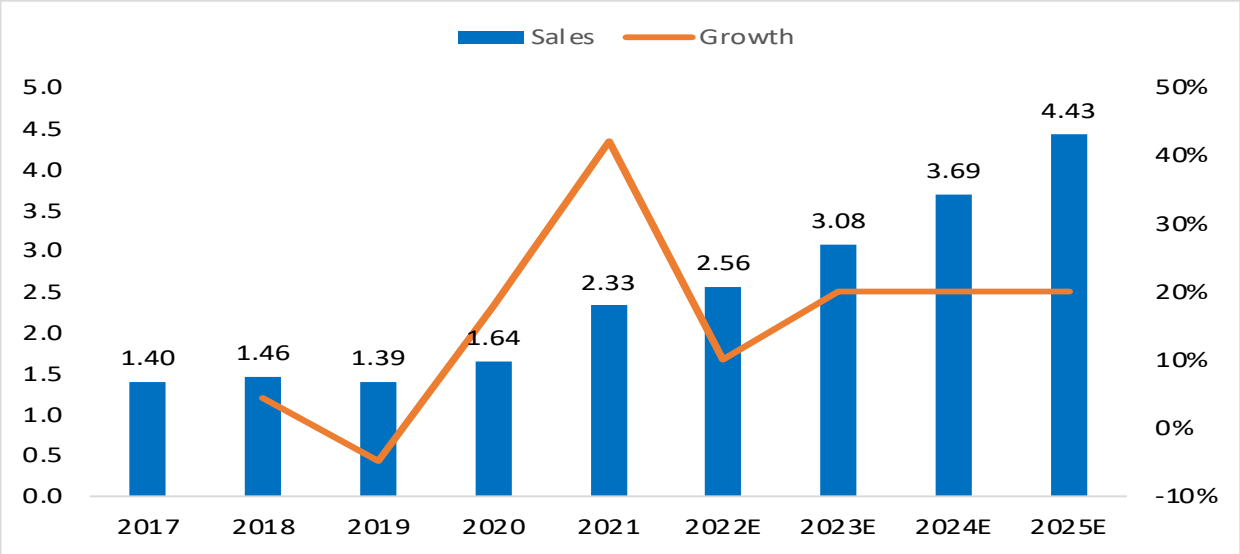
- In China, however, industrial PC-based controllers are more popular due to their significantly lower initial cost, increased code reusability, versatility, and functionality, and fewer training, maintenance, and programming development requirements than PLCs. PLCs tend to be tied to the manufacturer and specific language, with fewer options for troubleshooting.



Servo drive & motor vs stepper drive & motor

- The global servo drive and the motor market is a well-established industry, with a projected compound annual growth rate (CAGR) of only 5% to 9% over the next five years. However, China's servo drive and motor market are expected to experience more robust growth. This is mainly due to the increasing use of servo systems for manufacturing automation in China. A complete servo system typically comprises three key components: a controller, a driver, and a motor. In this system, servo drive and motor components replace stepper drive and motor components.

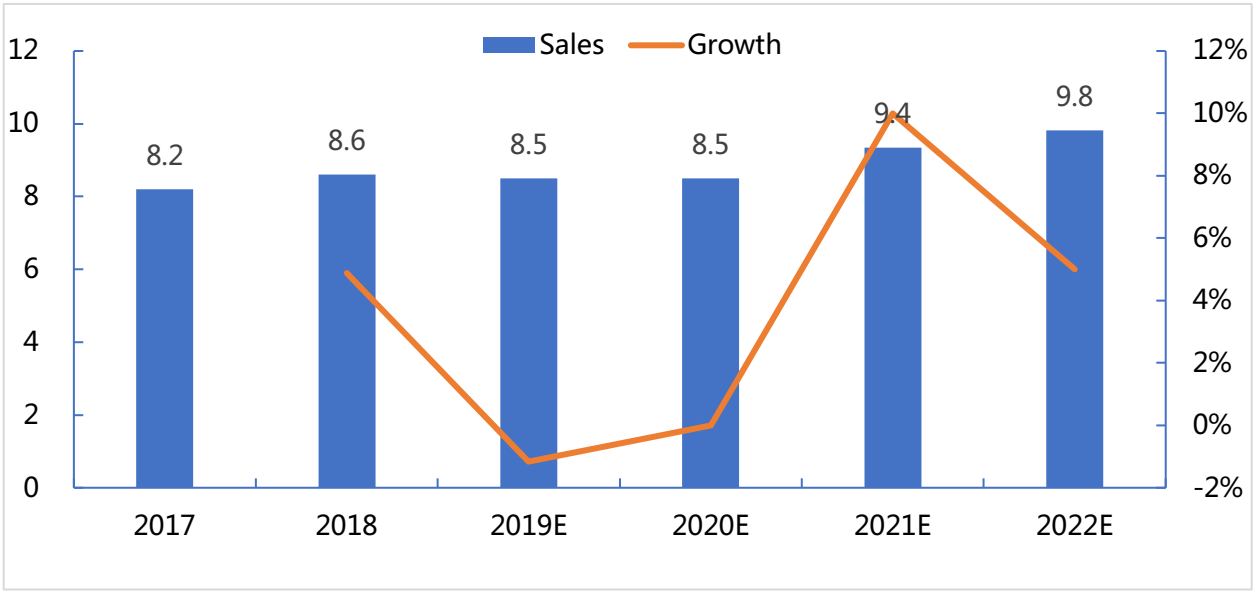
China General-Purpose Servo System Market (RMB100 Mn)



Data source: MIR, Common Research Network

- Servo and stepper drive and motor systems are capable machines that convert electrical energy into mechanical energy to power factory automation processes. By replacing outdated, low-efficiency electric motors with highly efficient servo motors, production lines with heavy-duty loads can experience increased efficiency and output. However, stepper drive and motor systems may be more suitable for light loads requiring a smaller and less powerful motor.

China Stepper System Market (RMB100 Mn)

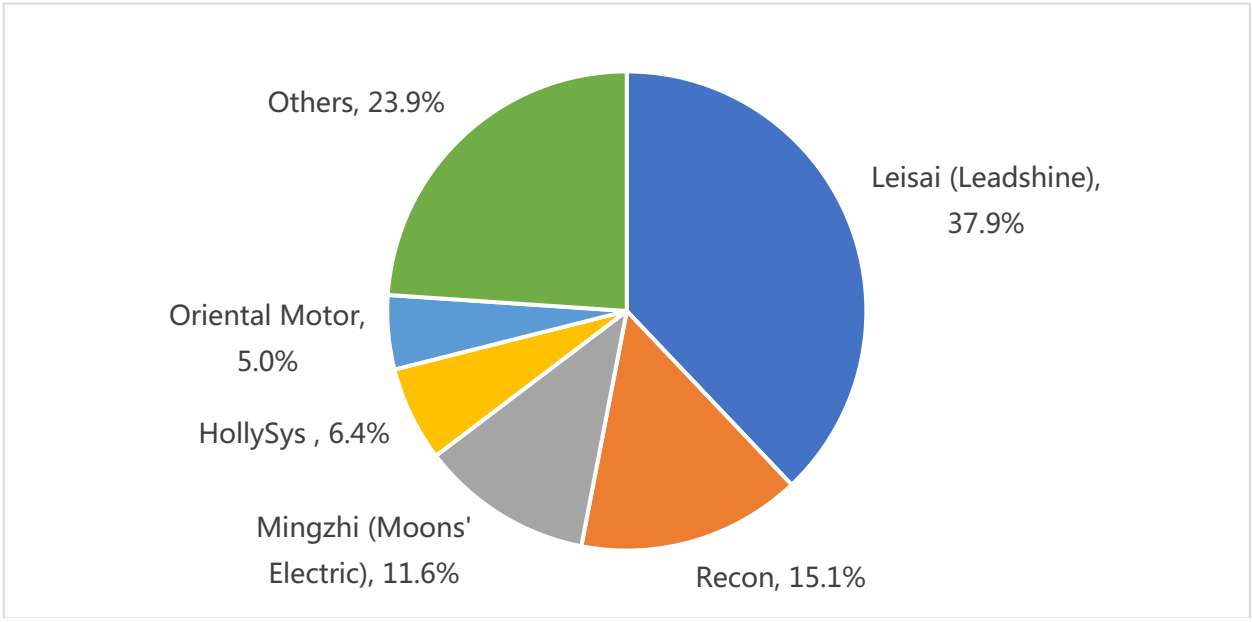


Data source : Leisai Prospectus, China Industrial Automation Network

- It is important to note that although servo drive and motor systems are more powerful than stepper drive and motor systems, they also come with higher costs and require adequately trained staff. In contrast, stepper motors may be more suitable for specific applications requiring only a small, simple motor running at low speeds with much lower costs and maintenance and training requirements. These applications may not require feedback and can be operated easily.

- In China, servo drive and motor systems are more popular than stepper drive and motor systems due to their significant power, efficiency, and functionality advantages. The stepper driver and motor market, along with the PC-based industrial controller market, are mature sectors with limited market growth potential and a high rate of localized manufacturing.

China Stepper System Market (2018)



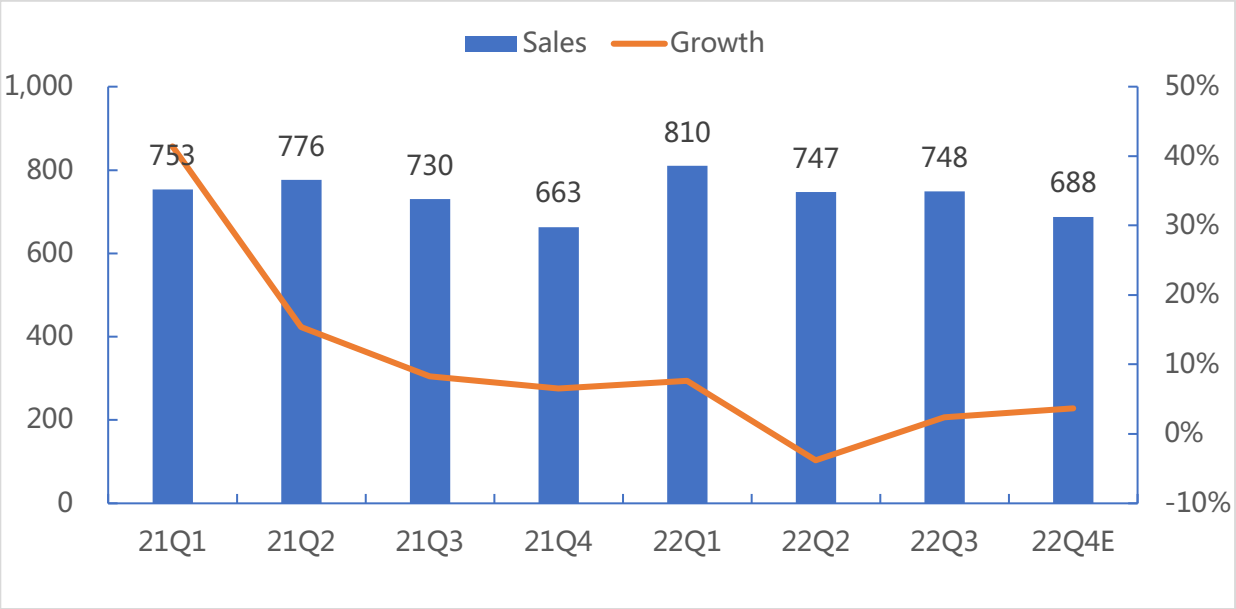
Data source: Leisai Prospectus, China Industrial Control Network

Competitive Landscape Analysis

- Overall demand for industrial automation systems has improved in 4Q22 and is expected to continue to increase in 2023. Sales orders recovered MoM in the fourth quarter due to strong demand in the new energy industry, with domestic brands outperforming foreign brands.

- Given that China's economy has been seriously impacted by Covid-19 shutdowns & restrictions in 2022, downstream customers have been proactively controlling costs and cautious in making additional investments. Hence, China's industrial automation system market is expected to grow from a low base in 2022.

China's Automation Market by Quarter (RMB100 Mn)

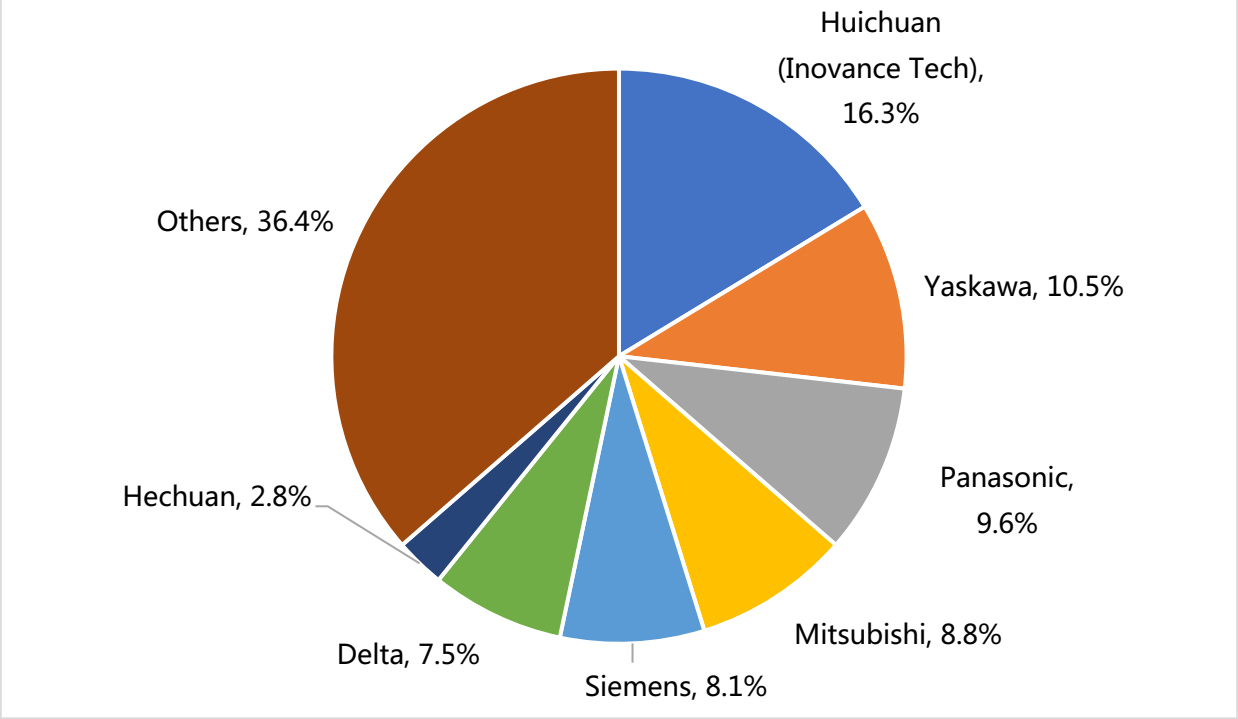


Data source: MIR

- Foreign brands mainly sell in the high-end product-market segments, with low demand elasticity. As a result, their market share in these segments remains stable and is not significantly impacted by price competition or industry trends favoring domestic brands. For instance, high-end automation models are necessary for product-market segments requiring complex manufacturing automation processes such as cutting and grinding, and foreign brands dominate this field.

- Despite their dominance in these segments, foreign brands are cautious about their 2023 forecasts due to ongoing supply chain problems. For example, delivery times for assembly and ramp-up for imported brands such as Siemens and Mitsubishi can take up to two to three months. Therefore, foreign brands predict low single-digit growth or even negative growth in 2023. Consequently, there is still ample room and opportunities for import substitution of high-end servo drive and motor products and systems, which may occur in due course.

China Market for Servo System in 2021

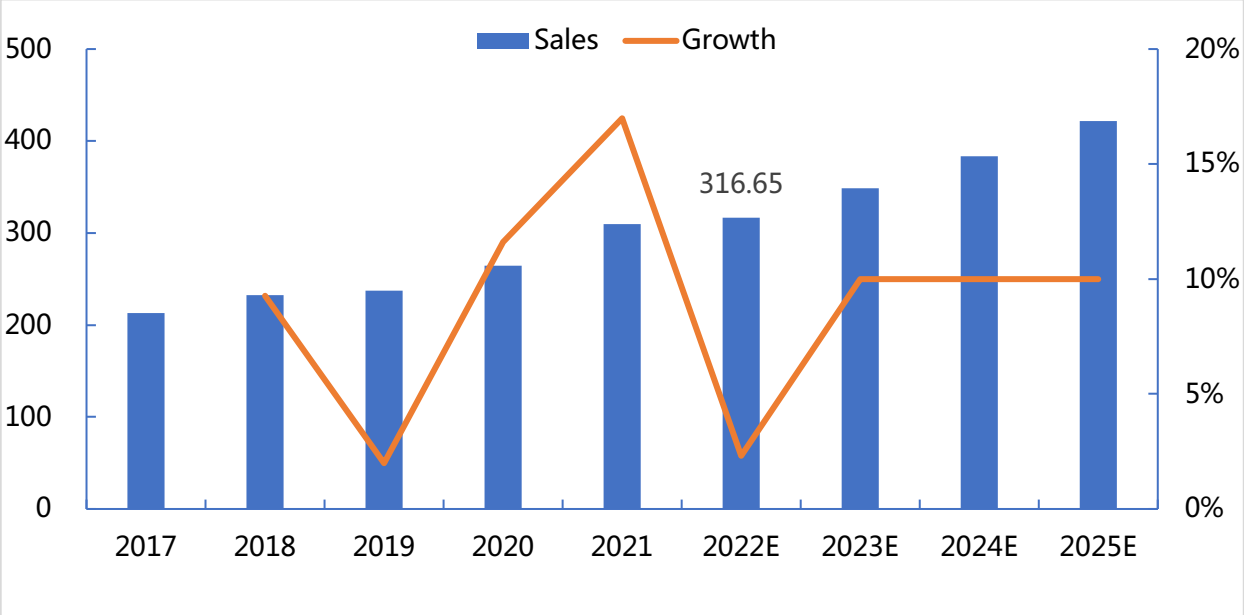


Data source: Hua Jing Industry Research Institute, MIR

- In contrast, the industry trend of import substitution is already occurring rapidly in the lower-end product-market segments. Looking forward to 2023, domestic brands are expected to continue replacing foreign brands in market share. China's drive and motor product market has entered a new era of reduced production costs, enabling domestic brands to reduce prices significantly. Domestic manufacturers have achieved efficiency gains that have reduced production costs and lowered the cost of products in areas such as optical editing and magnetic editing, allowing domestic manufacturers to launch price competition.

- In the fourth quarter of 2022, the price gap between domestic and foreign brand products widened, increasing import substitution in the lower-end product-market segment. Many major customers have adopted project bidding to lower costs, awarding projects to the bidder with the lowest price quotation. This has resulted in fierce competition between **Inovance Tech** and **He Chuan Tech** for large domestic customer projects, particularly in the lower-end motor and drive market, including converter-inverter products.

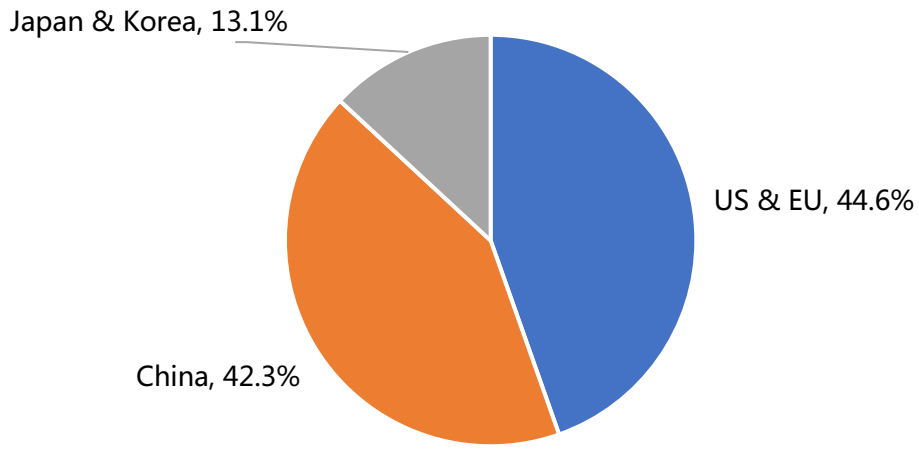
China's Low-Voltage Converter-Inverter Market (RMB100 Mn)



Data source: MIR, Common Research Network

- **During the Covid-19 pandemic, the supply shortage of converter-inverter imports from the US, EU, Japan, and Korea and price competition have resulted in short-term domestic sales growth for domestic brands. Furthermore, the trend towards import substitution in the industry is anticipated to persist into 2023.**

China's Low-Voltage Converter-Inverter Market In 2021

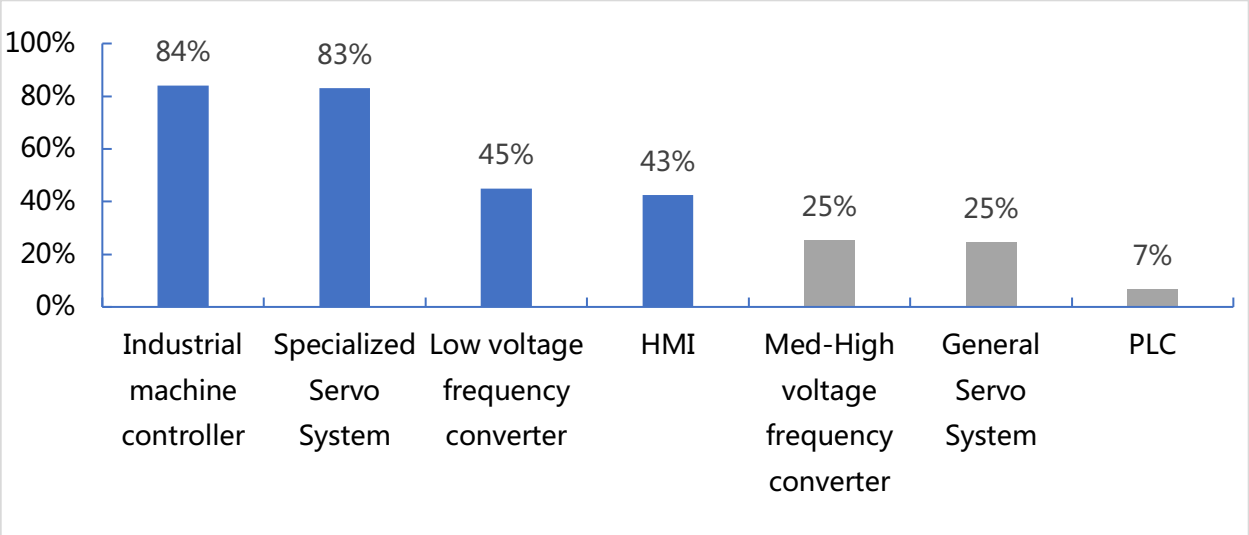


Data source: Hua Jing Industry Research Institute, MIR

- Competition in the domestic servo system market has become more intense. The localization rate of servo system manufacturing, including controllers, driver-converter-inverters, and motors, has continued to rise, leading to a sharp contraction of foreign brands. This has resulted in heightened competition between domestic brands, with many introducing and developing new and comprehensive portfolios of servo products.

- The localization rate of PLCs remains sluggish. Domestic PLCs have yet to be widely accepted by end users, and it will take more time for PLC localization efforts to make further progress.

Localization Rate of Industrial Automation Products In 2021



Data source: Hua Jing Industry Research Institute, MIR

- All in all, the negative impact of Covid on the automation sector was very serious in 2022. However, growth rate of the industrial automation market in 2023 is expected to recover to an acceptable level. As an across-the-board phenomenon for most industries in China during Covid, the large players are less affected and enjoy first in line benefits in terms of customer orders while many small players have faced detrimental sales declines.

- In the lower end product-market segment, including the converters-inverters, domestic brands have high hopes for 2023, expecting it to be a big year given the continual trend of import substitution. With the demand from downstream new energy industry continue to maintain rapid growth, and with downstream factories' willingness to invest in new updated automation system has increased as the Covid related problems fade, domestic brands are gaining sales growth momentum going into 2023.

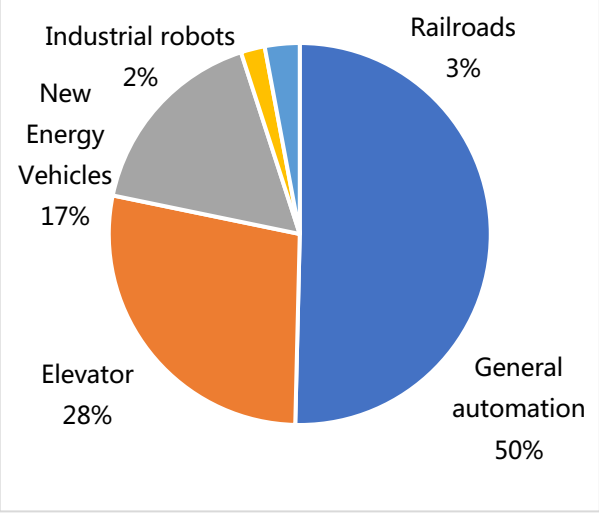
- In summary, with the Covid situation improving, domestic brands are optimistic about the prospects for 2023. Downstream factory clients have regained confidence to invest in automation systems, and it is anticipated that lower-end mainstream products, such as driver-converter-inverters and motors, are expected to be the primary beneficiaries.

- Meanwhile, in the context of ongoing price competition in China's domestic market, automation system vendors increasingly target domestic customers in the new energy sector. The growth drivers for China's factory automation industry before 2025 are expected to remain the same, with demand from three major sectors: solar photovoltaic energy, lithium batteries for electric vehicles, and semiconductors. Medium-sized PLCs for photovoltaic and lithium batteries are still primarily dominated by foreign brands such as Siemens and Omron.

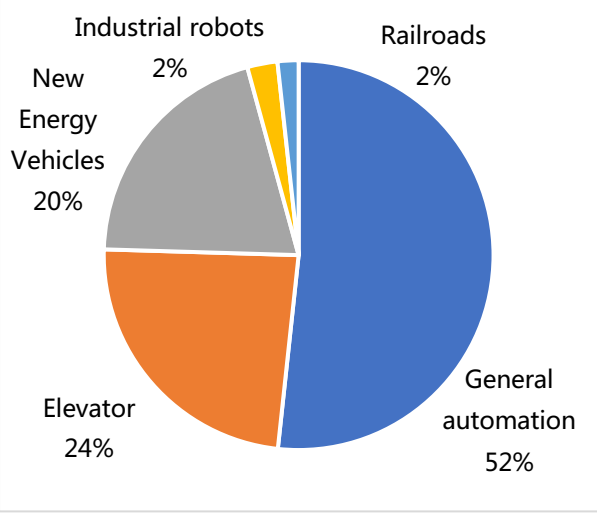
Key Updates: Inovance Tech & Leadshine

- **Inovance Tech (300124.SZ)** generates over half of its revenue from the industrial automation sector. The company's main business strategy has two prongs: first, to become a solution provider in the industrial automation industry, with a particular focus on the new energy sector in 2023, and second, to expand its presence in overseas markets.

Inovance Tech 2021 Sales Breakdown



Inovance Tech 3Q22 Sales Breakdown

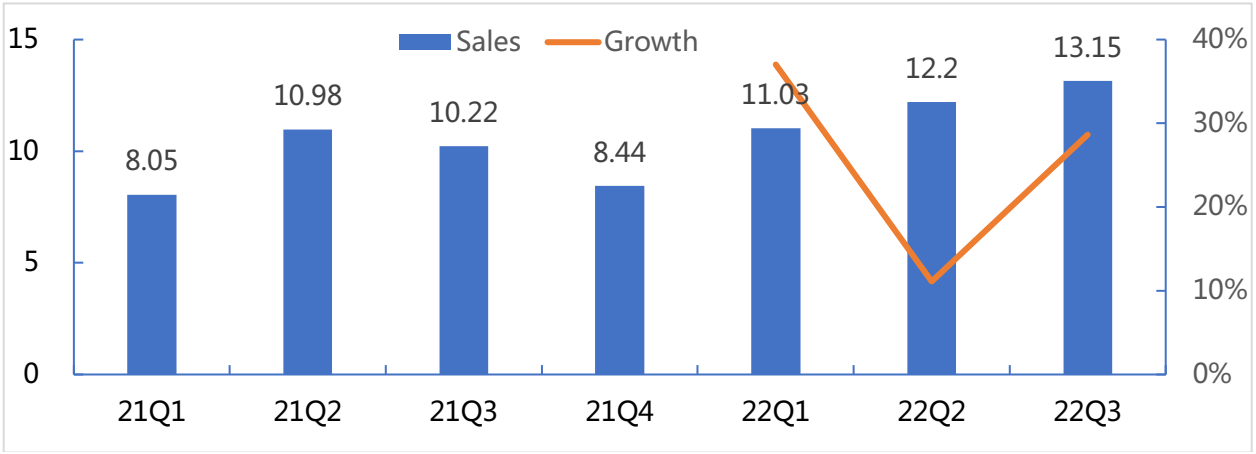


Data source: Wind

- Due to the large market potential of overseas market, expanding to overseas market may provide rapid growth. However, this will depend on the degree by which the new energy industry (i.e. solar photovoltaic & lithium battery for EV) and other key industrial sector's logistic supply chain will transfer and relocate to Southeast Asia, before industrial

automation suppliers such as Huichuan can decide to whether to follow suit or not.

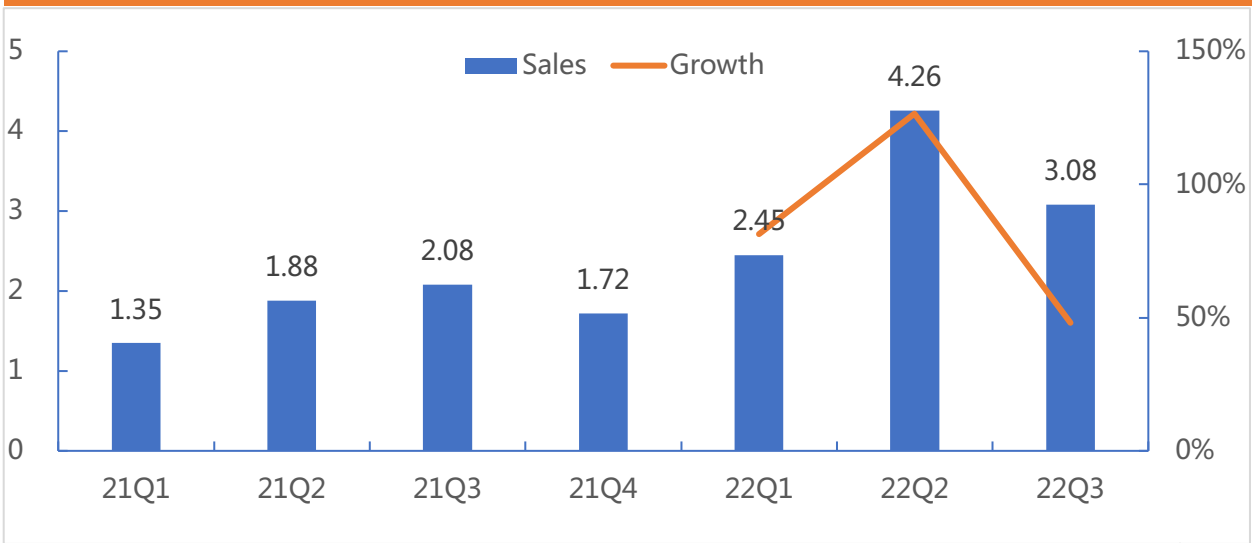
Inovance Tech's Servo System Sales (RMB100 Mn)



Source: Wind

- Inovance Tech is seeking to become a provider of solutions for clients. Since product hardware is increasingly becoming homogeneous, providing solutions & services will therefor become the key to future growth and the basis of competition. In addition, to solve a client's problems, management at Inovance Tech has established new departments targeting markets in automotive, industrial internet, and new energy industries with increased personnel and investment.

Inovance Tech's PLC-HMI Sales (RMB100 Mn)

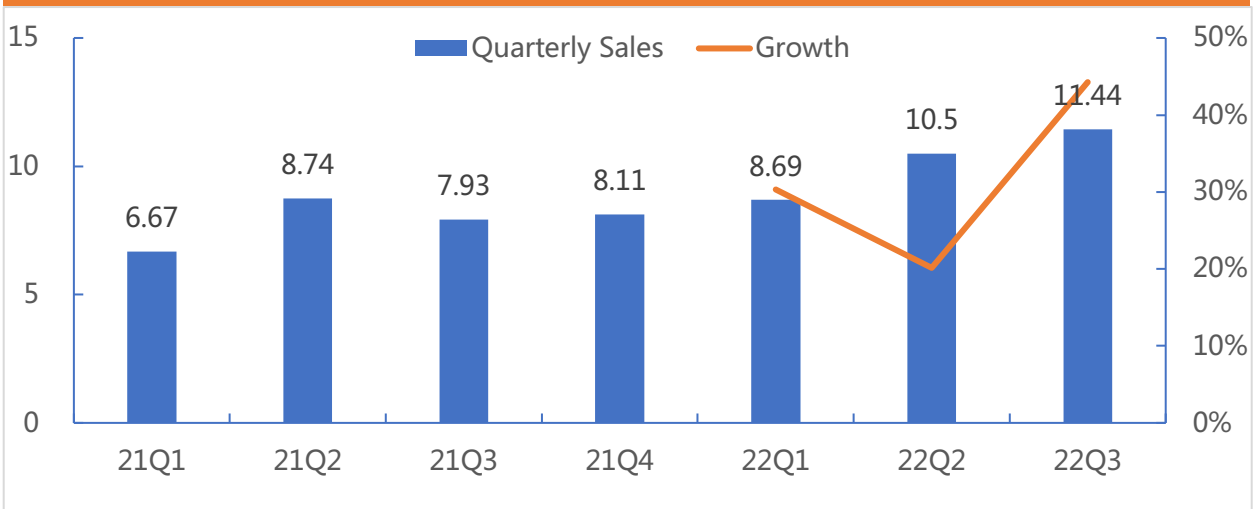


Source: Wind

- The supply of foreign brand's converter-inverter products is very limited due to supply

chain issues. Domestic brands such as **Inovance Tech** uses domestic suppliers that did not have a supply chain issue, and has seen a rapid QoQ growth in 2022, largely due to increasing demand from the heavy industrial sector.

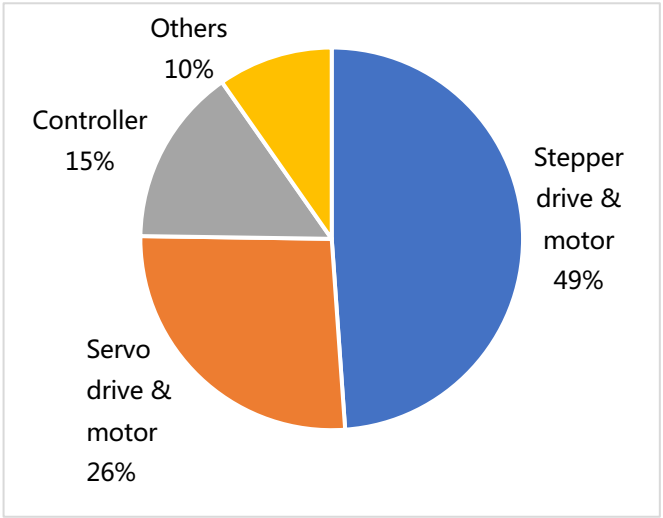
Inovance Tech's General Converter-Inverter QoQ Sales (RMB100 Mn)



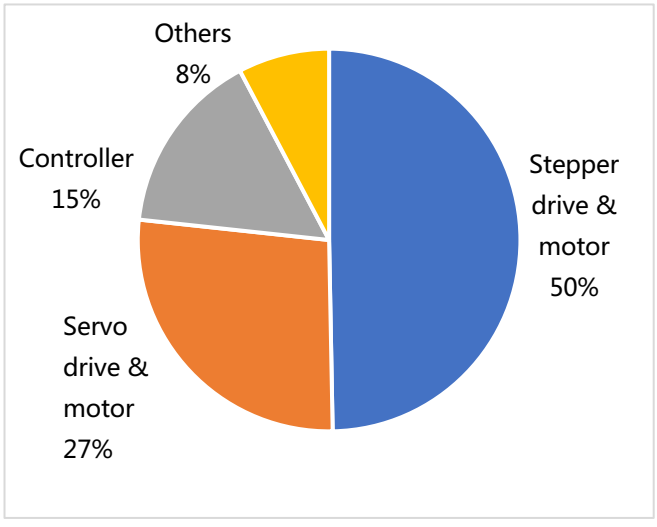
Source：Wind

- **Leadshine Technology (002979.SH): Leadshine** will continue to place a strong emphasis on expanding its distribution channels in 2023, selling servo motor & driver system and PLC products as upgrades to existing customers currently still using traditional stepper motor & driver boards.

Leadshine 2021 Sales Breakdown

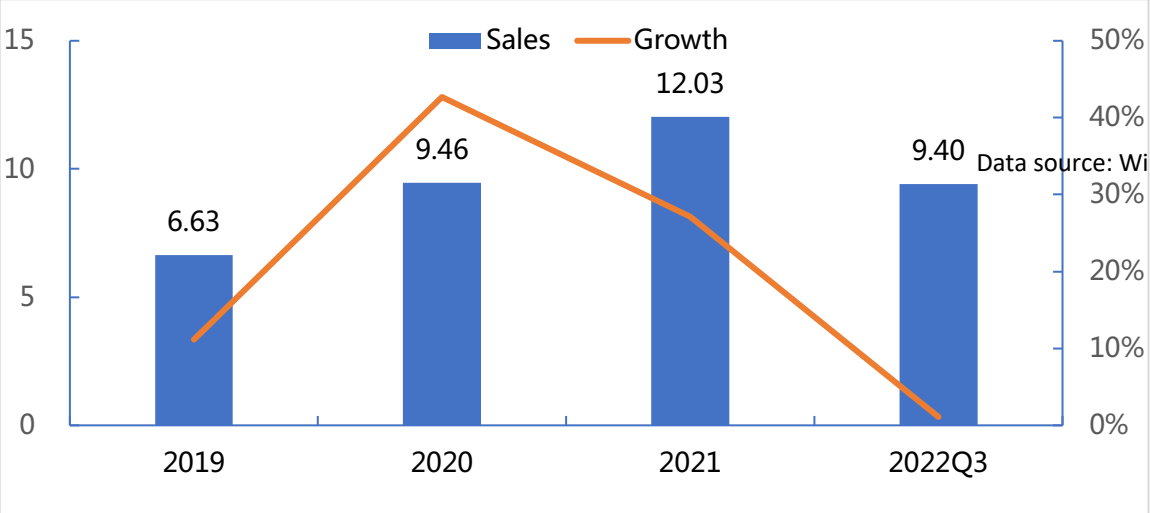


Leadshine Q3 2022 Sales



- **Leadshine** future development direction is from stepper motor & drive system to servo motor & drive system, and from PC-based to PLC. **Leadshine** 's can utilize and apply its past experience in stepper system & PC-based controller on top of its already established existing customer resources to its future business development focusing on higher-end servo motor & drive systems and PLC. (S-18)

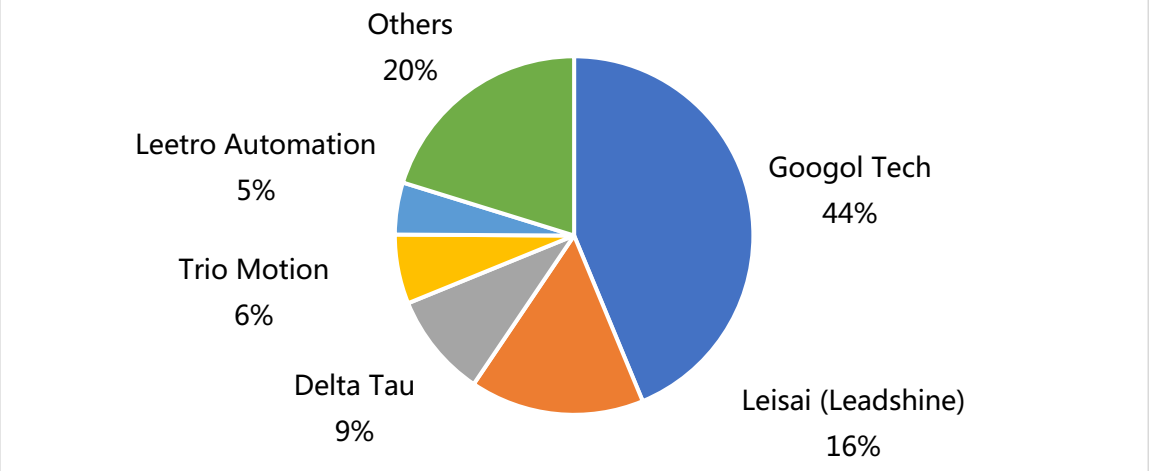
Leadshine's 2019 – YTD Q3 2022 Sales (RMB100 Mn)



Source: Wind

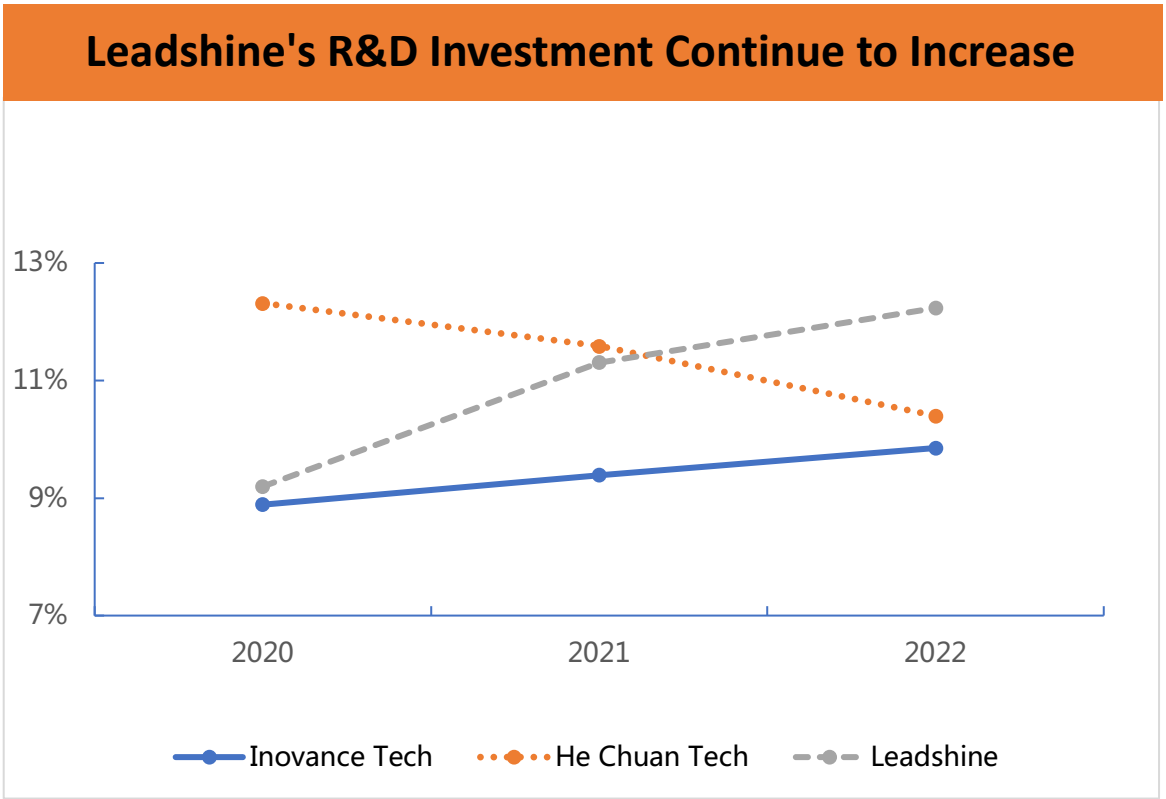
- **Leadshine** has a stronger sense of customer service, especially in the PC-based industrial controller segment, which is the company's biggest competitive advantage against its competitors. PC-based

China's PC-based Controller Market (2018)



Data source: Leisai Prospectus, China Industrial Control Network

- Leisai's servo products-systems have been verified by downstream users, and will just need time to penetrate the solar photovoltaic energy sector and the lithium battery industry as the company has been investing heavily in its R&D.



Source: Wind

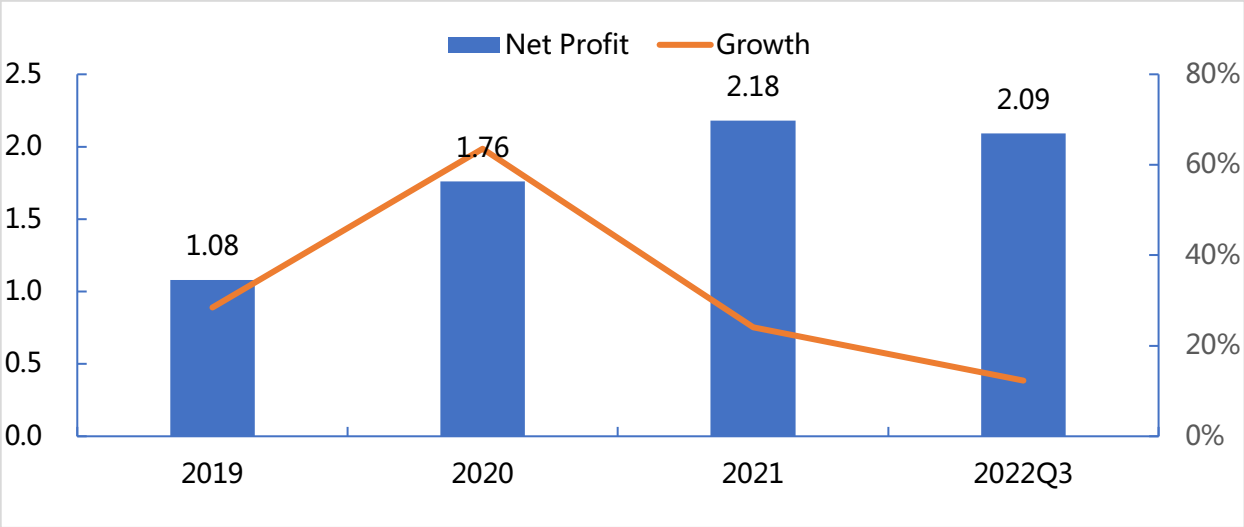
- In terms of **Leadshine**'s stepper motor & driver board business, as long as there is no market share erosion and business remain stable, management will be satisfied since the potential for further growth is limited for this business segment. At present, the stepper drive & motor market is basically divided by **Leadshine**, **Mingzhi** and **Inovance Tech**.

- In 2022, **Leadshine** underwent distribution expansion and internal management reform, and its operation was significantly improved. In terms of its sales distribution system, management implemented a discounted pricing strategy for its distributors in an effort to increase sales volume, thereby intending to rely on the large volume to share the fixed costs. In addition, management also seeks to devote additional marketing efforts on value-added services and solutions, which will increase the sales proportion of high-end products.

- At present, Japanese and Taiwanese brands are losing ground in China's domestic lower-end products due to pricing competition, and their distributors are expected to switch

suppliers and cooperate with domestic brands such as **Leadshine**, which is a preferred choice.

Leadshine's 2019 – YTD 3Q22 Net Profit (RMB100 Mn)



Data source: Wind

- In conclusion, while industrial automation aims to increase factory output and reduce costs, Industry 4.0 will require factory automation to integrate the latest technologies, such as AIoT, 5G communication networks, and autonomous robots, to usher in the next generation of factory automation.

- Factory 4.0 aims to integrate autonomous manufacturing equipment with the latest information technology systems. In this new era, data from sensors and PLCs will be integrated into IoT devices and other IT computer systems, such as machine learning AI, to create additional value-added services and solutions for manufacturing clients.

- With 5G big data, machine learning AIoT systems, other IoT devices, sensors, and robotic equipment fully connected and integrated, and smart factories can maximize output while reducing costs and downtime and ensure quality products with on-time delivery, zero defects, and quick response times.

- Therefore, the future of industrial automation lies with Factory 4.0 integrated automation systems, also known as "smart factories." However, in China's economy, with its distinctive OEM-ODM manufacturing model and a mature, low-growth industry, implementing Factory 4.0 may pose challenges for system integrators, especially when the cost-benefit analysis does not warrant drastic changes or upgrades. Nonetheless, a small step-by-step approach to system integration toward becoming "smart factories" may be necessary to ensure future growth.

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