
# Discrete (Factory) Automation

## Favorable global trends in discrete automation driving growth and investment opportunities

Q2 2022

Harris Williams | LEK

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# Executive summary

- Automation is a critical success factor for today's production processes. Only excellent automation solutions make it possible to achieve consistently high quality, high throughput, and low production costs. Based on current trends and recent COVID-19 issues, this market is expected to grow substantially in the coming years, providing a range of opportunities for investment and value creation.
- While the initial automation and robotics revolution was started by the automotive industry, new industries such as healthcare, food, consumer goods, and electronics are increasingly utilizing automation systems. Since 2005, non-automotive industries have increased their automation usage with evolving application technologies driving strong adoption.
- Current automation trends are creating intelligent factories where new and innovative manufacturing technologies will increase flexibility, quality, security, and productivity. Main trends in discrete automation include:
  - **Convergence of IT and OT*:** Data-centric IT systems are being integrated with existing and new OT monitoring systems to create smarter, more efficient operations.
  - **Everything as a Service** (XaaS): Manufacturers adopt a Product as a Service business model, where the product is delivered as a service or experience, while the customer does not take ownership of a physical product.
  - **New and intelligent manufacturing technologies**: Intelligent systems such as artificial intelligence and machine learning deliver instant manufacturing intelligence by analyzing large amounts of data in seconds. Intelligent autonomous devices are able to learn from their environment and improve production through independent decisions. Due to technology advancement and reduction in costs, sensors become a standard in products.
- **Winning companies** in discrete automation have high levels of IP, strong innovation capabilities, and global aftermarket presence, and they offer synergistic software-based solutions. System integrators act as the connective link to the end customers for component and module manufacturers and are an integral part of the value chain.
- The global discrete automation market was **worth roughly $110 billion in 2021** and is **expected to increase to $156 billion by 2025**. This level of growth is attracting the attention of many strategic, as well as financial, investors interested in consolidating the market.
- Overall **M&A activity has been strong** over the last five years with a stagnation in 2020 in discrete automation due to COVID-19 issues. Investors are looking for both **end-market diversification** and **strong application-oriented companies**. They value highly specialized niche players with extraordinary engineering capabilities and exceptional margin profiles. Customers expect system integrators to provide holistic solutions based on strong, in-house engineering capabilities.

# Value chain – the landscape of companies in the fast-growing discrete automation market is broad, and margin profiles are differentiated based on value chain positioning and end market focus

**Raw material suppliers** → **Component and module suppliers** → **Discrete (factory) automation** (**Machine builders**, **Integrators**) → **Services** → **Customer industries**

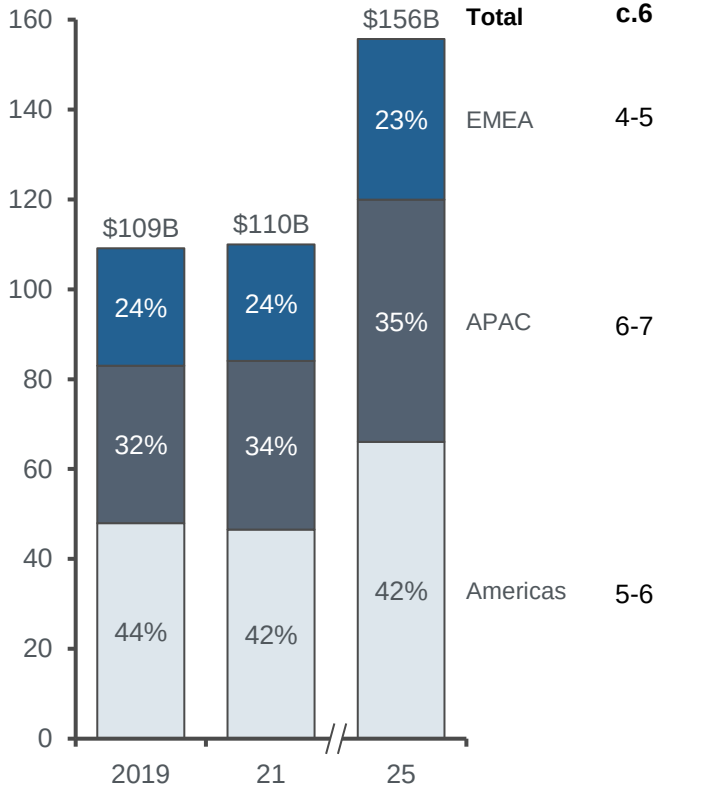
Downstream — Value Chain — Upstream

| | Raw material suppliers | Component and module suppliers | Machine builders | Integrators | Services | Customer industries |
|---|---|---|---|---|---|---|
| **Products** | Lenses, Screws and fixtures, Metal, Plastic parts | Drives / Motion Control, Sensors, Robotics, End-of-Arm-Tools, Machine vision | Cutting, Pressing, Assembly, Motion Systems*, Moulding, Testing | Fully Integrated Automation Systems | | Automotive, Electronic Devices, Construction Materials, HealthCare, Semiconductors |
| **Activities** | ▪ Extraction<br>▪ Initial processing<br>▪ Logistics<br>▪ Distribution | ▪ Design / Engineering<br>▪ Development<br>▪ Parts Sourcing<br>• Assembly / Production | • Design / Engineering<br>• Development<br>• Parts Sourcing<br>• Assembly / Production | • Design / Engineering<br>• Mechanical & Electrical Integration<br>• Installation & Commissioning | • Installation<br>• Support / MRO<br>• Project planning<br>• Operation<br>• Maintenance | • Product development<br>• Product assembly<br>• Pilot manufacturing<br>• Quality assurance |
| **Market participants (samples)** | | ASS, BALLUFF, BECKHOFF, COGNEX, EWELLIX, FESTO, KEYENCE, Leuze electronic, robot, piab, rexroth, SCHMALZ, SCHUNK, SEW EURODRIVE, SIEMENS, STÄUBLI, Rockwell Automation, TURCK, ZIMMER | AMADA, cesia, DMG MORI, DÜRR, ENGEL, FELSS, FRIMO, Hennecke, KOMATSU, LIEBHERR, MAKINO, MILACRON, ProXES, PST, RENA, SCHULER, SYNTEGON, TRUMPF | asic, ATS, aumann, BBS, BROSTJE, BURKE PORTER GROUP, ECKHART, HAHN AUTOMATION, Hirata, JENOPTIK, JR AUTOMATION, KUKA, leidos, SCIO, SCOTT, STRAMAMPS, team technik | | |
| **EBITDA margins** | | **15% - 30%** less reliant on aftersales business and mission critical for processes, less tendency to underpricing, low project risk | **10% - 20%** mainly higher value projects and very pricing competitive | **10% - 20%** mainly higher value projects with customization needs, differentiation and project management skills are key | | |

Note: * Robotic Motion Systems such as SCARA, Cartesian, Delta

# The global discrete automation market was worth c. $110bn in 2021, and is forecast to grow at a long-term rate of c.6% (2019-25)

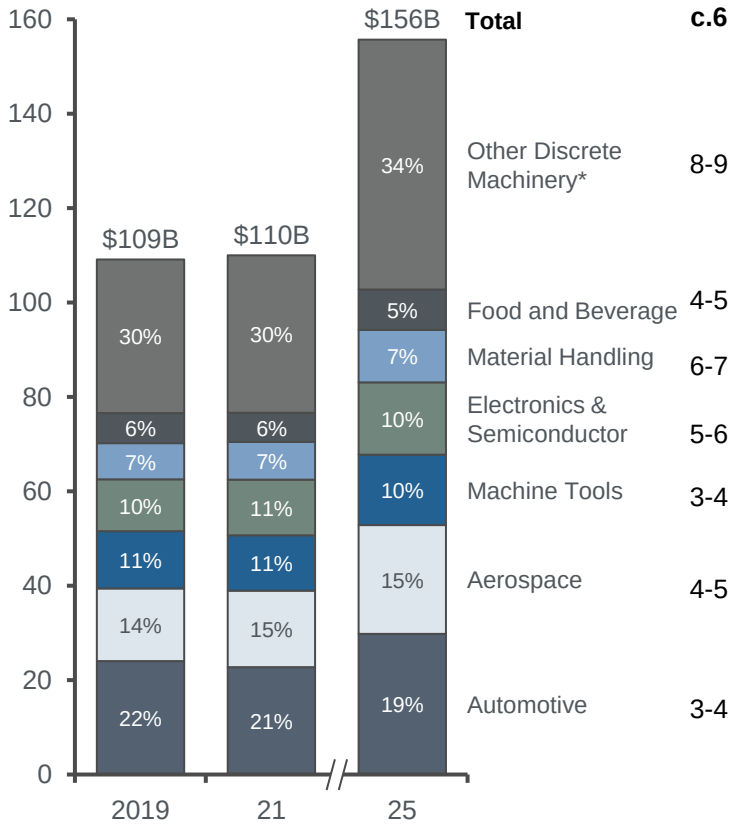
**Global discrete automation hardware market[2]**
**– by geography**
**(2019-25F)**
USD bn




CAGR % (2019-25)

| | |
|---|---|
| **Total** | **c.6** |
| EMEA | 4-5 |
| APAC | 6-7 |
| Americas | 5-6 |

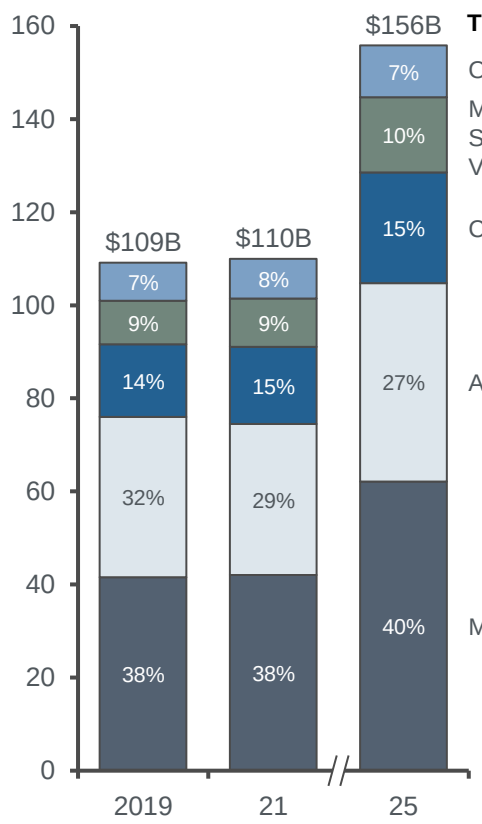
**– by end market**
**(2019-25F)**
USD bn




CAGR % (2019-25)

| | |
|---|---|
| **Total** | **c.6** |
| Other Discrete Machinery* | 8-9 |
| Food and Beverage | 4-5 |
| Material Handling | 6-7 |
| Electronics & Semiconductor | 5-6 |
| Machine Tools | 3-4 |
| Aerospace | 4-5 |
| Automotive | 3-4 |

**– by component^^**
**(2019-25F)**
USD bn




CAGR % (2019-25)

| | |
|---|---|
| **Total** | **c.6** |
| Other Electronics*** | 5-6 |
| Machine Safety, Sensors, and Vision Systems | 9-10 |
| Controls / PLC | 7-8 |
| Actuators ** | 3-4 |
| Motors & Drives | 6-7 |

Note: * Other discrete machinery = Agricultural machinery; Pharmaceuticals; Packaging; Battery machinery; Textile machinery; Rubber and plastics; Paper and paperboard; Woodworking machinery; Furnaces and burners, and robotics; ** Actuators = linear and rotary handling equipment; hydraulics; pneumatics; ^ only includes the discrete machinery within food & beverage for example; ^^ note robotics are seen as systems and are across the components; *** Low-voltage electronics, including switches, connectors, circuit breakers and others

# A number of factors are driving increased factory automation

| | Description | Impact on factory automation products |
|---|---|---|
| **Operational efficiency** | • Continued focus on sustaining and improving profitability by taking cost out of production | • Continued automation technology development allowing automation of processes that have previously not been automated (e.g., pick-and-place robots)<br>• Requirement to update aging infrastructure resulting in retrofitting machinery with sensors, increased criticality of sensors in avoidance of unplanned maintenance |
| **Labor shortage** | • Shortages due to an aging workforce, recruitment challenges and resulting knowledge losses | • Continued automation technology development allowing automation of processes that have previously not been automated (e.g., pick-and-place robots)<br>• Requirement to update aging infrastructure resulting in retrofitting machinery with sensors, increased criticality of sensors in avoidance of unplanned maintenance |
| **Reshoring and regional sourcing** | • Companies looking to gain greater control and minimize disruptions are turning to domestic supply chains by reshoring production and regional / local sourcing | • De-globalization and the trend toward more flexible, regional production structures need automation to stay competitive |
| **Digital revolution** | • Advances in software and digital leading to innovation in measurement analytics | • Increased use of IoT-enabled devices required to generate more data points (e.g., use of sophisticated photoelectric sensors)<br>• Increased ability to analyze Big Data to derive process optimization |
| **Quality improvement** | • Drive to consistently improve and produce high-quality end products through enhancements in quality-control processes | • Increasingly stringent regulatory requirements to ensure high quality levels of output<br>• Requirements for reduced waste from faulty or rejected output driving further demand for sensors for QC during manufacturing |
| **Health and safety** | • Strengthened public and corporate focus on safer and responsible business practices; accelerated after COVID-19 | • Increased use of sensors / robotics to monitor and avoid dangerous conditions (e.g., use of safety light curtains to control environments around automated machinery) and reduce labor presence in enclosed environments |
| **Environmental sustainability** | • Increasing regulatory requirements and consumer sentiment around environmental impact | • Companies are increasing automation initiatives to reduce energy usage and reduce emissions (e.g., conveyor belts that switch off when not in use)<br>• Reducing material wastage |

# Trends in automation are aimed at creating intelligent factories where new and innovative manufacturing technologies will increase flexibility, quality, security, and productivity

| Industry Trends | | Impact on factory automation products | Impact |
|---|---|---|---|
| **Convergence of IT & OT** | IT systems merge with operational technologies (OT) | • Data-centric IT systems are being integrated into existing and new OT monitoring systems to create smarter, more efficient operations.<br>• Industrial IoT is reshaping manufacturing.<br>• Operational data to support real-time decision making creates additional value for companies.<br>• Connected factory: From improving the supply chain to driving innovation and minimizing downtime. | Benefits of IT & OT Convergence[3]<br>48.9% Decrease in the defect rate<br>47.8% Decrease in unplanned downtime<br>17.5% Decrease in annual energy costs<br>34.8% Increase in inventory turns<br>23.1% Decrease in new product intro-duction cycle time<br>16.2% Increase in original equipment effectiveness |
| **Everything as a Service (XaaS)** | Manufacturers evolve toward more service-centric business models | • Manufacturers adopt a Product-as-a-Service business model, where the product is delivered as a service or experience, while the customer does not take ownership of a physical product.<br>• Manufacturing itself evolves to a service where businesses leverage a shared manufacturing infrastructure. | Cost reduction through XaaS[4]<br>Share of company's enterprise IT that is XaaS (vs. traditional IT)<br>76-100% 67%<br>51-75% 52%<br>26-50% 44%<br>0-25% 32% |
| **Intelligent Manufacturing** | Smarter manufacturing through intelligent connected systems | • Intelligent systems such as artificial intelligence and machine learning deliver instant manufacturing intelligence by analyzing large amounts of data in a few seconds.<br>• AI and ML are powering intelligent, autonomous systems that can streamline processes at any stage of the value chain.<br>• Cloud-native platforms will serve for more than 95% of digital initiatives by 2025 – on the other side, the edge computing market is growing exponentially. | Global AI in Manufacturing Market[5]<br>(in $bn) 1.0 (2021) 7.5 (2026) CAGR: ~24%<br>Smart Machines Market[5]<br>(in $bn) 40 (2021) 95 (2026) CAGR: ~19% |
| **Manufacturing technology** | New technology disrupts traditional manufacturing | • Manufacturers develop, test and design their products through digital simulation (digital twins), thereby drastically decreasing R&D cost.<br>• Proliferation of sensors due to cost reductions and technology advancements.<br>• Intelligent autonomous devices are able to learn from their environment and make decisions independently.<br>• Computer modeling tools enable companies to design materials with desired properties.<br>• Cobots* and light industrial robots have an increasing share in the workforce. | IoT Connected Machine Market[7]<br>(in $bn) 272 (2021) 1,612 (2028) CAGR: ~24%<br>Cobots Market[8]<br>(in $bn) 1.3 (2021) 6.4 (2028) CAGR: ~26% |

Note: * Cobots = Collaborative robots

# Main themes and challenges for system integrators based on CEO interviews (1/2)

| Topic | Market commentary |
|---|---|
| **Impact on the overall integrator industry over the last three years** | • The integrator industry was affected by four main events: (1) Normal cyclical downturn at the beginning of 2019, especially in the automotive industry; (2) COVID-19; (3) Supply chain issues and chip shortages (with additional challenges resulting from the Ukraine / Russia conflict); (4) Raw material and logistic price increases<br>• The automotive industry, which is still the largest market for integrators, is transforming rapidly from combustion engine to e-mobility<br>• Due to COVID-19, many businesses shut down temporarily, and experienced widespread restrictions on travel and mobility – countries started to focus on reshoring, which was accelerated by supply chain issues<br>• The combination of supply chain issues and increase in raw materials prices put pressure on margins in the short term – passing on price increases to customers possible mid to long term |
| **Industry drivers** | • Due to the increased awareness of employees' health and protection, as well as increasing labor costs, companies are interested in automating production processes<br>• Due to the limited availability of unskilled people and requirement to maintain high-quality production, manufacturers are now investing in automating their processes<br>• The limited availability of skilled people (in particular engineers and software developers) at end customers will increase the need for systems integrators to implement complex automation processes<br>• In addition, technology advancements make it easier and affordable for smaller companies to automate – enhanced transfer of technology increases pressure on innovation for companies across the globe |
| **Digitalization** | • Digital twins, intelligent human-machine-interfaces (HMIs), and predictive maintenance are becoming increasingly standard for system integrators and are required by customers – customers buy experience and not a standard product<br>• The Industrial Internet of Things (IIoT) must be understood as "holistic solutions" – shopfloor and IT are converging<br>• Software expertise, especially SPS software programming and standard language programming, is a bottleneck due to lack of employees as it is crucial for digitalization<br>• Solutions with AI are important, and new start-ups with a focus on AI are emerging – integrators are looking for potential partners or need to develop these skills in-house |

CIO AUTOMATION

"…Companies in the past used automation to improve quantity throughput and achieve a high quality level. Now the focus has moved to production certainty / security as experienced / qualified people are not available…"

-Michael Goepfarth, CEO CIO Automation

EDGEWATER AUTOMATION

"…The pandemic put automation on steroids..."
Rick Blake, CEO Edgewater Automation

KUKA

"…Factors such as increasing safety and security concerns are propelling the demand for automation systems and demand for low-cost, energy-efficient production processes by manufacturing plants…"

*-Gerald Mies, CEO KUKA Systems*

STRAMAMPS

"…De-globalization is coming, and companies look at their value chains and will focus more regionally..."

-Herbert Wittl, CEO Strama-MPS



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# Main themes and challenges for system integrators based on CEO interviews (2/2)

| Topic | Market commentary |
|---|---|
| **End-markets with attractive growth over the next years** | • Life science and healthcare: Resilient industries, which do not depend on economic cycles. Companies have strong balance sheets benefitting from COVID-19 and looking to invest in automation processes<br>• Automotive: Challenges related to change from combustion engine to electromobility and AV/ADAS* have resulted in new and large investments. In particular, battery technology and electro-motors are benefitting<br>• Semiconductor: Precision is crucial and manufacturing processes are already highly automated, but growth will come for assembly, testing, and packaging to achieve full automation – China and Taiwan are already very advanced, and Europe and the US need to invest to stay competitive<br>• Food processing industry: New technologies in gripping and object vision will steer growth<br>• Nuclear automation business benefits by the need to cut planet-warming emissions and soaring energy prices |
| **Threats on the industry over the coming years** | • The unforeseeable geopolitical uncertainties and their negative effects on the economy<br>• Continued difficulties with supply chains and increasing raw material and energy prices, i.e., chip shortages<br>• China becoming a closed market and isolating itself from the Western countries – China for China business only<br>• War of talent due to lack of skilled people<br>• Cybersecurity |
| **Critical competencies to be successful** | • System integrators need to have a certain size and need to be financially healthy, or they will not get a RfQ** due to increasing project sizes – this requires excellent project management and claim management expertise<br>• International presence with local production and engineering capabilities is important to serve customers globally with the same quality<br>• Customers want to avoid multiple interfaces and require planning expertise and engineering capabilities – larger system integrators increasingly act as general contractors, which reduces time to implementation<br>• Understanding processes of customers and having a holistic know-how in automation for all processes, including their own R&D capabilities, is required to be successful – vertical integration is important to reduce supply chain issues and to ensure on time delivery<br>• Production and intralogistics are becoming increasingly integrated |

team technik PRODUCTION TECHNOLOGY

"Life science and healthcare is a rising topic. These are very resilient industries that do not depend on economic cycles and are backed by constantly improving healthcare systems and infrastructures."
*-Stefan Rosskopf, CEO Teamtechnik*

asic ROBOTICS

"Life cycles of products (and machinery) will decrease, and customers demand adjustability / flexibility of equipment to allow design changes to the product. This will be a main driver of automation."
*-Milo Gasser, CEO ASIC Robotics*

ATS

"Many automation programs are getting larger and can only be handled by companies with size."
*-Udo Panenka, President Industrial Automation at ATS Automation*

ECKHART

"Understanding the manufacturing ecosystems, as well as the connectivity within the factory, are crucial competencies to succeed as an integrator."
*-Andy Strom, CEO Eckhart*

Note: * AV / ADAS = Automated Vehicles / Advanced Driver-Assistance Systems, ** RFQ = Request for Quotation



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# Leading companies share common themes and strengths across segments

## Which companies make money and why?

- **Innovation leaders** self-evidently have a higher **annual R&D spend than** competitors. However, they are also able to translate the R&D spend into **high levels of IP,** retention of **detailed application knowledge, state-of-the-art and revolutionary products and product designs. They are therefore able to demand higher prices as well as margins** and can protect and grow their leading market position.

- **Niche providers** with leading market positions in one or many sectors and subsectors, due to **unique technology, application knowledge and/or product offering**, can command **higher prices or improve their margin profile.** This is especially true for system integrators, as they can save time and effort **recycling previously used designs and engineering.**

- Successful companies have managed to **diversify themselves into more than one end market,** leveraging their application or product **portfolio across categories**. This allows them to stay flexible and shift capacities to meet demand in those sectors where it is needed with **premium contract terms.**

- Customers increasingly are asking for **“global solutions”** to simplify their production and supply chains, **including local service offerings.** Therefore, system integrator play a critical role as touchpoint to the end customers for all component and module manufacturers. As such**, integrators are an integral part** of the customer’s value chain with high levels of customer stickiness

- **Software enabled / connected products** for monitoring, analysis and productivity improvements are highly sought-after, as long as security protocols ensure **data protection**

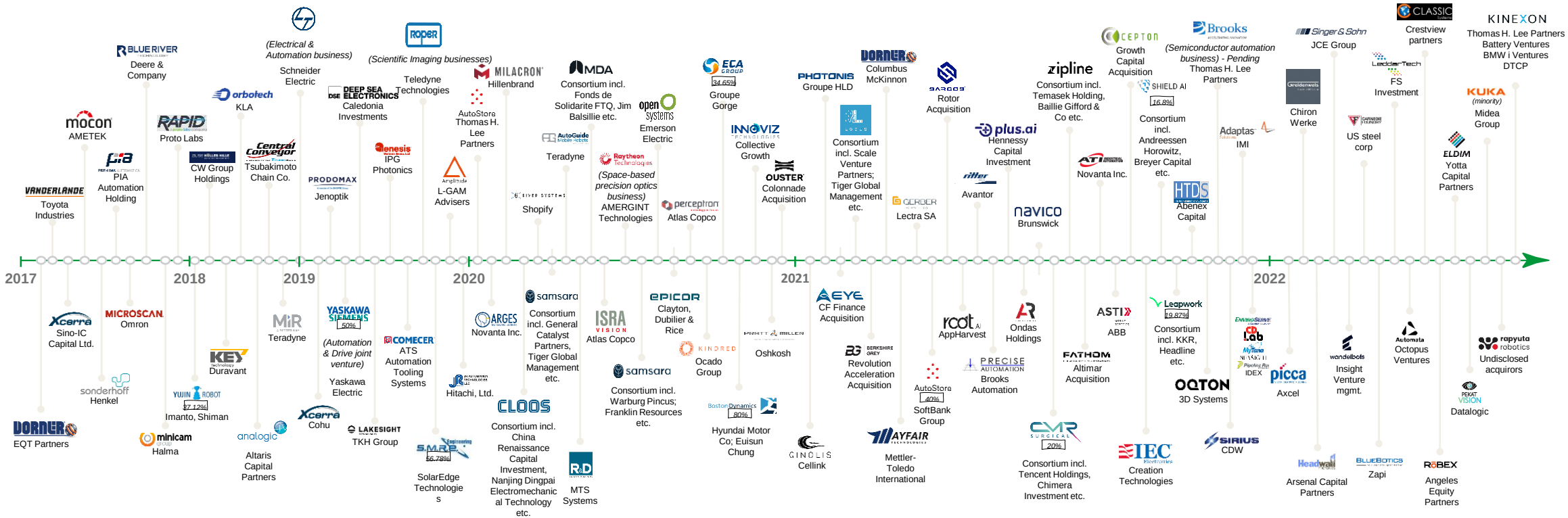
**6%+**
global discrete automation market growth 2019-2025[9]

**8.5%**
of the global manufacturing workforce will face job loss due to automation[10]

**50%+**
of all workplace tasks will be performed by machines by 2025[11]

**57%**
of employers want to use automation in order to improve human performance and productivity[12]

# Discrete automation assets with resilient business models driving M&A activity[13]




**Notable Transactions**

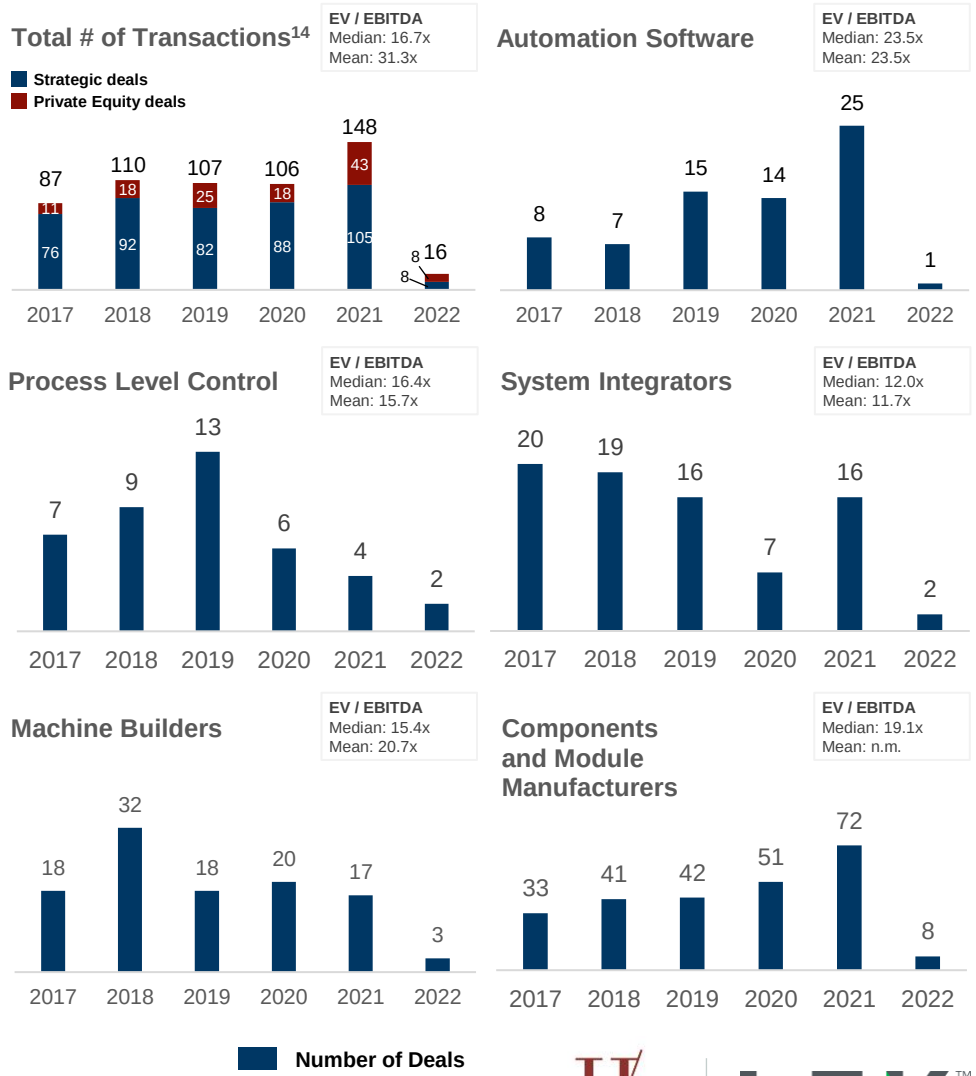
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Target | DORNER | GIMATIC | piab | JR AUTOMATION | ISRA VISION | team technik | Brooks (Semiconductor automation business) | ATI INDUSTRIAL AUTOMATION | ECKHART |
| Buyer | EQT | Barnes Group Inc | PATRICIA INDUSTRIES a part of Investor AB | HITACHI | Atlas Copco | DÜRR | THL | Novanta | Arsenal Capital Partners |

HW Transaction

# Increased M&A activity expected in discrete automation over the next 12-24 months

## M&A Trends

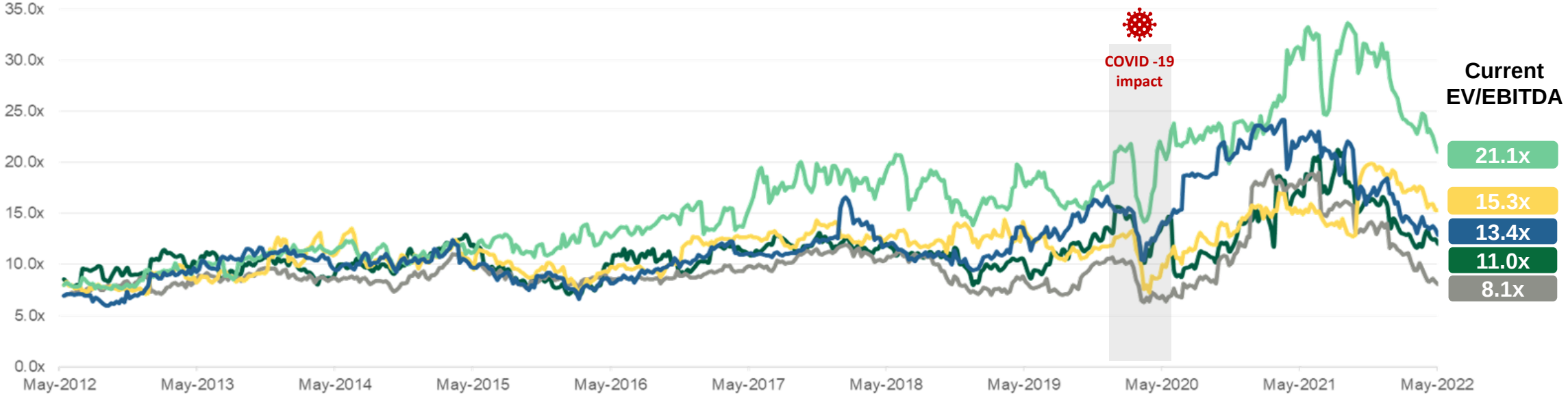
- Even though the **COVID-19 impact** on overall M&A activity in discrete automation **seems negligible**, taking a detailed look reveals that there were both **positive and negative impacts** on the sub-sectors. **Automation Software and component and module manufacturers saw a significant increase in transactions**, while PLCs and machine builders were not able to benefit.
- Beside strategic investors, there remains a **growing interest from private equity** in the discrete automation space with **around 25% of all transactions ending up with financial buyers**. While some sub-sectors seem to be less interesting for financial investors, we observe **strong interest in robotics, as almost 40% of all transactions are led by financial buyers** (incl. add-on acquisitions).
- Innovative software providers are in high demand as **market participants are looking to add related software modules to their hardware offering** to provide a holistic offering for factory automation solutions, while deeply **embedding themselves in customers' operations and increasing cost of change.**
- We expect an **increased level of M&A activity** in the discrete automation space over the next 12-18 months (depending on geopolitical developments) driven by **increased investments** across applications and integrators. Strongly emerging interest from private equity investors to invest in market leaders and hidden champions will continue.
- Additionally, there are some **premium sponsor-backed automation platforms of scale expected to come to market**, which are ideally positioned for further inorganic growth strategies with a new owner.
- Discrete automation companies' valuation levels have continuously increased over the last decade **with current valuation levels between 12-18x EBITDA**, depending on the sub-sector. **Generally, machine builders and integrators are trading below component and module manufacturers. Software solutions are currently valued the highest.** For the **right asset, valuations can vastly exceed** the range listed above.



# In the last five years, publicly listed companies active in discrete automation as component manufacturers or system integrators have traded between 10x and 19x LTM EBITDA

## Discrete automation companies - Public Comparable Market Performance[15]

| | Machine Vision & Sensors | Drives / Motion Control | Robotics | System Integrators | Machine Builders |
|---|---|---|---|---|---|
| Current median | 21.1x | 15.3x | 13.4x | 11.0x | 8.1x |
| 5-year median | 19.4x | 12.8x | 13.9x | 11.9x | 10.3x |
| Current premium (discount) | 8.3% | 19.8% | (7.2%) | (7.6%) | (21.2%) |




MACHINE VISION & SENSORS

ANTARESVISION, BASLER, COGNEX, DATALOGIC, KEYENCE, JENOPTIK, OMRON, STEMMER IMAGING, Novanta, TELEDYNE, TK GROUP

DRIVES / MOTION CONTROL

Allied Motion, Altra Industrial Motion, EATON, MOOG, Nidec, RegalRexnord, Rockwell Automation, SMC

ROBOTICS

ABB, DOOSAN, FANUC, Kawasaki, OMRON, TERADYNE, YASKAWA

SYSTEM INTEGRATORS

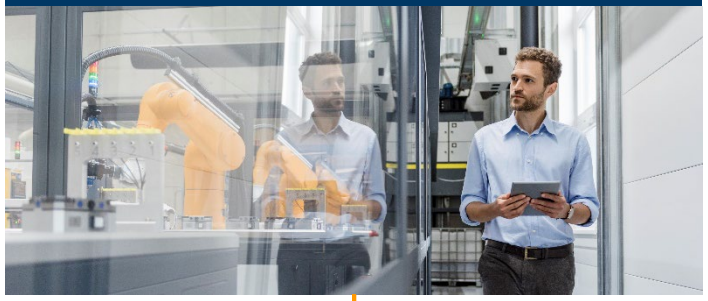
ATS, DÜRR, Hirata, mx automation, SCOTT

MACHINE BUILDERS

Barnes Group Inc, DÜRR, +GF+, KRONES

# Harris Williams and L.E.K. are leveraging unique insights from market-defining transactions and executive con-versations to distill critical trends in industrial automation – look for previous and coming reports

**Industrial automation**



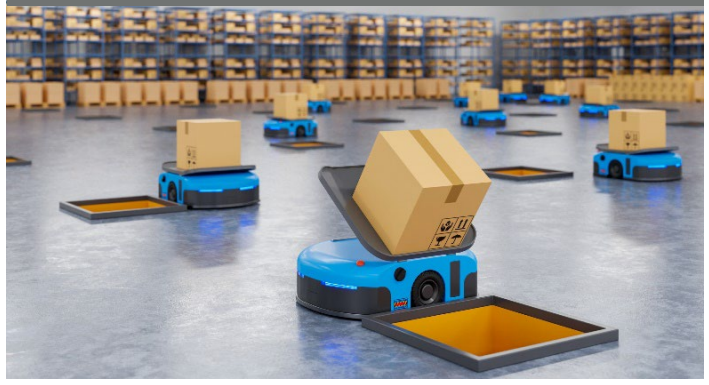
**Process industry automation**

December 2021

**Discrete (factory) automation**

Summer 2022

**Warehouse automation**



Fall 2022

# We are a global network of experts and look forward to connecting with you to share our experience in the automation sector

## Harris Williams / GLOBAL M&A ADVISOR

**10 INDUSTRY GROUPS**
With Robust Experience Across the Globe

**3 DECADES**
Providing Award-Winning M&A Advisory Services

**1 UNIFIED TEAM**
Bringing Firmwide Dedication to Every Engagement

### Selected industrial technology transactions

| | | | | |
|---|---|---|---|---|
| ECKHART has been acquired by Arsenal Capital Partners | ATI Industrial Automation has been acquired by Novanta | Grohmann Engineering has been acquired by Tesla | team technik Production Technology has been acquired by TDJ | OnRobot Strategic Advice and Fundraising Support to OnRobot Management and Shareholders |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# Endnotes


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2. L.E.K. research and analysis
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13. Pitchbook, Mergermarket, S&P Capital IQ, HW research and analysis
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15. S&P Capital IQ as of 12 May 2022

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