

# Revolutionizing horticulture: unleashing the power of robotics, machine vision, data & AI

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## MARKET TRENDS (pg.2)

The horticulture robotics market is experiencing robust growth, driven by factors that are advancing the adoption of robotics, machine vision, data and AI

## PLAYERS' LANDSCAPE (pg.6)

The landscape for robotics, machine vision, data and AI in horticulture is in its early stages, but both large strategic players from outside the space and investors are getting involved

## SECTOR VIEW (pg.12)

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Overview of recent transaction and valuations of listed peer groups

“Each sub-segment in horticulture follows its unique growth and consolidation cycle, with robotics ecosystem currently leading in growth. This trend is likely to persist throughout the decade.

The market player landscape, while presently fragmented, is evolving. Internal industry forces like economies of scale, synergy, professional demand, and the need for comprehensive service offerings are driving players towards forming partnerships in various ways. Additionally, external forces, including interest from financial investors like venture capitalists and private equity firms, are attracted by the consolidation potential and significant market growth. This interest isn't limited to financial investors; strategic parties outside the sector are also keen.

Several market players have already gained from collaborations with others, including venture capitalists, private equity firms, and strategic partners from different sectors. These partnerships are not only accelerating their growth but in some cases, enabling it. As a result, we anticipate a surge in such partnerships in the near future.”

FRANK DE HEK

HORTICULTURE SPECIALIST, OAKLINS



# Market trends

The industrial robotics market, including machine vision, data and AI, has experienced rapid growth over the past few years. The number of robotics installations hit a new record of 614,000 units in 2023, representing a total market value of US\$54 billion. The market is expected to enjoy high growth through 2030, with an annual growth rate of 11.4%.

Five megatrends are driving industrial robotics market growth:

**Demand for automation and efficiency:** Various sectors are adopting industrial robotics and automation solutions to enhance productivity, reduce costs, and improve operational efficiency. Industrial robotics play a vital role in automating repetitive and easy tasks, enabling

businesses to achieve higher production rates, faster cycle times, and improved quality control.

**Robotics becoming more affordable:**

As a result of, among other aspects, decreasing technology prices, economies of scale and increasing robotic production in lower-cost countries, robotics prices have fallen rapidly. With average robotics costs dropping by more than 80% since 2005, the payback period has become much more attractive.

**Advancements in technology and new applications:**

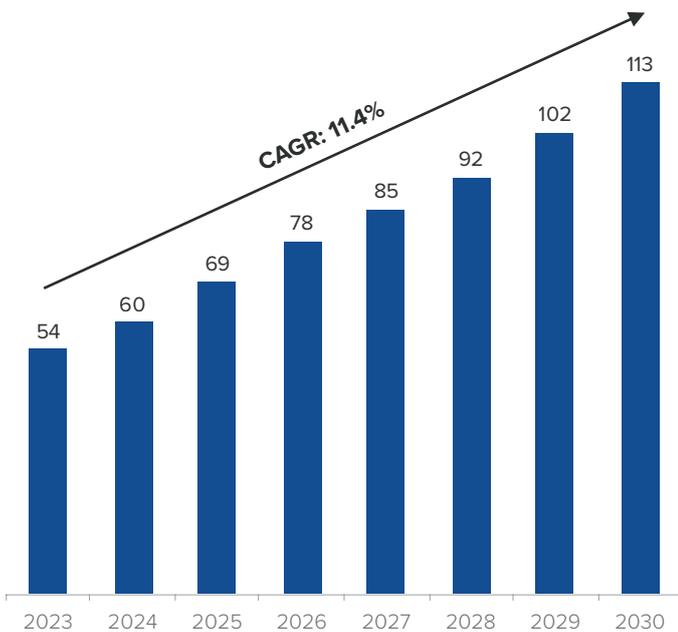
The rapid advancements in robotics technology, including improved capabilities, increased flexibility and enhanced safety features, have made industrial robotics more flexible and applicable. AI-driven machine learning is expected to play a vital role in software solutions that enhance operational systems, including process optimization and vision-based gripping. Furthermore, there is growing demand for smaller, lower-cost robotic applications.

**Labor shortages and cost reduction:**

With rising labor costs globally, as a result of increasing human skills shortages and cost-intensive labor changes, the adoption of robotics is becoming increasingly attractive in manufacturing. By investing in robotics, businesses can mitigate the impact of labor shortages and reduce dependency on human workers to achieve significant cost savings and meet operational challenges in the long run.

**Growing trend of reshoring:** The growing trend of reshoring, driven by geopolitical considerations and a desire for supply chain resilience, is further fueling demand for robotic automation. Companies are incorporating industrial robotics into production processes to bring manufacturing closer to home, reducing reliance on other regions.

Industrial robotics market size, by revenue (in US\$bn)



Source: GlobeNewswire

Key European labor development rates (in%)



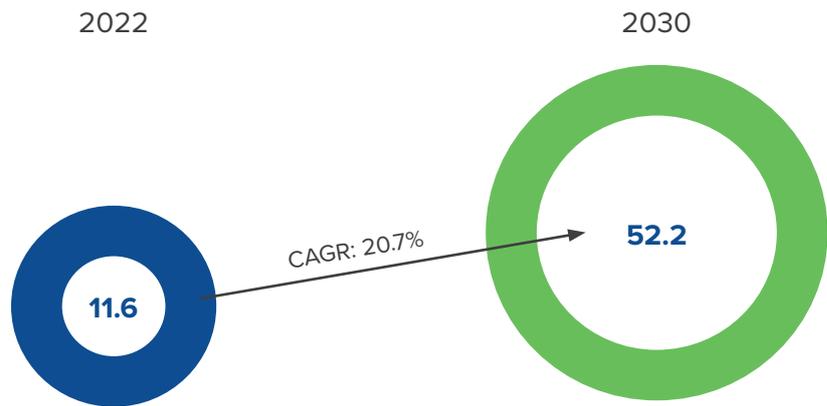
Source: Eurostat

Though robotization in horticulture is not as advanced as in the overall industrial market, it is the rising star.

Technological advancements typically first conquer the largest and easiest segments. This pattern is evident in the case of fixed asset production robots, where the market has already achieved significant size and maturity. Robotics for agricultural applications is a much more complicated segment as a result of the characteristics of living products. Consequently, this market has been served less well. It is, however, catching up, and currently shows an annual growth rate of 20.7%, significantly higher than the overall industrial robotics market. This growth has, until recently, mostly been for open-field agricultural applications. But next in line are robotics for horticulture applications, which typically lag a couple of years behind on the larger volume (and, on many occasions, less diverse) open-field applications. Numerous underlying growth drivers are accelerating the use of robotics in horticulture, as we explain below.

**Increasing adoption of high-tech greenhouses:** The surge in the adoption of high-tech greenhouses is primarily attributed to the increasing demand for sustainable and efficient agricultural practices. With an estimated annual growth rate of 15.5%, these technologically advanced greenhouses are at the forefront of horticultural innovation. High-tech greenhouses provide the perfect environment for the implementation of robotics and advanced horticultural practices. The integration of robotics has become a key focus, as these greenhouses leverage automation and intelligent systems to enhance productivity and precision in cultivation. This growing trend underscores the pivotal role of robotics in driving the evolution of modern horticulture, paving the way for a more sustainable and technologically integrated future.

Size of agriculture and horticulture robotics market (in US\$bn)



Source: GlobeNewswire

Drivers of robotics AI in horticulture



Increasing adoption of high-tech greenhouses



Structural labor shortage



Decreasing equipment costs, optimization and cost reduction



Technological advancements, paired with increasing availability and applications of robotics



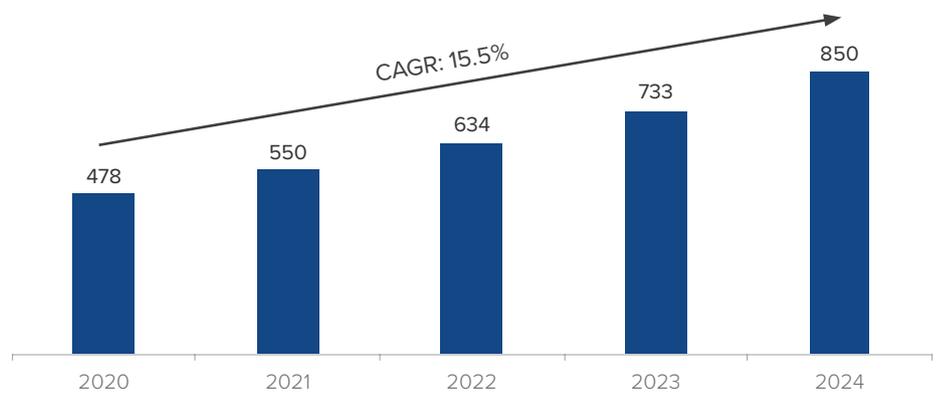
Sustainability focus



Increasing influx of financial investors

Source: Oaklins' research

Size of new-build high-tech greenhouses (in ha)



Source: Wageningen University & Research

**Structural labor shortage:** In the last five years, Western countries have been struggling with a structural labor shortage in the agriculture and horticulture markets. Businesses are increasingly mitigating these challenges by leveraging robotics to reduce reliance on manual labor in areas such as planting and harvesting.

**Decreasing equipment costs, optimization and cost reduction:** Costs associated with robotic solutions in industrial sectors have notably dropped, and this trend has occurred particularly rapidly in the horticulture domain, providing interesting opportunities for horticultural players. These decreasing prices, combined with increasing labor costs, have resulted in the payback times of robotics falling dramatically. In several cases, payback times are significantly shorter than five years. The diminishing payback period for robotics tailored to horticultural tasks is a crucial driver for widespread adoption, making automation financially feasible. Robotics contribute to further cost reduction by increasing operational efficiency and precision in tasks such as planting, harvesting and sorting. This not only enhances overall productivity but also optimizes resource utilization, making horticultural processes more sustainable and cost-effective.

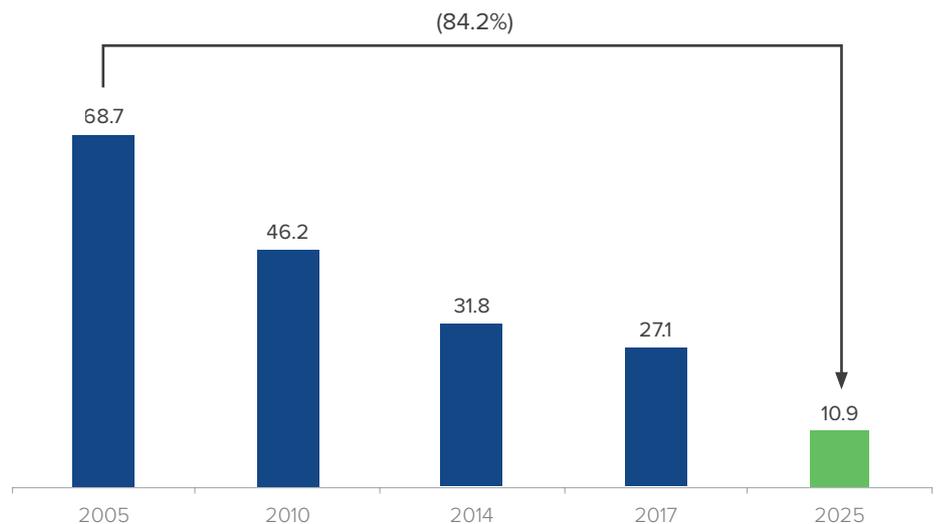
**Technological advancements, paired with increasing availability and applications of robotics:** The increasing availability of robotics in horticulture marks a transformative shift in the landscape, as companies gain access and have more options to choose from. In the last couple of years, this has accelerated on the back of the integration of machine vision and AI possibilities, which are more important for live products than for fixed asset handling. As the technology becomes more accessible, its applications in horticulture continue to expand, offering a versatile range of uses beyond traditional farming methods. Easier access to robotic technology, coupled with decreasing costs, makes it increasingly attractive for companies in horticulture to integrate these innovations into their operations.

Dutch agricultural firms with labor shortage issues (%)



Source: CBS

Average costs industrial robotics (in US\$k)



Source: Statista

Payback period of robotics

Historical payback period for robotics



6–8 years

Recent payback period for robotics



2–4 years

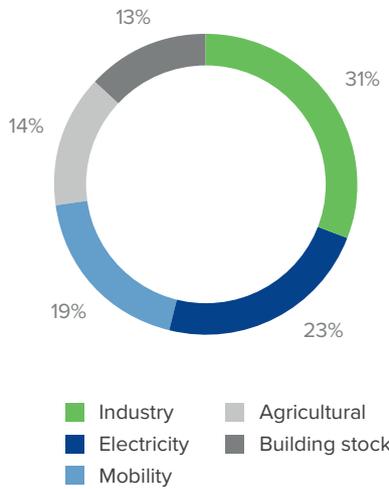
Source: Oaklins' research

**Sustainability focus:** The horticulture sector faces a significant challenge in dealing with sustainability issues, given agriculture’s contribution to greenhouse gas emissions — in the Netherlands, for example, this currently stands at 14%. AI-based technologies are pivotal for regulating greenhouse climates, optimizing resource use, and reducing environmental impact through data-driven solutions. Precision robotics and machine vision technologies producing pesticide-free food underscore the importance of robotization for the edible segment. The demand for and adoption of sustainable practices in horticulture is expected to intensify.

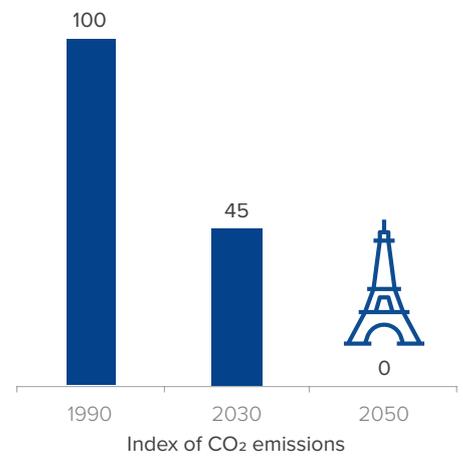
**Increasing influx of financial investors:** The horticulture sector is witnessing increased investor interest from a financial perspective, leading to careful evaluation of financial viability and growth prospects. This influx of investment capital incentivizes businesses to explore and adopt advanced technologies, including robotics, for operational optimization and improved profitability. Investors, aware of the decreasing payback period for robotics investments, are turning more towards horticulture. Evidence of this can be seen in the Dutch horticultural sector where private equity involvement is higher than overall private equity involvement in deals in the Netherlands. As businesses invest in advanced greenhouse equipment and robotics, investors are expected to boost process optimization in greenhouses.

**Sustainability focus in the agriculture sector**

Agriculture is responsible for 14% of CO<sub>2</sub> emissions in the Netherlands



Investment is necessary to reach CO<sub>2</sub> neutrality by 2050



Source: GlobeNewswire, CBS and the Paris Climate Agreement

**Private equity (PE) involvement in horticulture**

**PE involvement in all Dutch deals in 2022**



22%

**PE involvement in Dutch horticulture deals in 2022**



26%

Source: S&P Global Market Intelligence; Mergermarket; Alex van Groningen and Oaklins’ research

**SECTOR OUTLOOK**

We see a snowball effect in the application possibilities of robotics in horticulture, and by 2030, we expect a universal adoption of robotics and related solutions in segments as well as tasks. Robotics are expected to be increasingly integrated for specialized tasks, especially autonomous cultivation, not only in traditional greenhouses but also in new production systems, exemplifying the transformative shift in horticulture practices. This trend mirrors the broader convergence of innovation occurring both within and beyond the limits of traditional greenhouses. The unprecedented market growth outlook offers large opportunities, for parties both within and outside the sector.



# Players' landscape

Like most early-stage markets, the players' landscape for horticultural robotics companies is still scattered.

Due to its nascent stage, as of today there are only a limited number of large robotics players in the horticulture market, and very few industrial robotics companies from other segments are active in the space. Several characteristics can be observed within the horticultural robotics landscape, some of which are discussed here.

**Diversified player landscape:** The increasing demand for efficiency and the automation of horticulture operations in combination with a very diverse product to be handled is driving a surge in new high-tech market entrants, which results in a highly diversified landscape across different market segments. On the next page, we have classified several market players into eight major categories: AI & software, multi-purpose, seeding, crop inspection, weeding, harvesting, placing, and material handling. The multi-purpose segment is notably crowded, which can be attributed to cost-effective initial entry, the widespread popularity of modern technological advancements that can be deployed for multiple applications, and synergies between applications. In addition to the more general applications, we have identified several other categories focusing on specific parts of the horticultural value chain. Most of these applications are supported by niche AI & software solutions provided by a wide array of software developers. In the AI & software segment, numerous companies develop software and related tools suitable for various applications in greenhouses, and offer software platforms that support horticulture (management) solutions.

**Geographically:** The concentration of companies based in the United States, the Netherlands, Israel and

the United Kingdom is high. However, the Netherlands has emerged as the preferred hub for horticultural robotics and AI companies. This preference for the Netherlands can be attributed to various factors, including the country's extensive horticultural history and high penetration level of high-tech greenhouses, which fuels demand for advanced technology aimed at improving the efficiency of horticultural processes. Additional factors include the advanced technological infrastructure, a highly skilled workforce, and the government's supportive approach to horticultural technology and innovation.

**Maturity:** The players' landscape is predominantly occupied by early-stage companies. Over the past five years, one-third of these companies have secured seed funding from venture capitalists (VCs). This underpins the dynamic growth and involvement of financial investors, further accelerating the adoption of automated solutions. Many companies in the robotics horticulture sector are still in their startup phase, and the degree to which robotic solutions are adopted differs widely among different applications.

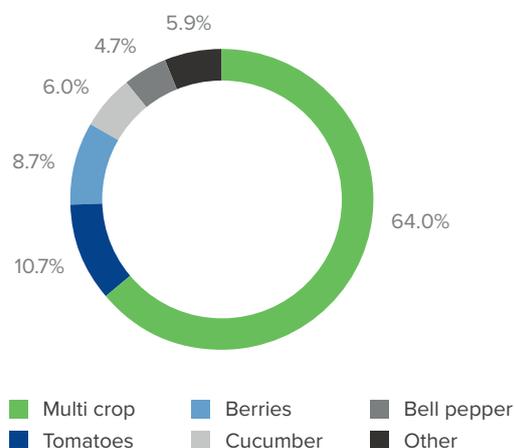
At the crop inspection stage, robotics are extensively employed, as this process is labor-intensive and time-

consuming, and can be accomplished with greater efficiency using robotics. Harvesting is another popular application, with many financial investors interested in this niche. Approximately 50% of the companies engaged in harvesting solutions have raised funding with VCs within the past five years. This indicates a favorable market sentiment towards robotics harvesting solutions.

Overall, financial investors are increasingly drawn to the horticultural robotics and AI market. The increasing interest in the horticultural sector is poised to accelerate the growth of participants and propel their technological advancements, inevitably leading to the widespread adoption of high-tech technologies in greenhouses.

**Crops:** The industry comprises both generalist and specialist players. Specialists focus on specific applications or crops, with some solutions tailored for particular crops like tomatoes and berries. Harvesting automation often requires crop-specific adaptations, as different crops have unique characteristics, such as shape, size and growth patterns. Though niche players show promise, we expect that most aim to create versatile solutions for various crops to enhance scalability and profitability.

Robotics/AI/software market player landscape per crop



Source: Oaklins' research

Players' landscape by application



Source: Oaklins' research

As discussed in the previous pages, the horticultural robotics market is still an early-phase and scattered market. This will however change, probably sooner than later, driven by forces from within the industry as well as from outside it.

**Economies of scale:** Mature industries typically feature two categories when it comes to companies outperforming competition: i) three to five large-scale “one-stop-shops”; and ii) specialized companies focused on a specific niche. Frontrunners in both categories excel by capitalizing on economies of scale, enhancing vital characteristics to outperform the competition. Notably, scale facilitates the expansion of the knowledge base, allowing frontrunners to apply expertise in specific crops to diverse segments. This is vital in a complex market, raising entry barriers, enhancing reputation, fostering innovation capabilities, and creating intellectual property (IP) opportunities.

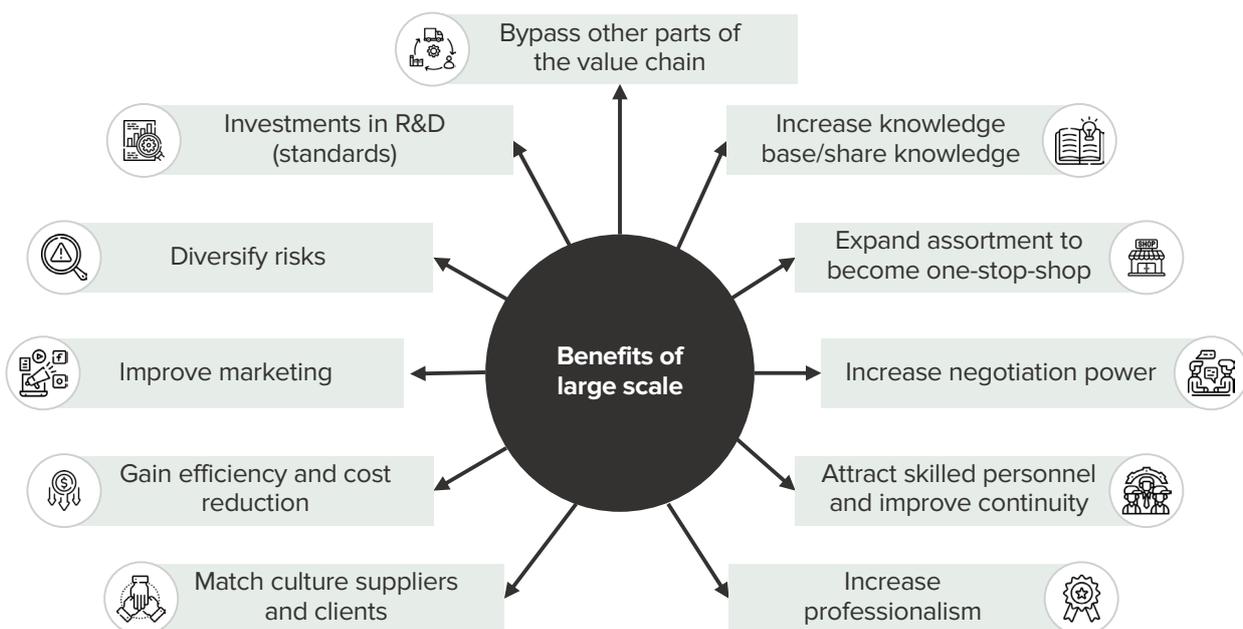
**Synergies are key:** In addition to these economies of scale, synergy plays a crucial role in consolidation, especially in markets where IP is core. It is obvious that in horticultural robotics, there is a large overlap in IP between different crops and applications. By bringing together diverse IP portfolios through consolidation, companies can tap into this inherent synergy. Shared knowledge and technologies mean that advancements made for one specific crop or application can be adapted and leveraged for others, fostering a collaborative environment. This collaborative approach not only accelerates innovation but also mitigates the risk of redundancy in research and development efforts.

**Increased demand for professionalism:** A third factor driving a more consolidated market player landscape from within the industry is the demand for increased professionalism, which has proven to be a challenge for very small businesses. As the sector matures, standardized practices and compliance become critical. Larger, consolidated players are better equipped to meet these demands, establishing trust and

reliability. Moreover, the complexity of technological advancements favors consolidated entities with the expertise needed for innovation. Consolidation not only addresses the challenge of professionalism but also streamlines industry efforts, fostering a more robust ecosystem that can effectively tackle the evolving demands of horticultural technology.

The convergence of industry overperformance, synergy-driven consolidation, and the growing demand for professionalism propels market players to forge strategic partnerships. Recognizing the benefits of shared resources, expertise and intellectual property, these collaborative efforts empower companies to navigate the complexities of a maturing market more effectively. By pooling their strengths, market players enhance their collective ability to innovate, address industry challenges, and foster a dynamic ecosystem poised for sustained growth.

**Benefits of teaming up and growing size**



**Financial investors accelerate consolidation:** The consolidation trend from forces within the industry is strengthened by factors from outside it. As highlighted in the previous pages, many VCs are currently active in the space.

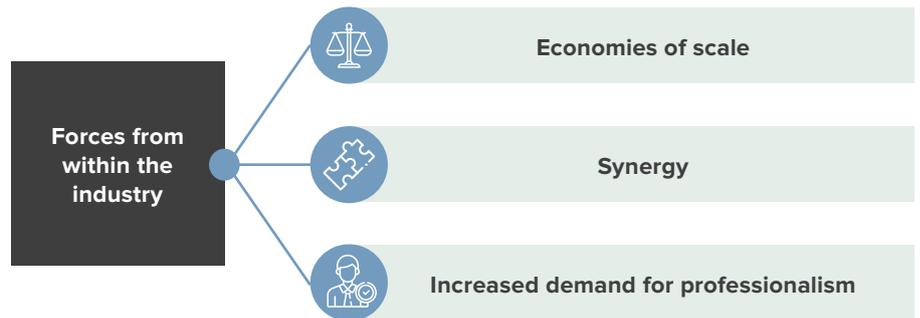
VC and private equity firms provide not only financial investment but also strategic guidance and mentorship to accelerate growth. They often leverage their industry expertise, network and resources to help startups grow, navigate challenges, and scale their businesses successfully. Teaming up can provide numerous benefits to companies, ultimately improving their financial outlook. The pursuit of strategic partnerships and investments from VC and private equity firms often catalyzes companies to expand further through acquisitions.

**Strong market growth attracts interest:** At the same time, VCs and private equity firms aim to benefit from the beneficial long-term trends in the sector. All of the investments need to be exited at some point in time. Despite the relatively restrained involvement of private equity firms in this domain, which are known for typically investing in more established

companies, an increasing number of businesses in this sector are reaching a size that makes them appealing targets. Private equity loves a very scattered market player landscape in an IP-driven market, as there is a lot of room to combine players in order to realize, among other things, synergies and multiple arbitrage. We therefore expect

private equity firms to be increasingly active. Furthermore, large robotics companies from other industries will enter the horticulture market in order to benefit from the market growth as well as to deploy their own technology. This trend could potentially reshape the competitive landscape and drive innovation within the horticulture sector.

**Drivers for consolidation**



“We expect that these forces will have resulted in a much more concentrated market player landscape by 2035, just as we’ve seen in other segments like robotics for tangible fixed asset production. In the latter category, we see a lot of large, professional, profitable parties with plenty of capital to invest in R&D, with which it’s difficult for smaller players to compete. M&A will play a crucial tool in this. Decisions taken today can determine if a company will be among the leading players 10 years from now. As such, market players within horticulture robotics should decide now where they want to be in 2035, taking into account that the market players’ landscape will have drastically changed by then. After having determined that, the route to get there should be at the core of their strategy.”

**FRANK DE HEK**  
HORTICULTURE SPECIALIST, OAKLINS

Example 1: Strategic partnerships

	<p><b>Combining expertise and knowledge</b></p> <p>In September 2021, <b>Priva</b>, a Netherlands-based developer of a leaf-cutting robot for tomato cultivation and <b>Octinion</b>, a Belgium-based developer of a strawberry-picking robot and a UV-C robot to tackle diseases in greenhouses, merged their horticulture activities under the Kompano flag – which has now been rebranded to <b>Octiva</b>.</p>	<p><b>Shared ambitions</b></p> <p>Both companies see advantages in joining forces, creating synergy by sharing knowledge on technology and scaling up research and application.</p>	<p><b>New partnership</b></p> <p><b>1 June 2023</b> Octiva entered into a partnership with <b>Berkvens</b>, a Netherlands-based developer of, among other things, self-propelled scissor lifts</p>
	<p><b>Repositioning for market demand</b></p> <p>Through several partnerships, <b>Biobest</b>, a Belgium-based biological crop protection and pollination specialist, is working towards an integrated portfolio of crop protection tools and solutions. By partnering up with companies that provide real-time data inputs, the company is taking its services to the next level.</p> <p>In September 2023, <b>Tikehau Capital</b>, a France-based private equity firm recognized the value of the partnerships and acquired a majority stake in Biobest.</p>	<p><b>Strategic partnerships</b></p> <p><b>1 September 2021</b> Biobest entered into a partnership with <b>Ecoation</b>, a Canada-based developer of robotics and AI technologies for horticulture</p> <p><b>2 May 2022</b> Biobest entered into a partnership with <b>PATS</b>, a Netherlands-based developer of indoor drone solutions</p>	
	<p><b>Stimulating automation in horticulture</b></p> <p>Under the flag of <b>VDL CropTeq Robotics</b>, VDL has been developing AI-driven robotic solutions for autonomous leaf cutting of cucumbers. While VDL is able to develop high-tech technology in-house, a partnership brings additional value to the table. That is why in September 2021, VDL entered into a strategic partnership to further stimulate the development of a leaf-cutting robot. This was followed by a strategic acquisition in October 2022, which further established VDL's position in the market.</p>	<p><b>Strategic partnership and acquisition to accelerate growth</b></p> <p><b>1 September 2021</b> VDL entered into a partnership with <b>Bosman van Zaal</b>, a Netherlands-based developer of smart plant production systems</p> <p><b>2 October 2022</b> VDL acquired a minority stake in <b>VBTI</b>, a Netherlands-based developer of deep-learning technology</p>	

Example 2: Venture capital

	<p><b>Deal description</b></p> <p><b>Future Food Fund (FFF)</b>, a Netherlands-based venture capital firm, is focusing on obtaining a strong position in the market for food &amp; agriculture tech companies.</p> <p>Through several investments over the years, the VC firm is driving environmental impact and contributes to the development of smart robotics solutions.</p>	<p><b>Selection of relevant transactions</b></p> <p><b>1 July 2018</b> FFF invested in <b>PhenospeX</b>, a Netherlands-based manufacturer of novel sensors that aims to address the overuse of chemicals and fertilizers through smart plant analysis</p> <p><b>2 July 2019</b> FFF invested in <b>AVL Motion</b>, a Netherlands-based, in developer of fully-automated asparagus harvesting robots</p>		
	<p><b>Deal description</b></p> <p><b>Elbow Beach Capital</b>, a UK-based venture capital firm, is focusing on obtaining a strong position in the market for automated harvest solutions.</p>	<p><b>1 August 2022</b> Elbow Beach invested in <b>Muddy Machines</b>, a UK-based developer of crop harvesting automation technologies</p>	<p><b>2 February 2023</b> Elbow Beach invested in <b>Upp</b>, a UK-based developer of AI-driven automation and upcycling technologies for broccoli</p>	<p><b>3 August 2023</b> Elbow Beach invested in <b>Fieldwork Robotics</b>, a UK-based developer of autonomous raspberry harvesting robots</p>

Example 3: Private equity

 <p>x</p>  <p>2021</p>	<p><b>Partnership description</b></p> <p>In July 2021, <b>Cibus Fund</b>, a Guernsey-based private equity firm, acquired ISO Group, a Netherlands-based manufacturer of automated solutions for the horticulture sector.</p> <p>Cibus Fund is focused on companies that are well positioned to benefit from transitions in the food and agriculture value chain.</p>	<p><b>Strategic partnership to accelerate growth</b></p> <p>The partnership will help accelerate the company's expansion into indoor food farming technologies.</p> <p>As a result of its acquisition by Cibus, ISO was introduced to a strong team of experienced investors and a large network in the food and agriculture industry, including the horticulture sector.</p> <p><b>Selection of portfolio companies of Cibus Fund</b></p> 
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 <p>x</p>  <p>2018</p>	<p><b>Deal description</b></p> <p><b>Gimv</b>, a Belgium-based private equity firm, invested in Kind Technologies alongside the founders.</p> <p>The goal was to triple revenues in 5 years time by executing an expansion strategy in machine vision systems and modules, before exiting and selling Kind to Avedon in 2023.</p>	<p><b>Strategically expanding the company</b></p> <ol style="list-style-type: none"> <li> <p><b>November 2020</b></p> <p>Kind Technologies invested in <b>Martin Stolze</b>, a Netherlands-based manufacturer of automation solutions for internal transport in greenhouses</p>  </li> <li> <p><b>February 2023</b></p> <p>Kind Technologies invested in <b>KOAT</b>, a Netherlands-based provider of automation solutions for internal transport and material handling systems in greenhouses</p>  </li> </ol>	 <p>x</p>  <p>2023</p>
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Example 4: Trade buyers

 <p>x</p>  <p>2021 – 2022</p>	<p><b>Repositioning for market demand</b></p> <p><b>Koppert</b>, a Netherlands-based provider of biological crop protection and natural pollination services, has acquired several high-technology companies in order to improve its operations.</p> <p>The company recognized the need to complement the quality and efficiency of their products with a more specialized application to guarantee maximum performance.</p>	<p><b>Strategic partnerships</b></p> <ol style="list-style-type: none"> <li> <p><b>December 2020</b></p> <p>Koppert acquired <b>Geocom</b>, a Brazil-based developer of robotics drones providing crop management and imaging services</p>  </li> <li> <p><b>May 2022</b></p> <p>Koppert acquired <b>AgriAI</b>, a Netherlands-based developer of AI-based automatic pest detection solutions</p> <p><b>AgriAI</b></p> </li> </ol>
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“The application of robotics is revolutionizing the horticulture market. The professionalization trend has become even more important now that the market is growing, and the sector has become a vital pillar in fighting food scarcity. An increasing number of agricultural players as well as newcomers are making their entrance into horticulture because they see opportunities in the near future or in the long term. These newcomers can contribute to the further professionalization of the global horticultural industry by leveraging the knowledge and experience they have gained in other sectors. The interest and added value of these parties have not gone unnoticed by horticultural players, and several of them have formed partnerships with the aim of strengthening and growing their company. In 2030, we expect to see a more established and mature robotics horticulture market. We believe financial investors will play a key role in this transformation.”

**FRANK DE HEK**  
HORTICULTURE SPECIALIST, OAKLINS



# Sector view

By Jason Silm, Partner at Cibus Capital

**Cibus Capital (Cibus) is a sustainable food and agri investment advisory firm driving the dynamic future of food and agriculture — more food, better food, with less impact on our planet. The Cibus strategies invest in new and innovative companies that are well positioned to benefit from the transition of the food and agriculture value chain to a new, sustainable model. One of its focus areas is robotics and mechanization, a category in which it currently holds four investments.**

We spoke to Jason Silm, Partner and Head of Agriculture at Cibus, about the opportunities in the horticulture robotics and mechanization segment, current market developments, Cibus' investment strategies and added value, and its view on how to maneuver in a changing market environment.

## THE ATTRACTIVENESS OF THE SEGMENT

“On the demand side, the horticulture fruit and vegetables market outlook is great, with a 7% increase in annual food consumption expected in the coming decade. However, a huge challenge is that the availability of labor in the agricultural sector is decreasing rapidly, in some regions even by 40%.

With 30 to 40% of horticulture production costs currently represented by labor, without drastic changes, food prices will go up dramatically to pay workers more or there will simply not be enough food to feed the world's population. The solution to this challenge is the broad and rapid adoption of robotics and mechanization. Cibus is eager to support the sector in developing strong and affordable robotics and mechanization solutions. Affordability is an important factor because, in the end, the shift will only take place when the growers will make a good return on investment. By helping this happen, the Cibus funds can also benefit from the anticipated strong market growth.

## CIBUS

Since 2016, the Cibus strategies have been focusing on investments in the agri and food markets worldwide, deploying capital through two channels: (i) Cibus Funds, a private equity strategy that focuses on mid-market growth equity and buy-out opportunities targeting control buy-out positions in companies with US\$3–20m EBITDA; and (ii) Cibus Enterprise Funds, a venture strategy focused on late-stage venture agritech and foodtech investments, aimed at obtaining minority stakes in disruptive



technologies in food and agricultural companies. From our experience, we see many symbioses/cross-pollination between the two strategies, which enable us to share best practices and know-how across portfolio companies, and identify and capitalize on disruptive technologies.

While we are already well established in the robotics horticultural market with investments in Burro, Ecorobotix, ISO Group and Saga Robotics, we are continuously evaluating new business opportunities in this attractive market segment. We believe that winning market players must be able to provide full-service, end-to-end solutions to growers in order to deliver the grower an adequate and reliable return on investment. Generally, more advanced/high-tech solutions require more professionalism from market players. This is especially relevant for growers of crops with time-critical harvesting periods, which require reliable machines, and experienced and capable teams applying the technology.

We are looking for committed management teams with proven capabilities to innovate and develop disruptive technologies on a small scale, that are looking for a partner to help scale up their business. Through our support, we can transform businesses with ample untapped market potential as well, ideally with an appetite for internationalization and increased emphasis on R&D. We are a partner that can help scale up businesses, and are happy to reinvest in bolt-on acquisitions or invest into the organization to prepare for further growth.

At ISO Group for example, we invested heavily in the organization in order to prepare for future growth, including expanding the workforce from 40 to 100 employees, strengthening the management team and increasing focus on innovation by growing the R&D team from 6 to 24 employees.

To achieve these growth plans, we operate as true partners, working closely with founders to deliver on their business and personal objectives. We are truly hands-on investor and sparring partners for management teams, having monthly board meetings and semi-annual strategy sessions, as well as an annual workshop with the CEOs of our portfolio companies to share best practices regarding techniques and operational improvements. Our commitment, together with our niche focus and track record in the food and agri space, and a combined 100 years

of team investment experience in food and agriculture industries, makes us a unique and value-added partner for companies in the horticulture space with ambitious growth plans.

**MARKET OUTLOOK**

Success will be largely driven by having the right intellectual property and being able to deliver, alone or with partnerships, a complete solution. Companies that are able to provide both will obtain strong market position.

Key in robotics are machine vision and AI, but we see that many companies still struggle to implement those properly, as successful adoption of machine vision and AI are very environment and crop dependent. Furthermore, very few parties are able to provide end to end solutions, which, as mentioned above, is key in our eyes. Consequently, the capability to form solid partnerships with other sector players for technology, distribution power, integrated solution and/or service reasons is integral to success.

In the long term, we expect a few winners in each specific crop family, typically providing end-to-end solutions across the value chain, while smaller and more niche players will team up in order to stay relevant.

The market developments are exciting and with the right capabilities, there are many big opportunities to grasp!”



**About Jason Silm**

Jason is Partner and Head of Agriculture at Cibus. Jason has over 20 years of experience in agricultural investments in both developed and emerging markets throughout Australia, South America, Europe and China.

**Relevant portfolio companies**



# M&A activity and valuations

In recent years, the consolidation in the sector has started to take off, although it's still early days. Observed transactions show a mix of primarily early-stage investors and strategic acquirors, with the former group especially present in certain niches of the market. Most early-stage investors obtain minority stakes, to spread risks. Many companies are rapidly professionalizing on the back

of these investments, further stimulating investor appetite. PE-backed parties and PE investors slowly entered the market between 2021 and 2023, although most companies are not yet mature enough to attract PE interest. This underpins the fact that the sector is embracing different kinds of partnerships depending on the identity and maturity of the company. M&A activity can be observed across

the world, with a significant proportion of transactions being cross-border, highlighting the international character of the sector. Valuation parameters are publicly available for very few transactions, but multiples are typically high, depending on several parameters such as size and profitability.

Date	Target	Buyer	Country	Target description	Segment	Valuation		
						EV (EURm)	EV/Revenue	EV/EBITDA
18-Dec-23	 		Netherlands-based provider of vision software, AI algorithms and robotization solutions for the horticulture sector		N/A	N/A	N/A	
15-Nov-23	 		Canada-based developer of automated mushroom harvesting solutions		N/A	N/A	N/A	
26-Oct-23	 		Japan-based developer of robots for weed control solutions enabling organic production		N/A	N/A	N/A	
24-Aug-23	 		Germany-based developer of mobile robotic solutions that can be used in the horticulture sector, among others		N/A	N/A	N/A	
10-Aug-23	 (Minority stake) 		UK-based developer of autonomous raspberry harvesting robots		N/A	N/A	N/A	
07-Jun-23	 		Netherlands-based developer of AI-based operating systems for greenhouses		N/A	N/A	N/A	
10-May-23	 		US-based developer of cultivation management software designed to optimize performance at greenhouses and indoor farms		N/A	N/A	N/A	
09-May-23	 		Switzerland-based manufacturer of autonomous farm and agricultural machinery		N/A	N/A	N/A	
02-Feb-23	 (Minority stake) 		UK-based developer of AI-based automated harvesting solutions and upcycling technologies for broccoli		N/A	N/A	N/A	
27-Jan-23	 		Netherlands-based developer and distributor of machine vision solutions such as inspection systems for food		N/A	N/A	N/A	

Date	Target	Buyer	Country	Target description	Segment	Valuation		
						EV (EURm)	EV/Revenue	EV/EBITDA
20-Dec-22		 DURAVANT		Spain-based developer of machine vision solutions for the food processing industry		N/A	N/A	N/A
08-Dec-22		 mirova		France-based developer of agricultural and vineyard robots used for weeding activities, among others		N/A	N/A	N/A
08-Nov-22	 (Minority stake)	 ELBOW BEACH CAPITAL		UK-based developer of crop automated harvesting technologies		N/A	N/A	N/A
03-Nov-22	 (Aquaponics segment)	 CEVAS		Canada-based operator of aquaponic systems and developer of automated harvesting robotic vehicles		N/A	N/A	N/A
13-Oct-22		 gener8tor		Spain-based developer of, among other items, strawberry harvesting robots		N/A	N/A	N/A
11-Oct-22		 NARWHAL VENTURES		US-based developer of robots for weed control solutions for organic production		N/A	N/A	N/A
07-Oct-22		 MIZUHO		Japan-based developer of agricultural harvesting robots		N/A	N/A	N/A
04-Oct-22	 (Minority stake)	 VDE		Netherlands-based provider of AI engineering services and developer of deep learning solutions for companies in areas such as agriculture and manufacturing		N/A	N/A	N/A
26-Sep-22	 (Minority stake)	 GLOCALINK		Japan-based developer of AI-based robotic machines for farm management		N/A	N/A	N/A
03-Aug-22		 regenerate		UK-based developer of a generation of field robots that help growers manage labor-intensive crops by conducting fieldwork to enable sustainable farming		N/A	N/A	N/A
27-Jul-22		 Nufarm		US-based provider of crop protection software solutions		N/A	N/A	N/A
27-Jul-22		 SAME DEUTZ-FAHR		France-based developer of an electric autonomous vineyard management robot		N/A	N/A	N/A
13-Jul-22		 panda capital 熊猫资本		China-based developer and manufacturer of large-field agricultural planting management robots		N/A	N/A	N/A

Date	Target	Buyer	Country	Target description	Segment	Valuation		
						EV (EURm)	EV/Revenue	EV/EBITDA
03-May-22	 Bloomfield Robotics	 Kubota		US-based provider of plant growth monitoring services to tree crops using image data		N/A	N/A	N/A
09-Mar-22	Strio.AI	ZOOX		US-based developer of robotics for picking and pruning strawberry crops		N/A	N/A	N/A
02-Mar-22	 Source Minority stake	 ACRE		Netherlands-based developer of AI-based operating systems for greenhouses		N/A	N/A	N/A
16-Feb-22	 TRAPTIC	 BOWERY		US-based developer of computer vision, robotic arms and AI solutions for harvesting delicate crops		N/A	N/A	N/A
16-Nov-21	 FruitSpec. (29% stake)	 smart agro		Israel-based provider of accurate early season yield estimation of fruits using hyperspectral machine vision technology		15.2	N/A	N/A
27-Sep-21	 METOMOTION	 RIDDER		Israel-based developer of tomato harvest robots		N/A	N/A	N/A
22-Sep-21	 IRON BOX	 Breakthrough Energy		US-based developer of crop harvesting robots		N/A	N/A	N/A
06-Sep-21	 ecoation	 biobeT SUSTAINABLE CROP MANAGEMENT		Canada-based developer of data collection services for the horticulture and agriculture sectors		N/A	N/A	N/A
30-Aug-21	 ELEOS ROBOTICS (18% stake)	 Glenbriar		US-based developer of an AI-based weed-killing robot		N/A	N/A	N/A
25-Aug-21	 NIQA ROBOTICS	 omnivore		India-based developer of AI-powered agricultural robotics for sustainable farming		N/A	N/A	N/A
21-Jul-21	 ISS HOEFT INNOVATIONS	 CIBUS  ADM CAPITAL		Netherlands-based developer of automation solutions for the horticulture sector		N/A	N/A	N/A
22-Jun-21	AgriAI	 Koppert		Netherlands-based developer of AI-based automatic pest detection solutions		N/A	N/A	N/A

Source: Oaklins' research



crop inspection



multi-purpose



AI & software



harvesting



weeding



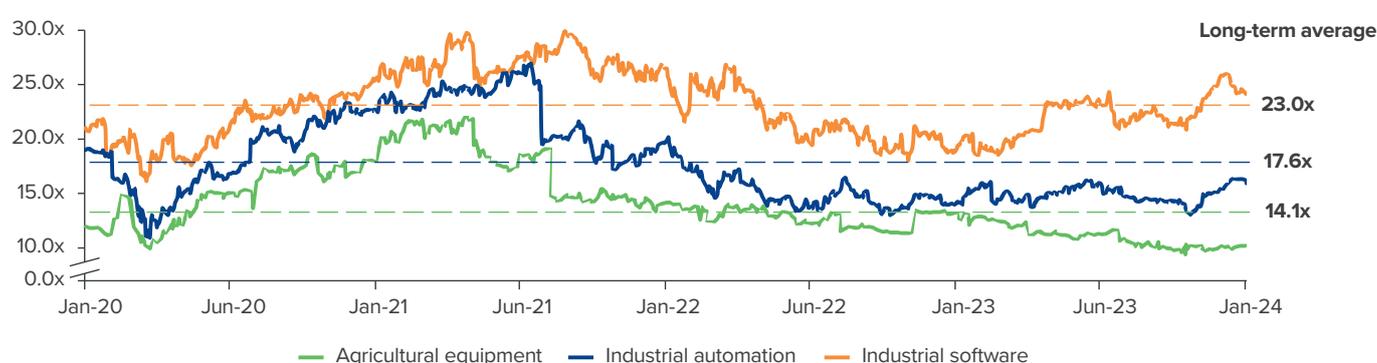
material handling

When looking at listed companies for which valuation data is publicly available, there are only a few spot-on peers, with some having limited market capitalization (e.g., Ekobot AB). We have, nevertheless, listed three peer groups, as they contain some valuable information: agricultural equipment, industrial software, and industrial automation. We observe relatively low multiples in the market for agricultural equipment, although multiples are still high compared to

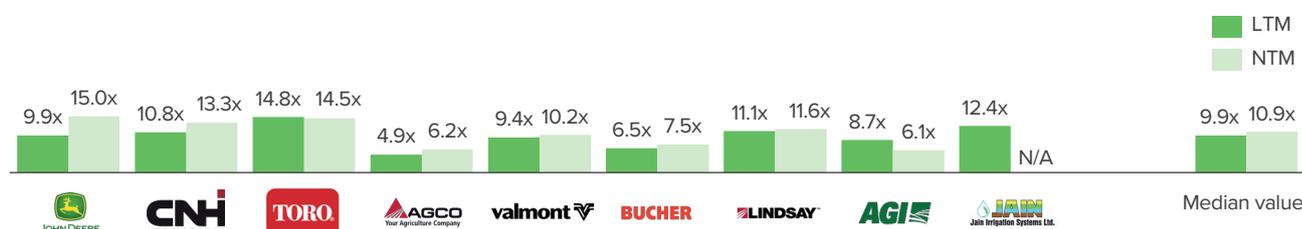
general manufacturing companies as a result of a strong appetite for digital technology in this sub-segment. Higher multiples can be observed in the market for industrial automation and robotics, especially in the machine vision and sensing sub-sector. This is largely driven by an increased awareness of robot-based solutions. The highest multiples can be observed for industrial software. Strong investor appetite in this segment can be explained by the increasing demand for automation and

qualitative manufacturing, the growing need for mass production while reducing operational costs, and the increasing adoption rate of new technologies. These factors, together with recurring revenues and low capital expenditures, result in relatively high valuations. Trimble is already implementing advanced technologies in agriculture and horticulture, further boosting the development of these sectors.

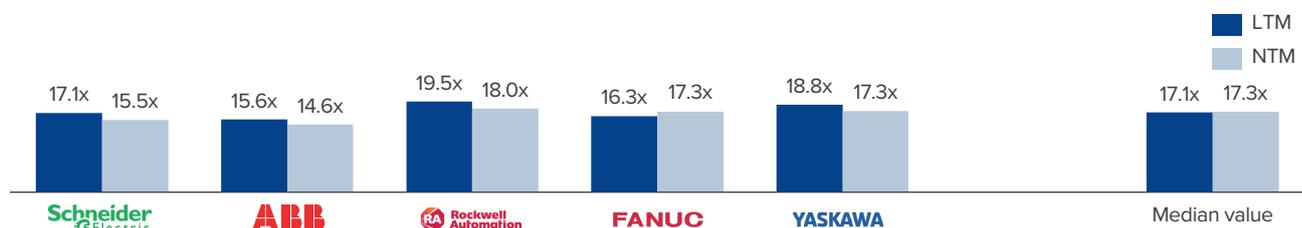
**Historical valuations (LTM EV/EBITDA)**



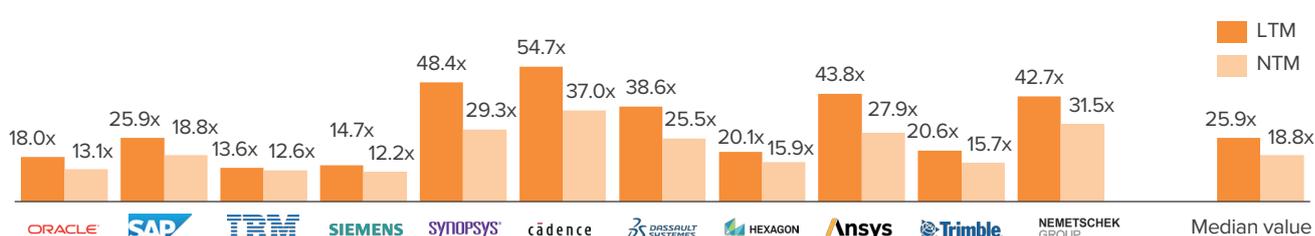
**Agricultural equipment – Comparable Company Analysis (CCA) | Selection of listed agricultural equipment companies(EV/EBITDA)**



**Industrial automation – CCA | Selection of listed industrial automation companies(EV/EBITDA)**



**Industrial software – CCA | Selection of listed industrial software companies (EV/EBITDA)**



Source: S&P Capital IQ, as of 1 January 2024

# Our track record

 <p>has been acquired by</p>  <p>M&amp;A SELL-SIDE Agriculture</p>	 <p>&amp;</p>  <p>have been acquired by</p>  <p>M&amp;A SELL-SIDE Agriculture</p>	 <p>has obtained a 100% stake in</p>  <p>M&amp;A BUY-SIDE Agriculture/Private Equity</p>	 <p>has been acquired by</p>  <p>M&amp;A SELL-SIDE Agriculture/Private Equity</p>	 <p>has been acquired by</p>  <p>M&amp;A SELL-SIDE Agriculture/Private Equity</p>
 <p>has been acquired by</p>  <p>M&amp;A SELL-SIDE Agriculture</p>	 <p>has been acquired by</p>  <p>M&amp;A SELL-SIDE Agriculture/Consumer &amp; Retail/Private Equity</p>	 <p>has been acquired by</p>  <p>MANAGEMENT ADVICE (MBI/MBO) Agriculture/Construction &amp; Engineering Services/Private Equity</p>	 <p>has acquired</p>  <p>US\$764m M&amp;A BUY-SIDE Automotive/Private Equity</p>	 <p>has been acquired by</p>  <p>M&amp;A SELL-SIDE Agriculture/Construction &amp; Engineering Services/Private Equity</p>

## CASE STUDY: ECOROBOTIX RAISES US\$52M IN NEW FUNDING

In May 2023, Ecorobotix, the Swiss manufacturer of ARA, an AI-powered plant-by-plant recognition and ultra-high precision smart spraying system, raised US\$52 million in funding, jointly led by AQTON Private Equity and Cibus Capital, with additional investments from several new and existing investors.

With customers in 15 European markets, these investments will further accelerate Ecorobotix's rapidly growing business. With its largest capital raise to date, Ecorobotix aims to accelerate geographic expansion across new and existing markets and accelerate new product development. Ecorobotix will use the new capital to expedite the growth of ARA worldwide, particularly in the Americas.



has raised funds











US\$52m  
FUNDING, DEBT ADVISORY & ECM  
Agriculture/Automotive/Industrial Machinery & Components/TMT

## CASE STUDY: SAME DEUTZ FAHR AND VITIBOT FORM A PARTNERSHIP FOR STRATEGIC GROWTH

In July 2022, SAME Deutz Fahr (SDF Group), a world-leading manufacturer of agricultural equipment, and VitiBot, the French vineyard robotics specialist, formed a partnership.

Together with its new strategic partner, VitiBot plans to accelerate product development and further consolidate its leading market position of its Bakus®, a 100% electric and autonomous robot that offers real-time remote supervision and monitoring services, recognized as the most advanced solution in the vineyard market.



has been acquired (majority stake) by



Farming Technology. Since 1927.

M&A SELL-SIDE  
Agriculture

# Deep local roots, global commitment

Oaklins brings you opportunities from across the world and we meet you with our expertise wherever you are

## OAKLINS OFFERS A COMPREHENSIVE RANGE OF SERVICES

- M&A advisory (buy- and sell-side)
- Growth equity and equity capital markets advisory
- Debt advisory
- Corporate finance services

Horticulture is one of our focus areas. Combining comprehensive sector knowledge with global execution has led Oaklins to become one of the most experienced M&A advisors in the horticulture sector, with a large network of relevant market players worldwide. This results in the best possible merger, acquisition and divestment opportunities for horticulture companies.

If mergers, acquisitions or divestitures of businesses or business units are part of your strategy, we would welcome the opportunity to exchange ideas with you.



✉ **FRANK DE HEK**

Partner  
Amsterdam, Netherlands  
T: +31 6 1397 9464

Frank leads Oaklins' horticulture team and is a partner at Oaklins Netherlands. As part of his horticultural sector focus, Frank continuously follows developments, publishes newsletters, attends the major events and maintains regular contact with the key players. Consequently, he has a deep understanding of the market dynamics and value drivers in breeding, growing, distribution, retail, machinery, equipment and consumables in this sector. Globally, Frank is the most experienced M&A advisor in the horticulture sector. High-profile transactions Frank has completed include Dümmer Orange and Floranova.



✉ **DAVID ZÜRRE**

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David leads Oaklins' robotics team and is a partner at Oaklins Switzerland. He has a particular focus on the automation sector, where Switzerland-based companies are global technology leaders. A key transaction he has been involved in is Stäubli Group's acquisition of a 70% stake in WFT.

**United by a strong belief that we can achieve the extraordinary.** Oaklins is a global team of 850+ financial advisory professionals in 45 countries providing M&A, growth equity, ECM, debt advisory and corporate finance services to support entrepreneurs, corporates and investors in reaching their goals.

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