



PLUS ONE
ROBOTICS

**2020 NORTH AMERICAN
ROBOTICS AND COMPUTER VISION SOFTWARE FOR LOGISTICS
CUSTOMER VALUE LEADERSHIP AWARD**

2020
BEST PRACTICES
AWARDS

FROST & SULLIVAN

BEST PRACTICES AWARD

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Frost & Sullivan’s global team of analysts and consultants continuously research a wide range of markets across multiple sectors and geographies. As part of this ongoing research, we identify companies that consistently pursue or invest in new technologies, enabling them to serve their customers more effectively and grow above the industry average.

David Frigstad, Chairman, Frost & Sullivan

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SIGNIFICANCE

Ultimately, growth in any organization depends on customers purchasing from a company and then making the decision to return time and again. Satisfying customers is the cornerstone of any successful growth strategy. To achieve this, an organization must be best in class in 3 key areas: understanding demand, nurturing the brand, and differentiating from the competition.

UNDERSTANDING

Customer Value Leadership is defined and measured by 2 macro-level categories: Customer Impact and Business Impact. These two sides work together to make customers feel both valued and confident in their products’ quality and performance. This dual satisfaction translates into repeat purchases and a lifetime of customer value.

BACKGROUND AND COMPANY PERFORMANCE

Industry Challenges

The industrial sector is fast emerging as a key area where major digital investments are being realized. Factories have become smarter, processes and operations are faster and more efficient, and workers are increasingly more productive with the advent of Industry 4.0. Despite all of these rapid developments, Frost & Sullivan notes that the industrial sector still views digital investments with a conservative mindset and significant skepticism. Industrial enterprises are typically not as open to change as their counterparts from the information technology (IT) industry. Moreover, rapidly evolving technologies, process complexities, and budget restraints make it quite difficult for market players to make swift decisions. As a result, less than 20% of the industrial sector has made a shift to advanced digital systems, including robotics. Instead, a large portion of the manufacturing industry continues using conventional legacy

systems. Convincing these users to adopt modern technologies on the factory floor is a clear challenge that technology solution providers currently face. Despite a high comfort level with the status quo, Frost & Sullivan observes that the manufacturing sector is starting to realize the additional value digital investments can bring about. Moreover, the pressure of competition spurs both manufacturers and the industrial warehouse and logistics market participants to explore ways to leverage technology's benefits.

Robotics, in particular, is emerging as a critical development in the industrial sector, with the majority of solution development centering on the robotic arm and gripper markets for the automotive and electronics industries. Frost & Sullivan analysts point out that only a handful of companies have properly realized robotics' potential in the warehouse and logistics market.



Furthermore, vendors often use buzzwords that fail to create an impact as industrial companies still do not trust artificial intelligence (AI)-based systems. AI remains an abstract concept that industrial companies fail to relate to - unless a solution provider can reassure their faith in the technology. Moreover, AI-based technologies such as computer vision that can best serve industrial applications are relatively underdeveloped. A lack of awareness among users - coupled with many developers' lack of technical expertise - leads to a significant market gap.

Frost & Sullivan analysis concludes that successful vendors will effectively communicate and support the benefits of computer vision solutions while ensuring the ability to integrate the technology into robots and legacy factor equipment, which is otherwise a complex task for manufacturers.



CUSTOMER IMPACT AND BUSINESS IMPACT

Founded in 2016, San Antonio, Texas-based Plus One Robotics develops computer vision software to automate robots in warehouse and supply chain applications. The company's unique approach to human-robot collaboration ensures flexible and fault-tolerant operations.

Plus One Robotics' solutions empower robots with AI-powered computer vision. Moreover, the company's cloud-based monitoring solution enables robots to complete monotonous tasks such as package sorting, parcel induction, or piece-picking. Unlike traditional robots that can only perform pre-programmed tasks, Plus One Robotics' systems can adapt to dynamic industrial environments and accommodate unpredictable situations such as

packages of variable types, shapes, and sizes. The offering is supplemented by human experts who monitor the robots to ensure tasks are accomplished correctly. In an industry constantly scrutinized for its potential to eliminate human jobs, Plus One Robotics' operational model empowers the human workforce to perform sophisticated tasks versus the mundane jobs that robots perform.

Moreover, Plus One Robotics realized early on the market was flooded with robotic arm and gripper market participants, with a minimal focus on computer vision capabilities. The company identified the need to develop a gripper-agnostic perception stack to augment its entrance into the computer vision software market.

While the robotics market has traditionally been heavily dependent on the automotive industry, Frost & Sullivan notes that overreliance on a single end-market is a major business risk. For example, any setback in the automotive industry will have a direct impact on the robotics market. Plus One Robotics' founders identified and turned this gap into a business opportunity by identifying the North American supply chain and logistics market as an alternate end-market.

What Makes Plus One Robotics Stand Out?

Industrial robots traditionally excel at repetitive tasks, whereas warehouse and supply chain tasks have a high degree of variability. Therefore, robotics vendors seeking to crack the warehouse and supply chain market require offerings that can sense and respond to variations in the workflow. Frost & Sullivan notes the classic approach to robotic perception is via AI. While similar market solutions leverage AI alone, Plus One Robotics' process employs a human-in-the-loop (HITL) approach along with the AI algorithm. The company understands AI by itself cannot solve the complex problems of 3D computer vision. By adding a human expert, the company facilitates machine learning. For example, if a robot picking and placing objects at an Asian warehouse encounters an object that it has never experienced before, it raises a flag over the company's cloud-based software.

At that point, a person based in San Antonio will observe what that robot is experiencing and can subsequently show it how to perform the operation remotely. The robot then learns the new technique and returns to autonomous work until it runs into

case another flag will be raised. The company's HITL approach differentiates Plus One Robotics from competitors, as indicated in its name (i.e., the human is the "plus one".) Specifically, Plus One Robotics' HITL comprises specialized personnel who are available 24/7 and can offer services to the world's most remote locations. In a legacy industry known to be sluggish in adopting new technologies Frost & Sullivan feels that Plus One Robotics' solution is truly fresh and unique. For example, the warehouse industry is traditionally reticent to technology adoption and may not even have an engineering staff. Therefore, there is a need for exceedingly reliable and user-friendly solutions. Plus One Robotics nicely meets this need, as reflected in its above-average industry growth and growing market share. For example, vendors who claim a virtually fail-proof autonomous solution using deep learning and reinforcement models will typically be met with skepticism. But when a company acknowledges the current shortcomings of the robotics field while also providing a solution to mitigate risk, they will experience higher market penetration. Plus One Robotics does precisely that by involving a live human being that resembles the client's workforce.

"In a legacy industry known to be sluggish in adopting new technologies, Frost & Sullivan feels that Plus One Robotics' solution is truly fresh and unique."

Nandini Natarajan, Industry Analyst

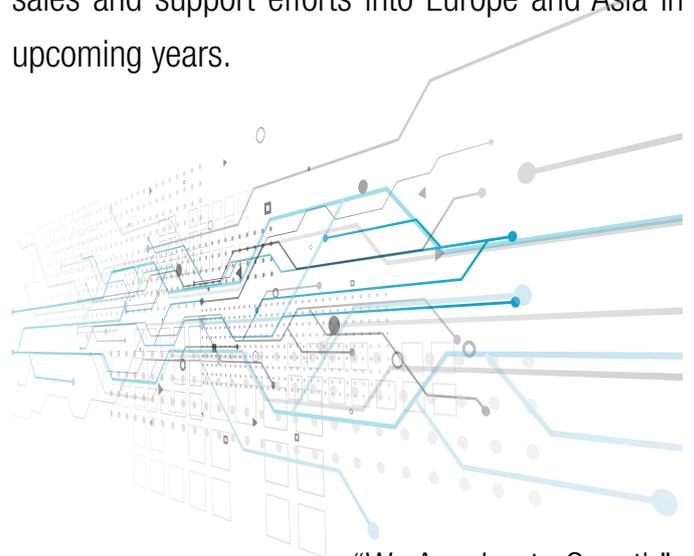
Putting Customers First

Plus One Robotics understands that the sales cycle can be lengthy and involved, especially concerning emerging technologies such as computer vision in a traditional legacy space. Even though the company has a direct sales team, Plus One Robotics believes in intensive account management. Unlike the majority of other competitors, Plus One Robotics' sales personnel ensure that customers receive dedicated attention and service. The company also cooperates with systems integrators to deploy robots at larger clients. Once a product is deployed at the customer's site, Plus One Robotics abides by a contractual maintenance agreement to ensure ongoing support. In addition, Plus One Robotics' unique HITL approach allows continual client support throughout the product lifecycle. Therefore, there is never a time when a customer is unattended. Finally, robots' upkeep and AI upgrades are performed by Plus One Robotics during the entire product subscription period, thereby optimizing the customers' ownership experience. Frost & Sullivan's own research reveals that this unique client-centric approach clearly sets the company apart from its competitors.

Despite only four years since the company's inception, Plus One Robotics has been named one of the top places to work for in San Antonio for two consecutive years (2019 and 2020.) With a current headcount of 40, Plus One Robotics plans to double its workforce in the next year.

The company consciously supports a positive and healthy corporate culture. Empathy for customers, respect for others, frugality with resources, and creativity before compromise are key tenets on which the company runs. Plus One Robotics believes that innovation results from employing individuals with diverse backgrounds and viewpoints. Empathy is another quality that is constantly stressed within the company. For example, Plus One Robotics recognizes that the conservative warehouse and logistics industry is often sensitive about new technology adoption (due to a lack of familiarity and proven ROI). To that end, the company assumes significant ownership in making sure that its robotics is successful for customers. Finally, the company exhibits an extraordinary and uncompromising commitment to creativity, preferring a resourceful problem-solving approach - rather than changing target metrics

Such an approach is clearly driving growth. Frost & Sullivan notes that Plus One Robotics' customers are currently large multinationals, potentially spurring the need for a global footprint beyond North America. Even though the company can handle global operations remotely at present, Plus One Robotics is mindful that it will need to expand sales and support efforts into Europe and Asia in upcoming years.



CASE STUDY: MSC INDUSTRIAL

Who is MSC?

A leading distributor of metalworking, maintenance repair, and operational products and services for North American industrial enterprises.

What was implemented?

In 2019, MSC deployed Plus One Robotics' 3D-vision and AI-enabled robotic packaging system at its customer fulfillment center in Harrisburg, Pennsylvania to enhance efficiencies. Its successful implementation has encouraged MSC to implement the system across a number of sites in other major cities.

What was MSC able to achieve?

Plus One Robotics supports MSC's growth by acting as a force multiplier for labor. Previously, the company struggled to find enough people to pack all the orders and meet cutoff times. Plus One Robotics MSC solves this issue effectively. As a result, MSC plans to adopt the company's computer vision software systems, along with Plus One Robotics' cloud-based monitoring service.

CASE STUDY: FEDEX

Who is FedEx?

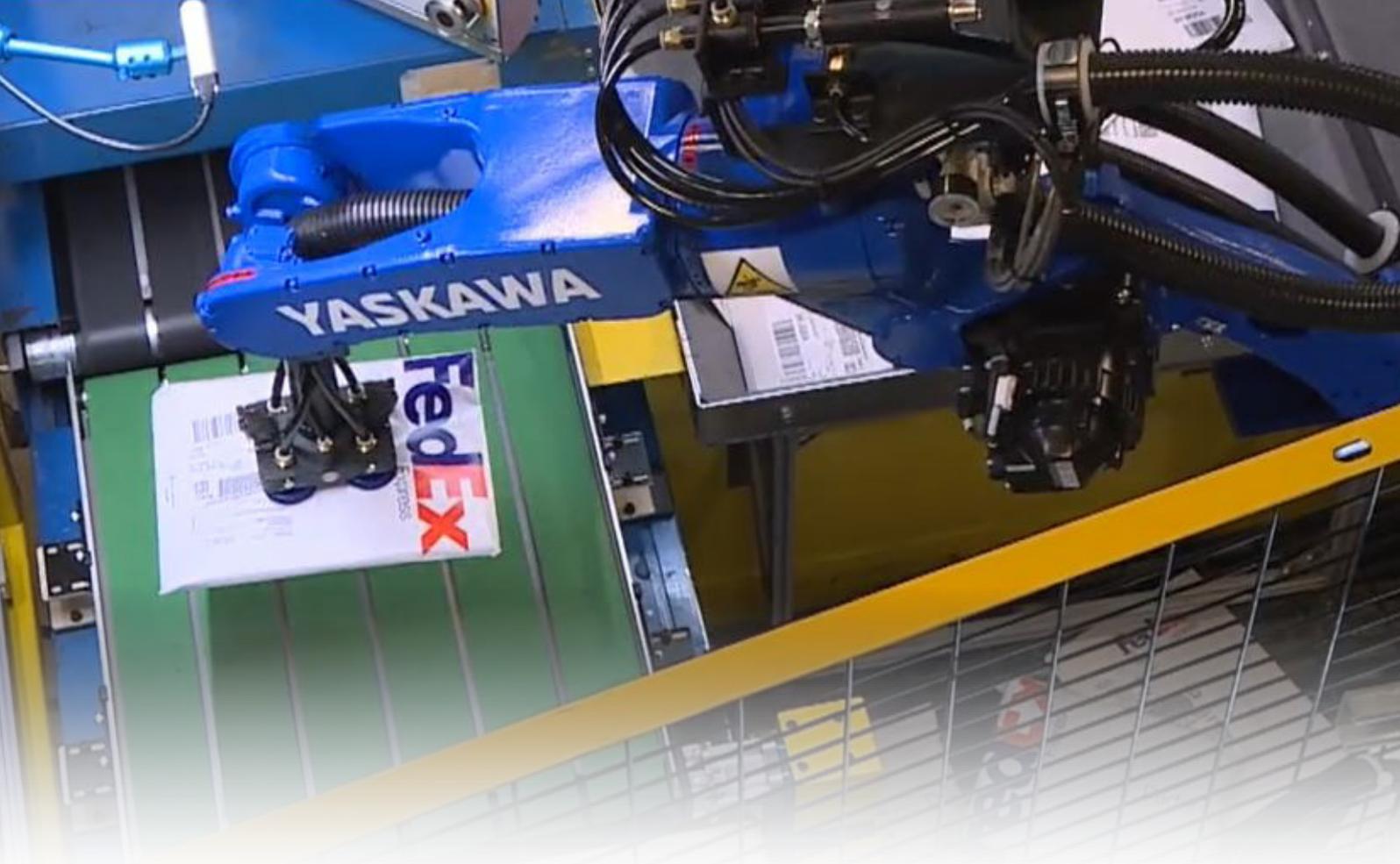
FedEx invented express package distribution and is the industry's global leader, providing delivery to more than 220 countries and territories. FedEx Express, the world's largest express transportation company, providing fast and reliable services for more than 3.6 million shipments each business day.

What was implemented

In 2020, FedEx installed four robotic arms at the company's World Hub in Memphis, Tennessee to automate its small package sorting. FedEx's robotic arms are mounted inside protective cages on the upper or of the small package sort, where incoming parcels are inducted into high-speed parcel sorters. The robotic arms are powered by Plus One's 3-D machine vision and artificial intelligence. Yaskawa Motoman supplied the robots arms, grippers, and system integration. Plus One provided the 3-D vision, artificial intelligence (AI) and an industrial computing system to run the software.

Future Potential

The arms were installed in the small package sort facility at the Memphis hub in March, when the COVID-19 pandemic was hitting the US. The robotic arms help FedEx manage the surge in e-commerce demand by maintaining warehouse throughput and mitigating labor shortages. The robots are improving efficiency and creating new roles for workers, as former package-sorters can now manage the team of robots. FedEx stated plans to expand beyond these four robots.



Conclusion

While the North American industrial sector is rapidly evolving in the face of Industry 4.0, technology adoption is hindered by budget restraints, legacy infrastructure, and a lack of proven return on investment.

Plus One Robotics' couples technical excellence with high-touch customer service to help clients quickly and cost-effectively and optimize operations. The company's innovative human-in-the-loop approach provides 24/7 expert support while ensuring that robots perform to their maximum capacity, spurring Plus One Robotics' rapidly-growing brand equity and

market share. Convincing these users to adopt modern technologies on the factory floor is a clear challenge that technology solution providers currently face. Despite a high comfort level with the status quo, Frost & Sullivan observes that the supply chain sector is starting to realize the additional value digital investments can bring about. With its advanced technology, uniquely client-centric focus, and disruptive potential, Plus One Robotics earns the 2020 Frost & Sullivan Customer Value Leadership Award.



KEY BENCHMARKING CRITERIA

For the Customer Value Leadership Award, Frost & Sullivan analysts independently evaluated Customer Impact and Business Impact according to the criteria identified below.

360-DEGREE RESEARCH METHODOLOGY

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of the research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often companies make important growth decisions based on a narrow understanding of their environment, resulting in errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry participants and for identifying those performing at best-in-class levels.

BUSINESS IMPACT

*Financial
Performance*

*Customer
Acquisition*

*Operational
Efficiency*

*Growth
Potential*

*Human
Capital*

CUSTOMER IMPACT

*Price &
Performance
Value*

*Customer
Purchase
Experience*

*Customer
Ownership
Experience*

*Customer
Service
Experience*

*Brand
Equity*



BEST PRACTICES AWARDS

The Frost & Sullivan Best Practices Awards have recognized exemplary achievements within a multitude of industries and functional disciplines for the last 19 years. Frost & Sullivan conducts best practices research to properly identify unmatched innovation and leadership among companies, products, processes, and executives.

FROST & SULLIVAN

For over five decades, Frost & Sullivan has become world-renowned for its role in helping investors, corporate leaders and governments navigate economic changes and identify disruptive technologies, Mega Trends, new business models and companies to action, resulting in a continuous flow of growth opportunities to drive future success.

