FROST & SULLIVAN

2021 Frost & Sullivan
Enabling Technology Leadership Award

North American Data and AI Solutions for Manufacturing Excellence in Best Practices

FROST & SULLIVAN
BEST PRACTICES
AWARDS

Altair Engineering, Inc.

Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each award category before determining the final award recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. Altair excels in many of the criteria in the data and AI solutions for manufacturing space.

Commitment to Innovation, Creativity, and Application Diversity

Digital transformation catalyzed by industrial internet of things (IIoT), virtualization, cloud, and artificial intelligence (AI) is rapidly changing today's organizations of all sizes and types, including manufacturers. Industry 4.0 and smart manufacturing/smart factories initiatives further accelerate this pace of change. However, with not enough data scientists available, manufacturers are unable to scale data and AI.

> *"Globally, millions of engineers are available; the EU alone has 3 million mechanical engineers. Capitalizing on its synergy of engineering, AI, and HPC, Altair equips engineers with the tools to adopt the role of citizen data scientists and unlock manufacturers' AI potential through its solution."*
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> ***– Sankara Narayanan, Senior Industry Analyst***

Amid this scenario, Altair empowers engineers and analysts with practical AI to become citizen data scientists. Founded in 1985 and headquartered in Michigan, Altair offers a broad software solution portfolio that includes simulation, data analytics/AI, design, modeling and visualization, Internet of things (IoT), and high-performance computing (HPC). Altair is a global software company that has helped create revolutionary products, such as the fastest cars and planes and putting the first three-dimensional (3D) printed parts in space. Altair's vision of data-driven enterprise is made possible through its 2018 acquisition of Datawatch, a pure AI and data company specializing in data preparation, data science, and data visualization. The acquisition was a catalyst for the convergence of engineering, HPC, and AI knowledge and technologies, differentiating Altair from the competition as the industry's only engineering, HPC, and data science company. Frost & Sullivan

recognizes Altair's technology leadership as Altair offers advanced solutions to many industry challenges.

Many organizations may have deployed AI, but it is not scalable. To become a data-driven or AI-driven enterprise at scale, manufacturers need the expertise of data engineers, data architects, and data scientists. However, the availability of data scientists is scarce, and computer scientists whose focus is on information technology (IT) and cloud-based tools mainly dominate the industry. Manufacturers find it challenging to implement AI solutions in their operations or scale up AI deployment. The key question then is this: Who will do data science and make AI scalable especially when not enough data scientists are available? Data software companies primarily look at scaling from an IT perspective, such as scaling up on the cloud and not scaling up AI.

Frost & Sullivan finds Altair's solution unique in addressing this issue. Globally, millions of engineers are available; the European Union (EU) alone has 3 million mechanical engineers. Capitalizing on its synergy of simulation, AI, and HPC, Altair equips engineers with the tools to adopt the role of citizen data scientists and unlock manufacturers' AI potential through its solution. Data scientists are successful in the first use cases, but the gap arises when they attempt to execute their ideas in engineering or on the manufacturing floor because they typically lack domain knowledge. To this end, Altair bridges that gap and accelerates game-changing convergence by empowering engineers to become citizen data scientists.

Citizen data scientists require mastery in mathematics and statistics, domain expertise in use cases, and computer science programs such as Hadoop, Python, Apache Spark, and TensorFlow. Engineers have expertise in mathematics and statistics as well as domain knowledge; they know why a product breaks on the manufacturing floor or what the quality issues are for a product. However, engineers lack computer science expertise, and not many are willing to learn the different programs. Well aware of the capabilities and limits of engineers, Altair supports engineers in becoming citizen data scientists by automating parts requiring computer science knowledge in its solution. To this end, Altair offers an easy-to-use, self-service, practical, affordable, and low- or no-code solution. What further differentiates Altair's solution is that it is not a black-box solution. Altair offers an open and extensible solution that enables code exchanges between expert and non-expert users and even allows the code to be exported to a different platform. Re-skilling an engineer typically takes 8 to 16 months, but with Altair's solution, it can be accelerated to 6 to 8 weeks.

In addition to facilitating engineers in becoming citizen data scientists, Altair's solution is also valuable for organizations that already have data scientists and computer scientists. Equipped with its data science, data preparation, and data visualization capabilities, the solution complements the skills of expert users who can spend more of their time in productive and practical AI work. Expert data scientists and citizen data scientists can deliver business value through use cases without worrying about governance and security tasks. Some of Altair's simulation-driven data use cases are in engineering and testing such as digital twin and warranty analytics, production and factory floor such as predictive maintenance and quality analytics, and computer-aided engineering (CAE) such as product design.

Altair stays abreast of the latest trends and focuses on incorporating and offering additional functionalities to ensure its technology solutions are on par with industry requirements and technological advancements. To this end, Altair released Altair SmartWorks™, a next-generation, cloud-native platform to empower augmented, data-driven decision-making. Frost & Sullivan commends Altair for providing organizations with its innovative solution that enables engineers to do data science and make data-driven decisions daily without requiring computer science or coding knowledge.

Customer Ownership, Purchase, and Service Experience

Altair operates in 25 countries, with more than 3,000 employees and 11,000 global customers across automotive, aerospace, energy, financial services, government and defense, industrial goods, and material suppliers. The company's big footprint in business, financial services, and insurance as a result of its data heritage is a strong differentiating factor. Altair brings in standard rapid trading and real-time trading techniques from the finance industry into the manufacturing space for IoT, providing real-time actionable insights in milliseconds and nanoseconds.

Altair's engineering-driven data use cases have delivered some of the most significant customer values such as reducing the number of recalls, shortening development lead time, optimizing products through AI, decreasing testing costs and lead time, preventing unplanned retesting, lowering maintenance costs, and improving part quality and customer satisfaction.

With its solutions being deployed in multiple sites globally, Altair focuses on working closely with customers to ensure an enhanced service experience. In addition to industrial design and engineering services, Altair offers a comprehensive portfolio of data science services such as consulting, management, and training. One of the primary factors contributing to the company's success is its highly efficient resource pool of data scientists and analysts with unmatched industry expertise and understanding of every aspect of customers' business and requirements. The company's enhanced service experience also includes training, ranging from on-site and virtual to on-demand training, that effectively guide customers to use Altair's products and gain maximum value.

Altair makes AI scalable. For example, Ford's engineers trained and built various machine learning (ML) models to automatically predict optimal stamping processes (for automotive parts in its factory) with near 100% accuracy in automatic process selection. With Altair's solution, Ford reduced the cost of materials and rework time while increasing first-time through (FTT) rates. Ford's stamping engineers could use data and ML and improve part stamping process without writing one line of code. This is an example of how Altair can help with AI democratization and scale-up and enable more engineers to be data-driven and carry out data science-related tasks without requiring computer science expertise.

"We believe 'the citizen data scientist,' in particular engineers, are now the key to unlock the potential of data and AI at manufacturers. This will be game changing for our future."

Anthony Mc Loughlin, vice president, data & AI, Altair

Altair's solutions are also suitable for material scientists in companies producing plastics and steel. By combining material science product knowledge and data tools, Altair automates material testing and reduces the amount of physical testing with its solutions. Altair's solutions can facilitate automated historical test discovery, in which data from multiple sources including test machines and laboratories are automatically acquired, and automated new material property prediction. In a particular use case, Altair's customer saved $10 million and achieved $100 million in potential additional revenue as the amount of physical testing declined by more than 30%.

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In 2021, Altair and Rolls-Royce entered into a partnership to offer combined AI and engineering solutions for the latter's aerospace engine development and testing. To generate data analytics, a typical data company would place sensors on the engines to obtain data, create a data lake, and allow ML tools to find patterns in the data. However, this approach is expensive as the installed sensors can be costly and it is not easy to know how many sensors are required. As such, Rolls-Royce chose Altair for its convergence of engineering knowledge and data science that can streamline the process. Through engineering and ML models, Altair will help Rolls-Royce predict what and where they need to test to reduce the amount of testing. Once determined, Altair can identify the number of sensors required and the locations for installation. These insights can help Rolls-Royce save time and money. Frost & Sullivan praises Altair for offering cutting-edge solutions that cater to multiple industries and use cases.

Conclusion

Manufacturers need solutions that make data and AI scalable. Altair successfully addresses this need by capitalizing on the convergence of simulation, HPC, and AI. Frost & Sullivan finds Altair's convergence approach to be a game-changer because it empowers engineers to take on the role of citizen data scientists and transform enterprise decision-making. Through its self-service low- or no-code solution, Altair enables engineers to unlock the potential of data and AI without requiring them to write a single line of code or possess computer science expertise. In addition, Altair's solution is open and extensible so users can seamlessly add and export code. Altair's solution also complements available data scientists and expert users in helping them prioritize productive and practical AI work. Altair's engineering-driven data use cases have helped companies reduce cost of materials, increase FTT rates, save costs, and generate additional revenue.

For its strong overall performance, Altair is recognized with Frost & Sullivan's 2021 North American Enabling Technology Leadership Award in the data and AI solutions for manufacturing market.

What You Need to Know about the Enabling Technology Leadership Recognition

Frost & Sullivan's Enabling Technology Leadership Award recognizes the company that applies its technology in new ways to improve existing products and services and elevate the customer experience.

Best Practices Award Analysis

For the Enabling Technology Leadership Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

Technology Leverage

Commitment to Innovation: Continuous emerging technology adoption and creation enables new product development and enhances product performance

Commitment to Creativity: Company leverages technology advancements to push the limits of form and function in the pursuit of white space innovation

Stage Gate Efficiency: Technology adoption enhances the stage gate process for launching new products and solutions

Commercialization Success: Company displays a proven track record of taking new technologies to market with a high success rate

Application Diversity: Company develops and/or integrates technology that serves multiple applications and multiple environments

Customer Impact

Price/Performance Value: Products or services provide the best value for the price compared to similar market offerings

Customer Purchase Experience: Quality of the purchase experience assures customers that they are buying the optimal solution for addressing their unique needs and constraints

Customer Ownership Experience: Customers proudly own the company's product or service and have a positive experience throughout the life of the product or service

Customer Service Experience: Customer service is accessible, fast, stress-free, and high quality

Brand Equity: Customers perceive the brand positively and exhibit high brand loyalty

About Frost & Sullivan

Frost & Sullivan is the Growth Pipeline Company™. We power our clients to a future shaped by growth. Our Growth Pipeline as a Service™ provides the CEO and the CEO's growth team with a continuous and rigorous platform of growth opportunities, ensuring long-term success. To achieve positive outcomes, our team leverages over 60 years of experience, coaching organizations of all types and sizes across 6 continents with our proven best practices. To power your Growth Pipeline future, visit Frost & Sullivan at http://www.frost.com.

The Growth Pipeline Engine™

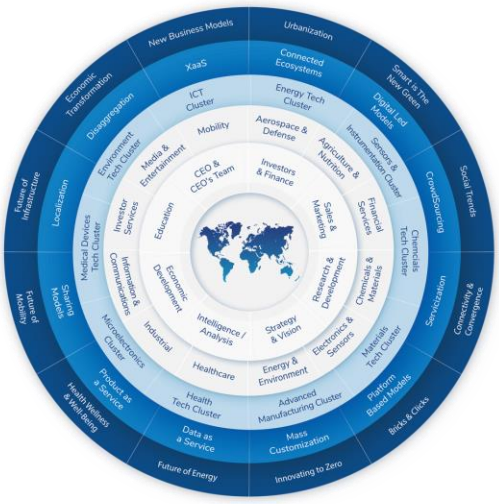
Frost & Sullivan's proprietary model to systematically create ongoing growth opportunities and strategies for our clients is fuelled by the Innovation Generator™.
Learn more.

Key Impacts:

- **Growth Pipeline:** *Continuous Flow of Growth Opportunities*
- **Growth Strategies:** *Proven Best Practices*
- **Innovation Culture:** *Optimized Customer Experience*
- **ROI & Margin:** *Implementation Excellence*
- **Transformational Growth:** *Industry Leadership*

The Innovation Generator™

Our 6 analytical perspectives are crucial in capturing the broadest range of innovative growth opportunities, most of which occur at the points of these perspectives.



Analytical Perspectives:

- Mega Trend (MT)
- Business Model (BM)
- Technology (TE)
- Industries (IN)
- Customer (CU)
- Geographies (GE)