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BEST PRACTICES

AWARDS

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2020 BEST PRACTICES AWARD

dataprophet
machine learning specialists

2020 EUROPEAN PRESCRIPTIVE AI FOR AUTONOMOUS MANUFACTURING TECHNOLOGY INNOVATION LEADERSHIP AWARD

Contents

Background and Company Performance

Industry Challenges

Industry 4.0, smart manufacturing/factories initiatives, artificial intelligence (AI), and machine learning (ML) capabilities are accelerating the pace of change in manufacturing organizations of all sizes and types. The goal of manufacturing companies is to improve economic efficiency by upgrading their facilities and methods to optimize process efficiency. To do this systems need to avoid defects, faults, and quality errors even before they occur and maximize system yield amid the complex nature of manufacturing processes. Existing AI platforms still require expert operators or data scientists to set up the optimization problem. Due to the shortage of such personnel in the manufacturing industry, hiring them can be expensive for companies. Therefore, autonomous manufacturing calls for AI-driven analysis and self-directed feedback.

Under these circumstances, vendors offering a prescriptive AI system that can proactively prescribe changes to plant control plans, remove the need for expert human analysis, enable autonomous manufacturing, and address the challenges above are expected to secure a leadership position in the market.

Technology Leverage and Business Impact

Technology Leverage

Founded in 2014, DataProphet is an expert in AI and advanced predictive and prescriptive artificial intelligence capabilities for manufacturing. The company offers PRESCRIBE, an deep learning AI manufacturing optimization solution that enables manufacturers to move toward autonomous manufacturing. DataProphet PRESCRIBE centers on optimizing and prescribing process parameters to improve production. The system is realised through a state-of-the-art deep learning artificial intelligence system. Frost & Sullivan finds that DataProphet is committed to being at the forefront of AI solutions for the manufacturing sector.

DataProphet PRESCRIBE provides guidance versus assistance in the journey to realize autonomous manufacturing

Most factories today operate using some form of AI-based assistance. This is because most AI solutions (for example solutions from a manufacturing analytics company based in France; or Edge AI solutions from a provider of edge intelligence software for industrial and commercial IoT application solutions in the U.S) only provide support to enable better analysis through the aggregation, visualization, and presentation of data. With such immature AI solutions, the analysis for process optimization on the production floor still requires expert operators or data scientists to look at and analyze the data, build and test hypotheses, and implement solutions. In short, it is not fully automated. But to achieve full factory automation and the autonomous manufacturing goal, the update loop of the control plan must be automated, in addition to the presence of an established solution architecture.

Amid this environment, DataProphet's technology focuses on self-directed feedback and arriving at sophisticated AI-driven analysis without depending on experts. Frost & Sullivan finds DataProphet PRESCRIBE unique because it can accelerate a manufacturer's journey

toward autonomous manufacturing by providing continuous direction to the machine operator, i.e., automating the next best action for the machine operator without human analysis. PRESCRIBE is an Expert Execution System (EES) that leverages existing assets, technology, and data, and one of its key differentiators is the data orchestration layer, a significant component of automation. DataProphet differentiates itself through the ability to automate everything, from data aggregation, to model building and training, and through to providing prescriptive actions for the machine operator. Demand for a prescriptive AI system can heighten when companies try to scale their operations, necessitating the hiring of experts with each expansion, which may be unfeasible for many manufacturers. Intelligent systems such as PRESCRIBE offer manufacturers advantages in terms of the ability to scale on demand, without the need to hire expert operators or data scientists.

Similar to lane guidance in autonomous driving, PRESCRIBE offers lane guidance for factories and production lines to achieve autonomous manufacturing. Therefore, Frost & Sullivan finds DataProphet PRESCRIBE strikingly different from competitors' solutions as it guides process optimization on the production floor and not just provides assistance.

DataProphet PRESCRIBE issues prescriptions to ensure processes meet quality requirements

Despite having numerous statistical process controls, complex relationships between multiple process parameters can result in the late discovery of product defects, incurring unnecessary costs and delaying order fulfillments. PRESCRIBE overcomes these issues by bringing the recommended changes for the process parameters to the machine operators' attention and supporting their current quality control methods, before any defects occur.

Everything PRESCRIBE does is prescriptive—ahead of any reactive response system. It learns from historical processes and production data and tracks the complex relationships between parameters. Using both supervised and unsupervised AI algorithms, PRESCRIBE quickly identifies the optimal set points for high yield process parameters within existing tolerance limits even in the most sophisticated manufacturing environment. At the front-end, the solution then automatically and continuously presents clear instructions and the ideal, optimized process control operating parameters—prioritized from the most to the least important—to the control engineer and machine operator so that they can eliminate defects and scrap material and improve yield in the production process. DataProphet designed PRESCRIBE to predict when defective products will happen as opposed to being reactive, a significant shift from root cause analysis that requires a failure before commissioning an analysis.

Although PRESCRIBE gives clear instructions to the machine operators, DataProphet is looking at sending the instructions back to the machine. The machine will then adapt itself based on the input it receives. DataProphet's comprehensive portfolio also includes DataProphet CONNECT, a machine infrastructure interface system, and DataProphet TRANSFORM. The company enables digitization strategies by ensuring all necessary data, irrespective of source and format, is digitized along the manufacturing line to create a single view upon which PRESCRIBE can work.

Frost & Sullivan applauds DataProphet for offering PRESCRIBE, an AI-as-a-service that allows continuous process control optimization to proactively prescribe changes to the

control plan to avoid defects, reduce non-quality cost by about 40% and ultimately, enable autonomous manufacturing, all without requiring the usual expert human analysis.

Business Impact

Employing a skilled team of over 40 engineers, computer scientists, statisticians, and mathematicians, the company grew its revenue by an impressive 70% in 2019 compared to 2018. With customers across the metals, minerals, and automotive industries, DataProphet's clients include Nexteer, BMW, Daimler, Maxion Wheels, and Atlantis Foundries. To demonstrate how PRESCRIBE works, DataProphet shows customers their current operating region, common operating region, and the operating regions that are best for them, i.e., the best of best (BOB) operating regions. Thus, customers can see how various process parameters affect production states and output.

Companies find PRESCRIBE appealing as it can assist any factory regardless of size and automation level. It is also designed to work seamlessly on top of existing platforms, systems, and environments. Delivered via Amazon Web Services (AWS),Microsoft Azure, or the Alibaba Cloud without requiring hardware investment, DataProphet manages the AI core without the need for data scientists. In addition to enabling autonomous manufacturing, PRESCRIBE delivers some of the greatest customer values by reducing defects and external scrap rate to 0% in the production process, minimizing downtime, improving or maximizing throughput or yield in the production process, and reducing otherwise unforeseeable costs. Since PRESCRIBE is based on AI, it continuously learns and adapts to changes on the line, resulting in even higher yields over time. One of DataProphet's automotive original equipment manufacturer (OEM) customers was able to achieve 75% reduction in quality stops per week and saving an estimated US$4.0 million/year while an OEM parts supplier achieved 43% reduction in aluminum casting defect, saving an estimated US$1 million/year.

With regards to expansion into more target accounts, DataProphet has a business development and collaboration strategy that depends on close working relationships with partners. It has forged strong partnerships with some of the most prominent names in the industry, such DISA, a provider of molding equipment and foundry technology.

Conclusion

Manufacturing companies need an AI system that will accelerate their journey toward autonomous manufacturing. DataProphet's PRESCRIBE, a prescriptive Expert Execution system powered by AI, successfully addresses this need. Unlike other AI platforms, PRESCRIBE does not depend on or require expert operators or data scientists. It proactively provides optimal prescriptive recommendations to machine operators without requiring expert human analysis. By automating the next best action for operators, PRESCRIBE guides manufacturers instead of just assisting them in optimization analysis. The solution renders unmatched customer value as machine operators can now make the necessary process parameter changes, preemptively avoid defects, scraps, and errors, and maximize yield in their production process. The entire management of AI core by DataProphet and no hardware investment further enhances the customer value proposition. Overall, Frost & Sullivan is impressed with DataProphet for enabling autonomous manufacturing. With its strong overall performance, DataProphet has earned Frost & Sullivan's 2020 Technology Innovation Leadership Award.

Significance of Technology Innovation Leadership

Technology-rich companies with strong commercialization strategies benefit from the demand for high-quality, technologically innovative products that help shape the brand, resulting in a strong, differentiated market position.

- Acquire competitors' customers
- Generate awareness
- Increase market penetration
- Build a larger customer base
- Balance pricing with profitability

- Establish a strong brand identity
- Align the brand to the company's vision
- Inspire customers
- Push the envelope
- Build a reputation for innovation

DEMAND

BRAND

Technology Innovation Leadership

COMPETITIVE POSITIONING

- Establish a clear value proposition
- Deliver superior value to customers
- Be a leader in innovation
- Be a leader in technology development
- Stake out a clear market position

Understanding Technology Innovation Leadership

Technology innovation leadership recognizes companies that lead the development and successful introduction of high-tech solutions to customers' most pressing needs, altering the industry or business landscape in the process. These companies shape the future of technology and its uses. Ultimately, success is measured by the degree to which a technology is leveraged and the impact it has on growing the business.

Key Benchmarking Criteria

For the Technology Innovation Leadership Award, Frost & Sullivan analysts independently evaluated 2 key factors—Technology Leverage and Business Impact—according to the criteria identified below.

Technology Leverage

Criterion 1: Commitment to Innovation
Criterion 2: Commitment to Creativity
Criterion 3: Technology Incubation
Criterion 4: Commercialization Success
Criterion 5: Application Diversity

Business Impact

Criterion 1: Financial Performance
Criterion 2: Customer Acquisition
Criterion 3: Operational Efficiency
Criterion 4: Growth Potential
Criterion 5: Human Capital

Best Practices Award Analysis for DataProphet

Decision Support Scorecard

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Scorecard. This tool allows research and consulting teams to objectively analyze performance according to the key benchmarking criteria listed in the previous section, and to assign ratings on that basis. The tool follows a 10-point scale that allows for nuances in performance evaluation. Ratings guidelines are illustrated below.

RATINGS GUIDELINES
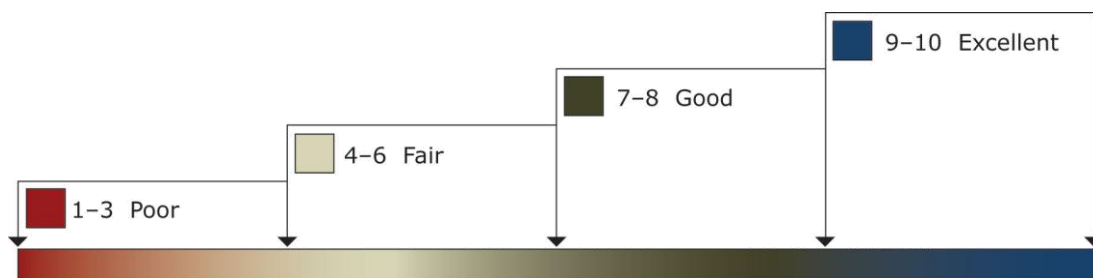
The Decision Support Scorecard considers Technology Leverage and Business Impact (i.e., the overarching categories for all 10 benchmarking criteria; the definitions for each criterion are provided beneath the scorecard). The research team confirms the veracity of this weighted scorecard through sensitivity analysis, which confirms that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

The results of this analysis are shown below. To remain unbiased and to protect the interests of all organizations reviewed, Frost & Sullivan has chosen to refer to the other key participants as Competitor 1 and Competitor 2.

Measurement of 1–10 (1 = poor; 10 = excellent)			
Technology Innovation Leadership	Technology Leverage	Business Impact	**Average Rating**
DataProphet	**9.0**	**9.0**	**9.0**
Competitor 1	8.0	8.0	8.0
Competitor 2	7.0	7.0	7.0

Technology Leverage

Criterion 1: Commitment to Innovation

Requirement: Conscious, ongoing development of an organization's culture that supports the pursuit of groundbreaking ideas through the leverage of technology.

Criterion 2: Commitment to Creativity

Requirement: Employees rewarded for pushing the limits of form and function by integrating the latest technologies to enhance products.

Criterion 3: Technology Incubation

Requirement: A structured process with adequate investment to incubate new technologies developed internally or through strategic partnerships.

Criterion 4: Commercialization Success

Requirement: A proven track record of commercializing new technologies by enabling new products and/or through licensing strategies.

Criterion 5: Application Diversity

Requirement: The development of technologies that serve multiple products, multiple applications, and multiple user environments.

Business Impact

Criterion 1: Financial Performance

Requirement: Overall financial performance is strong in terms of revenue, revenue growth, operating margin, and other key financial metrics.

Criterion 2: Customer Acquisition

Requirement: Overall technology strength enables acquisition of new customers, even as it enhances retention of current customers.

Criterion 3: Operational Efficiency

Requirement: Staff is able to perform assigned tasks productively, quickly, and to a high quality standard.

**Criterion 4: Growth Potential**

Requirements: Technology focus strengthens brand, reinforces customer loyalty, and enhances growth potential.

Criterion 5: Human Capital

Requirement: Company culture is characterized by a strong commitment to customer impact through technology leverage, which enhances employee morale and retention.

Decision Support Matrix

Once all companies have been evaluated according to the Decision Support Scorecard, analysts then position the candidates on the matrix shown below, enabling them to visualize which companies are truly breakthrough and which ones are not yet operating at best-in-class levels.
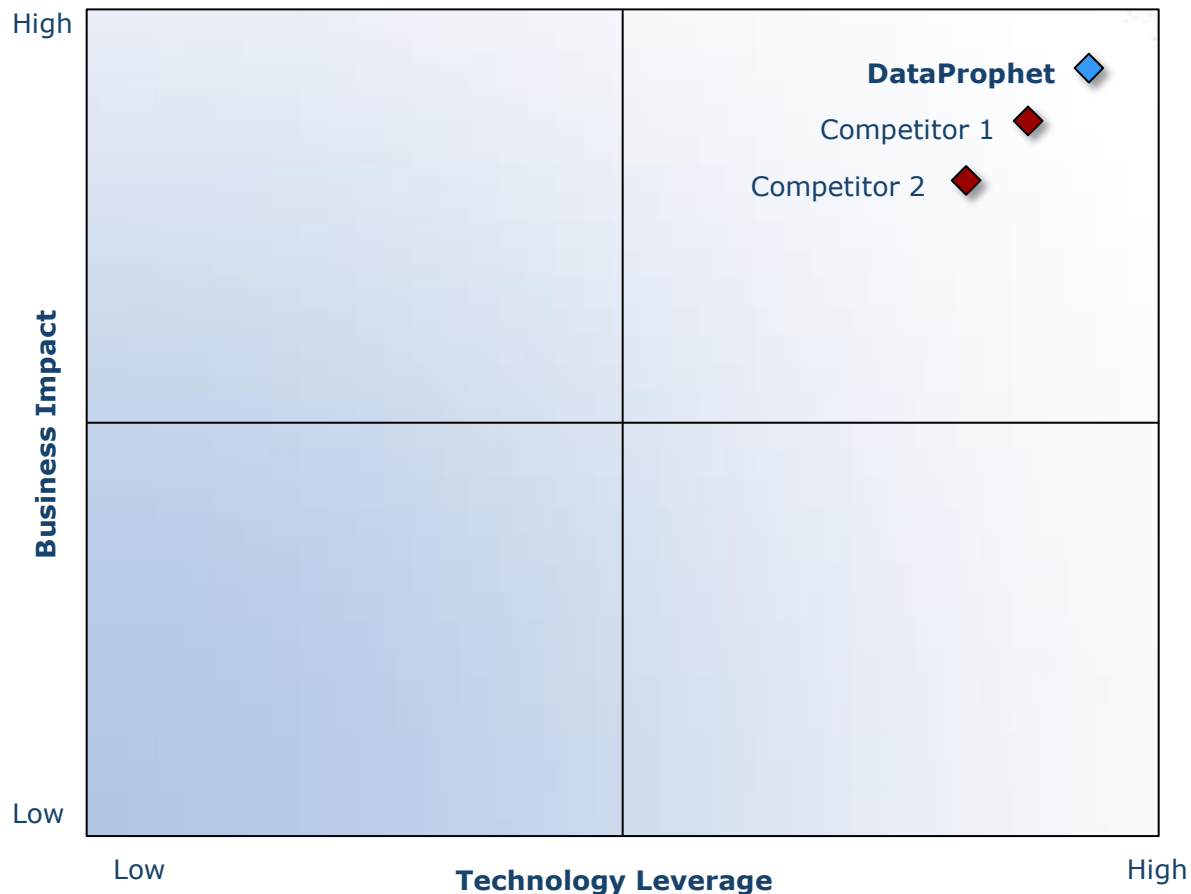
Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan analysts follow a 10-step process to evaluate award candidates and assess their fit with select best practices criteria. The reputation and integrity of the awards are based on close adherence to this process.

STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1 **Monitor, target, and screen**	Identify award recipient candidates from around the world	• Conduct in-depth industry research • Identify emerging industries • Scan multiple regions	Pipeline of candidates that potentially meet all best practices criteria
2 **Perform 360-degree research**	Perform comprehensive, 360-degree research on all candidates in the pipeline	• Interview thought leaders and industry practitioners • Assess candidates' fit with best practices criteria • Rank all candidates	Matrix positioning of all candidates' performance relative to one another
3 **Invite thought leadership in best practices**	Perform in-depth examination of all candidates	• Confirm best practices criteria • Examine eligibility of all candidates • Identify any information gaps	Detailed profiles of all ranked candidates
4 **Initiate research director review**	Conduct an unbiased evaluation of all candidate profiles	• Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles	Final prioritization of all eligible candidates and companion best practices positioning paper
5 **Assemble panel of industry experts**	Present findings to an expert panel of industry thought leaders	• Share findings • Strengthen cases for candidate eligibility • Prioritize candidates	Refined list of prioritized award candidates
6 **Conduct global industry review**	Build consensus on award candidates' eligibility	• Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates	Final list of eligible award candidates, representing success stories worldwide
7 **Perform quality check**	Develop official award consideration materials	• Perform final performance benchmarking activities • Write nominations • Perform quality review	High-quality, accurate, and creative presentation of nominees' successes
8 **Reconnect with panel of industry experts**	Finalize the selection of the best practices award recipient	• Review analysis with panel • Build consensus • Select recipient	Decision on which company performs best against all best practices criteria
9 **Communicate recognition**	Inform award recipient of recognition	• Announce award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance	Announcement of award and plan for how recipient can use the award to enhance the brand
10 **Take strategic action**	Upon licensing, company is able to share award news with stakeholders and customers	• Coordinate media outreach • Design a marketing plan • Assess award's role in strategic planning	Widespread awareness of recipient's award status among investors, media personnel, and employees

The Intersection between 360-Degree Research and Best Practices Awards

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 players and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS

About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, helps clients accelerate growth and achieve best-in-class positions in growth, innovation, and leadership. The company's Growth Partnership Service provides the CEO and the CEO's growth team with disciplined research and best practice models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages nearly 60 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on 6 continents. To join Frost & Sullivan's Growth Partnership, visit http://www.frost.com.