FROST & SULLIVAN

2015

BEDROCK
SECURE INDUSTRIAL AUTOMATION

2015 North American Industrial Control System Entrepreneurial Company of the Year Award

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50 Years of Growth, Innovation & Leadership

Contents

Background and Company Performance

Industry Challenges

Frost & Sullivan recognizes the major challenges that industrial companies face include increasing global competition, material and labor costs, and manufacturing complexities. Hence, industrial companies are increasingly adopting sophisticated automation technologies to overcome these challenges. However, due to increasing competition from automation vendors, end-users are demanding sophisticated technologies with advanced features and at affordable prices. To successfully combat the fierce competition in the process automation space, participants need to build high-performance solutions and deliver them to customers at a cost lower than their competitors' in the North American market.

In addition to higher operational performance, users are demanding robust security assurance from the process automation solutions in which they invest. Recent incidents of cybersecurity breaches in critical infrastructure industries have raised significant concern not only among manufacturers but also from government, associations, and the public. Hence, cybersecurity has become an important criterion for system and supplier selection in the process automation industry.

Entrepreneurial Innovation and Customer Impact

Market Disruption

Technology advancements, along with the need for higher growth in a saturated market, have led to fierce competition among automation vendors. While Distributed Control Systems (DCS) focus on integration and scalability as key propositions, the Programmable Logic Controllers (PLC) solutions offer optimum performance at lower cost. However, solutions with both these technologies overlap, with Vendors having improved their technologies to make their systems suitable for several different applications, from smaller plants to large manufacturing plants. Both DCS and PLC vendors compete to capture each other's traditional market. Nevertheless, there are challenges in adopting and integrating multiple technologies by the process plant users, particularly the communication between stand-alone technologies. In this context, Frost & Sullivan's research reveals that Bedrock Automation overcomes this user challenge by offering a truly unified solution suitable for all industrial control applications.

Bedrock Automation offers a universal platform with a universal controller suitable for continuous, batch, and discrete applications. The company has designed a very simple platform with fewer part numbers that includes a universal backplane, universal I/O modules, universal controller, universal smart power supply module, and just one universal I/O module cable. The automation platform from Bedrock Automation is ready to compete in a large automation market and against key process automation suppliers.

Best Practices Example: The Bedrock Automation system offers significant scalability as it is suitable for applications requiring fewer input/output (I/O) points to even applications requiring multiples of thousand I/O points. The company has developed a unified control system platform suitable not only for DCS and PLC applications but also for SCADA remote telemetry unit (RTU), safety, commercial heating, ventilating, and air conditioning (HVAC), marine, and military applications.

Competitive Differentiation

In recent years, cybersecurity has emerged as the biggest challenge to the adoption of advanced process control technologies such as DCS and SCADA systems. Recent cyberattacks with malwares, such as Stuxnet, Duqu, Flame, and Shamoon, Dragonfly and Havex, have significantly increased end users' concern for information and network security. Hence, cybersecurity capabilities are important selection criteria when choosing a process automation technology and supplier.

Most of the automation suppliers are trying to address this challenge by offering external security hardware, protection software, and managed security services. Though this approach helps end users resolve issues, they need to make significant investments over the entire lifecycle of the technology to ensure effective cyber protection.

Frost & Sullivan's benchmarking analysis confirms Bedrock Automation differentiates itself from competitors by providing built-in cybersecurity features in its process automation platform, helping end users save the cost of bolt-on security-related hardware and services. The company not only offers intrinsically secure hardware and software but also provides physical security of the system modules.

Best Practices Example: Bedrock Automation has designed a control system with layered and embedded cyber security features, starting at the transistor level using secure microcontroller technology that includes secure memory, hardware accelerators and true random number generators (TRNG). In addition to these secure hardware features, Bedrock utilizes Green Hills Software INTEGRITY secure real-time operating system (RTOS) software for its controller. Green Hills Software INTEGRITY RTOS has achieved EAL6+ certification (Evaluation Assurance Level) and is proven for use in military and aerospace applications.

In addition to a secure hardware and software platform, Bedrock also designed a patented Black Fabric™ backplane to ensure physical protection and security. The Black Fabric™ backplane has no I/O module pins and provides integral anti-snoop protection. The all-metal sealed modules provide an additional level of protection, as they can only be opened with metal saws; in such cases, the controller will trigger the casing sensors to destroy the memory and keep the IP safe. As an additional measure, the company secures its supply chain with a proprietary Device Lifecycle Management (DLM) system. This system enables authentication of not only hardware and software used in the control system but it will also protect future third-party software and applications.

Passionate Persistence

Product obsolescence is a major challenge to users of process automation. Component obsolescence is one of the primary reasons for products becoming obsolete. Most of the process automation vendors source almost 100% of the active semiconductor components from several instrument or semiconductor vendors. Rapidly changing technologies make managing obsolescence of components extremely difficult.

Bedrock Automation follows the non-obsolescence concept wherein it sources most of the system's active components from its parent company, Maxim Integrated. Hence, complex analog and digital components are designed internally and built around a multi-fab supply chain model. In addition, Frost & Sullivan notes the company has drastically reduced the number of components, thereby improving the system life expectancy and effectively addressing the component non-obsolescence issue.

Best Practices Example: Bedrock's advanced design with analog and digital application-specific integrated circuits (ASICs) helps users reduce the total system's component count significantly when compared to that of a typical control system. This provides improved system life expectancy and eliminates the concerns associated with the non-obsolescence issue. Bedrock also ensures component availability by controlling component supply chain and managing component lifecycles over decades.

Price/Performance Value

The North American process automation market is highly competitive with the presence of demanding, price-sensitive customers. According to Frost & Sullivan research, end users look for control systems that promise hardware optimization to minimize cost, improve operations, and ensure project performance. I/O modules represent a significant portion of the process automation hardware, significantly adding to the cost. End users not only look for cost optimization while making automation investments but also demand intelligent and less complex systems for improved flexibility.

Bedrock Automation has designed programmable and smart universal I/O modules that deliver embedded cyber security that starts at the I/O channels. In addition to a simplified series of high density, high performance I/O modules, Bedrock offers software configurable I/O that condenses user applications to three very high performance module types: Universal Analog, Universal Discrete In, and Universal Discrete Out. The company also offers Universal Ethernet and Fieldbus I/O Modules that provide a road map for Profibus, Devicenet, Industrial Ethernet, and Foundation Fieldbus.

Best Practices Example: Bedrock Automation claims a significant reduction in the need for cross-wiring (marshaling), along with reduced engineering and labor costs. The company is well positioned to help users increase system flexibility, reduce total cost of ownership (TCO) and witness faster project implementation with configurable I/O.

Bedrock claims an approximate 90% reduction in module types (for a typical user) as a result of its automation platform.

Customer Purchase Experience

Earlier designs of industrial control systems (ICS) showed integral power supplies for process automation applications. Though these power supplies and modules were big and bulky, they were reliable. However, with the evolution in ICS design, power supply systems were decoupled and the designs were not improved. Though automation vendors continually improved ICS capabilities, power products saw little improvement in terms of intelligence, diagnostics, communication, or robustness.

Advanced ICS systems ensure process and system reliability, but failures in power supply can have serious consequences and can result in process failure. Hence, excellence in user's purchase experience requires focus on the reliability and availability of power, along with process and system reliability.

Frost & Sullivan's analysis confirms that Bedrock Automation's holistic system design offers significant improvements in automation power supplies and modules. Bedrock's smart power systems are equipped with advanced Internet of Things (IoT) technologies with features such as sensing, computation, analytics, diagnostics, and communication.

Best Practices Example: Bedrock Automation's power supply and UPS products offer 32-bit ARM cyber secure microcontrollers with system memory for improved sensing and monitoring experience. System variables, such as line, intermediate, channel and output voltages, currents, power factors, board and component temperatures, can be sensed and monitored. The system also enables dynamic sharing, advanced redundancy, and situational awareness, for improved efficiency.

Customer Ownership Experience

Delivering a fulfilling customer ownership experience depends a lot on a system's capability in minimizing TCO. Process automation technologies are highly mature, with few product differentiations from different vendors. In this scenario, a user's technology and vendor selection largely depends on reduced TCO and high performance. Though hardware costs are decreasing, end users face challenges due to increased project and operating costs. In addition, increased expenditure from cyber security related costs further contributes to the TCO. Almost all control system suppliers focus on new revenue streams through cyber security related hardware, services and support. Hence, cyber security related costs are a lifetime ownership cost to users.

Bedrock Automation's system design ensures reduced TCO, with cost reduction in all aspects of the project, such as procurement, engineering, installation, commissioning, and maintenance, and also through built-in cyber security capabilities. Frost & Sullivan's

research shows the company provides a better system with reduced TCO and delivers a better customer ownership experience.

Best Practices Example: Bedrock Automation's system offers a reduction in engineering hours by approximately 33% due to a simplified bill of material (BOM), software configuration of I/O, and standardization of junction boxes to simplify commissioning and installation and reduce cable termination requirements. With nearly 90% spare parts reduction pertaining to the overall control system modules, end users will see a significant reduction in the maintenance cost.

Backed by an innovative system design and patented Black Fabric™ technology, Bedrock Automation's industrial automation platform helps users improve system performance and reliability while reducing TCO. Additionally, the company's control system offers deep-layered security embedded into processor, memory, communication, inter-connection, backplane, and package technologies. Finally, security can be extended to third party software and applications through its Device Lifecycle Management system.

Conclusion

Frost & Sullivan's independent analysis of the Industrial Controls Systems market clearly shows Bedrock Automation has designed and developed a superior system which is secure by design, promises to optimize cost, performance, and ensure security, and is suitable for a variety of industrial applications and plant sizes. The system is truly simple, scalable and secure™, which gives it the edge to acquire a competitive position among major automation solution suppliers in the North American space and beyond.

With its strong overall performance, Bedrock Automation has earned Frost & Sullivan's 2015 Entrepreneurial Company of the Year Award.

Significance of Entrepreneurial Leadership

Ultimately, growth in any organization depends upon customers purchasing from your company, and then making the decision to return time and again. In a sense, then, everything is truly about the customer—and making those customers happy is the cornerstone of any long-term successful innovation or growth strategy. To achieve these dual goals (customer engagement and growth), an organization must be best-in-class in three key areas: understanding demand, nurturing the brand, and differentiating from the competition. This concept is explored further below.

Understanding Entrepreneurial Leadership

Demand forecasting, branding, and differentiation are part of an entrepreneurial company's larger journey toward forming deep relationships with customers and permanently altering the market with their actions. These two concepts—entrepreneurial innovation and customer impact—are therefore the cornerstones of this award, as discussed further in the next section.

Key Benchmarking Criteria

For the Entrepreneurial Company of the Year Award, Frost & Sullivan analysts independently evaluated two key factors—Entrepreneurial Innovation and Customer Impact—according to the criteria identified below.

Entrepreneurial Innovation

Criterion 1: Market Disruption
Criterion 2: Competitive Differentiation
Criterion 3: Market Gaps
Criterion 4: Blue Ocean Strategy
Criterion 5: Passionate Persistence

Customer Impact

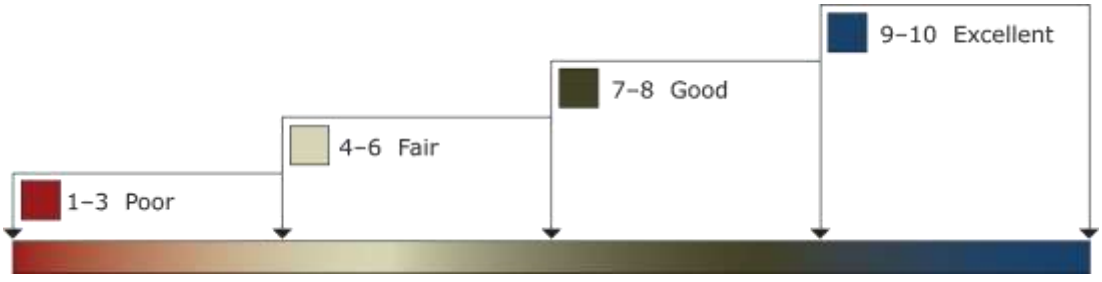
Criterion 1: Price/Performance Value
Criterion 2: Customer Purchase Experience
Criterion 3: Customer Ownership Experience
Criterion 4: Customer Service Experience
Criterion 5: Brand Equity

Best Practice Award Analysis for Bedrock Automation

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 our 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 is organized by Entrepreneurial Innovation and Customer Impact (i.e., the overarching categories for all 10 benchmarking criteria; the definitions for each criteria 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 chose to refer to the other key players as Competitor 2 and Competitor 3.

DECISION SUPPORT SCORECARD: ENTREPRENEURIAL COMPANY OF THE YEAR AWARD

Measurement of 1–10 (1 = poor; 10 = excellent)			
Entrepreneurial Company of the Year	Entrepreneurial Innovation	Customer Impact	**Average Rating**
Bedrock Automation	9.5	9	9.25
Competitor 2	8	8.5	8.25
Competitor 3	7.5	8	7.75

Entrepreneurial Innovation

Criterion 1: Market Disruption

Requirement: Innovative new solutions that have a genuine potential to disrupt the market, obsoleting current solutions and shaking up competition

Criterion 2: Competitive Differentiation

Requirement: Deep understanding of both current and emerging competition to create and communicate strong competitive differentiators in the market

Criterion 3: Market Gaps

Requirement: A clear understanding of customers' desired outcomes, the products that currently help them achieve those outcomes, and where key gaps may exist

Criterion 4: Blue Ocean Strategy

Requirement: Strategic focus in creating a leadership position in a potentially "uncontested" market space, manifested by stiff barriers to entry for competitors

Criterion 5: Passionate Persistence

Requirement: A deep belief in the "rightness" of an idea, and a commitment to pursuing it despite seemingly insurmountable obstacles

Customer Impact

Criterion 1: Price/Performance Value

Requirement: Products or services offer the best value for the price, compared to similar offerings in the market

Criterion 2: Customer Purchase Experience

Requirement: Customers feel like they are buying the most optimal solution that addresses both their unique needs and their unique constraints

Criterion 3: Customer Ownership Experience
Requirement: Customers are proud to own the company's product or service, and have a positive experience throughout the life of the product or service

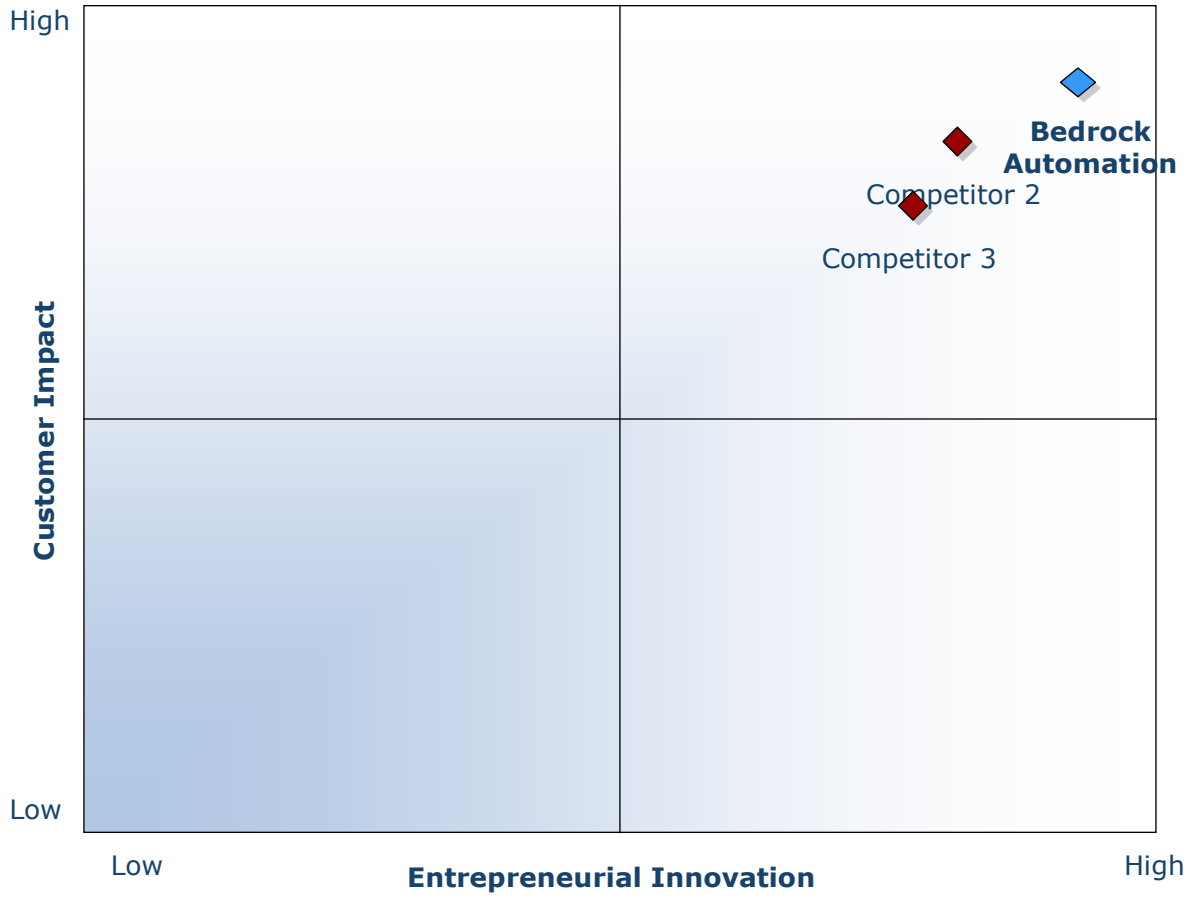
Criterion 4: Customer Service Experience
Requirement: Customer service is accessible, fast, stress-free, and of high quality

Criterion 5: Brand Equity
Requirement: Customers have a positive view of the brand and exhibit high brand loyalty

Decision Support Matrix

Once all companies have been evaluated according to the Decision Support Scorecard, analysts can 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.

DECISION SUPPORT MATRIX: ENTREPRENEURIAL COMPANY OF THE YEAR AWARD



The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of our 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, leading to 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, enables clients to 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 more than 50 years of experience in partnering with Global 1000 companies, emerging businesses and the investment community from 40 offices on six continents. To join our Growth Partnership, please visit http://www.frost.com.