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2020 BEST PRACTICES AWARD

Honeywell

**2020 GLOBAL DESIGN AND ENGINEERING
OF INDUSTRIAL CONTROL SYSTEMS
CUSTOMER VALUE LEADERSHIP AWARD**

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Background and Company Performance

Industry Challenges

In the industrial realm, distributed control systems (DCS) are automated control systems specifically designed to coordinate and supervise processes within industrial plants. They consist of several geographically distributed control elements over plants or control areas, which include hardware (e.g., controllers, input/output [I/O] operations, workstations), software (e.g., controller software, human machine interface software, plant information management software), and associated services (e.g., project management services, non-contract maintenance, retrofits and upgrades). DCS systems are critical to manufacturing and process control and operations.

For the last couple of decades, the DCS industry has focused on streamlining long-standing work practices. Physical relationships defined the traditional control engineering landscape with a rigid and hierarchical model tied to methodological wiring and system planning. Engineers, in other words, have to design and build their systems strategically with rules on how much and how many I/Os could connect to specific controllers; then they have to implement those control strategies. This paradigm complicated the physical reconfiguration processes and manual load balancing, particularly in scenarios with large industrial sites that require DCS infrastructure with multiple control units, junction boxes, and wiring panels. Engineers typically devote significant time to organizing the way they wire instruments, junction boxes, marshaling cabinets, and I/O modules. Every cabinet they deploy requires significant custom work and design before they turn them over to their operations teams. Additionally, they have to make manual configuration changes whenever small changes occur in physical devices such as control units.

Solutions providers that successfully navigate these obstacles can offer tremendous value to their customers. Not only will they stand to gain market share quickly, but they will also retain their existing customers.

Customer Impact and Business Impact of Honeywell

Honeywell provides leading technologies and lifecycle services that enable its industrial customers to optimize their businesses to run safely, sustainably, efficiently, and profitably. Leveraging more than 40 years of control and automation industry expertise, the company continuously introduces groundbreaking innovation to improve process automation control. One of Honeywell's most recent contributions include its Experion[®] Process Knowledge System (PKS) Highly Integrated Virtual Environment (HIVE) system that decouples I/O modules and control strategies from specific controllers.

Leadership through Innovation

As a leader in the DCS technology space, Honeywell created its Experion[®] PKS, which integrates an advanced automation platform and innovative software applications into one system. By combining process, business, and asset management capabilities, Experion enables industrial customers to optimize their operations, leading to increased productivity and profitability. The system integrates disparate data across many processes, delivering actionable insights that users leverage to be proactive and efficient. In essence, it allows processes to dictate how engineers deploy control systems, rather than control systems dictating how they deploy processes. The

method Experion employs to achieve this end creates control systems that are flexible enough to be deployed in multiple types of industries.

In 2019, Honeywell expanded Experion's functionality with HIVE, advancing DCS technology to the next generation. Building off of Honeywell's LEAP™ technology, HIVE seeks to improve the way engineers design projects, keep automation off the critical path, and eliminate non-value added work. The technology decouples I/O modules from process controller assignment, allowing I/O modules to communicate with any process controller, not just the ones to which they would connect to in a traditional configuration. Any controller that connects into the HIVE network can access any I/O module, and by extension, any device that connects to the I/O modules. In other words, the I/O modules are not dependent on their controllers. As a result, I/O modules and controllers connect when it makes sense and without limitations.

HIVE accomplishes three key functions:

- It combines the IT HIVE, IO HIVE, and Control HIVE into a single solution; engineers can use each of these elements on their own, in combination with one or both of the other elements, or with their existing infrastructure.
- It centralizes up to 80% of project engineering IT infrastructure, which reduces costs, enables engineers to leverage skills efficiently, and allows them to provide consistent physical and cybersecurity management.
- It makes the I/O and control distribution flexible, allowing for increased standardization of project deliverables.

The Benefits of Establishing a New Paradigm

This new paradigm unlocks several critical benefits. Primarily, it simplifies engineering control systems' design, architecture, implementation, and lifecycle. Rather than spending numerous hours designing (and redesigning) control systems, engineers simply assign I/O modules to the IO HIVE, controllers and strategies to the Control HIVE, and then the Experion system automatically matches devices, I/O modules, control strategies, and controllers in an optimized manner. Experion PKS HIVE also simplifies maintenance and upgrades, allowing engineers to perform them at any time without having to wait for a downtime window.

Experion PKS HIVE also brings the idea of portability to process controllers, giving much more flexibility in process controller deployment than it had previously. Because the control application is no longer tied to a specific controller, process controllers can be considered compute resources. Rather than having a specific controller back up another specific controller, as in the traditional notion of one-on-one redundancy, Control HIVE allows one application to back up another application, regardless of what specific process controllers are used. Engineers can deploy control strategies to be executed from anywhere in the control HIVE. They can use HIVE to group control strategies as applications around a process unit, and all the control strategies that go into that application will remain a part of it. Engineers can use HIVE to have one controller performing a primary function while also backing up another application that runs off of a different controller. Also, this portability allows controllers to be better utilized, optimizing the costs for controller deployment across the entire control system.

Facilitating Adoption through Gradual Increments

Honeywell's implementation strategy for Experion PKS HIVE allows it to evolve gradually and incrementally. The company consulted with several key global customers to understand this need for an efficient approach to control system engineering. Keeping in mind their aversion to risk, Honeywell elected to make the adoption of Experion PKS HIVE modular and systematic rather than the "rip and replace" approaches of some of the company's competitors. Honeywell also understands that many customers take a conservative approach when it comes to making additional investments, which they typically must do when adopting new and innovative technologies such as HIVE. Cognizant of this critical barrier, Honeywell built HIVE with backward integration capabilities so that it is compatible and interoperable with its customers' existing control infrastructure.

Conclusion

While the technological advancement of distributed control systems has been largely focused on streamlining long-standing practices, , Honeywell, found a way to push the industry forward. As a leader in the distributed control systems (DCS) space, the company offers an integrated solution in its Experion® Process Knowledge System (PKS), which enables industrial customers to achieve operational efficiency, leading to increased productivity, profitability, and a speedy return on investment. Honeywell enhanced Experion PKS in 2019 with additional functionality through its Highly Integrated Virtual Environment (HIVE), advancing DCS technology to the next generation. Essentially, HIVE decouples input/output (I/O) modules from process controllers, providing the flexibility that enables engineers to design, build, deploy, and update projects quickly. Through this new paradigm, I/O modules are independent of their controllers, which permits limitless connectivity.

Honeywell also understands the demands and concerns of its customers, particularly surrounding the traditional "rip and replace" modus operandi of adopting new technologies too quickly and suddenly. As such, the company built HIVE to be modular and systematic, allowing it to progress gradually and incrementally. Not only is this approach more affordable, but it also helps the company's customers mitigate risks.

As a result of the company's innovative approach to creating and implementing new technology, Honeywell earns Frost & Sullivan's 2020 Global Customer Value Leadership Award for the design and engineering of industrial control systems industry.

Significance of Customer Value Leadership

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

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 valued and confident in their products' quality and performance. This dual satisfaction translates into repeat purchases and a lifetime of customer value.

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.

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 they are buying the 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.

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: Customer-facing processes support the efficient and consistent 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: Customer focus strengthens brand, reinforces customer loyalty, and enhances growth potential.

Criterion 5: Human Capital

Requirement: Company culture is characterized by a strong commitment to quality and customers, which in turn enhances employee morale and retention.

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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 award recognition	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 participants and for identifying those performing at best-in-class levels.



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 practices 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>.