# FROST & SULLIVAN

## MODULAR DATA CENTRE - GLOBAL

# Company of the Year 2019

FROST & SULLIVAN

2019  BEST PRACTICES AWARD

CANNON
TECHNOLOGIES GROUP

# Contents

# Background and Company Performance

## *Industry Challenges*

The underlying challenge in the modular data center market is the lack of awareness and skepticism among end users. It is of paramount importance that market players take meticulous efforts to educate and demonstrate the benefits and advantages of a true modular solution. While there are many inadequate or inappropriate solutions in the market which do not offer true modularity, it is extremely important for modular data center players to incorporate value added features and new functionalities in their products to gain a competitive edge in the market.

The other key challenge in the market is suitability of available modular solutions to improve financial ratios. End users in this market can be broadly categorized into two groups – enterprises and co-location providers. The needs of these two groups vary depending on their applications. Modular data center manufacturers are presented with a challenge of developing solutions that would fit the individual needs of these varying end user groups. There is no one solution that would fit all. It is quite crucial for manufacturers to be able to provide a broad set of modular solutions which offer multi segment options.

## *Visionary Innovation and Performance/Customer Impact*

### Excellence in Addressing Unmet Needs

The most intriguing aspect about Cannon is its rock solid determination and relentless pursuit for technology innovation and excellence. Its comprehensive product portfolio represents the next generation of modular data centre solutions that are not only truly end-to-end, but also state of the art future ready solution set. When it comes to anticipating future market needs and addressing unmet needs, Cannon has time and gain maintained its position at the forefront of the industry. Furthermore, it has gained a reputation of raising the bar higher every time with its innovations, making it difficult for its competitors to catch up. Cannon's excellence in addressing unmet needs in the modular data centre market can be attributed to its truly holistic approach. This is demonstrated by its visionary product innovations and technology incubations in three distinct categories – structural concepts, data hall usability concepts, and power & cooling concepts.

In a day and age where modular data centres are being widely accepted and are gaining significant traction, the fact still remains that modular data centres are considered only for small/medium scale deployments. This is due to market perception that modular structures are not suitable for large scale deployments; which is not far from the truth given the lack of truly modular solutions that enable large scale deployments. Enters Cannon with its ground breaking technology innovation, this is no longer the case! Data centre operators now have the luxury of reaping all the benefits (and more) of a modular build out even for a large scale deployment. This is a true game changer that will reform the landscape of the modular data centre industry. Cannon has shattered the predicated rules and has developed a revolutionary technology concept that allows it to crossover

into large scale modular build outs – it's called the "Cannon Matrix". The company developed this technology based on its latest iteration of the matrix steel construction system which is largely influenced by aerospace type building construction system.

**Implementation of Best Practices**

A common perception among end users in the data center industry is that Cannon is a company that delivers what it promises. The company has also gained a reputation of delivering products and solutions that cater to the exact needs of the market. Cannon leaves no stone unturned when it comes to technology and innovation. This is evident from its meticulous R&D initiatives aimed at strengthening and advancing its vision of creating truly modular data centers. Cannon's products are embedded with a wide gamut of features and functionalities that enhance end user value multifold. Most of these features are unique in the industry.

With its innovative matrix construction, Cannon has implemented a multitude of best practices that brings in several positive disruptions and offers an immense range of benefits to the data centre industry. To highlight a few fine examples, it eliminates the legacy issues caused by wide roof span and the associated large trusses and frequent inconvenience of structural columns, there by significantly diminishing project complexity and greatly increasing design options. Irrespective of obstinate site conditions, the matrix design optimizes site utilization to the fullest extent and achieves maximum space coverage, hence offering highest financial benefits. One of the key highlights regarding this aspect its ability to generate curved walls seamlessly. All this while perfectly maintaining structural integrity and without any need for special engineering; which is highly impressive.

Furthermore, the matrix structure comprises of strong, light weight, portable, precision steel components produced in tightly controlled factory conditions and avoids the use of usual site based heavy machinery in most instances. It also allows multiple assemblers to operate in parallel with just hand tools. In simple terms, the matrix design accelerates the build process, enables precision construction, increases reliability and construction accuracy, enhances health and safety, and reduces cost and complexity. It is also noteworthy that it eliminates the need for deep foundations for critical structural columns and avoids in ground excavation challenges associated with traditional construction. On the other hand, the matrix assembly leverages a unique "self-jigging" technique that dramatically simplifies and further accelerates the construction process. This facilitates use of unskilled local labor (with sensible supervision), contributing towards added cost benefits the development of the local economy. The other aspect that further reduces skill requirements is the fact that the same matrix components can be utilized to build data halls and people space such as offices, NOC areas, pre-staging rooms and so on. Even though it leverages the matrix structure throughout, Cannon offers different options for external cladding and internal paneling, providing best of all worlds.

**Visionary Scenarios through Mega Trends**

Cannon is always ahead of the competition when it comes to identifying/analyzing mega trends and developing products that effectively address customer pain points and

frustrations. It places tremendous emphasis on three core aspects of its product development process – simplicity, efficiency and reliability. The company has recognized and capitalized on the need to find a balance between market requirements and customer requirements when it comes to innovation. Its unparalleled commitment to innovation is a boon to the data center industry. The company has a clear understanding of the evolving market needs and continually innovates to ensure that its product offerings are state of the art. Its targeted innovation focusses on creating solutions based on the market's current and future needs such as AI, increasing power density, edge implementation, IoT, virtualization and so on. With this targeted innovation the company has developed futuristic solutions that deliver high power density, low energy loss, flexible investment, rapid deployment and dynamic data center management.

With rack power densities steadily increasing, data centre operators tend to overload the racks as it provides operational convenience. However, it poses a serious risk of hot-spots that could eventually damage the IT mission. This hot spot issue will only grow in magnitude as the power densities increase over the coming years. In fact, with the advent of 5G, higher rack power densities will be further driven by high tech power hungry applications, GPU intensive installations and AI implementations. Capitalizing on its extensive intellectual property and technology know-how, Cannon has developed an innovative solution to address the issue of hot spots – called "Cannon Hot Spot Resolver". The core design of this hot spot resolver is based on a pull-out drawer, positioned in the roof of the "Cannon Server Smart Rack". The pull-out drawer is designed in such a fashion that it can be seamlessly and rapidly withdrawn and fitted with a multi fan module and slid back into place in the Rack Roof. Once in place, the multi fan module resolves the local hot spot issues. The even more intriguing aspect is that this process can be achieved even while overhead cabling is present and when top U spaces of the rack are fully populated.

**Industry Leading Operational Efficiency**

Frost & Sullivan believes that Cannon's multi-dimensional approach to implementing best practices will further accelerate its leadership position in the market. One of the key focus areas for the company in this regard is implementing best practices for operational efficiency. Its process design excellence is underpinned by continuous improvement and development of operating and construction efficiencies within its data centres. Cannon's diligent analysis of increasing rack power densities and its impact on data centre operations resulted in the development of another novel concept called "SUPER-G Cooling" which is designed to significantly enhance cooling efficiencies and operational convenience and safety. It leverages a unique "Within Rack Row" plenum system configuration that enables seamless cooling for high density applications. The SUPER-G cooling units offer capacity of up to 60KW of cooling each and are fitted between Racks (in pockets) in a row and allows for flexible expansion of as many pockets as required. It employs a warm air plenum deployed between the rear door of the Rack and the rear of the GPU equipment; this captures and contains the extreme heat exiting the rear of the GPU equipment, hence avoiding overheating at the rear aisle. The SUPER-G cooling units draw the air from the hot plenum, cool it, and pass it over at the front cold air plenum for re-use. It is noteworthy that both the front and rear plenums operate continuously along the rack row,

and serve all racks in the row, thus providing any required level of resilience and redundancy up to Tier 4 level.

**Outstanding Customer Ownership Experience**

Cannon is the embodiment of next generation cutting edge data centre design and engineering. The company's best of breed facilities complemented by its innovative matrix design offer industry leading availability, resilience, energy efficiency, operational excellence and security, while remaining highly cost competitive. Frost & Sullivan believes that this is a significant step forward in the right direction which marks a corner stone in the evolution of data centre infrastructure solutions. Cannon has assembled a portfolio of the most popular and frequently requested specifications to satisfy the diverse and bespoke needs of the global market; it is offering these as "Cannon Stock Data Centers". The unique advantage of these pre-engineered, pre-designed and pre-specified solutions is that 100% of the costly up front computer aided designs, mechanical & electrical (M&E) designs and specifications are all already completed and proven. This can save a year or more of heavy design effort and also removes a substantially front loaded financial investment requirement, cutting overall cost and saving valuable lead time to commissioning the eventual facility. Furthermore, Cannon's Stock Portfolio also allows for easy customization. Given its technology excellence, client specific tweaks are readily accomplished. The company is able to seamlessly provide unmatched speed of new project configuration, which means that even bespoke client solutions are quick to generate.

Cannon's use of natural source cooling is another fine testament to its efforts in offering outstanding customer ownership experience. It utilizes the cooling capacity of natural water sources such as lakes, underground and surface rivers, reservoirs, canals and the sea. Cannon's natural source cooling offers up to 70% reduction in power needs in comparison with tradition cooling. Furthermore, data centre operators are presented with the much needed opportunity to optimize power usage; i.e. to focus on using the power for servers rather than using it for power hungry chilling units.

**Brand Equity**

Frost & Sullivan finds Cannon's growth trajectory in the data centre industry highly impressive. The driving force behind its success is its stellar determination and commitment to pursuing its vision of creating top notch world class data centres. Cannon has been gaining significant brand recognition over the past few years. The company has gained a reputation of delivering solutions, products, and services of the highest standard that specifically addresses customers' unmet needs. The Cannon brand is also is also well known for establishing excellent customer relationships and ensuring "best in class" practices to distinguish itself in the industry.  It is Frost & Sullivan's finding that end users perceive Cannon as a reliable brand and trusted partner, and are proud to own its products. The company has built a pedigree for nearly forty years, based on acclaimed data centre infrastructure solutions, which are globally proven and respected. Its extensive technology know-how and immense experience in this space brings a unique level of sophistication to its brand value, ultimately increasing brand loyalty.

## Conclusion

Two things clearly stood out during the course of the research, Cannon's razor sharp focus on each of its thoroughly vetted strategic priorities and its sheer passion to make it a reality; a perfect amalgamation that Frost & Sullivan believes will make Cannon achieve further heights in the global data centre market. The company's unique business value is characterized by its strategic priorities that include product leadership, operational fineness, customer focus, technology innovation and manufacturing flair. Cannon's excellence in each of these aspects serves as crucial market differentiators that provide the company with a unique competitive edge.

With its strong overall performance, Cannon Technologies has earned Frost & Sullivan's 2019 Company of the Year Award.

## Significance of Company of the Year

To receive the Company of the Year Award (i.e., to be recognized as a leader not only in your industry, but among non-industry peers) requires a company to demonstrate excellence in growth, innovation, and leadership. This excellence typically translates into superior performance in three key areas—demand generation, brand development, and competitive positioning—that serve as the foundation of a company's future success and prepare it to deliver on the 2 factors that define the Company of the Year Award: Visionary Innovation and Performance, and Customer Impact).

- Acquire competitors' customers
- Increase renewal rates
- Increase upsell rates
- Build a reputation for value
- Increase market penetration

- Earn customer loyalty
- Foster strong corporate identity
- Improve brand recall
- Inspire customers
- Build a reputation for creativity

DEMAND

BRAND

Company of the Year

COMPETITIVE POSITIONING

- Stake out a unique market position
- Promise superior value to customers
- Implement strategy successfully
- Deliver on the promised value proposition
- Balance price and value

## Understanding Company of the Year

Driving demand, brand strength, and competitive differentiation all play critical roles in delivering unique value to customers. This three-fold focus, however, must ideally be complemented by an equally rigorous focus on Visionary Innovation and Performance to enhance Customer Impact.

## Key Benchmarking Criteria

For the Company of the Year Award, Frost & Sullivan analysts independently evaluated each factor according to the criteria identified below.

**Visionary Innovation and Performance**

Criterion 1: Addressing Unmet Needs
Criterion 2: Visionary Scenarios through Mega Trends
Criterion 3: Implementation of Best Practices
Criterion 4: Blue Ocean Strategy
Criterion 5: Financial Performance

**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 Practices Award Analysis for Cannon Technologies

## 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

9–10 Excellent

7–8 Good

4–6 Fair

1–3 Poor
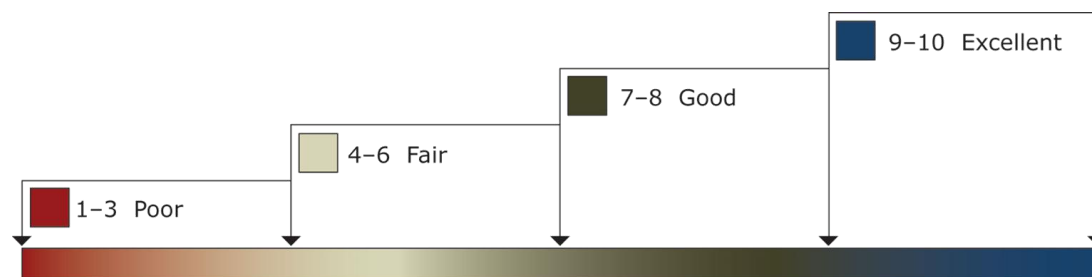
The Decision Support Scorecard considers Visionary Innovation and Performance and Customer Impact (i.e., the overarching categories for all 10 benchmarking criteria; the definitions for each criterion are provided beneath the scorecard). The research team confirms the veracity of this weighted scorecard 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) | | | |
|---|---|---|---|
| **Company of the Year** | Visionary Innovation & Performance | Customer Impact | **Average Rating** |
| | | | |
| Cannon  Technologies | **9.0** | **9.0** | **9.0** |
| Competitor 1 | 8.0 | 7.0 | 7.5 |
| Competitor 2 | 6.0 | 6.0 | 6.0 |

## Visionary Innovation & Performance

### Criterion 1: Addressing Unmet Needs
Requirement: Implementing a robust process to continuously unearth customers' unmet or underserved needs, and creating the products or solutions to address them effectively.

### Criterion 2: Visionary Scenarios through Mega Trends
Requirement: Incorporating long-range, macro-level scenarios into the innovation strategy, thereby enabling first-to-market growth opportunity solutions.

### Criterion 3: Implementation of Best Practices
Requirement: Best-in-class strategy implementation characterized by processes, tools, or activities that generate a consistent and repeatable level of success.

### Criterion 4: Blue Ocean Strategy
Requirement: Strategic focus on creating a leadership position in a potentially uncontested market space, manifested by stiff barriers to entry for competitors.

### Criterion 5: Financial Performance
Requirement: Strong overall business performance in terms of revenue, revenue growth, operating margin, and other key financial metrics.

## 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.

## 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.
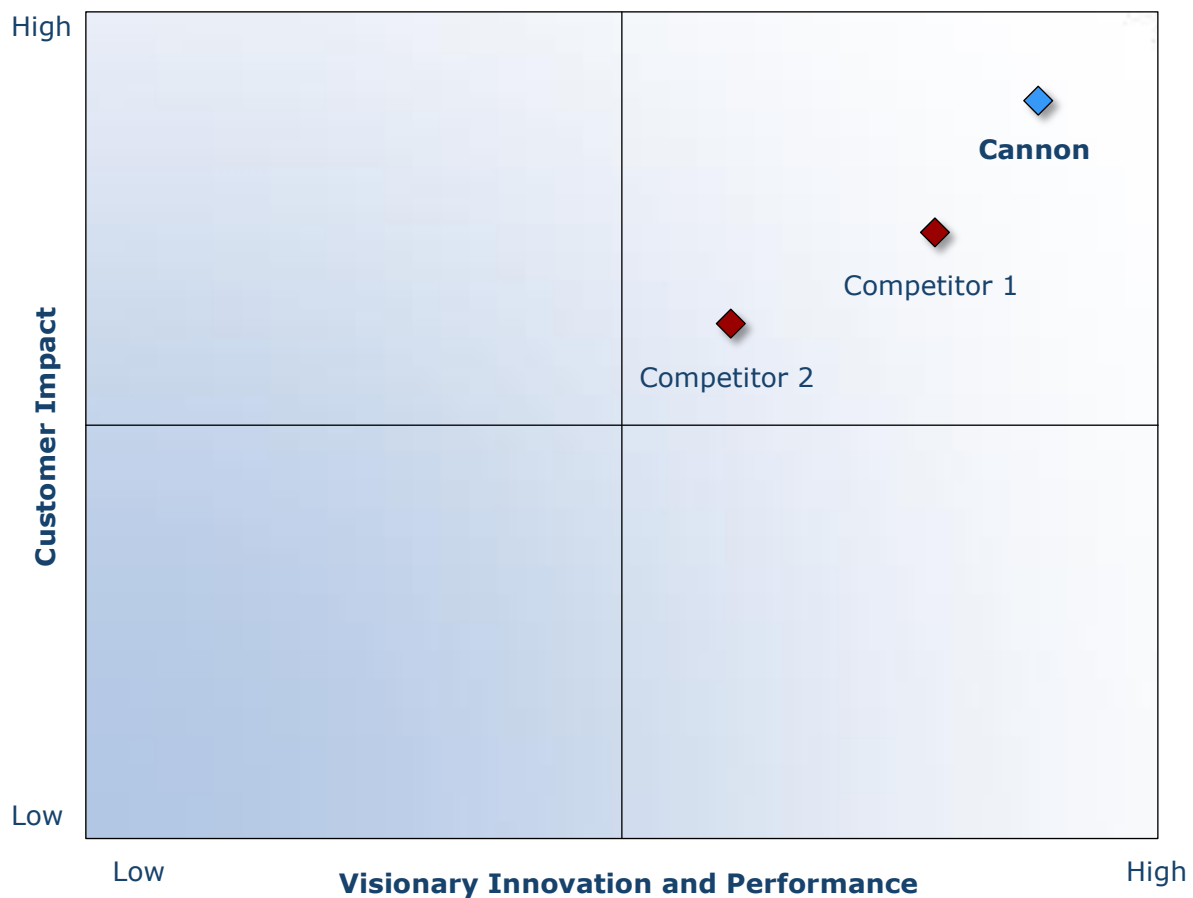
# Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan analysts follow a 10-step process to evaluate award candidates and assess their fit with select best practice 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<br>• Identify emerging industries<br>• 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<br>• Assess candidates' fit with best practices criteria<br>• 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<br>• Examine eligibility of all candidates<br>• 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<br>• Invite multiple perspectives on candidates' performance<br>• 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<br>• Strengthen cases for candidate eligibility<br>• 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<br>• Pressure-test fit with criteria<br>• 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<br>• Write nominations<br>• 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<br>• Build consensus<br>• Select winner | Decision on which company performs best against all best practices criteria |
| 9 | **Communicate recognition** | Inform award recipient of recognition | • Present award to the CEO<br>• Inspire the organization for continued success<br>• 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 able to share award news with stakeholders and customers | • Coordinate media outreach<br>• Design a marketing plan<br>• 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.



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 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.