ABI RESEARCH COMPETITIVE RANKING

THERMAL MANAGEMENT PROVIDERS FOR DATA CENTERS

Johnson Controls

OVERALL: 79.8 | INNOVATION: 78.0 | IMPLEMENTATION: 81.5 | RANK: 2

Johnson Controls

LEADER
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TOP INNOVATOR
ABIresearch.

TOP IMPLEMENTER
ABIresearch.

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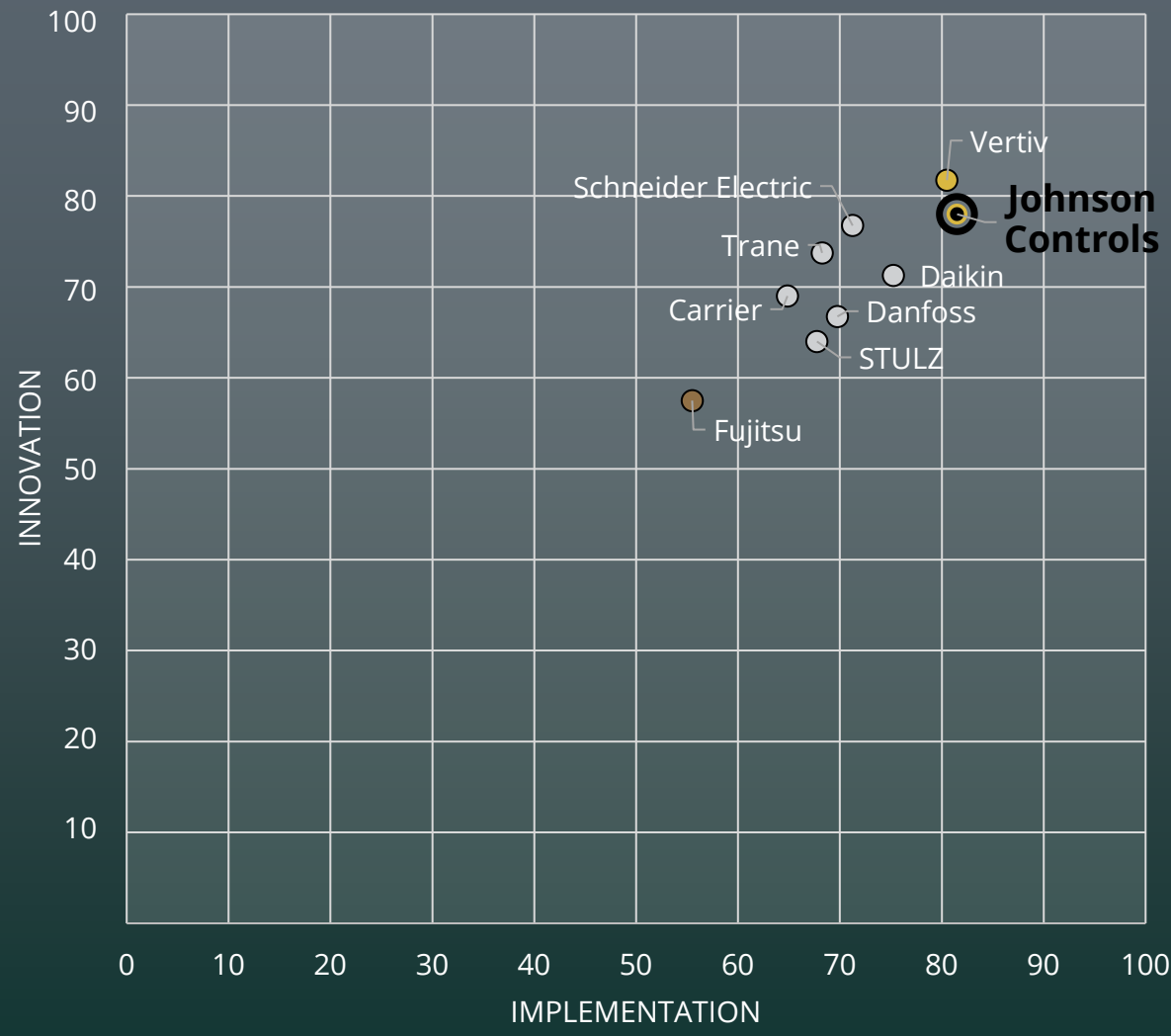
INNOVATION *VERSUS* IMPLEMENTATION MATRIX



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INNOVATION

Johnson Controls

INNOVATION SCORE: 78.0

Johnson Controls has leveraged its extensive experience in building efficiency, cooling, building automation, safety, and security to create comprehensive, flexible, and integrated DC solutions, including design, installation, commission, maintenance, and monitoring of its solutions for single or multiple sites.

Johnson Controls' DC portfolio includes YORK HVAC air- and water-cooled chillers, Silent-Aire hyperscale cooling (Direct Evaporative Cooling (DEC), Computer Room Air Handlers (CRAHs), fan walls), and modular DC solutions, Metasys and OpenBlue for building automation systems and operational intelligence, fire detection through Simplex, and security and remote monitoring with C-CURE. The YORK and Silent-Aire portfolios are purpose-built DC cooling solutions with integrated connected HVAC products such as air- and water-cooled chillers and services for diverse climatic conditions, helping to minimize energy costs, maximize efficiency and ROI and optimize uptime. Furthermore, Johnson Controls' dedicated DC solutions like the magnetic-driveline technology found in the YORK® YVAM air-cooled magnetic bearing centrifugal chillers and YORK® DC CRAH help minimize costs, maximize efficiency, and enhance reliability. To further optimize a chiller's performance, Johnson Controls combines technology with expert support and tailored maintenance programs designed to extend the chiller's life span, maximize its efficiency, and increase uptime, sustainability, and efficiency, while reducing costs. The Connected Equipment Portal (CEP) helps extend the cooling equipment life through analytics, insights, and condition-based actions, with timely alerts and Key Performance Indicators (KPIs) to track asset health. Lastly, the hardware and software systems are connected through industrial protocols Modbus, BACnet, and SNMP, and include expertise in installation, service, and systems integration.

Johnson Controls has set ambitious targets to achieve short- and long-term goals through its Sustainability Materiality Assessment of ESG strategy, reducing absolute operational emissions through Science Based Targets initiative (SBTi)-approved targets of 55% by 2030 and a net-zero carbon pledge. Johnson Controls' sustainability initiatives include reducing product line emissions by 27% ahead of 2030 goals, thus reducing operational costs by utilizing technology to create technically agile assets. For instance, the YVAM chillers with chilled water setpoint for 60° F to 90° F, extend the server life span by over 15 years. Additionally, Johnson Controls has a dedicated retrofit team to refurbish existing equipment and extend life span. By 2030, Johnson Controls is committed to purchasing 10% of net-zero steel for its products and reducing embodied carbon of its products. Current circular initiatives include sustainable packaging and water/wastewater management, EP100 energy-efficiency commitment across in-house operations, Department of Energy Better Buildings Plants Challenge to reduce energy intensity by 25% by 2028, and transitioning to low Global Warming Potential (GWP) refrigerant as part of the American Innovation and Manufacturing (AIM) Act.

Johnson Controls ranked second with a score of 78.0 in the innovation category, one of the leaders in the innovation criteria. Johnson Controls' DC cooling portfolio is flexible and integrated with hardware, software, and services. The lack of liquid cooling solutions in-house or through partnerships is a gap in its portfolio, which is a solution provided by its competitors Vertiv and SE. Johnson Controls has quantifiable goals on product emissions, low carbon commitments, and product lines to extend allied service equipment. Publishing case studies on DC pilot projects around refrigerant recycling and reuse/rental of thermal management systems will further its competitive edge to support customers' decarbonization goals.

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IMPLEMENTATION

IMPLEMENTATION SCORE: 81.5

Johnson Controls is a global, multi-industrial solution provider of building technology, software, and services with a robust supplier network catering to over 150 countries, employing over 100,000. The merger of Tyco and Johnson Controls has increased its customer base to include some of the largest players in the DC industry with solutions from YORK®, Silent-Aire, Metasys®, Sabroe®, ZETTLER®, and Frick®. Johnson Controls adopts an agile approach, partnering with key players in the DC ecosystem to serve hyperscalers, co-locaters, and others. Johnson Controls' breadth, scope of capabilities, and global presence resulted in a major stake of the DC cooling market share. In June 2024, Johnson Controls announced a dedicated Global Data Center Solutions organization, catering to industry and customer demand for end-to-end DC solutions and services that are integrated, energy-efficient, and offer a reduced carbon footprint. Additionally, Johnson Controls provides specific and targeted third-party training to technicians and frontliners for DCs.

Noteworthy case studies include Telia Finland, the largest open DC that uses renewable energy, Johnson Controls' high-performing chillers, recycling waste heat for district heating, and a low carbon footprint.

A large enterprise cloud provider with multiple sites used Johnson Controls' cooling systems and Metasys to support its major retrofit. Using innovative solutions and planning in line with regulations, Johnson Controls was able to shorten commissioning time by 8 to 12 weeks. The pre-packaged Metasys® controllers enabled pre-testing of air handling units in the factory, helping the cloud provider shorten the deployment time by another 4 to 6 weeks, reducing construction time by 18 weeks, and driving the driving ROI.

Johnson Controls' OpenBlue technology, with optimized HVAC equipment and central plant performance, was deployed in a hyperscaler's DC in Australia, resulting in US$70,000 in cost savings and more than 1 million Kilowatt-Hour (kWh) of energy savings over an 8-month duration, which amounted to 4X more than the predicted goal. Lastly, ODATA, a Brazilian hyperscaler, carrier-neutral, and multi-tenant DC operator recently expanded its footprint in Latin America. Johnson Controls and its partners Tyco and C-CURE BMS delivered integrated secure DC solutions to control and manage the ODATA BG01 facility.

Johnson Controls' customers have commended the "one-stop" integrated approach for the entire lifecycle of their buildings, be it cooling, energy efficiency, or fire and security systems that seamlessly work together to deliver the intelligent, high-performing DC operations with increased efficiency and low operation cost.

Johnson Controls ranked first with a score of 81.5, leveraging its comprehensive portfolio of innovative and sustainable cooling solutions with allied services. Its global reach combined with a customer-centric approach and scaled deployment helped position it as a leader in the DC cooling industry.

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CONCLUDING REMARKS

Johnson Controls ranked second overall with a score of 79.8, a leader in the innovation and implementation criteria, scoring well across the board and exceeding market expectations. Its comprehensive portfolio of innovative and sustainable solutions combined with its global reach, customer-centric approach, and scaled deployment position Johnson Controls as a leader in the DC cooling industry. The lack of liquid cooling solutions in-house or through acquisition is a gap in its DC portfolio, and is a solution provided by its competitors. Johnson Controls has quantifiable goals on product emissions and low carbon commitment and robust sustainability initiatives. Pilot projects around refrigerant recycling and reuse/rental of thermal management systems will further its competitive edge to support customers' decarbonization goals.

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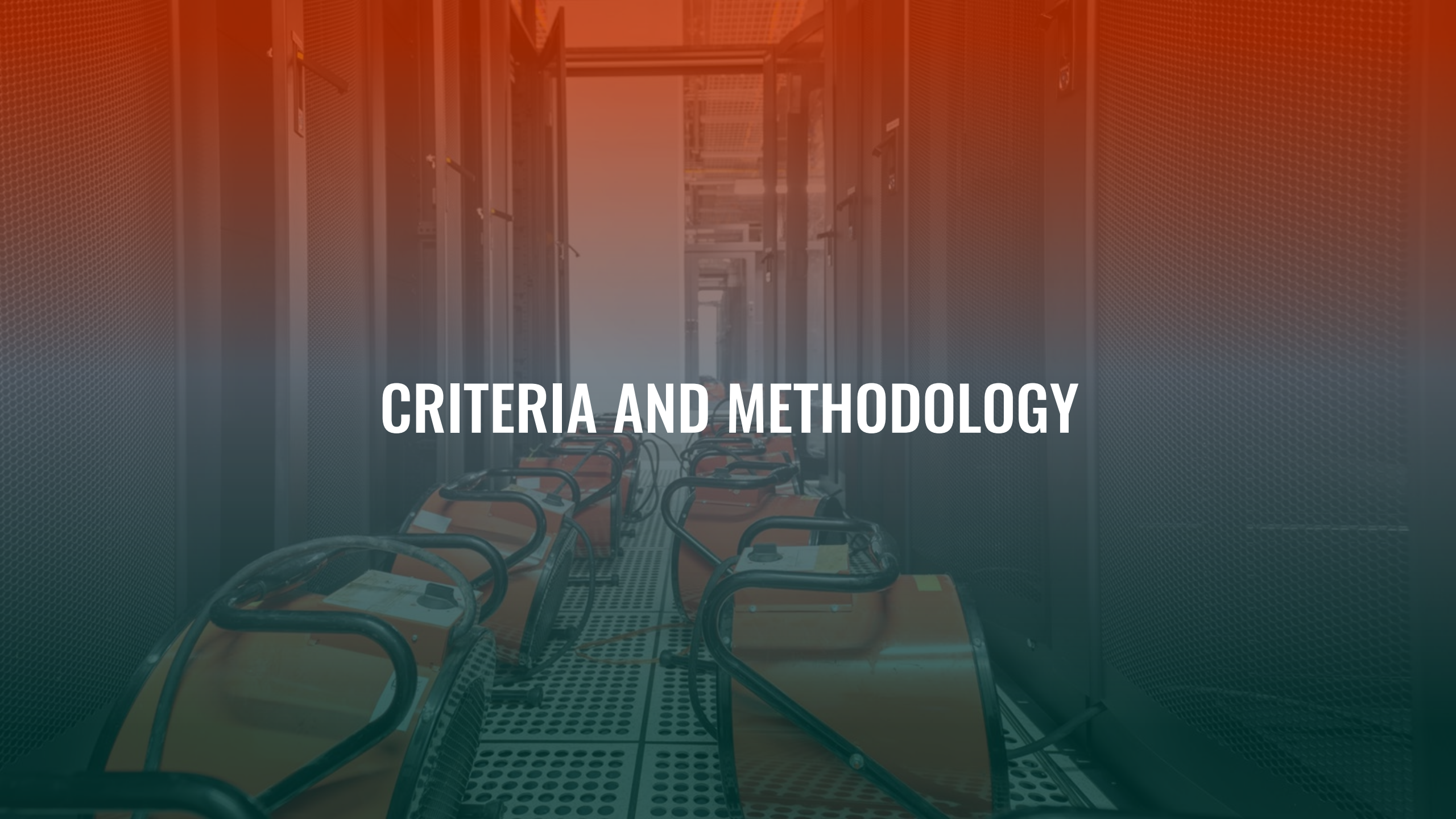

CRITERIA AND METHODOLOGY

VENDOR MATRIX

Methodology: After individual scores are established for innovation and implementation, an overall company score is established using the Root Mean Square (RMS) method:

$$Score = \sqrt{\frac{innovation^2 + implementation^2}{2}}$$

The resulting overall scores are then ranked and used for percentile comparisons.

The RMS method, in comparison with a straight summation or average of individual innovation and implementation values, rewards companies for standout performances.

For example, using this method, a company with an innovation score of nine and an implementation score of one would score considerably higher than a company with a score of five in both areas, despite the mean score being the same. ABI Research believes that this is appropriate as the goal of these matrices is to highlight those companies that stand out from the others.

RANKING CRITERIA

Leader: A company that receives a score of **75 or above** for its overall ranking

Mainstream: A company that receives scores **between 60 and 75** for its overall ranking

Follower: A company that receives a score of **60 or below** for its overall ranking

Innovation Leader: A company that receives a score of **75 or above** for its innovation ranking.

Implementation Leader: A company that receives a score of **75 or above** for its implementation ranking.

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LEADERS, MAINSTREAM, AND FOLLOWERS

Leaders: Vertiv and Johnson Controls

The leader group experiences first-mover advantage by delivering a complete end-to-end solution from hardware, software, and deployments, to after-sales and allied services. These companies balance innovation and implementation through thermal management portfolios, supporting clients' decarbonization goals, scaled deployments, and a majority stake of the DC cooling market share.

Mainstream: Schneider Electric (SE), Daikin, Trane, Danfoss, Carrier, and STULZ

The mainstream solution providers consist of either innovative companies that lag in implementation or established companies with limited geographical deployments due to delayed or cautious Go-to-Market (GTM) strategies.

Follower: Fujitsu

The followers group is mainly composed of companies that either have a niche strategy, for instance, focusing on specific regional markets or a type of cooling solution in a single region.

Innovation Leaders: Vertiv, SE, and Johnson Controls are innovation leaders exceeding market requirements, scoring above 75 and pushing the boundaries of the potential of DC cooling solutions and allied capabilities in a competitive marketplace.

Implementation Leaders: Johnson Controls, Vertiv, and Daikin are the top three implementation leaders due to their strong established ecosystems partnerships built over the years, global scaled deployments, robust service and predictive monitoring capabilities, strategic partnerships, and commercialized solutions available in the market today.

INNOVATION CRITERIA

- **Thermal Management Technology:** This criterion evaluates end-to-end capabilities of the vendor, including cooling hardware (infrastructure and server level), deployment support, and software and operations provided either in-house or through partnerships.
- **Reliability, Resilience, and Data Center Optimization:** Downtime significantly affects the performance and reliability of a DC. Vendors with capabilities such as optimizing existing workloads, predictive maintenance, and built-in dashboard with AI software alerts or triggers to support troubleshooting will be positioned well.
- **Interoperability with Other Platforms:** For DCs to operate efficiently, facility managers should be able to visualize plant operations on a dashboard or software tools like DCIM, a BMS, or a digital twin. Vendors with software and hardware tools that communicate through an Application Programming Interface (API) or third-party software and optimized DC operations will score well in this criterion.
- **Platform Features:** This criterion identifies unique features, technologies, or capabilities that set the vendor apart from the competition. Examples include hardware efficiency, software optimization, energy efficiency, AI optimization/monitoring, digital twin, Computational Fluid Dynamics (CFD)/thermal analysis.
- **End of Life:** DC operators are focusing on building and operating green DCs to get ahead, implementing cooling solutions with circular practices like refrigerant recycling, hardware part reuse, or retrofit solutions, which are providing DC operators with a competitive edge, saving operating costs and reducing operational carbon emissions.

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IMPLEMENTATION CRITERIA

- **Commercial Success and Market Share:** This criterion evaluates HVAC capabilities, market share, the number of projects executed, and customer growth to date. Market share is derived from ABI Research's *Optimizing Data Center Infrastructure: Market Sizing Thermal Management & Energy Consumption* market data (MD-CSDS-101).
- **Geographical Reach:** The number of regions where the company operates. Companies with a global presence are better positioned to secure supply chains, understand regional and global regulations and market trends, and provide after-sales support.
- **Deployment, Operation, and Maintenance Support:** This criterion identifies how the thermal management solution is commissioned, and how operational maintenance and equipment checks are performed once deployment is completed; for example, online comprehensive monitoring checks, predictive maintenance, air flow hotspots, etc. Vendors catering to end-to-end product delivery either in-house or through a professional third-party vendor are well placed in this category.
- **Allied Products and Services:** Vendors are evaluated based on allied products, software, or services provided to support DC operations. For example, DCIM, generators/Uninterruptible Power Supply (UPS), battery storage, fire & safety, and security.
- **Partnerships & Case Studies:** Identifies the number of customers, projects, and partnerships executed today. Table stakes are companies with less than 3 deployments; with more than 10 global deployments securing a higher score.
- **Operations Time to Value:** This criterion collects qualitative and quantifiable financial, operational, or other benefits clients are observing by deploying the solution.

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