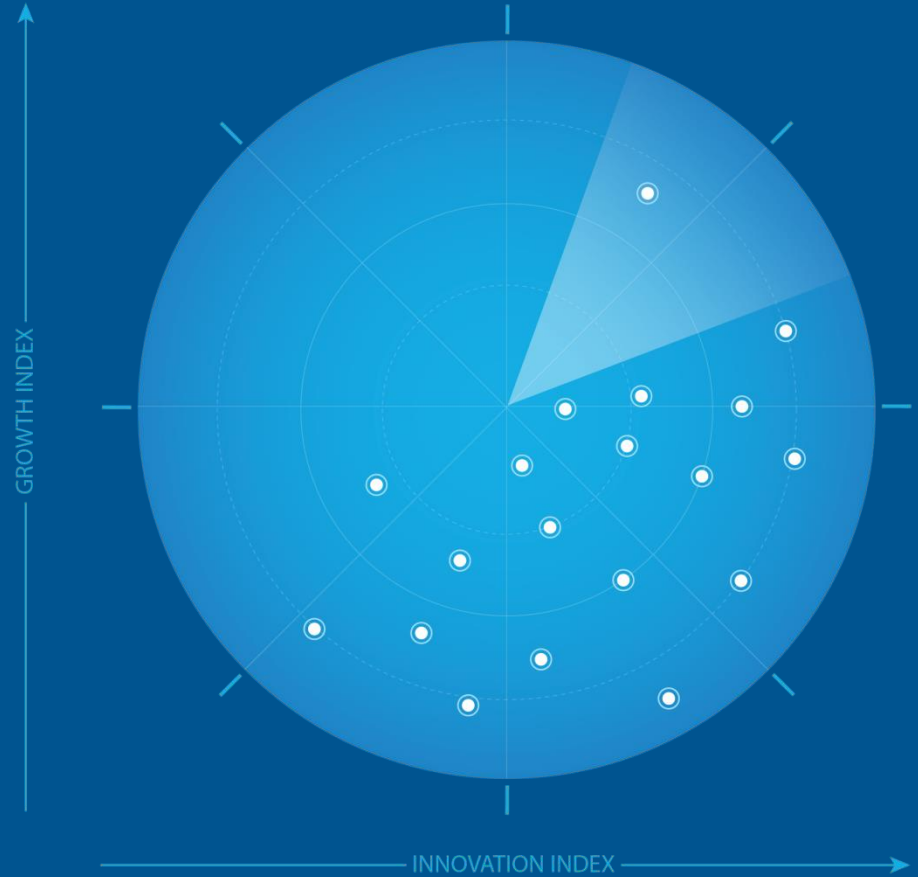


# Frost Radar™: Global SD-WAN Solutions, 2024

Authored by: Leandro Agion

A Benchmarking System  
to Spark Companies to  
Action - Innovation That  
Fuels New Deal Flow and  
Growth Pipelines



FROST & SULLIVAN

# Strategic Imperative and Growth Environment



# Strategic Imperative

## Factors Creating Pressure on Growth

- Companies on their digital journeys are focusing on being more productive and enhancing end users' experiences. Forward-thinking companies realize that a network transformation is needed to support the technology stack of the future, and they are investing in cutting-edge cloud, artificial intelligence machine learning (AI/ML), advanced robotics, the internet of things, and augmented/virtual reality technologies.
- Software-defined wide area network (SD-WAN) technologies placed at customer edge locations facilitate the convergence of networks and security to meet rapidly changing business needs without compromise. SD-WAN is the first step toward secure access service edge (SASE)—the integration of SD-WAN with a range of security functionality including secure web gateway (SWG), zero-trust network access (ZTNA), cloud access security broker (CASB), and firewall-as-a-service (FWaaS). All these functionalities can be managed via centralized software, simplifying deployments, optimizing network costs, and improving application performance. Protecting such environments requires increasingly complex solutions that skilled cybersecurity professionals manage. The best option that allows enterprises to focus on their business without neglecting security is an MSSP that can provide and manage comprehensive ecosystems of cybersecurity solutions.

Source: Frost & Sullivan

# Strategic Imperative

## Factors Creating Pressure on Growth

- Traditional networking typically was operationally distinct from security and delivered from entirely separate hardware, managed by different teams. SASE converges connectivity and security into one service offering. SASE secures connectivity and sets the organization on a secure, scalable operational path to growth, moving from legacy, hardware-based security to a cloud-based SASE platform solution.
- Prominent SD-WAN vendors are enhancing their product portfolios and/or forming strategic alliances to offer secure SD-WAN and the related SASE offering. Approaches to SASE differ: some SD-WAN vendors follow a single-vendor strategy (adding SASE components to their portfolio), while others use a partnership model that requires automation and orchestration with the partner's solution.
- In the past, networking vendors sold through various channels, including resellers, distributors, system integrators, value-added resellers (VARs), and managed service providers (MSPs). Overall, the networking hardware space was commoditized and did not require much specialization.

# Strategic Imperative

## Factors Creating Pressure on Growth

- With the introduction of SD-WAN and SASE solutions, in which hardware is no longer the central component, the traditional networking vendor business model requires a revision. The model of straight reselling (without adding value to the solution) is diminished. Because these solutions are complex to deploy and manage, vendors are now helping their sales channels develop their capabilities to provide quality managed service solutions.

# Growth Environment

- The SD-WAN industry is in the growth phase. In the past year, SD-WAN deployments increased significantly as businesses tried to simplify their network architecture and gain flexibility in a distributed workforce and application environment. SD-WAN enables organizations to combine direct internet access, wireless, broadband, Ethernet, and MPLS, and wireless connections, directing traffic over the optimal network technology based on application requirements. The increasing number of vendors and technological features, as well as the complexity of managing them all, drive businesses toward the managed services area for SD-WAN. As more endpoints (users or things) connect to the network, SD-WAN is especially crucial for businesses because it enables automated, optimized, and secure connectivity.
- ZTNA is the ability to identify and authenticate users and devices and enable access over encrypted tunnels of applications on a granular basis. ZTNA has emerged as one of the top security solutions to help organizations keep applications and resources safe at a time when applications have migrated to the cloud and a significant number of employees continue working remotely.



Source: Frost & Sullivan

# Growth Environment

- Frost & Sullivan's 2023 global network services survey found that 83% of respondents said their organizations have employees who work from home at least once per week. The proliferation of IoT devices connecting to the network creates liabilities for the network. ZTNA verifies a device's identity and the context of the access request: the device being used, its location and security posture, and the applications it is trying to access. In this way, the system evaluates much more than just IP addresses, allowing for granular access control covering the who, what, and where aspects of networks and applications.
- Vendors are acknowledging that businesses are holistically planning networking and security and offering a complete portfolio of support to customers on their SD-WAN journey.
- Many vendors' SD-WAN solutions are delivered via software deployed on a universal customer premises equipment (uCPE) at the customer edge site. The 2023 network services survey found that 64% of respondents consider virtual network functions (VNFs) to be crucial or very important for their organization. With the uCPE approach, businesses can choose to virtualize network functions in a phased manner. For example, they can deploy SD-WAN functionality in a virtual format instead of using a dedicated SD-WAN appliance. Alternatively, they may choose to deploy an additional virtual firewall from another security vendor for added security features.



Source: Frost & Sullivan

# Growth Environment

- The survey also revealed that the top-cited challenges to deploying SD-WAN include ensuring interoperability with the existing WAN, resistance from internal teams, and hurdles implementing international sites because of regulations and local on-site support. Moreover, 45.4% of respondents said they prefer a fully managed solution and 40.6% a co-managed solution. Overall, 86% of respondents prefer to deploy SD-WAN via managed providers rather than doing it themselves. This reflects that organizations increasingly recognize the complexity of SD-WAN management and are choosing to delegate it or share management responsibility with a third party that can deliver these services better and faster. This trend is pushing SD-WAN vendors to build partnerships to tap into the potential. The SD-WAN vendor partner channel typically includes network service providers (NSPs), MSPs, system integrators, application service providers, and VARs.
- By offering managed SD-WAN services, NSPs deliver high levels of value to their clients, becoming trusted advisors rather than merely vendors. They also create additional recurring revenue streams to compensate for pricing pressure on transportation services.



Source: Frost & Sullivan



# Growth Environment

- Organizations also are in search of network architectures that offer centralized management, analytics, and visibility into their local area network/wireless local area network (LAN/WLAN) and SD-WAN networks. The network services survey revealed that 52% of respondents indicated that convergence of LAN/WLAN and WAN is crucial to their selection of an SD-WAN solution. The software layer of networking provides visibility that enhances the end user's digital experience. LAN management software technologies are becoming essential for location-based and proximity-related metrics in certain industries, such as retail. Moreover, it is the opportunity to include AI/ML to improve LAN/WLAN network performance.
- Vendors that can offer an SD-WAN solution that includes LAN/WLAN management are in a better position.
- Network visibility/observability tools allow organizations to gain deep knowledge of a network's health, behavior, and performance. Some vendors provide comprehensive visibility platforms that include WAN link health and application and user experiences. As an example, Cisco acquired ThousandEyes and integrated it into its Catalyst SD-WAN product to extend network observability and visibility for a unified application experience, driven by actionable network data insights.



Source: Frost & Sullivan

# Growth Environment

- ThousandEyes provides real-time visibility into each employee's experience with SaaS apps, allowing the organization to quickly detect issues that affect their productivity. Enterprises are giving more consideration to these features when procuring SD-WAN infrastructure.
- The concept of a self-healing WAN has remained at the core of SD-WAN discussions. SD-WAN solution vendors are investing in and integrating AI and ML tools to deliver on the promise of application-aware or intent-based networking to automate routine network operation tasks, set policies, measure network performance against set targets, and respond to and rectify the networks as needed. Solutions available today are capable of predicting and notifying events, with providers incorporating robotic process automation to eliminate manual intervention and instead have the WAN self-correct.
- The growth in the adoption of IoT applications and the need for faster data processing for latency-sensitive applications drive demand for edge computing that pushes intelligence, data processing, analytics, and communication capabilities down to where the data originates: at network gateways or directly at endpoints. Edge includes computing power in the network or on-premises. Vendors cloud providers and operators are now deploying smaller data centers on the network edge, closer to customers, optimizing application performance.



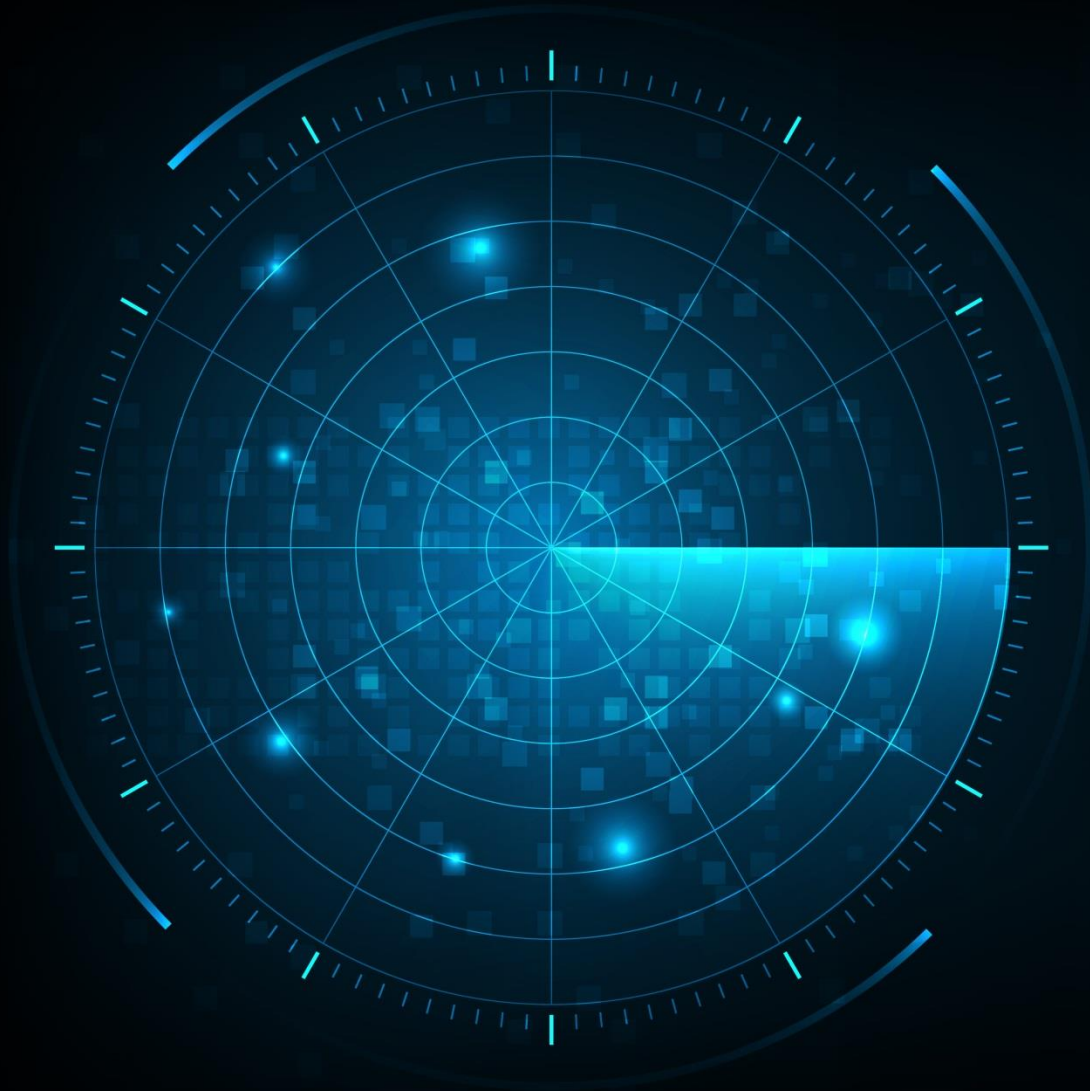
Source: Frost & Sullivan

# Growth Environment

- 5G wireless service also is crucial to the success of edge computing because of its high-speed and low-latency bandwidth features. 5G rollout began in 2018, but the service has yet to be widely available. Data delivered over 5G is transferred at speeds comparable to that of fiber, with a data peak rate for download speeds reaching 20 Gbps. 5G also offers superior connection density compared to LTE because it can support close to 1 million connected devices.
- SD-WAN facilitates automated, optimized, and secure connectivity over 5G between endpoints and edge compute nodes. The network slicing feature of 5G enables an SD-WAN platform to request virtualized slices on the network for different applications based on centrally defined policies. SD-WAN vendors are looking to ship SD-WAN appliances with integrated 5G support to tap into edge computing and 5G trends.



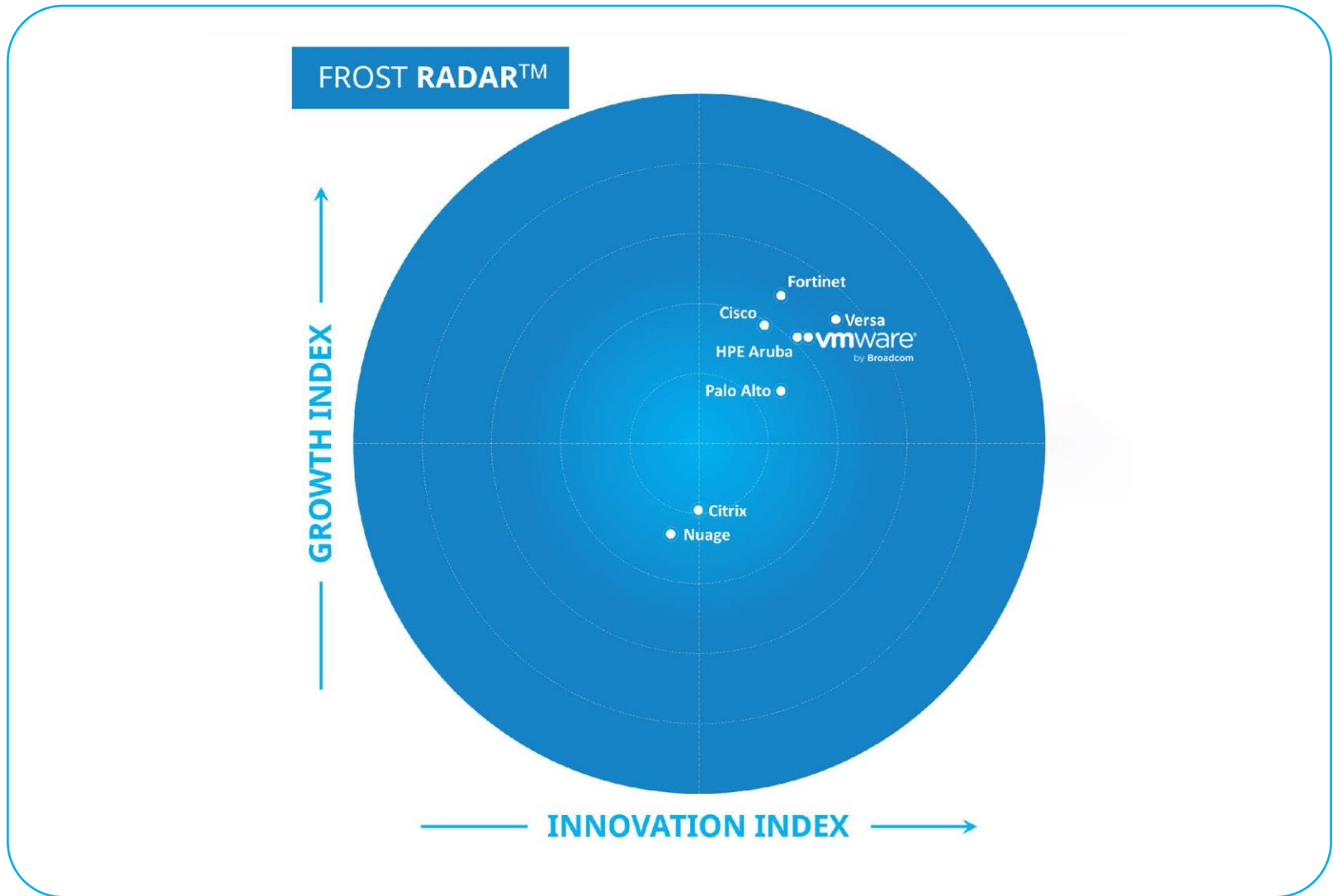
Source: Frost & Sullivan



**Frost Radar™**

**Global SD-WAN  
Solutions, 2024**

# Frost Radar™: Global SD-WAN Solutions, 2024



Source: Frost & Sullivan

## Competitive Environment

- The global SD-WAN industry remains fragmented, with close to 25 vendors in competition. However, not all vendors provide complete SD-WAN solutions. Frost & Sullivan primarily analyzed vendors based on their SD-WAN features and functionality; while related functions such as security, WAN optimization, and routing are important, vendors must have a comprehensive SD-WAN solution for inclusion. The eight companies on the Frost Radar™ offer well-rounded solutions.
- Merger and acquisition (M&A) activity in the SD-WAN vendor space has been intense in the last five years as innovative start-ups are acquired to complement traditional vendors' portfolios. As businesses devise holistic SD-WAN transformation strategies inclusive of LAN, WAN, cloud and edge networking, and security solutions, sufficient opportunities are available for each vendor on this Radar™ to compete effectively.
- Fortinet is the Frost Radar™ Growth Index leader because of the completeness of its offering and the large installed base of its FortiGate product. The SD-WAN functionality built into the FortiGate firewall offers integrated SD-WAN, security, and routing functions in a single appliance or a single virtual machine which appeals immensely to businesses that lead with a security-centric approach to WAN deployments. Nevertheless, Versa Networks, VMware, Cisco, and HPE Aruba Networking are close to the leadership position.



## Competitive Environment

- Versa Networks is the Frost Radar™ Innovation Index leader based on its holistic approach to software-defined solutions that integrates routing, networking, security, and SD-WAN services in a flexible, versatile software stack that displaces multiple legacy branch-office hardware devices. Versa is approaching AI by developing capabilities that include enhanced network and security performance, secure generative AI tools, and real-time detection of malicious behaviors.
- VMware is a strong competitor and is one of the SD-WAN market leaders in terms of deployed sites and revenue. It has surpassed the milestone of 1.2 million SASE users and is introducing a comprehensive single-vendor SASE solution.
- Cisco's dominance in enterprise routing gives it an edge. As managed SD-WAN service providers expand their support to multivendor SD-WAN solutions, Cisco is almost always one of the three vendors in the mix.
- HPE Aruba Networking is a strong performer, leveraging its ability to tap into LAN, WAN, and cloud networking solutions and compete effectively for enterprise business owing to HPE's deep sales and marketing resources.



## Competitive Environment

- Palo Alto Networks' Innovation Index position reflects its top-notch capabilities such as autonomous digital experience management (ADEM) that utilizes AI-driven problem detection and predictive analytics to automate complex IT activities. Palo Alto does exceptionally well in terms of growth in North America, particularly at the high end of the market.
- Nuage Networks has a remarkable performance in Europe, the Middle East, and Africa, driven by its strong service provider partnerships. Nuage's proprietary Virtualized Services Platform supports a multitenant architecture, with more than 2,000 deployments across enterprise clients.
- Citrix's Frost Radar™ position is based on its SD-WAN solution that offers full-fledged routing functionality, firewall, and app-based routing features at the WAN edge. Citrix networking solutions, combined with its virtual workspace solution, provide a compelling value proposition to businesses.





**Companies to Action:**  
**Companies to Be Considered First for**  
**Investment, Partnerships, or Benchmarking**

# Company to Action: VMware

## Innovation

- VMware SD-WAN is a SaaS solution that incorporates three main components: the VMware SD-WAN Edge (available as virtual or physical appliances), VMware SD-WAN Orchestrator (the central management platform for configuration and management), and VMware SD-WAN Gateways (a multitenant appliance distributed across more than 200 global points of presence and hosted by VMware in the cloud or deployed by service providers in their network to provide optimized data paths to applications).
- VMware Edge Network Intelligence is a vendor-agnostic AIOps solution that employs ML algorithms and big data analytics to process high volumes of data from a wide range of network, device, and application sources at the gateways.
- VMware's comprehensive single-vendor SASE solution includes a single management platform for SD-WAN, advanced routing, AIOps, edge compute, ZTNA, URL filtering, SWG, CASB, DLP, and FWaaS. VMware SD-WAN offers integration and orchestration with cloud security partners such as Zscaler, Symantec, Palo Alto, Check Point, and Netskope.

# Company to Action: VMware

## Growth

- In November 2023, Broadcom completed the acquisition of VMware. One of the first strategic decisions was to simplify the offer lineup and licensing model.
- VMware is an industry leader in terms of deployed sites and revenue. The company surpassed the milestone of 1.2 million SASE users as of October 2022.
- VMware sells to enterprises through a network of channel partners globally that includes NSPs, MSPs, VARs, system integrators, and more than 290 telecom service providers. The company served more than 18,000 SD-WAN customers globally as of October 2022.

Source: Frost & Sullivan

# Company to Action: VMware

## Frost Perspective

- Following its acquisition by Broadcom, VMware faces the challenge of maintaining its innovation and customer experience while leveraging the strength of its new parent company. VMware's client relationships may be affected by the change from a perpetual licensing model to a subscription model, since customers may resist the shift because of the perception that subscriptions are more costly than perpetual licenses. VMware should focus on customer retention.
- VMware has adopted a single-vendor SASE marketing strategy, with VMware SD-WAN as a core component. While not a pioneer in this transformation, it has moved faster than many competitors. With this holistic offering delivered through a single management platform, it is in a good position to continue growing in the SD-WAN industry.
- In interviews with SD-WAN service providers, many mention VMWare as their favorite solution. This is particularly important because the adoption of SD-WAN will be primarily through managed services. VMware should keep this strategy and strengthen these channels.

Source: Frost & Sullivan



## Key Takeaways

# Key Takeaways

1

Businesses are continuing to plan for networking and security holistically, embracing the best model that works for hybrid WAN architecture. SD-WAN vendors need to offer a clear roadmap to SASE. For instance, ZTNA has emerged as one of the top security solutions that can help organizations keep applications and resources safe and is a driver for SD-WAN adoption.

2

Customers prefer managed SD-WAN services over the DIY option because of numerous benefits including access to a wide range of consulting and advisory services, more efficient network administration, varied pricing options, and customizable service-level agreements. Vendors will have to strengthen their partnerships with MSPs to tap into the full SD-WAN market potential.

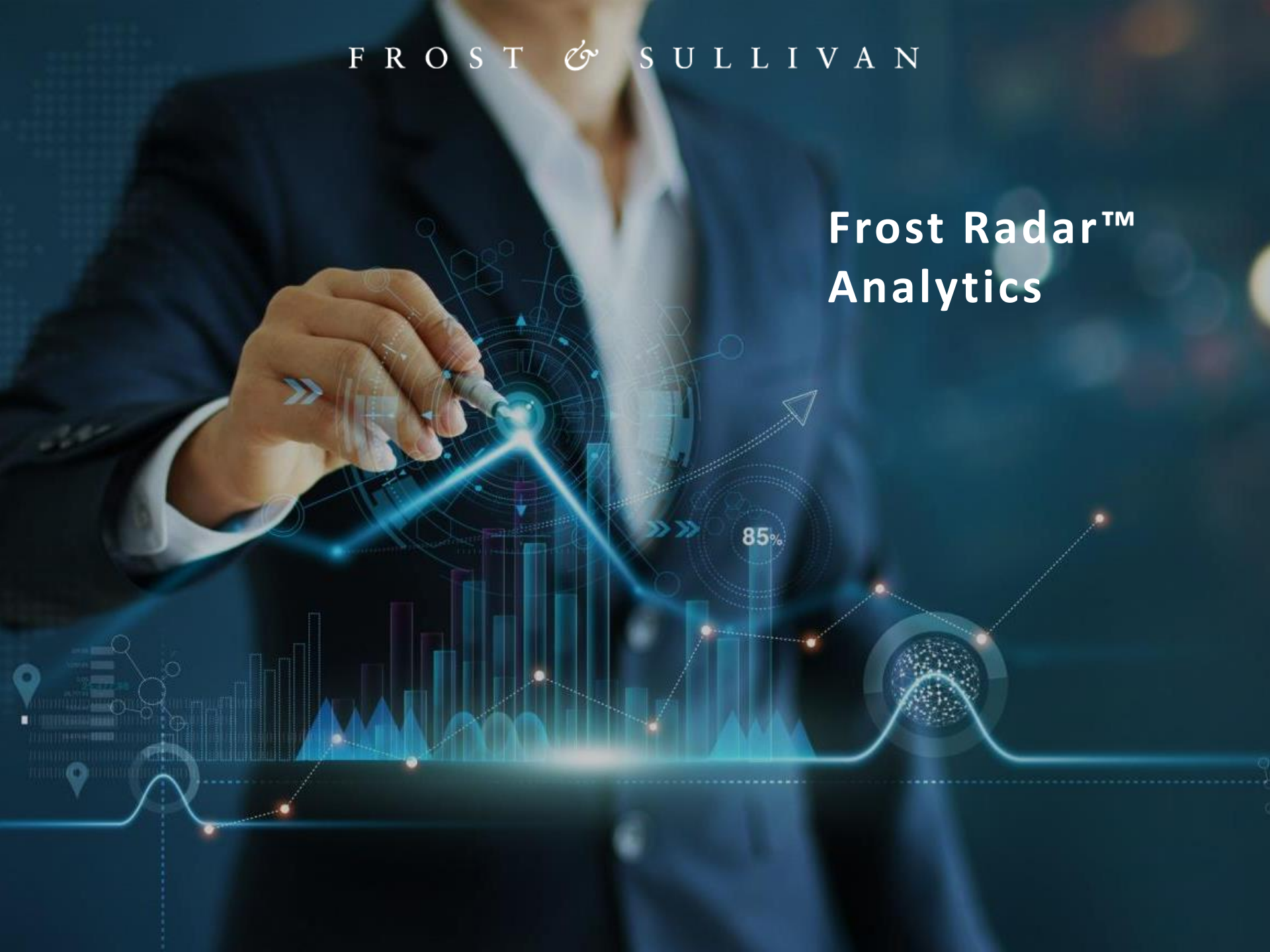
3

Vendors are expanding their portfolios to meet customers' networking and security demands and have employed M&A as a means of broadening their product portfolio. Frost & Sullivan expects additional consolidation in the next few years.

Source: Frost & Sullivan

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# Frost Radar™ Analytics



# Frost Radar™: Benchmarking Future Growth Potential

2 Major Indices, 10 Analytical Ingredients, 1 Platform

## VERTICAL AXIS

**Growth Index (GI)** is a measure of a company's growth performance and track record, along with its ability to develop and execute a fully aligned growth strategy and vision; a robust growth pipeline system; and effective market, competitor, and end-user focused sales and marketing strategies.

## GROWTH INDEX ELEMENTS

- **GI1: MARKET SHARE (PREVIOUS 3 YEARS)**  
This is a comparison of a company's market share relative to its competitors in a given market space for the previous 3 years.
- **GI2: REVENUE GROWTH (PREVIOUS 3 YEARS)**  
This is a look at a company's revenue growth rate for the previous 3 years in the market/industry/category that forms the context for the given Frost Radar™.
- **GI3: GROWTH PIPELINE**  
This is an evaluation of the strength and leverage of a company's growth pipeline system to continuously capture, analyze, and prioritize its universe of growth opportunities.
- **GI4: VISION AND STRATEGY**  
This is an assessment of how well a company's growth strategy is aligned with its vision. Are the investments that a company is making in new products and markets consistent with the stated vision?
- **GI5: SALES AND MARKETING**  
This is a measure of the effectiveness of a company's sales and marketing efforts in helping it drive demand and achieve its growth objectives.



# Frost Radar™: Benchmarking Future Growth Potential

2 Major Indices, 10 Analytical Ingredients, 1 Platform

## HORIZONTAL AXIS

**Innovation Index (II)** is a measure of a company's ability to develop products/services/solutions (with a clear understanding of disruptive Mega Trends) that are globally applicable, are able to evolve and expand to serve multiple markets, and are aligned to customers' changing needs.

## INNOVATION INDEX ELEMENTS

- **II1: INNOVATION SCALABILITY**

This determines whether an organization's innovations are globally scalable and applicable in both developing and mature markets, and also in adjacent and non-adjacent industry verticals.

- **II2: RESEARCH AND DEVELOPMENT**

This is a measure of the efficacy of a company's R&D strategy, as determined by the size of its R&D investment and how it feeds the innovation pipeline.

- **II3: PRODUCT PORTFOLIO**

This is a measure of a company's product portfolio, focusing on the relative contribution of new products to its annual revenue.

- **II4: MEGA TRENDS LEVERAGE**

This is an assessment of a company's proactive leverage of evolving, long-term opportunities and new business models, as the foundation of its innovation pipeline. An explanation of Mega Trends can be found [here](#).

- **II5: CUSTOMER ALIGNMENT**

This evaluates the applicability of a company's products/services/solutions to current and potential customers, as well as how its innovation strategy is influenced by evolving customer needs.

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