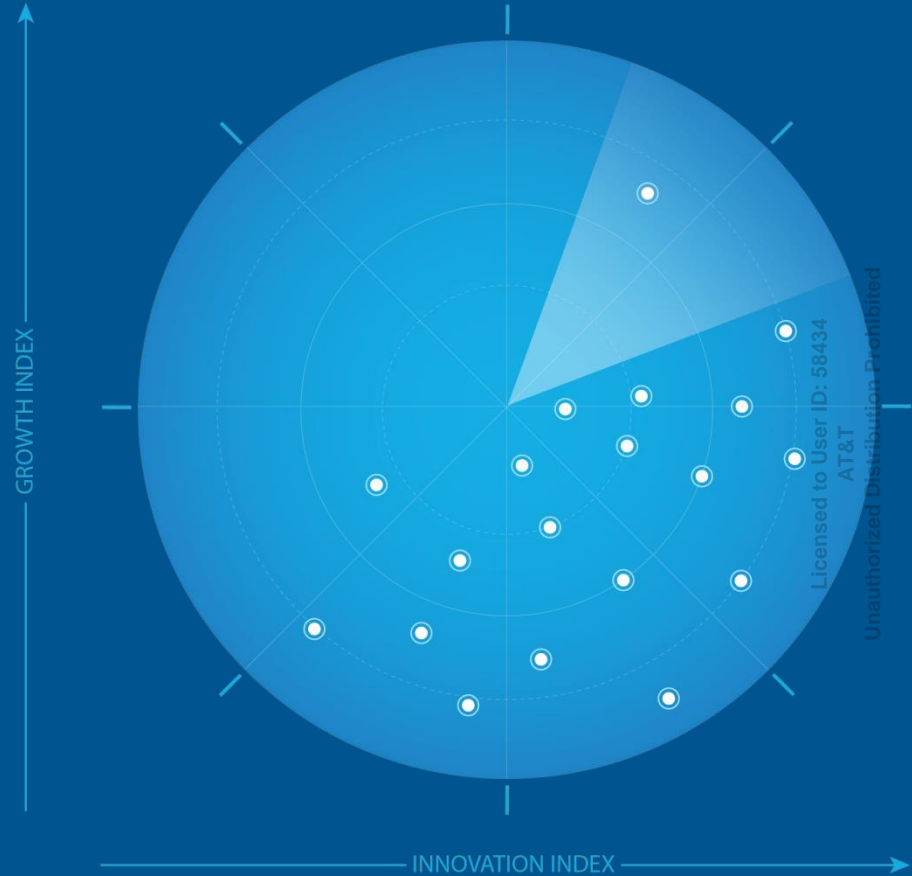


Frost Radar™: Managed SD-WAN Services in North America, 2022

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

Global Information &
Communications Technologies
Research Team At Frost & Sullivan



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Strategic Imperative and Growth Environment

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Strategic Imperative

- Managed software-defined wide area network (SD-WAN) services is a software approach to managing and controlling the underlying enterprise network technologies to optimize costs and application performance. Underlying technologies can include direct internet access (DIA), wireless, broadband, Ethernet, and multi-protocol label switching (MPLS).
- SD-WAN abstracts control and management functions from the data or traffic flows, thus allowing the controllers and management mechanisms to be placed in the edge, cloud, or traditional data center. Like Internet Protocol Security (IPsec), SD-WAN has tunnels that connect end-user devices to the controllers where the “intelligence” of the software can define traffic routes, priority, and management. These tunnels are for management of the data plane, not the actual traffic/data itself.
- SD-WAN allows enterprises to mix wired and wireless connections, directing traffic over the optimal network technology based on the application need. Overall, the growing mix of providers and technologies – and the complexities of managing them all – pushes enterprises to the managed services space for SD-WAN.
- The top five drivers for implementing SD-WAN per the 2021 Frost & Sullivan SD-WAN survey are to optimize IT resources, improve business productivity, improve customer experience, increase operational efficiency, and better support remote working.

Strategic Imperative (continued)

- Customer portals are essential tools and components of managed SD-WAN. Portals provide visibility, integration with enterprise IT service management suites, and tools to manage performance and service-level agreements (SLAs). The service provider and customer both benefit from portals, which track the customer journey from quote to order and help the provider by streamlining the quote-to-cash process and visibility.
- Industry standards body MEF (formerly Metro Ethernet Forum) has established standards for SD-WAN service attributes. The providers that follow the MEF 70 SD-WAN standard and contribute to MEF 3.0 initiatives are the leaders in the space, providing the building blocks for this new era of software-defined networking (SDN).
- In addition to MEF SD-WAN-specific efforts, the framework of Open Networking Automation Platform (ONAP) drives the integration of the portals. Per [ONAP.org](https://onap.org), “ONAP is a comprehensive platform for orchestration, management, and automation of network and edge computing services for network operators, cloud providers, and enterprises.” Customer portals and specifically SD-WAN reporting is the output of all these behind-the-scenes application programming interfaces (APIs) and integrations.
- Frost & Sullivan found that most providers start their SDN journey with SD-WAN and then continue to offer more services including Secure Access Secure Edge (SASE), which represents the progression of SD-WAN, combining network services and security services such as firewalls, intrusion detection and prevention, and security gateways at the hubs and endpoints.

Strategic Imperative (continued)

- All providers are currently integrating their security, voice over IP (VoIP), and unified communication as a service (UCaaS) services in the service point of presence (PoP), often referred to as edge as well. It is where the clients have their SD-WAN tunnels terminated for management and control of the networks but also where the provider deploys the infrastructure that supports the virtual services.
- For deployment within the PoP or customer edge location, service providers are positioning their own universal customer premises equipment (uCPE) as a vendor-agnostic device pre-engineered with the provider's virtual network functions (VNFs).
- As network function virtualization gains traction, the ability to configure VNFs on the uCPE, in the cloud, at the edge, or in any virtualized platform becomes crucial. Service providers are evolving the platforms to support network as a service (NaaS) thanks to the capability to seamlessly deploy and manage network functions on the client side or in the service PoP, as well as to connect and secure multi-edge compute platforms.
- Worth noting is that most managed SD-WAN providers offer traditional security functions, including firewall, intrusion prevention system (IPS), and intrusion detection system (IDS) services, in both virtual and physical form factors. Most providers are offering or considering value-added security services as endpoint detection and response (EDR), managed detection and response (MDR), and overall extended detection and response (XDR) efforts. Artificial intelligence (AI) and machine learning (ML) tools give the provider visibility to the data and end-to-end network security and apply learnings from both the network they are observing and the collective knowledge of all customer networks.

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Source: Frost & Sullivan

Growth Environment

- In managed SD-WAN, the service provider acts as a single point of contact for the complete SD-WAN solution, including the SD-WAN appliance, software license, WAN services, and managed services.
- Provider responsibilities in a managed SD-WAN service include
 - procuring, installing, configuring, and managing the SD-WAN edge device (physical or virtual) and software;
 - installing and managing the WAN links (their own, from a partner, or provided by the customer) that support the SD-WAN solution;
 - managing (at least partially) moves, adds, and changes across the SD-WAN solution;
 - monitoring the service 24x7, troubleshooting, and restoring it in case of a problem;
 - offering an SLA for the entire solution and ensuring that performance guarantees offered in the SLA are met;
 - creating optional value-added services such as WAN aggregation and continuity configurations, third-party access management, additional security features, or WAN optimization;
 - supporting IT managers with a self-service portal interface that provides a granular level of visibility and control; and
 - billing for the service in a subscription-based model in which the customer pays a monthly recurring charge for the managed SD-WAN. Some providers bill managed SD-WAN services as a single monthly recurring charge for the edge device, bandwidth charges, and management fees, while others charge bandwidth fees separately.

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Source: Frost & Sullivan

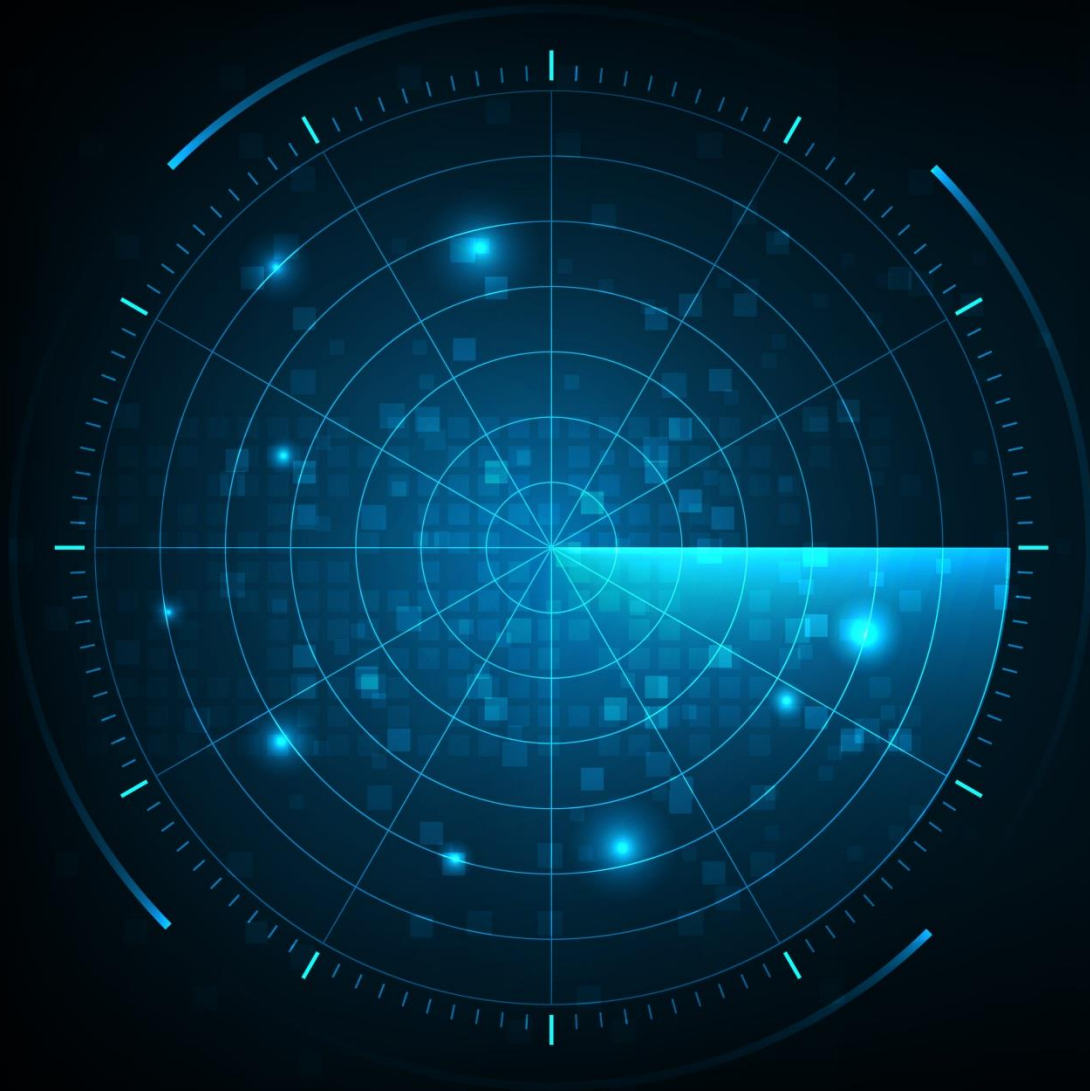
Growth Environment (continued)

Managed SD-WAN service providers comprise four categories:

- **Network Service Providers (NSPs)** such as AT&T, Lumen, and Verizon can combine their own network services with equipment vendors' solutions. Most often, the customer stands to benefit from network services owned by the provider because of tighter integration of SD-WAN solutions with the network and the provider being able to offer better SLAs and better visibility through the customer portals.
- **Managed Service Providers (MSPs)** such as Aryaka, TPx, and Hughes offer managed services for a plethora of enterprise solutions, such as network, security, unified communications, and cloud services. They generally have partnerships with several network and solution vendors and are in a position to combine SD-WAN with managed network services and offer optional value-added services as the end customers' needs grow.
- **System Integrators (SIs)** have long been key participants in the managed network services space; large enterprise customers prefer working with SIs that can bring IT and network solutions together and reduce the burden of dealing with multiple network and solution vendors. SIs are quickly expanding their portfolios to include managed SD-WAN services in response to customer demand.
- **Value-added Resellers (VARs)** have emerged as a key channel through which some enterprises prefer to buy managed SD-WAN. VARs can act as a single channel for procuring solutions that are from different vendors but that appear as one cohesive solution. It helps customers future-proof technology investments because VARs are in a position to migrate their customers to evolving technologies when needed.

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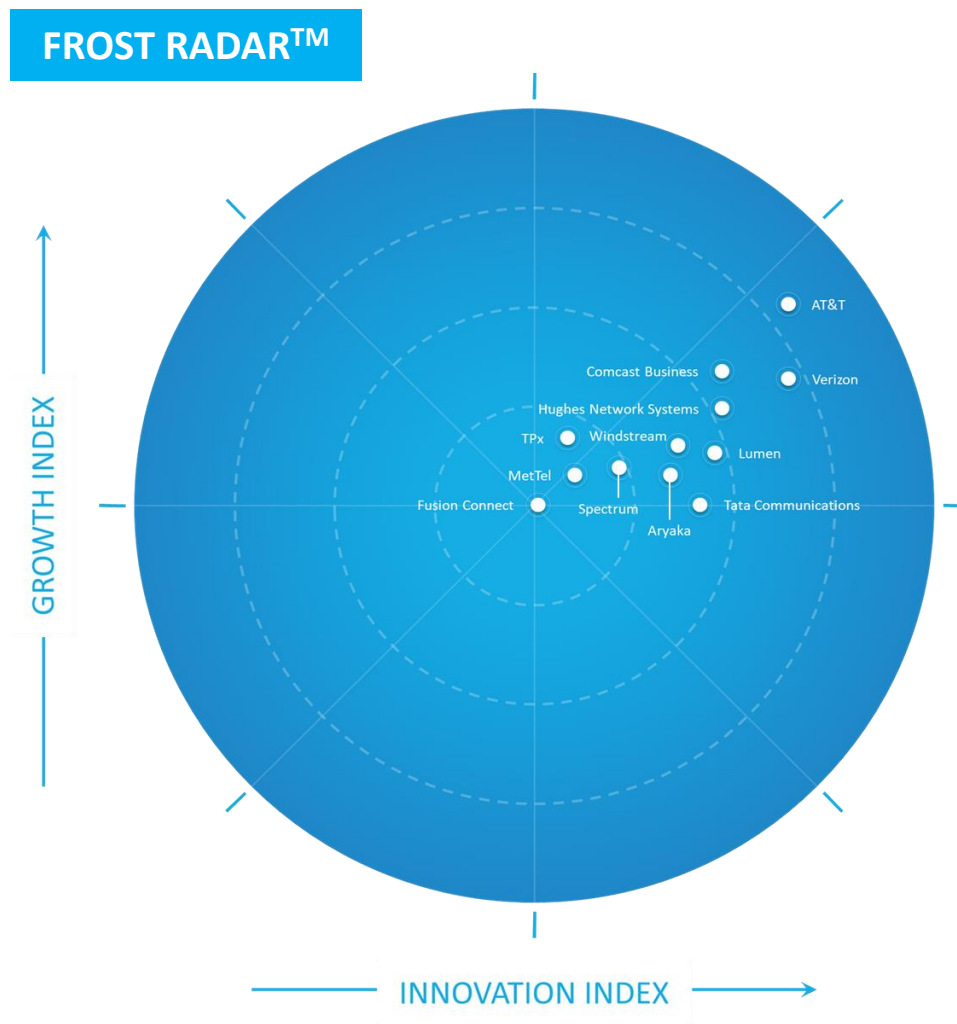
Source: Frost & Sullivan



Frost Radar™

**Managed SD-WAN
Services in North
America**

Frost Radar™: Managed SD-WAN Services in North America



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Source: Frost & Sullivan

Frost Radar™: Competitive Environment

- The North American managed SD-WAN market is competitive with a mix of NSPs, MSPs, SIs, and VARs. Table stakes for each vendor is to have simple pricing models for small, medium, and large sites, competitive access (underlay) pricing, competitive SLAs, and a robust client portal for customers to view and manage the service.
- Of the hundreds of service providers in the space, Frost & Sullivan independently plotted the top 12 in this Frost Radar™ analysis. This report focuses on NSPs and MSPs that have full-fledged managed SD-WAN offerings.
- Service providers were primarily analyzed based on their managed SD-WAN portfolios, which include (but are not limited to) choice of SD-WAN vendor solutions; the underlay network choices; managed service support before, during, and after deployment; self-service portals and network management capabilities; and the ability to deliver value-added services (security, routing, VoIP, UCaaS).
- Frost & Sullivan has included companies that are either long-time NSPs or are considered national MSPs. Smaller MSPs that are focused on specific regions of North America and generally function as an agent/reseller to the larger MSPs have been excluded.
- One non-US-based player, Tata Communications, is included because it has a competitive portfolio and is leveraging its strength in the Asia-Pacific SD-WAN market to make inroads in North America. Frost & Sullivan will consider expanding the list of companies on a future managed SD-WAN Frost Radar™ as more from outside North America try to gain a foothold in the large regional market.

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Frost Radar™: Competitive Environment (continued)

- The Frost Radar™ measures growth rates in addition to absolute revenues and combines them with other factors ([described here](#)) to measure companies' performance along the Growth Axis. AT&T and Verizon have the highest revenues in absolute terms as well as solid growth rates and the some of the highest connection counts of all companies covered. While some MSPs have high individual-year growth rates, growth performance also considers multiyear growth patterns.
- Formidable competitors AT&T, Verizon, and Comcast Business have the largest share of business network services, which extends to the share of managed SD-WAN.
- Hughes Network Systems, Windstream, Aryaka, TPx, and MetTel have emerged as leading companies with high growth rates and a focus on driving industry innovation through management of the local area network, SD-WAN overlay, network underlay, and add-on security. Windstream emerged from bankruptcy in 2020 and is building momentum with a portfolio of managed and value-added services.
- AT&T, Verizon, Comcast Business, Hughes, and Lumen lead the pack on the Innovation Index. While not currently a leader, Aryaka is noteworthy for its focus on delivering global SD-WAN services at scale like the bigger players. Aryaka is positioning itself as a technology services platform provider as well as an MSP.
- In recent years, Spectrum Enterprise has increased its investment in SD-WAN; however, it lags the SD-WAN market leaders in revenues and growth.

Frost Radar™: Competitive Environment (continued)

- A smaller network service provider, Fusion Connect, offers promise in this market for its integration of SD-WAN, security, and UCaaS offerings.
- In terms of customer satisfaction and focus on value for clients, Comcast Business, Windstream, and Hughes stand out. Aryaka additionally has shown high retention rates and is worth mentioning in the space as well. The added focus on the customer portals positions these providers well in this competitive market. Frost & Sullivan recognizes the time and investment spent to truly integrate performance and SLA management, ordering, scheduling, and billing functionality into easy-to-use portals.
- For MSPs with competitive local exchange carrier (CLEC) roots, SD-WAN is forcing them to focus on the software layer and management of services rather than providing the telecom infrastructure itself. As MSPs migrate out of that business, they partner with NSPs and enter into stronger wholesale agreements with the larger national or global players.

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Source: Frost & Sullivan

Companies to Action

Companies to Be Considered First for Investment, Partnerships, or Benchmarking

INNOVATION

- AT&T SD-WAN is offered in white-labeled hardware (commonly referred to as uCPE), x86, or a VNF. AT&T also offers clients a choice of market-leading SD-WAN vendors such as Cisco, Aruba, VMware, Fortinet, Palo Alto, while in parallel investing to simplify its SD-WAN portfolio and make it more integrated.
- AT&T adapts its offerings to vertical market needs. For example, it offers support for pop-up stores with transportable point-of-sale kits and splits the traffic by application type, e.g., guest Wi-Fi, point of sale, video, and surveillance. This is the type of vertical adjustment-focused strategy needed to win additional business.
- Its SDN-based network-on-demand offering gives customers the ability to procure dynamic bandwidth across its portfolio of AT&T Switched Ethernet, AT&T MPLS VPN, and AT&T Dedicated Internet services, which increases flexibility in WAN provisioning.

GROWTH

- AT&T has the most SD-WAN sites deployed in North America and offers native 5G connectivity as one of the underlays as well as wireless internet in more than 70 countries.
- SD-WAN is offered as fully managed and co-managed. Standardized “try before you buy” offerings provide flexibility to end customers.
- Cloud and multicloud connectivity is already pre-provisioned at AT&T’s 750-plus global on-net cloud locations, as well the Equinix fabric with a tight orchestration called Total Access Orchestration (TAO).
- AT&T offers an integrated service experience across underlay transport, SD-WAN overlay, and security services. It supports both vertically integrated single-stack SASE solutions and best-of-breed multivendor solutions.

FROST PERSPECTIVE

- Frost & Sullivan recognizes AT&T for its product leadership and market position for other providers to follow.
- The company’s focus on hybrid networking solutions allows customers to grow at a pace their WAN infrastructure demands. Customers have a broad range of network service choices, with the most extensive SD-WAN portfolio in the industry as well as four fully integrated SASE offerings with flexible contracting and pricing.
- AT&T still has the largest base of MPLS clients, so proactively transitioning those clients to SD-WAN is recommended. The Frost & Sullivan 2021 SD-WAN survey indicates that only 21% of enterprises prefer their existing network provider for SD-WAN. Therefore, helping clients transform to flexible, dynamic SD-WAN networking will benefit long-term customer retention and retain revenue.

Source: Frost & Sullivan

INNOVATION

- Aryaka has its roots in the WAN optimization space, which provides a nice launchpad into the SD-WAN and managed services market.
- Unique among industry leaders, Aryaka has developed its own tightly integrated code set, which puts the company on a path to become a NaaS provider.
- Since adding VPN and launching a secure web gateway, Aryaka is on a firm foundation to complete a full SASE model by the end of 2023. Cloud access security broker and zero trust today are the last two components the company needs to achieve full SASE.
- Aryaka has an end-to-end vision, and this focus allows it to add functionality to its portal and its overall SDN portfolio.

GROWTH

- Partnerships with CheckPoint and Palo Alto Networks deliver integrated security, enabling growth beyond SD-WAN.
- Partnerships with Deutsch Telecom, Softbank, and Alibaba position the company well to expand internationally.
- The company's managed SD-WAN service is delivered over a purpose-built wavelength and IP network with 40 global PoPs spread across the major six continents. The PoPs are strategically located to ensure that they are less than 30 ms away from 95% of business users and leading cloud provider data centers. Such investment and global thinking position Aryaka well for growth.
- Aryaka reports a noteworthy 95% customer retention rate and clients in more than 100 countries. This is impressive for a company founded in 2009.

FROST PERSPECTIVE

- Frost & Sullivan appreciates Aryaka's orchestration-first approach to SD-WAN. Aryaka expands its code into the platform as it adds SDN SASE functions but also embraces easy integration into its orchestration and performance suite, which is part of the company's intellectual property and uniqueness.
- Frost & Sullivan recommends accelerating the zero trust offering as a critical element to the security portfolio. Remote work and DIA combined with cloud SaaS offerings is pushing clients to replace significant parts of the VPN with zero trust endpoint deployments.

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Source: Frost & Sullivan

Comcast Business/Masergy

INNOVATION

- Comcast Business acquired Masergy in 2021. Its managed SD-WAN portfolio provides clients with a choice of partners including Versa, Fortinet, Cisco Viptela, Cisco Meraki, Aruba (HPE), and Palo Alto, and leading cloud providers including AWS, GCP, Azure, IBM, Oracle, and Alibaba. It is available in fully managed, co-managed, customer managed, and platform-as-a-service packages.
- The Comcast Business platform leverages automation and AI IT operations, with services as digital assistants for network, application, and security. These services monitor different events while making recommendations to enhance application performance, predict bandwidth needs, and optimize network throughput. For instance, during electrical storms Comcast Business can detect device damage and has options that can include a two-hour response time for such events.

GROWTH

- Comcast Business is the second-largest provider of SD-WAN connections in North America by installed and managed customer sites. It has solid success with clients with 250 or more sites that are often replacing MPLS/T1 network technologies.
- Comcast Business has made strategic acquisitions and partnerships in the last two years. Its partnership with Nokia positions it well for 5G private network opportunities.
- Comcast Business's acquisition of Masergy added 1,400 clients and 100 countries to the portfolio, and the Defined Technologies acquisition in October 2021 strengthens its push into the government sector.
- Comcast Business has a soft launch into the Ingram Micro ecosystem, paving the way for a more robust, efficient, and frictionless channel partner program.

FROST PERSPECTIVE

- Comcast Business is focused on winning global enterprise and Fortune 1000 business with strengths in the financial services, healthcare, manufacturing, retail, hospitality, and government verticals.
- While a leader in the small and mid-market segment, the company continues to approach the larger enterprise segments, where its white-glove approach and customer focus should translate well.
- Its integration with Masergy is helpful overall but will bring challenges in the short term as it blends a global company into what was traditionally a domestic provider. These synergies often take one to two years to fully synthesize. Masergy has a solid reputation, offering unmatched SLAs and leadership in customer self-portal technologies, so there should be synergies with this acquisition.

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Source: Frost & Sullivan

Fusion Connect

INNOVATION

- Fusion Connect SD-WAN has three vendor partners (Meraki, VMWare, and Fortinet) with automation to support orchestration for the Fortinet product.
- The company differentiates itself with five service guarantees, covering customer satisfaction, installation, uptime, rates/pricing, and a future-proof technology guarantee that provides upgrades to the next-generation technology at no additional cost. These guarantees supply relevant, personalized, and responsive technology solutions.
- Fusion Connect offers managed SD-WAN services with a management portal, managed security, optimized application performance, UCaaS, and calling services, with network connectivity and a diverse, nationwide IP backbone.

GROWTH

- In 2022 Fusion Connect announced an agreement to transition Intrado's enterprise voice and network clients in Europe to Fusion Connect services. In addition, Intrado's account managers will join the Fusion Connect workforce. This agreement is poised to effectively drive growth and revenues, while expanding the customer base first in the United Kingdom and then western Europe.
- Fusion Connect has determined to focus on its growth dynamics in the US market; it has sold its wholly owned Primus subsidiary in Canada to Distributel.

FROST PERSPECTIVE

- To grow in the competitive US market, Fusion Connect must differentiate itself. Growth needs to be fueled by innovation, e.g., from a customer experience perspective through digitization, pricing models, and servicing/operational elements.
- From a product perspective, Fusion Connect needs to augment the capabilities in its security offering.
- Fusion Connect has been pruning networks and clients from its legacy Broadvox & Birch business. The strategic relationship with Intrado will foster the transition from small to mid-market clients. Frost & Sullivan sees this as a positive step as the company migrates to a more stable client base and cohesive platform.

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Source: Frost & Sullivan

Hughes Network Systems

INNOVATION

- Hughes has slowly moved away from its own SD-WAN solution to strengthening its partnerships with VMware (VeloCloud), Fortinet, and Cisco Meraki, thus anchoring its position as an MSP rather than a technology supplier.
- Hughes has a clear focus on customer experience, reflected in its innovated ever-evolving customer portal and its focus on solid Net Promoter Scores.
- An innovative win for customers and Hughes includes what Hughes calls its Onsite Accelerated Service Installation System (OASIS). This process for network installations supplies paperless service orders, a mobile provisioning application that Hughes has been improving for 10 years, and a workflow engine enabling technician management and the ability for clients to view arrival times and reschedule if needed. It offers zero touch provisioning across multiple vendors, including Fortinet, Meraki, Aruba, and Cradlepoint.

GROWTH

- Hughes has thousands of operational SD-WAN sites across North America (and internationally), making the company one of the largest managed SD-WAN providers in the North American market. The company has successfully upgraded existing managed network services customers to SD-WAN functionality, resulting in a large installed base.
- Hughes has more than 100 managed SD-WAN customers, with an average network size of over 350 sites spread across distributed enterprises spanning retail, healthcare, banking, petroleum, restaurant, and government verticals.
- The company sells primarily via direct sales and is successful in selling to verticals in a franchise model; for example, restaurants or retail petroleum, which could represent dozens to hundreds of locations per franchisee.

FROST PERSPECTIVE

- Hughes continues to support its own SD-WAN platform, called HR. Frost & Sullivan supports Hughes's strategy of doubling down on partner solutions for the full orchestration, management, and deployment, showing a clear focus on providing managed services rather than a platform.
- The Fortinet partnership strengthens Hughes's competitive positioning, attracting companies looking for security and SD-WAN in a single solution.
- Frost & Sullivan applauds Hughes's focus on providing integrated orchestration for visibility and efficiency across multiple vendors (where other providers simply provide access to the vendor's portal).
- Hughes stands out with its scalable automation and orchestration capabilities that accelerate onboarding of multivendor solutions.

Source: Frost & Sullivan

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Lumen

INNOVATION

- Lumen's managed SD-WAN portfolio includes solutions from VMWare, Cisco Viptela, Cisco Meraki, and Versa Networks while adding Fortinet recently.
- Lumen uses Advantech and Lanner x86 devices for its white box VNF solution with Versa.
- Lumen supplies an SD-WAN design engineer for seamless creation, implementation, and onboarding of SD-WAN service in enterprise WAN.
- The company has focused on incorporating high-availability infrastructure and a service operations team (for ticketing, event correlation, and CPE or circuit outage) to ensure superior service.

GROWTH

- Lumen's SD-WAN reach extends to more than 100 countries.
- Lumen offers a broad portfolio of hybrid SD-WAN solutions that encompass cloud, managed network services, cloud networking, and advanced security services.
- The co-management option has been a solid driver for gaining more clients. As an example, for its Meraki solution Lumen offers a Management Only Package that includes management of customer-owned Meraki devices.
- Lumen recently launched its SASE offerings with Fortinet that combine network and security features.

FROST PERSPECTIVE

- Lumen offers prepackaged bundles with Versa and Cisco Meraki SD-WAN partner solutions, which Frost & Sullivan believes simplifies the offer for businesses evaluating SD-WAN. The company has ramped up its Cisco Meraki bundles to reach customers in the small and midsize business base.
- Lumen has enhanced its virtual network services portfolio to drive adoption of the uCPE approach. The company has added a range of VNFs (security, routing, and session border controllers) to its adaptive virtual services offering, which positions it strongly to tap into demand arising from the enterprise WAN transformation trends.
- Lumen recently divested out of Europe and South America, focusing more intently on its home market, which Frost & Sullivan sees as a positive for the long term.

Source: Frost & Sullivan

INNOVATION

- MetTel started in 1996 as a CLEC and has transitioned to a global cloud network with 19 data centers and PoPs worldwide. Coupled with its access aggregation business with 100-plus WAN carriers, MetTel provides end-to-end, fully managed network services.
- MetTel offers flexible SASE deployments with AI and robotic process automation and custom network design by operating its own global network with VMware (VeloCloud) SD-WAN and Fortinet security deployed at each of its data centers.
- MetTel partners with major cloud providers including AWS, GCP, and Azure, extending SD-WAN networks into the public cloud.
- MetTel has also addressed legacy line retirement with POTS Transformation, a fully managed network solution that connects to the internet via broadband, Wi-Fi, or LTE using endpoint connections provided by DataRemote.

GROWTH

- MetTel has won several government contracts after winning a 15-year General Service Administration Enterprise Infrastructure Solutions contract in 2017.
- MetTel is seeing growth in managed LAN/WAN and security.
- Its client base has a big push to replace MPLS with SD-WAN protected DIA and to consolidate voice networks into one fully managed network as a trend for the next several years.

FROST PERSPECTIVE

- MetTel has received multiple awards for innovation, managed services, and customer service over the years and strives to be leader in managed network services.
- Like other MSPs that employ best-in-class products, MetTel integrates point provisioning and management solutions from various leading technology providers. Frost & Sullivan believes MetTel should focus on masking the multiple point solution portals to create one integrated and seamless customer journey from onboarding to installation to gaining access to the vendors' network performance.
- MetTel will have challenges attracting clients that prefer a tightly aligned underlay and overlay network.

Source: Frost & Sullivan

Spectrum Enterprise

INNOVATION

- Spectrum Enterprise has been offering managed SD-WAN for several years. Its primary offers are based on the Cisco/Meraki and Fortinet platforms.
- When building its Meraki-based service, Spectrum Enterprise took the approach of offering an entire ecosystem of fully managed LAN/WAN/cloud/security services to complement its SD-WANs. It calls this Managed Network Edge (MNE).
- Spectrum Enterprise expanded its Fortinet security service earlier in 2022 to include another ecosystem of services like MNE but designed to better meet the requirements of larger enterprises. This service is called Enterprise Network Edge (ENE).
- MNE and ENE are fully managed services that include design, activation, professional installation, and support, all backed by industry-leading SLAs. Both provide clients co-management capabilities via intuitive portals.

GROWTH

- Spectrum works directly with federal government intelligence, defense, and civilian agencies in improving modernization and transformational missions through partnerships with systems integrators and wholesale clients while remaining active on the Enterprise Infrastructure Solutions (EIS) contract.
- It is part of Charter Communications, which launched a nationwide 4G LTE wireless internet service in 2020 to be used as a temporary or failover solution. This shows Charter's willingness to partner with mobile network operators to provide alternative and redundant connectivity for its managed SD-WAN portfolio.
- In 2020, Charter won \$1.2 billion from the Rural Digital Opportunity Fund, an FCC initiative that provides funding for broadband in rural areas, thus adding to its own network underlay for its SD-WAN offerings.

FROST PERSPECTIVE

- Spectrum has a good opportunity to make a mark in the managed SD-WAN space because of its competitive network and additional transport partnerships. The company has positioned itself well with its maturing Fortinet and Meraki offerings, but it will still have to differentiate itself in the crowded US market.
- Like other cable companies, Charter does not have a MPLS network, so it is not able to draw upon that base of clients. Therefore, Spectrum will be challenged to win new business versus transforming an existing client base.
- With a 41-state footprint, however, Spectrum has a solid pool of broadband, Ethernet, and internet subscribers to pull into a managed SD-WAN solution.

Source: Frost & Sullivan

Tata Communications

INNOVATION

- Tata Communications goes to market with five categories of SD-WAN offerings: network integrated (CPE plus network underlay); managed SD-WAN (overlay only); SD-WAN NaaS (clients choose which function/features they need); AppWAN (a secure way to add apps in a virtual WAN environment); and Secure Private Access Edge Device (SPAED), a service designed for small locations.
- Tata's SD-WAN vendor partners are Cisco, Versa, and Aruba Edge Connect/Silver Peak.
- Through its NetFoundry unit, Tata is incorporating zero trust into SD-WAN offerings while creating a path to SASE offerings. NetFoundry is used for the AppWAN solution set as well.
- Tata has completely rebuilt its customer experience platform. Called TCx, it is a modular MEF 3.0-certified platform with benefits across the entire portfolio of network and security offers.

GROWTH

- Headquartered in Mumbai and Singapore, Tata has 8,500 employees across 38 countries and is growing its North American presence. Tata reports that 20% of its clients have connections in North America.
- The SPAED solution is positioned as "SD-WAN lite." It targets retailers that operate small branches, pop-up stores, ATM/kiosks, and secure remote workers. This offering has been out for a year and should complement an SD-WAN deployment with low cost and added security protection.
- Tata has both network and security vendor-integrated offerings, such as Cisco with Zscaler or Cisco with Palo Alto. It also goes to market with a single-vendor offering with Versa and Fortinet, which works well for clients that want consistent policies across SD-WAN and security, with a simple architecture, and do not require the extra features of a Zscaler or Palo Alto.

FROST PERSPECTIVE

- Tata has a brand challenge in North America because it is known as a global provider with Asia-Pacific roots.
- Tata has an innovative and well-orchestrated offering with features and services most enterprises need in an SD-WAN provider.
- Tata Communications is a global player with an established MPLS client base. If the company can translate its Asia-Pacific success into the United States, it will be a formidable competitor to the established incumbents.

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Source: Frost & Sullivan

TPx Communications

INNOVATION

- TPx's managed SD-WAN portfolio has continued to grow, while still primarily focused on two partners: VMware and Aruba Edge Connect.
- TPx offers managed connectivity, managed IT services, and collaboration services to small and midsize businesses (SMBs).
- Started as a California CLEC, TelePacific Communications, TPx continues to transform into a nationwide MSP.
- TPx has a broad network services portfolio to add to its SD-WAN offering, which includes UCaaS, VoIP, and managed security.

GROWTH

- TPx is focused on catering to the SMB market. The company brings together an entire range of business communication and collaboration services in managed solutions.
- As a nationwide provider, TPx has an advantage over local and regional players in attracting mid-market clients.
- In 2023, TPx plans on marketing its SASE capabilities within its customer Firewall and End Point Managed Security offerings. This should improve the attach rate in the client base.
- TPx is working with ServiceNow to combine its various customer portals. Its goal is to offer a single pane of glass instead of a mix of solution-based portals. Customer portals are clear table stakes for any MSP.

FROST PERSPECTIVE

- TPx combines managed SD-WAN services with its broad range of managed services capabilities including managed wireline and wireless network services, managed UC services, and managed IT services.
- As an MSP for network and communication services, TPx simplifies the vendor experience by bringing together multiple products for distributed enterprises. A largely similar portfolio is available to small and midsize providers.
- TPx attracts a wide range of customer types, including MSPs and value-added resellers. TPx boasts an impressive channel partner program that further enables it to cater to the SMB segment. Frost & Sullivan believes this will be a driver for its continued growth.

Source: Frost & Sullivan

Verizon Business

INNOVATION

- Verizon has partnered with Versa, Cisco (vEdge), Aruba Edge Connect, and Fortinet to create managed SD-WAN services that are available directly on purpose-built hardware, virtualized and hosted on an on-premises uCPE, or hosted on the Verizon Cloud Platform or on third-party public cloud platforms such as AWS.
- All vendor SD-WAN solutions are fully integrated and managed via Verizon's orchestration and lifecycle management platform. Users have visibility into a broad range of business services (not just SD-WAN) through the Verizon Enterprise Customer portal, which includes the underlay, UCaaS, VoIP, and security. This positions Verizon well as a NaaS provider.
- Verizon SD-WAN offers centralized control, application awareness, and transport diversity with load-share across WAN options, in addition to network segmentation.

GROWTH

- Verizon proactively markets its managed SD-WAN offering to its base of MPLS customers, which has resulted in better customer stickiness. The company sees a significant number of its SD-WAN deployments use a combination of MPLS and internet links, with wireless in backup mode.
- Verizon has invested a lot of time, money, and energy on 5G technologies, and specifically the Fixed Wireless Access will help drive growth in the SD-WAN space as wireless is now a de facto part of SD-WAN implementations.
- The company's widespread network reach allows it to combine a plethora of network services (MPLS, Ethernet, DIA, broadband, wireless) with its SD-WAN. The combination of SD-LAN, SD-WAN, network services, and virtual network services positions Verizon as a leading managed network services provider in the market.

FROST PERSPECTIVE

- Verizon has invested billions of dollars in the 5G space and will focus on Fixed Wireless Access to complement the transportation strategy in the SD-WAN underlay choice. 5G wireless with its ease of deployment and higher speed is allowing wireless to move from backup to primary in SD-WAN deployments; for this reason, Frost & Sullivan is positive Verizon will see significant growth.
- The company's orchestration platform is vendor-agnostic and drastically simplifies policy management, paving the way for its NaaS, SASE, and SSE portfolio.
- Verizon with an extensive portfolio can easily upsell SD-WAN clients to UCaaS, mobile, video, and security offerings.
- With a large base of MPLS clients, Verizon's ability to help those clients migrate sooner to an SD-WAN overlay will position it well in the long run while managing the MPLS decline.

Source: Frost & Sullivan

Windstream Enterprise

INNOVATION

- Windstream's managed SD-WAN partners include VMware, Fortinet, and Cato Networks on its own IP backbone.
- The company believes in supplying high-touch design solutions and automation. It has partnered with Ciena Blue Planet for automation and orchestration across its vendors. The partnership provides a tight integration and a single pane of glass for its SD-WAN and other network services.
- Windstream can supply highly customized data insights through its Insight Engine, which offers a single view of UCaaS, SD-WAN, and security services.
- It is building an API marketplace for customers focused on deep vertical application integrations. It is the first North American MSP to partner with Cato Networks to provide a truly integrated SASE offering. As its only innovation partner, Windstream is helping to shape direction and development.

GROWTH

- Windstream reports that SD-WAN is its fastest-growing segment, and its solution has been implemented with 4,000 clients and more than 25,000 sites.
- Windstream's technical services management group is responsible for ensuring that customers are satisfied with the implementation. Each project manager is given only a handful of customers so that each is treated exclusively. This effort translated into repeat business from 60% of its customers.
- Windstream offers customers the ability to walk off the deal in the first year without any penalty, a fixed price for the life of the contract, and a 100% uptime guarantee.

FROST PERSPECTIVE

- After emerging from bankruptcy in 2020, Windstream looks promising. The laser focus on the SD-WAN platform and its diligence concerning the customer experience and retention is well noted.
- Windstream has more than 300,000 users on its hosted UC platform, OfficeSuite. SD-WAN can help achieve superior QoS and optimization on any underlay for VoIP and UCaaS.
- Frost & Sullivan recognizes that Windstream has significant opportunities to upsell and cross sell SD-WAN to its UCaaS user base.
- To provide more choices and attract new clients, Windstream needs to add more vendor options to the managed SD-WAN portfolio.

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Source: Frost & Sullivan



Strategic Insights

Strategic Insights

1

NSPs are finally delivering on the promise of being platform-as-a-service providers, and behavior analytics will be the next frontier for MSP and NSPs. Now that providers can capture location, frequencies, device types, and numerous other variables from SDN, look for them to expand deeper into customer networks to derive insights from user behavior and traffic flow, which can be increasingly useful in industries such as retail.

2

SD-WAN drives professional services growth. The complexity mixed with reduced cost of transport allows MSPs and NSPs to capture more services growth. Professional services range from field services and device installation to full turn-up and optimization, with the installation then handed over to the client for ongoing management. Co-management creates cooperative partnerships with a client and more application visibility; this creates opportunity in the application performance space via professional services engagements.

3

As network and security converge, enterprises will move away from best-of-breed to single-vendor solutions in which architecture configurations and policy deployment create simplicity versus the complexity of managing and integrating multiple vendors. Both NSPs and MSPs will look for boutique security firms to bolster their security practices, either via partnerships or acquisitions.

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**Next Steps:
Leveraging the
Frost Radar™ to
Empower Key
Stakeholders**

Significance of Being on the Frost Radar™

Companies plotted on the Frost Radar™ are the leaders in the industry for growth, innovation, or both. They are instrumental in advancing the industry into the future.

GROWTH POTENTIAL

Your organization has significant future growth potential, which makes it a Company to Action.

BEST PRACTICES

Your organization is well positioned to shape Growth Pipeline™ best practices in your industry.

COMPETITIVE INTENSITY

Your organization is one of the key drivers of competitive intensity in the growth environment.

CUSTOMER VALUE

Your organization has demonstrated the ability to significantly enhance its customer value proposition.

PARTNER POTENTIAL

Your organization is top of mind for customers, investors, value chain partners, and future talent as a significant value provider.

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Source: Frost & Sullivan

Frost Radar™ Empowers the CEO's Growth Team

STRATEGIC IMPERATIVE

- Growth is increasingly difficult to achieve.
- Competitive intensity is high.
- More collaboration, teamwork, and focus are needed.
- The growth environment is complex.

LEVERAGING THE FROST RADAR™

- The Growth Team has the tools needed to foster a collaborative environment among the entire management team to drive best practices.
- The Growth Team has a measurement platform to assess future growth potential.
- The Growth Team has the ability to support the CEO with a powerful Growth Pipeline™.

NEXT STEPS

- **Growth Pipeline Audit™**
- **Growth Pipeline as a Service™**
- **Growth Pipeline™ Dialogue with Team Frost**

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Source: Frost & Sullivan

Frost Radar™ Empowers Investors

STRATEGIC IMPERATIVE

- Deal flow is low and competition is high.
- Due diligence is hampered by industry complexity.
- Portfolio management is not effective.

LEVERAGING THE FROST RADAR™

- Investors can focus on future growth potential by creating a powerful pipeline of Companies to Action for high-potential investments.
- Investors can perform due diligence that improves accuracy and accelerates the deal process.
- Investors can realize the maximum internal rate of return and ensure long-term success for shareholders.
- Investors can continually benchmark performance with best practices for optimal portfolio management.

NEXT STEPS

- **Growth Pipeline™ Dialogue**
- **Opportunity Universe Workshop**
- **Growth Pipeline Audit™ as Mandated Due Diligence**

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Source: Frost & Sullivan

Frost Radar™ Empowers Customers

STRATEGIC IMPERATIVE

- Solutions are increasingly complex and have long-term implications.
- Vendor solutions can be confusing.
- Vendor volatility adds to the uncertainty.

LEVERAGING THE FROST RADAR™

- Customers have an analytical framework to benchmark potential vendors and identify partners that will provide powerful, long-term solutions.
- Customers can evaluate the most innovative solutions and understand how different solutions would meet their needs.
- Customers gain a long-term perspective on vendor partnerships.

NEXT STEPS

- **Growth Pipeline™ Dialogue**
- **Growth Pipeline™ Diagnostic**
- **Frost Radar™ Benchmarking System**

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Source: Frost & Sullivan

Frost Radar™ Empowers the Board of Directors

STRATEGIC IMPERATIVE

- Growth is increasingly difficult; CEOs require guidance.
- The Growth Environment requires complex navigational skills.
- The customer value chain is changing.

LEVERAGING THE FROST RADAR™

- The Board of Directors has a unique measurement system to ensure oversight of the company's long-term success.
- The Board of Directors has a discussion platform that centers on the driving issues, benchmarks, and best practices that will protect shareholder investment.
- The Board of Directors can ensure skillful mentoring, support, and governance of the CEO to maximize future growth potential.

NEXT STEPS

- **Growth Pipeline Audit™**
- **Growth Pipeline as a Service™**

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Source: Frost & Sullivan

Frost Radar™ Analytics

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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.

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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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