FROST & SULLIVAN

BEST PRACTICES

AWARDS

LUMEN

2020 LATIN AMERICAN ENTERPRISE SERVICES COMPANY OF THE YEAR AWARD

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Background and Company Performance

Industry Challenges

In Latin America, services for the large enterprise and government scales differ significantly by product and region. A small number of global and multi-Latina telecoms carriers deliver a variety of services with operations centers in multiple countries. Conversely, there has been a proliferation of small, niche, or product-specific firms offering specialty services to the wider market. Concurrently, some system integrators and hardware vendors with presence in the region have begun to expand out of their core competencies to network management, security, and/or cloud management. In this landscape, customers are collecting a patchwork of services from a growing number of providers and increasing the complexity and difficulty of managing and operating across local and global connectivity, network architecture, and security. Thus, information technology (IT) departments in the region are looking for avenues to simplify deployments.

Frost & Sullivan surveys reveal that IT decision-makers in the region prioritize digital transformation strategies to help the organization improve customer experiences and increase operational efficiencies. Underlining a long-developing trend acutely felt in the region toward modernizing interactions and interfaces to become more customer-centric, surveys report that most significant driver of IT investments (in the short term) will be efforts to improve customer experience. At the same time, Frost & Sullivan research finds that decision makers in Latin America report main challenges for digital transformation rest in system integration/managing multi-vendor solutions, ensuring network stability/reliability, and security concerns. Therefore, enterprises are looking for partners and vendors able to tackle a number of multifaceted and interrelated digital transformation plans and modern service areas. The interconnected nature of such enterprise services obliges vendors to articulate both an overall framework and localized vision that accounts for the complex variables in the business models, processes, and systems.[1]

Security services are a cost of doing business. Yet, enterprises in the region face a scarcity of expertise and demonstrate price sensitivity. While some small cyber-security firms dedicate themselves to a single function, many enterprises only invest after an attack and even then remain in a reactive security posture that does little to mitigate future attacks—a troubling condition. Moreover, digital transformation and remote work open more vulnerability in an organization. Organizations must take threats seriously and develop holistic security strategies to safeguard essential data and operations. At the enterprise-grade, customers need comprehensive solutions to cover the footprints of monitoring networks, mitigating attacks, and keeping pace with constantly evolving advanced persistent threats.

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[1] *Top End User Priorities in Digital Transformation, Global, 2019: Gain a Competitive Advantage Using Customer Insights,* (Frost & Sullivan, September 2019).

Cloud transitions are attractive to lower the costs of hardware and minimize the need to update obsolete appliances, and the organization gains efficiency, remote access, and connected operations. However, purely in-house network management, security, and cloud management have become nearly impossible for most enterprises and large organizations to undertake. This challenge is due to the high threshold of administration and maintenance and a local scarcity of expertise. Enterprises in the region have moved beyond the initial question of cloud adoption. Rather, they are using a wide variety of cloud applications and services, using or accessing multiple clouds from multiple providers—making management increasingly complex. Thus, workloads may be accessing information from several private and public cloud environments. Enterprises will need support from managed service and professional services vendors to run complex multitenant cloud migrations and deployments. To ensure visibility and drive efficiency, IT departments need a toolset that allows them a unified view to migrate and manage hybrid and multitenant environments.

Amid the COVID-19 crisis, Internet usage increased drastically across the Internet, networks, and cloud. Network and service providers have witnessed spiking demand as enterprises desired more bandwidth and capability, to enable work from home capabilities and cope with more traffic. The stresses placed on enterprises, networks, and cloud applications only serve to underline the essential pain points: Static design, legacy hardware, and manual configuration processes appear unable to meet enterprise needs. Decision makers are gravitating toward more comprehensive packages, where the service provider supports dynamic networks, maintains a service level agreement and responsibility, and drives more flexible and proactive digital transformation.

Visionary Innovation & Performance and Customer Impact of Lumen

Recognized in preceding years as a leader in the enterprise services space, Lumen continues to drive innovation and bring impressive new technologies and services to the market that support organizations to achieve digital transformation and push efficiencies. Impressing Frost & Sullivan, Lumen presents a singular offering in Latin America with a collection of services that layer upon one another and add up to a greater whole than just the sum of its parts. Lumen offers enterprises a comprehensive vision as well as the solutions and tools to implement, all under one umbrella.

**Unlocking Additional Value through Adaptive Networking**

The foundation of Lumen's portfolio lies in the owned and operated network and data centers and investments the company made to develop its adaptive networking. With increasing numbers of metro areas directly on the network (including 2019 additions in Mexico City, Guadalajara, and Monterrey), and adding points of presence (in Querétaro and Nuevo Laredo), Lumen is constantly expanding the footprint of the network with transport through multiprotocol label switching (MPLS), broadband/dedicated Internet access (DIA), and broadband aggregation, on a highly reliable, available network.

On top of the robust global fiber network, the adaptive networking technologies are a group of tools that work in concert together to improve performance and enable greater

flexibility and security throughout. Combining hybrid networking functions, software-defined wide area network (SD-WAN), flexible bandwidth, and network virtualization allows Lumen to deliver a dynamic and intelligent network performance, and inform additional layers of functionality. Adaptive networking unlocks additional value and efficiencies when components work together, with the network connectivity as a basis and additional layers designed to operate together.

Composed of tools that in concert together, the adaptive network supports enterprises to provision data centers, clouds, and endpoints as needed as network traffic patterns change—avoiding overspending on unused capacity or reacting quickly to surges. Adaptive networking unlocks greater value and efficiencies when components work together, with the network connectivity as a basis and additional layers designed to operate together.

**Adaptive Network: Technologies that Boost
Network Performance, Flexibility, and Security**
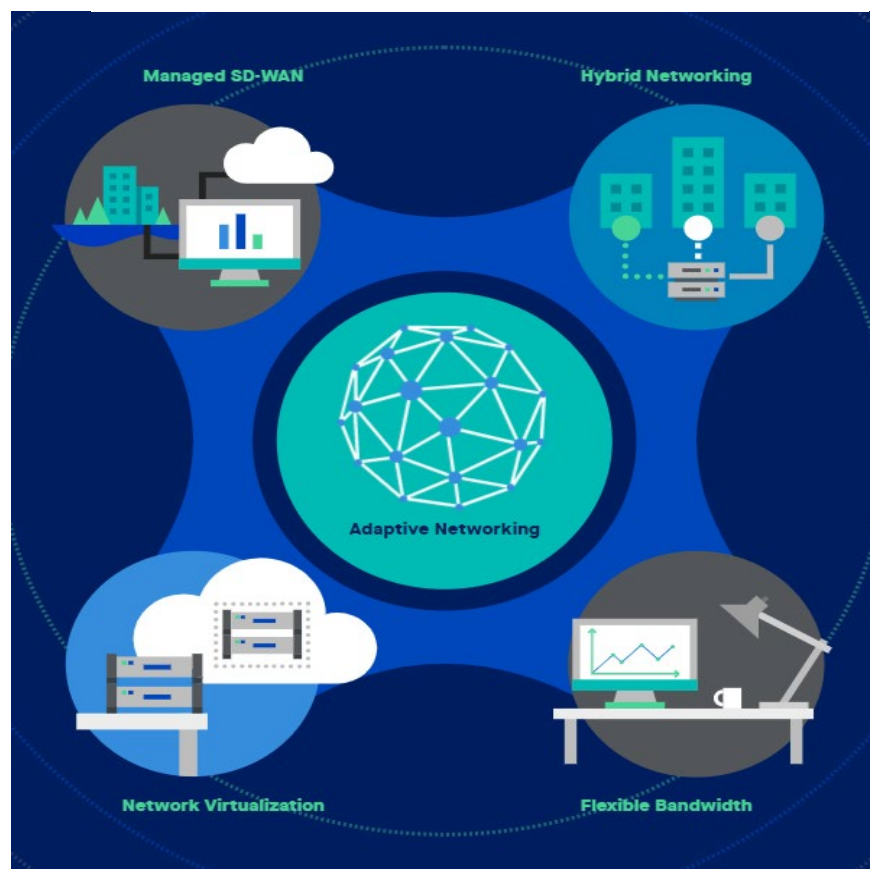
Source: Lumen

The hybrid connectivity solutions, or *hybrid networking*, combines MPLS, broadband/DIA, and wireless connections to minimize mirroring practices and treat services the same and capitalize on the efficiencies of each. Merging public and private Internet protocol (IP) networks, organizations save operating costs (mirroring and security) but also gain better

application performance through splitting the workloads onto different network types and upgrading and configuring services are faster.

Network virtualization enables an organization to transition physical network resources to the cloud, deploy new sites quickly, as well as add functions and scale. With the ability to add virtualized endpoints and services, scale them on demand, and add implement services inside the cloud.

Flexible bandwidth plans allow organizations to scale network bandwidth dynamically, in an on-demand fashion. Using dynamic bandwidth, enterprises can scale traffic between cloud and data centers, or cloud and enterprise endpoints, or directly between endpoints with preset performance profiles.

Now, fully implemented in Latin America, and connected to the entire global network, the *SD-WAN* service centralizes application visibility and control across the organization's infrastructure and optimizes service delivery with automated intelligence. Administrators set policies at a high level (with automation monitoring and prioritizing packet routing) and gain a view into how applications behave and opportunities to optimize traffic. With centralized management, SD-WAN makes it easier for enterprises to deploy branch sites, manage complex hybrid networks, and monitor traffic for security anomalies. Offered as fully-managed or co-managed, Lumen partners with Versa Networks, Cisco Viptela, and Cisco Meraki platforms for deployment on-premises, as a virtual machine in the cloud or data center, or as a virtual network function on Lumen's transport.

Additionally, in 2019, Lumen finalized the acquisition of Steamroot, a developer of a peer-assisted content delivery network (CDN) technology that borrows capacity at the network edge from end-users devices. The acquisition supports Lumen's CDN traffic on the network and helps peak demand or unique events in global Internet services. Moreover, the move comes almost in tandem with Lumen's 2019 launch of Lumen CDN Edge Compute, a collaboration with Section.io to support developers and edge computing. The platform serves as a flexible and open module platform for developers to build and configure custom Web application workloads at the edge. Developers can customize the edge environment, and build applications and workloads that use global edge delivery to push content to end users quickly during mass events.

A Robust Security Portfolio with Unique Visibility

On top of the managed infrastructure, Lumen layers on a portfolio of security that is built into the services, informed by the network visibility, leverages automation, and is customizable. With one of the largest Internet backbones in the world, Lumen leverages the unique visibility over so much traffic to inform its connected security services and take action. The company effectively uses the network as a massive sensor for threat discovery. Tracking that network traffic is Lumen's in-house threat research and development team call Black Lotus Labs. Black Lotus Labs use artificial intelligence and machine learning tools to analyze network traffic—ingesting and analyzing approximately 139 billion NetFlow sessions and collecting 771 million domain name system queries—to understand and identify malicious traffic and how it changes. Threat intelligence generated

by Black Lotus Labs keeps Lumen's security services appraised of the latest trends and network protection best practices.

Lumen's approach centers on leveraging that visibility on the network and automating solutions to trigger security policies or countermeasures directly. In network-based security, Lumen's managed firewalls, delivered via the cloud through service chaining across 32 global Lumen gateways, require zero hardware to deploy and consolidate security policy in one configuration. Further, the SD-WAN overlay equips security teams with embedded abilities to collect logs, generate analytics, deploy threat defenses, and maintain 24/7 monitoring. The secure SD-WAN solution is inherent in the network, allowing improved security posture and better user experience.

Lumen Connected Security Sees More and Stops More
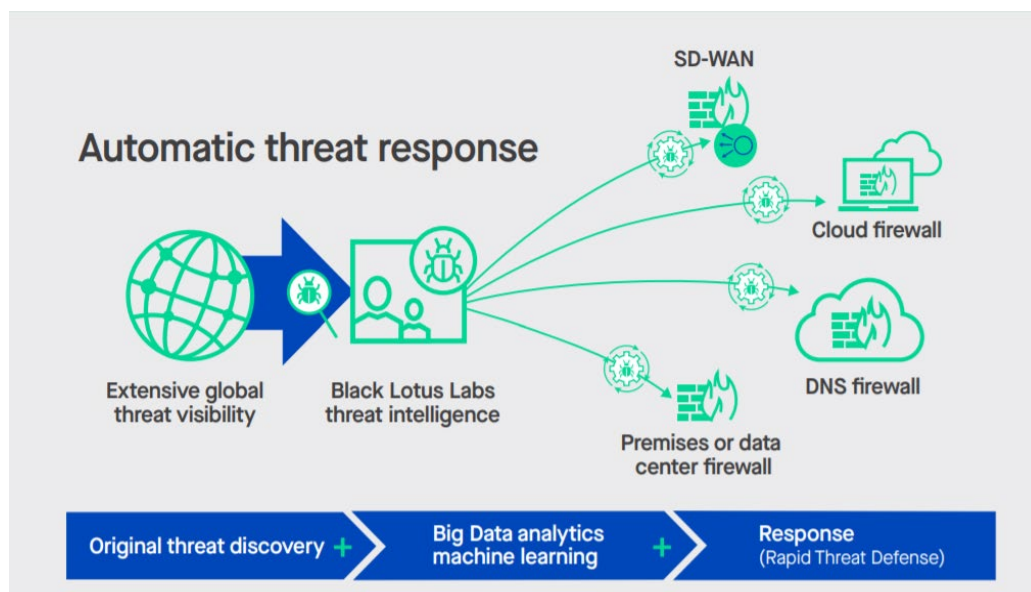
Source: Lumen

Notably, the company will also soon release its distributed denial of service (DDoS) 2.0 mitigation solution. Upgrading a previous iteration, the DDoS 2.0 includes intelligence scaling from always-on local scrubbing centers across the global minimizing latency in a first layer, then escalating through regional and super scrubbing centers to handle attacks when the size exceeds thresholds. The new solution includes a regional presence in the São Paulo security operations center, with new equipment in place to manage Latin American customers.

For customers preferring on-premise solutions, Lumen continues to offer appliance-based security—including on-premises firewall, managed intrusion detection/intrusion prevention, as well as a remote client virtual private network (VPN) that enables an organization to connect many remote users and cope with the increase in traffic with a virtual appliance in parallel to customer equipment

Finally, Lumen's security portfolio includes offerings for professional services and consulting, and customer-tailored solutions. With in-house analysts and third-party partners, the dedicated consulting and advisory teams work with customers to design deployments, prioritize resources, and identify risk and compliance management procedures.

Moreover, the global product offerings Adaptive Network Security and Adaptive Threat Intelligence are available for global customers with in-region operations, and will soon be available to local customers. Adaptive Network Security, built into the adaptive network, enables encrypted remote access to private networks, cloud providers or the public internet, and additionally next-generation firewall, intrusion detection/intrusion protection, and log reporting. Adaptive Threat Intelligence brings security management down to a single pane of glass, where customers set policies that become consistent throughout the environment and gain almost real-time visibility of the threat landscape. Rapid threat defense, capable of both services, then detects and blocks threats automatically.

**Simplifying Cloud Adoption and Management to Maximize Value**

As enterprises move their business processes to hybrid and fully cloud operations, they find that cloud migration, operations management, and modernization are more challenging than imagined. In cloud services, Lumen similarly draws from the foundation of its network and data center experience, and dynamic connections to leading cloud providers, to smooth the transition. Instead of unwieldy assessment and vendor selection process at each step of the way, Lumen offers a single product—the Managed Services Anywhere program to serve as a single provider handling each step from connectivity, to automation, monitoring, scaling, patching, and disaster recovery. Managed Services Anywhere and Cloud Application Manager Platform earn high marks for providing a streamlined alternative, supporting enterprises to get to market faster, accelerate application delivery, and save on management costs.

At the base, the cloud application manager (CAM) platform manages applications and processes in a single pane. The CAM platform uses automation to orchestrate delivery across infrastructure, applications, physical services, as well as public (Azure, Amazon Web Services, others), private (such as the Lumen private cloud based on VMware Cloud Foundation), or the Latin America specific Lumen DEC3 multitenant community cloud. Managing infrastructure and cloud spending and resources through a CAM interface allows for simple and effective multi-cloud and hybrid IT strategies, with standardized configuration and application lifecycle management and consolidated billing, logging, and health monitoring. Deployed either as-a-service or dedicated (on-premise or Lumen private cloud instance), the platform serves as the key enabler for Lumen's wrap-around Managed Services Anywhere.

The Managed Services Anywhere offering uses the CAM platform and grants an enterprise with a mix of management activities fully managed by Lumen, to take care of much of the downstream complexity of transitioning to the cloud, managing, and further modernization. Through a designated technical account manager (and accompanying

365/24/7 engineer availability), the Managed Services Anywhere includes a changeable menu of managed services for installing, deploying, and scaling supported application components and cloud-native services, patching and automating workflows, application modeling and management, optimizing cost, and configuring security and disaster recovery. The service drastically simplifies governance in one subscription for all cloud platforms, and users can flexibly change the mix and scope of activities as desired for self-management.

Managed Services Anywhere Simplifies Governance, Speeds App Delivery, and Lowers Costs
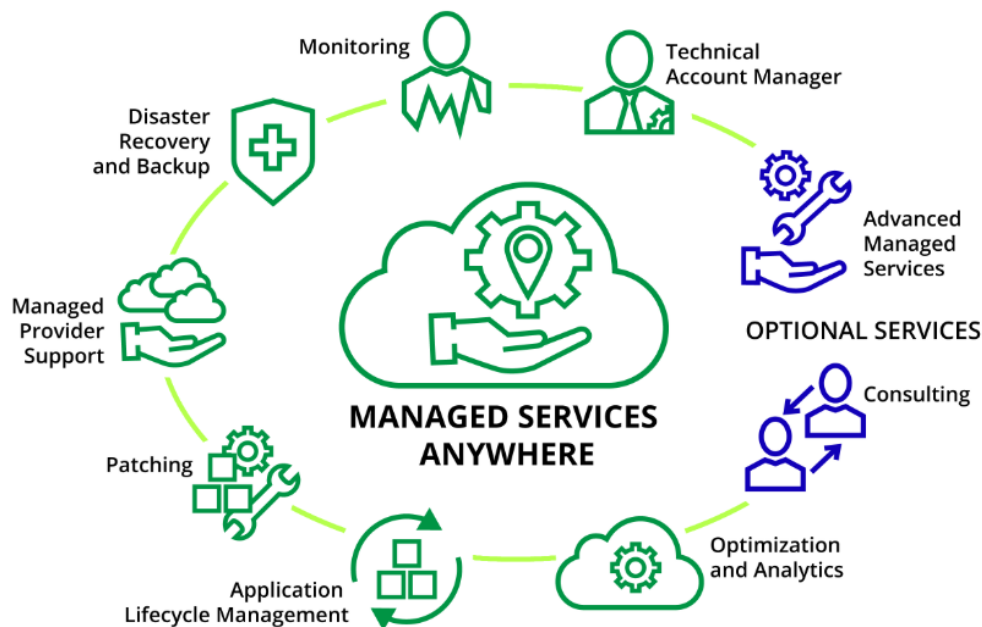
Source: Lumen

In addition, organizations can choose to layer on Advanced Managed Services for specific needs, engaging assistance from a senior-level expert team to council IT teams in how to align infrastructure resources with business imperatives and higher-level governance and efficiency support on how to manage multi-cloud environments. Moreover, fully custom services are available to serve as individualized consultants for custom design projects. Alternatively, organizations can also choose the more self-service platform advisory support, where a technical account manager familiarizes an IT team with the CAM platform and feature set and serves as a bridge to cloud service providers.

A Local Intimacy and Consultative Approach

While the portfolio of services is broad and far-reaching, Lumen impressively retains the importance it places on a deeply consultative approach. Especially in the Latin America region, Lumen's teams demonstrate a profound commitment, at each level, to defining solutions that fit the real needs of customers. Notably, amid the COVID-19 crisis, the company's teams worked tirelessly to ensure customers had the connectivity and capacity

needed to cope with the increases in Internet traffic and remote users. Adding many scalable virtualized solutions for customers on short time tables, Lumen is enabling organizations to convert to remote work without significant interruptions and maintain security, despite the expanded threat landscape.

Global Resources Brought to the Local Level

Relatedly, Lumen's Latin America operations draw upon the resources and expertise of the entire global company. Constantly adding new capacity in the network, and new data center capacity in Brazil, Chile, Colombia, Argentina, and Peru in 2019, Lumen continues to demonstrate the dedication to building its presence in Latin America. With more than 29,000 kilometers of infrastructure in the region, 10,000 kilometers of metropolitan trunk network, 18 data centers, as well as a network operations center and security operations center in São Paulo, the company is deeply invested in the success of the region. Moreover, regional teams enlist the backing of the global company's expertise and resources, in the technical and advanced cloud managers and the Black Lotus Labs group working for a cleaner Internet across the board.

Conclusion

As the cost of complexity of operating a modern enterprise information technology deployment becomes an unwieldy patchwork of connectivity, networking, cybersecurity, and cloud management systems, organizations struggle with achieving their digital transformation goals.

Repeatedly recognized as the leading provider of enterprise services in Latin America, Lumen continues to impress by developing and implementing innovative technologies that drive value and efficiency across an organization. Lumen's enterprise services leverage the network itself as a massive sensor, informing and forming the foundation for layered services that add up to a higher value than the sum of each of its parts. With advanced, flexible, and software-defined solutions, the Adaptive Network equips enterprises with intelligent network connectivity that continuously optimizes performance and efficiency. With visibility across much of the global Internet backbone, Lumen and its threat intelligence Black Lotus Labs prevent and remediate cyberattacks. Lumen's Cloud Application Manager platform and Managed Services Anywhere support organizations to migrate and manage complex multi-cloud deployments with ease and efficiency.

Enabling unprecedented visibility, simplified administration and management, and a solution-driven toolset, Lumen earns Frost & Sullivan's 2020 Latin America Company of the Year Award in enterprise services.

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).

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 & Performance

Criterion 1: Addressing Unmet Needs
Requirement: Implementing a robust process to continuously unearth customers' unmet or under-served 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 revenues, 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 most 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.

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 globe	• Conduct in-depth industry research • Identify emerging sectors • Scan multiple geographies	Pipeline of candidates who potentially meet all best-practice criteria
2	**Perform 360-degree research**	Perform comprehensive, 360-degree research on all candidates in the pipeline	• Interview thought leaders and industry practitioners • Assess candidates' fit with best-practice criteria • Rank all candidates	Matrix positioning of all candidates' performance relative to one another
3	**Invite thought leadership in best practices**	Perform in-depth examination of all candidates	• Confirm best-practice criteria • Examine eligibility of all candidates • Identify any information gaps	Detailed profiles of all ranked candidates
4	**Initiate research director review**	Conduct an unbiased evaluation of all candidate profiles	• Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles	Final prioritization of all eligible candidates and companion best-practice positioning paper
5	**Assemble panel of industry experts**	Present findings to an expert panel of industry thought leaders	• Share findings • Strengthen cases for candidate eligibility • Prioritize candidates	Refined list of prioritized Award candidates
6	**Conduct global industry review**	Build consensus on Award candidates' eligibility	• Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates	Final list of eligible Award candidates, representing success stories worldwide
7	**Perform quality check**	Develop official Award consideration materials	• Perform final performance benchmarking activities • Write nominations • Perform quality review	High-quality, accurate, and creative presentation of nominees' successes
8	**Reconnect with panel of industry experts**	Finalize the selection of the best-practice Award recipient	• Review analysis with panel • Build consensus • Select winner	Decision on which company performs best against all best-practice criteria
9	**Communicate recognition**	Inform Award recipient of Award recognition	• Announce Award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance	Announcement of Award and plan for how recipient can use the Award to enhance the brand
10	**Take strategic action**	Upon licensing, company able to share Award news with stakeholders and customers	• Coordinate media outreach • Design a marketing plan • Assess Award's role in future 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 our 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, leading to 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, enables clients to 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 practice models to drive the generation, evaluation, and implementation of powerful growth strategies. Frost & Sullivan leverages more than 50 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on six continents. To join our Growth Partnership, please visit http://www.frost.com.