

# 2025 Frost & Sullivan Company of the Year Recognition

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The Singapore Quantum Safe Network Service  
Provider Industry  
Excellence in Best Practices

*Driving Impact Across the Customer Value Chain*

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## Best Practices Criteria for World-class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each recognition category before determining the final recognition recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. Singtel excels in many of the criteria in the quantum-safe network service provider space.

RECOGNITION CRITERIA	
<i>Visionary Innovation &amp; Performance</i>	<i>Customer Impact</i>
Addressing Unmet Needs	Price/Performance Value
Visionary Scenarios Through Megatrends	Customer Purchase Experience
Leadership Focus	Customer Ownership Experience
Best Practices Implementation	Customer Service Experience
Financial Performance	Brand Equity

## Preparing for Quantum Cyberthreats

With its powerful, high-speed computation and complex problem-solving capabilities, quantum computing will drive rapid advancements in various sectors (e.g., healthcare and finance) and see commercial applications in five to ten years. However, this transformative potential also introduces substantial risks. For example, quantum computers could easily decrypt widely used encryption systems like Rivest-Shamir-Adleman (RSA), elliptic curve cryptography (ECC), and elliptic curve digital signature algorithm (ECDSA), which are used in financial and healthcare systems.

Driven by the impending risks, Singapore-headquartered Singtel is proactively deploying quantum-resistant infrastructure to combat quantum threats, ensuring its ability to secure communications and safeguard critical data in the quantum era. An early mover, this leading communications technology company is driving quantum-resistant technology integration and building a robust security ecosystem for its customers and the nation.

## Advancing Scalable and Interoperable Quantum-safe Encryption Systems

Current encryption systems rely on public key cryptography, which secures data using complex mathematical problems that are effectively unsolvable by classical computers in a practical timeframe. However, these systems are vulnerable to quantum computers, which have the exceptional computational power and speed needed to solve these problems, rendering current encryption methods obsolete.

To address these limitations, Singtel has deployed advanced quantum-resistant cryptographic solutions across its extensive network, launching a nationwide quantum-safe network (QSN) integrated with quantum key distribution (QKD) and post-quantum cryptography (PQC) technologies.

*“With real-world implementations across a diverse set of industries and use cases, Frost & Sullivan commends Singtel for its leading best-in-class quantum-safe innovations that set the benchmark for digital infrastructure and services providers across the region.”*

**- Kenny Yeo**  
**Director**

Singtel was appointed by the Infocomm Media Development Authority in 2024 to develop Singapore’s first NQSN+ to fortify Singapore’s resilience against quantum threats in the next decade. Its quantum-resilient infrastructure offers robust, future-proof security by leveraging the principles of quantum physics instead of complex computations to distribute encryption keys securely. QKD ensures that any attempt to intercept the keys disturbs the transmission, immediately alerting both parties to eavesdropping and allowing them to discard the compromised keys and

initiate a new secure exchange. With this capability, QKD enables secure key exchange over public channels without reliance on third-party validators like certificate authorities, which are essential in classical public key encryption systems. Meanwhile, PQC algorithms leverage mathematical problems that are computationally hard to solve, making them resistant to both quantum and classical computing threats. PQC-based key transport solutions provide greater deployment flexibilities to customers complex operating environments, thereby helping to augment customer quantum-safe migration strategies.

Singtel collaborates with global quantum-safe technology leaders to ensure a scalable, interoperable, robust, and cost-effective infrastructure, enabling customers to adopt quantum-resilient security easily and efficiently. These strategic partnerships empower cryptographic agility, hybrid deployment support, multi-layered security, and alignment with global standards—all vital for customers in highly regulated industries. Moreover, by conducting rigorous technology testing, these providers help customers minimize the risks of adopting emerging technologies. Singtel’s key partners include ID Quantique, Cisco, Fortinet, and Palo Alto Networks.<sup>1</sup> Establishing a strong partnership ecosystem with these leading tech partners provides customers with greater integration options, augmenting their quantum-safe migration strategies. With ID Quantique’s QKD technology embedded in its infrastructure, Singtel delivers multi-layered security that integrates seamlessly with existing infrastructure across OSI Layers 1 to 3 and MPLS networks. This interoperability allows enterprises to adopt quantum-safe protection without disrupting their current operations.

<sup>1</sup> <https://www.singtel.com/business/articles/the-future-of-quantum-security-isnt-a-product-its-an-ecosystem>

Backed by its leading-edge quantum-safe network, Singtel offers a comprehensive suite of solutions and services that allow customers to focus on their core operations without capital investment or workforce expansion requirements. Its quantum key-as-a-service (QK-aaS) includes full operational support, including monitoring, incident response, and change management, while allowing organizations to retain complete control over their encryption keys. Additionally, Singtel provides fully managed quantum-safe domestic networks that deliver secure bandwidth between office locations and data centers, with Singtel managing QKD, key management, and encryptors. Singtel QSN includes hybrid quantum-safe technologies to support a wide range of deployment scenarios.

Singtel maintains its leadership by continuously innovating its quantum-safe capabilities and enhancing its scalability, cost-efficiency, and implementation effectiveness. A key advancement is the integration of

*“Frost & Sullivan notes Singtel’s strategic focus on easing the adoption of quantum-safe encryption solutions—an equally critical factor in the success of a quantum-safe transition. Its three-phase program’s seamless and structured pathway builds customer trust and drives adoption.”*

**- Rubini Kamal**  
**Best Practices Research Analyst**

hardware security modules into its QSN, which improves security through hardware-backed encryption. Looking ahead, Singtel is prioritizing support for cloud-based deployments, including expanding its key management network to the cloud. Additionally, the company is advancing system efficiency through a one-to-many pairing model, where a central QKD node or key management system can securely serve multiple endpoints or network nodes simultaneously. This approach reduces complexity, infrastructure costs, and setup time,

making the solution more scalable and practical for enterprise and regional deployments—part of the company’s strategic roadmap. By advancing quantum-safe technologies and deploying validated security solutions, Singtel establishes a solid foundation for secure communications in the quantum era, reinforcing its reputation as a trusted partner.

With real-world implementations across a diverse set of industries and use cases, Frost & Sullivan commend Singtel for its leading best-in-class quantum-safe innovations that set the benchmark for digital infrastructure and services providers across the region.

### Building Trust through a Customer-centric Approach

Singtel is building a quantum-safe nation by enabling a seamless technology adoption journey for its customers. To help enterprises transition from classical to quantum-resistant security protocols, the company offers a three-phase pilot program designed to provide a risk-free, end-to-end experience. It begins with exploration workshops to educate and build awareness among stakeholders on the implications of quantum threats, helping them identify practical, industry-specific use cases. The next phase consists of integration testbeds, where organizations can engage in hands-on experimentation through live trials. This enables them to validate interoperability and assess real-world network behavior, fostering confidence in quantum-safe solutions. Finally, in the operational assessment phase, Singtel allows enterprises to get an end-to-end experience of its managed services. Through this structured approach, the company eliminates uncertainty and promotes smooth quantum-safe technologies adoption.

In 2024, Frost & Sullivan observed an increase in commercial engagements and an expanding customer base that spans the public and private sectors, higher education, and research institutions, driving diverse use cases and accelerating adoption across industries. An example of this is Singtel and OCBC leading efforts to establish a robust foundation for secure banking in the future by using Quantum Key Distribution on Singtel's Quantum-Safe Network, supporting Singapore's broader quantum ecosystem.<sup>2</sup> As part of its efforts to get enterprises quantum-ready, Singtel is helping train its partners' workforces to prepare a pool of quantum-proficient employees ready to support operations and drive innovation. These efforts reflect Singtel's commitment to fostering future-ready talent as part of a broader quantum security ecosystem that brings together technology partners, enterprise collaborators, government agencies, and global accreditations and standards bodies.

Frost & Sullivan notes Singtel's strategic focus on easing the adoption of quantum-safe encryption solutions—an equally critical factor in the success of a quantum-safe transition. Its three-phase program's seamless and structured pathway builds customer trust and drives adoption.

## Conclusion

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With the emergence of quantum computing, existing encryption systems face a significant threat to data confidentiality. Singtel is proactively mitigating these threats by deploying advanced quantum-resistant cryptographic solutions across its expansive network in Singapore.

Singtel addresses this evolving challenge with strong leadership and a customer-centric approach that reflects industry best practices. Through strategic collaborations with global leaders in quantum-safe technology, the company delivers scalable, interoperable, robust, and cost-effective infrastructure. This enables enterprises to easily adopt long-term quantum-resilient security with minimal operational overhead. To further support the transition from classical to quantum-resistant protocols, Singtel offers a comprehensive three-phase pilot program that provides a risk-free, end-to-end adoption experience.

With its strong overall performance, Singtel earns Frost & Sullivan's 2025 Singapore Company of the Year Recognition in the quantum-safe network service provider industry.

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<sup>2</sup> <https://www.youtube.com/watch?v=kZxmysCDMw4>

## What You Need to Know about the Company of the Year Recognition

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Frost & Sullivan's Company of the Year Recognition is its top honor and recognizes the market participant that exemplifies visionary innovation, market-leading performance, and unmatched customer care.

### Best Practices Recognition Analysis

For the Company of the Year Recognition, Frost & Sullivan analysts independently evaluated the criteria listed below.

#### Visionary Innovation & Performance

**Addressing Unmet Needs:** Customers' unmet or underserved needs are unearthed and addressed to create growth opportunities across the entire value chain

**Visionary Scenarios Through Megatrends:** Long-range scenarios are incorporated into the innovation strategy by leveraging megatrends and cutting-edge technologies, thereby accelerating the transformational growth journey

**Leadership Focus:** The company focuses on building a leadership position in core markets to create stiff barriers to entry for new competitors and enhance its future growth potential

**Best Practices Implementation:** Best-in-class implementation is characterized by processes, tools, or activities that generate consistent, repeatable, and scalable success

**Financial Performance:** Strong overall business performance is achieved by striking the optimal balance between investing in revenue growth and maximizing operating margin

#### Customer Impact

**Price/Performance Value:** Products or services offer the best ROI and superior value compared to similar market offerings

**Customer Purchase Experience:** Purchase experience with minimal friction and high transparency assures customers that they are buying the optimal solution to address both their needs and constraints

**Customer Ownership Excellence:** Products and solutions evolve continuously in sync with the customers' own growth journeys, engendering pride of ownership and enhanced customer experience

**Customer Service Experience:** Customer service is readily accessible and stress-free, and delivered with high quality, high availability, and fast response time

**Brand Equity:** Customers perceive the brand positively and exhibit high brand loyalty, which is regularly measured and confirmed through a high Net Promoter Score®

## Best Practices Recognition Analytics Methodology

### Inspire the World to Support True Leaders

This long-term process spans 12 months, beginning with the prioritization of the sector. It involves a rigorous approach that includes comprehensive scanning and analytics to identify key best practice trends. A dedicated team of analysts, advisors, coaches, and experts collaborates closely, ensuring thorough review and input. The goal is to maximize the company’s long-term value by leveraging unique perspectives to support each Best Practice Recognition and identify meaningful transformation and impact.

STEP		VALUE IMPACT	
		WHAT	WHY
1	<b>Opportunity Universe</b>	Identify Sectors with the Greatest Impact on the Global Economy	Value to Economic Development
2	<b>Transformational Model</b>	Analyze Strategic Imperatives That Drive Transformation	Understand and Create a Winning Strategy
3	<b>Ecosystem</b>	Map Critical Value Chains	Comprehensive Community that Shapes the Sector
4	<b>Growth Generator</b>	Data Foundation That Provides Decision Support System	Spark Opportunities and Accelerate Decision-making
5	<b>Growth Opportunities</b>	Identify Opportunities Generated by Companies	Drive the Transformation of the Industry
6	<b>Frost Radar</b>	Benchmark Companies on Future Growth Potential	Identify Most Powerful Companies to Action
7	<b>Best Practices</b>	Identify Companies Achieving Best Practices in All Critical Perspectives	Inspire the World
8	<b>Companies to Action</b>	Tell Your Story to the World (BICEP*)	Ecosystem Community Supporting Future Success

\*Board of Directors, Investors, Customers, Employees, Partners

## About Frost & Sullivan

Frost & Sullivan is the Growth Pipeline Company™. We power our clients to a future shaped by growth. Our Growth Pipeline as a Service™ provides the CEO and the CEO's growth team with a continuous and rigorous platform of growth opportunities, ensuring long-term success. To achieve positive outcomes, our team leverages over 60 years of experience, coaching organizations of all types and sizes across 6 continents with our proven best practices. To power your Growth Pipeline future, visit Frost & Sullivan at <http://www.frost.com>.

### The Growth Pipeline Generator™

Frost & Sullivan's proprietary model to systematically create ongoing growth opportunities and strategies for our clients is fueled by the Innovation Generator™.

[Learn more.](#)

#### Key Impacts:

- **Growth Pipeline:** Continuous Flow of Growth Opportunities
- **Growth Strategies:** Proven Best Practices
- **Innovation Culture:** Optimized Customer Experience
- **ROI & Margin:** Implementation Excellence
- **Transformational Growth:** Industry Leadership



### The Innovation Generator™

Our 6 analytical perspectives are crucial in capturing the broadest range of innovative growth opportunities, most of which occur at the points of these perspectives.

#### Analytical Perspectives:

- **Megatrend (MT)**
- **Business Model (BM)**
- **Technology (TE)**
- **Industries (IN)**
- **Customer (CU)**
- **Geographies (GE)**

