FROST & SULLIVAN

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TECHNOLOGY INNOVATION LEADER

*IN THE ASIA-PACIFIC
5G ENTERPRISE
INDUSTRY*

Singtel

Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each award category before determining the final award 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 Asia-Pacific 5G enterprise space.

AWARD CRITERIA

Technology Leverage	Business Impact
Commitment to Innovation	Financial Performance
Commitment to Creativity	Customer Acquisition
Stage Gate Efficiency	Operational Efficiency
Commercialization Success	Growth Potential
Application Diversity	Human Capital

Commitment to Innovation

Singtel is a leading 5G enterprise service provider in Asia-Pacific (APAC) with a regional presence through

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> *Director, ICT Research*

stakeholders (e.g., Optus) and regional associates (e.g., AIS in Thailand, Globe in the Philippines, Telkomsel in Indonesia, and Airtel in India). The company has 53 enterprise offices in 17 countries globally, and more than 76% of its net profit in FY24 came from operations outside Singapore. Global-scale infrastructure that spans 428 points of presence in 362 cities, back Singtel's strength in the region. Singtel is in business to solve enterprise pain points and derive intelligent outcomes based on actionable insights through technology-based solutions.

5G brings new capabilities and monetization opportunities for mobile operators that can also offer better network yield and improved profitability. To tap into these opportunities, solutions need to serve various use cases affordably without a long lead time, especially with many enterprises undergoing rapid digitalization and urgently requiring support. The Singtel Paragon platform uniquely extends the boundaries for 5G to influence even more industries by enabling 5G solutions for use cases that require more effort and customization. Visibility, ability to provide more services and monetization, performance assurance, and risk mitigation are key value propositions of the Singtel Paragon platform. 5G use cases have been well received because they allow enterprises' needs to be met through a single pane of glass,

and with lower risks and reduced overhead. The company benefits from a skilled team with a wealth of experience in developing and implementing new solutions for enterprises. The human element behind technology innovation and its approach is crucial to success. The Singtel Paragon platform is critical in enabling futuristic concepts that would otherwise not be feasible with 4G.

To enhance its technological innovation capability, Singtel has commercialized advanced network slicing capability that can withstand high mobile network congestion with support from its strategic partners, Ericsson and Samsung. The launch of the world's first implementation of application-based network slicing in February 2024 marks a significant milestone and a breakthrough for the telecoms industry. The

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technology will enable the activation of dedicated and customized slices of Singtel's 5G SA network, which can boost application performance and enhance the customer experience to offer a differentiated network experience by selected applications used. New technical features, such as User Equipment Route Selection Policy (URSP) with Application Detection Control (ADC), are used to dynamically allocate network resources and prioritize users or traffic to support applications that require higher data performance (e.g., workplace productivity, enterprise communications, gaming and media streaming, artificial intelligence [AI] and augmented reality/extended reality [AR/XR]). This development could enable applications with significantly boosted performance in the future as application providers seek different approaches to deliver enhanced user experiences within the increasingly immersive experience users are exposed to and the strain these experiences are putting on mobile networks. Singtel has successfully deployed advanced slicing capability with Singapore government agencies for public safety for home and military defense and with Singapore media for special events and remote media coverage.

Commercialization Success

As 5G technology develops, 5G solutions increasingly impact businesses and make a difference. Singtel is leading the way for enterprises to experience the benefits of 5G technology in solutions that drive innovation and productivity improvements. Its technology leadership initiatives also help harness the 5G ecosystem and seed long-tail revenue streams. Singtel's successful commercial deployments in Singapore, such as with Hyundai Motor Group, Micron Technology, National University Health System (NUHS), and Civil Aviation Authority of Singapore (CAAS), showcase the capabilities of 5G technology and act as a proven track record for Singtel to drive clusters of adoption worldwide. To drive the local cluster in Singapore, the company is working with HealthTEC.sg Connect IV Innovative Technology for Eldercare, which will enable networks and innovative applications (e.g., non-invasive vital signs monitoring leveraging AI and sensors) for eldercare. These are technologies utilized in nursing homes and active aging centers. The solution addresses concerns regarding the aging population, a megatrend with a global impact. To drive overseas clusters, the company works with Hitachi Digital, whose applications and consulting services have been integral to the digitalization movement, impacting businesses worldwide for manufacturing-specific scenarios. Integrating Hitachi's advanced AI applications with Singtel Paragon

Platform's 5G ecosystem will significantly enhance 5G solutions for enterprises in the manufacturing industry and enable them to seamlessly transform their operations powered by AI. This development overcomes the complexity associated with incorporating AI and helps drive AI adoption for enterprises in the manufacturing industry, a key economic growth driver for countries.

Application Diversity

Singtel's 5G solutions can be expanded in scope (e.g., offer workforce management and business transformation solutions) and serve other industries (e.g., retail). In the first instance, with new solutions added to the Paragon Marketplace, Singtel can find a wider audience for its platform, and enterprises can leverage these new solutions served through 5G. Enterprises can then achieve additional value through further collaborations between Singtel and its partners to optimize the solutions for 5G and/or develop better capabilities for solutions. For example, Singtel and Hitachi are collaborating on Singtel's Nxera next-generation data centers. These AI data centers will offer cloud co-location services, managed hosting services, GPU-as-a-Service, and GPU Cloud in Japan, one of APAC's largest and fastest-growing data center markets. The collaboration will combine Singtel's data center and connectivity expertise and platforms with Hitachi's capability to enable end-to-end data center integration, including green power solutions, cooling systems, storage infrastructure, and data management, to sustainably enhance data center performance and capabilities. By combining Singtel's expertise in developing and operating sustainable data centers with the Hitachi Group's expertise, ranging from green power solutions to facility and data management, enterprises can utilize data centers intelligently and environment-consciously, thereby promoting sustainability. With a broader set of technologies to innovate, Singtel can enable more use cases, and enterprises can stay ahead of the curve, accelerate digital transformation, and drive business growth.

Customer Acquisition

Equipped with an API library, the Singtel Paragon platform accelerates customer onboarding and go-to-market timelines, enhancing overall operational efficiency. Singtel's solutions lower entry barriers, allowing faster deployment with a low overhead cost by creatively using emerging technologies (e.g., cloud, multi-access edge computing [MEC] and internet of things [IoT]). By overcoming the technological challenges for enterprises, Singtel makes it easier to address approval bottlenecks with confidence. Singtel's proven track record of reducing commercialization risks allows enterprises to focus on leveraging technological advancements to drive much-needed innovation. Singtel regularly works with leading technology companies to make their solutions available on its Paragon Platform Marketplace to support enterprise digitalization. Advanced cybersecurity solutions from Fortinet, a global cybersecurity leader, is the latest addition to the Paragon Platform Marketplace. To counter growing cybersecurity threats and address data protection, the collaboration will leverage Fortinet's leading security technologies, including its FortiGate VM Next Generation Firewall, to offer plug-and-play cybersecurity solutions to Singtel Paragon Platform enterprise users as a new option for secure deployment of 5G and MEC applications. This development is a proactive step toward safeguarding the digital world and sets new standards in cybersecurity, particularly for 5G networks.

Growth Potential

As the company continues to partner with other technology companies, Singtel maintains a strong customer focus, strengthening its brand and reinforcing customer loyalty. Each partnership works to add 5G solutions to help enterprises solve customer pain points.

Singtel's Centre of Digital Excellence (CODE) is a platform to put into practice innovative ideas with partners to enable 5G. The 5G XR solution for industrial training and certification enables remote assistance and multi-party collaboration for industrial machine training and certification. It improves training quality with high fidelity and realistic content secured through 5G and/or MEC solutions for real-time multi-party collaboration, thus reducing the need for expert trainers. The 5G AR HealthTech solution supports nurses with actionable patient insights, automates in-ward nurse operations, monitors patient vital signs, and facilitates remote doctor access at the patient's bedside. The 5G Industrial IoT Automation solution highlights Singtel's Intelligent Edge Aggregator, empowering advanced manufacturing with real-time insights for faster, data-driven decisions—powered by the SAP Business Technology Platform. The 5G Business Critical Communication solution enables Singtel 5G PTX solution for all business-critical operations across verticals that extends beyond voice to facilitate data connectivity to enable live streaming and file sharing to increase situation awareness to better manage incidents. Singtel's Enterprise Mobile Protect (EMP) solution leverages 5G Network Slicing technology to integrate a Next-Generation Firewall (NGFW) into Singtel's 5G network. Powered by artificial intelligence and machine learning, EMP detects and blocks zero-day cyber threats at the network level before they can reach user devices.

Singtel CUBΣ is a unified suite of network solutions and services with the flexibility and agility enterprises need to work smarter, more efficiently, and cost-effectively. Taking on a Network-as-a-Service approach, Singtel CUBΣ makes it easier for enterprises to subscribe and manage the desired services (e.g., cloud-based network solution, software-defined wide area network, and managed network services); scale external partner vendors; and gain insights on network utilization, workload performance, and sustainability metrics through a single sign-on portal. Features like proactive user experience monitoring, incident automation, and AI-driven predictive analytics to respond to incidents faster will be beneficial for enterprises to meet their needs. The model offers on-demand usage-based pricing, which reduces upfront capex costs and leads to greater efficiency and cost savings.

Brand Equity

Singtel has a strong brand image and is recognized for the technological innovation that it brings to the market. Partnering with other strong, well-known global technology brands (e.g., Microsoft, Apple, Intel, SAP) has further enhanced Singtel's brand equity. In Singapore, Singtel's 5G network is a credit to the company's effort to catalyze innovation and support industry digital transformation. Singtel leveraged its lead in 5G Coverage Experience, first to achieve 95% population coverage in 2022 and coming in ahead of peers with an 8.3 points score on experience recorded by Opensignal in November 2023,[1] to embark on capturing untapped digital growth. The result is evident in how the company is leading in advanced digital enablement after a steady and concerted effort to create a tangible and wide-reaching impact on the local

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[1] https://www.opensignal.com/reports/2023/11/singapore/mobile-network-experience

community and environment. Singtel's initiatives focus on healthcare, education, environment, and inclusion. Its community impact programs range from helping seniors acquire digital literacy through the Singtel Digital Silvers program to enabling education through the Singtel Touching Lives Fund for more than 3,000 students with special needs annually for the last 10 years. To date, Singtel's effort has positively impacted over 80 local and regional social impact start-ups with its invested funds of S$5 million.

Conclusion

Singtel is in business to solve enterprise pain points and to derive intelligent outcomes. The combination of Singtel's technological capability is unique and not comparable in the market, thus offering the best value to enterprises. Each additional partnership that Singtel enters strengthens its value proposition. The company's reach is growing day by day. With growing clusters worldwide, Singtel's technology innovation leadership looks set to transform enterprises and countries sustainably. Frost & Sullivan commends Singtel and the impact it is making with 5G technology.

With its strong overall performance, Singtel earns Frost & Sullivan's 2024 Asia-Pacific Technology Innovation Leadership Award in the 5G enterprise industry.

What You Need to Know about the Technology Innovation Leadership Recognition

Frost & Sullivan's Technology Innovation Leadership Award recognizes the company that has introduced the best underlying technology for achieving remarkable product and customer success while driving future business value.

Best Practices Award Analysis

For the Technology Innovation Leadership Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

Technology Leverage

Commitment to Innovation: Continuous emerging technology adoption and creation enables new product development and enhances product performance

Commitment to Creativity: Company leverages technology advancements to push the limits of form and function in the pursuit of white space innovation

Stage Gate Efficiency: Technology adoption enhances the stage gate process for launching new products and solutions

Commercialization Success: Company displays a proven track record of taking new technologies to market with a high success rate

Application Diversity: Company develops and/or integrates technology that serves multiple applications and multiple environments

Business Impact

Financial Performance: Strong overall financial performance is achieved in terms of revenues, revenue growth, operating margin, and other key financial metrics

Customer Acquisition: Customer-facing processes support efficient and consistent new customer acquisition while enhancing customer retention

Operational Efficiency: Company staff performs assigned tasks productively, quickly, and to a high-quality standard

Growth Potential: Growth is fostered by a strong customer focus that strengthens the brand and reinforces customer loyalty

Human Capital: Commitment to quality and to customers characterize the company culture, which in turn enhances employee morale and retention

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 Engine™

Frost & Sullivan's proprietary model to systematically create ongoing growth opportunities and strategies for our clients is fuelled 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:

- Mega Trend (MT)
- Business Model (BM)
- Technology (TE)
- Industries (IN)
- Customer (CU)
- Geographies (GE)