FROST & SULLIVAN

Singtel

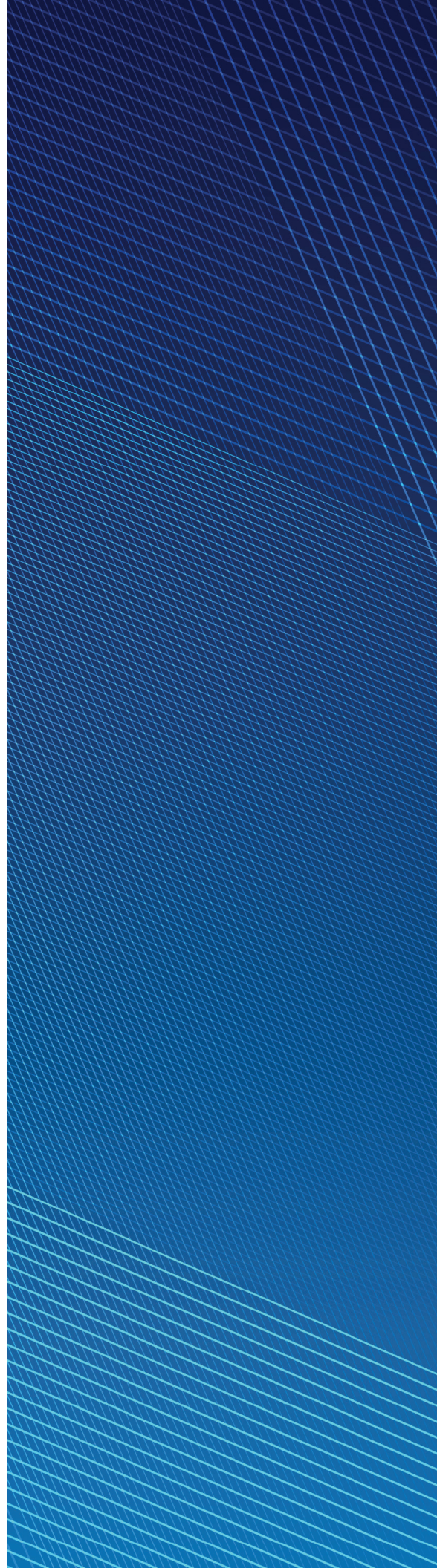# SINGTEL
RECEIVES THE 2023
ENABLING TECHNOLOGY
LEADERSHIP AWARD

Identified as best in class in the Asia-Pacific 5G platform industry

FROST & SULLIVAN

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 (APAC) 5G platform space.

AWARD CRITERIA

Technology Leverage	Customer Impact
Commitment to Innovation	Price/Performance Value
Commitment to Creativity	Customer Purchase Experience
Stage Gate Efficiency	Customer Ownership Experience
Commercialization Success	Customer Service Experience
Application Diversity	Brand Equity

Commitment to Innovation

Singapore Telecommunications (Singtel) is a leading 5G enterprise service provider in the Asia-Pacific (APAC) region. The company maintains a regional presence in APAC through stakeholders, such as Optus in Australia, and through regional associates, such as AIS in Thailand, Globe in the Philippines, Telkomsel in Indonesia, and Airtel in India. To date, the company has 52 enterprise offices in 18 countries worldwide, and more than 65% of its net profit is derived from operations outside of Singapore.

Singtel initially developed its Singtel Paragon platform in-house, launched in February 2022, as an innovative product to support its well-established enterprise segment in Singapore. The company leverages the platform as part of its offering of new value-added services, such as infrastructure-as-a-service (IaaS), to target enterprise customers in Singapore.

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> **- Mei Lee Quah**
> **Director, ICT Research**

Enterprises have well received 5G because they need end-to-end use cases that have a service level agreement (SLA) and edge computing dependencies for monetization. The enabling capabilities to facilitate these use cases would have had to come from multiple providers (e.g., Singtel) for high bandwidth and low latency 5G connectivity, hyperscalers for cloud technology, IT providers (e.g., Red Hat), compute providers (e.g., VMware), and system integrators to stitch the solutions together, making the build and management challenging, from an operations perspective.

For example, while building a single drone application is easy, it may not be as easy to manage a use case with over 1,000 camera feeds or even managing 1,000 drones transmitting into a compute facility. An end-to-end overarching view is needed to manage it and avoid failure in one part of the solution, rendering the solution unusable.

Singtel facilitates the overarching view of all the enabling capabilities that would go into the solution for enterprises on its platform through a single pane of glass. As a result, the Singtel Paragon platform is recognized by industry participants as the region's first innovative all-in-one platform that can support regional enterprises by tapping the potential of 5G in combination with other emerging technologies. The platform has been granted 3 patents in the United States, Australia, and Singapore.

Commitment to Creativity

Unlike competitors, Singtel 5G-ready solutions (e.g., real-time fleet management and smart warehouse management) can be marketed by mobile operators and creatively enable 5G solutions that require more effort and customization, thus extending the boundaries for 5G to influence more verticals and create more use-case solutions.

Through its Paragon Marketplace, Singtel equips enterprises with access to 5G-ready solutions to make development tasks easier so that solutions do not have to start from scratch. Through its Partner Ecosystem Program, the company enables access to skillsets from its partners to customize the remainder of the solution to suit requirements, allowing enterprises to scale faster with less risk and within budget and, in some instances, enabling successful implementation that would otherwise be unattainable without the knowledge, skillsets, and expertise or access to the same.

For example, in the case of drone applications, platform-as-a-service (PaaS) elements (e.g., firewall and load balancers) must be considered, in addition to the necessary compute capabilities, because people do not think about these aspects when building a minimum viable product (MVP) but which are still important for scale. Additionally, enterprises need to know how to leverage analytics to build meaningful service applications because there might be the need to trigger the underlying network telemetry or network performance to ensure a specific SLA for the application or to ensure the use case is ready for use. In both cases, the ecosystem of applications and partners that Singtel brings to the table can be useful in enabling end-to-end solutions that work. Existing solutions from the Paragon Marketplace (e.g., PaaS, firewall, and load balancers) can be quickly deployed where needed.

Furthermore, new 5G end-to-end use-case solutions will require better coordination between environments; therefore, the ability to orchestrate platform capabilities between environments will increase in importance going forward. In many cases, several workloads, whether supply chain management or enterprise resource planning or others, that would traditionally sit in the public cloud environment will now need to communicate with mission-critical applications that sit in the edge computing environment, to meet low latency requirements, such as data analytics or artificial intelligence (AI) or to render for virtual reality (VR). Moreover, with network slicing, there is further complexity associated with managing the various network profiles for different speeds and latencies to match with application requirements.

Through the Singtel Paragon platform, enterprises can create and manage network slices on-demand and process data in high volumes and at high speeds to derive intelligent outcomes based on actionable insights, without compromising performance. Through a single pane of glass, enterprises can manage all service applications seamlessly across cloud, edge compute, and network resources. The Singtel Paragon Platform further supports infrastructure exposure via API to enable automation. For example, analytics or video applications can call the necessary network telemetry and shift network bandwidth as necessary and as needed. If enterprises want to add drone capability to the service, an existing drone application can be quickly stitched together around Singtel's current offering.

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With these value-added services in place for enterprises and backed by an end-to-end security posture, the rapid deployment of even complex 5G solutions is now possible, and Singtel can enable the future by creatively pulling the technology together through its Singtel Paragon platform.

Commercialization Success

Singtel launched its Singtel Paragon platform into the market, where more than 80% of enterprises already work with the company, to enable mobile connectivity and/or other enterprise business services, such as core connectivity, workforce management, cybersecurity services, multi-access edge computing (MEC), and cloud technology. As such, the platform leverages Singtel's strong branding and has established trust in Singapore over the years.

Singtel has achieved customer success in advanced manufacturing, smart construction solutions, autonomous environment service vehicles, electric vehicle (EV) trials, disaster site management, drone-enabled remote inspection, outdoor surveillance robots, unmanned retail experiences, enhanced surgery and clinical, regional cloud computing, and integrated command centers. As a testament to the success of the Singtel Paragon platform, the number of commercial deployments at well-known global brands, such as Hyundai Motor Group and Micron Technology, and at government agencies, such as the Advanced Remanufacturing and Technology Centre (ARTC) and National University Health System (NUHS), is on the rise in Singapore.

To date, the platform supports more than 15 commercial deployments in Singapore. Considering a ready pipeline of orders and customers for 2024, revenue growth and the number of customers are projected to grow at a compound annual growth rate (CAGR) of 675% and 124%, respectively, from 2021 to 2024. By winning in its stronghold in Singapore, Singtel is expanding its proven track record and thus helping to open up new markets within its regional associates While Singtel's previous focus has been in APAC, it has now expanded its foot print globally with several proof-of-concepts and trials underway at the global level, indicating a bright future growth potential for the Singtel Paragon platform.

Application Diversity
The Singtel Paragon platform supports 4G and 5G, with plans to support multiple access technologies such

Wi-Fi, and fixed technologies in its roadmap and it provides a suite of different edge compute environments, such as Singtel's own bare metal implementation, Amazon Web Services (AWS), and Microsoft Azure private MEC infrastructure environments, all of which can be managed and orchestrated through the Singtel Paragon platform.

Enterprises can choose the best MEC environment to leverage based on any cloud dependencies or familiarity with their existing cloud stack. The platform is vendor agnostic and can be integrated with the different 5G vendor technologies, it has been integrated into Ericsson and Huawei's environment. This is important as Singtel plans to scale its Paragon platform initially to regional associates and mobile operators in Asia Pacific and then expand globally.

Price/Performance Value

Singtel is in close touch with enterprises in Singapore and thus realized that the market needs 5G solutions to serve a wide variety of use cases in an affordable manner, especially with many enterprises undergoing rapid digitalization. As such, Singtel addresses the market demand for 5G solutions through its Singtel Paragon platform, allowing the company to offer enterprise features that allow its customers to manage their connectivity and cost providing affordable pricing to match the customers' customizable demands.

The platform is secure, and services can be launched within minutes, thus improving the time to market for new services. Upgrading legacy services and service refinements are made easier with access to Paragon Marketplace and Singtel Partner Program, thus improving the customer experience. Although Singtel designed the platform to help enterprises harness the combinational power of emerging technology with the introduction of 5G capabilities, the resultant product is a key differentiator for Singtel because the market lacks a similar strong platform solution in Singapore, regionally, and potentially even globally.

With the transition to 5G, the ability to process large volumes of data can provide enterprises with the necessary analytics to enter into a new era of personalization, to stay competitive and relevant. Enterprises, therefore, can justify the need to invest in 5G because it is more outcome based and viewed as an investment instead of only an outlay of money as a cost.

Brand Equity

Singtel leverages its strong brand for new products, including the Singtel Paragon platform. In 2023, Brand Finance recognized Singtel as the world's 6th strongest brand in the telecoms sector. In 2022, Singtel won multiple awards at both the local and global levels for its Paragon platform, including the Network Transformation Awards 2022 for 5G Service Excellence, the Global Carrier Awards 2022 for Best Mobile/5G Service Innovation, and the Asian Telecom Awards 2023 for the B2B Client Initiative of the Year - Singapore and Digital Initiative of the Year - Singapore.

Other areas acknowledged by industry veterans and observers include Singtel's 5G@Sentosa public-private sector collaboration project and its world-first portable 5G-in-a-box platform called GENIE. In a strategic move to strengthen its brand in 2023, the company undertook a corporate restructure to combine its consumer and enterprise business segments and separate its infrastructure business into the Digital InfraCo infrastructure unit, to reposition itself in the market and to drive growth, synergies, and

productivity. The infrastructure unit will run Singtel's Paragon platform and regional data center business, subsea cable, and satellite operations.

With the rise of the digital economy, the infrastructure unit is set to tap into the rising importance of digital infrastructure on a global scale and drive the monetization of Singtel's infrastructure. This positive move offers better visibility into the platform and puts a champion in place to push the platform to achieve a greater business impact for enterprises. For example, with the Singtel Paragon platform, enabled AR headsets can help enterprises reduce training time by 50%.

Conclusion

Singtel can extend the boundaries for 5G through its Singtel Paragon platform, which is a strong core product that is unique in the market, to provide more industries with use-case solutions. With the platform, the company can creatively and affordably enable 5G solutions that typically require more effort and customization. The platform can provide enterprises with a competitive advantage and help them derive a higher business impact; therefore, enterprises have well received 5G to launch and monetize end-to-end use cases that have SLAs and compute dependencies with ease and within budget. Singtel can enable the future by creatively pulling the technology together through its Singtel Paragon platform.

With its strong overall performance, Singtel earns Frost & Sullivan's 2023 Enabling Platform Technology Leadership Award in the APAC 5G platform industry.

What You Need to Know about the Enabling Technology Leadership Recognition

Frost & Sullivan's Enabling Technology Leadership Award recognizes the company that applies its technology in new ways to improve existing products and services and elevate the customer experience.

Best Practices Award Analysis

For the Enabling Technology 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

Customer Impact

Price/Performance Value: Products or services provide the best value for the price compared to similar market offerings

Customer Purchase Experience: Quality of the purchase experience assures customers that they are buying the optimal solution for addressing their unique needs and constraints

Customer Ownership Experience: Customers proudly own the company's product or service and have a positive experience throughout the life of the product or service

Customer Service Experience: Customer service is accessible, fast, stress-free, and high quality

Brand Equity: Customers perceive the brand positively and exhibit high brand loyalty

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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)