WHITEPAPER

The Current 5G Paradigm And The Future Of Managed Services

Abstract

The term '5G' refers to the fifth generation of wireless telecommunication technology, which will have a paradigm-shifting impact on many aspects of life. Mobile network traffic is rapidly increasing because of new mobile technologies such as virtual reality applications, high-resolution video streaming and cloud gaming. In a few years, 4G services will almost certainly be unable to keep up with the rate of increase in traffic as well as the anticipated demands of new scientific technologies such as unmanned aerial vehicles (UAVs), virtual reality and autonomous vehicles.

According to our survey, the global 5G market is expected to grow at a CAGR ranging from 15% - 18% from 2022 to 2027. The increase in the number of demand for wireless broadband services globally is one of the significant trends driving the wireless industry towards the 5th generation network technology. The number of commercially available 5G devices has increased rapidly. In the last three years, more than three hundred 5G devices have been announced, with over 100 of them commercially available. Smartphones, head-mounted displays, CPE devices, industrial grade CPE, tablets, TV, drones and vending machines are among these 5G devices.

With a convergence of technologies (IoT, big data, edge computing and AI) maturing together, 5G is set to be a game changer for the telecom industry and is likely to present immense opportunities for growth and expansion till 2027. Based on the insights and estimates captured from our market studies, the augmentation of enterprise 5G will impact almost all major sectors with the potential to unlock USD 5.25 - 5.75 trillion (2026) globally through identified use cases.

Key Takeaways

01
Understanding the shift from 4G to 5G

02
Key drivers in the adoption of 5G

03
Role of managed service providers in the 5G era

04
Value enabled services for managed services

05
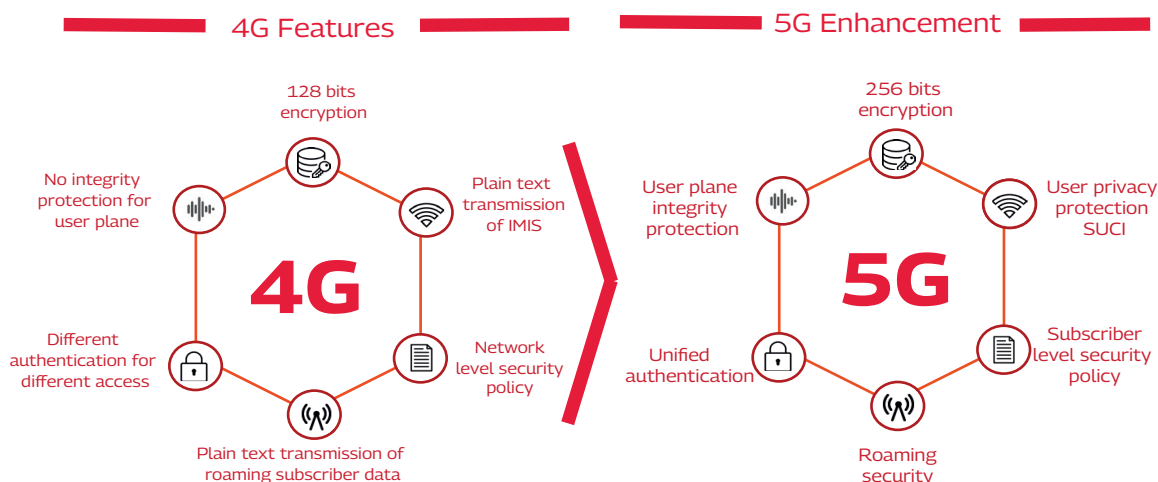The future of managed services

Introduction

The Shift from 4G to 5G

4G Features | 5G Enhancement

128 bits encryption
No integrity protection for user plane
Plain text transmission of IMIS
Different authentication for different access
Network level security policy
4G
Plain text transmission of roaming subscriber data

256 bits encryption
User plane integrity protection
User privacy protection SUCI
Unified authentication
Subscriber level security policy
5G
Roaming security

Figure 1: Evolution of different network security features enhanced with 5G

Key aspects resulting in shift from 4G to 5G landscape include the following

Massive Machine Communication (MMC)

This provides up and down scalable connectivity solutions for tens of billions of network-enabled devices, which is important for the long-term mobile and wireless communication systems. Machine-to-machine communication (M2M) has a good range of characteristics and requirements like rate, latency and cost that usually differ substantially from those of human-centric communication. M2M technology encompasses a number of applications such as warehouse management, remote, robotics, control, logistic services, supply chain management, fleet management and telemedicine.

Moving Networks (MN)

Enabling mobility has always been one among the main driving forces since the event of cellular communications. The flexibility to support mobility has also evolved from nomadic to vehicular speed.

Ultra-Dense Networks (UDN)

This addresses the high traffic demands via infrastructure densification. The goals are to extend capacity, increase energy efficiency of radio links, and enable a higher exploitation of spectrum. Increasing the traffic density in areas like airports and huge shopping malls require both outdoor and indoor deployment to supply seamless coverage and capacity.

Shared Spectrum

Cognitive radio was often considered as an answer to the matter of frequency spectrum shortage. However, it was seldom adopted due to concerns about the impact on the first user or license holder of the spectrum. Spectrum sharing is another solution that can solve this dilemma. Spectrum sharing can help by enabling mobile access to additional frequency bands in areas in different time slots when other services won't be using those specific bands. Spectrum sharing is a chance to open access to new spectrum for mobile services but needs careful positioning to succeed.

Multi-Node Transmission

Multi-node / multi-antenna technologies are addressed to attain the performance and capability targets of 5G wireless systems by observing evolutions of 4G technologies at both node and architectural level. Advanced inter-node coordination would enable significant increase in spectrum efficiency and user throughput facing unfavorable radio conditions.

Heterogeneous Multi-RAT and Multi-Layer network

In 5G wireless systems, we are going to see a co-existence of legacy radio access technologies (RATs) and new access.

technologies and very dense multi-layer networks consisting of cells of different sizes. Both aspects raise novel challenges within the field of interference and mobility management, which need new approaches in how cellular systems are handled generally. Novel multi-RAT and multi-layer solutions require novel infrastructure enablers like new network management interfaces. One clear differentiator between a 5G system and earlier generations would be to move towards a proactive management of demand, mobility and interference rather than simply reacting to instantaneous channel, demand and network condition.

Key Drivers

Higher System Capacity

In recent times, the cellular mobile communication system is experiencing an increase in volume of mobile data traffic at an alarming rate. Handling this explosive increase will therefore, witness a dramatic increase in system capacity and is considered to be the foremost requirement for the 5G network.

Higher Data Rate

Looking at the proliferation of cloud applications and rich content services, it's evident that 5G is incredibly capable of providing a jump in bit rate. Therefore, the quality of service (QoS) is vital and must provide the desired provisions regardless of the location and time. Ideally, mobile users are expected to access 100 times more of peak rate than what's obtainable in LTE (>10 gbps) with an honest wireless environment.

Improved Latency and Reliability

The 5G technology is anticipated to introduce some new emerging services like AR that need low latency than supported by LTE. The expected latency in 5G radio interval is smaller than 1ms as compared to that of LTE. In addition to the low latency, high reliability is necessary for services like autonomous driving that need certainty and safety.

Massive Device Connectivity

To support exponential increase in the number of devices that connect with the wireless network for the IoT services, the ecosystem would need to support simultaneous connection of devices under different schemes. The ecosystem would be required to manage mass user gatherings as well as event centers and natural disaster situations where multiple attempts to access the network would be made simultaneously by multiple users in the same area.

Energy and Value Reduction

Telecom leaders aim to achieve high-performance targets for 5G networks while offering cost-efficient and economical services to end users. The network cost per user would be greatly reduced in the 5G era. It would be supported by improved energy consumption that guarantees high network performance. The designers also need to consider life-span of batteries of IoT sensors and devices. Energy efficiency would therefore, be another variable to be managed in the 5G equation.

Survey Insights

TechM conducted a survey of leaders and key decision-makers of service providers and their technology / channel partners. The survey received responses from 125+ participants who shared their views about major priorities and challenges for 5G landscape. Key insights of the survey are given below:

90%
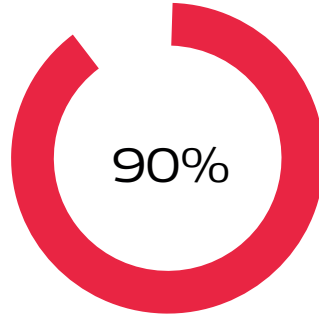
More than 90% of businesses will roll out 5G enabled services to the market within the next 12 months.

85%
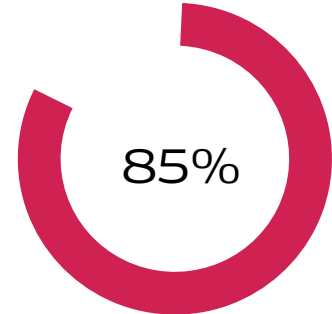
"Developing use cases" and "transforming the organization" were identified as the major leading challenges that requires assistance for driving best ROI for 5G investments with 85% of responses.

60%
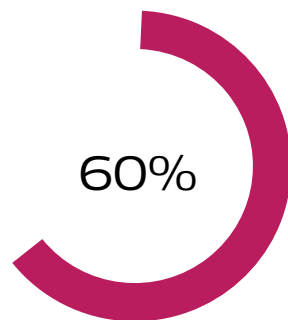
"Immersive entertainment" emerged as the top use case with the maximum monetization potential, with more than 60% of firms opting for it.

85%
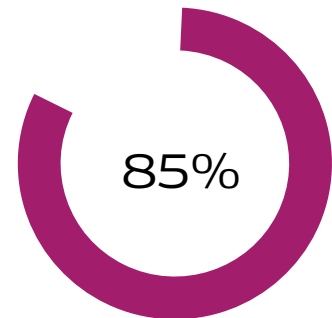
"Superior speed" and "reliability and availability" are the leading expectation area of the 5G consumer with more than 85% responses selecting them to make 5G adoption successful.

80%
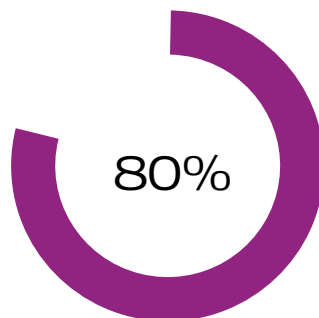
"Managed service" and "technology partners" emerged as the top choices for partners in the 5G ecosystem according to the survey, with more than 80% of the firms opting for them.

80%
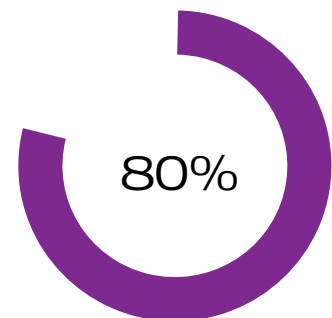
"Network and IT operations", "data-driven operations" and "customer experience" are the top 3 areas where managed service partners can play a major role with around 80% of the responses picking them.

90%

Nearly 90% of the respondents want to have more partnerships with "OTT players" and "enterprise mobility organizations".

75%
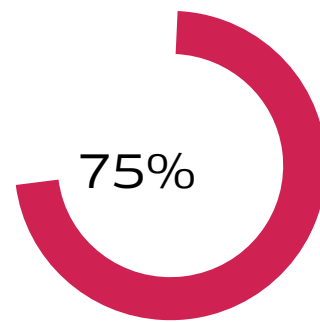
"Basic connectivity of devices" came up as the leading major initiative taken by firms for the smooth migration to 5G infrastructure, with more than 75% of the firms opting for it.

60%
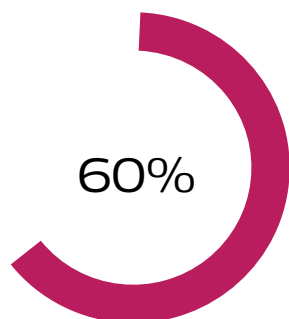
With more than 60% votes, the "pandemic shift" came up as the major regional/geo-specific aspect playing a major role in 5G adoption.

80%
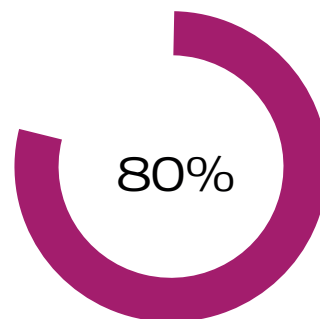
"Partner enablement/acquisition", "system upgrade/integration issues", and "funding" came up as the three major hurdles likely to delay 5G rollout plans for businesses according to the survey with more than 80% of responses being between them.

80%
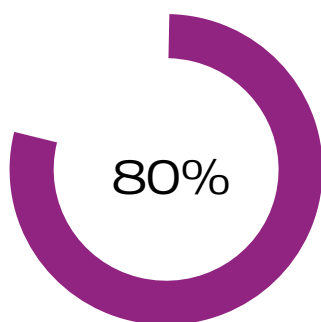
"Social media and website" and "channel partner support" emerged as the top choices for CSP enterprise channels to train their customers on exposure solutions in with more than 80% of responses being between them.

Framework for 5G Managed Services
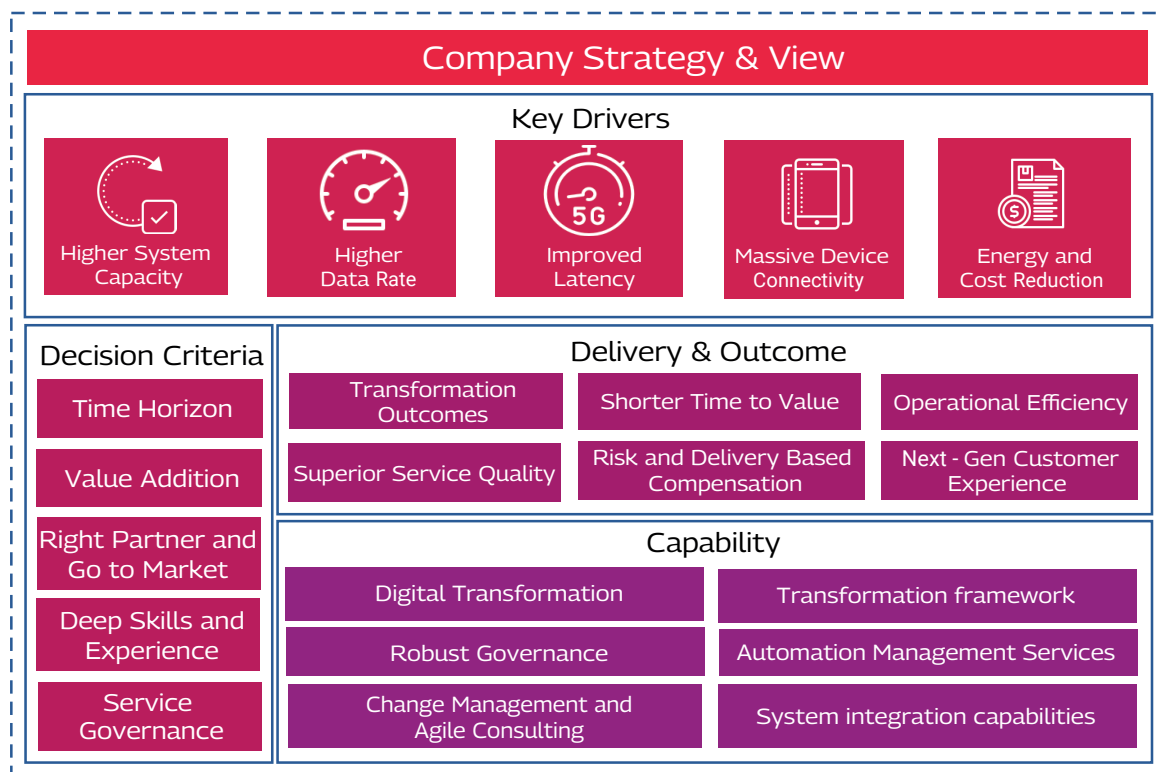
Company Strategy & View

Key Drivers

Higher System Capacity	Higher Data Rate	Improved Latency	Massive Device Connectivity	Energy and Cost Reduction

Decision Criteria

- Time Horizon
- Value Addition
- Right Partner and Go to Market
- Deep Skills and Experience
- Service Governance

Delivery & Outcome

Transformation Outcomes	Shorter Time to Value	Operational Efficiency
Superior Service Quality	Risk and Delivery Based Compensation	Next - Gen Customer Experience

Capability

Digital Transformation	Transformation framework
Robust Governance	Automation Management Services
Change Management and Agile Consulting	System integration capabilities

Figure 2: Managed Services Framework

Role of Managed Service Providers in the 5G Era

The global study we conducted, captured views and vision of more than 125 participants including CXOs from leading telcos, aligned solution providers, industry leaders and consultants. Most of the participants are responsible for electing their technology and managed service partners for growing their 5G presence. Managed service providers (MSPs) will also bring in more insights about evolving customer expectations and use cases in demand to fuel innovation and transformation. They can leverage their pedigree of IT and automation to create a roadmap to offer next generation customer experience as well.

Major facets of managed service capabilities and offerings that would shape 5G ecosystem and enable telecom service providers to achieve their 5G goals include the following:

Change Management and Agile Consulting

For seamless change management, MSPs can support optimal resource utilization to enhance the delivery speed, understand the requirement and its impact and assess and optimize cost of change. The MSPs can also support for dynamic prioritization, improved time-to-market and fast feedback implementation leading to improved project predictability, performance and product quality.

Outsourcing

Business process services (BPS) players play a vital role to enable next gen digital CX and back office services across multiple industries including communication, media and entertainment, retail, and CPG. The BPS solutions and technologies have evolved over the past few years and will continue to reshape the future of BPS. The 5G networking capabilities in the BPO industry offers more than just ultra-fast speeds and low latency.

Automation Management Services

Automation solutions will support multiple applications such as auto-ticket classification, predicting cell site degradation, real-time classification of network tickets, improvements in operational KPIs, and enhancement in customer experience. For development and deployment of use cases, AI/ ML and automation centers of excellence (CoEs) will play a critical role.

Automation is also required to address complex 5G networks. It requires automation that can support multi-domain and multi-vendor technologies as services such as network slicing will traverse across multiple network segments comprising of virtual and physical network capabilities along with programmable and non-programmable functions.

Service Level Operations Management

To manage the service level agreements (SLA), solution architects would need to understand the client priorities and demonstrate improvements in management of operational KPIs. Developing an SLA for a given 5G-enabled ecosystem offers all stakeholders the opportunity to consider the risks associated with communication service degradation, delay or disruption, and design risk mitigation plans. Therefore, 5G would be instrumental in improving everyday SLA management.

Digital Transformation

Digital transformation solutions would boost customer experience for 5G users. MSPs would bring in their transformation and consulting capabilities leading to benefits such as reduction in incident tickets, higher customer satisfaction (CSAT) scores, and faster ticket turn-around.

Process Mining

Process data can be leveraged to achieve continuous productivity improvement essential for several critical communications (military, autonomous driving, and public safety). Process mining encompasses a strong focus on process analytics that includes data-based forecasts, customer experience management, incident / risk prevention, and predictive maintenance. Emerging process mining technology that enables data owners to generate retrospective, prospective, and insights about the process by applying mining analytics would ensure high process quality and minimize process gaps and loopholes.

Data Analytics

As part of application intelligence, network data analytics will support businesses and technology specific applications and use cases over 5G. This will help in building an agile and cost-effective RAN to cater to 5G network at every layer with the help of AI, ML, and deep learning techniques. Data analytics would also be offered as a service to support data management for orchestration of complex processes or ecosystems positioning.

The Future of Managed Services

Managed services is no longer just a cost-effective operating model. It has become a catalyst to remodel operations and improve cost, quality, security, and control of network operations and performance, together with user experience.

Under a managed services contract governed by an SLA, the MSP commits to work the network and its services to the level of performance and reliability needed to make achieve a high standard of user experience. The mobile network operator retains full ownership and control and is accountable for investment decisions, strategy, architecture and style, technology and vendor selection, together with access control and security of their network.

Efficiently Managing Devices

More than 75% of MSPs are managing equipment from approximately four or more network vendors. This will cause many problems as most vendors don't share a standard governance structure. This, together with an absence of standardization between devices, can result in network outages. Slow response times and recurring resolution issues are major factors impacting selection of MSPs. This eliminates the necessity to rely on a server or application group to access a production server. Separate to the management plane, these devices ensure remote access to critical devices at any time.

Ensuring Network Resilience

Network resilience is an organization's ability to produce and maintain an appropriate level of service while handling multiple technical and non-technical challenges. A prime objective of MSPs is to keep the network running at all times and ensure high network resilience. MSPs would leverage advances in technology like Predictive Network Intelligence, AI and deep learning, and IoT to achieve this goal.

Network Design and Optimization (NDO)

A digital NDO approach would be critical to manage evolving complexities that include 5G – network densification, new spectrum bands, cloudification, and stricter performance parameters for bandwidth, reliability and latency. MSPs would focus on redesigning their capabilities and realigning their work force to achieve this trade-off.

Data-driven and Closed-loop System Operation

Closed loop automation and data driven approaches would guarantee the best service quality and productivity in 5G operations. A leading telecom has established a good example to use AI and machine learning to work customers' networks and services with web scale models for service automation.

Service Agility

Service agility measures how effectively a managed services vendor can help communications service providers (CSPs) bring more services to plug, sooner. Considering the plethora of recent use cases possible with 5G and therefore, the multi-trillion dollar business opportunity that comes with it, reducing time to promote by half or more would bring a significant impact. It would enable broader service ecosystem to offer diverse use cases such as managed IoT and security solutions with faster time, lower risks, and reduced costs.

Modular and Flexible Commercial Models

CSPs have to be ready to pick from a modular, customizable portfolio of 'micro' managed services and business models. This would enable them to outsource multiple processes / functions of their operations to achieve cost efficiency and manage issues of shrinking profit margins. These micro services have to be injected on demand into operations. This would enable service providers to offer next generation support for CSPs.

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