



# Telecommunication Roadmap for 2022 & 2023

An Analysis by Draup

**Conceptualized and Developed: December - 2022**

The document's objective is to provide an overview of the elements of the Telecommunication Roadmap for 2022 & 2023.

**[CLICK HERE](#)**  
**[To access the full report](#)**

### Segments Overview

### Ecosystem

### Opportunities

*Draup has identified four key segments that will become the overwhelming focus in enhancing the Telecommunication industry throughout the following decade:*



#### Value-added Services

- **Ecosystem Enablement:** Utilizing the mobile device's data connection to provide voice calling services and video-based streaming services



#### Network Management

- **Intelligent Networks:** Blockchain-enabled monitoring of commercial communications from the registered telemarketers that helps prevent unauthorized access of subscriber's data for confidentiality
- **Telecom Operations Digitization:** A secured recharge method that allows users to recharge for mobile numbers from a distance by using a voice-enabled feature that will capture the command of a person and help contactless recharge
- **Asset Maintenance & Security:** Utilizes IoT-based tracking system that seamlessly communicates with existing systems, providing real-time location and condition of the asset
- **Workplace Safety & Assistance:** Telecom infrastructure is provided with a mobile or smart device to gather instant real-time information about the radio signals and tower data



#### Sales & Marketing

- **Customer Experience:** Mobile apps are created to authenticate new SIM cards by the agents to enable faster registration during a new SIM purchase.
- **Customer Intelligence:** Using advanced AI systems on the customer data to provide recommendations to increase customer interaction, retention, and engagement
- **Digital Marketing:** Involves targeting potential customers with personalized ads based on near a consumer (or device) is to a specific location using Near Field Communication (NFC), beacons, and Real-Time Location System (RTLS)
- **Digital Selling:** Telecom client onboarding automation helps companies to save the turnaround time between the customer submitting the application form till the requested service being activated.



#### Customer Support

- **Support Transformation:** Uses artificial intelligence and machine learning to answer basic customer questions via a live chat messenger
- **Customer Intelligence:** Measurement, collection, analysis, and reporting of phone call data to derive customer and demographic insights that can be used to optimize marketing campaigns and call handling

Segment Overview	Ecosystem	Opportunities
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*The Global Telecommunication industry is rapidly increasing its digital capabilities through partnerships with specialized technology providers and start-ups.*



Telecommunication Ecosystem

- Solutions providers focus on the areas such as AI/ML, AR/VR, Digital twin, Blockchain, Cloud, GPS, automation, and IoT technology are major deal winners.
- Several specialized solution providers and start-ups in this space offer niche solutions such as Autonomous networks, 5G Wireless Technology, digital assistants, Network Security, and Connected Product Solutions.
- Top technology providers such as Tech Mahindra, TCS, and Wipro are offering sophisticated 5G network solutions, wireless solutions, Network RAN Automation, and cybersecurity solutions to the telecom industry.
- The Telecom industry is keen to enhance its four key segments, including Value-added Services, Network Infrastructure, Sales & Marketing, and Customer Experience, by leveraging advanced automation platforms and digital technologies to develop next-gen 5G Wireless Technology Solutions and analyze network failures and monitor everything connected to the network.
- Telecom providers are continuously modernizing 5G networks by leveraging cloud and AI to create new opportunities across machine-to-machine services, autonomous vehicles, remote healthcare, and innovative video delivery services.

1. GPS: Global Positioning System  
2. AI: Artificial Intelligence  
3. ML: Machine Learning  
4. AR: Augmented Reality  
5. VR: Virtual Reality  
6. IoT: Internet of Things

Segment Overview	Ecosystem	Opportunities
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*Business intentions to enhance the network connectivity technologies such as AI/ML, Cloud, IoT, and Blockchain will provide enormous opportunities for solution providers to drive engagement within the Telecommunication Industry.*

Use-cases that can drive high opportunities with in the Telecommunication Industry



Short Term	Medium Term	Long Term
Network Virtualisation	Digital Wallet	Customer Support Chatbots
Video Over-The-Top (OTT)	Customer Churn Prediction	Client Onboarding Automation
Telemedicine	Geotargeting	Self Optimising Network
Call Analytics	Blockchain based Virtual Sim	Cloud Gaming

Platforms



- Digital Twin Platforms
  - Cloud Platforms
  - GPS
  - AI/ML Platforms
- AR/VR Platforms
  - Robotics Platforms
  - Blockchain Platforms
  - IoT Platforms

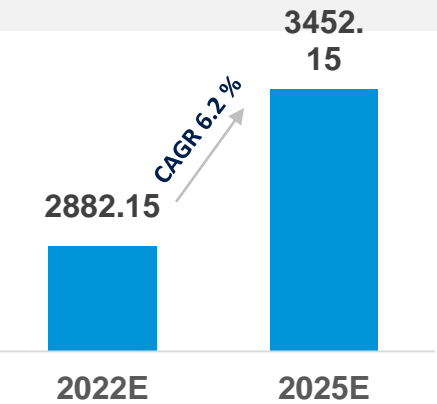
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- This Section includes
- Overview of the Telecommunication Industry
  - Trends

**Global Telecom Market Overview:** Cloud computing is adopted by stakeholders to reduce costs to withstand the competition; cloud computing is projected to contribute sizable opportunities in the telecom market



**Global Telecom Industry Market Overview in (USD Billion)**

- The global Telecommunication market was valued at USD 2882.15 Billion in 2022 to USD 3452.15 Billion by 2025, at a CAGR of 6.2 % during the forecast period.
- The widespread adoption of 5G offers many benefits. It also creates new security concerns & challenges.
- The increase in the use of voice broadcasting, video streaming, and data sharing due to easy accessibility to internet services is propelling the growth of the telecommunication market.

**Trends for Telecom in 2022 & 2023**

**5G**

5G enables a unified connectivity platform to meet the diverse requirements of a multitude of use cases, such as enhanced **Mobile Broadband (eMBB)**, massive Machine Type Communication (mMTC), and ultra-Reliable Low Latency Communication (uRLLC)

**Network Security**

The **Extended detection and response platform** increases detection accuracy by correlating threat intelligence and signals across multiple security offerings **and improving security operations efficiency and productivity.**

**Internet of Things (IoT)**

**Telecommunications** can enable energy-efficient machine-to-machine communication by using IoT. By combining IoT data with big data analytics, telecom companies **build predictive models to help them predict upcoming trends** in the industry.

**SDN/NFV**

**NFV and SDN** capitalize and rely heavily on network virtualization **to enable their respective capabilities and deliver the functionality** to distinguish connections and packet handling.

**Big Data and Network Analytics**

Using big data, Telecom is building intelligence and analytics tools to proactively identify and fix issues or **offer a solution before it impacts the customer.** Data analytics helps identify network inconsistencies by monitoring tons of current and historical data.

**Cloud Computing**

The increasing availability of cost-effective, cloud-based applications for data storage and **the increasing usage of cloud-based telecom services** to efficiently manage IT operations create enormous market demand for telco cloud.

**Key SP's**



**Key Startups**



Source: Draup Ecosystem, Press releases, Reports (e.g., Globenewswire, Businesswire)

Note: The above-mentioned telecom market value includes wireless telecommunication carriers, wired telecommunication carriers, communications hardware, & software & telecommunication resellers

1. SDN/NFV - Software Defined Networking/Network Function Virtualization

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This Section includes

- Digital Themes and associated use cases



Overview: Value Added Services, Network Management, and Sales and Marketing are the major business intentions in the telecommunications industry



Top Companies



Problem Statements

Offering enhanced Value-added services to increase the customer value

Providing seamless network connectivity with easy integration

Digitizing Sales and Marketing for precise customer targeting

Providing loyalty rewards & secure identity management for private customers

Solution Providers

IoT-based Traffic Control	HCI	5G	NFV/SDN	Omni-Channel

Use Cases

- Digital Wallet
- Telemedicine
- e-Commerce
- Remote Patient Monitoring
- Video Over-The-Top (OTT)
- mHealth
- Usage based auto Insurance
- Over-The-Top (OTT) Voice Calling

- Telecom Network Orchestration
- Network Virtualisation
- Virtual Telecom Assistant
- Self-optimising Networks
- Software-defined Wide Area Network (SD-WAN)
- Disaster Management using Drones
- Telecom Infrastructure Inspection using Drones

- Telecom Mobile Apps
- Customer Churn Prediction
- Recommendation Engine
- SMS Marketing using AI
- Telecom Customer Retention and Engagement using AI
- Email Marketing Automation
- Proximity Marketing

- Customer Support Chatbots
- Intelligent Call Routing
- Call Analytics
- Voice-assisted Smart Speakers
- AR-based Remote Customer Assistance

Business Intentions

Value added Services

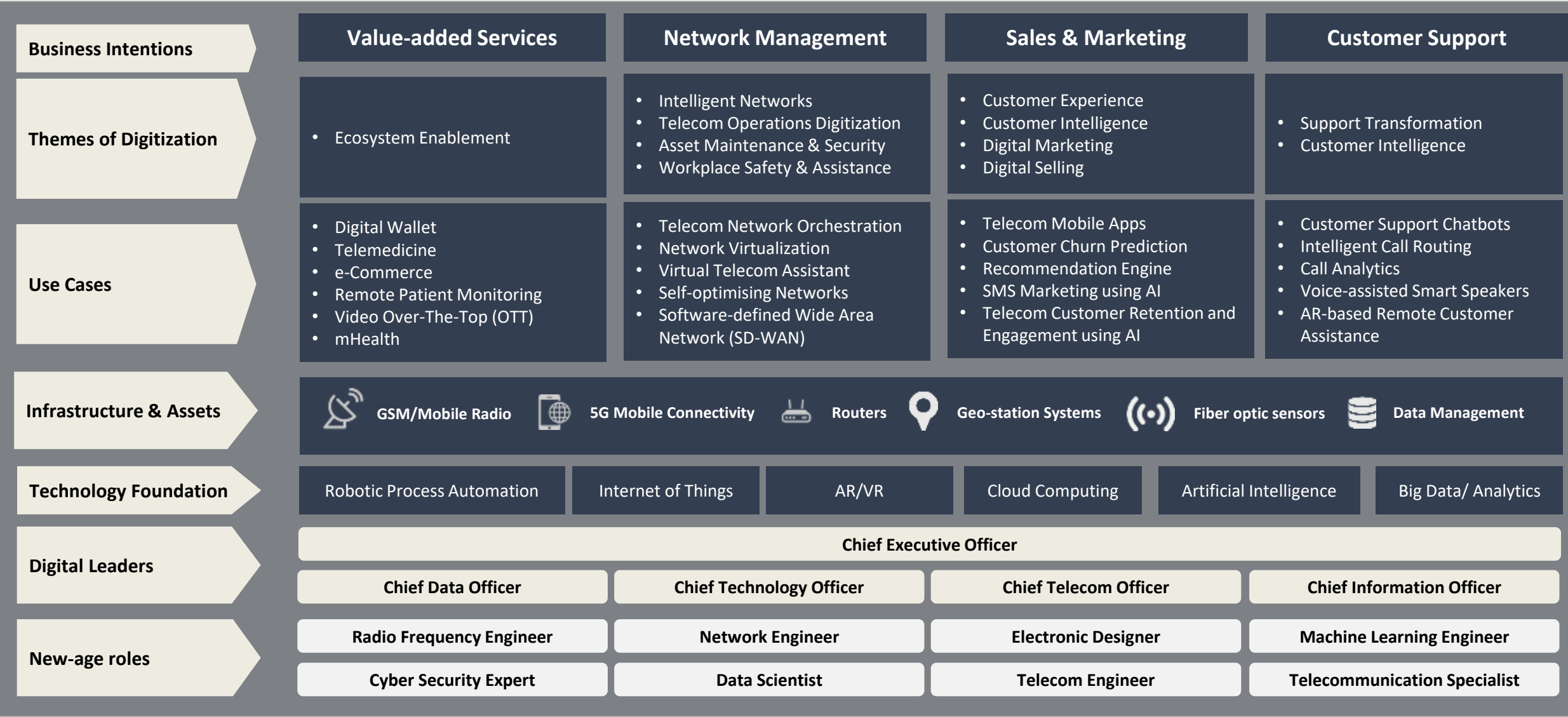
Network Management

Sales & Marketing

Customer Support



**Digital Framework:** Companies leverage digital technologies such as AI/ML, Cloud, Big Data, and IoT to build a robust connected framework and enhance operational efficiency



Source: Draup Business Intentions Module  
Note: Above Uses Cases, Roles, and Digitization Themes are not exhaustive

1. AI: Artificial Intelligence  
2. AR/VR : Augmented Reality/ Virtual Reality

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This Section includes

- Segments of Value-added Services
- Key Initiatives

Segments of Value - Added Services

Ecosystem Enablement

- Telecommunication companies are keen on allowing customers to have **OTT (Over-The-Top) service consisting of streaming audio, video, and other content** over the Internet without the involvement of traditional operators in controlling or distributing content.
- Communications providers implement **IPX (IP Exchange) platform** to seamlessly interconnect their networks for **VoIP-to-VoIP and VoIP-to-TDM voice calls, HD voice, video, data, and rich multimedia services.**

Network Capacity Augmentation

- Mobile network operators are **augmenting their network capacity** with additional wireless and fiber deployment to meet the constant demand for high-speed, secure, and **innovative enterprise applications like unified communications, application-to-person messaging solutions**
- To mitigate the network congestion threshold, most operators attempt to keep per-cell PRB utilization under a congestion threshold of 80% with the help of Network capacity Augmentation

5G-enabled Drones for Agriculture

- The network service providers are focusing on the **5G-enabled Drones for Agriculture** to collect real-time data on weather, air, soil parameters, crop growth, and animal behavior and **enable monitoring of the crops via multispectral sensors to analyze the nutrient status.**

Omnichannel Communications Platform

- The telecom service providers are developing **remote services** to stream games in a cloud environment and stream them directly to the user's device to meet the demand for cloud gaming the users

Navigation/Route Assist

- **Navigation and Route Assist Systems** allow truck drivers to achieve a 20% reduction in driving time and increase fuel efficiency.
- Provides **Navigation/Route Assist**, helping the driver to go to the destinations they select or has stored as favorites through the browser included in **the application, avoiding difficult or uncomfortable traffic situations.**

Case Studies

5G-powered Autonomous Cars



Ericsson has partnered with Volvo Cars for **5G-powered Autonomous Cars.** Ericsson/Volvo utilized **5G connectivity** to ensure that maps were constantly updated with real-time information to aid future autonomous driving operations.

Mobile Wallet






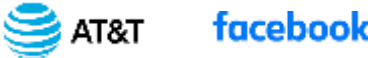
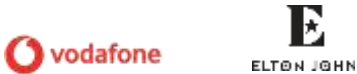




Vibes has launched its **Mobile Wallet as a Channel** to revolutionize native **mobile wallet apps on consumers' mobile devices to deliver personalized and dynamic mobile experiences** for marketing, loyalty, and servicing.

**Value-added Services:** Companies are focusing next generation 5G technologies, cloud-based TV apps, V2X Communication, live music experiences



Value-added Services

Cloud-based TV App	<div><p>Comcast has partnered with DT's Magenta TV is being deployed as the <b>back-end platform</b>. It combines conventional TV, media and video libraries, streaming services, and exclusive subscription content with advanced features.</p></div>	Cloud-based Contact Center	<div><p>Bharti Airtel launched <b>Airtel IQcloud-based omnichannel communications platform</b> that enables a central point in an enterprise hosted on an internet server, to handle all outbound customers.</p></div>	V2X Communication	<div><p>Verizon partnered with HERE to build the <b>next-generation vehicle and pedestrian safety technologies</b> using hyper-precise high-definition mapping and RTK (Real Time Kinematics) that pave the way for connected services to drive road safety improvements.</p></div>
Next-Generation 5G Technologies	<div><p>Batelco and Ericsson have signed an MoU to collaborate on <b>next-generation 5G technologies and innovations</b> in line with the Kingdom of Bahrain's digital economy vision and collaboration on Voice over New Radio and an advanced Charging System to enhance Batelco's real-time convergent charging.</p></div>	5G-Connected Vehicle	<div><p>T-Mobile, Applied Information, and Temple are introducing <b>5G-connected vehicle technology</b> that enables traffic signals to communicate with any vehicle on the road via a revolutionary mobile app for residents in Peachtree Corners.</p></div>	5G-enabled Augmented Reality Video Calls	<div><p>AT&amp;T Inc has partnered with Facebook for <b>5G-enabled Augmented Reality (AR) Video Calls</b> to build collaborative video calling and augmented reality experiences across Facebooks apps, including Instagram and Messenger</p></div>
Live Music Experiences	<div><p>Vodafone Group plc has teamed up with Elton John for <b>Live Music Experiences/ Concerts Streaming using VR</b> through the Elton John X Vodafone app.</p></div>	Machine Learning System	<div><p>Vodafone partnered with Nokia develop <b>new machine learning (ML) algorithm</b> for its pan-European mobile networks to detect and correct anomalies before they impact customers.</p></div>	Red Cloud	<div><p>Vodafone Business has introduced '<b>Red Cloud</b>,' a <b>cloud-based service</b> meant to improve and safeguard digital operations. It offers businesses a more flexible, scalable, and cost-efficient IT infrastructure to help achieve their business goals of keeping their data safe.</p></div>

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This Section includes

- Segments of Network Management
- Key Initiatives

Segments of Network Management

Intelligent Networks

- Telecom players focus on the development of a **virtualized intelligent edge network** to transform and virtualize its various networks under a common and unified framework
- **The telecom service providers develop the narrowband IoT (NB-IoT)** in addition to the stable of **low-powered wide-area networks (LPWANs)** to complement the **LTE-M network** and its core high-speed cellular coverage.

Telecom Operations Digitization

- The telecom service provider focuses on the deployment of advanced applications enhanced by 5G, such as **network slicing, IoT, and automation through AI**
- The virtual assistant Xfinity Assistant with **machine intelligence** and natural language to understand and deliver informed, personalized customer service solutions
- The emergence of **eSIMs** offer remote provisioning of user-profiles and device management, key functions that enable communication service providers (CSPs) to manage user profiles in a more flexible way

Source: Draup Business Intention, Draup Platform, and Press Release

Asset Maintenance & Security

- The network service providers implement **telecom site management software** to enhance the control and visibility over sites and their corresponding inventory such as active equipment such as antennas, microwave backhaul, BTS, and RRUs - to ongoing telecom infra projects

Predictive Network Maintenance

- **AI and predictive analytics systems** used to measure historical and real-time data from the network elements to predict impending network incidents and prevent them before they can occur
- **Virtual Network Assistants AI-driven are used to** simplify the network operations and provide real-time network insights for helpdesk staff and network

Cloud Deployment

- Cloud deployment provides a host of benefits to **CSPs and facilitates CSPs to automate processes and operations**, deploying in the cloud and scaling up and down to meet traffic demands, optimizing their network resources

Case Studies

Software-defined Wide Area Network (SD-WAN)



Deutsche Telekom partnered with Versa Networks to develop **SD-WAN services to reduce enterprise networks' complexity while improving service quality** and giving customers enhanced network visibility.

Mobile Wallet



Vodafone partnered with VMware to **deliver a single platform** to automate and streamline the delivery of multi-vendor network functions across network core, RAN, and edge.

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This Section includes

- Segments of Sales & Marketing
- Key Initiatives



Segments of Sales & Marketing

Customer Experience

- Telecom companies create **mobile apps** to help users Telecom companies develop mobile apps to help users track their plans, data balance, and **other information related to the telecom services**

Customer Intelligence

- **Real-Time Location Systems (RTLS) and Near Field communications systems** are used by the network service providers to identify the potential customer and provide personalized ads on the customer’s devices
- **AI-enabled Emotion Detection** is used by telecommunication services to safely and effectively understand users’ interactions with such services and to respond to their needs.
- The telecom service providers across the globe implement **Email Marketing Automation** to automatically send out personalized emails to customers and prospects based on a schedule or trigger

AI SMS Marketing

- The network service providers use Artificial Intelligence to trigger bulk SMS API through an **AI-based SMS channel that allows broadcasting messages** to thousands of consumers at once, resulting in the growth of sales and the audience traffic

Marketing Content Analysis

- **The telecom industry players leverage AI and ML technologies** to analyze subscriber profiling, conversion rates, content usage trends, and network activity
- Telecommunication companies developed a platform called Digital Customer Experience, and it consists of a **Live Agent feature that helps communication via text, voice, or video, or it utilizes standard connectors** to other contact center agent desktop application

Telecom Client Onboarding Automation

- Telecom service provider companies enable the automation of client processes to save the turnaround time between customers applying service activation

Case Studies

**Telecom Customer Retention and Engagement using AI**



Telus partnered with Thrio for the **AI-Driven CC360 Customer engagement platform** to increasingly deliver superior customer experiences by **leveraging agile and innovative AI-powered solutions.**

**BloT Sim Card**



Orange partnered with Smartkey to **launch Orange BloT Sim by Smartkey** to enable users to manage device access and payments and **connect to Apps in the SmartKey ecosystem.**

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This Section includes

- Segments of Customer Support
- Key Initiatives

**Customer Support:** Companies are focusing on intelligent call routing and application integration that helps enterprises automate various business processes like lead management, order booking, and payment collections



Segments of Customer Support

Support Transformation

- Communications Service Providers are focused on **Cloud Telephony Solutions with intelligent call routing and application integration** that helps enterprises automate various business processes like **lead management, order booking, payment collections, customer appointments**

Customer Support Chatbots

- Telecom companies offer an **Artificial Intelligence (AI) driven contact center chatbot, a 24/7 digital assistant** designed to improve customer experience, allowing a seamless conversation for several queries

Intelligent Call Routing

- Telecommunication companies are developing **Hosted Intelligent Contact Routing (ICR) technology**. It provides contact-by-contact intelligent call routing through a universal queue that directs each contact to the best agent to serve each customer's need, whether in a contact center, home office, or remote branch office location.

First Call Resolution using RPA

- Communication service provider **leverage the RPA technology** to enable a 67% reduction in the customer waiting time for the first call resolution process to resolve customer problems, questions, or needs the first time they call with no follow-up required

AR-based Customer Assistance

- Telecom companies implement 68% improvement in customer satisfaction by **eliminating miscommunication while providing technical support** to customers using an AR-based assistance system

Speech Analytics for Customer Service

- Telecommunication companies are using **voice recognition and AI** in analyzing calls of customers enables to provide call handlers with near real-time insights into customer tone.
- The network provider uses the AI-based speech analytics software tools to achieve the **~40% reduction in call handling training time spent by customer service teller**

Case Studies

Digital Customer Experience



Comviva partnered with VNPT Group to **deploy its flagship MobiLytix Marketing Studio solution**, deliver real-time, personalized, contextual communications, and **build a next-generation digital customer experience platform for our customers.**

Advanced 5G Services



Samsung Electronics and Orange partnered to **enhance Samsung Galaxy user experiences across Europe to implement device and technology testing** to prepare for the arrival of 5G standalone, promote the Samsung Galaxy multi-devices experience, and **enhance the mobile customer journey.**

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This Section includes

- Key Challenges and Solutions

**Challenges:** Over-The-Top (OTT) Voice Calling, Network Virtualisation, AI-based Smart Customer Communication, and Telecom Mobile Apps are the major telecommunications challenges



	Value Added Services	Network Management	Sales & Marketing	Customer Support
Challenges	<ul style="list-style-type: none"><li>Although almost every smart home device connects to a companion <b>smartphone app</b>, the best experience is being able to open a single app.</li><li><b>Making content compatible</b> with all devices is a key challenge OTT service providers face.</li></ul>	<ul style="list-style-type: none"><li>Through <b>rapid advancements in AI</b> and automation, network management has become one of the key generators of business value in the telecom industry.</li><li>The arrival of <b>5G has presented communication service providers</b> with an increasingly dynamic set of operational challenges.</li></ul>	<ul style="list-style-type: none"><li>ArcGIS provides a <b>collaborative system for managing customer interactions</b>, planning and developing regional strategies and tactics, and safeguarding the customer experience.</li><li>This helps telecommunications organizations foster better understanding and create effective action plans to serve customers.</li></ul>	<ul style="list-style-type: none"><li>The growing demand for <b>digital services</b> is a significant challenge for the telecom industry, which provides service to billions of customers worldwide. Therefore, the telecom industry needs fast and efficient digital customer service.</li><li><b>Mobile and web applications</b> are now essential in distributing bills and other miscellaneous materials to customers.</li></ul>
Solutions	<ul style="list-style-type: none"><li><b>Integrating smart home products</b> with the most popular smart home hubs allows users to use and schedule their favourite devices to turn on and off from a single app.</li><li><b>OTT service providers</b> must regularly update the packager to keep track of the new formats available and maintain total compatibility.</li></ul>	<ul style="list-style-type: none"><li>With 5G, the industry is evolving away from traditional network <b>resource management models</b>, where technology-related capacity, performance, and availability are key, and into an age of secure, high-performance, and service-driven networks.</li><li>As <b>network density and capacity increase</b>, service providers face a demand to reduce energy consumption across expanding network infrastructures.</li></ul>	<ul style="list-style-type: none"><li>ArcGIS can help CSPs increase revenue by <b>leveraging geospatial data and marketing or sales</b> analytics to locate high-growth areas and upsell opportunities.</li><li>ArcGIS Solutions can enable presales engineers and customer sales representatives (CSRs) to qualify customers in a quarter of the time.</li></ul>	<ul style="list-style-type: none"><li>Telecom companies should implement an <b>AI-based smart customer communication solution</b> that automatically manages customer service by using AI and offering self-service capabilities and smart omnichannel solutions that can upgrade their communication and customer experience.</li></ul>

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- Globalization Technology Footprint for APAC, EMEA, and AMERICAS

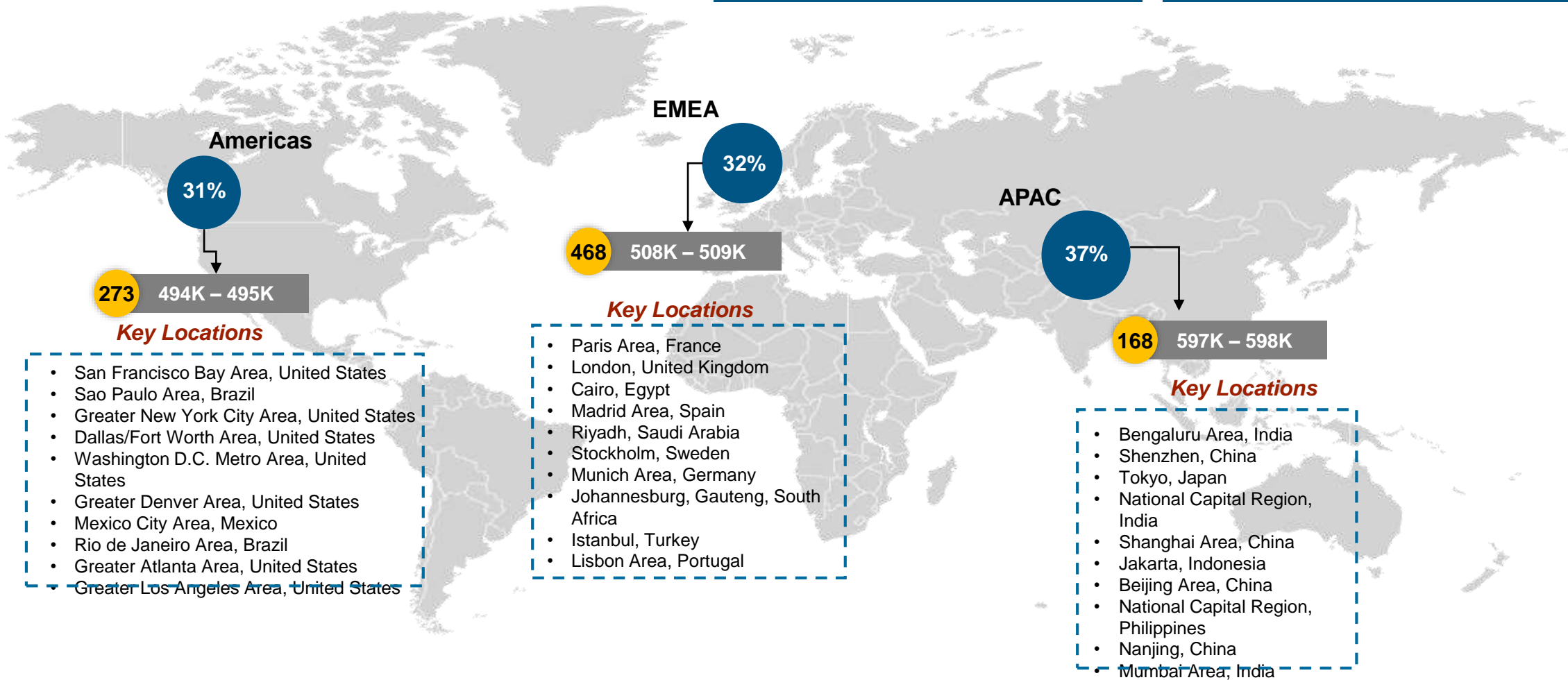
# Globalization Technology Footprint: APAC region dominates Telecommunication Industry’s global Technology workforce landscape



## Global Technology Footprint for Telecommunication

~909  
Total Number of Technology Locations

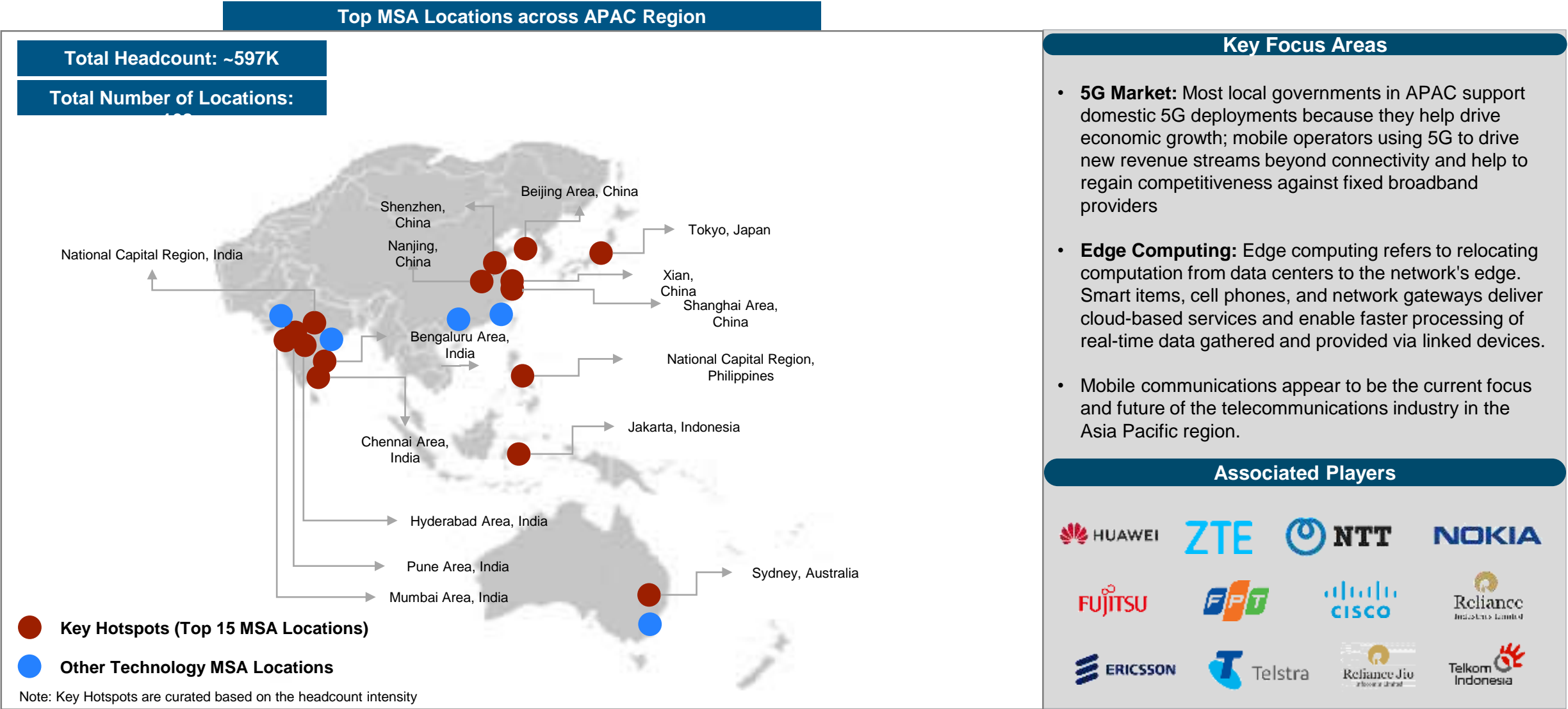
1600K – 1601K  
Total Number of Technology workforce Installed























Source: Draup Globalization Module, updated in December 2022  
Note: The represented data illustrates the number of centers by Geography and the bubble size is proportional to overall HC Installed in the area.



APAC Region Technology Footprint: Bengaluru Area, India, Shenzhen, China, and Tokyo, Japan are the major MSA Locations for APAC Region



## Key Location Highlights(1/2): Bengaluru Area, India, and Shenzhen, China has Core Network Engineer, Data Engineer, and Software Develop Engineer as the major job roles

Locations	Job Roles in Demand	Key Companies	Description
Bengaluru Area, India	<ul style="list-style-type: none"> <li>Core Network Engineer</li> <li>DevOps Infrastructure Engineer</li> <li>Data engineer</li> </ul>	   	<ul style="list-style-type: none"> <li>Providing timely responses to RFI / RFP ensuring a high standard of the answer reflecting Industry knowledge, identifying and linking win themes for the requirement</li> <li>Managed ongoing performance and maintained a superior level of quality service and support in delivering products and services, resulting in continued customer satisfaction.</li> </ul>
Shenzhen, China	<ul style="list-style-type: none"> <li>Software Develop Engineer</li> <li>5G Application Engineer</li> <li>Network solution Engineer</li> </ul>	   	<ul style="list-style-type: none"> <li>Define and develop a global Mobile product marketing strategy and assets, including Phone, Tablet, and wearable devices</li> <li>Led the global mobile territory marketing team to work with WW local marketing teams to roll out central marketing strategy and assets</li> </ul>
Tokyo, Japan	<ul style="list-style-type: none"> <li>Network Engineer</li> <li>Cloud Engineer</li> <li>Data Scientist</li> </ul>	   	<ul style="list-style-type: none"> <li>Owning key responsibility to making successful COD- Center of Deployment, India, to support global and regional teams by providing technical support, templates, and application images for successful delivery.</li> <li>Defined processes to streamline work transition of product development work from the USA and product support activities from the India development center.</li> </ul>
National Capital Region, India	<ul style="list-style-type: none"> <li>Software Engineer</li> <li>Software Test Engineer</li> <li>RAN Integration Engineer</li> </ul>	   	<ul style="list-style-type: none"> <li>Enterprise Business Sales, Business Development, Network Services Sales, International WAN/Satellite Network Services, Data Centre Solutions</li> <li>Global Voice and Data Sales, Business Strategy, International Telecom Business Development, P&amp;L Management, Alliances and Partnerships, Wholesale Voice/Data Product Development, Service Support and Assurance, Business Operations</li> </ul>
Shanghai Area, China	<ul style="list-style-type: none"> <li>Sales Engineer</li> <li>Software Engineer</li> <li>Research Engineer</li> </ul>	   	<ul style="list-style-type: none"> <li>Developed main slides, sell-in sheet, key selling points and brochures to support project bidding, to achieve business goals.</li> <li>Product lifecycle management in supply and inventory processes to avoid production delay and material loss.</li> </ul>

Source: Draup Globalization Module

Note: The Locations mentioned above are the key locations for Telecommunications in the APAC region

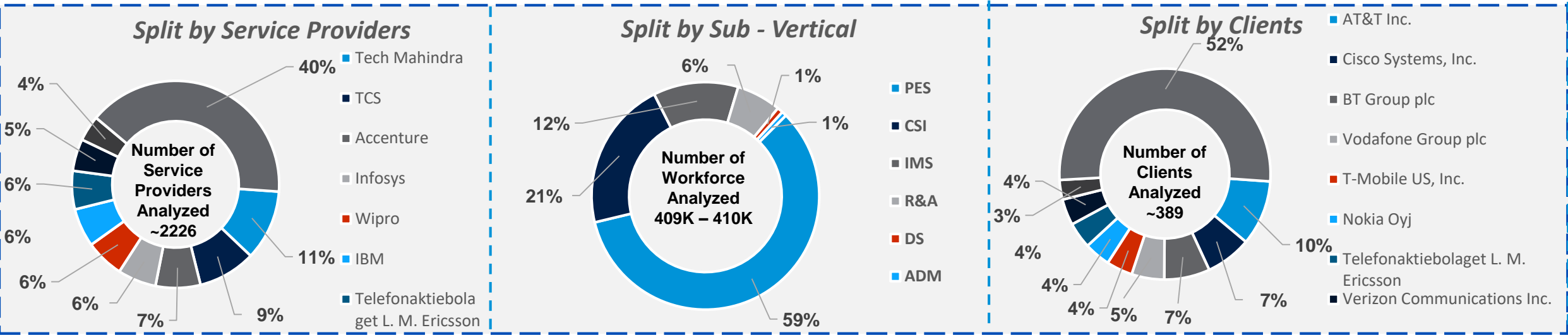
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This Section includes

- Vendor Analysis Overview
- Key subvertical snapshots

**Vendor Analysis:** Tech Mahindra, TCS, Accenture, Infosys, and Wipro are the leading service providers for the telecommunication



- #### Key Provider Locations

  - Bengaluru Area, India
  - Hyderabad Area, India
  - Pune Area, India
  - National Capital Region, India
  - Chennai Area, India
  - Mumbai Area, India
- #### Key Client Locations

  - Bengaluru Area, India
  - National Capital Region, India
  - Chennai Area, India
  - Pune Area, India
  - Mumbai Area, India
  - London, United Kingdom

#### Key Service Providers

#### Key Clients

1. CSI: Consulting & Service Integration

2. PES: Product Engineering Services

3. ADM: Application Development & Maintenance
4. IMS: Infrastructure Management Services

5. R&A: Reporting & Analytics

6. DS: Digital Services

Key Engagement Snapshots: Product Engineering Services

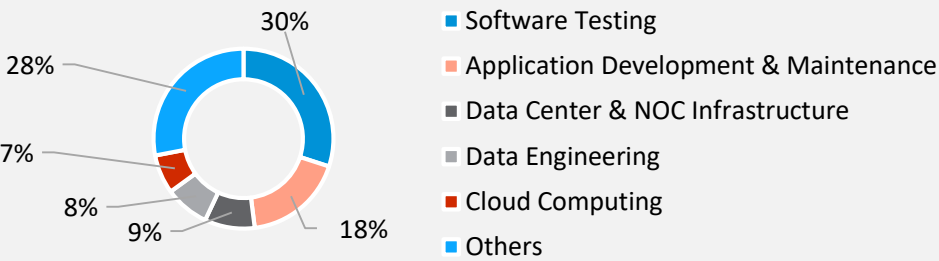


No. of Clients Analyzed  
~340

No. of Service Providers Analyzed  
~1585

Total Outsourcing Headcount  
240K – 241K

Split by Micro-Verticals



Top Service Providers

Tech Mahindra

tcs

ERICSSON

accenture

Infosys

wipro

HCL

IBM

amdocs

cognizant

Top Clients

AT&T

BT

CISCO

VI

T Mobile

verizon

ERICSSON

NOKIA

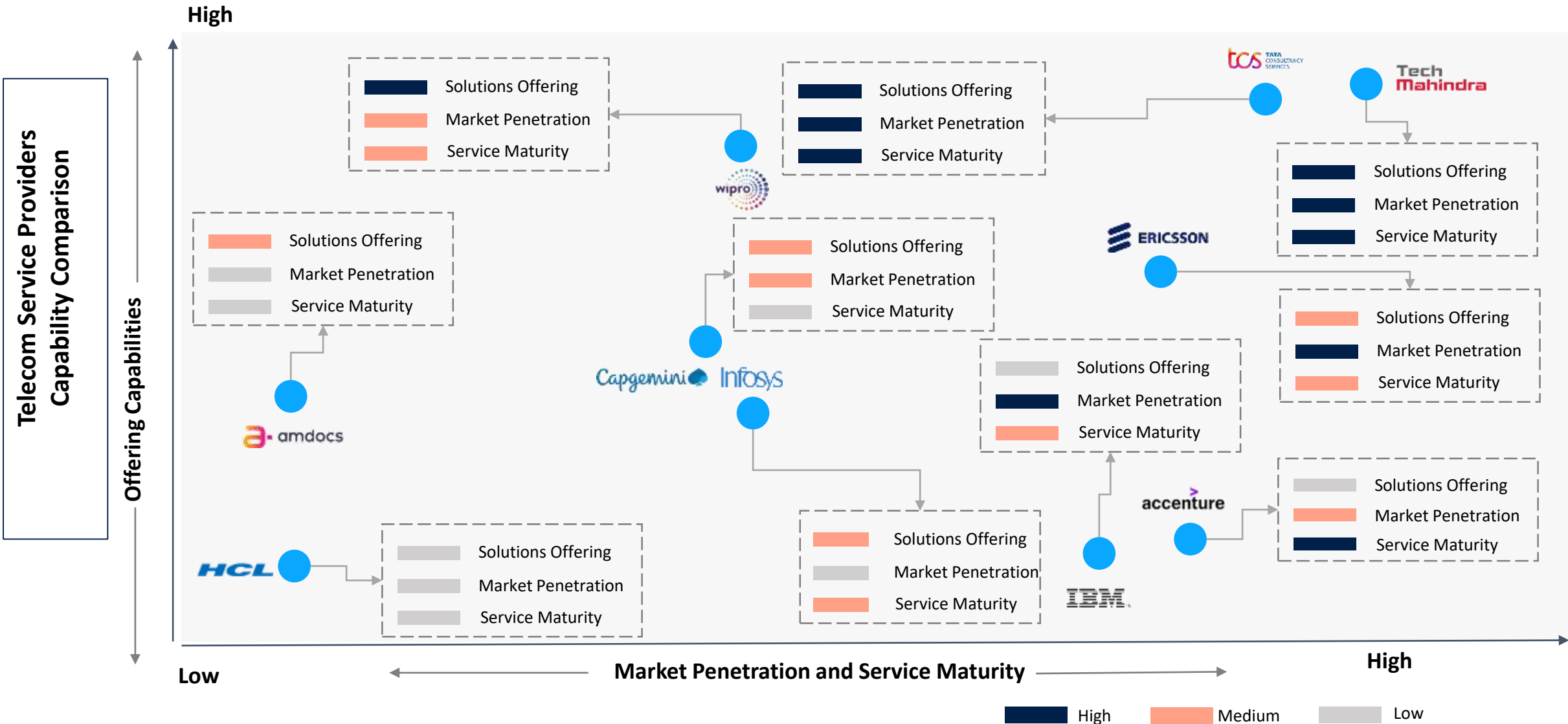
Telstra

airtel

Top Service Providers Engagement Snapshot			
Top Service Providers	Top Client MSA	Top Provider MSA	Key Workloads
Tech Mahindra	<ul style="list-style-type: none"><li>Bengaluru Area, India</li><li>National Capital Region, India</li></ul>	<ul style="list-style-type: none"><li>Pune Area, India</li><li>Bengaluru Area, India</li></ul>	<ul style="list-style-type: none"><li>Design, Development, and Implement Data Pipeline Reconciliation end to end using Data Pipeline Configuration Tool</li><li>Development of fiber plan for fiber cities</li></ul>
tcs	<ul style="list-style-type: none"><li>National Capital Region, India</li><li>Bengaluru Area, India</li></ul>	<ul style="list-style-type: none"><li>Hyderabad Area, India</li><li>Bengaluru Area, India</li></ul>	<ul style="list-style-type: none"><li>Preparation of test scenarios and test cases based on the requirement</li><li>Performance of Automation and Regression testing of various Protocols</li></ul>
ERICSSON	<ul style="list-style-type: none"><li>Bengaluru Area, India</li><li>National Capital Region, India</li></ul>	<ul style="list-style-type: none"><li>National Capital Region, India</li><li>Bengaluru Area, India</li></ul>	<ul style="list-style-type: none"><li>Performance of Digital BSS Solution Platform design for Product and Order Management</li><li>Performance of End-to-End troubleshooting for LTE-related issues</li></ul>
Top Clients Engagement Snapshot			
Top Clients	Top Client MSA	Top Provider MSA	Key Workloads
AT&T	<ul style="list-style-type: none"><li>Bengaluru Area, India</li><li>Dallas/Fort Worth Area, United States</li></ul>	<ul style="list-style-type: none"><li>Bengaluru Area, India</li><li>Pune Area, India</li></ul>	<ul style="list-style-type: none"><li>Design and Development of a new voice-based wireline Service</li><li>Design and Development of applications using java and spring</li></ul>
BT	<ul style="list-style-type: none"><li>National Capital Region, India</li><li>Bengaluru Area, India</li></ul>	<ul style="list-style-type: none"><li>Bengaluru Area, India</li><li>Pune Area, India</li></ul>	<ul style="list-style-type: none"><li>Performance of Support and Monitor Oracle Application instances</li><li>Creation of development and optimization ESB application Designing new API</li></ul>
CISCO	<ul style="list-style-type: none"><li>Bengaluru Area, India</li><li>San Francisco Bay Area, United States</li></ul>	<ul style="list-style-type: none"><li>Bengaluru Area, India</li><li>Hyderabad Area, India</li></ul>	<ul style="list-style-type: none"><li>Development of web-based application using Angular and spring boot</li><li>Perform Regression Testing, Unit Testing, and Testing using Python Selenium</li></ul>

Source: DRAUP’s proprietary Outsourcing module, updated in December 2022, outsourcing details mentioned above are only some of the ongoing projects and not exhaustive.

**Service Providers Capability Comparison:** Tech Mahindra, TCS, and Wipro are the leading telecom service providers delivering solutions to the major players in the Telecom market








**Note:** Y-axis shows Offering Capabilities- Intensity of solutions and initiatives  
The X-axis shows the intensity of Market penetration and Service Maturity.



**Service Provider Overview (1/2):** Service providers are offering 5G Computing, Network Monitoring and Automation, and Wireless Solutions to their clients



<div><div></div><div></div><div></div><div></div><div></div></div>				
<i>Tech Mahindra provides engineering solutions for key technology areas in Wireless, Wireline, Unified Communications, Core Networks, Optical Transport, Switching &amp; Signaling, SDN/NFV &amp; Smart Devices.</i>	<i>TCS Communication Business Operations span the value chain of communication service providers, consumers, and enterprises based on managed services and outcome-based operating and commercial models</i>	<i>Accenture’s data-driven, open-platform models and agile services are scalable and designed to drive growth across the business.</i>	<i>The Infosys Communication Services practice offers network solutions that meet the connectivity needs of digital consumers and enterprises.</i>	<i>Wipro helps Network Edge Providers by enabling them to foster innovation, transform customer experience and accelerate time to market in a rapidly changing world.</i>
Key Telecom Solutions				
<ul style="list-style-type: none"><li>❑ Wi-fi Offload</li><li>❑ EPC Application Framework</li><li>❑ Product Customization &amp; Enhancement</li><li>❑ 5G Ready Device Testing &amp; Certification</li><li>❑ Sustenance &amp; Support</li></ul>	<ul style="list-style-type: none"><li>❑ Billing And Revenue Assurance Services</li><li>❑ Network Management</li><li>❑ Fibre Rollout Services</li><li>❑ Service Management</li><li>❑ Next-gen Operation Services</li></ul>	<ul style="list-style-type: none"><li>❑ Network Services</li><li>❑ Cybersecurity</li><li>❑ Network Engineering And Optimization</li><li>❑ 5G Business/Technology Strategy</li></ul>	<ul style="list-style-type: none"><li>❑ Network Function Virtualization (NFV)</li><li>❑ Software-Defined Networking (SDN)</li><li>❑ LAN/WAN Monitoring</li><li>❑ Intelligent Alerting</li></ul>	<ul style="list-style-type: none"><li>❑ Ai-based Automated Network Planning</li><li>❑ Automated Network Configuration</li><li>❑ Ai-based Cross-domain Correlation Of Events</li></ul>
Key Strengths				
<ul style="list-style-type: none"><li>❑ Rich Communication Services</li><li>❑ ROBOT Automation Platform</li><li>❑ Highly Versatile And Customizable Solutions</li></ul>	<ul style="list-style-type: none"><li>❑ Increase Net Promotor Score</li><li>❑ Reduce Opex And Capex</li><li>❑ Enhance Customer Experience</li><li>❑ Improved First Time Resolutions</li></ul>	<ul style="list-style-type: none"><li>❑ Immersive Customer Experiences</li><li>❑ Next-gen IP Services</li><li>❑ Open Digital Architecture (ODA)</li></ul>	<ul style="list-style-type: none"><li>❑ Bouquet Of Administration And Maintenance Services</li><li>❑ Cyber Security Services For Critical Infrastructure</li></ul>	<ul style="list-style-type: none"><li>❑ Self-optimizing Networks</li><li>❑ Smart Field Operations</li><li>❑ Flow-through Network Build</li></ul>

**Source:** Company Whitepapers, Product Portfolio (Tech Mahindra, TCS, Accenture, Infosys, and Wipro)  
**Note:** Key strengths are derived from the company’s portfolios, recent technological initiatives, and enhancement in their solution offerings



01	Global Telecom Market Overview
02	Digital Framework
03	Themes Deep Dive
	I Value-added Services
	II Network Management
	III Sales & Marketing
	IV Customer Support
04	Challenges
05	Globalization Technology Footprint
06	Vendor Analysis
07	Key Focus Areas



This Section includes

- Key Focus Areas

**Focus Areas:** Internet of Things, Cloud Computing, 5G Deployment, Artificial Intelligence and Machine Learning are some of the major focus areas for telecommunications sector



### Cloud Computing

- Telecom companies and **cloud** service providers collaborate to **enhance data centers and complete server utilization**.
- **With cloud computing services**, Communications Service Providers can broaden a set of offered services and transform into **digital service providers (DSPs)**.
- Telecom companies leverage vast tools and services provided by public clouds.
- **Cloud services** based on **edge computing** bring many benefits like **network performance improvements, low latency, and high bandwidth**.



### Internet of Things

- The implementation of **IoT solutions in telecom companies** can offer **business analytics, ensure safety at remote sites, and monitor equipment**.
- IoT offers solutions such as **asset tracking, equipment monitoring, and condition-based maintenance for the telecom sector**.
- **IoT-powered Tower Operations Center** can collect and analyze data from cell towers to monitor key performance indicators of active and passive equipment at remote sites.



### 5G Deployment

- **5G networks** allow Telecommunications to target enterprises with 5G-related applications **specifically built for industries and enable digitization**.
- 5G adoption will allow telecommunications to enhance Industry 4.0, powering **machine-to-machine communication and demand-driven supply chains**.
- Telecommunications industry will get faster connectivity, low latency, **enhanced bandwidth, and connectivity** speed by deploying 5G technology.



### AI and ML Integration

- **Artificial Intelligence** is leveraged by Telecommunication players to predict peak traffic, provide **better end-to-end service, and enhance connectivity**.
- By using AI, Telcos can process and analyze large volumes of big data and gain access to actionable insights that can be used to **enhance customer experience and improve operations and profitability**.
- Telcom providers can use AI and machine learning techniques to optimize network performance and **streamline their business processes for higher profit**.

### Key Technologies Involved

Artificial Intelligence



Cloud Computing



Big Data



Machine Learning



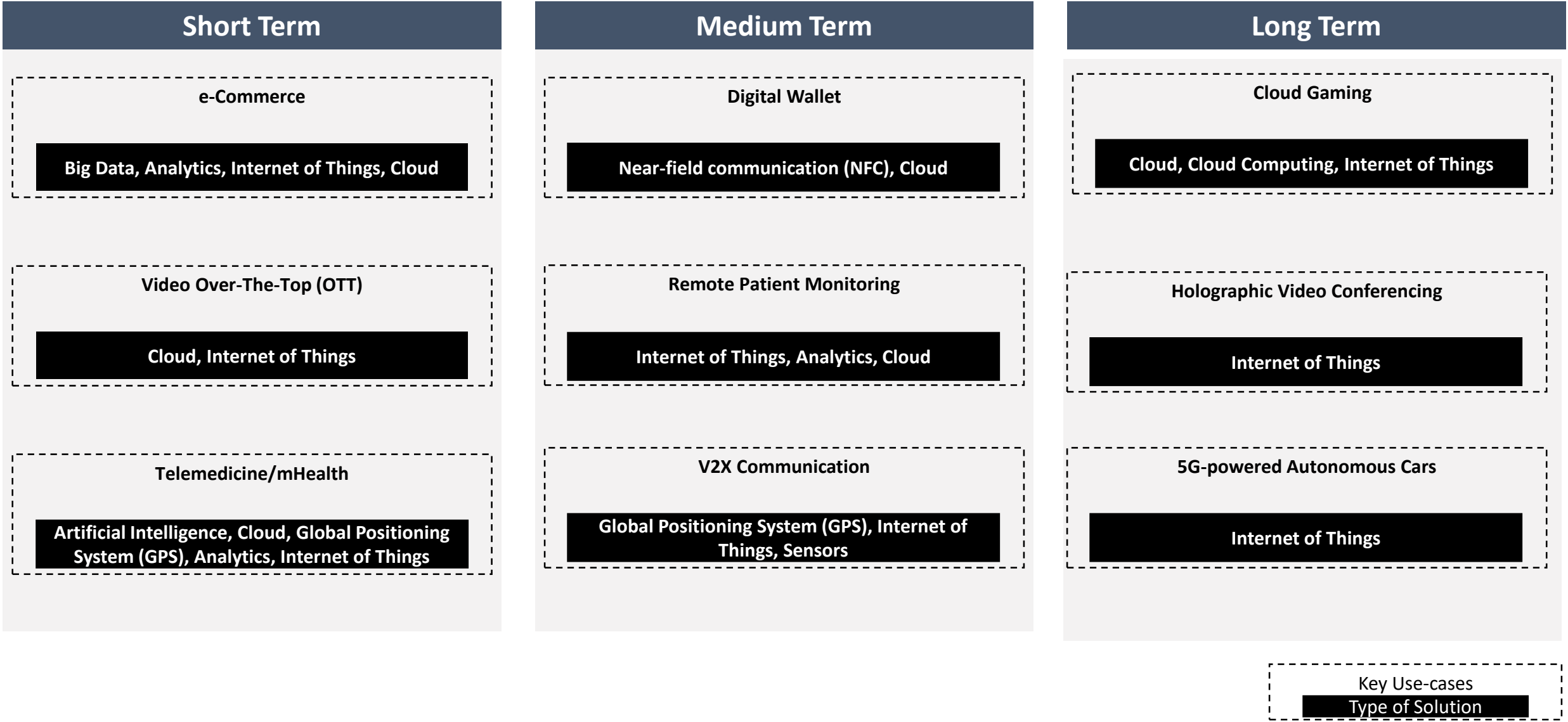
Robotic Process Automation



Cloud



**Value-added Services - Opportunities:** V2X Communication, mHealth, e-Commerce, and Digital Wallet are the major use cases for Value-added Services





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