TELECOM INFRA PROJECT®

The AI Opportunity for Telecoms

TelcoAI Project Group

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Change Tracking

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Introduction - AI in Telecoms

1. Introduction - AI in Telecoms

The ability to utilize Artificial Intelligence (AI) is becoming critically important for telecommunications companies (Telecom Operators) for several interconnected reasons, primarily revolving around driving new growth, improving efficiency, and maintaining competitiveness in a rapidly evolving market. Few of the main reasons to deploy AI are listed below.

1.1 Generating New Revenue Streams

- **Counteracting Declining Traditional Revenue:** For many Telecom Operators, revenue growth has remained flat and has been outpaced by the cost to meet the capacity demand for the services running across the network. As a result, Telecom Operators tend to prioritize efficiency and cost optimization initiatives, often to the detriment of developing new revenue streams beyond core services such as connectivity.

- **AI-as-a-Service (AIaaS):** Telecom Operators can leverage their real-estate, infrastructure (data centers, edge locations) and expertise to offer AI platforms, tools, computing power (like GPU-as-a-Service), model training, and data curation services directly to enterprise customers. This includes opportunities to offer sovereign AI infrastructure requested by many governments.

- **Data Monetization:** Telecom Operators possess vast amounts of network and customer data. AI allows them to analyze this data (while respecting privacy regulations) to generate valuable insights, offer targeted advertising, location-based services, and data analytics packages to other businesses.

- **Enhanced Service Offerings:** AI can be embedded into existing services or enable new ones, like AI-optimized private 5G networks for enterprises, AI-optimized home networks, or advanced security solutions.

1.2 Improving Operational Efficiency and Reducing Costs

- **Operations Automation:** AI, including Generative AI, can automate repetitive tasks in network management, IT operations, , and back-office processes. This significantly reduces operational expenditures (OPEX), which remain high for many Telecoms Operators.

- **Network Optimization:** AI algorithms analyze network performance data in real-time to predict traffic patterns, optimize resource allocation, automate network configuration, and perform predictive maintenance. This improves network quality, reduces downtime, and minimizes energy consumption.

- **Enhanced Productivity:** AI tools can act as "co-pilots" for employees, assisting with tasks like software development, data analysis, and knowledge management, boosting overall workforce efficiency.

1.3 Enhancing Customer Experience (CX) and Retention

- **Hyper-Personalization:** AI analyzes customer data to understand individual behavior and preferences, allowing Telecom Operators to offer highly personalized marketing campaigns, product recommendations (Next Best Action/Offer), and tailored service experiences.

- **Improved Customer Service:** AI-powered chatbots and virtual assistants provide instant responses to customer queries, while AI tools can assist human agents, leading to faster issue resolution, reduced customer effort, and increased satisfaction. This can reduce churn and build loyalty.

1.4 Staying Competitive and Enabling Transformation

- **Competitive Edge:** As AI becomes more integrated into business operations across industries, Telecoms Operators that successfully implement and monetize AI gain an advantage over slower adopters.

- **Transition to "Techcos":** To survive and thrive, Telecom Operators need to evolve beyond being mere connectivity providers. Embracing and monetizing AI is central to transforming into more agile, automated, data-driven "techcos" capable of offering a wider range of digital services.

- **Leveraging Infrastructure:** AI provides new ways to leverage Telecom Operators' existing assets, such as data centers and network infrastructure, by positioning them as key players in the AI compute and edge AI ecosystem.

In essence, AI monetization is not just an opportunity but a strategic imperative for Telecom Operators. It allows them to unlock new value from their data and infrastructure, significantly cut operational costs, deliver superior customer experiences, and ultimately build more sustainable and profitable business models for the future.

2

TelcoAI and Monetization

2. Monetization Strategies for Telecommunication Operators

For Telecom Operators, the main strategies are focused in two areas, operational optimization and the offering of enhanced/new services for monetization:

2.1 Enhancing Operational Efficiency

The primary focus here for the Telecom Operator is to reduce OPEX and minimize CAPEX spend through initiatives such as:

1. **AI enhanced Network Maintenance and Fault Management**

    - **Overview:** Traditional Telecom Operator network maintenance and operations rely on customized siloed tools, manual processes and a reactive-first approach, which is brought together through a significant level of human expertise. When a component failure occurs, the component is identified, isolated and exchanged. Whilst this has evolved and been improved greatly with the use of automation, AI will look to further enhance this, for example, by predicting component failure and issuing a work request to pre-emptively replace this.

    - **Data Required:** Historical equipment failure logs, network performance data (latency, jitter, error rates), sensor readings from network hardware (temperature, vibration), weather data, network load patterns, energy consumption.

    - **How it Reduces OPEX:** Instead of reacting to failures (reactive maintenance) or performing routine checks regardless of need (preventive maintenance), Telecom Operators analyze this data to predict *when* and *where* network equipment (like cell tower components, routers, fiber optic lines) is likely to fail.

- **Outcome:** Allows scheduling of maintenance proactively *before* failure, reducing costly emergency repairs, reducing of unused spare parts, minimizing network downtime (which itself incurs costs and customer dissatisfaction), optimizing technician deployment (fewer truck rolls, better routing), and extending equipment lifespan.

2. **Network Performance Optimization**

   - **Overview:** Customers expect service performance according to the contracted SLA**.** Traditionally, the optimization of network performance is dependent on a set of static rules and periodic audits, such as the expected network traffic load throughout the day for example. Should Telecom Operators fail to meet their SLAs, customers and subsequent revenues could be lost due to network performance degradation and outages. AI can enhance this by enabling systems to be more adaptive, providing optimization in a continuous and real-time manner.

   - **Data Required:** Real-time network traffic data, Quality of Service (QoS) metrics, application usage patterns, cell load data, spectrum utilization data.

   - **How it Reduces OPEX:** AI/ML models analyze this data to automatically adjust network configurations. This includes optimizing traffic routing, dynamically allocating bandwidth and spectrum, load balancing across cells, and identifying areas needing capacity upgrades *before* they become critically overloaded.

   - **Outcome:** More efficient use of existing network resources reduces the need for immediate, costly infrastructure upgrades. Automated adjustments decrease the need for manual intervention by network engineers, lowering labor costs.

3. **Customer Service Automation and Optimization**

    - **Overview:** Traditional customer service is reactive and heavily labour intensive. While chatbots have helped to mitigate this, AI agents can assist greatly in resolving customer queries and providing an enhanced service experience.

    - **Data Required:** Call center logs, chat transcripts, customer relationship management (CRM) data, website interaction data, common query topics, trouble ticket history.

    - **How it Reduces OPEX:** Analyzing customer interactions helps identify frequently asked questions or common simple problems. This data informs the development and improvement of AI-powered chatbots, virtual assistants, and self-service portals that can handle these issues automatically. For human agents, AI can analyze call data in real-time to provide "agent assist" functions, suggesting solutions or relevant knowledge base articles.

    - **Outcome:** Reduces call volume to human agents, lowers Average Handling Time (AHT) for calls that do require human intervention, improves First Call Resolution (FCR) rates (reducing repeat calls), and decreases overall customer service labor costs.

4. **Energy Consumption Optimization**

    - **Overview:** Telecom networks consume vast amounts of power, most of the operations do not care about the real network load, therefore a lot of energy is consumed just to power empty networks. Operators would like to change the situation and decrease costs for energy and decrease carbon footprint.

    - **Data Required:** Energy consumption data from network sites (base stations, routers, data centers), network traffic load data, time-of-day

energy pricing, energy cost per 15 min; weather conditions.

- **How it Reduces OPEX:** Analyzing this data allows Telecom Operators to identify energy inefficiencies. AI models can predict periods of low network demand and automatically power down or place specific network components into low-energy modes without impacting service quality.

- **Outcome:** Significant reduction in energy costs, which are a major component of network OPEX.

5. **Fraud Detection and Prevention**

   - **Overview:** Traditionally, fraud detection management is reactive and bound by a set of rules tied to a specific area. With AI, more adaptive systems with cross-domain correlation could be developed to enhance preventative measures and automated mitigation.

   - **Data Required:** Call Detail Records (CDRs), data usage patterns, account login activity, location data, transaction records.

   - **How it Reduces OPEX:** ML algorithms analyze usage patterns to detect anomalies indicative of various types of fraud (e.g., SIM cloning, subscription fraud, International Revenue Share Fraud - IRSF).

   - **Outcome:** Early detection and prevention of fraudulent activities directly reduce financial losses that would otherwise increase operational costs.

6. **Network Infrastructure Field Services Optimization**

   - **Overview:** Ensuring that commissioning, upgrade and repair activities are carried out efficiently across the network are crucial for ensuring service availability and controlling costs. With AI, vast amounts of network data can be utilized in real-time to further enhance field service work to enable

better decision making and ensuring network uptime.

- **Data Required:** Technician schedules, job locations, real-time traffic data, predicted equipment failure data (from predictive maintenance), spare parts inventory levels.
- **How it Reduces OPEX:** Data analysis optimizes technician dispatching, routes, and scheduling. It ensures technicians are sent to the right place at the right time, potentially with the correct spare parts for an anticipated failure.
- **Outcome:** Reduces travel time, fuel consumption, and labor costs associated with field service operations. Improves the efficiency of repairs and installations, minimizing repeat visits.

7. **Enabling New Services**

- **Overview:** Traditional new service enablement is linear and rigid in nature. AI can transform this process into one that is more adaptive and personalized for customers.
- **Data Required:** Network data, service specification, network topology, automation systems.
- **How it enables a service:** AI driven optimization or activation of the network functions to support new services. For example, AI driven network slicing, AI driven resource allocation, AI SD-WAN automatic configuration.
- **Outcome:** Provides network capabilities to deliver new service to the end customer. i.e. network performance assurance for prime customers, or first responders, connection and data transfer for hundreds of thousands of IoT devices (Smart City, Entertainment, Avatar chatbots, AI retail

chatbots).

8. **Network Planning and Scaling**

    - **Overview:** Networks are traditionally viewed as static assets for the Telecoms Operator. With AI driven network planning, the network could be transformed into something more dynamic and agile for the services it carries.

    - **Data Required:** Network topology, site location, transport and backbone, customer generated traffic, customer locations.

    - **How it Reduces OPEX:** Data analysis optimizes network sizing and network system resource planning (Hardware).

    - **Outcome:** Precise Hardware deployment driven by demand with minimum overhead.

2.2 Providing AI and Inference Services

Operators can potentially monetize their investments offering AI inference services to their enterprise customers:

1. **Offer AI-Accelerated Edge Compute (IaaS/CaaS Model)**

    - **Overview:** Renting out virtual machines, containers, or bare-metal servers located in edge data centers that are specifically equipped with hardware accelerators optimized for AI inference (like GPUs, NPUs, or FPGAs).

    - **Monetization:** Charge enterprises based on the compute resources consumed (e.g., per hour, per GPU instance), data transfer, and potentially the type of accelerator used.

- **Enterprise Value:** Access to powerful, low-latency inference hardware close to their data sources without the capital expenditure and management overhead of owning it. Ideal for companies with their own AI models ready to deploy.

2. **Provide Managed Inference Platforms (PaaS Model)**

   - **Overview:** Offering a managed platform deployed at the edge designed specifically for running and scaling inference workloads. This could include optimized operating systems, container orchestration (Kubernetes), inference serving software (like NVIDIA Triton Inference Server, KServe, Open Platform for Enterprise AI), model management tools, monitoring, and APIs for easy integration.

   - **Monetization:** Subscription fees for the platform, potentially tiered based on features, number of models deployed, or inference requests processed. Could also include charges for underlying compute resources.

   - **Enterprise Value:** Simplifies the deployment, scaling, and management of AI inference models at the edge, allowing enterprise data science and development teams to focus on their models rather than the infrastructure, sovereign environment.

3. **Deliver End-to-End Managed AI Inference Services**

   - **Overview:** Offering fully managed, vertical-specific solutions that perform inference at the edge. The Telecoms Operator (often with partners) manages the edge infrastructure, platform, connectivity, deployment of pre-trained or customer-provided models, and ongoing operations.

   - **Monetization:** Typically a recurring fee (subscription) based on the solution's value, number of endpoints (e.g., cameras analyzed, machines monitored), or specific outcomes achieved.

- **Enterprise Value:** A turnkey solution for businesses that need specific AI capabilities (like real-time video analytics or predictive maintenance) but lack the in-house expertise or desire to build and manage the underlying AI/edge stack.

- **Examples:**

  - **Real-Time Video Analytics:** For retail (footfall, queue length, shelf stock analysis), smart cities (traffic flow, public safety monitoring), manufacturing (quality control defect detection), or venue security.

  - **Industrial IoT Predictive Maintenance:** Analyzing sensor data (vibration, temperature) via edge inference to predict equipment failures in factories or critical infrastructure.

  - **AR/VR Assistance:** Performing real-time object recognition, spatial mapping, or rendering inference at the edge to support augmented reality overlays for field technicians or immersive VR training.

  - **Voice/Speech Recognition:** Local processing for voice commands or transcription in environments where service assurance or privacy is critical (e.g., healthcare, specific industrial controls).

4. **Sell Optimized Network Services for Edge Inference**

   - **Overview:** Offering premium network connectivity, particularly via 5G network slicing, that guarantees the ultra-low latency and/or high bandwidth required for specific edge inference applications (e.g., connecting sensors to the edge node or the edge node back to a central system).

   - **Monetization:** Charging a premium for these guaranteed network Quality of Service (QoS) slices tailored for AI workloads.

- **Enterprise Value:** Ensures the network performance necessary for real-time inference applications to function reliably, which standard best-effort connectivity might not provide.

5. **Develop an Edge AI Marketplace**

   - **Overview:** Creating a platform where enterprises can discover, deploy, and manage pre-trained AI inference models (developed by the Telecom Operator or third-party AI vendors) that are optimized to run on the Telecom Operator's edge infrastructure.

   - **Monetization:** Revenue sharing with model/application providers, charging enterprises per inference call, subscription fees for access to certain models, or bundling model access with edge compute resources.

   - **Enterprise Value:** Accelerates deployment by providing access to ready-to-use solutions, reducing the need for enterprises to train their own models from scratch for common tasks.

By focusing on these inference-centric offerings, Telecom Operators can leverage their distributed edge locations and network capabilities to provide high-value AI services that meet the growing enterprise demand for real-time intelligence and automation closer to where data is generated.

2.3 Enabling and accelerating AI innovation

Given how rapidly the state of AI capabilities evolve, it is critical for Operators to ensure they can drive their AI initiatives in a timely fashion and adapt as required. For this purpose, 3rd party AI-driven application companies are perfectly placed to assist Operators, given their level of expertise in specific industry domains/technologies, while also being at the forefront of development within AI. Some examples where these specialist companies could play a role include:

1. **Consume Edge Infrastructure/Platform as a Service (IaaS/PaaS)**

    a. **How it works:** 3rd party AI companies can act as direct customers of the Telecoms Operator. They rent AI-accelerated compute resources (VMs, containers, bare metal with GPUs/NPUs) or utilize managed platforms (like Kubernetes or specialized inference servers) offered by the Telecoms Operator at its edge locations.

    b. **Benefits:** The 3rd Party AI Company gains immediate access to edge hardware and managed environments close to end-users, enabling low-latency inference. This significantly reduces the 3rd Party AI Company's upfront infrastructure costs (CapEx) and time-to-market. They manage their application deployment and customer relationships.

2. **Integrate with Telecoms Operator Edge Platforms**

    a. **How it works:** Companies can integrate their inference software or AI models *onto* specific edge platforms managed or offered by the Telecoms Operator. This might involve certifying their software to run smoothly within the Telecoms Operator's environment (e.g., a specific MEC platform or an edge cloud stack like AWS Outposts managed via the Telecoms Operator).

    b. **Benefits:** Leverages the Telecoms Operator's potentially optimized and managed platform, potentially simplifying deployment, orchestration across multiple edge sites, and operations. It can also lead to co-marketing opportunities.

3. **Participate in Telecoms Operator Edge Marketplaces**

    a. **How it works:** Telecom Operators may operate marketplaces showcasing edge-native applications and services to their enterprise customers. 3rd

Party AI Companies can list their AI inference applications, pre-trained models, or full solutions on these marketplaces.

b. **3rd Party AI Company Benefit:** Gains visibility and direct access to the Telecoms Operator's established enterprise customer base. This simplifies customer acquisition and potentially offers streamlined deployment and billing integration via the Telecoms Operator platform.

4. Form Joint Go-to-Market (GTM) Partnerships

a. **How it works:** The 3rd Party AI Company partners directly with the Telecoms Operator to create bundled solutions. The 3rd Party AI Company provides the specialized AI inference software/model, while the Telecoms Operator provides the edge infrastructure, 5G connectivity, sales channels, and potentially system integration or managed services.

b. **3rd Party AI Company Benefit:** Allows the 3rd Party AI Company to leverage the Telecom Operator's brand, market reach, and enterprise relationships to sell sophisticated edge AI solutions, often targeting specific vertical industries (e.g., manufacturing, retail, healthcare).

5. Utilize Telecoms Operator Network APIs and Capabilities

a. **How it works:** The 3rd Party AI Company designs its inference service to take advantage of specific network capabilities exposed by the Telecoms Operator through APIs. This could involve requesting dedicated low-latency 5G network slices, using real-time network quality information, or incorporating precise location data to enhance the inference service.

b. **3rd Party AI Company Benefit:** Creates a differentiated and potentially superior inference service by tightly coupling the AI application with the advanced features of the Telecoms Operator's network, offering performance or context-awareness that generic cloud solutions cannot match.

By pursuing these strategies, AI 3rd Party AI Companies can effectively "rent" the critical edge infrastructure and network capabilities from Telecom Operators, allowing them to focus on their core AI expertise and deploy powerful, low-latency inference services to enterprise customers much faster and more economically than building everything themselves.

3. Conclusion

Effective collaboration within the telecoms industry is the cornerstone of success to tackle the numerous challenges that the adoption of AI brings, where we may see a distinct change in consumer consumption of services, increasing regulatory pressures and a keen focus on data sovereignty and security as examples.

Within TIP, a strong community of like-minded organizations (Telecom Operators, Suppliers and Systems Integrators) work closely to tackle these challenges and continue to accelerate innovation within the telecoms industry. BTIP Project Groups, such as the TelcoAI PG, collaborate to deliver use-case and technical requirements documents, encouraging the community for building innovation and validating the implementations through to PoCs, testing and trials. Through the Project Group, the learnings are shared within the community with a feedback loop for continued improvement.

In addition, TIP Academy provides a general training curriculum for workforce upskilling and certification, based on real-world development within the industry.

As a TIP member we invite you to participate in the above in order to monetize your Data and network. By creating POCs, blueprints and partnerships, we create repeatable motions at Telecom Operators.

Please contact us to express your interest and how you would like to contribute.

Glossary

AIaaS

AI as a Service

API

Application Programming Interface

CaaS

Container as a Service

FPGA

Field-programmable gate array

GPU

Graphics Processing Unit

IaaS

Infrastructure as a Service

MEC

Multi-Access Edge Computing

ML

Machine Learning

NPU

Neural Processing Unit

PaaS

Platform as a Service

VM

Virtual Machine