SKOCH GROUP
GROWTH | LIVELIHOODS | EQUITY
www.skoch.in

CASE STUDY # 137

JIO PLATFORMS LIMITED

Featuring 5G SA Core, Open RAN, JCP, Private 5G, Edge Platforms, Quantum-ready solutions and Agentic AI

Abstract

The global telecommunications ecosystem is increasingly determined by 5G, artificial intelligence, cloud-native networks, edge computing and quantum-safe security. Yet much of it still relies on proprietary technologies, fragmented vendor stacks and imported network platforms. Jio Platforms Limited (JPL) responds by building an indigenous digital infrastructure ecosystem that integrates 5G Standalone (SA) Core, Open RAN, Private 5G, Jio Cloud Platform (JCP), Edge Compute, Quantum-Ready Security and Agentic AI through JioBrain into a unified technology stack.

Operational since 2023 and continuously evolving through 2025, the platform powers over 500 million users, more than 1.2 million 5G cells, over 265 million live 5G SA subscribers and more than 9.3 million AirFiber homes. Designed as a sovereign, cloud-native, AI-driven and export-ready architecture, the ecosystem reduces vendor dependence, lowers operating costs, increases security and accelerates the delivery of next-generation digital services. The initiative demonstrates how indigenous innovation can create globally competitive telecom infrastructure while supporting national digital sovereignty, enterprise transformation and future 6G readiness.

Introduction

Jio Platforms initiated a multi-year transformation journey to create India's first fully indigenous, end-to-end digital infrastructure stack. This project integrates cloud-native 5G Core, Open RAN, Private 5G, Edge Platforms, AI-powered automation, quantum-safe security systems and JioBrain, an industry-agnostic distributed machine-learning platform.

The ecosystem has been deployed at a national scale and supports more than 500 million users while carrying a significant share of India's wireless traffic. The platform powers over 265 million live 5G SA subscribers and more than 9.3 million AirFiber homes through an integrated architecture spanning 5G SA, 4G, fixed wireless access and enterprise services.

A characteristic of the initiative is its sovereign technology approach. JPL developed a unified stack encompassing Open RAN, cloud-native core networks, AI-native operations, Private 5G, edge computing, cybersecurity, quantum-safe networking and cognitive automation rather than relying on conventional telecom vendor ecosystems. The result is a future-proof digital infrastructure platform designed for India's needs and for global replication through standards-based, export-ready architectures.

The Problem Statement

The telecommunications industry is undergoing an unprecedented transformation, driven by exponential data growth, enterprise digitisation, Industry 4.0 adoption and emerging cyberattacks. Traditional telecom architectures, heavily dependent on proprietary vendors and siloed systems, are increasingly struggling to deliver the flexibility, scalability, security and economics required for next-gen networks.

The main challenge was excessive dependence on global technology vendors across the network core, radio access networks, cloud infrastructure and security ecosystems. Such dependence limited flexibility, increased costs and constrained innovation.

The second challenge involved rising network operating expenditure. Traditional network operations relied heavily on manual interventions, fragmented operational systems and isolated workflows, resulting in losses and delayed optimisation.

A third challenge was the limited availability of AI-based automation at national scale. As networks expanded to millions of cells and hundreds of millions of users, conventional management approaches became increasingly difficult to sustain.

The fourth challenge was the growing demand for enterprise-grade connectivity capable of supporting Industry 4.0 applications, smart factories, healthcare networks, campuses, logistics hubs and mission-critical use cases.

The fifth challenge appeared from emerging cybersecurity dangers and the long-term impacts of quantum computing. Existing cryptographic frameworks may eventually become vulnerable to quantum-enabled attacks, underscoring the need for future-ready, sovereign security architectures.

Meeting these challenges required a comprehensive rethinking of telecom infrastructure, from the network core to radio systems, cloud platforms, AI frameworks, security architectures and enterprise connectivity models. This rethinking set the stage for the strategic vision that followed.

Strategic Vision

Jio Platforms envisioned a sovereign digital infrastructure ecosystem capable of supporting India's digital future while reducing dependence on imported technologies. The vision was to build a unified, cloud-native architecture that integrates core networks, radio access infrastructure, cloud platforms, cybersecurity, artificial intelligence, edge computing and enterprise connectivity into a single operational system.

The organisation sought to establish India's first indigenous digital infrastructure stack that could operate at national scale while remaining export-ready and globally competitive. Fundamental to this vision was the belief that future networks must be AI-native, software-defined, cloud-agnostic, quantum-safe and highly automated. The initiative therefore focused on building indigenous capabilities across 5G SA Core, Open RAN, Private 5G, Jio Cloud Platform, JioBrain and quantum-ready security.

The strategic objective surpassed telecommunications. By enabling affordable connectivity, protecting digital sovereignty, supporting enterprise transformation and creating future-ready infrastructure for 5G, 6G and Industry 4.0 applications, JPL intended to create a technology foundation for India's wider digital and economic ambitions.

Solutions Stack

The transformation was implemented through an integrated technology architecture consisting of linked components. These components work together across the ecosystem to deliver the capabilities described below.

At the heart of the ecosystem is JPL's indigenous cloud-native 5G SA Core platform. Integrated across 5G SA, 4G and fixed wireless access services, the platform enables more than 265 million live 5G SA subscribers and over 9.3 million AirFiber homes. It supports network slicing for distinct business segments, operates in multi-cloud environments including Azure and GCP and incorporates quantum-safe encryption capabilities. The platform is also available as the HyperLite Series, enabling "5G-in-a-Box" deployments for enterprises and Private 5G networks.

JPL developed an O-RAN-compliant architecture that supports multi-vendor interoperability and full disaggregation of O-RU, O-DU and O-CU. The solution includes software-defined radios, intelligent scheduling, native VoNR support, N26 interworking and integration with AI/ML platforms. This architecture reduces vendor lock-in while improving flexibility, scalability and deployment efficiency.

To support Industry 4.0 and enterprise digitisation, JPL introduced a Private 5G platform capable of delivering up to 20 Gbps throughput while supporting approximately 10,000 subscribers within a compact deployment footprint. The platform incorporates network slicing, hyperscale automation, AI integration and simplified deployment through a 5G-in-a-Box architecture.

Jio Cloud Platform evolved into a multi-tenant orchestration environment capable of supporting applications across cloud, edge and enterprise environments. This architecture permits rapid application deployment while providing the flexibility required for distributed digital services.

JioBrain is an industry-agnostic distributed machine learning platform that institutionalises AI across telecom operations. The platform enables predictive maintenance, root-cause analysis, resource optimisation and operational automation. Jio Cognitive Platform processes massive volumes of network data daily and automates planning, deployment, operations and optimisation. These capabilities include spatial analytics, coverage intelligence, automated test procedures, customer complaint analysis, work-order generation and zero-touch e-tilt implementation.

JPL integrated quantum-safe security directly into the network architecture through quantum-safe encryption systems and Quantum Random Number Generator (QRNG) capabilities. The solution authenticates 5G customers using quantum-safe keys without requiring changes to existing 5G devices. This provides future-ready protection against nascent quantum threats while preserving network compatibility.

The Jio Cloud Native Security Center (CNSC) and Security Operations Center (SOC) provide integrated cybersecurity capabilities across cloud, network, OSS/BSS and enterprise workloads. CNSC processes vulnerability information from more than 4.8 million CVEs across over 20 global sources and performs real-time security scanning across both MEC edge and core environments. Together, CNSC and SOC deliver end-to-end prevention, monitoring, detection and response abilities for large-scale digital infrastructure.

Implementation Journey

The initiative has generated significant operational, economic as well as strategic outcomes:

- Automation powered by AI reduced network outages by 40 percent through predictive operations and pre-emptive maintenance.
- Zero-touch provisioning and automated deployment mechanisms accelerated network rollout by 50 percent, supporting rapid expansion of national-scale infrastructure.
- The adoption of Open RAN disaggregation generated 35 percent Capex savings by reducing dependence on proprietary vendor architectures.
- AI-led autonomous operations reduced operating expenditure by 30 percent through automation across network domains and operational workflows.
- The implementation of quantum-ready security systems extended future-ready protection to more than 500 million users across the national digital ecosystem.

The scale of deployment itself amounts to a significant achievement. The ecosystem today supports over 500 million users, more than 1.2 million 5G cells, over 265 million live 5G SA subscribers, more than 9.3 million AirFiber homes, 22 million connected homes through AirFiber and FTTx services and 50 million external beneficiaries.

The initiative has additionally strengthened India's global technology position. JPL achieved the TM Forum Diamond Badge and maintained the number one global ranking in TM Forum Open API conformance. In parallel, the organisation expanded its 6G research efforts, increasing its contributions from 51 to 375 within a one-year period.

Highlights

- Jio Platforms built an indigenous digital infrastructure ecosystem, integrating 5G SA Core, Open RAN, Private 5G, Edge Computing, Jio Cloud Platform, Quantum-Ready Security and JioBrain AI.
- The platform supports 500+ million users, 265+ million 5G SA subscribers and 9.3+ million AirFiber homes, reinforcing its scale and reach.
- The platform reduces dependence on proprietary vendors through a cloud-native, AI-driven open architecture.
- AI-powered automation reduced network outages by 40 percent, accelerated rollout by 50 percent, lowered OPEX by 30 percent and delivered 35 percent CAPEX savings through Open RAN adoption, demonstrating measurable operational value.
- Quantum-safe security protects over 500 million users, while the platform provides a scalable foundation for 5G, 6G, Industry 4.0 and enterprise digital transformation, completing the value story.

Outcomes

The initiative has delivered significant outcomes across acquisition, engagement, operational efficiency and investor trust. The platform has successfully onboarded more than 560,000 digital investors, demonstrating strong acceptance of the digital-first model. Digital channels account for 74 percent of all investor onboarding, validating the organisation's strategy to reduce dependence on physical distribution networks and expand its national reach.

Transaction scale has grown substantially, with more than 9 million transactions processed through the platform. This volume reflects both platform reliability and growing investor assurance in digital investment channels. At the same time, digital channels have enabled more than ₹650 crore in assets under management, demonstrating the platform's ability to convert engagement into meaningful investment activity.

Customer experience improvements have been equally significant. AI-powered support capabilities reduced daily support queries from approximately 400 to 50-80, representing an 80 percent reduction in support volume. Self-service effectiveness improved by 45 percent, enabling investors to resolve issues independently and reducing operational costs.

System improvements have additionally strengthened onboarding and transaction success rates. The introduction of PAN-based fallback validation improved onboarding success by 35 percent , while enhanced payment infrastructure increased UPI transaction success rates to exceed 97 percent. These improvements reduced abandonment rates and boosted investor confidence.

Beyond operational metrics, the initiative has strengthened trust, transparency and financial inclusion. By simplifying access to investment products and embedding education within customer journeys, the platform has enabled broader participation in formal investment market.

Conclusion

Jio Platforms' integrated ecosystem of 5G SA Core, Open RAN, Private 5G, Edge Platforms, Quantum-Ready Security, Jio Cloud Platform and JioBrain represents one of the most ambitious indigenous digital infrastructure programmes undertaken globally. By combining cloud-native networking, AI-native operations, quantum-safe security, edge computing and enterprise-grade connectivity within a unified architecture, JPL has created a sovereign, future-ready platform capable of supporting India's digital transformation at unprecedented scale.

The initiative demonstrates that next-generation telecommunications infrastructure need not depend on fragmented global technology stacks. Through indigenous innovation, standards-based design and deep support for research and development, Jio Platforms has established a replicable model for building secure, scalable, AI-driven and quantum-ready digital infrastructure. The outcomes: 40 percent fewer outages, 50 percent faster rollout, 35 percent Capex savings, 30 percent OPEX reduction and protection for over 500 million users, underline the revolutionary effect of this consolidated approach and position the platform as a blueprint for future 5G, 6G and enterprise digital frameworks worldwide.

SKOCH GROUP

GROWTH | LIVELIHOODS | EQUITY

www.skoch.in

SKOCH

ECO-SYSTEM FOR GROWTH

e-Mail: info@skoch.in

www.skoch.in

Disclaimer:

- This case study is based on the information/content provided by the organisation.
- Information published in the case study is as of November 2025.
- All company names, app titles and trademarks mentioned are the properties of their respective owners and are used solely for illustrative and reporting purposes.