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Developer Platform as a CSP Revenue Stream for B2B and B2B2X Opportunities

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Executive Summary

Communications service providers (CSPs) have been waiting for the official start of the 5G era. This massively hyped technology promised super-fast broadband rates and tempted us with the prospect of the Internet of Things (IoT), VR, self-driving vehicles, drones, and AI augmenting our future.

As a result, Telecom operators invested extensively in deploying 5G core networks to enable advanced 5G services powered by low latency performance, network slicing, edge cloud, and massive IoT. After spending billions on 5G infrastructure, CSPs are working on opportunities to support the monetization of their networks for returns on their investment.

Since 5G's inception phase, the goal has been to make digitalization more accessible. This digitalization will allow small enterprises, government agencies, and even individual families to benefit from innovative products and services. With billions of linked individuals and potentially trillions of connected sensors, 5G will do much more than enable faster speeds and feeds for mobile services.

It will profoundly revolutionize the way we live, work, and play, although operators cannot develop these cutting-edge products and services on their own. They need to move away from their old ways and collaborate with partners and development ecosystems. This comprehensive ecosystem will help them to innovate, monetize, and scale the market to reach the full revenue potential of 5G business-to-business (B2B) and business-to-business-to-X (B2B2X) value streams.

As Neil McRae, the MD and Chief Architect, BT Global Services said:

"Telecom operators need to move out of the traditional focus areas and be stronger in other services. Without that, the future looks similar to those in the utility sector… customers want more services from us, they trust us, and they are frustrated with us for not doing what we should be doing, truly innovating in services."

This paper highlights how the operators should strategize their services to maximize returns on their investments on 5G through a developer platform. It also discusses how they can monetize the investment, offer services and APIs to work with their customers, the enterprises, and server message blocks (SMBs), and generate additional revenue streams.

Communications Service Provider Challenges

CSPs have already made significant investments in 5G, ensuring a diverse range of services. From a return on investment perspective, they are looking to not only regroup the investment, but at the same time, they want to maintain and grow trust. Even though CSPs are practically ready for the 5G rollout plan in 2022, they still have unanswered questions about monetizing 5G.

CSPs have massive revenue growth opportunities with 5G. At the same time, these new growth opportunities provide unique challenges to overcome. Almost all of these opportunities are unknown at the moment and have their own set of obstacles.

As a result, CSPs can either stay in the connectivity comfort zone with their diminishing revenues or pivot to play a crucial role in a more expansive opportunity.

Solutions for most identified use cases require specific domain knowledge from industry participants outside of the telecom area. Third-party apps drive the edge application ecosystem outside of the telecom domain. As a result, third-party application providers and developers will have access to edge infrastructure, which will host various applications, each with its own set of characteristics and requirements.

The following are the specific challenges:

High Investment and Risk

CSPs must invest time, effort, and money to reskill their people and gain industry knowledge to deliver each industry sector's use cases. Some of the potential risks for use cases implementation are regulatory boundaries, traditional infrastructure, availability of devices, standards, and technical requirements.

In addition, companies haven't tested most of the use cases, and thus, with so many regulatory hurdles and unproven economics, the path ahead appears to be unclear.

Innovation Cost and Return on Investment

It should come as no surprise that expenses are one of the most critical challenges that businesses will confront with 5G. There has been heavy debate over the cost of deploying 5G across industries. Companies aren't sure what influence some of 5G's features will have on their business plans.

Security Concerns

There is a delicate interplay between 5G and perceived security concerns. Businesses feel that 5G will increase their security in general. However, security risks with 5G network architecture include user privacy, personal data collection, the number of connected devices, device vulnerability, diverse networks, network data transmission vulnerabilities, service access, and supply chain integrity.

B2B Experience

CSPs lack the requisite experience and connections to work in the B2B sector. Also, businesses are unsure how 5G would help them in their operations because it isn't commercially available everywhere yet. Guidelines and standards related to data exchange across borders, implementing use cases arising from integration with new technologies (artificial intelligence, big data, IoT) needs a different approach.

Existing IT, Operations Support System, and Business Support System Limitations

CSPs must upgrade their IT and connectivity infrastructure to provide high-quality, reliable, and affordable data and voice services. To achieve consumer expectations of total system security from the network to the device level, several operational and technical advances are required on their end. CSPs are still highly reliant on outdated operations support systems (OSS) and business support systems (BSS). OSS and BSS applications need to be virtual and run as containerized microservices, to support a massive scale of various use cases.

None of these challenges are insurmountable, especially when companies work with the right partners and stakeholders in the ecosystem. After all, an astonishing 90% of organizations believe they will eventually identify the business opportunities presented by 5G. The key to success is turning opportunities into tangible outputs and recognizing what has to happen to reach this goal. In addition, six out of ten CSPs expect partner ecosystems to drive cost-effective innovation.

For CSPs to satisfy the expectations and demands of business, they must understand the orchestration of partner ecosystems. Furthermore, time is of the essence, with the enterprises and SMBs already choosing their partners to help them carry out their long-term digital transformation plans. Therefore, CSPs need to act quickly. They will be replaced by technology and vertical solution providers if they do not.

Partner Ecosystem for 5G Monetization

B2B is supposed to be the 'North Star' of 5G income, yet, no one appears to have established a road map for CSPs to follow. Indeed, the 5G B2B possibility raises more problems than answers.

- What are the most successful use cases?
- Which market sector – SMB or enterprise – offers the most potential?
- What role do generic, horizontal offers play compared to specialized, vertical services?
- Will businesses purchase from CSPs or other companies?
- What is the CSP's function in the 5G value chain?

For CSPs to navigate through the 5G B2B journey, they must transition from a connective approach that focuses on the underlying technology to a network as a platform that efficiently links customers with their predefined services by enabling multi-party B2B and B2B2X models. They should be able to support any service for any application.

The new 5G digital services will be more dynamic, requiring more agile operations and IT infrastructure. Operators must also generate, launch, update, and remove offers quickly and easily. In addition, they must support dynamic pricing and be able to make price and bundle changes on the fly.

The majority of CSPs believe that they should strive to be platform enablers or platform suppliers. CSPs believe that they should transform into comprehensive digital service providers capable of providing a full range of end-to-end services. This is a lofty ambition that will require CSPs to go beyond the connection offerings on which they have built their businesses.

It takes a lot more flexibility, an inventive attitude, and a willingness to collaborate to provide the variety of services necessary in vertical enterprise markets. A collaborative open platform will open new ways to compete in the digital economy.

CSP Objectives

With the launch of 5G and edge computing, CSPs are in a stronger position to provide new services to businesses looking to automate industrial processes and consumers looking for better online gaming experiences. Edge computing brings dispersed computing and storage resources closer to where they're needed, opening up new business options and enabling unique application use cases. Augmented and virtual reality, manufacturing, and automotive are some examples of use case areas. As a result, the rate of innovation in this section of the application ecosystem will be tremendous in the future.

Edge computing will enable many broader use cases, such as the IoT, and might combine with other enterprise solutions such as 5G private networks. Therefore CSPs must understand the edge opportunity in the context of the enterprise opportunity.

The edge computing environment is fragmented and rapidly changing. So far, the edge computing environment hasn't established interfaces, standards, or business models. Several actors must be involved in developing end-to-end solutions, and CSPs must carefully assess which industries they can expand their capabilities into beyond connection. CSPs can choose an appropriate model or a combination of models that meet their needs based on their market position and the type of use case supplied.

CSPs must recognize the need to reform and refocus their operations to be successful. In addition, their networks play a critical part in the digital economy since their assets and data can help new sectors like smart cities, smart homes, and connected cars.

The potential hazards for implementing these use cases include regulatory limitations, device availability, norms and standards connected to data interchange across borders, and technical constraints. These use cases require the integration of new technology such as artificial intelligence, big data, and the IoT, as well as a unique implementation strategy.

CSPs want to enable these use cases in their capacity without assuming the risk of constructing independently due to a lack of competence, and they want to share as little risk as possible. They should differentiate themselves across the services, capabilities, and features they provide via simple APIs, although not in the same way those services are defined or consumed – for example, not on the APIs themselves. They can still be stakeholders through the developer platform.

The platform economy is nearing a tipping point, and it will affect every organization in every area. To expand and safeguard their business, all organizations will require a platform strategy, even if it's just to determine which ecosystem partners to collaborate with in the future. CSPs need to build collaboration platforms to help them monetize their connectivity assets and expand their business model from B2B and B2C to B2B2X. Deeper collaboration between CSPs and enterprise and SMB customers will inspire a deeper understanding of customers' problems and the benefits and drawbacks of alternative solutions. In addition, it will enable the enterprise customers to move towards digitization by providing vertical solutions on the platform.

CSPs could partner with organizations that already have these skills and capabilities to target new markets rather than creating their own. For example, they could team up with other partners to focus on specific vertical solutions or use cases and subsequently replicate the model for as many vertical solutions and use cases as possible.

This ecosystem approach is becoming vital in this fast-evolving digital telecommunications space. Ecosystems help players cost-effectively and rapidly expand their product opportunities into new solutions, segments, and markets.

According to Dario Talmesio, Principal Analyst and Practice Leader, CSPs Europe, Omdia:

"The promise of enterprise 5G is there for the taking, but CSPs must realize they will need to master ecosystem orchestration, including joint go-to-market with vendors and co-creation with customers."

Collaboration is critical to maximize and increase the 5G B2B and B2B2X revenue streams across every market segment. Therefore, CSPs should provide a developer platform where developer and partner communities can use network and APIs as a service to create the use cases across vertical solutions.

Developer Platform

Although the term 'platform' can have multiple meanings, CSPs are beginning to experiment with platforms. In this document, the term platform binds high-value CSP services to ecosystem services while guaranteeing that CSPs retain control over customer data and identity. In addition, CSPs can utilize this platform to organize and deliver their own and third-party horizontal software features that typically are the foundation for vertical industry solutions and use cases.

Developers' platform influence and success are inevitable. They are the new economic activity model. CSPs can expect performance improvement, leveraged growth, distributed innovation, and, in some instances, market restructuring due to the aggregation of customers and producers through an ecosystem. In addition, technology has made asset sharing easier and less expensive than ever before. CSPs can use the developer platform to host non-telco applications and turn their network into a distributed cloud resource. Enterprises can use orchestration logic to design, deploy, and manage applications flexibly towards a landing zone that connects to the dispersed cloud infrastructure and consumes services accessible through APIs.

This developer platform can diversify their portfolio by incorporating new domains powered by modern network technologies (5G, programmable, etc.) such as:

- Extension in Device and Connectivity Services
- Cloud Computing Capabilities
- Security
- MEC and Cloud Edge Services
- Data Analytics and Intelligence
- Industry-specific Services

This platform will enable CSPs to turn the components of their portfolio into value propositions for their B2B customers. This change will take them from a siloed and disconnected marketplace to one that offers a variety of commercial packages, ready-to-use integrated use cases, and project-based cross-industry solutions.

The platform will facilitate different partners, developers, and integrators to seamlessly develop unique products and use cases and integrate their specialized product catalog with the unified product catalog of the CSP. It will allow CSPs to make bundled, innovative data-driven offerings. Platform users can vary from large enterprises to SMBs, mobile virtual network operators, and digital signal processors to individual developers.

The platform should primarily be cloud-native to provide agility to CSPs' businesses by utilizing TM Forum Open APIs as much as feasible.

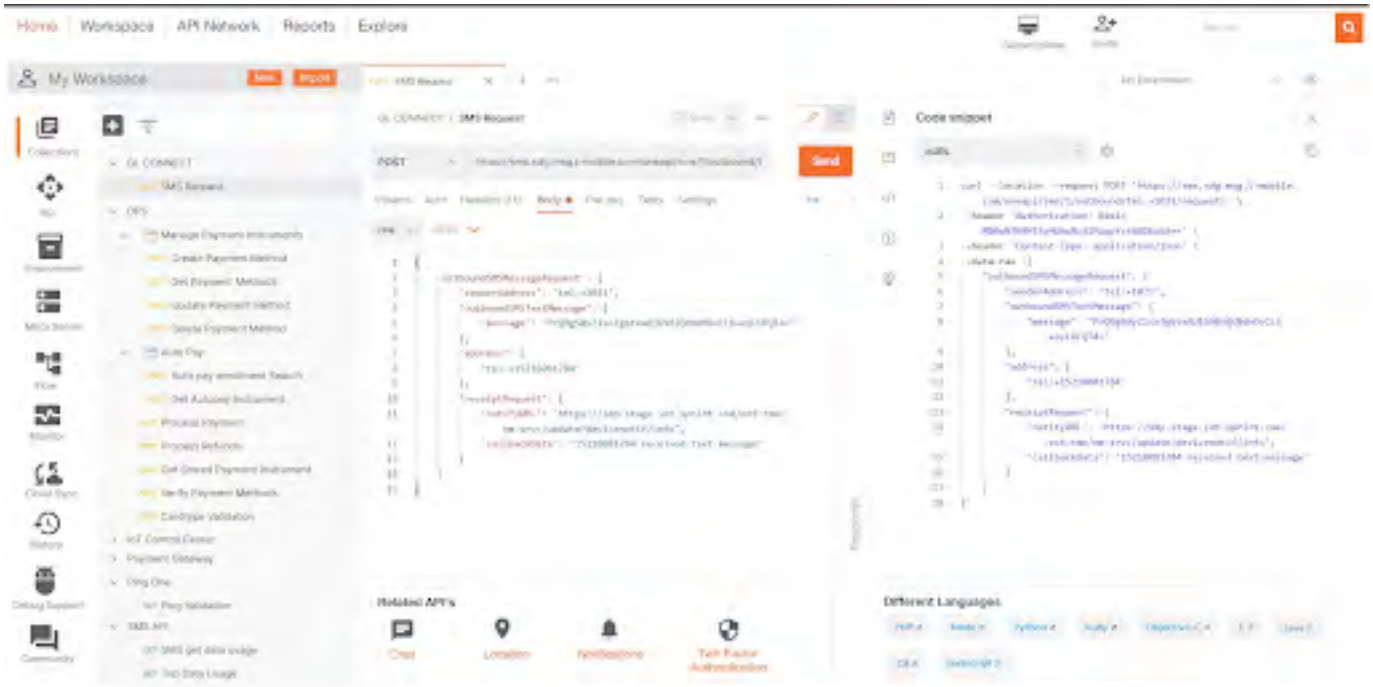


Fig: Developer Platform PoV

Platform Functional Components

The following is a basic outline of the functional components required to build the platform:

Ecosystem Services

The fundamental competencies that deliver value to internal and external users are connectivity, optimization, identification, security, data, analytics, onboarding, and innovation with the ecosystem. The platform delivers all of these services in a customizable and expandable manner for apps. The onboarding capability enables registration and adds partners' services into the platform through an automated validation process.

Distributed Cloud Infrastructure

The collection of various cloud data centers in global, national, local, regional, and possibly access locations are connected to the network and managed by a central orchestration and management system. The infrastructure specifications on the various sites may vary depending on the use cases and applications onboarded. Furthermore, multiple infrastructure providers may be present on the same site.

Connectivity

The use cases may have connectivity requirements on bandwidth, throughput, mobility, and latency within its components or with the external world, such as an internet connection and the user equipment or the application session. As a result, CSPs are increasingly searching for network intelligence to fine-tune end-customer use-case requirements. In other words, applications, end-customer devices, as well as dynamically set connectivity based on use-case requirements enable use cases.

Dynamic Orchestration and Management

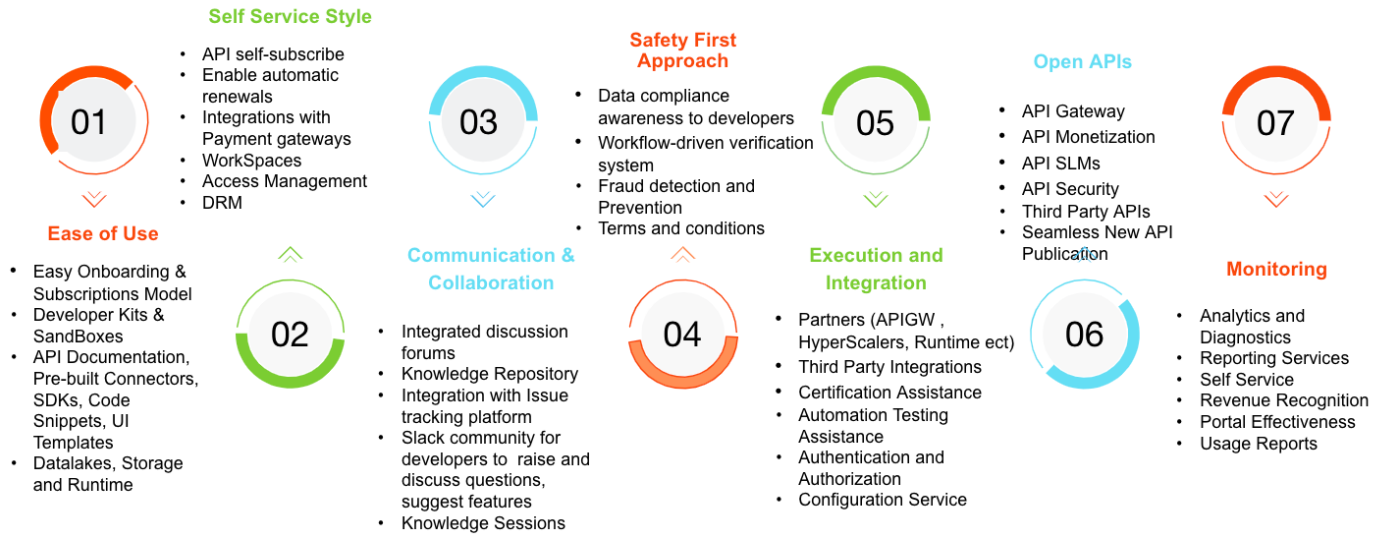
Core orchestration and management capabilities are aware of the network architecture and resources available in a distributed cloud environment which allows planning across RAN, core, and transport on 4G and 5G networks. This collaboration controls the flow of information from radio base stations to the data center, as well as essential applications. In addition, it enables third-party vendors to quickly onboard VNFs by providing an end-to-end automated paradigm that supports the entire lifecycle of service implementation. This process cuts the provisioning time and time to market for new services in half.

Industry-specific Services

The platform should define, reuse, and evolve the data models of industry-specific contexts, develop and deploy specific analytics models, create digital experiences, and simulate the orchestration of the end-to-end use case and rules to optimize its technical and business performance.

When the platform is fully functional, it should have the below features:

- Easy onboarding and subscription services
- Enable self-service
- Integrations with third parties and operator-specific services
- Flexibility to choose services and plans
- Security and deployment options as services
- Analytics and diagnostics
- Real-time dashboards for business and operations users
- Community support
- APIs and service documentation
- Troubleshooting support
- Testing support



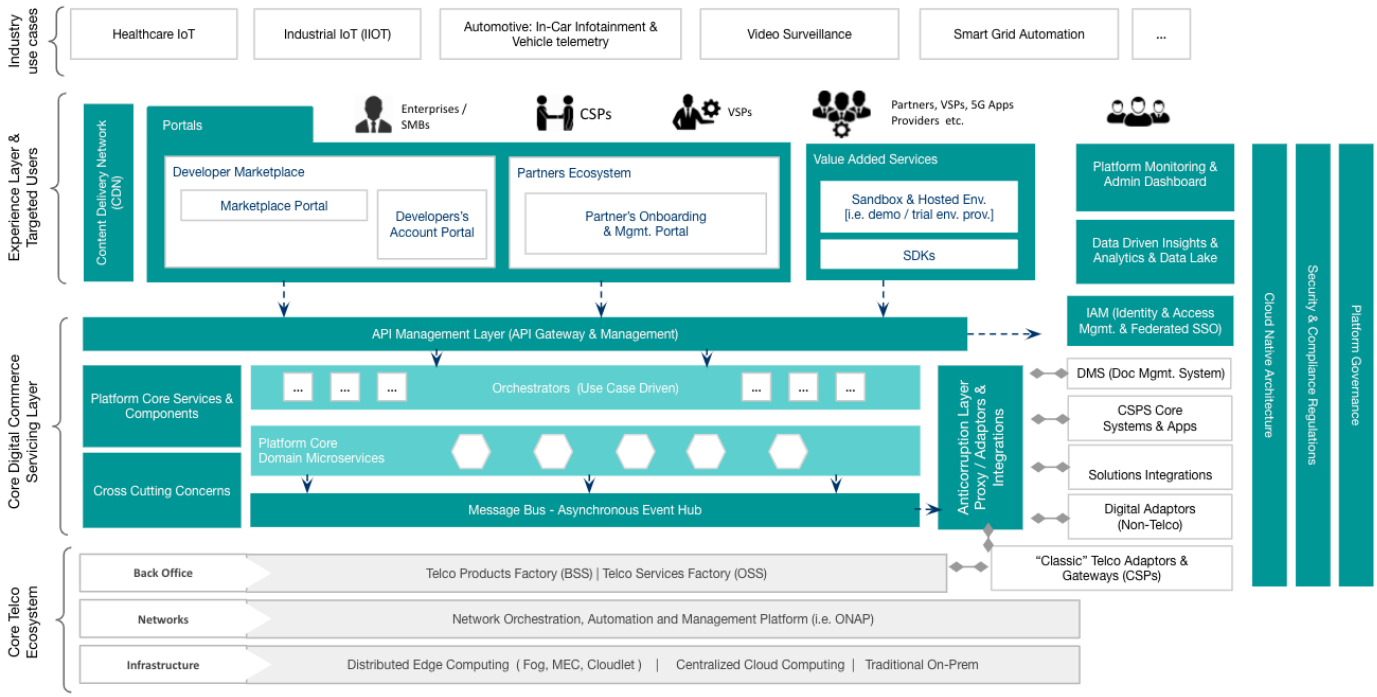
Expectations for this platform in terms of allowing partners and developers to collaborate are:

- Improve business process and service assurance while lowering operational costs
- Design, test, and deploy services quickly and evolve to zero-touch operations
- Run services and use cases on any cloud, anywhere, and manage any network vendor infrastructure

The ease with which partners-customers may onboard, customer retention, data analytics, omnichannel, and multi-device experience determines the platform's resilience.

Platform Conceptual Architecture

The conceptual architecture for the developer platform is pictured below:



Platform Service Offerings

The platform can provide numerous services for various platform users. See next page.

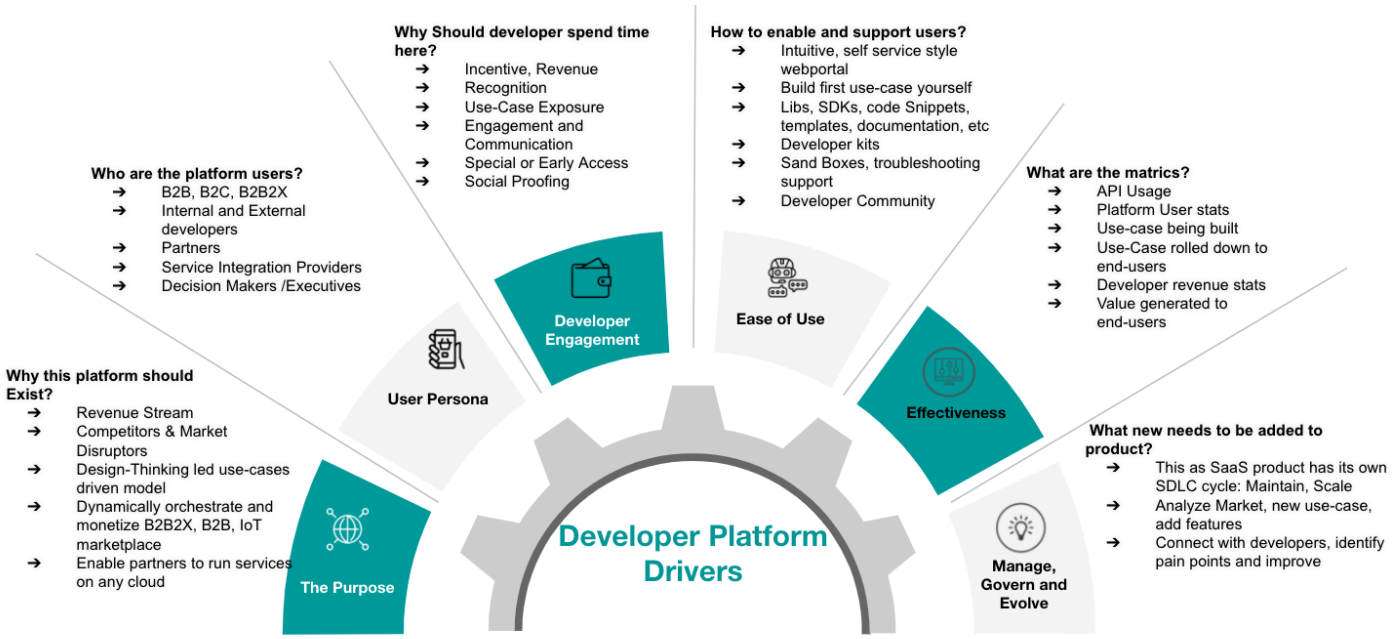
Service Offerings/ Platform users	Connectivity	Telecom	Platform	Collaboration
Large Enterprises	• Network Slice as a service • SD/WAN as a service • Managed Customer provided equipment • Managed Routers	• Third-Party integrations • CSP specific services like Network/Voice/ SMS/ Email services • OSS as a service	• Subscription Services • Security as a service • Cloud Integrations and Deployment Services • Zero Touch Operations Management	• Advertising And Marketing • Content Delivery • Directory and Registry Management • Enterprise Collaboration
SMBs	• Network Slice as a service • SD/WAN as a service • Managed Customer provided equipment • Managed Routers	• Third-party integrations • CSP specific services like Network/Voice/ SMS/ Email services	• Subscription Services • Security as a service • Cloud Integrations and Deployment Services • Zero Touch Operations Management	• Advertising And Marketing • Content Delivery • Directory and Registry Management Solutions • M2M and Internet of Things • Unified Communications • Voice/Speech
IoT/MVNO/ DSPs	• Network Slice as a service • SD/WAN as a service • Managed Routers	• Third-party integrations • CSP specific services like Network/Voice/ SMS/ Email services	• Subscription Services • Security as a service • Cloud Integrations and Deployment Services • Zero Touch Operations Management	• IoT platform as a service • Analytics as a service • AI/ML services • Reporting Services • AR/ VR
Developer	• Network Slice as a service	• Third-party integrations • CSP specific services like Network/Voice/ SMS/ Email services	• Analytics as a service • CI/CD as a service • Authorization services • Cloud Integrations and Deployment Services	• IoT platform as a service • Analytics as a service • AI/ML services • Reporting Services • AR/ VR • OTT services

Platform Drivers

The platform will enable CSPs to become ecosystem-driven and build meaningful collaborations with a bottom-up approach to onboard and expose internal and third-party capabilities. In addition, it allows for a top-down approach to collaborate with business integrators and vertical industry partners in the development and orchestration of end-to-end use cases.

Summarized below are the drivers deciding the platform's success:

- All the services and support must cater to the identified purpose.
- Services for all identified users - enterprise users, MVNOs, and independent developers should engage developers by providing revenue recognition, community support, integration, and collaboration services.
- Self-service portals must support APIs, SDKs, and developer kits for use case creations and sandboxes for deployment and troubleshooting.
- Diagnostics reports sharing API and service usage.



Platform Use Cases

This section describes real-time use cases to explain the use of this platform with various actors to provide services across different industries and show the possible vertical solutions.

Use Case 1 –Smart City Initiative by Government-Video Surveillance as a service

The government is looking to set up and deploy video surveillance and analytics across the city. They engage CSPs (like T-Mobile) to design and deploy this solution. CSPs see the market potential for video surveillance and analytics use cases for smart cities and set up partnerships with video service providers (VSPs) to sell this solution.

The use case ecosystem will have various actors

- CSPs provide the digital ecosystem platform in addition to 5G Network connectivity, 5G IOT capability, BSS, and OSS for the fulfillment, assurance, and billing.
- VSPs provide devices like 5G Security cameras for the device management platform.
- A cloud service provider contributes cloud services.
- A skilled workforce creates end-user applications such as mobile and web apps and provides reporting and analytics for the enterprise customer through city the incorporation of smart cities.
- The end-user, smart city corporations, and smart city police teams.

CSPs, VSPs, cloud service providers, and a skilled workforce will work together to provide an integrated operation center for city surveillance.

Use Case 2 –Self Driving Vehicles for Material Handling

An automotive company designs, manufactures, and operates self-driving vehicles for an industry with the ultimate goal of making human driving obsolete. A self-driving vehicle uses laser-based perception and AI to dynamically move through facilities and infrastructure-free areas. These vehicles combine the benefits of manual labor, conveyors, and automated guided vehicles to provide the most advanced method of material transport available today.

The use case ecosystem will have various actors:

- An automotive company's self-driving vehicles.
- CSPs provide the digital ecosystem platform in addition to 5G Network connectivity, 5G IOT capability, BSS, and OSS for the fulfillment, assurance, and billing.
- VSPs provide the sensors and management platform.
- A cloud service provider contributes cloud services.
- A skilled workforce creates end-user applications such as mobile and web apps. and provides reporting and analytics.
- The enterprise customer provides manufacturing and warehouses.

CSPs, VSPs, cloud service providers, and a skilled workforce will work together to provide a safe alternative for transporting goods and materials, ensuring waste reduction.

Summary

Traditional barriers that would originally isolate organizations from one another can now help establish productive ecosystems that lead to new opportunities in today's business environment.

Ecosystem intelligence will be critical in creating appealing products and services that lead to higher consumer satisfaction and creative business models. Adopting a strategic ecosystem approach is an excellent way to rethink the new business model, secure future revenue, and reduce risk. In addition, the platform business model gives a new option for traditional CSPs to flourish, enhancing their relevance and value in the rapidly expanding digital economy.

The evolution described here will not be rapid or easy. Instead, it's a multi-year transition that will affect the entire company and ecology of a CSP. It will be a long road that's necessary for a bottom-up and top-down strategy, with CSPs gradually allowing essential and real-time use cases to harness their skills to orchestrate the new wave of a core connected Industry-X.

CSPs in this market have the best chance to redefine their growth trajectory by leveraging 5G and edge computing. In addition, developer platforms for enterprises, partners, and integration services enable them to monetize their connectivity assets by expanding the business models to B2B and B2B2X.

Key points to consider in providing a platform:

Harness the synergy of all stakeholders. Platforms need to take advantage of all users' skills, participation, and data, including enterprises, VSPs, partners, and developers, to generate innovative new market solutions.

Consider long-term value development. Major CSPs recognize that the platform economy offers lucrative opportunities. However, the platform needs curation and careful nurturing.

About the Author

Vijaya Kotwani has over 20 years of excellent software architectural background with experience working with global teams in digital technologies such as Cloud and Microservices, Big Data, BI Analytics, and Advanced Analytics with AI-ML. She has worked with leading telecommunications companies to enable digital transformation.

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