Network Operations Transformation White Paper

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Preface

The change of technology, business model innovation, and fierce competition have brought about a new industry layout and accelerated the transformation of the way in which industry values are created. Reshaping the "resources" and "capabilities" of enterprises with digital technologies, and changing the allocation of enterprise resources, have become the key for enterprise transformation.

The convergence of digital technologies and the industry brings huge value space. How to reshape the capability system, value system, and ecosystem, participate in the new business domain with a better way, and capture new industry value has become a common issue for global carriers.

Surveying the development trend of global carriers, 5G policies and strategy of major economies, it is imperative for carriers to find out the way that how to transform network operation, reshape resource allocation models, support future transaction model transformation, and seek to expand value space, optimize value structure, enhance competitiveness and sustain development capabilities in the new industry landscape.

1. Trends and Challenges

1.1 ICT Industry Environment

Industrial upgrading accelerates enterprise transformation. In the process of industrial upgrading and enterprise transformation, the carrier’s operation mode of increasing marginal benefits driven by scale is ending. According to Huawei’s global insight vision, the total market space of global ICT industry will exceed $6 trillion by 2022, the market space for new technologies will reach $1.6 trillion, for ICT services will reach $1.87 trillion, for telecom services will reach $1.6 trillion, and that for ICT manufacturing will reach $1.1 trillion. Facing with such a huge market space, carriers need to break with the traditional mode, change the original resource allocation mode, and improve the value of resource capabilities, improve the internal and external transaction efficiency, participate in industry competition with a better way. Relying on such huge network resources, it’s necessary for carriers to reshape the capability system and value operation system to win the battle of industrial upgrading.

1.2 Policy Environment

5G has become the competition focus in the high-tech field in major countries around the world. Major developed countries have released 5G policies to seize strategic opportunities and have deployed top-level design to seek a leading position.

USA: On April 12, 2019, The White House announced that it would release more wireless spectrum and simplify the construction of communications facilities to gain a leading position in the 5G field. On the same day, the Federal Communications Commission (FCC) released the 5G Quick Plan, which is a comprehensive strategy to promote the 5G technological advantages of the United States.

UK: On March 8, 2017, the Department for Culture, Media and Sport (DCMS) and the Ministry of Finance jointly released Next Generation Mobile Technologies: UK 5G Strategy, announcing that the UK will become a global leader in the next generation mobile technologies and digital communications through 5G and all-fiber plans.

South Korea: In April 2018, the Ministry of Future Innovation and Science of South Korea released the Innovative Growth Engine plan, proposing the vision of
leveraging 5G commercialization and IoT hyperlink services and the promoting convergence services by 2022.

China: The Chinese government has incorporated 5G into national strategies as one of the priorities for implementing national innovation strategies. Strategic plans, such as the 13th Five-Year Planning Outline and National Informatization Development Strategy Outline, have made clear plans for promoting 5G development. Against the backdrop of “Cyberpower”, the core of Made in China 2025 is smart manufacturing, and telecom networks is the basis of smart manufacturing.

Therefore, the CAPEX of carriers will be further increased, and the high cost-to-revenue ratio of resources needs to be changed urgently. The traditional operation mode will further devalue network resources, during the fiercer competition, it’s imperative to carriers to capture business value from network resources and network operation capabilities.

1.3 Telecom Industry Trends

According to Keystone research and analysis, the market space of 2C and major ICTs in vertical industries will reach $4.7 trillion by 2025, of which the connection-based market space will reach $1.6 trillion, accounting for 33%. The next-generation connection technologies (such as 5G) of carriers will account for 30% of the entire connection-based market. Consumers, smart home, and smart city take up a large proportion of the expenditure on next-generation connection technologies. The ICT field in vertical industries will be the focus area of carriers.

According to the World Economic Forum/Accenture analysis, in the past eight years, the control of carriers over the profit pool of the telecom industry has been shrinking globally, from 58% in 2010 to 45% in 2018. The core telecom services are shrinking due to the saturation of the industry and the erosion from OTT. Compared with other service providers in the telecom industry chain, carriers have the lowest CAGR both in Revenue and EBITDA, with 1.8% (up to 10.0%) and 2% (up to 10.6%) respectively. On the other hand, content manufacturers and distributors have started to control more industry profits through digital media experience, and started to target ecosystem growth areas such as cloud, to compete with carriers in the fields of emerging technologies.

From the perspective of the development of the carrier industry, it is urgent for carriers to seize the industrial opportunities and improve the capability of creating and capturing value from resource in the telecom industry.
1.4 Challenges

Contrast between telecom industry and ICT industry: Facing with the huge ICT industry market space, the emerging industry layout, and the rapid development of industry partners, carriers are in the dilemma of increasing traffic without increasing revenue, which is greatly different from the current ICT industry development.

Challenges to operation and development: The acceleration of 5G construction, continuous CAPEX investment, and high OPEX further deteriorate carriers’ profitability. The comprehensive value and sustainable development capability of enterprises are facing great challenges.

Exploration of the transformation mode: Faced with operation difficulties, it has been proved that carriers’ punctate emphasis on network capability exposure, operation middle-end building, process reshaping, and business model transformation cannot truly change the current operation difficulties of carriers or bring about sustainable development capabilities in the future. The insufficient competitiveness, deteriorating profitability, and continuously declines of EBITDA% are still difficult operation issues for most carriers.
2. Successful Transformation Implications

Digital transformation has become the development strategy of major global carriers, the ultimate goal of dominant carriers is to become the leader of ecosystem operation. Breaking down industrial barriers, expanding value space, optimizing value structure, and strengthening operation capability are the keys to improving the comprehensive strength of enterprises under new industrial characteristics.

**Case 1: Turkcell Digital transformation strategy**

Turkcell proposed the “1440” digital transformation strategy in 2015 to transform from a network operator to an experience provider. Tactically, it integrated industry resources by building a digital ecosystem, built digital operations platform to strengthen data operation, enhanced network capabilities and implemented one-click login, and promoted talent transformation, transformed 1000+ R&D personnel to strengthen data services.

The revenue growth rate and ARPU of Turkcell maintain a double-digit growth rate since 2016. In 2018, the ARPU increased by 13.5%. In the first half of 2019, the ARPU increased by 16.5% and the churn rate is the lowest in the past 10 years.

The inspiration of Turkcell’s successful transformation is that, strengthening network resource capacity building, collaborating enterprise and the external ecosystem, and improving customer experience, could enhance the competitiveness of enterprises effectively.

**Case 2: LGU+ FMC strategy**

In 2014, LGU+ increased investment strategically to supplement fixed networks and enhance fixed-mobile convergence (FMC) to improve customer stickiness. In terms of strategy execution, the CAPEX of the fixed network and mobile network increased by 54.2% and 29.6% respectively to enhance service robustness. In the meanwhile, LGU+ enhanced service convergence and improved customer loyalty through video content, video SNS, video communication and navigation, design of remote video application, and strengthen business-network collaboration by building LTE services based on video, including HDTV and Uflix GTM strategies, LTE and FBB services bound to video, and turn video services into basic package services etc. Finally, it improved video customer experience by using FMC video, multi-screen convergence, and enhanced key functions (HD audio, time machine, and slow-motion).
In 2015, the number of broadband users of LGU+ increased sharply by 15.6%. Up to now, it still increases by 5% every year. The proportion of fixed service revenue increase from 38% to 42% gradually. Since 2015, the growth rate of fixed service revenue has been higher than that of mobile service revenue. In 2018, the robust revenue structure help LGU+ effectively resist the negative growth of mobile services.

The successful transformation of LGU+ has inspired us that the powerful ways to facilitate long-term stable growth is to strengthen network capability, optimize the enterprise value structure, collaborative business-network operation, and improve the resource value acquisition capability.

**Case 3: KDDI IoT Strategy**

In 2016, KDDI took IoT as the anchor point to drive enterprise user growth, the strategy for enterprise business development is to aggregate the ecosystem, and provide growth momentum for ICT solutions. Tactically, KDDI established IoT joint ecosystem partners’ platform and alliances, strengthened ICT solution capabilities and focus on smart metering and automobile industries. Based on the KDDI global IoT architecture, KDDI cooperated with Toyota Motor Corporation to provide IoV services and extended the platform to various industrial fields, built operations platform to improve the operation capability in market segments, for example, used the KDDI 5G/IoT platform to turn big data into small data that can be used in various industries.

In 2016, KDDI’s enterprise business revenue increased by 12.4%, and has maintained a growth rate of more than 5% so far. In addition, the enterprise revenue proportion of KDDI has increased from 13% to 14.2%. The EBITDA% of the enterprise business increases from 17.3% to 18.8%.

The inspiration of KDDI’s successful transformation is that carriers can integrate ecosystem resources based on their own resource capabilities, consolidate integrated solution capabilities and build operations platform for certain key industries, and improve market operation support and assurance capabilities to improve the business performance.

The transformation of carriers outside China is aiming to optimize user experience. For example, Turkcell aims to optimize 2C personal digital experience, LGU+ aims to optimize 2H video convergence experience, and KDDI aims to optimize 2B enterprise operation experience, and with the systematic means of reform, such as systematic capability building, platform-based support, and structural adjustment. Systematic capabilities include network capabilities, service
collaboration capabilities, and integrated solution capabilities, and on the other hand, these capabilities include single network capabilities, enhanced internal capabilities, and customer-oriented solution design capabilities. Platform-based support includes the operations platform, data platform, and ecosystem integration platform, which is the basis of refined operation. Structured adjustment includes personnel structure adjustment, investment structure adjustment, and business structure adjustment, that would support the company’s transformation from the perspectives of personnel efficiency, investment efficiency, and business robustness.
3. Network Operations Transformation Solution

3.1 Value Positioning

The network operations transformation of carrier aims to create a network resource value system to capture business value from network technologies, network resources, and operation capabilities. And aims to assist carrier to expand value space, optimize value structure, and enhance competitiveness and sustainable development capability in the new industrial landscape by changing the supporting mode for market with network resources.

Carriers’ digital transformation includes market and customer-oriented transaction transformation and technology-oriented network transformation. Network operations transformation is crucial for carrier digital transformation, and is the core for efficiently value system operating. On the one hand, network operations transformation undertakes the resource capability requirements of front-end business/operation/service model transformation brought by industrial transformation, on the other hand, network operations transformation maximize the value monetization of technologies and resource capabilities to flexibly and efficiently support market expansion and differentiated competition.

Therefore, the value positioning of network operations transformation (Figure 1) is creation, delivery, and support, that is to monetize resources into capabilities, monetize capabilities into value, and transform the support system into a transaction system. Network operations transformation is crucial to monetize network assets and meet market requirements quickly.

![Figure 1: Value positioning of network operations transformation](image)

3.2 Value system and capability system
Build the value system for network operations transformation (Figure 2) based on the value operation model and by taking eTOM 2.0 as reference. In the value system, with the main stream of value operation, design the overall architecture with network capability productization and operation based on basic resources, operate with support and assurance means, and guarantee the benefit by talent transformation.

The closed-loop of value operation is from support value, create value, deliver value, to capture value. The value system of network operations transformation is based on basic network resources, the talent transformation provides assurance and support for capturing value, and the network resource capability building creates value, the market-oriented operation deliver value through network products GTM, and the collaboration capability between supporting means and marketing departments realize value capturing finally.

Define key capabilities system for network operations transformation (Figure 3), by mapping network capability productization and operation, support assurance means, and talent transformation with the carrier's value operation system.

Figure 2: Value system of network operations transformation

Figure 3: Capability system of network operations transformation
The network capabilities are fundamental. Build three capability sets: basic resource visualization, resources enablement, and value-based network product. The three capability sets cover basic information management of resources, micro-capability of network resources and service resources, productization of capabilities, and related operation capabilities.

The support capability is the carrier for workflow. The support capability of the network domain, service domain, and market domain is built from the operation monitoring and fault management capabilities of the network domain, automatic provisioning and unified management capabilities of the service domain, and product design and support capabilities of the market domain.

Talent capability is guaranteed. Build a team of personnel with cross-domain network operation capabilities, network product planning and design capabilities, and network product operation capabilities, cultivate talent with all-domain network micro-service and process operation capabilities, and support continuous optimization of network productization and support methods, could realistically implement network operation transformation and value operation.

### 3.3 Overall Architecture

- **Build network resource capability system:** Build a network resource capability library, and network atomic capability sets. The network atomic capability is the key features and capabilities of existing and future network resources by NE on demand, and could be coordinated with cross-domain combinations, invoked by the market through protocol encapsulation and orchestration to participate in market competition.

- **Build network product system:** Slice the market into 2B/2C/2H, and build four types of network product systems based on market requirements: customer touch point product, pipeline control product, comprehensive perception product, and basic resource product. In addition, strengthen the invoking and orchestration policies of the network product system and network capability system, to embody the differentiated capabilities of network assets and support market competition more flexibly.

  **Customer touch point product:** network product directly related to the experience of touch point with customer, including the experience of product and service selection, charging, payment, and service provisioning experience, etc.

  **Pipeline control product:** network product based on service quantity and
quality of carrier pipeline resources.

**Comprehensive perception product**: network products are provided for 2B customers. Comprehensive perception product is built for each phase of the lifecycle from purchase, provisioning, use, assurance, to operation of 2B customers.

**Basic resource product**: The basic product is built based on carriers' traditional network resource capabilities and data resource capabilities.

- **Build network product operation system**: Strengthen the value monetization capability of network products and build a network product operation system. In network product operation system, plan and design network products based on market requirements and industrial development, and according to the market competition situation, make the price strategy of network products, design network products and value operation based on customers' characteristics and requirements, and incorporate the design into the key phases of pre-sales, sales and after-sales of the market to enhance customer stickiness and continuously capture value from customers.

![Figure 4: Overall architecture of network capability operation](image-url)

The overall architecture design of network capability operation should change the internal and external transaction models, which is traditional model with delivering internal network resources to the market and customer. Design "3+1" domains for network operations, the three horizontal domains are designed hierarchically, decoupled from each other, and encapsulated layer by layer.

In the three horizontal domains, the network product domain is for network product design and operation. The network capability domain is for building network micro-capability in single-domain, cross-domain network operation
capability, and related policy system. The basic resource domain is for basic resource management.

The AI management domain in the one vertical domain is for data governance and model optimization. Advanced technologies such as big data and AI must be fully used to improve the efficiency of the “three horizontal” domains.

3.4 Support assurance solution

The support assurance solution consists of process system, platform system, and tool system. Build three types of main process that run through the frontend and backend, to accelerate the network capability monetization, improve the collaboration and response efficiency, and improve end users’ experience. Build a platform system with five key platforms to support operation, and improve the centralized and automatic operation capability of the network, improve the operation efficiency of network products. Build a tool system to further improve the efficiency of network value operation and the convenience of supporting operation.

Aggregate network resource capabilities layer by layer through protocol encapsulation, API encapsulation, and product encapsulation to form atomic capabilities and network products, and provide them to the market in the form of products and support the commercial offering to the final market.

Figure 5 Support assurance solution for network operations transformation

- Process System

Design the process system that supports the assurance solution to maximize the network value monetization. Build three types of main process to implement value operation of network products and collaboration operation of front-end and back-end, to maximize the operation efficiency of the network product architecture
and the supporting capability of market value monetization.

Based on the overall architecture of network operation, construct three major processes, including the network product operation management process, customer service process, and market and network planning and construction collaboration process, to improve the efficiency and effectiveness of network operation, customer service, and service collaboration.

**Network product operation management process:** includes three sub-processes, network product planning, design, and generation process, network product value management process, and ecosystem cooperation management process. The processes aims to E2E value generation and realization based on network products.

**Customer service process:** includes six sub-processes, sales support process, hierarchical customer management and assurance process, service provisioning process, unified monitoring process for integrated service, alarm management process, and customer complaint management process. The customer service process involves in network products and capabilities, and the E2E customer lifecycle services supports from pre-sales, hierarchical customer management and assurance, service provisioning, monitoring, and alarming, to fault rectification, which could improve service collaboration efficiency and customer experience.

**Market and network planning and construction collaboration process:** the process aims to collaborate between the market and network from the perspective of overall efficiency of network planning and construction, and improve the efficiency and benefits of resource planning and construction by invoking network operation capabilities.

![Figure 6: Process system for network operations transformation](image)
• **Platform System**

As an important support capability for network operations transformation, the platform supports productization of network capabilities, improves network product development efficiency, supports coordinated planning and operation of "market-service-network", improves service operation efficiency and quality, and supports market-oriented value monetization.

Based on the overall architecture of network operation, design five support platforms through the designed process system previously, and implement front-end, middle-end, and back-end collaboration to provide strong support for network value operation.

**Sales enablement platform:** includes four functional modules, sales operation analysis, network product management, sales support management, and service order and order fulfillment management.

**Intelligent O&M platform:** includes six functional modules, policy management, resource & service operation analysis, and dynamic resource management, service provisioning management, fault management, and performance monitoring management.

**Network capability standardization platform:** consists of four functional modules, micro-service-based management of network atomic capabilities, network operation capability exposure management, network capability product exposure management, and orchestration center.

**Service and network collaboration operations platform:** includes four functional modules, collaboration diagnosis with market requirements and network experience, network planning and design with service collaboration, capacity expansion agilely with service collaboration, and visualized delivery management.

**Ecosystem partner management platform:** consists of two functional modules, ecosystem partner lifecycle management and ecosystem partner cooperation management.
3.5 Talent transformation solution

The product-based operation of network resources supports the implementation of assurance measures, changes the positioning of network resources in carrier’s value system, and raises new requirements for personnel. For a better competition advantage, it is necessary to build an elite team that integrates DICT technologies, cross-domain network operation capability, and front-end and back-end collaborative operation capability to deeply explore the value of network assets.

Based on the requirements of the network value operation transformation, form the pre-sales, sales, after-sales, and general talent capability systems, and develop related enablement plans and evaluation models to enable talent transformation and meet the requirements of the network value operation system.
The four types of talent competency category are designed in detail from four aspects: course system, enablement training solution, learning result evaluation, and comprehensive evaluation. And design the seven-degree model to evaluate the training result combined with course learning and practical training.

The seven-degree model: \( P = 40\% \sum_{i=1}^{4} K_i x_i + 60\% \sum_{i=1}^{2} t_i y_i \).

\( X \) indicates theoretical learning, \( Y \) indicates practical training, and \( K \) indicates the weight of the four aspects of theoretical learning result evaluation, including training participation, basic course score, professional course score, and certification exam. \( T \) indicates the weight of the three aspects of practice training result evaluation, including transformation training practice, actual on-site practice, and on-site presentation.
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