RESEARCH

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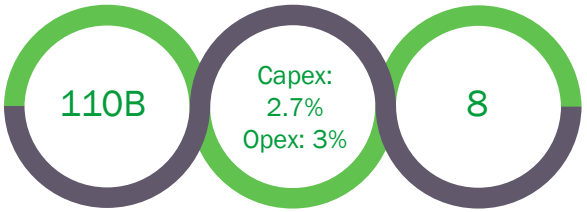
Telenor's multi-vendor platform approach to NFV is delivering cost efficiencies and a foundation for 5G

Caroline Chappell

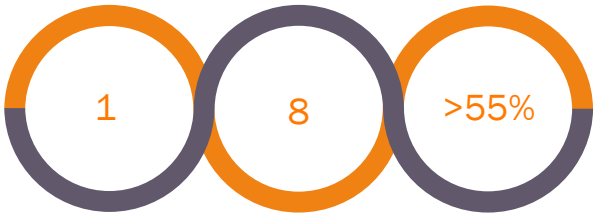
Overview of Telenor's implementation of the network as digital (cloud) infrastructure

STATE OF THE BUSINESS[1]



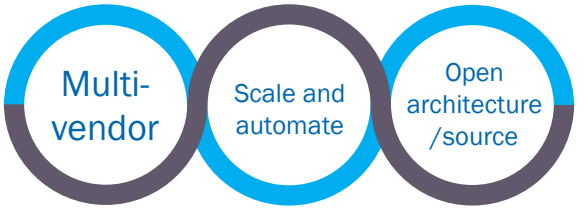
Total revenue 2018 (NOK) | Capex and opex decreases | Number of opcos

FOCUS OF THIS EFFORT



NFV cloud platform architecture | NFV cloud platform implementations | Share of mobile network on NFV cloud platform

PROJECT APPROACH



Sources of VNFs and NFVI components | Next focus for project | Key project enabler

BUSINESS DRIVERS

- Telenor operates in fiercely competitive country markets, with a broad span of ARPU levels and rates of traffic growth.
- Telenor's ambition is to enable business growth and improve efficiency.
- Network virtualisation and cloud are seen as key means of decoupling growth from cost and promoting an excellent user experience.

STRATEGY

- Telenor's cost reduction targets and future ability to innovate will come from having a common NFVI architecture across opcos.
- All opcos participate in developing Telenor's cloud strategy for network and IT.
- Telenor is on target to run 90% of its network functions on its virtualised platform by 2020.

ANALYSIS

- Telenor is working with its traditional vendors to de-risk its multi-vendor approach to NFV.
- Open-source MANO (OSM) is Telenor's preferred future direction for multi-vendor orchestration and automation.
- Telenor uses open-source components where it can.

BENEFITS

Telenor has reduced network and associated operational costs by more than 40%

Telenor is seeing improvements in key operational areas such as time to deploy, service resilience and security protection

Telenor has created a network platform that is ready for future innovation and 5G

Source: Analysys Mason

[1] Telenor Annual Report 2017

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Business challenges and key drivers of the project

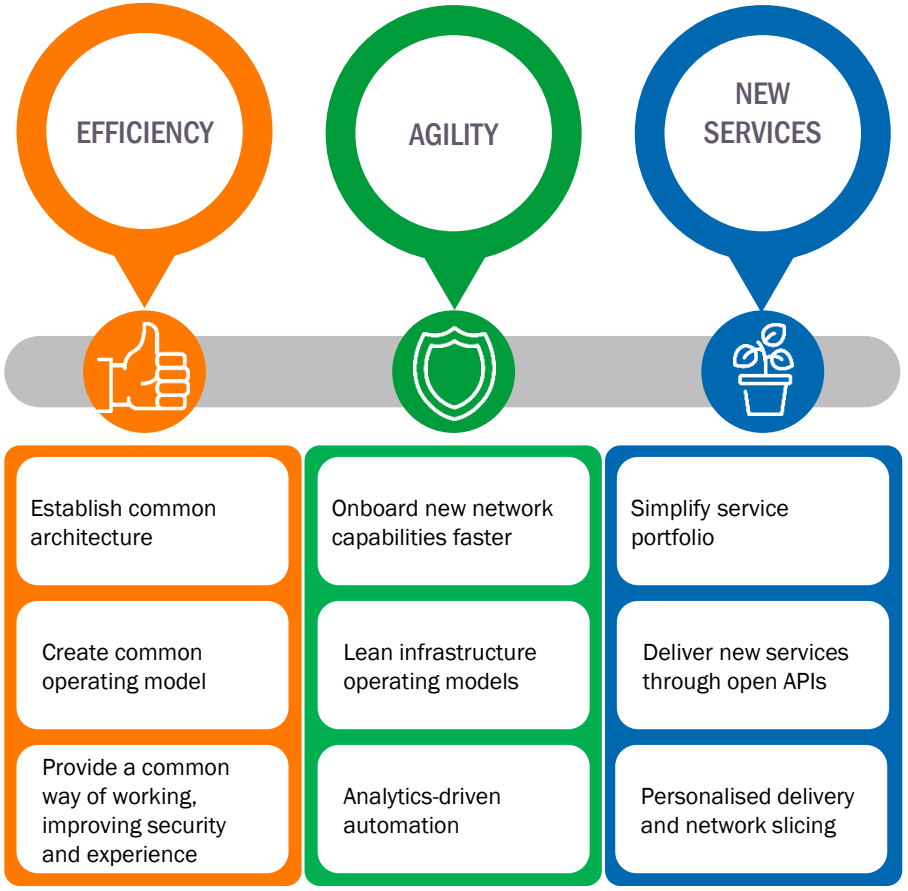
Telenor's NFV initiative is part of a major business, IT and network transformation to reduce cost and complexity, despite high rates of traffic growth, and to capture new revenues.

Telenor's business transformation expects to achieve future-readiness and cost-efficiencies from driving standardisation at scale across the company's eight opcos, for example, by:

- Adding capabilities and reducing complexity and costs by deploying common technologies in each opco, leveraging global re-use and volumes. Telenor aims to virtualise 90% of mobile core functions by 2020
- Standardising APIs and delivery set-ups across opcos, enabling future business and operating models
- Providing consistent and innovative customer services and experiences based on targeted insights. Engaging partners to complement service offerings.

Network virtualisation and a cloud platform are key components of the initiative. They will increase Telenor's business agility by supporting the rapid delivery of new services and enabling a lean infrastructure approach. Telenor is also developing cloud-enabled, analytics-driven automation to improve the speed of network operations and enhance customer experience.

Figure 1: Telenor's NFV initiative is part of a broader business transformation



Source: Analysys Mason

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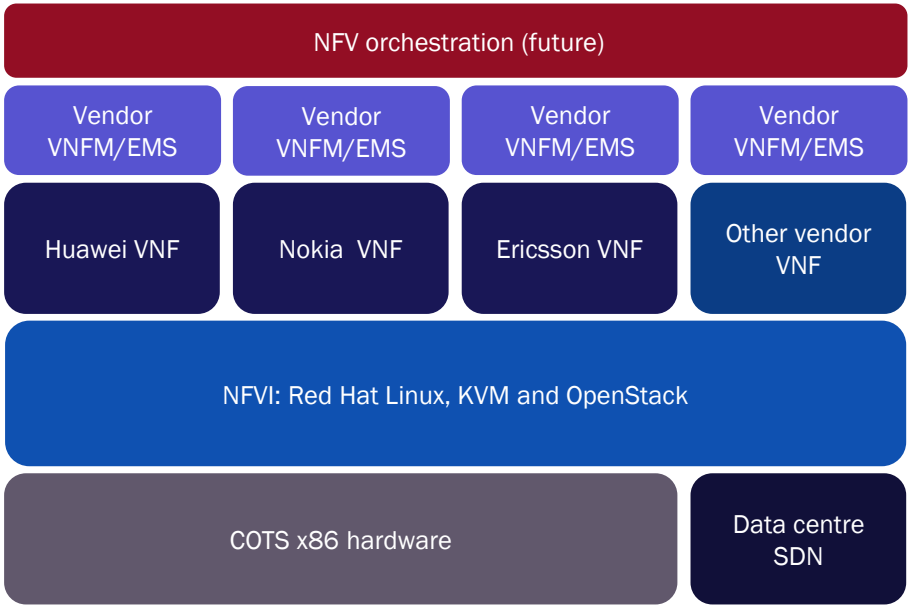
Telenor's decision to implement a virtualised mobile core on a multi-vendor platform was brave but necessary for the long-term, the company believes

Telenor aims to virtualise 90% of mobile core functions by 2020. The company began its network virtualisation journey at the end of 2015 when it set up a project team to investigate strategies for developing its mobile core. When it released an RFP in 2016, the team was clear that an end-to-end cloud-based approach would be feasible and future-proof and that it would not need to retain traditional, physical mobile core functions on the longer term.

Telenor's decision to procure a multi-vendor virtualised mobile core and infrastructure had a precedent in the operator's 2012 mobile core design, based on software/hardware separation and generic components. The same architecture has guided Telenor's virtual network functions (VNFs) and NFVI strategy, with the goal of supporting all Telenor VNFs, regardless of vendor, on a shared platform. Implementing a single-vendor NFVI/VNFs would have been quicker and easier in the short-term but would have tied Telenor to proprietary, immature vendor-integrated solutions.

The project team ran proofs of concept and trials to demonstrate that its multi-vendor concept would work. At the end of 2018, Telenor's virtual mobile core (gateways, MME/SGSN, DRA,UDC/HLR/HSS) running on its cloud NFVI handles more than 55% of all Telenor's mobile data traffic globally. The vUDC supports over 100 million subscribers. NFV components were contracted together but the pace of deployment and scaling has been VNF vendor-specific. Telenor's preference for a generic VNF manager across all VNFs has proved difficult to realise at this stage of the market.

Figure 2: Telenor's NFV initiative is part of a broader business transformation



Telenor points to leadership, cross-organisation involvement, business process change and vendor choice as keys to NFV success

Telenor highlights four factors that have been critical to the successful rollout of its NFV strategy.

Support for the initiative at senior levels of the business. Telenor senior executives had the vision and set the strategy for transformation on a global scale. They have been highly supportive of the NFV project team's efforts, encouraging early results.

Buy-in from all opcos by involving them from the outset. Telenor is a lean, decentralised organisation which did not have all the expertise and resources it needed at Group level. The Group technology unit reached out to a range of experts from each of Telenor's opcos, involving them in the programme from the outset. This ensured that all opcos bought into the common NFV infrastructure, VNFs and operations defined by the joint NFV project team. Early benefits were demonstrated, such as improved security protection.

Aligning procurement to ensure its support for the purchase of horizontal platform components. Telenor successfully modified existing practices to take into account new purchasing requirements for NFV.

Persuading multiple vendors to collaborate. Telenor selected vendors with which it already had relationships to provide VNFs since its familiarity with their products helped to mitigate risk. It also made it easier to insist that they work together to achieve Telenor's multi-vendor vision.

Figure 3: Critical success factors for establishing a multi-vendor NFV platform

Telenor's next challenges are to automate VNF onboarding, lifecycle management with multi-vendor orchestration and to improve cybersecurity protection

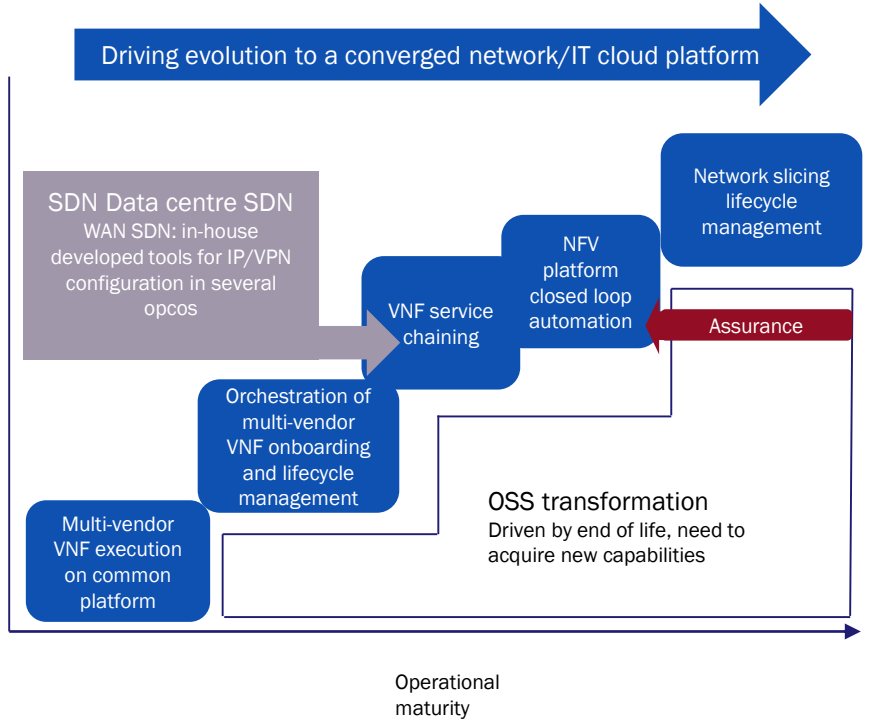
Telenor's next challenge is to put automation (orchestration and service assurance) in place across its multi-vendor NFV platform. It is also gradually migrating IT applications onto the platform, while strengthening protection against security attacks.

Telenor and its VNF vendors have learned together how to co-exist on a common, third party NFV infrastructure but the vendors' different VNF management approaches place an operational burden on Telenor. At this point, Telenor mainly manages VNFs manually, with little automated support for scaling.

Individual VNF suppliers do support automation when they control the full stack of NFV components and Telenor is pushing them to disaggregate this capability for a multi-vendor environment. It is currently evaluating orchestration tools, both from current vendors and from third party, independent orchestration vendors. Telenor will lean on the NFV Management and Orchestration (MANO) standardisation that ETSI NFV is undertaking and the operator is a member of the Open Source MANO project with Telefónica, BT, Sprint and others.

OSM gives Telenor a reference architecture for VNF and network service onboarding and lifecycle management around which it hopes to align vendor implementations. It is working on strategies for service assurance-driven closed loop automation and convergence with its SDN controller and network configuration tools to support service chaining and eventually network slicing.

Figure 4: Telenor is building up automated NFV operational capabilities that intersect with OSS and SDN



Key benefits

1

Telenor has reduced network and associated operational costs by more than 40%

Telenor saw immediate cost efficiencies with the VNFs ported to its common NFVI. These resulted from lowering operational costs including licenses, lower power and footprint requirements. As it adds further VNFs to the same platform, Telenor has achieved price points that are 40% lower than traditional equipment. The company says that this is basis for further efficiency.

2

Telenor is seeing improvements in key operational areas such as time to deploy and service resilience

Telenor is now able to implement a new VNF in its network within 2 days or 2 weeks, depending on the VNF's complexity, compared with the months it took to order, ship and install physical equipment. In addition, the company has already benefited from the resilient properties of a virtualised network. When it suffered a hardware outage, it was able to migrate VNFs immediately to new hardware without any impact on customers and their services.

3

Telenor has created a network platform that is ready for future innovation and 5G

Network virtualisation is a prerequisite for the delivery of key 5G services, such as network slicing and low latency services for industry. Telenor expects its early experience with NFV to enable it to bring 5G innovation to different markets. It is confident that it has a scalable, cost-efficient platform to support 5G business and traffic growth. It is leading the 5G VINNI project from a position of strength, as an operator that has already deployed NFV at scale.

FURTHER INFORMATION

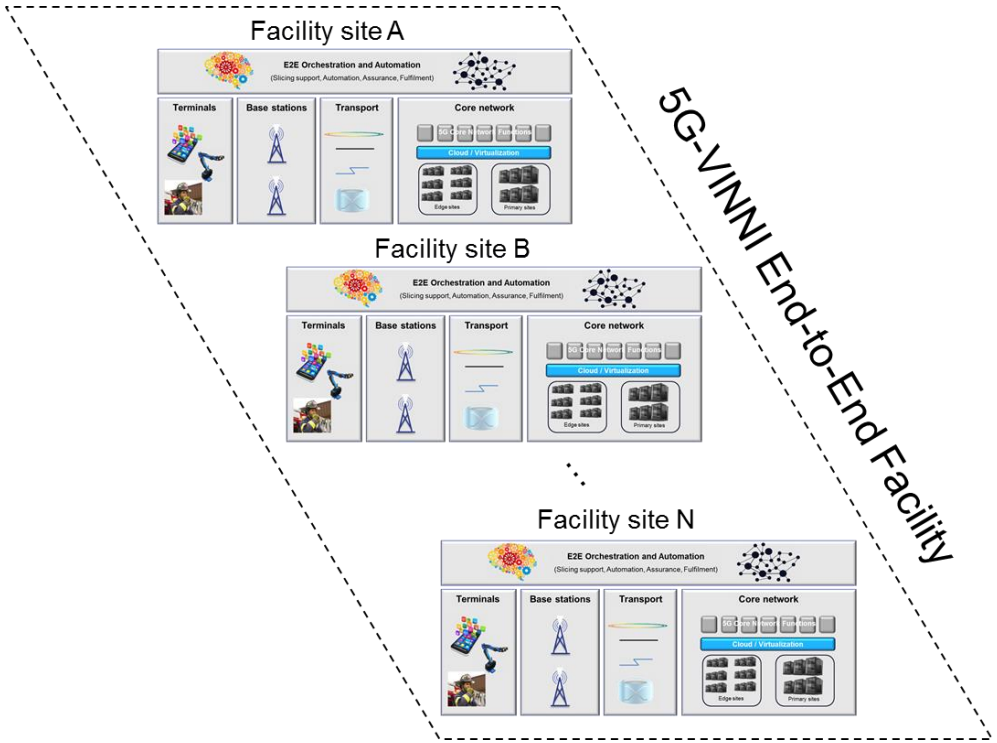
5G VINNI

Telenor Group is co-ordinating the 5G VINNI (Verticals INNovation Infrastructure) project with 23 project partners that aims to accelerate 5G uptake in Europe.

5G VINNI is a European Union Horizon 2020-funded project that will establish facilities in key locations in Europe, including Norway, which vertical industries can use to test use cases on a highly automated, dynamic and cloud-based 5G mobile network. The network innovations that 5G VINNI will create are expected to result in new commercial and technical service models. The goal is to allow users to invoke any network or service virtualised function running in any interconnected facility with full location transparency, using advanced orchestration and network slicing capabilities. The key themes of 5G are the focus of 5G VINNI, including edge computing, and the project expects its vertical industry partners to explore all the categories of 5G service: enhanced mobile broadband, massive machine-type communications and ultra-reliable low latency communications.

The EUR 20 million project started in July 2018 and the first 3GPP Release 15-compliant facilities are due to open in June 2019. Stand Alone New Radio and 5G Core will be supported from December 2019. Telenor, which is hosting one of the four main facilities, will showcase infrastructure and orchestration from Nokia, 5G RAN from Ericsson and Huawei, vEPC and later 5G Core from Ericsson, and other components from Cisco, Keysight and Palo Alto. Telenor Satellite and SES will provide satellite backhaul.

Figure 5: Conceptual architecture of 5G VINNI



Further reading

Case study	**Partner Communications: adoption of NFV-based on an 'orchestration-first' vCPE and SD-WAN solution**	Dana Cooperson and Don Alusha	www.analysysmason.com/Research/Content/Case-studies/Partner-Communications-Cloudify-RMA07-RMA16/

About the author

Caroline Chappell (Research Director) is the lead analyst for Analysys Mason's *Digital Infrastructure Strategies* research programme. Her research focuses on service provider adoption of cloud, and the application of cloud technologies to fixed and mobile networks. She is a leading exponent of SDN and NFV and the potential that these technologies have to enhance business agility and enable new revenue opportunities for service providers. Caroline investigates key cloud and network virtualisation challenges, and helps telecoms customers to devise strategies that mitigate the disruptive effects of cloud and support a smooth transition to the era of software-controlled networks.

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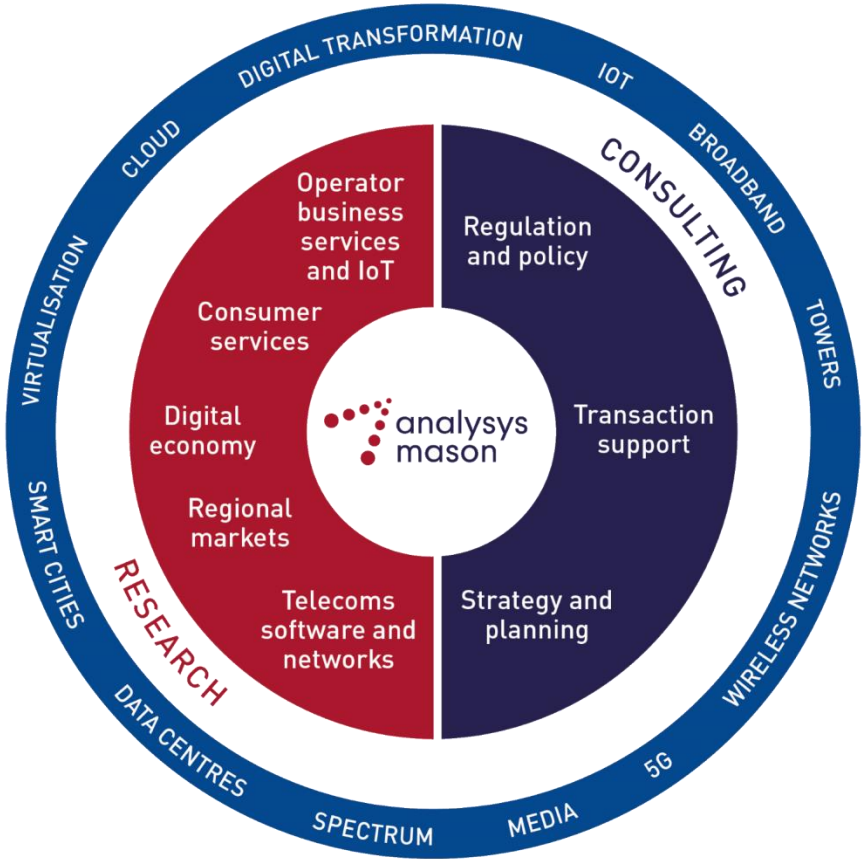

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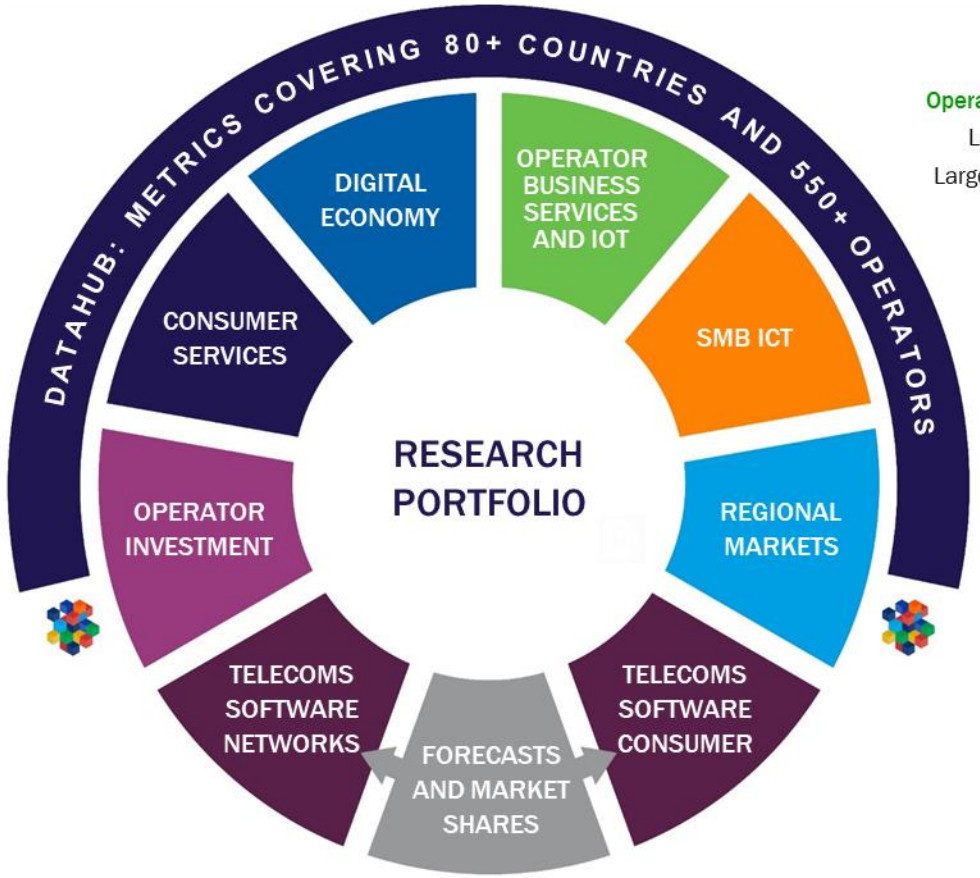

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