Service provider digital transformation roadmaps
Year 2

A framework for the digital transformation journey

DE-RISK AND ACCELERATE
YOUR TRANSFORMATION JOURNEY

Executive summary

Catalyst

Digital transformation has become an overwhelming concern for communications service providers (CSPs). With disruptive digital and online players eating away at their core markets, CSPs have no choice but to fundamentally change their operating and business models. They must adopt digital transformation strategies that streamline their operations, improve customer experience, and create new revenues. To achieve this, they must deliver a complex mix of transformations that span multiple domains.

Given the complexity of such a task, there is a huge role for CSPs' professional service partners to play, not just in implementing specific projects, but also in providing guidance throughout the transformation journey. Such guidance can take various forms, but at its heart there needs to be a framework, or roadmap, that can assist CSPs in their transformation.

Ovum view

The main drivers for digital transformation are relatively universal. They include the need to automate, create more agile operating models, improve operational efficiency, and improve customer engagement. However, CSPs' digital transformation goals are generally clearer than the journey required to attain them. This is because the transformation journey does not involve a simple or linear set of requirements; it is a complex and iterative process that requires cooperation not just across the organisation but with customers, partners, and employees.

The nature and the size of the task also depends on the maturity and nature of the CSP. The digital transformations undertaken by CSPs vary because every service provider has a different starting point. However, there are considerations and steps common to CSPs of a similar type, making it possible to create a framework to guide whole categories of CSPs throughout their journey. With this in mind, Ovum has for the second year running created roadmaps for six key service provider segments, outlining the steps different types of CSP typically need to take to deliver a successful transformation.

The roadmaps summarise the key activities that need to be carried out in the short term (0–6 months), medium term (7–24 months), and longer term (24+ months). We also explain why certain CSPs should prioritise particular tasks at different stages of their development.

Key messages

- The market is seeing an increasing number of digital transformation projects, as operators seek to streamline their operations, improve customer experience, and generate new revenues.

- There is increasing operator focus on automation and simplification.

- Network transformation remains the key focus of activity, but most projects span multiple domains, requiring alignment.

- Given the complexity of transformation, operators need to find partners that can assist with implementing specific projects and also provide guidance during the transformation journey.
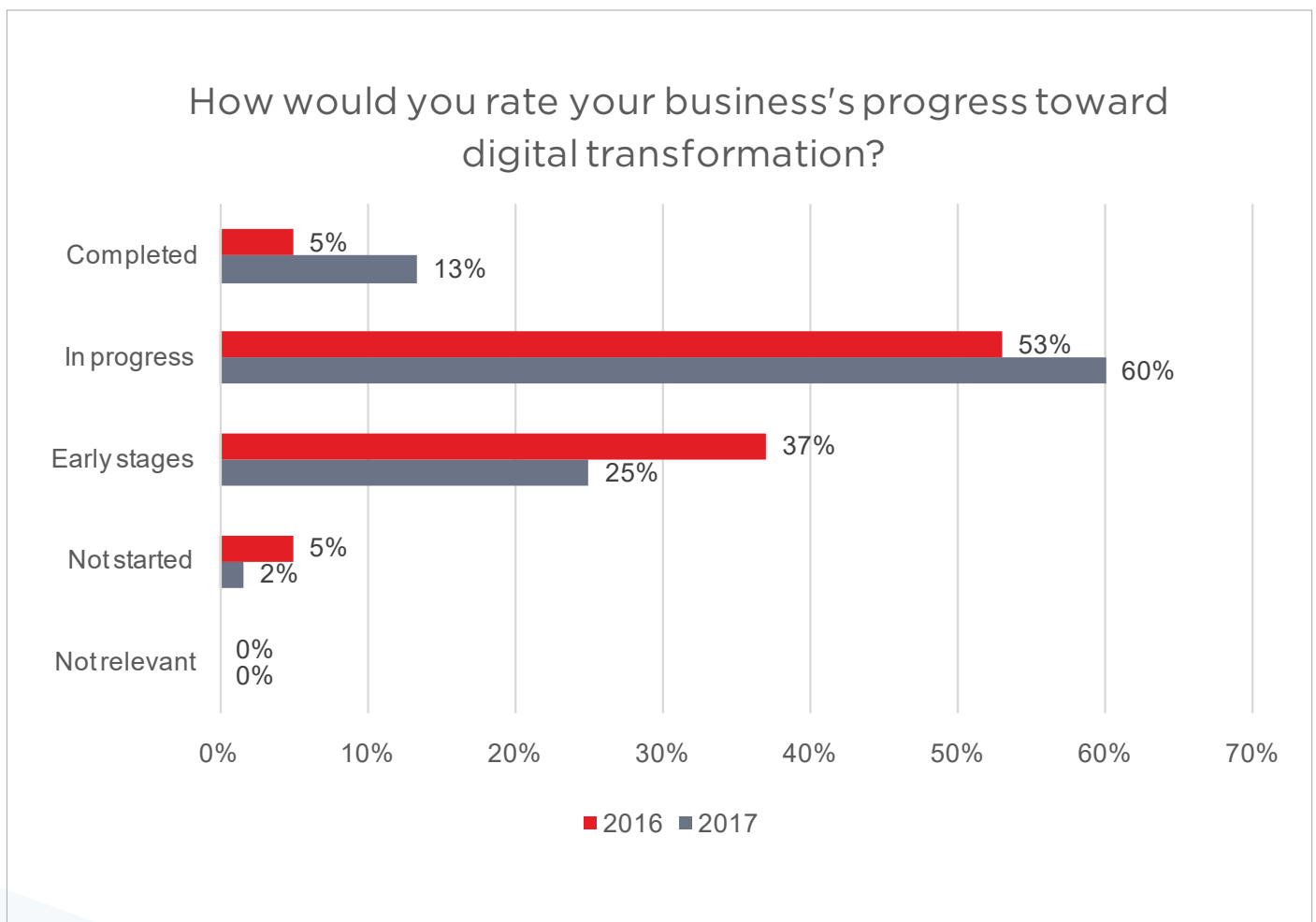
The digital transformation journey

Digital transformation has become an overwhelming concern for CSPs. A global survey of 60 service providers conducted by Ovum for a second year running shows that all segments and categories of service provider take digital transformation very seriously indeed: 75% view it as being either important or very important.

We are seeing an increasing number of digital transformation projects. As Figure 1 shows, 13% of service providers claimed to have "completed" transformation projects (up on a mere 5% last year) and 60% had projects in progress (up on 53% last year). Clearly the pace is ramping up, but what is driving this flurry of activity?

Figure 1: Progress toward digital transformation (All respondents)

How would you rate your business's progress toward digital transformation?

Completed: 5% (2016), 13% (2017)
In progress: 53% (2016), 60% (2017)
Early stages: 37% (2016), 25% (2017)
Not started: 5% (2016), 2% (2017)
Not relevant: 0% (2016), 0% (2017)

■ 2016 ■ 2017

Source: Ovum

The need to improve the customer relationship and the customer experience is what underpins digital transformation. Internet content providers (ICPs) have created lean, customer-centric operations that allow them to rapidly deliveragile, innovative services. This is what CSPs must do to turn themselves into digital service providers (DSPs). The business goal may be simple, but the means to achieve it are not.

When asked about the drivers for undergoing a digital transformation, most CSPs highlight improving customer engagement, automating and reducing manual processes, and adopting a more agile operating model (see Figure 2). Improving customer engagement and adopting a more agile business model were both cited as important drivers in last year's survey, but over the last 12 months, automating and reducing manual processes has leapt from almost bottom of the list of drivers to the top.

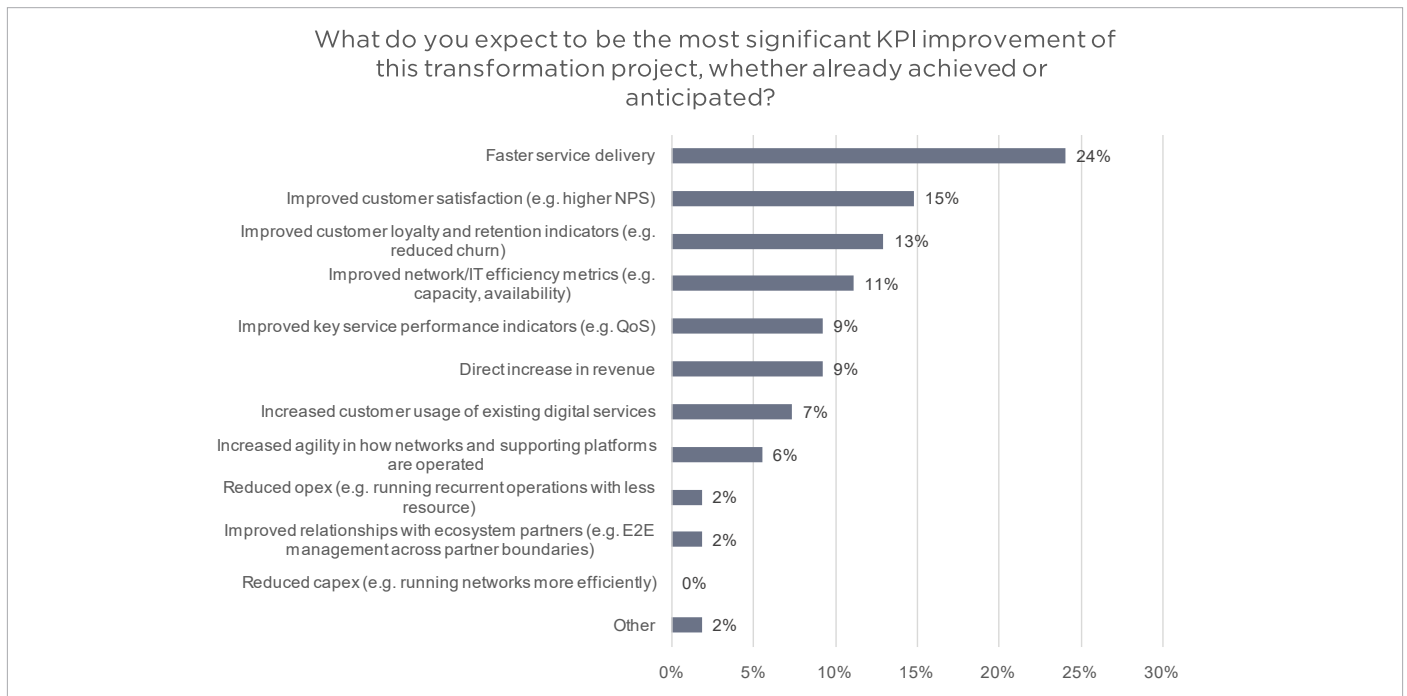Figure 2: The main drivers for undergoing a digital transformation
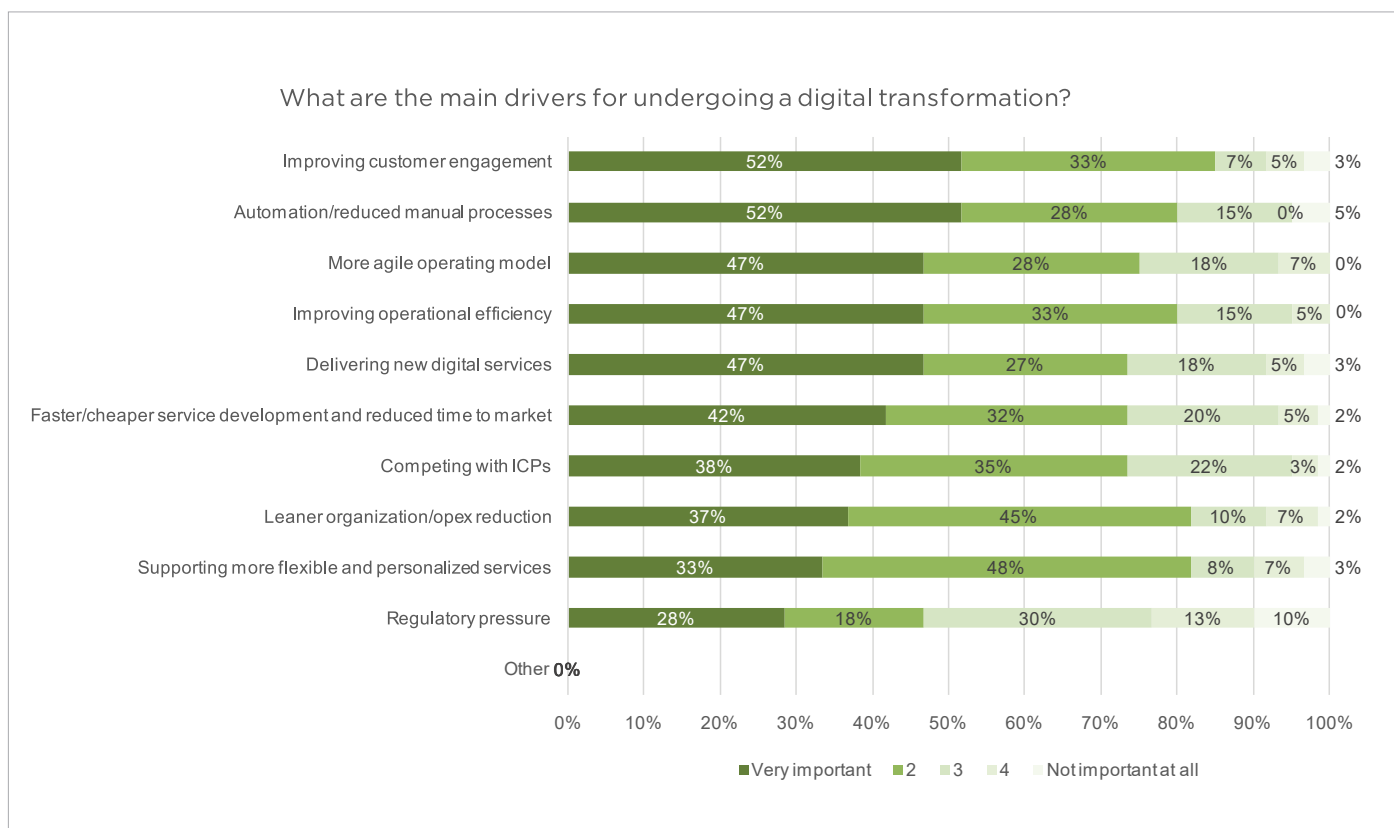
Source: Ovum

Digital transformation project strategies

Typically, service providers implement up to four narrowly defined transformation projects: 72% of operators we surveyed fell into this category. Clearly, service providers are steering away from running too many separate projects at the same time. But not much evidence of large-scale cross-company initiatives exists: only 3% of operators claim to be doing this. It appears that AT&T-style coordinated cross-company initiatives still remain in the minority.

When it comes to KPI improvements achieved by digital transformation, faster service delivery is deemed the most important, although improved customer satisfaction and retention are also rated highly (see Figure 3).
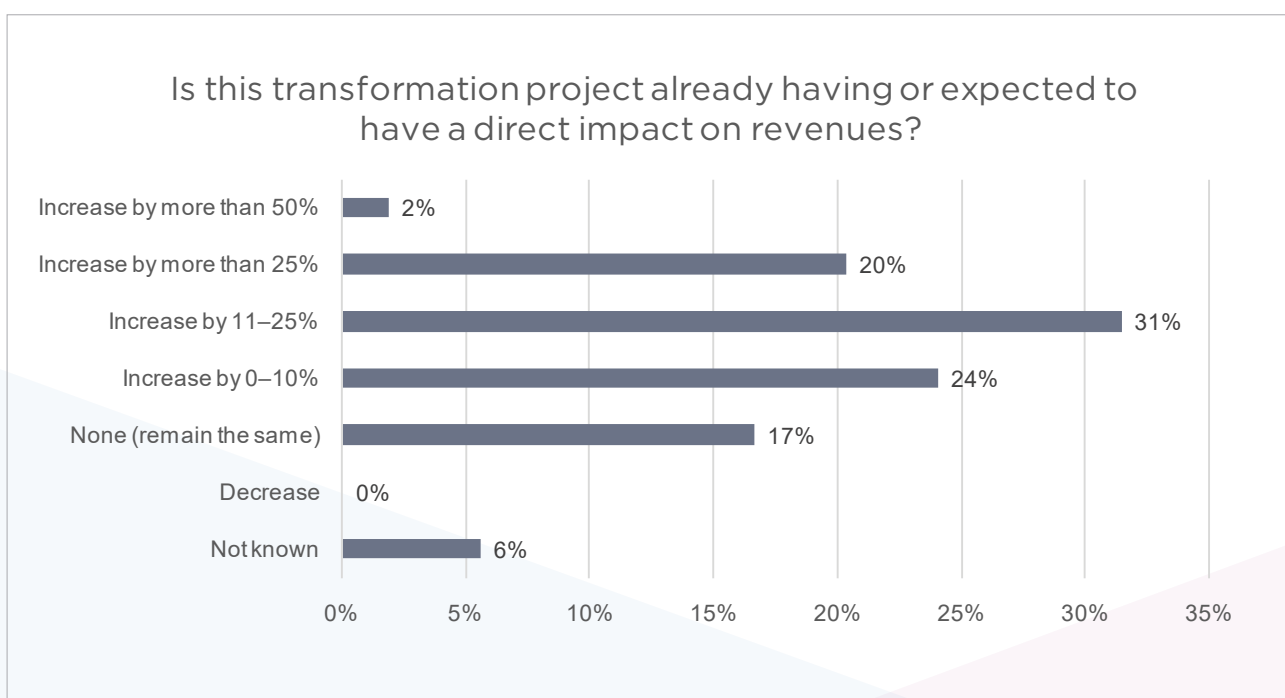
Figure 3. Most significant KPIs for a digital transformation project

What do you expect to be the most significant KPI improvement of this transformation project, whether already achieved or anticipated?

KPI	%
Faster service delivery	24%
Improved customer satisfaction (e.g. higher NPS)	15%
Improved customer loyalty and retention indicators (e.g. reduced churn)	13%
Improved network/IT efficiency metrics (e.g. capacity, availability)	11%
Improved key service performance indicators (e.g. QoS)	9%
Direct increase in revenue	9%
Increased customer usage of existing digital services	7%
Increased agility in how networks and supporting platforms are operated	6%
Reduced opex (e.g. running recurrent operations with less resource)	2%
Improved relationships with ecosystem partners (e.g. E2E management across partner boundaries)	2%
Reduced capex (e.g. running networks more efficiently)	0%
Other	2%

Source: Ovum

Although a direct impact on revenue is not typically the key purpose of digital transformation projects, there is nevertheless an impact in most cases. An 11–25% revenue increase is most common, with around one-third of projects seeing this level of growth (see Figure 4). However, around 40% of projects have single-figure impact or no impact at all on revenues.

Figure 4: Revenue impact of digital transformation projects

Is this transformation project already having or expected to have a direct impact on revenues?

	%
Increase by more than 50%	2%
Increase by more than 25%	20%
Increase by 11–25%	31%
Increase by 0–10%	24%
None (remain the same)	17%
Decrease	0%
Not known	6%

Source: Ovum

So, what are the digital transformation projects that service providers are focusing on? Over 60% of the projects that are currently live can be classed as falling primarily into the network technology domain. The largest proportion of current projects among the CSPs we surveyed focused on network technology, closely followed by business process systems transformation and then BSS.
A typical example is a two-year transformation project alarge national player in Singapore implemented to its existing access and core networks, with the help of SDN. The project aimed to better address the needs of enterprise customers, and resulted in a revenue increase of over 25%. But being able to deliver bandwidth dynamically requires changes to network management, BSS, and business process systems to support the greater flexibility.

Another example is a SD-WAN project implemented over four months by a small national player in one of the Gulf States to help differentiate itself regionally. The project also required network management and business process system changes to support on-demand capabilities. Some of the immediate benefits of this project included better SLA monitoring, improved security, and a cloud-based call center that supports rapid expansion into other EMEA markets. The CSP estimates that the project also delivered cost savings of around 60%.

Another transformation project was aunified billing integration initiative implemented by the South-Asian business unit of a major international group. The project focused on BSS, but required changes to network technology and business process systems as well as substantial system and process integration and automation activity. The main objective of the project was to improve operational efficiency; however, the company saw a single-figure percentage increase in revenues and a boost to customer satisfaction scores.

These examples show how most of the live projects we looked at spanned multiple domains rather than being siloed.

Key service provider segments

In this section, we summarise the six key service provider segments we have identified and have used to structure our research. For a more detailed overview of this market segmentation, see last year's report. In the second half of this report, we go into more detail about how this impacts the choices that need to be made in a variety of different domains.

Segment 1: Players with a large home market that are also present in multiple geographies (e.g. AT&T, Orange, Telefonica)

Large international players are leading the way with radical network technology change (e.g. virtualisation), investment in business process systems (e.g. AI and analytics), and agile/automated operations. Their lead is partly due to their size and the resources they have at their disposal. Also, players that operate in a multiple-opco environment increasingly need to centralise and standardise resources and operations.
Key considerations for such players include improvingthe customer experience, ensuring operational efficiency, and achieving automation – with automation in particular gaining importance over the past 12 months.

Segment 2: Large national players with some international investments (e.g. China Unicom, Telecom Italia)

Large national players place a lot of emphasis on network technology change but tend to have a less radical approach to this than the large international players. Segment 2 players care just as much about automation and improving customer engagement as players in Segment 1, but they tend to focus more on delivering new digital services, reducing time to market, and implementing more agile operating models, partly because they are playing catch-up with internet cloud players and key international operators.

Segment 3: Smaller national players with limited international investments (e.g. TeliaSonera, Telstra, Telus)

Smaller national players place a lot of emphasis on network technology change and improving operational efficiency. However, they have some similarities with players in Segment 2, such as the importance they attach to implementing a more agile operating model. Customer experience–focused investment and transformation is especially important to small service providers; therefore, the type of investments they might prioritise include automating BSS and call center processes. Segment 3 players tend not to have the budget and resources for the multiple trials common among Segment 1 players.

Segment 4: Mobile-first players (e.g. Globe, Airtel, Safaricom)

Mobile-first players place a lot of emphasis on the importance of improving customer engagement and the customer experience, which explains their focus on BSS upgrades, including investment in integrated billing and charging, omnichannel initiatives, and self-service apps. However, as with competitors in other segments, automation has also become a priority for mobile-first players.

Segment 5: Internet cloud players (e.g. Google, Facebook)

Internet cloud players are similar to many players in other segments because they have network technology and network management at the heart of their concerns. Automation is also a key driver of their digital transformation projects. Not surprisingly, competition with other internet cloud players is a major concern. Because of their strong performance in customer experience, internet cloud players tend to have fewer concerns about this.

Segment 6: Smaller national, niche, and virtualised players (e.g. Elisa)

Smaller niche players place considerably less emphasis on network technology than players in any of the other segments. This may be because they are less burdened by legacy network issues, and so can focus more on business process systems and OSS. They are noticeably ahead of many segments in their focus on service assurance, end-to-end lifecycle management, and orchestration. Challengers seeking to bring new digital services to the market also typically need to focus on promotional activities to drive day-to-day business, and need the IT systems to support this.

Service provider priorities within the key domains

In this section, we look in more depth at the tasks required for a successful digital transformation. Clearly, network-related transformation projects figure high on the list, but the range of technologies, operations, and processes that need to be transformed is extensive. Ovum has chosen to structure these into the following six domains:

- Network technologies
- Network management systems
- OSS
- BSS
- Business process systems and functions
- Business-led tasks

AN INDICATIVE SP TRANSFORMATION ROA

Players with a large home market & presence in multiple geographies e.g. AT&T, Orange, Telefonica.

These large players are leading the way with radical network technology change (e.g. virtualisation), investment in business process system automated operations.

1 KEY TRIGGERS

- Competitors moving to 5G/4G in main geographical market
- Competitors award contracts to vendors for SDN/NFV
- Disruption to business and pricing model by Internet Content Providers (ICPs)

2 KEY OUTCOMES

- Automation/reduced manual processes
- Improved operational efficiency
- Improve customer engagement

3 NEXT STEPS

SP's should address skill shortage issues as soon as possible and identify key partners who can support their transformation.

This roadmap is based on a combination of primary and secondary research, including briefings, interviews, surveys, and industry events. It forms part on an ongoing three-year initiative investigating transformation in CSPs in partnership with Tata Communications Transformation Services (TCTS).
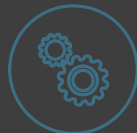
NETWORK TECHNOLOGY

- Press ahead with LTE enhancements incl. massive MIMO
- Press ahead with SDN/NFV investment based on differentiation & market positioning
- Prioritise fiber backhaul before building out radio networks to align with peers

NETWORK MANAGEMENT

- Invest in optimisation, incl. centralised SON to improve performance of multi-vendor heterogeneous network
- Improve network fault reporting & management
- Improve CX with network assurance/performance management modernisation

OSS

- Transform network performance & fault management with real-time analytics to make more predictive
- Centralise data and network inventory to address future digital network complexity (SDN/NFV, 5G, IoT)
- Service assurance requires real-time capabilities, policy, analytics & tighter integration with other systems

BSS

- Integrate billing and charging systems with customer management systems
- Large players have many channels so need to define which will be supported & how

BUSINESS PROCESS SYSTEMS

- Re-architect existing workflows & eliminate redundant or irrelevant tasks
- Automate business processes, especially time to resolve
- Move from network-centric to CEM process (E2E customer lifecycle)

BUSINESS-LED TASKS

- Appoint project lead (e.g. CIO, CTO, transformation program team, project management office)
- Review organisational and operational processes & identify those that need to be transformed
- Press ahead with recruitment to bring in new digital skills
- Make targeted use of digital accelerator teams

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s (such as big data analytics), and agile/

MEDIUM-TERM PRIORITY 7-24 MONTHS	LONGER-TERM PRIORITY 24+ MONTHS
Push fiber deeper and deeper into and throughout access network.	Support edge computing & MEC trials & targeted deployments
Press on with virtualising core functions and introduce agile DevOps approaches	Adopt cloud-native, microservices architectures, containerisation & multicloud environments
Initiate early 5G deployment if not already done so	
Cloud IT infrastructure and data center investment/partnerships	
Prepare for network management and orchestration in a hybrid network environment	Predictive maintenance and harmonised service level management across technologies
L2/L3 support – start to integrate big data analytics tools	
Plan migration to SDN-based optimisation & policy-based approach	
Automate service provisioning, activation & fulfilment to improve customer experience	End-to-end lifecycle management (i.e. service assurance and fulfilment)
Open APIs require serious attention, also need to engage in standardisation and integration initiatives	
Centralize/consolidate OSS to reduce cost and support standardised environment	
Upgrade third party settlement systems to support new business models e.g. revenue share	Move to microservices architectures
Move customer management systems to the cloud	
Improve self-service app functionality/capabilities	
Define service orchestration in hybrid environment	
Increase investment in big data analytics and explore machine learning & AI	
Move from waterfall to DevOps to support agile & continuous development in targeted areas	
Develop detailed strategy plan for network, IT and business platform transformation	Follow through with cross-group cultural and organisational transformation
Review portfolio and business models	
Initiate targeted cultural change including cross-functional teams, selling business outcomes, etc.	
Retraining & up-skill to support cloud-native development, ML, big data, IoT	

AN INDICATIVE SP TRANSFORMATION ROA

Large national players with some international investments e.g. China Unicom, Telecom Italia.

These large national players place a lot of emphasis on network technology change but tend to be less radical than Segment 1 - there is mor migrating legacy networks, although implementing more agile operating models and reducing time to market also figure high. Nor are they

1 KEY TRIGGERS

- Market disruption due to launch of new digital services
- Disruption to business model by OTT/Internet players
- Competitors moving to 5G/4G in their main market

2 KEY OUTCOMES

- Automation/reduced manual processes
- Improved customer engagement
- Improved operational efficiency

3 NEXT STEPS

SP's should obtain senior management buy-in for transformation and look to establish a transformation program team to build momentum.

This roadmap is based on a combination of primary and secondary research, including briefings, interviews, surveys, and industry events. It forms part on an ongoing three-year initiative investigating transformation in CSPs in partnership with Tata Communications Transformation Services (TCTS).

NETWORK TECHNOLOGY

- Press ahead with LTE enhancements incl. massive MIMO
- Prioritise fiber backhaul before building out radio networks (impact of 5G/IoT/small cell)
- Push fiber deeper and deeper into and throughout access network
- Focus on niches where SDN/NFV business case makes sense e.g. enterprise services

NETWORK MANAGEMENT

- Invest in optimisation, incl. centralised SON to improve performance of multi-vendor heterogeneous network
- Improve CX with network assurance/performance management modernisation

OSS

- Transform network performance & fault management with real-time analytics to make more predictive
- Automate service provisioning, activation & fulfilment to improve customer experience
- Centralise data repositories, acute for legacy SPs, to overcome silos & gain enterprise-wide view of the business

BSS

- Integrate billing and charging systems with customer management systems
- Improve order management process by improving automation, and integrating systems
- Large players have many channels so need to define which will be supported & how

BUSINESS PROCESS SYSTEMS

- Re-architect existing workflows & eliminate redundant or irrelevant tasks
- Automate business processes, especially time to resolve
- Move from network-centric to CEM process (E2E customer lifecycle)

BUSINESS-LED TASKS

- Obtain senior management buy-in for transformation
- Identify which areas of the business to transform (vs. just grow or maintain)
- Press ahead with recruitment to bring in new digital skills
- Make targeted use of digital accelerator teams

e focus on improving operational efficiency and
investing so much in business process systems.

MEDIUM-TERM PRIORITY 7-24 MONTHS	LONGER-TERM PRIORITY 24+ MONTHS
Press ahead with SDN/NFV investment based on differentiation & market positioning	Press on with virtualising core functions and introduce agile DevOps approaches
Cloud IT infrastructure and data center investment/partnerships	Support edge computing & MEC trials & targeted deployments
Initiate trials and early 5G deployment if not already done so	
Plan migration to SDN-based optimisation & policy-based approach	Predictive maintenance and harmonised service level management across technologies
Prepare for network management and orchestration in a hybrid network environment	
L2/L3 support – start to integrate big data analytics tools	
Service assurance requires real-time capabilities, policy, analytics & tighter integration with other systems	End-to-end lifecycle management (i.e. service assurance and fulfilment)
Open APIs require serious attention, also need to engage in standardisation and integration initiatives	
Centralise/consolidate OSS required to reduce cost and support standardized environment	
Consolidate products into a single product	Move to microservices architectures
Improve self-service app functionality/capabilities	Upgrade third party settlement systems to support new business models e.g. revenue share
Move customer management systems to the cloud	
Increase investment in big data analytics and explore machine learning & AI	Define service orchestration in hybrid environment
Move from waterfall to DevOps to support agile & continuous development decision making in targeted areas	
Develop detailed strategy plan for network, IT and business platform transformation	Follow through with cross-group cultural and organisational transformation
Review portfolio and business models	
Initiate targeted cultural change including cross-functional teams, selling business outcomes, etc.	
Retraining & up-skill to support cloud-native development, ML, big data, IoT	

AN INDICATIVE SP TRANSFORMATION ROA

Smaller national players with limited international investments e.g. TeliaSonera, Telstra, Telus.

Smaller national players place a lot of emphasis on network technology change and improving operational efficiency. They tend to see IT tra improving customer experience & the digital relationship with the client as well as increasingly finding ways to automate this.

SHORT-TERM PRIORITY
0-6 MONTHS

1 KEY TRIGGERS

- Disruption to business model by OTT/Internet players
- Competitive pressure to develop IoT
- Market disruption from launch of new digital services

2 KEY OUTCOMES

- Improving operational efficiency
- More agile operating model
- Automation/reduced manual processes

3 NEXT STEPS

SP's should identify which areas of the business to transform operational efficiency and customer-experience. Also need to quickly identify key partners who can support their transformation.

NETWORK TECHNOLOGY

- Press ahead with LTE enhancements incl. massive MIMO
- Prioritise fiber backhaul before building out radio networks (impact of 5G/IoT/small cell)
- Push fiber deeper and deeper into and throughout access network

NETWORK MANAGEMENT

- Invest in network optimisation

OSS

- Automate service provisioning, activation & fulfilment to improve customer experience
- Transform network performance & fault management with real-time analytics to make more predictive

BSS

- Integrate billing and charging systems with customer management systems

BUSINESS PROCESS SYSTEMS

- Automate business processes, especially time to resolve
- Re-architect existing workflows & eliminate redundant or irrelevant tasks

BUSINESS-LED TASKS

- Obtain senior management buy-in for a transformation project
- Appoint project lead (e.g. CIO, CTO, transformation program team, project management office)
- Identify which areas of the business to transform (vs. just grow or maintain)
- Press ahead with recruitment to bring in new digital skills

...nsformation as a longer term project, but prioritise

**MEDIUM-TERM PRIORITY
7-24 MONTHS**

**LONGER-TERM PRIORITY
24+ MONTHS**

Deliver on plans for 100G and 200G, as video/cloud will drive bandwidth

Take step-by-step approach to SDN/NFV, not full network transformation, wait for large players to prove out

Initiate trials and early 5G deployment if not already done so

Follow edge computing & MEC developments, be ready to move if takes off

Cloud IT infrastructure and data center investment/partnerships

Focus on niches where SDN/NFV business case makes sense e.g. enterprise services

Network assurance modernisation to consolidate and improve customer experience

Predictive maintenance and harmonised service level management across technologies

Capacity management - move to on-demand bandwidth allocation and plan for BDA integration

Prepare for network management and orchestration in a hybrid network environment

L2/L3 support - plan for big data analytics integration

Service assurance requires real-time capabilities, policy, analytics & tighter integration with other systems

Centralise data and network inventory to address future digital network complexity (SDN/NFV, 5G, IoT)

Open APIs require serious attention

Develop a strategy for managing customer portals such as self-service apps, social, chat, and other channels

Move to microservices architectures

Improve content management & optimisation across channels

Upgrade third party settlement systems to support new business models e.g. revenue share

Move customer management systems to the cloud

Improve order management process by improving automation, and integrating systems

Move from network-centric to CEM process (E2E customer lifecycle)

Consolidate all sales order processing functions into a single platform

Move from waterfall to DevOps to support agile & continuous development decision making in targeted areas

Define service orchestration in hybrid environment

Increase investment in big data analytics and explore machine learning & AI

Outline a clear vision and goals for transformation

Initiate targeted cultural change including cross-functional teams, selling business outcomes, etc.

Review portfolio and business models

Review organisational and operational processes & identify those that need to be transformed

Retraining & up-skill to support cloud-native development, ML, big data, IoT

AN INDICATIVE SP TRANSFORMATION ROA[D]

Mobile first e.g. Globe, Airtel, Safaricom.

Mobile first players place a lot of emphasis on the importance of improving customer engagement and customer experience, something wh[ich]
support system transformation. Clearly their network technology concerns are mobile-focused but automation is increasingly a concern.

**SHORT-TERM PRIORITY
0-6 MONTHS**

1 KEY TRIGGERS

- Disruption to business model by OTT/Internet players
- Competitive response required to new digital services & need to develop IoT strategy
- M&A activity and market consolidation

2 KEY OUTCOMES

- Automation/reduced manual processes
- Improving customer engagement
- Faster, cheaper service development & reduced time to market

3 NEXT STEPS

SP's should look to focus on areas that expand customer-experience. but need to review portfolio & business models to avoid mobile lock-in and too narrow a technology focus.

NETWORK TECHNOLOGY
- Press ahead with LTE enhancements incl. massive MIMO
- Plan a fiber network or find partners for backhaul services, to align with peers
- Push fiber deeper and deeper into and throughout access network

NETWORK MANAGEMENT
- Start deploying a centralised SON solution
- Improve CX with network assurance/performance management modernization

OSS
- Automate service provisioning, activation & fulfilment to improve customer experience
- Centralise data repositories, acute for legacy SPs, to overcome silos & gain enterprise-wide view of the business

BSS
- Integrate billing and charging systems with customer management systems

BUSINESS PROCESS SYSTEMS
- Automate business processes, especially time to resolve
- Move from network-centric to CEM process (E2E customer lifecycle)
- Re-architect existing workflows & eliminate redundant or irrelevant tasks

BUSINESS-LED TASKS
- Obtain senior management buy-in for a transformation project
- Appoint project lead (e.g. CIO, CTO, transformation program team, project management office)
- Agree a digital transformation blueprint that prioritizes key tasks

...ich feeds through into their focus on business

MEDIUM-TERM PRIORITY 7-24 MONTHS	LONGER-TERM PRIORITY 24+ MONTHS
Initiate early 5G deployment if not already done so	Take step-by-step approach to SDN/NFV, not full network transformation, wait for large players to prove out
Small cells/network densification to provide extra capacity	Support edge computing & MEC trials & targeted deployments
Cloud IT infrastructure and data center investment/partnerships	
Focus on niches where SDN/NFV business case makes sense e.g. enterprise services	
L2/L3 support – start to integrate big data analytics tools	Prepare for network management and orchestration in a hybrid network environment
	Network fault reporting and management - start to integrate big data analytics/machine learning tools
Service assurance requires real-time capabilities, policy, analytics & tighter integration with other systems	
Transform network performance & fault management with real-time analytics to make more predictive	
Open APIs require serious attention	
Move customer management systems to the cloud	Strategically support multiple channels with consistent view and functionality across channels
Improve self-service app functionality/capabilities	Move to microservices architectures
Upgrade third party settlement systems to support new business models e.g. revenue share	
Increase investment in big data analytics and explore machine learning & AI	
Move from waterfall to DevOps to support agile & continuous development decision making in targeted areas	
Define service orchestration in hybrid environment	
Develop detailed strategy plan for network, IT and business platform transformation	Initiate targeted cultural change including cross-functional teams, selling business outcomes, etc.
Initiate recruitment to bring in new digital skills	
Retraining & up-skill to support cloud-native development, ML, big data, IoT	
Review portfolio and business models	

AN INDICATIVE SP TRANSFORMATION ROA

Internet cloud players e.g. Google, Facebook.

Internet cloud players are more focused on investment in business process systems and business process change than other segments, altho
They are typically ahead of the game with a strong customer-experience focus but still need to regularly review organisational and operation

SHORT-TERM PRIORITY
0-6 MONTHS

1 KEY TRIGGERS

- Competition from other OTT/Internet players
- Market disruption through the launch of new digital services
- Competitors pressing ahead with cloud-ready platforms or applications

2 KEY OUTCOMES

- Automation/reduced manual processes
- Stronger competitive positioning against other internet players
- Faster, cheaper service development & reduced time to market
- Improved customer engagement

3 NEXT STEPS

SP's should look to establish a "Transformation Program Team" to build momentum and identify key partners who can support their transformation.

This roadmap is based on a combination of primary and secondary research, including briefings, interviews, surveys, and industry events. It forms part on an ongoing three-year initiative investigating transformation in CSPs in partnership with Tata Communications Transformation Services (TCTS).

NETWORK TECHNOLOGY

Targeted investment in subsea fiber cable or consortiums where required
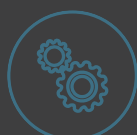
NETWORK MANAGEMENT
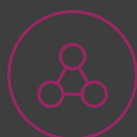
OSS

Service assurance requires real-time capabilities, policy, analytics & tighter integration with other systems

Centralise data and network inventory to address future digital network complexity (SDN/NFV, 5G, IoT)

BSS

BSS is not a major priority area for ICPs, they operate primarily in one channel and have few legacy system concerns

BUSINESS PROCESS SYSTEMS

Automate business processes, especially time to resolve

Move to CEM-centric process (E2E customer lifecycle) if not done so already

Re-architect existing workflows & eliminate redundant or irrelevant tasks

BUSINESS-LED TASKS

Outline a clear vision and goals for next round of transformation

Develop detailed strategy plan for the next wave of network, IT and business platform transformation

...ough network issues are also an increasing priority.

...nal processes to avoid complacency.

MEDIUM-TERM PRIORITY
7-24 MONTHS

LONGER-TERM PRIORITY
24+ MONTHS

MEDIUM-TERM PRIORITY	LONGER-TERM PRIORITY
Aggressively push towards full virtualised network if not doing so already	Build out Open Optical network to lower the cost from Metro Data Center to Submarine
Increasing focus on expanding data centers and reliability, and improving data center interconnect connectivity	Invest in fixed or wireless broadband where business case makes sense
	Support edge computing & MEC trials & targeted deployments

Invest in control, management, orchestration and policy tools	
Plan to migrate legacy assurance to SDN based assurance	
Plan migration to SDN-based optimisation & policy-based approach	

Automate service provisioning & fulfilment to improve customer experience	
Transform network performance & fault management with real-time analytics to make more predictive	
Open APIs require serious attention, also need to engage in standardisation and integration initiatives	

Ensure that consolidated all sales order processing functions into a single platform (lead to cash)	Continue to optimise use cases for big data analytics and explore machine learning & AI
Move from waterfall to DevOps to support agile & continuous development decision making in targeted areas	

Review organisational and operational processes & identify any that need to be transformed	Identify new ways to innovate & expand IT skills e.g. partnering, collaboration
Conduct gap analysis of in-house skills	

AN INDICATIVE SP TRANSFORMATION ROA

Smaller national, niche and virtualized players e.g. Elisa.

Smaller niche players currently place less emphasis on network technology change than other segments. They are less burdened by legacy r systems and OSS. They are typically ahead of the game in areas such as service assurance.

SHORT-TERM PRIORITY
0-6 MONTHS

1 KEY TRIGGERS

- Disruption to business model by OTT/Internet players

- Market Disruption through the launch of new digital services

- Competitive response required to develop an IoT strategy

2 KEY OUTCOMES

- More agile operating model

- Faster, cheaper service development & reduced time to market

- Improving customer engagement

3 NEXT STEPS

SP's should look to establish a transformation program team to build momentum as well as identify key partners who can support their transformation.

NETWORK TECHNOLOGY

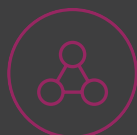- Press ahead with LTE enhancements incl. massive MIMO
- Prioritise fiber backhaul before building out radio networks, to align with peers

NETWORK MANAGEMENT

- Invest in network optimisation
- Start deploying a centralised SON solution

OSS

- Automate service provisioning, activation & fulfilment to improve customer experience
- Transform network performance & fault management with real-time analytics to make more predictive

BSS

- Integrate billing and charging systems with customer management systems
- Develop a strategy for managing customer portals such as self-service apps, social, chat, and other channels

BUSINESS PROCESS SYSTEMS

- Move from network-centric to CEM process (E2E customer lifecycle)
- Automate business processes, especially time to resolve
- Re-architect existing workflows & eliminate redundant or irrelevant tasks

BUSINESS-LED TASKS

- Review portfolio and business models
- Appoint project lead (e.g. CIO, CTO, transformation program team, project management office)
- Initiate recruitment to bring in new digital skills

network issues, and focus more on business process

MEDIUM-TERM PRIORITY 7-24 MONTHS	LONGER-TERM PRIORITY 24+ MONTHS
Initiate trials and early 5G deployment if not already done so	Small cells/network densification to provide extra capacity
Push fiber deeper and deeper into and throughout access network	Take step-by-step approach to SDN/NFV, not full network transformation, wait for large players to prove out
Invest in Wi-Fi network if provides point of differentiation	Follow edge computing & MEC developments, be ready to move if takes off
Improve CX with network assurance/performance management modernisation	Prepare for network management and orchestration in a hybrid network environment
Network fault reporting and management - start to integrate big data analytics/machine learning tools	
L2/L3 support - plan for big data analytics integration	
Service assurance requires real-time capabilities, policy, analytics & tighter integration with other systems	End-to-end lifecycle management (i.e. service assurance and fulfilment)
Open APIs require serious attention	
Centralise/consolidate OSS required to reduce cost and support standardised environment	
Move customer management systems to the cloud	Move to microservices architectures
Improve self-service app functionality/capabilities	
Improve order management process by improving automation, and integrating systems	
Upgrade third party settlement systems to support new business models e.g. revenue share	
Move from waterfall to DevOps to support agile & continuous development decision making in targeted areas	Define service orchestration in hybrid environment
Increase investment in big data analytics and explore machine learning & AI	
Agree a digital transformation blueprint that prioritises key tasks	Initiate targeted cultural change including cross-functional teams, selling business outcomes, etc.
Develop detailed strategy plan for network, IT and business platform transformation	
Retraining & up-skill to support cloud-native development, ML, big data, IoT	

Network technology transformation priorities

The Ovum survey shows that for CSPs, network technology remains the highest priority for transformation. However, the rapid expansion in number of devices and rapid growth in data traffic (especially video traffic) will continue to drive short- to medium-term activity in this domain, with continuing investment in areas such as fixed broadband and FTTx. Despite their undoubted importance as drivers of digital transformation, SDN/NFV and 5G are still viewed by most segments as longer-term investment priorities. Players in Segment 1, such as AT&T, Telefonica, and Vodafone, remain the exception in terms of treating SDN/NFV as a more immediate investment priority.

Even though investment varies considerably between segments, cloud infrastructure transformation has significantly increased in importance over the last 12 months and is now regarded by most operators (apart from smaller niche players and internet cloud players) as the highest transformation priority in the network technology domain.

Key priorities:

- **Cloud IT infrastructure and data center investment and partnerships:** Cloud infrastructure transformation is rightly perceived to be a key priority for a successful transformation by most segments, although it is still primarily a medium-term investment for larger operators and a longer-term one for smaller or niche players. However, as investment ramps up, service providers will need to form strategic alliances with cloud providers to boost their capabilities and address the needs of enterprise customers.

- **Building fiber backhaul and radio networks:** Backhaul is a basic that operators need to get right, but interestingly the market appears to have moved on over the past 12 months. Large international players (Segment 1), mobile-first players (Segment 4), and niche players (Segment 6) have downgraded backhaul as a priority, although it is becoming increasingly important for both large and small national players.

- **Pressing on with LTE enhancements, incorporating technology compatible with 5G:** This remains a priority for most segments. LTE will have a long life post-5G, so ongoing sustained investment will be required. Enhancements such as LTE-Advanced are needed to support services such as high-quality video streaming; low-power, wide-area (LPWA) networks are needed to provide a platform to support IoT; and Massive MIMO is needed to help increase capacity. LTE enhancements will also act as a stepping-stone to 5G.

- **Pushing fiber deeper and deeper into and throughout access networks:** This is the most immediate issue for players supporting quad-play service offerings.

- **Preparing for 5G deployment:** There will be some early commercial services available later this year from the likes of AT&T and Verizon, but most launches are further down the road. Therefore, most players view 5G as more of a longer-term priority. Only mobile-first players (Segment 4) view 5G as high priority at this stage. However, service providers should be wary of being complacent, as there is a lot of work to be done to prepare for 5G. Trials will be needed to address 5G/LTE interoperability and 5G New Radio (NSA 5G NR) and explore proofs of concept. CSPs also need to explore new distributed architectures such as Cloud-RAN and multi-access edge computing (MEC) and in the longer term prepare for network slicing.

- **Delivering on optical network upgrades, as video/cloud will demand bandwidth and flexibility:** Optical networking investment is more of an immediate short-term priority for Segment 1 players and Segment 6 players, although it is also rising in importance for large national operators and other segments. 100G and 200G adoption is the immediate focus, but focus on 400G will need to ramp up from 2018 onward, driven by the need to support data center interconnect and 5G.

- **Easingup SDN/NFV investment:** CSPs' NFV adoption strategies will continue to diverge as large players such as AT&T, Telefonica, and Vodafone seek to widen the technology maturation gap with their smaller peers.

Those well advanced with virtualising core network functionsneed to make these functions cloud-native and support micro services and multicloud environments. But smaller players should take an incremental approach, pressing on with trials and identifying well-defined areas to target, such as vCPE or vEPC. It will pay to learn lessons from cloud infrastructure transformation.

- **Investing in the Wi-Fi network if it provides a point of differentiation:** There is no need for most segments to make major investments in Wi-Fi, except where a large Wi-Fi network could be a point of differentiation (e.g. for small niche players).

Figure 5: Network technology priorities by segment

Q13: Which of the following network technology areas do you believe are the biggest priority for a successful transformation?						
	1. Players with a large home market that are also present in multiple geographies	2. Large national players with some international investments	3. Smaller national players with limited international investments	4. Mobile-first players	5. Internet cloud players	6. Smaller national, niche, and virtualized players
Cloud infrastructure	1	1	2	1	10	9
LTE/4G/LTE-Advanced/4.5G	2	6	2	4	3	5
Wi-Fi	4	1	2	8	10	3
Backhaul	9	3	1	4	3	9
2G and 3G	6	3	2	4	10	3
FTTx	2	11	2	10	1	5
Optical networking	6	3	8	10	3	1
Fixed broadband network	4	6	7	8	9	9
5G	6	6	10	1	3	5
Metro/outdoor small cells	12	6	10	1	3	1
SDN & NFV (network virtualization) implementation	10	6	8	4	3	9
Outsourcing network deployment and management	10	11	10	10	1	5

Source: Ovum

Network management transformation priorities

Network management systems – such as network optimisation and network assurance – are treated as a separate category here to ensure they get sufficient attention.

Network management is a priority domain – only marginally less important to service providers than network technology. This is due to the need to improve the customer experience (especially when it comes to video); optimise networks and services in realtime; and handle and automate increasingly complex network environments. There is already a lot of short-term activity in this space focused on areas such as network optimisation, capacity management, and network fault reporting and management, with Segment 1 players and Segment 4 players the most active in this area. Over the medium term, the focus will switch to areas such as network management and orchestration, and in the long term to areas such as predictive maintenance and harmonised service-level management. Eventually there will be the opportunity to adopt more dynamic and automated network orchestration approaches, such as intent-based networking systems (IBNS).

Key priorities:

- **Investing in network optimisation:** This is a short-term priority for pretty much all the segments, with the exception of smaller national players. This is driven by a growing telco need for flexible and scalable network optimisation services, and increasingly an end-to-end approach to network optimisation.

- **Deploying centralised SON (C-SON) to improve the performance of complex multivendor networks:** SON is a short- or medium-term priority for most service providers. After a slow start, C-SON is gaining momentum, although most service providers still mistrust advanced features and closed-loop operations.

- **Improving customer experience through network assurance modernisation:** Over the past 12 months this has moved from

a medium- to short-term priority for all segments other than the smaller players. Operators should start planning for migration to SDN-based dynamic or closed-loop assurance.

- **Moving to on-demand bandwidth allocation for capacity management, and planning for BDA integration:** This is a short-term activity for all service providers, with the exception of internet cloud players. There is a need to address the increasing customer demand to scale up and scale down network resources in line with their operational needs.

- **Modernising network fault reporting:** In most segments this is a short-term priority. Over the medium to longer term, the integration of big data and analytics tools will be required to improve network performance.

Figure 6: Network management priorities by segment

Q15: Which of the following network management systems or functions do you believe are the biggest priority for a successful transformation?	1. Players with a large home market that are also present in multiple geographies	2. Large national players with some international investments	3. Smaller national players with limited international investments	4. Mobile-first players	5. Internet cloud players	6. Smaller national, niche, and virtualized players
L2 support requirement review (managing incidents relating to SLAs)	5	2	1	1	1	6
Network optimization	5	2	5	9	4	1
Network fault reporting and management	1	10	1	4	6	6
Capacity management/bandwidth allocation	2	7	10	1	9	3
Network assurance/performance management	2	4	14	4	1	6
L3 support requirement review (break fix activities and specialist tech knowledge e.g. Windows admin)	9	4	10	3	3	12
Managing hybrid network operations (legacy and virtualized side by side, as well as migrating one to the other)	8	7	5	4	6	6
Network testing	2	14	3	9	6	6
L1 support requirement review (triage/telephone helpdesk or answer center support)	9	1	3	4	13	13
Move toward predictive maintenance	12	4	10	9	9	3
Self-optimized network (SON)	12	10	5	9	9	2
Traffic management	5	9	5	14	9	13
Moving to harmonized service level management across technology	12	10	13	9	4	3
L4 support requirement review (specific product/technical support)	9	10	5	4	13	6

Source: Ovum

OSS transformation priorities

To support CSPs' digital transformation, OSS need to fundamentally transform, so that they can deliver rapid order management and service creation/tear-down, service activation at internet speed, automated provisioning and fulfillment, and dynamic network management. They will also need to work more closely with the new management and orchestration functions required to support service delivery in a hybrid environment.

Almost all the OSS activities viewed as a priority by service providers are being targeted for short- and medium-term transformation. In all segments, service providers have an urgent need to centralise, consolidate, and integrate fragmented support systems, although large international players with multiple IT systems and suppliers have the strongest need to undertake large-scale transformation in this domain (a good example being Telefonica with its end-to-end IT transformation based on standardised systems and processes).

Key priorities:

- **Centralising data repositories to overcome silos:** This is a particularly acute short-term issue acrossall segments except for small niche players and internet content providers, as it is important to gain an enterprise-wide view of the business.

- **Deploying next-generation service assurance tools:** Service assurance is the main focus of short-term activity across all segments, although large established players view it as the highest priority, as they have the most issues with legacy systems and fragmented assurance and fulfillment processes. As SDN/NFV deployments ramp up, CSPs will need to be able to handle dynamic services delivered over physical and virtual network functions sourced from multiple vendors, with added open source components. Service assurance will require real-time capabilities, tighter integration with other elements in the stack, more reliable inventory information, analytics, and a more policy-driven approach.

- **Transforming network performance and fault management with real-time analytics:** This is a key short-term priority for most segments,
as CSPs need to automateperformance and fault management systems and make them more predictive and proactive.

- **Automating service provisioning, activation, and fulfilment to improve customer experience:** This needs to be addressed by most segments in a short time frame. Service providers actively pushing ahead with SDN/NFV implementation need systems that can support zero touch provisioning and activation. The adoption of routing analytics is one way to address this challenge.

- **Centralising the data network inventory:** This is required to support a dynamic virtual environment and future digital network complexity involving SDN/NFV, 5G, and IoT. Over the past 12 months, aunified network inventory has become a short-term priority across segments, with the exception of mobile-first players and internet cloud players. However, it has dropped off as an overall priority, suggesting that CSPs may feel they have it under control.

- **Paying serious attention to open APIs:** Service providers are still treating open APIs as a low priority. This needs to change. CSPs will also need to actively engage in standardisation and integration initiatives such as the TM Forum's Open Digital Architecture (ODA) program.

Figure 7: OSS priorities by segment

Q17: Which of the following OSS systems or functions do you believe are the biggest priority for a successful transformation?	1. Players with a large home market that are also present in multiple geographies	2. Large national players with some international investments	3. Smaller national players with limited international investments	4. Mobile-first players	5. Internet cloud players	6. Smaller national, niche, and virtualized players
Centralized data repositories	3	1	1	1	1	11
Service provisioning	1	2	1	1	8	3
Service fulfilment	1	9	4	1	5	3
Network fault reporting and management	6	6	6	4	1	1
Service assurance/performance management	3	2	8	6	1	3
End-to-end lifecycle management (i.e. service assurance and fulfilment)	6	6	1	6	8	2
Service activation	6	11	6	6	5	10
Application management	11	2	11	4	1	11
Unified network inventory	11	6	4	13	13	3
Service orchestration	3	12	12	6	5	3
Content management	9	9	8	6	8	3
Open APIs	11	2	8	6	8	11
MANO	9	12	12	6	8	3

Source: Ovum

BSS transformation priorities

BSS have a central role to play in supporting digital transformation, as they provide the key capabilities that enable better customer engagement as well as the fast creation and monetisation of services. CSPs see the inclusion of integrated billing and charging (IBC) platforms as the biggest priority for successful transformation, but they must also invest in other areas in the short to medium term, such as self-service apps and cloud-based platforms to deliver a personalised experience and simplify customer-facing operations.

Key priorities:

- **Integrating billing and charging systems:** For most segments this is a short-term priority. The introduction of digital services has added a new layer of complexity to billing and charging, as customers need to be able to purchase services and access information easily, regardless of subscription type.

- **Defining a portal management strategy:** This is also a priority area for activity across a number of segments, although less so for smaller players. It makes sense for the leading players to invest in portals early on alongside NFV or SDNs to enable on-demand service delivery. Other segments can follow later.

- **Improving self-service app functionality and capabilities:** This is now a medium-term priority for most operators, except for mobile-first operators which see self-service apps as a short-term way to increase engagement with customers.

- **Moving toward cloud for customer management:** Cloud migration for customer management has increased in importance over the past year, but players in most segments see it as a longer-term process, partly because of associated regulatory issues.

- **Launching cloud-based billing:** Most operator types see the move to cloud-based billing as a long-term project. It has dropped down the priority list over the past year as attention increasingly switches to cloud-based customer management.

- **Upgrading third-party settlement systems to support new business models (e.g. revenue share):** Critical to CSPs' digital transformation is the need to provide easy integration into third-party organisations for settlement and enhanced operations. A year ago, only the large international players appreciated the significance of this, but it has now become increasingly important for players in other segments.

- **Moving to a microservices architecture:** Microservices-based architecture provides CSPs with the foundation for continuous innovation. CSPs need to place it on their radar, as the implementation of a microservices architecture will enable the continuous delivery of large, complex applications as loosely coupled services, thus enabling shorter innovation cycles, increased agility, and reduced opex.

Figure 8: BSS priorities by segment

Q19: Which of the following BSS systems or functions do you believe are the biggest priority for a successful transformation?	1. Players with a large home market that are also present in multiple geographies	2. Large national players with some international investments	3. Smaller national players with limited international investments	4. Mobile-first players	5. Internet cloud players	6. Smaller national, niche, and virtualized players
Integrated billing and charging	1	3	4	4	5	1
Portal management strategy	5	1	7	1	7	6
Contact center management	5	3	10	1	1	6
Self-service apps strategy	8	5	4	3	1	6
Ensuring third-party settlement to support digital ecosystem	8	5	2	7	5	3
Developing single product catalog across all channels	4	2	4	7	7	6
Cloud-based customer management (integration into/replacement of existing systems)	2	5	10	4	12	3
Reviewing order management across channels	5	8	2	7	1	6
Omnichannel	11	11	1	4	1	5
Cloud-based billing	3	11	7	7	7	1
Cloud-based order management (integration into/replacement of existing systems)	8	8	10	7	7	6
Content management and optimization across channels and by device	11	8	7	7	7	12

Source: Ovum

Business process systems transformation priorities

The ultimate objective of all business process transformation is to automate as much as possible, hence the growing importance of big data, analytics, and AI. Developments in NFV/SDN will enable advanced network automation, while advances in AI and robotic process automation will expedite business process transformation.

Re-architecting existing workflows needs to be a short-term priority. Although not all the segments are doing this yet, there is finally wider recognition of its importance.

Key points:

- Moving from network-centric to CEM processes: The sense of immediacy attached to moving toward customer experience–based processes has slipped over the last year as automation has come to the fore. But there is no question of the need for a customer-centric focus.

- Increasing investment in big data analytics: Internet cloud players' business is based on analytical insights, so investment in these capabilities is critical for them. But such investment is now becoming important to other players.

- Adopting machine learning and AI: These are mainly medium- to long-term priorities for most operators. AI is still in the exploratory phase. Although successful use cases are increasing, scaling them will take time.

- Re-architecting workflows: Unlike last year, most operators have now finally realised that they need to restructure existing work flows before they can automate processes. Previously many had thought they could leap straight into automation without eliminating redundant or irrelevant tasks.

- Automating business process and improving time to resolve: This is a key short- to medium-term priority for all segments, given the impact it can have on customer perceptions of the provider's brand.

- Automating configure, price, quote (CPQ) processes: CPQ processes and their associated tools enable service provider sales and marketing teams to develop, launch, and sell new services and service bundles more quickly. Automating CPQ processes in the short to medium term is critical to reducing the length of order-to-cash pipelines.

- Automating the lead-to-cash process: This is a short-to medium-term priority for all segments, as CSPs must urgently attract and convert prospects.

- Defining service orchestration in a hybrid environment: As CSP adoption of SDN/NFV ramps up, service orchestration becomes critical. So, it is perhaps counter intuitive that players in most segments still view this as a low priority. However, this reflects the fact that operators rolling out SDN/NFV have tended to take an incremental, siloed approach.

- Moving from waterfall to agile development practices, such as DevOps: Operators also need to shift from traditional waterfall models to DevOps to support agile and continuous software development and delivery. CSPs may appreciate the importance of DevOps, but they have been slow to prioritise it because the cultural and organisational changes it requires are daunting. It is primarily the larger, more advanced players that feel equipped to take concrete steps in this area at this stage.

Figure 9: Business process system priorities by segment

Q21: Which of the following business process systems or functions do you believe are the biggest priority for a successful transformation?						
	1. Players with a large home market that are also present in multiple geographies	2. Large national players with some international investments	3. Smaller national players with limited international investments	4. Mobile-first players	5. Internet cloud players	6. Smaller national, niche, and virtualized players
Re-architecting workflow automation	3	1	4	1	3	4
Automating business process – improving time to resolve	1	5	2	3	1	5
Automating business process – configure, price, quote	3	4	1	3	5	1
Automating business process – lead-to-cash process	2	2	9	3	5	5
Big data and analytics	5	8	2	9	2	1
Moving to CEM process (E2E customer lifecycle across engineering, network operations, and marketing)	5	5	6	1	5	5
Machine learning, AI	5	2	4	9	3	11
Moving from waterfall to agile decision-making	5	8	6	3	11	5
Moving from agile to DevOps	9	5	6	7	5	5
Defining service orchestration in hybrid environment	9	11	9	7	5	1
Developing reference architecture	9	8	11	9	5	5

Source: Ovum

Business-led transformation priorities

As digital transformation projects become more common and the market matures, we are seeing a big change in business-led priorities and increasing divergence between service provider segments. Increasingly, business-led priorities are varying because operators find themselves at different stages of the transformation journey. A year ago, the over whelming focus across all segments was early-stage activities, such as developing strategy plans and outlining a clear vision for transformation. We are now seeing portfolio and business model review and people development and recruitment issues being treated as higher priorities. In particular, service providers leading the digital transformation charge, such as those in Segments 1 and 2, are finding that skills shortages are beginning to bite.

Key priorities:

- Obtainingsenior management buy-in and appointing a project lead: Although both of these tasks have diminished in importance over the last 12 months, they remain hygiene factors for digital transformation. Transformation is a multi year engagement that requires strong leadership to ensurea consistent strategy and continuous investment.

- Reviewing portfolio and business models: This has rightly increased in importance since last year and is now a priority across all segments, with the exception of internet cloud players, which in most cases already have the right models in place.

- Initiating ongoing recruitment to bring in digital skills: This has rapidly become a short-to medium-term priority across all segments, apart from internet cloud players, as CSPs seek to expand agile design, development, data science, and integration skills. Some smaller operators and mobile-only operators appear to view digital recruitment as a lower priority than the large national and international players do, but a lack of digital skills will significantly hinder their agility if they do not start recruiting soon.

- Retraining: Retraining existing employees in new skillsis fairly low on most CSPs' priority lists. But given the breadth of changes that need to take place, it is short-sighted of CSPs to overlook retraining. For example, CSP sales teams used to selling hardware need to be trained in selling software andin emphasising how NFV solutions can improve business outcomes, rather than just selling feature functions. CSPs cannot rely on recruitment alone. Some of the more far-sighted large players have already invested in online training portals and platforms and formed partnerships with business schools.

Figure 10: Business-led priorities by segment

Q23: Which of the following business-led tasks do you believe are the biggest priority for a successful transformation?	1. Players with a large home market that are also present in multiple geographies	2. Large national players with some international investments	3. Smaller national players with limited international investments	4. Mobile-first players	5. Internet cloud players	6. Smaller national, niche, and virtualized players
Reviewing portfolio and business models	5	4	2	1	10	1
Recruitment (e.g. with new digital skills)	1	2	5	10	7	3
Developing detailed strategy for network, IT, and business platform transformation	5	2	8	3	3	1
Appointing project lead (e.g. CIO, CTO, transformation program team, project management office)	2	7	5	6	2	5
Reviewing organizational and operational processes and identifying those that need to be transformed	5	11	2	2	1	7
Conducting gap analysis of in-house skills	11	4	1	3	3	7
Outlining clear vision and goals for a transformation	3	7	2	6	3	7
Obtaining senior management buy-in for a transformation project	10	1	5	6	3	7
Identifying which areas of the business to transform (vs. just grow or maintain)	3	4	8	6	7	6
Agreeing digital transformation blueprint that prioritizes key tasks	11	7	8	3	10	3
Retraining (e.g. upskilling, cross-skilling)	5	10	8	11	10	7
Identifying new ways to innovate and expand skills (e.g.venture capital, new partners, outsourcing, crowdsourcing)	5	11	8	11	7	7

Source: Ovum

About Tata Communications Transformation Services (TCTS)

Tata Communications Transformation Services (TCTS), a 100% subsidiary of Tata Communications Ltd, provides leading business transformation, managed network operations, network outsourcing and consultancy services to telecommunication companies around the world. TCTS delivers operational efficiency, cost transformation and revenue acceleration solutions for all the stages of the carrier process lifecycle including but not limited to network engineering and design, implementation and operations functions.

TCTS is a part of the USD $100+ billion Tata group. Tata group comprises of over 100 operating companies in seven business sectors. With presence in more than 100 countries across six continents it has a market capitalisation of USD $116.41 billion (as on 31st March, 2016). TCTS leverages the market expertise of Tata group's global telecom operation capabilities and globally established IT, process and consulting skills. It carries the rich traditions and business ethics of the Tata companies.

TCTS is head quartered in Mumbai, India with global offices in Europe, North America and Middle East. TCTS has two world-class India delivery centres in Pune and Chennai. These facilities operate completely independent from its parent affiliate, preserving full confidentiality in managing all customers' business processes.

For more details on TCTS and how we can help your company build, operate and transform, please contact us at **tcts.contactus@tatacommunications.com** or visit **www.tatacommunications-ts.com** To hear more from TCTS experts, join us on LinkedIn **https://www.linkedin.com/company/tata-communications-transformation-services** and follow us on Twitter **https://twitter.com/Tata_TCTSL**

About Ovum

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