Operational Support Systems (OSS) transformation

Foundational systems for telco operations

Atos

Managing the connections between customers, applications, physical, logical and virtual network infrastructure is a serious challenge. Each operator has its own legacy processes, systems, and obstacles that must be either included or eliminated to move forward with a horizontal, end-to-end approach to operations. There are numerous tools and a multitude of data sources that must be correlated, but manual processes cannot support the dynamic interoperability that operators require to cost-effectively deliver digital services.

To overcome the sheer volume of customers, services and infrastructure, operators must decompose complex operational processes into manageable system requirements. However, legacy processes and systems were never intended to meet the operational demands of emerging technologies like 5G, SD-WAN, cloud services and the Internet of Things (IoT).

As network technology evolves and transforms, so must the operational support systems (OSS) that tie those networks to consumers and businesses. At the heart of any OSS transformation strategy are new processes and integrated solutions designed to better design, deliver and support the volume and variety of services that customers demand. Existing OSS solutions were never intended or designed to manage these emerging networks. Yet, those same systems are what keeps the network running today. They cannot just be turned off.

In the always-on environment of today's network operators, any OSS transformation must be carefully executed to implement new, more capable OSS functionality without putting existing operations and data at risk. Atos adjusts its OSS transformation approach based on the needs of individual operators to manage risk and improve results.

Managing the evolution (and thereby the OSS transformation risk) can be accomplished in several ways. Atos has the tools and expertise to extract the necessary data and functionality from legacy systems without affecting daily network operations. The operator is better able to manage the speed of the evolution and maintain control over the testing and timing of changes.

In the diagram below, a "Big Bang" or "Rip and Replace" approach poses the greatest risk, while starting with a Blank Slate or siloed "Greenfield" implementation of OSS, similar to what some operators are doing for 5G, introduces significant integration risk. Starting at the Top Down and beginning transformation of specific, well-defined processes produces quick wins and enables more reliable transformation of complex operations. Starting at the Bottom Up enables an evolutionary approach that transforms legacy operations while maintaining customer transparency.

Caption Definitions:

	Big Bang (Rip and Replace)	Greenfield (Blank Slate)	Bottom Up (Controlled Evolution)	Top Down (Isolate and Update)
Pros	• Minimum project cost	• Reduced total costs (intermediate integrations are kept simple) • Allows adjusting speed of a gradual evolution	• Controlled evolution by component • Complete control over evolution • Minimum change management	• Advanced business processes available at early stages (quick-wins) • Minimum cross impact with legacy systems
Cons	• High risk • Complex Change Management	• High setup costs • Reduced chances to change the architecture after first phase	• Lack of visibility from end-users • Higher costs because of intermediate integrations	• Higher costs because of intermediate integrations
Evaluation	Only recommended for simple systems, or for delimited portions of the full functional map	Useful when target architecture is fully clear (e.g. when migrating to a corporate architecture or Best of Suite)	Recommended for "maintenance" evolution, driven by IT with low impact on business	Recommended strategy for complex evolutions, with high impact on business

Risk

Figure 1: Atos's risk-driven approach to OSS transformation

Elevating operations

Virtualization, cloud services, 5G, SD-WAN and intelligent automation solutions all have the potential to improve capacity, performance and reliability while increasing revenue and managing costs. Operators recognize that existing systems and data represent large investments and complex integrations that cannot be quickly replaced.

As new technologies are introduced, each comes with another dedicated stack of OSS solutions and data. While this may accelerate time-to-market for new services, it presents a host of OSS challenges when introduced to existing network architectures, virtual network elements, cloud software, data and operations.

Operators must balance customer demands with the need to generate sustainable revenue and manage costs. As infrastructure investments soar, bandwidth services become commoditized and margins erode, while support costs continue to rise. From product definition to fulfillment and assurance, every part of the

business requires data that can only be obtained from the network. Operators need a strategy to implement robust management and orchestration capabilities while ensuring timely and accurate interactions with business functions.

Managing complex, hybrid physical and virtual network assets involves several important system domains that must interact effectively to ensure performance, reliability, availability and security of every transaction for every customer every day. Inventory, provisioning/activation, assurance and

workforce management are foundational systems that, when reliably integrated with orchestration and management solutions, enable operators to profitably build and deliver the robust networks and complex services customers need and want.

Atos delivers OSS transformation strategies and solutions that enable operators to better utilize emerging technologies while ensuring interoperability with existing infrastructure and data. Atos OSS transformation solutions focus on six technology domains that each play a role

in the reliable transformation of complex OSS processes and solutions for today's networks.

Operators must marry the management and orchestration functionality required to deliver next generation services with existing infrastructure and OSS. Atos delivers multi-domain, multi-technology, vendor-agnostic management and orchestration strategies that enable emerging and legacy operations to coexist, while transforming OSS to deliver end-to-end support of new network technologies and strategies.

Figure 2: Atos OSS transformation solution domains

OSS transformation solution domains

Both consumers and businesses are demanding digital. Interactions with individuals and enterprises are increasingly online while applications and data reside in the cloud. Users can easily engage with apps and devices, but it's much more difficult for businesses to quickly access and use cloud-based applications and connected services. Yet, that's what businesses want.

Enabling secure, reliable online experiences for both consumers and businesses requires flexible, agile and programmable networks and OSS. There is also a need for interoperability with existing OSS/BSS applications and data. Consumers are much more forgiving of glitches and failures than businesses

that rely on network infrastructure for everything from supply chain to payroll. As operators deploy virtual network elements and software-driven services, OSS must be upgraded to manage added complexity while implementing automation and intelligence that makes operations more effective and efficient.

Operators must not only scale OSS solutions to accommodate a wide variety of customers, but also unique service instantiations of physical and virtual network and service components. As operators deploy 5G and digital network technologies to support consumers and business customers, sophisticated OSS solutions are needed to ensure performance, quality and a superior customer experience.

Implementing virtual networking and services environments, cloud infrastructure for network and service creation, OSS hosting and data, and next generation fixed and wireless infrastructure, requires transformation of each OSS domain to reduce costs and improve time-to-market for new services. Using standard, open architectures, Atos optimizes processes, incorporates automation and upgrades solutions within each domain while ensuring integration and interoperability among domains.

Management and orchestration

The nature of network operations is changing with new virtual, wireless and wireline technologies, combined with communication services now being considered essential infrastructure. While the basic requirements for OSS remain the same, the breadth of those functions has been expanded dramatically by virtualization.

Nearly 70% of operators admit that their existing OSS cannot manage hybrid networks that utilize network function virtualization (NFV)[1]. Managing containerized or virtualized network functions (xNFs) requires capabilities that existing OSS solutions were never intended to deliver.

Integrated management and orchestration is the answer for establishing services and activating customers across hybrid networks composed of physical and virtual resources. For operators to take advantage of NFV and its resultant business benefits, orchestration of xNFs must be integrated with existing OSS using an emerging collection of industry standards and interfaces (typically ETSI standards augmented by targeted industry efforts). Atos delivers management and orchestration integration and services that enable operators to take full advantage of the flexibility and cost savings of NFV. They include:

- Management and orchestration solution selection and configuration consulting

- xNF on-boarding
- xNF-xNFM integration
- Hybrid infrastructure on-boarding, configuration and management
- End-to-end service orchestration and management
- Multi-domain management and integration

Delivering 5G, IoT, SD-WAN and complex business services using NFV represents a significant revenue opportunity for operators, and Atos can ensure that effective and efficient end-to-end management and orchestration of hybrid networks is reliably and accurately integrated into your ongoing operations.

Network creation and inventory

Inventory is the single biggest challenge in network operations, and adding virtual elements and functions only makes it harder. Existing inventory solutions were not built to handle the demands and complexity of today's hybrid networks. Operators cannot optimize existing technology and bandwidth investments without a clear picture of utilization, performance and quality across all infrastructure, applications and customers.

Infrastructure consolidation and virtualization is underway for 64% of operators[2]. To configure and manage these new networks, each will require a cohesive, accurate and dynamically updated end-to-end view of the entire network that includes instantiation of new xNFs alongside changes to physical infrastructure. To engineer new services, prevent disruption and rapidly adjust to changes in performance and demand, Atos delivers accurate and reliable inventory using:

- Rationalization of multiple physical, virtual and service inventories
- Federation of legacy inventories into a common inventory platform
- Simplified inventory architecture
- Uniform processes and data aligned with current best practices

Atos network creation and inventory solutions work by federating resource and service inventory data into a unified, reliable source that supplies inventory data to OSS/BSS while capturing updated information from those same systems. Trusted inventory is also the foundation for automation. Atos ensures that physical, logical and service data is future-ready and reliable, so operators can implement automated workflows that execute maintenance, fault recovery, provisioning and activation functions without the risk of failure.

OSS integration and cloudification

Whether managing network functions that reside in the cloud or moving OSS functions into the cloud, operators are defining new approaches to building and managing networks. Cloud solutions for networking and operations require new systems strategies and architectures. More than 90% of operators have deployed some OSS functions in a combination of public, private and vendor clouds[3], yet challenges remain as virtualization accelerates and services become more complex.

Managing cloud services and virtual network functions already happens in the cloud. Most MANO solutions are cloud-based, and many operators want to move existing OSS functions to the cloud to streamline operations and reduce costs.

Unfortunately, moving existing OSS functionality and data to the cloud is extremely challenging. In addition to requiring multiple, disparate data stores, existing OSS solutions were not designed to operate from the cloud. Atos helps operators define and implement transitional strategies that deliver integrated cloud-based operations.

For Atos, delivering this transition requires:

- Depth of experience with multiple cloud strategies and providers

- Proven agile software development processes
- Extensive OSS interface libraries and experience
- Vendor-agnostic best practices

Cloud OSS offers operators the agility to implement automation to improve time-to-market for new services and rapidly configure or modify customer configurations. Atos delivers operators a multi-tenant OSS solution for business customers that can be deployed securely in the cloud, so each business is managed independently and configuration changes are executed on-demand.

Service assurance

Every network is a hybrid network. As new physical and virtual technologies are designed and deployed into the network, service assurance solutions must ensure the network delivers the expected reliability and performance. For many business services, those levels of performance are not only expected, but guaranteed. Nearly 75% of operators list integrated systems and seamless end-to-end visibility as key elements of their digital services strategy[4].

The disparate platforms that monitor and manage physical and virtual network elements and service delivery environments are generally not compatible or easily correlated into a common end-to-end view of service quality and performance. The Atos umbrella service assurance solution integrates new and existing infrastructure reporting, rationalizes alarms, correlates the root causes of problems, and determines impact of faults and failures. Configurable rules and a comprehensive interface library accelerate deployment while reducing risk.

Atos works with operators to implement an umbrella service assurance solution that delivers:

• Data collection, analysis and processing across physical, virtual and cloud environments

• Unified fault, performance and capacity management

• Technical problem and incident management integrated with technician and field force management to reduce response time

• Predictive maintenance, forecasting, planning and optimization data

Complex services require correlation and analysis of multiple assurance elements. Atos helps operators ensure bandwidth, capacity and service reliability by delivering service assurance data aggregation and visibility across physical, virtual and cloud service resources.

Service provisioning and activation

Designing, delivering and supporting virtual services, 5G, SD-WAN, cloud services and more requires the ability to rapidly provision and activate new or modified services. In addition to automating order decomposition workflows, adding intelligence to the service provisioning and activation process allows operators to understand current infrastructure and operating conditions — ensuring that activation is both timely and accurate. Over 70% of operators are aiming to implement a high degree of automation around service provisioning and activation to enable one-touch fulfillment[5].

Atos understands the interfaces required to accurately configure a wide variety of physical and virtual network elements, and what is necessary to provision services and activate customers using those services. Atos regularly augments and integrates established OSS solutions to improve performance, reduce errors and automate service provisioning and activation. In other instances, Atos utilizes its PSA Lite solution for provisioning and service activation that centrally manages, rather than directly connects, workflows and interfaces between established order capture (BSS) and activation (OSS) solutions across services and network infrastructure. Atos service provisioning and activation solutions improve performance and reliability while enabling:

• Simplicity of configuration and operation

• Improved time-to-market for new services

• Provisioning and activation accuracy that reduces rework

• Optimal utilization of existing OSS resources

• Automated integration with technician and field force management to reduce response time

Abstracting the BSS elements of order capture and catalog from the OSS elements of order decomposition, provisioning and activation helps operators reduce the complexity associated with provisioning complex services and activation of both consumer and business orders.

Workforce management

The impact of maintenance on operational expenses has never been greater. Ensuring that the right number of qualified resources are available for short-term installation and fault recovery as well as long-term construction and configuration keeps work on track while avoiding unnecessary rework and overtime expenses. Integrating workforce management (WFM) triggers into service assurance, service provisioning and activation as well as trouble ticketing and customer care reduces response times and errors. Company-wide visibility of WFM information enables effective management of enterprise-level metrics and the development of best practices across divisions and groups.

Technicians and operations personnel are digitally savvy, and expect mobile access to orders, data, drawings and GPS map support at the press of a button. Phone, tablet and laptop apps must be easy to access and manipulate while clearly presenting data suitable to each device. Atos WFM solutions deliver:

• Automated schedule and dispatch of a high volume of routine tasks

• Digital access to work orders, maps, drawings and location data

• Resource balancing based on location, skills, schedule, etc.

• Management and tracking of long term or complex projects that include many tasks and specific skills

Optimizing routes, schedules and skills makes a difference, and the savings are significant. Integration of WFM with existing OSS can improve response times while reducing errors and rework. Beyond implementing a WFM solution, it is important for operators to recognize that data the field force wants to see must be rendered in a form compatible with efficient operation on a mobile device. Integrated across multiple devices, Atos WFM solutions provide technicians, field personnel and support staff with the right information in the right format, wherever they are.

Managing OSS Transformation

Atos has successfully executed numerous OSS evolution, upgrade and integration transformation projects — each with its own unique technical complexities and business impact. In addition to managing risk as hardware, software and cloud resources are integrated into existing operations; managing OSS transformation projects requires attention to processes, procedures and organizational structure. Atos understands that OSS transformation isn't just about technology and relies on decades of experience to understand and address the business impacts of transformation. Based on this experience, Atos will address the complexities of your OSS transformation strategies and help you understand the expected outcomes and business results.

Sub-domains complexity vs. business impacts

1. Service Order Management
2. Activation & Configuration
3. Inventory
4. Asset Management
5. Work Force Management
6. Integration
7. Service Assurance (Fault/Performance Management)
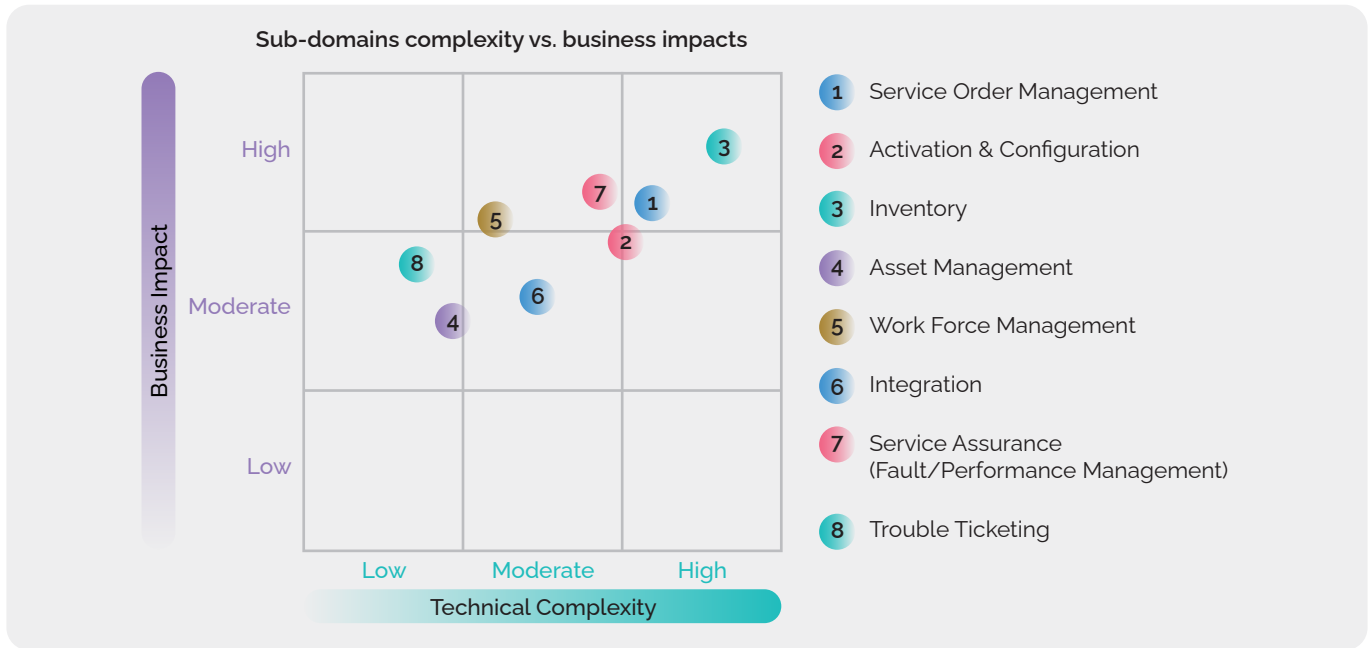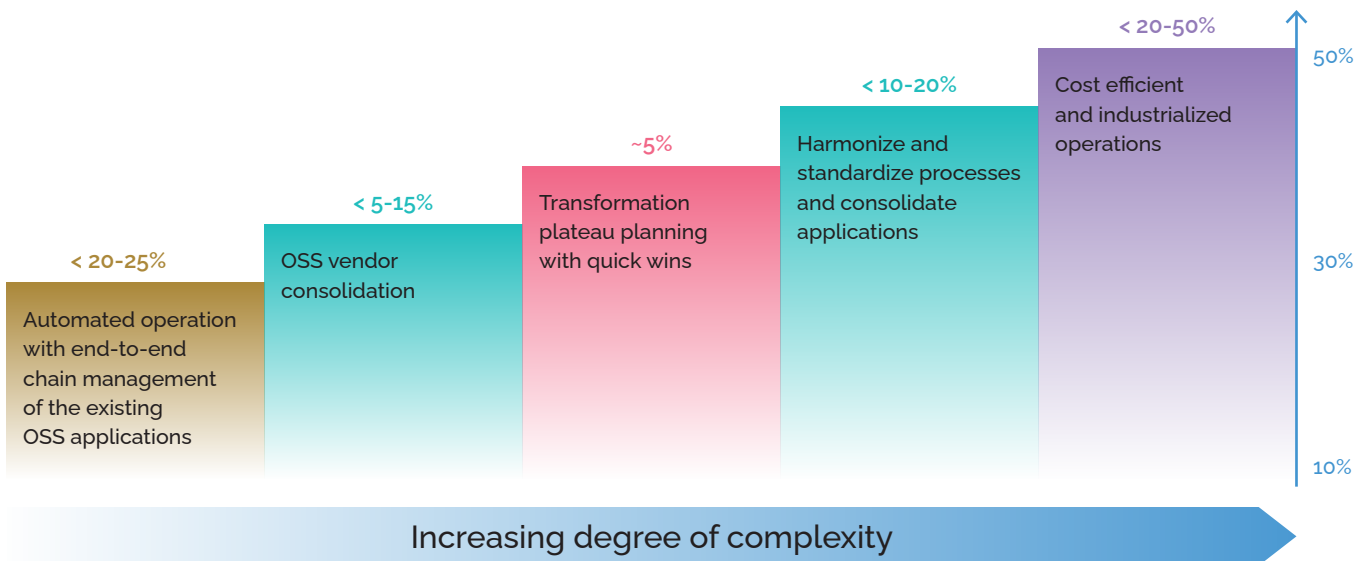8. Trouble Ticketing

Figure 3: OSS transformation projects are technically complex and have a significant business impacts

Operators are hesitant to risk ongoing operations with "big bang" OSS transformation projects, yet the ultimate goal is to completely rebuild network and service operations to accommodate new technologies and strategies.

Most operators are proceeding with an incremental approach that reduces risk while delivering functionality and business benefit improvements.

As the OSS transformation proceeds from basic automation and consolidation through cloudification and integration, the business benefits increase. Beyond

obvious software maintenance and infrastructure cost savings, operators also experience increased productivity, error reductions and improved reliability, responsiveness and customer satisfaction. As the complexity of the transformation increases, savings are realized across the business.

< 20-25%	Automated operation with end-to-end chain management of the existing OSS applications
< 5-15%	OSS vendor consolidation
~5%	Transformation plateau planning with quick wins
< 10-20%	Harmonize and standardize processes and consolidate applications
< 20-50%	Cost efficient and industrialized operations

Increasing degree of complexity

Nearly 75% of operators consider acquiring and maintaining staffing and skills to be the most important challenge[6]. Atos has a proven framework to address OSS transformation as a change program. We provide the right tools, techniques and expertise to develop a future-proof strategy and a manageable transformation approach that achieves all business and technology goals.

Atos partners with operators to design the optimal solution, and employs proven processes to achieve intermediate milestones and metrics as the solution is developed and transitioned to operations. Testing, training and governance are all critical to the success of an Atos OSS transformation program.

IT Governance

• Strategy
• Critical success factors
• Integrated governance & management
• Organization structure
• Roles and responsibilities

• Key performance indicators
• Targets (financial/non-financial)

Operational Excellence

• Proccesses (operations and control)
• Applications
• Alignment with business KPI

OSS Transformation

Technology & Infrastructures

• Physical infrastructure
• Targets architecture
• Access channels
• Asset management

People & Culture

• Working environment
• Education
• Training and coaching
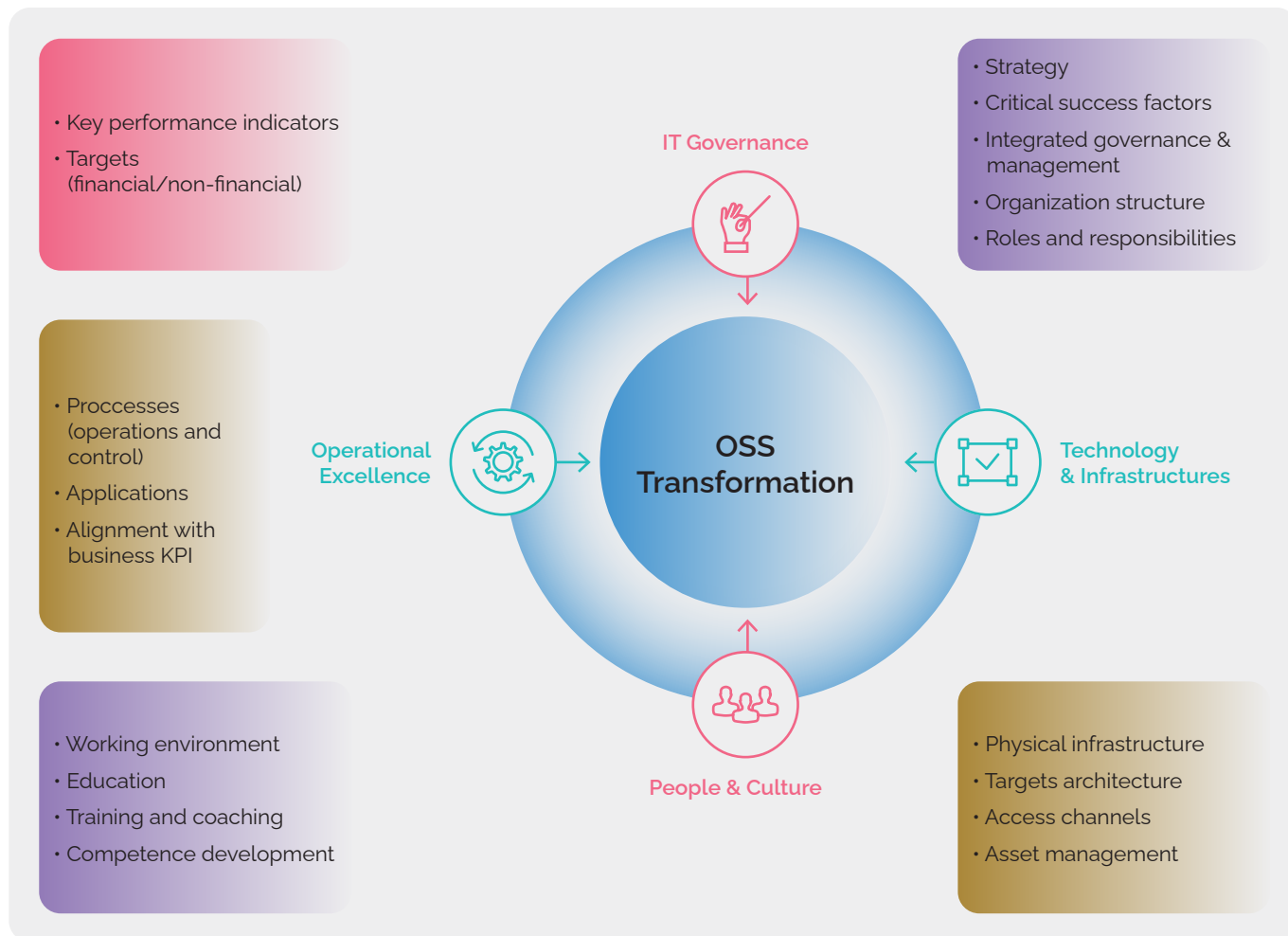• Competence development

Figure 4: Atos OSS transformation as a change program

Atos uses a systematic approach to estimating software projects, which combines established functional point analysis (FPA) methods with software non-functional analysis points (SNAP) to propose more reliable project schedules and pricing. SNAP is based on customer-defined rules, and the combined analysis results in improved level-of-effort calculations for software definition, development, testing and delivery.

There is no longer a middle ground for operators: they either provide the plumbing or the product. Atos works with each operator to refine and implement an optimized OSS transformation strategy. As a global systems integrator with decades of experience with multi-domain, multi-technology and vendor-agnostic solutions, Atos is uniquely qualified to engage and enable operators to define and deliver OSS transformation strategies that best serve operators and their customers.

[6] DSP 2020, A survey of digital transformation progress of 100 operators from around the world, ICT Intuition, LLC, 2020

About Atos

Atos is a global leader in digital transformation with 107,000 employees and annual revenue of over € 11 billion.

European number one in cybersecurity, cloud and high performance computing, the Group provides tailored end-to-end solutions for all industries in 71 countries. A pioneer in decarbonization services and products, Atos is committed to a secure and decarbonized digital for its clients. Atos is a SE (Societas Europaea), listed on Euronext Paris and included in the CAC 40 ESG and Next 20 Paris Stock indexes.

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